NAVI-SAILOR 4000/4100 ECDIS

(VERSION 2.00.009)

INSTALLATION GUIDE

© 2009 Transas Ltd. All rights reserved.

The information contained herein is proprietary to Transas Ltd. and shall not be duplicated in whole or in part. The technical details contained in this manual are the best that are available at the date of issue but are subject to change without notice.

Transas Ltd. pursues the policy of continuous development. This may lead to the product described in this manual being different from the product delivered after its publication.

The names of actual companies and products mentioned herein may be the trademarks of their respective owners.

This document contains:

Preamble	3
Warnings and Cautions	5
How to Use This Manual	7
List of Documents	7
Abbreviations in Use	8
Printing House Conventions	8
Chapter 1. Hardware Installation	9
NS 4000 MFD Hardware and Software Requirements	11
Hardware Requirements	11
Operational System Requirements	11
Workstations Installation	11
Dongle Installation	
RS6 Computer	
Transas ES6 Dedicated Keyboard with Trackball Installation	
Radar Integrator Board RIB6	
Uninterruptible Power Supply Unit UPS6	
Data Collector Unit DCU6	
Power Connection	42
RS6 Computer Discrete Signal Interface	42
WAGO I/O Modules for Conning	42
Network	
Physical Lavout	
IP Addresses	
Chanter 2 System Settings	45
Software Installation	
Pre-installation	
Installation of NS 4000	
Installation of NS 4100	
NS 4000 Configuration	
General	
Sensore Settings	
NS 4000/4100 Settings	
Workstation Settings	
Padar Settings	
Socurity Sottings for NS 4000	
Security Settings for NS 4000	90
SPOS Weather Module Adjustment	92
Novi Conning 4000 Adjustment	
Conoral	
General	101
Charte Installation and Chart Assistant Adjustment	102
	103
Chart Assistant Adjustment	105
	100
Settings III Autopilot	100
Raymeon meaning Control System NP 2025 (NP 2025 Plus)	801
Navis reading Control System AF 3000	109
Froceaure of TOS Control Setup Algorithms	۲۲۲
Alarm Station Setup	114

Activation of Transas Integrator	118
Commissioning Table Creation and System Configuration Back Up	119
Commissioning Table Creation	119
NS 4000 Configuration Back Up	120
NS 4000 Registry	122
Software Upgrade	123
Upgrade of Entire NS 4000 Product	123
Upgrade Navi-Conning 4000	127
Chapter 3. Technical Specification	131
General	133
NS 4000 Physical Layout	133
Integrating Equipment	133
NS 4000 Hardware Components	133
RS6 Dedicated Computer	133
Uninterruptible Power Supply Unit UPS6	136
Transas ES6 Dedicated Keyboard with Trackball	146
Transas Monitors	150
Radar Integrator Board RIB6	160
Data Collector Unit DCU6	163
WAGO I/O Modules	165
	474
MOXA Switch Type Approved EDS-305/308/316 Series	171
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities	171 175
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General	171 175 177
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General Format of Data Exchange Used in Accordance with IEC 61162-1 Standard	171 175 177 178
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General Format of Data Exchange Used in Accordance with IEC 61162-1 Standard Input	171 175 177 178 178
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General Format of Data Exchange Used in Accordance with IEC 61162-1 Standard Input Format of Input Data	171 175 177 178 178 179
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General Format of Data Exchange Used in Accordance with IEC 61162-1 Standard Input Format of Input Data Output	171 175 177 178 178 179 187
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General Format of Data Exchange Used in Accordance with IEC 61162-1 Standard Input Format of Input Data Output Format of Output Data	171 175 177 178 178 179 187 188
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General Format of Data Exchange Used in Accordance with IEC 61162-1 Standard Input Format of Input Data Output Format of Output Data Universal AIS Transponder Interface	171 175 177 178 178 179 187 188 193
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General Format of Data Exchange Used in Accordance with IEC 61162-1 Standard Input Format of Input Data Output Format of Output Data Universal AIS Transponder Interface Description of Universal AIS Transponder Interface	171 175 177 178 178 179 187 188 193 193
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General Format of Data Exchange Used in Accordance with IEC 61162-1 Standard Input Format of Input Data Output Format of Output Data Universal AIS Transponder Interface Description of Universal AIS Transponder Interface NAVTEX Sensor Data Exchange Format	171 175 177 178 178 179 187 188 193 193 215
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General Format of Data Exchange Used in Accordance with IEC 61162-1 Standard Input Format of Input Data Output Format of Output Data Universal AIS Transponder Interface Description of Universal AIS Transponder Interface NAVTEX Sensor Data Exchange Format NMEA Format	171 175 177 178 178 179 187 188 193 193 215 215
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General Format of Data Exchange Used in Accordance with IEC 61162-1 Standard Input Format of Input Data Output Format of Output Data Universal AIS Transponder Interface Description of Universal AIS Transponder Interface NAVTEX Sensor Data Exchange Format NMEA Format ASCII Format	171 175 177 178 178 179 187 188 193 215 215 216
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General Format of Data Exchange Used in Accordance with IEC 61162-1 Standard Input Format of Input Data Output Format of Output Data Universal AIS Transponder Interface Description of Universal AIS Transponder Interface NAVTEX Sensor Data Exchange Format NMEA Format Description of the NS 4000 and Rhotheta RT-202 RDF Interface	171 175 177 178 178 179 187 183 193 215 215 215 217
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General Format of Data Exchange Used in Accordance with IEC 61162-1 Standard Input Format of Input Data Output Format of Output Data Universal AIS Transponder Interface Description of Universal AIS Transponder Interface NAVTEX Sensor Data Exchange Format NMEA Format ASCII Format Description of the NS 4000 and Rhotheta RT-202 RDF Interface	171 175 177 178 178 179 187 183 193 215 215 216 217 219
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General Format of Data Exchange Used in Accordance with IEC 61162-1 Standard Input Format of Input Data Output Format of Output Data Universal AIS Transponder Interface Description of Universal AIS Transponder Interface NAVTEX Sensor Data Exchange Format NMEA Format ASCII Format Description of the NS 4000 and Rhotheta RT-202 RDF Interface Annex A Annex B	171 175 177 178 178 178 179 187 183 193 215 215 216 217 219 253
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General Format of Data Exchange Used in Accordance with IEC 61162-1 Standard Input Format of Input Data Output Format of Output Data Universal AIS Transponder Interface Description of Universal AIS Transponder Interface NAVTEX Sensor Data Exchange Format NMEA Format ASCII Format Description of the NS 4000 and Rhotheta RT-202 RDF Interface Annex A. Annex B. Annex C.	171 175 177 178 178 179 187 183 193 215 215 215 216 217 219 253 295
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General Format of Data Exchange Used in Accordance with IEC 61162-1 Standard Input Format of Input Data Output Format of Output Data Universal AIS Transponder Interface Description of Universal AIS Transponder Interface NAVTEX Sensor Data Exchange Format NMEA Format ASCII Format. Description of the NS 4000 and Rhotheta RT-202 RDF Interface Annex A Annex B Annex D	171 175 177 178 178 179 187 183 193 215 215 215 216 217 219 253 295 305
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General Format of Data Exchange Used in Accordance with IEC 61162-1 Standard Input Format of Input Data Output Format of Output Data Universal AIS Transponder Interface Description of Universal AIS Transponder Interface NAVTEX Sensor Data Exchange Format NMEA Format ASCII Format Description of the NS 4000 and Rhotheta RT-202 RDF Interface Annex A Annex B Annex C Annex E	171 175 177 178 178 179 187 183 193 193 215 215 215 216 217 219 253 305 311
MOXA Switch Type Approved EDS-305/308/316 Series Chapter 4. Interface Capabilities General Format of Data Exchange Used in Accordance with IEC 61162-1 Standard Input Format of Input Data Output Format of Output Data Universal AIS Transponder Interface Description of Universal AIS Transponder Interface NAVTEX Sensor Data Exchange Format NMEA Format ASCII Format Description of the NS 4000 and Rhotheta RT-202 RDF Interface Annex A Annex B Annex C Annex F	171 175 177 178 178 179 187 183 193 193 215 215 215 215 217 219 253 305 311 315

PREAMBLE

WARNINGS AND CAUTIONS

Service engineers intend this document for use only, providing installation or service for Transas Ltd. navigation systems, and holding Transas Ltd. Certificates for aforementioned works.

WARNING!

Lethal Voltage Hazard!

Inside the equipment and in the cables lethal voltage hazard is present. When access covers are removed, lethal voltages may be exposed. Some capacitors used in the equipment, take several minutes to discharge their stored voltages after the switching OFF, this is a lethal voltage hazard. Always set the supply switch-fuse to OFF and remove the fuses, before removing the access covers of the equipment.

Cables must be connected to the power supplies only provided with grounding.

Cables must not have damaged insulation and must exclude contact with parts conducting current.

WARNING! -

Health Hazard!

When cleaning the inside of the equipment, take care not to inhale dust. The dust is a temporary health hazard, depending on individual allergies.

Units radiate heat and must be installed in such way that free air circulation is ensured.

It is necessary to strictly follow the requirements set forth in the operation manuals for computers and system's peripheral devices.

- CAUTION!

Electrostatic Sensitive Devices (ESSDs)!

The equipment may contain ESSDs. Take care not to damage these devices by discharge of electrostatic voltages.

The guarantee will not apply if the system has been used improperly, i.e. the system is found to have been operated in a manner other than that set out in the user manuals, or if the system has been connected or adjusted in ways other than described and recommended in technical and/or installation manuals.

Users shall pay special attention to the following, to avoid damaging the system and voiding the guarantee. Users shall not:

- Expose the system to any liquids, including but not limited to tea, coffee, juices, soft drinks or chemical cleaners;
- Expose the system to fire, or to temperatures that exceed the normal operating conditions specified for the system;
- Expose the system to improper or insufficient ventilation by obstructing ventilation holes, fans etc, or by mounting the equipment in such a way that proper ventilation cannot be achieved;

- Expose the system to incorrect line voltages, voltage spikes, or use incorrect fuses;
- Replace whole or part of the system or components of the system with parts not specified, approved or certified by Transas or its sub manufacturers, without prior Transas written approval;
- Expose the system to violent movements, excessive vibration or any situation where physical damage results;
- Connect any type of storage device or data media that contains a virus or other malware that can damage the system. It is the customer's obligation to check prior to connection that any such device or media does not contains any virus or malware;
- Install any applications or software on the system besides what has been supplied by Transas, without prior written approval from Transas.

HOW TO USE THIS MANUAL

This manual is intended for use by the NS 4000 ECDIS Operator or Service Engineers. It should be used in conjunction with other related documents (for the full list). The structure of this manual and layout of the pages can help you to find the information that need.

Chapter 1	Hardware Installation.
Chapter 2	System Settings.
Chapter 3	Technical Specification.
Chapter 4	Interface Capabilities.
Annex A	Cisco PIX-501-BUN-K9 Firewall Installation and Adjustment
Annex B	Additional Settings for Navi-Conning 4000.
Annex C	Commissioning Table.
Annex D	Additional Information on Sensors Connection.
Annex E	Upgrade RS3 and RS4 to RS6 Computer.
Annex F	RS4v2 Computer Based Hardware.
Annex G	Diagrams.

LIST OF DOCUMENTS

Navi-Sailor 4000/4100 ECDIS (v. 2.00.009). User Manual. Navi-Sailor 4000/4100 ECDIS (v. 2.00.009). Functional Description. Navi-Sailor 4000/4100 ECDIS (v. 2.00.009). Additional Functions. Navi-Sailor 4000/4100 ECDIS (v. 2.00.009). Quick Reference. Navi-Sailor 4000/4100 ECDIS (v. 2.00.009). Installation Guide. Navi-Sailor 4000/4100 ECDIS (v. 2.00.009). Utilities. Navi-Sailor 4100 ECDIS (v. 2.00.009). Special Functions.

ABBREVIATIONS IN USE

- AIS Automated Identification System;
- ARPA Automatic Radar Plotting Aids;
- COG Course Over Ground;
- CPA Closest Point of Approach;
- ECDIS Electronic Chart Display Information System;
- ENC Electronic Navigational Chart;
- GPS Global Positioning System;
- HDG Heading;
- IEC International Electrotechnical Commission;
- IHO International Hydrographic Organization;
- IMO International Maritime Organization;
- MFD Multi Functional Display;
- NAVTEX Navigational Telex;
- NS Navi-Sailor;
- OS Operating System;
- RAM Random Access Memory;
- SOG Speed Over Ground;
- UPS Uninterruptible Power Supply;
- UTC Universal Time Coordinated;
- WP Waypoint;
- WS Workstation;
- XTD Cross Track Distance.

PRINTING HOUSE CONVENTIONS

Sample of notation	Usage comments
NAVI-SAILOR 4000/4100 ECDIS (v. 2.00.009). Functional Description	To highlight names of documents
Chapter 3	To highlight sections of a document
ECDIS	To highlight, in a printed document, user interface elements and the ECDIS task objects
Setup.exe	To highlight messages, commands, files, and other Windows OS information
<enter></enter>	To highlight names of keyboard keys
"Tasks"	To highlight names of windows, pages, buttons, etc.
Start	To highlight menu items
C:\SPOSROUTE	To highlight a path to the menu, file, etc.

CHAPTER 1

Hardware Installation

NS 4000 MFD HARDWARE AND SOFTWARE REQUIREMENTS

- ATTENTION!

The use of this computer for other purposes is discouraged. Other programs loaded in RAM may adversely affect the video plotter's operation.

Hardware Requirements

- PC RS6 Computer (see paragraph RS6 Dedicated Computer of the Chapter 3):
 - CPU:

CPU1 Intel® Core™2 CPU T7400 2.16 GHz; CPU2 Intel® Core™2 CPU T7400 2.16 GHz.

- RAM: 1 x DDR2 SO-DIMM 2 Gb;
- Video: NVIDIA GeForce 9600M GT (512 MB);
- Storage: Fujitsu MHV2080BH 80GB G2;
- Devices with removable storage: Optiarc CD-RW CRX880A.
- Monitors (see paragraph Transas Monitors of the Chapter 3): Jakob Hatteland LCD Maritime Multi Displays (MMD);
- Keyboards (see paragraph Transas Dedicated Keyboards of the Chapter 3): ES6/ES3/ES4 Dedicated Keyboards with Trackballs;
- Uninterruptible Power Supply Unit (see paragraph Uninterruptible Power Supply Unit UPS6 of the Chapter 3): UPS6.

Operational System Requirements

Operational System – Windows XP Professional English version Service Pack 2 + DirX 9.0.

WORKSTATIONS INSTALLATION

The NS 4000 ECDIS MFD Workstation consists of the following elements:

- RS6 Computer;
- TFT Monitor;
- ES6 Keyboard with Trackball;
- Radar Integrator Board RIB6;
- Connection Board X1 (optional);
- Uninterrupted Power Supply UPS6 (optional);
- Data Collector Unit DCU6 (optional);
- Ethernet Switches Moxa EDS-305/308/316 series (optional);
- WAGO Modules for Navi-Conning (optional).

Dongle Installation

After the computer has been mounted securely in its place, connect the dongle to the computer's printer port, as marked "DONGLE" (see picture below). The dongle should be connected to the printer port of a personal or industrial computer before the software installation.



Fig. 1. RS6 LPT port for the dongle

The NS 4000 ECDIS MFD System will not operate unless the dongle is connected to the computer. Description of the dongle is presented in **Chapter 3** of this document.

RS6 Computer

The basic component of Workstation is the RS6 Computer.

Specification of RS6 Computer is presented in Chapter 3 of this document.

Layout of RS6 Computer connectors for Workstation is described in drawings "RS6 Computer. Connectors layout" enclosed in **Annex G** of this document.

Transas ES6 Dedicated Keyboard with Trackball Installation

Specification of ES6 keyboard with trackball is presented in **Chapter 3** of this document.

For connection ES6 keyboard with trackball to RS6 computer see diagrams enclosed in **Annex G** of this document.

ES6 Keyboard Configuration Switch

ES6 keyboard connected to computer can work in following master modes: ES6 or ES3. For position of the Configuration switch and connections to the RS6 computer in the different master modes see table below:

Table 1.	ES6 keyboard	master modes
----------	--------------	--------------

Master modes	Configuration switch position	Connection to the computer
ES6 keyboard	8	USB
ES3 keyboard	0	PS/2 keyboard PS/2 mouse Com port RS232

Configuration switch settings 1–7 designates CAN network node addresses when keyboard is used as an ES6 slave (secondary) keyboard.

ES6 Keyboard Connections

CAN

Termination resistor is selectable by jumper. Both ends of the CAN network must be terminated with 120 ohm resistor.

Node number is selectable 0-7 by jumpers (Configuration switch).

Node number 0 is considered master node, and must be selected for the keyboard connected to PC by PS/2 or USB. This must be true even if only one node exists.

Information received by the master from the PC is sent out on the CAN-bus, and slave units will act accordingly (indicators on/off etc.). Information received by the master from the CAN-bus will be transferred to the PC if there is no risk for misinterpretation (e.g. if any key is down, no keys on other keyboards may be sent to PC).

Units with node numbers 1–7 are considered peripheral (slave) units.

Data from the keyboard and PS/2 device port is transferred to the CAN-bus. Data from the CAN-bus (regarding indicators, background light etc.) is received and action is taken.



Fig. 2. ES6 keyboard. View of 24 VDC and CAN connectors

RS232

Data from the PC received by the master will be transferred to the CAN-bus and also handled locally.

Data regarding function keys and encoders will be sent to the CAN-bus by slaves and to the RS232 port by the master.

PS/2 Device Ports

The keyboard may connect to an external pointing device (e.g. trackball or joystick) by a PS/2 port.

Data received on this port will be transferred to the PS/2 mouse port connected to the PC if node number 0 is set or to the CAN-bus if node number 1–7 is set. If node number 0 is set but no PC is connected to the PS/2 mouse port, data will be transferred via the USB port if PC connection is established.

USB

Pointer data from CAN-bus and PS/2 device port will be transferred to USB port if node number 0 is set and no PC is connected to PS/2 mouse port.

Keyboard data from CAN-bus and keyboard matrix will be transferred to USB port if node number 0 is set and no PC is connected to PS/2 keyboard port.



Fig. 3. ES6 keyboard. View of USB, PS/2 and RS232 connectors



Fig. 4. ES6 keyboard. View of Configuration switch

Trackball Connections

The ES6 Trackball can be connected using the CAN Interface to a CAN master (the ES6 keyboard) or using the USB Interface to connect to a computer's USB Host.

Switch 4 on the DIP-Switch is used to set CAN (switch OFF) or USB (switch ON) interface active. Switch 1–3 set CAN node address (must be in range 1–7).

USB uses a USB-B contact to connect to the USB Host and CAN uses a 4-pin Phoenix contact for CAN-Bus IN (supplied 5 VDC) and a 3-pin Phoenix contact for CAN-Bus OUT.

It is possible to supply power by USB port even if CAN interface is selected.

Both ends of the CAN network must be terminated with 120 ohm resistor.



Fig. 5. ES6 Trackball. View of CAN, USB connectors and DIP-Switch

Radar Integrator Board RIB6

Specification of RIB6 is presented in Chapter 3 of this document.

- ATTENTION!

Check that technical characteristics of the connected equipment match characteristics of the RIB6 Input/Output signals specified in **Chapter 3**, section **Hardware Technical Specification**, paragraph **Radar Integrator Board (RIB6)**, item **Electrical Characteristics**.

Cables

Cables are run and installed in accordance with the cabling schedules.

RIB6 is connected with the Ethernet ports of RS6 Computer by means of a standard category 5 screened cables used in Ethernet 10/100/1000 Mbit networks. The cable contains 4 twisted pairs within the common screen and has RJ-45 connectors on both ends. Connection of cable cores with the connector contacts is identical on both sides.

External lines of Video and Trigger signals to the RIB6 are connected by means of coaxial cables with BNC connector plug.

External lines of Bearing, Heading, RS 422 Control signals to the RIB6 are connected by means of screw connectors. Any types of cables with a wire cross section of up to 1.5 mm² can be used. In case of considerable length of external cables, a screened cable is recommended.

Connections

For connection of RIB6 to some radar types see diagrams "Connection of RIB6 to Some Radar Types. Connection Diagrams" enclosed in **Annex G** of this document.

- 24 V nominal supply voltage: use connector X11 (pin 1 is minus, pin 2 is plus, see);
- Ethernet port 1:
 - Use connector X4 (IP: 10.8.1.209, Netmask: 255.255.255.0, Gateway: 10.8.1.240);
 - This port can be used after Linux has booted. It will send out video data and can receive a TCP connection on port 4172 (Max 1 connection globally for RIB6).

- Ethernet port 2:
 - Use connector X5 (IP: 10.8.2.209, Netmask: 255.255.255.0, Gateway: 10.8.2.240);
 - This port must be used for firmware upgrades. (It is possible to use Port 1, but a few extra commands are needed);
 - This port can be used after Linux has booted. It will send out video data and can receive a TCP connection on port 4172 (Max 1 connection globally for RIB6).
- Video:
 - Connect to J3;
 - Termination can be selected using "SW5". The following combinations are possible:

50 Ohm	1: ON	2: OFF	3: OFF	4: OFF;
75 Ohm	1: OFF	2: ON	3: OFF	4: OFF;
1,2 kOhm	1: OFF	2: OFF	3: ON	4: OFF.

- Trigger pulse:
 - Connect to J2;
 - Termination can be selected using "SW2". The following combinations are possible:

50 Ohm	1: OFF	2: ON	3: OFF	4: OFF;
75 Ohm	1: OFF	2: OFF	3: ON	4: OFF;
1,2 kOhm	1: OFF	2: OFF	3: OFF	4: ON.

- Bearing pulse:
 - Connect to X9;
 - Termination can be selected using "SW3". The following combinations are possible:

560 Ohm pull-up	1: ON	2: OFF	3: OFF	4: OFF;
1,2 kOhm	1: OFF	2: ON	3: OFF	4: OFF;
Composite mode	1: OFF	2: OFF	3: OFF	4: ON.

- Heading pulse:
 - Connect to X9;
 - Termination can be selected using "SW4". The following combinations are possible:

560 Ohm pull-up	1: ON	2: OFF	3: OFF	4: OFF;
1,2 kOhm	1: OFF	2: ON	3: OFF	4: OFF;
Composite mode	1: OFF	2: OFF	3: OFF	4: ON.



RS 422 control signal: connect to X10;

Fig. 6. RIB6. Layout drawing

Signal Input Resistor Selector

General Recommendation

High resistor (1,2 kOhm) for Video and Trigger pulse is used in case of original transceiver signal distributing between Radar Display and RIB6.

Low resistor (50 Ohm) for Video and Trigger pulse is used in case of direct transceiver signal connection to RIB6.

If the video signal is too weak for the normal work of the RIB6, it is required to increase the input resistance, with small deterioration of the picture's quality.

SW2-SW5 switches are shown in the figure below. Examples of switches positions for different radars are shown in table below:

Table 2. Status SW2- SW5 switch for different type of radar

Type of Radar	Signal switch	Input	1	2	3	4
Racal-Decca	Video	1,2 kOhm	OFF	OFF	ON	OFF
Bridgemaster	Trigger Pulse	1,2 kOhm	OFF	OFF	OFF	ON
Series	Bearing Pulse	1,2 kOhm	OFF	ON	OFF	OFF
	Heading Pulse	1,2 kOhm	OFF	ON	OFF	OFF

Type of Radar	Signal switch	Input	1	2	3	4
Atlas 8600	Video	1,2 kOhm	OFF	OFF	ON	OFF
	Trigger Pulse	1,2 kOhm	OFF	OFF	OFF	ON
	Bearing Pulse	1,2 kOhm	OFF	ON	OFF	OFF
	Heading Pulse	1,2 kOhm	OFF	ON	OFF	OFF
Nucleus 6000	Video	1,2 kOhm	OFF	OFF	ON	OFF
	Trigger Pulse	1,2 kOhm	OFF	OFF	OFF	ON
	Bearing Pulse	1,2 kOhm	OFF	ON	OFF	OFF
	Heading Pulse	1,2 kOhm	OFF	ON	OFF	OFF
Atlas 9600	Video	1,2 kOhm	OFF	OFF	ON	OFF
	Trigger Pulse	Not connected	OFF	OFF	OFF	ON
	Bearing Pulse	Not connected	OFF	OFF	OFF	ON
	Heading Pulse	Not connected	OFF	OFF	OFF	ON
		Composite mode				
Raytheon	Video	1,2 kOhm	OFF	OFF	ON	OFF
Pathfinder	Trigger Pulse	Not connected	OFF	OFF	OFF	ON
	Bearing Pulse	Not connected Composite mode	OFF	OFF	OFF	ON
	Heading Pulse	Not connected Composite mode	OFF	OFF	OFF	ON
JRC JMA 9000	Video	50 Ohm	ON	OFF	OFF	OFF
Series	Trigger Pulse	50 Ohm	OFF	ON	OFF	OFF
	Bearing Pulse	560 Ohm pull-up	ON	OFF	OFF	OFF
	Heading Pulse	560 Ohm pull-up	ON	OFF	OFF	OFF
JRC JMA 5300	Video	50 Ohm	ON	OFF	OFF	OFF
Series	Trigger Pulse	50 Ohm	OFF	ON	OFF	OFF
	Bearing Pulse	560 Ohm pull-up	ON	OFF	OFF	OFF
	Heading Pulse	560 Ohm pull-up	ON	OFF	OFF	OFF
Sperry Rascar	Video	50 Ohm	ON	OFF	OFF	OFF
	Trigger Pulse	50 Ohm	OFF	ON	OFF	OFF
	Bearing Pulse	560 Ohm pull-up	ON	OFF	OFF	OFF
	Heading Pulse	560 Ohm pull-up	ON	OFF	OFF	OFF
Furuno FR 21XX,	Video	50 Ohm	ON	OFF	OFF	OFF
FR 28XX Series,	Trigger Pulse	50 Ohm	OFF	ON	OFF	OFF
Series	Bearing Pulse	1,2 kOhm	OFF	ON	OFF	OFF
	Heading Pulse	1,2 kOhm	OFF	ON	OFF	OFF
Bridge Master E	Video	1,2 kOhm	OFF	OFF	ON	OFF
Series	Trigger Pulse	50 Ohm	OFF	ON	OFF	OFF
	Bearing Pulse	1,2 kOhm	OFF	ON	OFF	OFF
	Heading Pulse	1,2 kOhm	OFF	ON	OFF	OFF



Fig. 7. RIB6. Resistor selectors

Checking and Settings RIB6 IP Addresses

Checking RIB IP Addresses

In the event of absence of the connection between PC and RIB6 check values RIB6 IP addresses. For this connect RS232 port of PC to RS232 service COM of RIB6.

1. Start terminal emulation program (i.e. "Hyper Terminal") and enter name for example "RIB6":

Connection Description	<u>? ×</u>
New Connection	
Enter a name and choose an icon for the connect	ion:
Name:	
RIB6	
loon	
8 😪 🗠 🖳 🛞 [
	Ď
	-
OK	Cancel
	Caricer

2. Select port number of PC:

Connect To			<u>? ×</u>
RIB6			
Enter details for	the phone n	umber that ye	ou want to dial:
Country/region:	United Stat	es (1)	*
Ar <u>e</u> a code:	11		
Phone number:			
Connect using:	COM1		•
			1
	12	UK	Cancel

3. Configure the terminal for 115200 baud, 8 data bits, no parity, 1 stop bit, none flow control. Press "Apply" and "OK" buttons:

11 Properties		
Bits per second:	115200	T
<u>D</u> ata bits:	8	•
<u>P</u> arity:	None	•
<u>S</u> top bits:	1	•
Elow control:	None	•
		<u>R</u> estore Defaults
	K Ca	ncel App

4. Restart RIB6 by means of small button Reset on RIB6 panel:

🍓 RIB6 - HyperTern	ninal								_ 🗆 🗵
<u>E</u> ile <u>E</u> dit <u>V</u> iew <u>⊂</u> all	<u>T</u> ransfer <u>H</u> elp								
02 3 -	079 🖻								
Connected 0:00:04	Auto detect	Auto detect	SCROLL	CAPS	NUM	Capture	Print echo		li.

5. When the words "Hit any key to stop autoboot" appear, press any key.

If the loading continues, perform the restart by using the Reset button.

🗞 RIB6 - HyperTerminal	- O X
Ele Edit View Call Iransfer Help	
Coherent System Bus: 100 MHz	
Core: 333 MHz	
QE: 200 MHz	
BRG:100 MHz	
Local Bus Controller: 133 MHz	
Local Bus: 66 MHz	
1201: 133 MIL	
Board: Freescale MPC8323ERDB	
T2C: readu	
DDR RAM: 64 MB	
FLASH: 16 MB	
PCI clock is 66MHz	
IIn: serial	
Uut: serial	
Err: Serial	
NET: UEC: PHY IS Generic MII (2430080)	
Hit any key to stop autoboot: 0	
=>	
<u> -</u>	,
Connected 0:01:14 Auto detect 115200 8-N-1 SCROLL CAPS NUM Capture Print echo	

6. For printing configuration type "printenv" and press <Enter> button:

RIB6 - HyperTerminal	-OX
Ele Edit View Çall İransfer Help	
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	
Connected 0:03:15 Auto detect 115200 8-N-1 SCROLL CAPS NUM Capture Print echo	1.

7. Check IP and Netmask values for LAN1 and LAN2 in correspondence to values given below:

RIB6 - HyperTerminal
Ele Edit View Cal Transfer Help 미년의 중에 있는 =미년의 문화
ff; cp.b \$loadaddr \$fdtaddr \$filesize; cmp.b \$loadaddr \$fdtaddr \$filesize flashkernel=tftpboot \$loadaddr \$tftp_path/uImage; cp.b \$loadaddr \$kernaddr \$file size; cmp.b \$loadaddr \$kernaddr \$filesize flashroot=tftpboot \$loadaddr \$ramdiskaddr \$filesize fwupgrade=run eraseandfdt; run flashkernel; run flashroot; imls flashuboot=tftpboot \$loadaddr \$tftp_path/u-boot.bin; protect off fe000000 fe07ff ff; erase fe000000 fe07fff; cp.b \$loadaddr fe000000 \$filesize message=Programming done! - Please set MAC and IP addresses before pressing rese t flashinit=saveenv; run fwupgrade; echo \$message srvcheck=ping 10.8.2.4 lan1mac=00:04:9f:ef:03:01 lan2mac=00:04:9f:ef:03:02 lan1ip=10.8.1.210 lan1mask=255.255.05 stdin=serial stdout=serial stderr=serial Environment size: 2648/8188 bytes =>
ionnected 0:03:42 Auto detect 115200 8-N-1 SCROLL CAPS MUM Capture Print echo

For the first type RIB6 values must be following:

- Lan1ip Address: 10.8.1.209;
- Lan1Mask: 255.255.255.0;
- Lan2ip Address: 10.8.2.209;
- Lan2Mask: 255.255.255.0.

For the second type RIB6 values must be following:

- Lan1ip Address: 10.8.1.210;
- Lan1Mask: 255.255.255.0;
- Lan2ip Address: 10.8.2.210;
- Lan2Mask: 255.255.255.0.

Setting RIB6 IP Addresses

- 1. Set the IP addresses by using the following commands (press <Enter> button after entering each command):
 - Setenv lan1ip <value>;
 - Setenv lan1mask <value>;
 - Setenv lan2ip <value>;
 - Setenv lan2mask <value>;
 - Saveenv.

RIB6 - Hyper Terminal	×
Lie For New Can Turuster Heb	
	-
<pre>mdiskaddr \$filesize, cmp.b \$loadaddr \$ramdiskaddr \$filesize fwupgrade=run eraseandfdt; run flashkernel; run flashroot; imls flashuboot=tftpboot \$loadaddr \$tftp_path/u-boot.bin; protect off fe000000 fe07ff ff; erase fe000000 fe07fff; cp.b \$loadaddr fe000000 \$filesize message=Programming done! - Please set MAC and IP addresses before pressing rese t</pre>	
flashinit=saveenv; run fwupgrade; echo \$message	
srvcheck=ping 10.8.2.4 lan1mac=00:04:9f:ef:03:01 lan2mac=00:04:9f:ef:03:02 lan1ip=10.8.1.210 lan1mask=255.255.0 lan2ip=10.8.2.210 lan2mask=255.255.0 stdip=sopial	
stdurtserial	
stderr=serial	
Environment size: 2648/8188 bytes => setenv lanlip 10.8.1.209 => setenv lan1mask 255.255.0 => setenv lan2ip 10.8.2.209 => setenv lan2mask 255.255.0 => saveenv_	
Connected 0:08:03 Auto detect 115200 8-N-1 SCROLL CAPS NUM Capture Print echo	- 11

2. Wait until new data is recorded.

RIB6 - HyperTerminal	
ile Edit View Call Iransfer Help	
	1
lan1mac-00:04:9f:ef:03:01	
lan2mac=00:04:9f:ef:03:02	
lan1ip=10.8.1.210	
lan1mask=255.255.255.0	
lan2ip=10.8.2.210	
1an2mask=255.255.0	
stdin=serial	
stdout=serial	
stderr=ser1al	
Environment cize: 26/9/0100 hutes	
= sotopu laplip 10.8 1 200	
= setenv lanip 10.0.1.20	
\Rightarrow setenu lan2in 10 8 2 209	
=> seteny lan2mask 255 255 255 0	
=> saveenv	
Saving Environment to Flash	
Un-Protected 2 sectors	
Erasing Flash	
done	
Erased 2 sectors	
Writing to Flash done	
Protected 2 sectors	
=>	
nnected 0:08:26 Auto detect 115200 8-N-1 SCROLL CAPS NUM Capture Print ec	ho

3. Then switch off/on RIB6 power and check preservation of all settings.

Uninterruptible Power Supply Unit UPS6

UPS6 installation consists of installation following units:

- EMC Filter ME-MAX/NEF/QUINT20A;
- Primary-Switched Power Supply Unit QUINT-PS/1AC/24DC/20;
- Uninterruptible Power Supply Unit for Universal Use QUINT-DC-UPS/24DC/20;
- Battery Module 24 V DC, 3.4 Ah QUINT-BAT/24DC/3.4AH (7.2 or 12 AH).



Fig. 8. View of UPS6

Technical specification of UPS6 is given in Chapter 3.

For connection of the units see also connection diagram enclosed in Annex G.

Installation of the Primary-Switched Power Supply Unit QUINT-PS/1AC/24DC/20



Fig. 9. Structure

Table 3	Table 3. Structure					
No.	Comments					
1	AC input: 85264 V AC input voltage, 4565 Hz frequency					
2	DC output: 24 V DC output voltage (default), can be set between 18 and 29.5 V DC					
3	Active POWER BOOST switching output					
4	DC OK output active					
5	DC OK output floating					
6	Potentiometer (covered) 18V DC29.5 V DC					
7	"DC OK" LED					
8	"BOOST" LED					
9	Universal DIN rail adapter UTA 107/30					

WARNING!

The device contains dangerous live elements and high levels of stored energy. Never carry out work when the power is turned.

The housing temperature can reach high values depending on the ambient temperature and the load of the device.

In order to guarantee sufficient convection, we recommend observing the following minimum distance to other modules: 5 cm in the vertical direction and 0.5 cm in the horizontal direction. A lateral distance of 5 mm, and in case of active components, that of 15 mm is necessary for proper functioning of the module.

The power supply unit can be snapped onto all DIN rails in acc. with EN 60715. They must be horizontal (connecting terminal blocks above and bellow).



Fig. 10. Convection



Slim-style installation: Installation depth 125 mm (+ DIN rail) (state at delivery)

Low-profile installation: Installation depth 90 mm (+ DIN rail)

Fig. 11. Mounting position drawing

Slim-style installation:



Fig. 12. View of slim-style position

- Assembly.

Position the module with the DIN rail guide on the upper edge of the DIN rail, and snap it in with a downward motion.

Removal.

Pull the snap lever open with the aid of a screwdriver and slide the module out at the lower edge of the DIN rail.

Low-profile installation:

Low-profile installation can be achieved by mounting the device at right-angles to the DIN rail. Mount the DIN rail adapter (UTA 107/30) as described in the figure. No additional mounting material is required. Fixing screws: Torx T10 (torque 0.8 Nm ... 0.9 Nm).



Fig. 13. View of low-profile position

Connection

Use a screwdriver with the correct blade width for wiring. The cable cross sections listed in the table below can be connected.

Note: For reliable and safe-to-touch connections, strip the cable ends according to the table.

	Solid [mm ²]	Stranded [mm ²]	AWG	Torque [Nm]	Stripping Length [mm]
Input	0,2–6	0,2–4	18–10	0,5–0,6	7 mm
Output	0,2–6	0,2–4	12–10	0,5–0,6	7 mm
Signal	0,2–6	0,2–4	18–10	0,5–0,6	7 mm

Table 4. Connecting cables

The 100 ... 240 V AC connection is established using the L, N and PE screw connections. The device can be connected to 1-phase AC networks or to two of the phase conductors of three-phase systems (TN, TT or iT systems in acc. with VDE 0100-300/IEC 60364-3) with nominal voltages of 100 V AC ... 240 V AC.



Fig. 14. Connection to various network forms drawing

- **Note:** For operation on two of the phase conductors of a three-phase system, an isolating facility for all poles must be provided.
- Input:



Fig. 15. View of Input

- Protecting the primary side.

The device must be installed in according with the regulations as in EN 60950. It must be possible to disconnect the device using a suitable isolating facility outside the power supply. The primary sideline protection, for example, is suitable. For device protection, there is an internal fuse. Additional device protection is not necessary.

- Recommended backup fuse for mains protection.

Power circuit breaker 10 A or 16 A, characteristic B (or identical function). In DC applications, a suitable fuse must be wired in upstream.

Note: If an internal fuse is triggered, there is most probably a malfunction in the device. In this case, the device must be inspected in the factory!

Output:



Fig. 16. View of Output

- Connecting the Output.

The connection is established using screw connections on the screw connection of the DC output:

24 V DC: "+" and "-"; DC OK switching output active: "DC OK" and "-"; DC OK output floating: "13" and "14"; POWER BOOST switching output active: "I < IN" and "-".

At the time of delivery, the output voltage is 24 V DC. The output voltage can be set on the potentiometer.

- Protecting the Secondary Side.

The device is electronically protected against short circuit and idling. In the event of a malfunction, the output voltage is limited to 35 V DC.

- **Note:** Make sure that all output lines are dimensioned according to the maximum output current or are separately protected. The cables on the secondary side must have sufficiently large cross sections in order to keep the voltage drops on the lines as low as possible.
- Signaling:

The active signal output, the floating signal contact and the active POWER BOOST switching output are provided for function monitoring. The DC OK-LED and the BOOST-LED also enable the function evaluation of the power supply unit directly on the operation site (see table below).

	l < In (20 A)	l > In (20 A)	Uout < 0.9 x Un (24 V)
"DC OK" LED	ON	ON	Flashing
"BOOST" LED	OFF	ON	ON
Active DC OK switching output	ON	ON	OFF
Floating DC OK output	Closed	Closed	Open
Active POWER BOOST switching output	ON	OFF	OFF
Meaning	Normal operation of the power supply (Uout > 21.5 V)	POWER BOOST operation, e.g. to start loads	Overload mode, e.g. consumer short circuit or overload

Table 5. Signalling

- Floating contact.

The floating signal contact opens and signalizes a drop in the output voltage as set of more than 10%. Signals and ohmic loads of up to 30 V and currents of up to 1 A can be connected. For heavily inductive loads such as a relay, a suitable protection circuit (e.g. damping diode) is necessary.



Fig. 17. Floating contacts drawing

Active signal outputs.

The 24 V DC signal is applied between the "DC OK" and the "-" connecting terminal blocks or between "I < IN" and "-" and can carry up to 1 mA. By switching from "active high" to "low", the DC OK signal output signalizes when the output voltage is more than 10% below the output voltage.

The DC OK signal is decoupled from the power output. It is thus not possible for parallel switched devices to provide external supply.

The 24 V DC signal can be directly connected to a logic input for evaluation.

The POWER BOOST signal output signalizes that the nominal current is exceeded.



Fig. 18. Active signal outputs drawing

- Signal loop.

Monitoring two devices: use the active signal output of device 1 and loop in the floating signal output of device 2. In the event of malfunctioning, a common alarm is output. Any number of devices can be looped in. This signal combination saves wiring costs and logic inputs.



Fig. 19. Signal loop drawing

Installation of the Uninterruptible Power Supply Unit for Universal Use QUINT-DC-UPS/24DC/20



Fig. 20. Structure

Table 6. Structure

No.	Comments
1	Input voltage 24 V DC unbuffered (internal fuse 25 AT)
2	Output voltage 24 V DC buffered (the device is idling-proof and short-circuit-proof)
3	24 V battery module connection
4	Floating PDT (11,12,13): Alarm
5	Floating PDT (21,22,23): Battery Mode
6	Floating PDT (31,32,33)
7	24 V supply voltage, maximum current limit 0.2 A for grouped contacts 11, 21, 31
8	Remote shutdown (R1, R2)
9	Universal DIN rail adapter UTA 107
10	Red LED: Alarm
11	Yellow LED: Battery Mode/Battery Charge
12	Green LED: Power In OK
13	Buffer time setting 0.5–30 minutes
14	Battery module/Service setting selection

CAUTION!

Never carry out work when the power is turned, this is highly dangerous.

Mounting

The uninterruptible power supply unit together with the battery module can be snapped onto all DIN rails according to EN 60715 and should be mounted horizontally (input terminal blocks facing downwards).

Note: No minimum spacing to other modules at the sides is required for proper operation of the device.

• Narrow Mounting Position.

The device is supplied ex works for a narrow mounting position.



Fig. 21. Narrow mounting position

- Assembly.

Place the module with the DIN rail guide way on the top edge of the DIN rail and then snap it downwards.

Removal.

Release the snap-on catch using a screwdriver and then detach the module from the bottom edge of the DIN rail.

• Flat Mounting Position.

A flat mounting position can be achieved by mounting the module onto the DIN rail at a 90° angle. To do this, mount the DIN rail adapter (UTA 107) as shown in Figure 46. No additional assembly material is required. Mounting screws: Torx T10 (torque 0.8...0.9 Nm).



Fig. 22. Flat mounting position

Connections



Fig. 23. Connection diagram

For reliable and safe-to-touch connections, strip the cable ends according to the table.

Table 7	Connecting cables	

	Solid [mm ²]	Stranded [mm ²]	AWG	Torque [Nm]
Input	0,5–16	0,5–10	20–6	1,2–1,5
Output	0,5–16	0,5–10	20–6	1,2–1,5
Battery	0,5–16	0,5–10	20–6	1,2–1,5
Signal	0,2–4	0,2–2,5	24–12	0,5–0,6

Strip 10 mm (0.39 in.) from the input and output side connector ends and 7 mm (0.28 in.) from the signal connector ends:



To maintain UL approvals, use copper cables, which are designed for operating temperatures > 75 $^{\circ}$ C (167 $^{\circ}$ F). To meet GL requirements, unused terminal compartments should be closed.

• Input.

The QUINT-DC-UPS is connected to the 24 V DC output of the power supply via the "Input +" and "Input -" terminal blocks. The output is isolated from the input by the internal diode. The stored power is only supplied to the output. The device is protected against over current and short circuit by an internal input fuse. Additional device protection is not required.

- **Note:** If an internal fuse is blown, this is most probably due to a device fault. In this case, the device should be checked in the factory.
- Output.

All devices that must be supplied without interruption in the event of a supply voltage failure ("Buffered Load"), are connected to the "Output +" and "Output -" terminal blocks of the DC output. It is recommended that all other loads, which do not require buffering ("Unbuffered Load"), are connected to the 24 V DC output of the power supply. This increases the buffer time, as this time depends on the output current. The internal diode ensures that the buffered loads are isolated from the unbuffered loads.

Battery module.

The battery module is connected to the QUINT-DC-UPS via the "Battery +" and "Battery -" terminal blocks. To interrupt the charge/discharge current of the battery module, the "Battery module selection" selector switch 14 must be set to "Service" (see below Fig. 24).



Fig. 24. "Battery Module Selection" selector

The QUINT-DC-UPS is optimized for use with QUINT-BAT/24DC type battery modules.

The following battery modules are recommended:

- QUINT-BAT/24DC/3,4AH (Order No. 2866349);
- QUINT-BAT/24DC/7,2AH (Order No. 2866352);
- QUINT-BAT/24DC/12AH (Order No. 2866365).

Following successful installation, the capacity of the connected battery module must be selected using the "Battery module selection" rotary switch 14.

- **Note:** The fuse on the battery module must be removed when installing or replacing the battery module.
- Signaling outputs.

The signal outputs are connected via terminal blocks 11/12/13 (4), 21/22/23 (5) or 31/32/33 (6). The contacts are floating contacts. The plug-in bridge provided can be used to supply +24 V to grouped contacts 11, 21, 31. This means that N/C contacts 12, 22, 32 and N/O contacts 13, 23, 33 can be evaluated as switching outputs with 0 V and +24 V voltage levels.

Remote Shutdown.

The device has a UPS remote shutdown function for specific shutdown.

Remote shutdown must be deactivated for the device to switch to buffer mode in the event of a supply voltage failure.

– Remote Shutdown Off:

The "Remote shutdown R1" and "Remote shutdown R2" terminal points are short circuited (e.g., with a plug-in bridge) OR. The "Remote shutdown R2" terminal point is supplied with a 24 V DC voltage. The QUINT-DC-UPS switches to buffer mode in the event of a supply voltage failure.

Remote Shutdown On:

The "Remote shutdown R1" and "Remote shutdown R2" terminal points are not connected.

All LEDs are off.

The QUINT-DC-UPS does not switch to buffer mode in the event of a supply voltage failure, instead the device is shut down. When the supply voltage is reapplied, the battery module is charged and the device remains off until remote shutdown is deactivated.

Connected loads are supplied as long as the supply voltage is present.



Fig. 25. Remote shutdown

Setting Options on the Device

Buffer Time Setting.

Buffer mode can be exited after a predefined time has elapsed or by external shutdown. If the device is to be shut down after a specific time has elapsed, the time can be set via the selector switch 13 on the front of the device. When the supply voltage is reapplied, the device can switch to buffer mode again.

ATTENTION!

The buffer time setting must be set to value not less than 1 minute according to ECDIS requirements.

• Battery Module Setting.

Before startup, the capacity of the battery module used must be set on the device via the selector switch 14. When replacing the battery, the selector switch must be set to "Service".



Fig. 26. Settings

Method of Operation

In the event of a power failure at the output, the QUINT-DC-UPS supplies all connected devices with a 24 V DC voltage without interruption at a load current up to 20 A. When the 24 V supply voltage is applied, the connected battery module is charged. In the event of a supply voltage failure, the battery module is connected to the output, and the stored power ensures that all connected devices continue to operate without interruption. The professional signaling via function LEDs and floating PDT contacts enables reliable evaluation of all the main operating states.

Output Voltage.

In normal operation, the QUINT-DC-UPS output voltage corresponds to the usual supply voltage. If the supply voltage drops more than 1 V in the space of 0.1 seconds or falls below the minimum threshold of 22 V, the device switches to buffer mode. If the output voltage drops below 20.4 V in buffer mode, this is indicated by the Alarm indicator. If the output voltage drops to 19.2 V because the battery module is flat, the device is shut down completely. When the supply voltage is reapplied, the device automatically switches on again. The device is electronically short circuit- proof and idling-proof.

Signaling.

Three floating PDT contacts and three indicators are provided for function monitoring.

Table 8. Status Indicators

Key/Indicators	Green Power IN OK	Yellow Bat. Mode/Charge	Red Alarm
Supply voltage OK, battery module charging	ON	Flashing	OFF
Supply voltage OK, battery module charged (normal operation)	ON	OFF	OFF
Buffer mode	OFF	ON	OFF
Battery module flat	OFF	OFF	ON
Battery module quality test negativeNo battery moduleService	ON	OFF	ON
Buffer time elapsedRemote shutdown activated	OFF	OFF	OFF

Table 9. Status Contacts

Key/Output	Bat. Charge	Bat. Mode	Alarm
Supply voltage OK, battery module charging	31–33	21–22	
Supply voltage OK, battery module charged (normal operation)	31–32	21–22	
Buffer mode	31–32	21–23	
Battery module flat	31–32	21–22	11–13
Battery module quality test negativeNo battery moduleService	31–32	21–22	11–13
Buffer time elapsedRemote shutdown activated		21–22	11–13

Where:

- xx xx: contact closed;
- 1x Alarm, 2x Battery Mode, 3x Battery Charge;
- x1 group contact, x2 N/C contact, x3 N/O contact.
- Temperature Response.

The charging rate of the connected battery module depends on the temperature.

• Testing the Battery Module.

A quality test is carried out on the battery module once a week and its presence is verified every minute. A negative test result is indicated by the Alarm indicator.
Installation of the Battery Modules QUINT-BAT/24DC/3.4AH, QUINT-BAT/24DC/7.2AH, QUINT-BAT/24DC/12AH

QUINT-BAT/24DC are maintenance-free lead gel rechargeable batteries for use with QUINT-DC-UPS 20A/40A.



Fig. 27. View of Battery modules

Safety and Warning Notes

In order to guarantee safe operation of the device, please read these instructions thoroughly! The operating instructions for the particular QUINT-DCUPS must also be observed.

The device may only be installed and put into operation by qualified personnel. The corresponding national regulations (e.g. VDE, DIN) must be observed. The VDE 0510 regulations regarding storage, installation and operation of the rechargeable battery module must be observed.

The site in which the rechargeable battery module is located must have sufficient ventilation. The rechargeable batteries may only be disposed of when fully discharged and in acc. with the valid regulations.

The fuse must be removed from the rechargeable battery module when work is being performed!

When replacing rechargeable batteries, please note that only rechargeable batteries from the same batch may be used together!

Device Connections

The connection to QUINT-DC-UPS is established using the black (-) and red (+) connecting cables. The fuse is not inserted until installation has been completed.

- 1. DC fuse.
- 2. Connection cable, red = +24 V, black = 0 V.
- 3. DIN rail adapter QUINT-ADAPTER/4 (only QUINT-BAT/24DC/3,4AH).

Installation

In conjunction with adapter QUINT-ADAPTER/4, it is possible to snap the rechargeable battery module onto all 35 mm DIN rails in acc. with EN 60 715, or "keyhole" fixing eyelets can be used for rear wall mounting (drilling diagram on reverse). Only QUINT-BAT/24DC/3,4AH is supplied with QUINTADAPTER/4. QUINT-ADAPTER/4 (Order No. 28 66 85 7) can be ordered separately for other rechargeable battery modules.

The module should be installed horizontally in the coolest part of the control cabinet. For the device to function in the manner intended, it is not necessary to observe any minimum spacing to other modules.



Fig. 28. Installation of Battery module

Data Collector Unit DCU6

Technical specification and dimensional drawings of DCU6 are given in Chapter 3.

For connection DCU6 to WS, see optional connection and block diagrams for each WS enclosed in **Annex G**.

Connections

DCU6 is connected with the Ethernet ports LAN1 and LAN2 of RS6 Computer by means of a standard category 5 screened cables used in Ethernet 10/100 Mbit networks. The cable contains 4 twisted pairs within the common screen and has RJ-45 connectors on both ends. Connection of cable cores with the connector contacts is identical on both sides.

Navigational sensors to the DCU6 are connected by means of screw connectors. In case of considerable length of external cables, a screened cable is recommended. For the connection of the DCU6 with navigational sensors, use double core screened cable in the insulating shell, category TP5. The screen is connected to earthing on the sensor side. Where the level of electromagnetic field is insignificant, "twisted pair" type unscreened cable up to 1.5 mm² cross section may be used. As the electric current in the cable does not exceed 20 mA the conductors' cross section is of no importance. The maximum length of the cable will depend on the type of interface and is shown for each specific sensor in the appropriate connection schedule.



Fig. 29. DCU6. Rear View

GPS1	GYRO 1×2 H	LOG 13.34	AIS tx-4 Ha	ta 5 fu	1/6 %	2x 7 Hz	1x 8 ##	Tr 9 Br	т.10н.	6114	1-1200	(st3a)	n.14m	1015m	1.261
	ACCRECT OF	Real Property in	Contract of		8 7	-	a r	1 1	1	1	1		(BRIDDING		

Fig. 30. DCU6. Front View

DCU6 interfaces and cables fixing are shown in the figures below.

DCU6 ports number 1–14 are RS 422 bi-directional channels.

DCU6 ports number 15–16 are RS 422 bi-directional channels by default and may be configured by jumpers X16 and X17 accordingly as follows:

- Output channels transmit RS 232 signal;
- Input channels receive RS 422 signal.



Fig. 31. DCU interfaces



Fig. 32. DCU cables fixing

Diagnostic Indication

DCU is equipped with the following Diagnostic Indicators, reflecting current processes of the device:

- Indicator of the RS-422 interface activity with use of TX/RX Channels. The corresponding indicator is lit while transmitting/receiving of the NMEA message;
- DCU modes indicator are sown in the table bellow.

Table 10. DCU status indicator

Indicator condition	Mode
Green, blinking	DCU data receiving
Yellow, blinking	DCU data transmitting

Checking and Settings DCU IP Addresses

Checking DCU IP Addresses

In the event of absence of the connection between PC and DCU check values DCU IP addresses. For this connect RS232 port of PC to RS232 COM1 of DCU.

1. Start terminal emulation program (i.e. "Hyper Terminal") and enter name for example "DCU":

Connection Description				<u>? ×</u>
New Connection				
Name:	n icon io	i the conr	iection.	
DCU				
	5000	6	r Si	-
	- Barris	190		X
				-
	3	ОК	1 Car	ncel

2. Select port number of PC:

A	
N DCU	
Enter details for the phone number that you want	to dial:
Country/region: Russia (7)	¥
Arga code: 812	
Phone number:	
Connect using: COM1	-
OK Car	

3. Configure the terminal for 57600 baud, 8 data bits, no parity, 1 stop bit, none flow control. Press "Apply" and "OK" buttons:

<u>B</u> its per sec	ond: 57600	•
<u>D</u> ata	bits: 8	-
E	arity: None	•
<u>S</u> top	bits: 1	T
<u>F</u> low cor	ntrol: None	

4. This screen appears. Otherwise restart DCU by means of small buttons on DCU panel:

DCU - HyperTermina File Edit View Call 1	il ransfer <u>H</u> elp								-o×
0 🖉 🔊 💈 🗅	ðď								
									I
Press Escap	e!								
Connected 0:00:23	Auto detect	57600 8-N-1	ISCROLL	CARS	NIM	Capture	Print echo	-]
2011100000010100120	mato detett	101000 014-1	In state	Tonuca.	pasto -	Jaspeare	June Cono		11.

Press <Escape> button.

5. For printing configuration type "1" and press <Enter> button:

© DCU - HyperTerminal	_ 🗆 🗙
Ele Edit Yew Call Transfer Help 미요! 이 것 이 것 이 안 이 안 이 안 이 있는 것 이 안 이 안 이 안 이 안 이 안 이 안 이 안 이 안 이 안 이	
DCU Main Menu 1) Print Configuration 2) Set Factory defaults 3) Set MAC Address 4) Set IP Address 5) Set DCUP Port 6) Set DTSP Ports 7) Monitor DCU Ports 8) Reset DCU 9) DCU Version (CPU and FPGA) 10) Start CAN test sequence Select a number and press Enter >> 1	
Connected 0:13:20 Auto detect 57600 8-N-1 SCROLL CAPS NUM Capture Print echo	

 Check IP, Netmask, Gateway values for LAN1 in correspondence to values given below. If necessary change them by means of "Set IP Address" option in "DCU Main Menu":

& DCU - HyperTerminal	
	<u>.</u>
DCU Global Settings	
MAC: 00:02:04:08:0A:01	
 TP: 10.8.1.200 Netmask: 255.255.255.0 Gateway: 10.8.1.240	
DCUP TCP Port: 50019 DTSP Server Port: 50017 DCUP Client Port: 50018	
DCUP Port 0 & 1 config: 05 & 05 DCUP Port 2 & 3 config: 05 & 05 DCUP Port 4 & 5 config: 05 & 05 DCUP Port 6 & 7 config: 05 & 05 DCUP Port 7 & 8 9 config: 05 & 05 DCUP Port 8 & 9 config: 05 & 05 DCUP Port 10 & 11 config: 05 & 05 DCUP Port 12 & 13 config: 05 & 05 DCUP Port 14 & 15 config: 05 & 05	
Press Esc to return to main menu	
nnected 0:14:43 Auto detect 57600 8-N-1 SCROLL CAPS NUM Capture. Print echo	

- 7. For the first type DCU values must be following:
 - IP1 Address: 10.8.1.200;
 - Subnet Mask: 255.255.255.0;
 - Default Gateway: 10.8.1.240.
- 8. For the second type DCU values must be following:
 - IP1 Address: 10.8.1.201;
 - Subnet Mask: 255.255.255.0;
 - Default Gateway: 10.8.1.240.
- Connect PC RS232 port to DCU RS232 COM2 and perform procedure described above. Check IP, Netmask, Gateway values for LAN2 in correspondence to values given below:

الم الله الم الله الله الله الله الله ال	.o×
DCU Clobal Settings MAC: 00:02:04:08:0A:02	
IP: 10.8.2.200 Netmask: 255.255.255.0 Gateway: 10.8.2.240	
DCUP TCP Port: 50019 DTSP Server Port: 50017 DCUP Client Port: 50018	
DCUP Port 0 & 1 config: 05 & 05 DCUP Port 2 & 3 config: 05 & 05 DCUP Port 4 & 5 config: 05 & 05 DCUP Port 6 & 7 config: 05 & 05 DCUP Port 8 & 9 config: 05 & 05 DCUP Port 8 & 9 config: 05 & 05	
DCUP Port 10 & 11 config: 05 & 05 DCUP Port 12 & 13 config: 05 & 05 DCUP Port 14 & 15 config: 05 & 05 ====================================	
Press Esc to return to main menu -	-
Connected 0:03:23 Auto detect 57600 8-N-1 SCROLL CAPS NUM Capture: Print echo	11.

If necessary change them by means of "Set IP Address" option in "DCU Main Menu".

- 10. For the first type DCU values must be following:
 - IP2 Address: 10.8.2.200;
 - Subnet Mask: value 255.255.255.0;
 - Default Gateway: 10.8.2.240.
- 11. For the second type DCU values must be following:
 - IP2 Address: value 10.8.2.201;
 - Subnet Mask: value 255.255.255.0;
 - Default Gateway: 10.8.2.240.

Setting DCU IP Addresses

1. In "DCU Main Menu" type "4" and press <Enter> button:

Ele Edit View Cal Transfer Hep Del Main Menu	DCU - HyperTern	inal				
DCU Main Menu 	jile Edit ⊻iew ⊆all	Iransfer Help				
DCU Main Menu 	je si	08 8				
DCU Main Menu 						4
>> 4	DCU Main M 1) Print 2) Set Fa 3) Set M 4) Set IF 5) Set DO 6) Set DI 7) Monito 8) Reset 9) DCU Voc 10) Start	enu Configuratiou C Address Address UP Port SP Ports r DCU Ports DCU ersion (CPU an CAN test sequ	n ts nd FPGA) uence			
	>> 4	umper and pr	ess Enter			

 Enter values (IP Address, Mask, Default Route) specified above determined in section Checking DCU IP Addresses for LAN1 and for LAN2. Press <Enter> after typing of each value.

CCU - HyperTerminal Elle Edit View Call Iransfer Help	<u>- ×</u>
DB 93 DB 6	
5) Set DCUP Port	<u> </u>
6) Set DTSP Ports 7) Monitor DCU Ports 8) Reset DCU 9) DCU Version (CPU and FPGA) 10) Start CAN test sequence	
Select a number and press Enter	
>> 4	
DCU IP Address Byte1: 10 DCU IP Address Byte2: 8 DCU IP Address Byte3: 1 DCU IP Address Byte3: 1 DCU IP Address Byte4: 200	
DCU IP Address Mask Byte1: 255 DCU IP Address Mask Byte2: 255 DCU IP Address Mask Byte3: 255 DCU IP Address Mask Byte4: 0	
DCU Default Route Address Byte1: 10 DCU Default Route Address Byte2: 8 DCU Default Route Address Byte3: 1 DCU Default Route Address Byte4: 240_	
Connected 0:16:59 Auto detect 57600 8-N-1 SCROLL CAPS NUM Capture Print echo	

Then switch off/on DCU power and check preservation of all settings.

Power Connection

Workstation requires 24 VDC. This power must be provided from 24 VDC ship's distribution board or from optional UPS6 connected with 110/220 VAC ship's distribution board with Main/Emergency Automatic Switch. For details, see "NS 4000/4100 ECDIS WS. Optional Configuration. Power Supply Distribution. Connection Diagram" and connection diagram for each scanner enclosed in **Annex G** of this document.

RS6 Computer Discrete Signal Interface

General

Discrete signal interface for alarms distribution is provided by digital I/O ports of RS6 computer. Four digital output (DO) ports provide issue NR MFD alarm signals on Alarm Panel. Four digital input (DI) ports are used for NR MFD alarms acknowledgment (silence) from Alarm Panel and for receiving alarm signals from UPS (see drawing "RS6 Computer. Connectors Layout" enclosed in **Annex G** and connection diagrams).

Digital Input

Digital input ports are designed for dry contact (5VDC@1mA) closure to GND. DI ports receive control signals from digital field devices (sensors, switches, etc.). Each pair of the port's terminals shall be used for connection with digital devices. Each pair of the ports has one ground terminal.

The inputs use a Phoenix 3.81 mm 6-pin connector.

Digital Output

DO ports switch the connected load by means of internal, isolated relays. The relays are capable of the switching 30VDC@1A and 100VAC@300mA. Each pair of the port's terminals shall be connected to the certain indication unit (Alarm Panel optical indicators, etc). The each port has separate ground. The outputs use a Phoenix 3.81 mm 8-pin connector.

WAGO I/O Modules for Conning

General



Fig. 33. WAGO modules set

WAGO I/O Set of Modules used in NS 4000 MFD System for Conning includes the following parts:

- MODBUS Coupler/Controller: the module is intended for communication of the set of WAGO I/O Modules with the Working Station via RS-232 protocol. Baud rate value recommended for use in NS 4000 MFD is 9600. Voltage supply – DC 24 V. Power AC/DC Adaptor might be used as a power supply source. With its I/O functions the coupler/controller forms the logic operation between the Fieldbus used and the field area. All control tasks necessary for the perfect operation of the I/O are performed by the coupler/controller;
- I/O modules: the input and output of the process data is made at the I/O modules. I/O modules are available for various tasks in accordance with varying requirements. Available are digital and analog input and output modules, I/O modules for angle and path measurement as well as communication modules. The individual I/O modules used in NS 4000 MFD are described in Chapter 3;
- End module: the module completes the internal data circuit and ensures correct data flow. One is required for each bus-coupler. The node end module is indispensable. It is always fitted as the last module, to guarantee the internal node communication. The end module has no I/O function.

All modules forming the above set must be mounted on the DIN rail to provide the common grounding contact.

Technical specification of WAGO modules for Conning is given in Chapter 3.

The connection diagram of WAGO set of modules is shown in drawing "WAGO Set for Conning. Functional Diagram" enclosed in **Annex G** of this document.

List of I/O Modules Used in NS 4000 MFD

List of I/O modules used in NS 4000 MFD is presented in the table below:

No.	Module	Ref. No.
1	MODBUS	750-314
2	4-Channel Digital Input Module DC 24 V	750-403
3	2-Channel Analog Input Module 4-20 mA	750-454
4	2-Channel Analog Input Module +/- 10 V	750-476
5	4-Channel Analog Input Module 0-10 V	750-468
6	2-Channel Relay Output Module AC 230 V, DC 30 V	750-513
7	End Module	750-600

Table 11. List of WAGO modules

Assembling of the WAGO I/O Set Modules

All system components can be snapped directly on a carrier rail (DIN rail) in accordance with the European standard EN 50022 (TS 35). All modules have the same shape to minimize the project commitment. The reliable positioning and connection of the coupler/controllers and the individual I/O modules is made using a tongue and groove system. Due to the automatic locking the individual components are securely seated on the rail after installing.

The coupler/controller must be fixed on the carrier rail with the lateral orangecoloured locking disk. To fix the coupler/controller apply pressure on the upper groove of the locking disk using a screwdriver.

To remove the coupler/controllers release the locking disk by pressing on the bottom groove. It is also possible to release an individual I/O module from the unit by pulling an unlocking lug.

The following sequence of modules must be observed in the course of assembling:

- MODBUS Module;
- Digital/Analog Input Modules;
- Relay Output Modules;
- End Module.

Cabling of the WAGO I/O Modules

The following requirements must be taken into consideration prior to cabling of the WAGO I/O Modules within the NS 4000 MFD System:

- Relay Output Modules: each pair of active contacts of the modules shall be connected to the certain indication unit (Alarm Panel optical indicators, etc.);
- Input Modules: each pair of active contacts on the modules shall be used for connection with different type of sensors (digital and analog);
- MODBUS: 24 V DC input contacts are marked on the module accordingly. The other contacts of the module are used for the power distribution only.

NETWORK

Network is basement of NS 4000 ECDIS MFD System for communication between Workstations and RIB6 (and DCU6). The network redundancy is provided by double network. The physical layer is Ethernet; the transport layer is TCP/IP.

Physical Layout

NS 4000 ECDIS MFD network could be connected in accordance with drawing "NS 4000/4100 ECDIS MFD (WS1 and WS2). Optional Configuration. Data Flow Diagram" enclosed in **Annex G** of this document, by means of FTP Cat.5 cables.

The Ethernet switches type approved MOXA EDS-305/308/316 series are the multiport high-speed switches which can be used for building of the high-performance communication.

Technical specification of the Moxa switch EDS-305/308/316 series is given in **Chapter 3**.

IP Addresses

IP addresses table is shown below:

STATION	LAN 1	LAN 2	Subnet mask
	IP address	IP address	
Workstation 1 (W01)	10.8.1.101	10.8.2.101	255.255.255.0
Workstation 2 (W02)	10.8.1.102	10.8.2.102	255.255.255.0
Workstation 3 (W03)	10.8.1.103	10.8.2.103	255.255.255.0
Workstation 4 (W04)	10.8.1.104	10.8.2.104	255.255.255.0
Workstation 5 (W05)	10.8.1.105	10.8.2.105	255.255.255.0
DCU I type	10.8.1.200	10.8.2.200	255.255.255.0
DCU II type	10.8.1.201	10.8.2.201	255.255.255.0
RIB6 I type	10.8.1.209	10.8.2.209	255.255.255.0
RIB6 II type	10.8.1.210	10.8.2.210	255.255.255.0

Table 12. WS's IP addresses

CHAPTER 2

System Settings

SOFTWARE INSTALLATION

Pre-installation

On a disk *C*: create folder *C*:*MFD*:



Insert CD with product to the CD-drive.

MFD						_	
e <u>E</u> dit ⊻iew F <u>a</u> vorite:	s <u>T</u> ools	Help					R
Back - 🕥 - 🎓 🔎 Search 🎓 Folders 🛄 -							
dress 🛅 C:\MFD						· →	Go
File and Folder Tasks	*		18	4	3	28.0	
Rename this file		mfd	MFD	Setup	Setup	tmsums	
Move this file							
Copy this file			12 million				
Publish this file to the Web		tmsums	Version				
E-mail this file							
✗ Delete this file							
Other Places	*						
🕼 Desktop							
My Documents							
🕎 My Computer							
A Markensel, Discourse	1						

Copy all files from this folder to C:\MFD and close this folder.

Install SPOS-6 software from Transas MNS CD.

Installation of NS 4000

At each workstation, perform the following procedure.

Run Setup.exe file in the folder C:\MNS:

llow the instructions precisely in order to properly application(s). Press "Next" button to start the

Press "Next >" button. A window containing the licensing agreement text will be displayed:

License Agreement		a			
Please read the following license agreeme	nt carefully	1	SIR	ANGA	E
e 182	4.).i	SET	S THE	STANDA	R
SOFTWARE LICENSE AGREEMENT					-
No National Hydrographic Office has v program and none accepts liability for modifications made therein. Transas electronic charts are not inter	erified the ir the accurac	nformatic :y of repr	on in the roduction	computer n or any	
charts. They do not necessarily contai always be used in conjunction with up WARNING: THIS COMPUTER PROGR AND IS NOT A SUBSTITUTE FOR AN MAX DE DEOUVEED UNDER ADDITE	in the latest idated gover AM IS ONL Y NAVIGAT	chart cor nment p Y A NAV IONAL E	r official rections aper cha /IGATIO QUIPME	government and should arts. INAL AID INT THAT	
charts. They do not necessarily contai always be used in conjunction with up WARNING: THIS COMPUTER PROB AND IS NOT A SUBSTITUTE FOR AN MAX DE DECUTER UNDER ADDITO to you accept all the terms of the preceding L lose. To Install Multifunctional Display, you m	in the latest idated gover AM IS ONL Y NAVIGAT icense Agreer ust accept thi	chart cor nment p Y A NAV IONAL E ATTONIC nent? If yo s agreeme	r official rrections aper cha /IGATIO QUIPME OD LAI	government and should arts. INAL AID INT HAT	▼

Press "Yes" button. The copyright information window will be displayed:

Trademarks and Copyrights	SETS THE STAN	
his product includes software developed by the http://www.apache.org/).	Apache Software Foundation	
rsion 2,00,009,1103		

Press "Next >" button.

At this installation stage, it is necessary to make sure that the computer parameters and pre-installed software comply with specified requirements. If any critical non-compliance is identified, the installation will not be continued:

	29162020166702020202020202020	SETS THE STAN	
'leas onti	e, read the following important information be nue, if your computer system is as specified be	fore installation. Press NEXT button slow or better. Otherwise press CAN	to ICEL.
Ŷ	1. Operating System: Windows XP		
3	2. Service Pack: 2		
3	3. CPU Type: Intel PENTIUM class		
3	4. CPU Frequency: over 2165 MHz		
3	5. System RAM Size: at least 512 MB, recomm	nended at least 1024 MB	
3	6. Video RAM Size: at least 32 MB		
3	7. Minimum X resolution: at least 1280 pixels		
3	8. Minimum Y resolution: at least 1024 pixels		
3	9. Color Depth: recommended 16 bits		-
á	10 Free Disk Space: at least 10240 MB recon	omended at least 15360 MB	Ě
			1
đ	10. Free Disk Space: at least 10240 MB, recon	mended at least 15360 MB	ŗ

Press "Next >" button. A window containing system information will be displayed.

		JIANDAK
r computer system doesn't meet hardware requirements following is some information related to your system:	s.	
/ 1. Operating System: Windows XP		
/ 2. Service Pack: 3		
7 3. CPU Type: Identifier - x86 Family 15 Model 3 Stepp	bing 3	
4. CPU Frequency: 2798 MHz		
5. System RAM Size: 1024 MB		
/ 6. Video RAM Size: (Can't detect)		
7. Minimum X resolution: 1280 pixels		
8. Minimum Y resolution: 1024 pixels		
9. Color Depth: 16 bits		1
10. Free Disk Space: 3226 MR		_

Press "Next >" button. Specify the path to the product license (*A*:\ by default) in displayed window:

Setting up the license	SETS THE STANDAR
License path:	
A:\	Browse



The license information will be displayed:

🙀 Multifunctional Display - Setup Wizard			
License information			
The following license has been installed: Product: Navi-Sailor 4000 ECDIS MFD SW Reg.Number: A8681D0800008928 Activator Key: 1700601 Primar User Permit: SFEB10AE47DEA518B10A01933233 Generated: 23/12/2008 Expired before: 1/06/2009			

Press "Next >" button.



Select "Custom".

etup components Choose components that Setup Wizard (
k on an icon in the list below to change h 	Component is installed. Component Description This component protects navigation software from potentially dangerous system modifications
📼 This feature will be installed	on local hard drive.
→ This feature, and all subfea	tures, will be installed on local hard drive.
× This feature will not be avai	lable.

Select components to be installed by the Setup Wizard (on each WS as per the licensed NS 4000 configuration). To prohibit the installation of selected component, select option "This feature will not be installed".

WARNING!				
It's strictly recommended to install "Chart Assistant" utility on the all WS.				

Select component "Transas Integrator" and set option "This feature will be installed on local hard drive".

Keep feature "Integrator Activation" not available, it will be activated later:

lick on an ico	n in the list below to change how a	component is installed.	
	Localization Navi-Radar Navi-Conning Navi-Planner Chart Assistant Online Help Alarm Monitoring Station Transas Integrator	Component I Installation o activates Int	Description f this component egrator after rebo
	Navi-Planner Chart Assistant Online Help Alarm Monitoring Station Transas Integrator Integrator Activation	<u>.</u>	



🖓 Multifunctional Display - Setup Wizard	×
Installing Multifunctional Display	SETS THE STANDARD
Chabura	
Copying new files	
Version 2.00.009.1103	
< <u> </u>	ack Next > Cancel

The program will perform the product installation.



In displayed window, press "Finish" button.

Installation of NS 4100

At each workstation, perform the following procedure.

Run Setup.exe file in the folder C::



Press "Next >" button. A window containing the licensing agreement text will be displayed:





Press "Yes" button. The copyright information window will be displayed:

Press "Next >" button.

At this installation stage, it is necessary to make sure that the computer parameters and pre-installed software comply with specified requirements. If any critical non-compliance is identified, the installation will not be continued:

ystem requirements	SETS THE STANDA
Please, read the following important inform	nation before installation. Press NEXT button to
continue, if your computer system is as sp	ecified below or better. Otherwise press CANCEL.
2 2 Service Pack: 2	-
2. CPU Type: Intel PENTILIM class	
4. CPU Frequency: over 2165 MHz	
💡 5. System RAM Size: at least 512 MB	3, recommended at least 1024 MB
💡 6. Video RAM Size: at least 32 MB	
💡 7. Minimum X resolution: at least 128	30 pixels
💡 8. Minimum Y resolution: at least 102	24 pixels
💡 9. Color Depth: recommended 16 bit	ts 🔤
2 10. Free Disk Space: at least 10240 M	MB_recommended at least 15360 MB

Press "Next >" button. A window containing system information will be displayed.

	SETS THE STAND
Your computer system doesn't meet hardware red The following is some information related to your	quirements. system:
V 1. Operating System: Windows XP	
V 2. Service Pack: 3	
👌 3. CPU Type: Identifier - x86 Family 15 Mod	lel 3 Stepping 3
V 4. CPU Frequency: 2798 MHz	
🔰 5. System RAM Size: 1024 MB	-
💡 6. Video RAM Size: (Can't detect)	
↓ 7. Minimum X resolution: 1280 pixels	
💙 8. Minimum Y resolution: 1024 pixels	
🛛 9. Color Depth: 16 bits	1
V 10 Free Disk Space: 3226 MB	[] \
<u> </u>	<u> </u>

Press "Next >" button. Specify the path to the product license (*A*:\ by default) in displayed window:

Navi-Sailor 4100 - Setup Wizard	
Setting up the license	SETS THE STANDAR
License path:	
A:\	Browse
reien 2.00.000.1110	
150112,00,009,1112	Bark Nevt S Caprel

Press "Next >" button.

The license information will be displayed:

	SETS THE STANDAR
The following license has been installed: Product: Navi-Sailor 4100 ECDIS SW Reg.Number: 3DC0CD0E00002260 Activator Key: 1700601 Primar User Permit: 518810AE47DEA518810A01933233 Generated: 10/12/2008 Expired before: 1/6/2009	3

Press "Next >" button.

Select components to be installed by the Setup Wizard (on each WS as per the licensed NS 4100 configuration). To prohibit the installation of selected component, select option "This feature will not be installed".



Select component "Transas Integrator" and set option "This feature will be installed on local hard drive":

hoose components that Setup	Wizard will install	SETS THE STANDA
on an icon in the list below to o Navi-Sailor Localization Navi-Radar Navi-Conning Chart Assistant Online Help Transas Integrator	change how a compon	ent is installed. Component Description This component protects navigation software from potentially dangerous system modifications
This feature will be	installed on local hard Il subfeatures, will be i	drive, nstalled on local hard drive,
× This feature will not	t be available.	

Keep feature "Integrator Activation" not available, it will be activated later:

Choose components that Setup Wiz	ard will install	SETS THE STAN
k on an icon in the list below to chan Navi-Sailor Localization Navi-Radar Navi-Coning Chart Assistant Online Help Transas Integrator Integrator Activ	ge how a compone	ent is installed. Component Description — Installation of this compone activates Integrator after r
ion 2,00,009,1112	stion	

Press "Next >" button.



Select ECDIS and press "Next >" button.

Software Installation



The program will perform the product installation.



In displayed window, press "Finish" button.

NS 4000 CONFIGURATION

Run the System Configuration utility by selecting the appropriate item in the START menu (START\PROGRAMS\MULTIFUNCTIONAL DISPLAY\SYSTEM CONFIGURATION):



During the NS 4000 installation enter the password.

Enter password	×
Password:	×
ОК	Cancel

Press the "OK" button and go on to the next installation step.

If the NS 4100 is being installed, in the "Logon" dialogue box which will appear, from the User listbox select the "root" user. Press "OK" button.

Logon		×
User:	Commander	•
Password:	Commander Navigator , Watch	
	root	

The screen will display a window showing the automatically generated master password intended for unlocking the system (the system is locked by default after three unsuccessful attempts to enter the password).

Syste	m Configuration Utility	×
♪	New root password generated:'0 Please, keep it in a safe place	2gWDwT'.
	<u>(ОК</u>]	

Save it and store in a safe place to prevent the unauthorised access.

Press the "OK" button and go on to the next installation step.

General

The System Configuration utility consists of 5 panels; pages divide each panel. To open the required panels, press the appropriate buttons:

Panel Name	Purpose	Button
INS	Configuration of the entire NS 4000/4100	
		INS
Workstation	Configuration of each Workstations separately	AL.
		Workstation
Sensors	Sensors settings, configuration of alarms, and warnings	Coord
		Sensors
Radar	Configuration of scanners and RIB-equipped Workstations	
		Radar
Security	For NS 4000 to create users permitted to edit the electronic ship logbook and set passwords permitting this access.	S.
	For NS 4100 configuration of security access system	Security
Commissioning Table	Formation of NS 4000/4100 commissioning table	B
		Comissioning Table

Sensors Settings

Press **Sensors** button. The drop-down **Workstation** list specifies the name of the workstation which settings will be made for, and "ALL" line for all WS's.

- ATTENTION! -

Perform individual settings for each Workstation, selecting them consecutively from the droop-down list **Workstation**. All data will be synchronized at all the Workstations after the settings saving.

- 1. Select "ALL" line from the Workstation drop-down list.
- 2. Open "Sensors" page to set the WS connected sensors.

🖟 System Configur	ation Utility									_ 🗆 🗙
	Workstation	ALL- 👻								
INS	Sensors DCU settings	Abre	1 Davit		(The ste	Developher	Dibe	Daviba		
	Sensor	Allds	Porc	Workstation	SUM	bauurate	DILS	Parity	bits	test
A.]]										
										- 1
Workstation										- 1
										- 1
(analas)										- 1
Sensors										- 1
										- 1
										- 1
Radar										- 1
										- 1
Q										- 1
<u>#</u> 2										- 1
Security										- 1
-										- 1
1										- 1
Commissioning										- 1
Table										
	Sensors Accuracy				DCL	J Disconnecter	1 .		Remove :	Sensor
	Log Accuracy 2	%						1		
	Gyro Accuracy 1	°								
		414					2017		- 19 Jan	
Backup						OK		Apply	C	ancel

 Adjust COM ports for operation with connected sensors. The following actions shall be done for this purpose:

Select required sensor from the drop-down list in the column Sensor:

Sensor	Alias	Port	Check sum
POS1	•		
POS1			
LOG1 DLOG1			

In the Alias column, specify the sensor name to enable its identification for the purpose of the redundancy concept. After the input of an alias, it becomes possible to connect this sensor to other ports. I.e., should one COM port fail, data will be received from the next port on other WS connected to this sensor:

Sensor	Alias	Port	Check sum
POS1 💌	GARMIN		

In the column **Port**, select from drop-down list the required COM-port of the Workstation computer, which this sensor is physically connected to:

Sensor	Alias	Port	Check sum
POS1	GARMIN	COM1 💌	
		COM1 💌	
		COM1	
	10	COM2	

In the Check sum column, if required disable the checksum by selected "OFF" from drop-down list:

Sens	or	Alias	Port		Chec	k sum
POS1]]	GARMIN	COM1	•	ON	-
			COM2	۲	ON	
				-	OFF	

- Check for the relevant port of this sensor:

If COM-port was selected, specify in the drop-down list the following COM port exchange parameters, defined in technical description of connected sensor: Baud rate, Bits, Parity, and Stopbits; To check the propriety of sensor connection, press the button Test in the column Port test.

Note: The above mentioned checking can be carried out only on the Workstation, which COM-port the sensor is connected to:

Port Monitoring		×
Port Settings Use In Lext Mode Port No 1 Baud Hate 4800 Data Bits 8 Parity None Stop Bits 1 Dump Type Tegt Hexadecimal List View Mode View Last String	Dir Data	
Start <u>M</u> onitoring	<u>a</u>	Apply Settings Cancel

- Press Start Monitoring button.

Port Monitoring				- 🗆 ×
Port Settings	100			
T Hart Tanklada	Dir	Data		-
M Use In ⊥ext Mode	Input	\$HEHDM,63.30,M*29		
	Input	\$HEHDM,63.37,M*2E		
	Input	\$HEHDM,63.45,M*2B		
Revel Rate 12000 and	Input	\$HEHDM,63.52,M*2D		
	Input	\$HEHDM,63.60,M*2L		
Data Rita	Input	\$HEHDM,63.67,M*28		
	Input	\$HEHDM,63.74,M*29		
Dening Internet	Input	\$HEHDM,63.82,M*20		
Eanly Inone	Input	\$HEHDM,63.89,M*2B		
Stop Dite 1	Input	\$GPD1M,W72,,W72*4A		
	Input	\$GPGB5,122201.30,-0.0,-0.0,,07,,,*69		
1	Input	\$GPGLL,6012.06531,N,02823.57007,E,122201.30,A,A*62		
- Dump Type	Input	\$GPRMC,122201.30,A,6012.06531,N,02823.57007,E,09.1,061.5,010805,,,A*63		
0.7	Input	\$HEHDM,63.96,M*25		
t• 1e <u>x</u> t	Input	\$HEHDM,64.04,M*29		
C Hexadecimal	Input	\$HEHDM,64.11,M*2D		
	Input	\$HEHDM,64.19,M*25		
- List View Mode	Input	\$HEHDM,64.26,M*29		
E I I I I I I I I I I I I I I I I I I I	Input	\$HEHDM,64.33,M*2D		
I View Last String	Input	\$HEHDM,64.40,M*29		
	Input	\$HEHDM,64.48,M*21		
	Input	\$HEHDM,64.56,M*2E		
	Input	\$HEHDM,64.63,M*28		
	Input	\$GPDTM,W72,W72*4A		
	Input	\$GPGBS,122202.30,-0.0,-0.0,,09,,,*64		
[Input	\$GPGLL,6012.06650,N,02823.57456,E,122202.30,A,A*65		-
Stop Monitoring	•			
			10	
		Apr	ly Settings	Cancel

 If incorrect data is received, or there is no data, change the COM port parameters in Port Settings group. COM port parameters:

> Baud Rate: 50–115200 (by default – 4800); Data Bits: 7,8 (by default – 8); Parity: None, Event, Odd, Space, Mark (by default – None); Stop Bits: 1,2 (by default – 1).

All the changes in the communication channel parameters are required to be made with the data monitoring turned off.

If data from some sensor is not processed by the NS 4000 but is nonetheless displayed in the monitoring window, it is necessary to turn off the processing of data checksum from the device in *System Configuration Utility*\Sensors\Sensors.

Finish testing by pressing Stop Monitoring and Close buttons.

- Enter as required, the log and gyro reading accuracy in Log Accuracy and Gyro Accuracy fields;
- Use the button Remove Sensor for deletion of unnecessary sensors;
- Press "Apply" button.
- During the NS 4100 installation, in addition to item 2, to use the functions for sending AIS bogus data on the own ship and target parameters, it is necessary to the WS with NS 4100 which the AIS sensor is connected to, in addition connect any free AIS port – Sensor 1, 2 or 3 (see INSTALLATION MANUAL R4

AIS CLASS A TRANSPONDER SYSTEM under Wiring Cable Connections). Connection should be made via ports with the RS-422 interface. This functionality is only available with the use of the SAAB R4SW Secure WAIS Transponder System. For the additional data on the functionality operation see NAVI-SAILOR 4100 ECDIS (v. 2.00.009). SPECIAL FUNCTIONS, section AIS Targets Simulation.

System Configur	ation Utility													
	Workstation	-ALL-	_ _											
INS	Sensors DEU set	lings Alias	Port		Workstation	Ch SL	eck Im	Baudrate	1	Bils	Pari	.y	Stop bits	Port test
1. 1	POS1	•	COM1	•	•	ON	•	4800 🔄	8	•	None	•	1 🔻	Test
7 B. 1	POS2	-	COM2	-	+	ON	-	4800	8	•	None	•	1 💌	Test
Workstation	LOG1	-	COM3	-		ON	-	4800	8	-	None	٠	1 💌	Test
Workstation	LOG2	-	COM4	-		ON	-	4800 💌	8		None	•	1 💌	Test
	DLOG1	•	COM5	-	*	ON	*	4800	8	-	None	•	1 💌	Test
\sim	GYRO1	-	COM6	-	-	ON	-	4800	8	-	None	*	1 💌	Test
- ANDAR	GYRO2	-	COM7	-	•	ON	-	4800	8	-	None	•	1 💌	Test
Sensors	MAGN	-	COM8	-	*	ON	-	4800	8	•	None	•	1 💌	Test
	AIS	-	COM9	-		ON	-	4800	8	-	None	*	1 💌	Test
-	NAVTEX	-	COM10	-	*	ON	-	4800	8		None		1 💌	Test
the second se	WIND	•	COM11	-	*	ON	-	4800	8	-	None	-	1 💌	Tes
Ш	TEMP		COM13	-	*	ON	۲	4800	8		None	*	1 💌	Tes
Radar	SOUNDER1	-	COM13	•	•	ON	-	4800	8		None	•	1 🔻	Test
	RHOTHETA	-	COM14	-	*	ON	-	4800	8	•	None	•	1 🔻	Test
	SEETRAC	-	COM15	-		ON	-	4800	8	-	None	*	1 💌	Tes
S.	WAGO_ADC1	-	COM16	-				4800	8		None		1 💌	Test
cell - 2	NMEA_CUSTOM1	-	COM17	-	*			4800	8	•	None	•	1 💌	Tes
Security	ARPA OUTPUT1		COM18	-				4800	8		None	*	1 -	Tes
	BOGUS OUT1	-	COM6	-	-			4800	8	-	None	•	1 🔻	Test
-	GOLD MSG OUT1	7	COM7	-	•			4800	8	Ŧ	None	-	1 👻	Test
1		-		•										
Iommissioning Table														
	Sensors Accuracy	2 1 0					DCL	J Disconnect	ed.				<u>R</u> emove	Sensor
Backup							[ОК]		Apply			ancel

- From the drop-down list in the Sensors column, select BOGUS_OUT, and assign the necessary COM port to it. By default, the Baudrate is 4800, the value can be checked or modified by using the AIS MKD (see under Port Rate Config in the OPERATOR'S MANUAL R4 AIS CLASS A TRANSPONDER SYSTEM);
- From the drop-down list in the Sensors column, select GOLD_MSG_OUT, and assign the necessary COM port to it;
- In the Check sum column, if required disable the checksum by selected "OFF" from drop-down list.

	Workstation -ALL-	
T.	Sensors DCU settings	
INS	DCUs Configuration:	
Workstation	DCU 1-1 F Enabled IP 1 Disconnected 10.8.1.200	
Sensors	IP 2 Disconnected	
Radar	DCU 1-2 Enabled IP 1 Disconnected 10 8 1 .201	
Security	IP 2 Disconnected 10.8.2.201	
Commissioning Table	DCU connection Connect Launch DCU Test., DCU status: Disconnected	
Backup		OK Apply Cancel

4. Switch to "DCU settings" page (if the DCU is available in the equipment set):

- In DCU 1-1 group check Enabled checkbox:
 - In IP 1 input box enter "10.8.1.200" IP address; In IP 2 input box enter "10.8.2.200" IP address.
- In DCU 1-2 group check Enabled checkbox:

In IP 1 input box enter "10.8.1.201" IP address; In IP 2 input box enter "10.8.2.201" IP address.

- In DCU connection group press Connect button:

System Configu	ration Utility	
INS	Workstation	
Di	DCUs Configuration: DCU 1-1 F Enabled Enabled	
Workstation	IP 1 Disconnected	
Sensors		
Radar	DCU connecting X IP 1 Disconnect Image: Cancel image: Can	
Security	IP 2 Disconnected	
	Connect Launch DCU Test DCU status: Connected	
raue		
Backup	OK Apply	Cancel

 After the connection of the DCU press the Launch DCU Test button and in the "DCU Client Simulator" utility window select the CONFIG/DCU CONFIG menu item:

📇 DCU Client Simulator	
File Config View Help	
DCU Config	
COM Ports	
F DLL: PortCint.dll	DCU IPs: 1[10.8.1.118;10.8.2.118]1[10.8.1.120;10.8.2.120]

 For the devices connected to the DCU ports, specify in the drop-down list the following COM port exchange parameters, defined in the technical description of connected sensor: Baud rate, Bits, Parity, and Stopbits;

DCUI	Vet Port	50019	DO	CU Serv	ver ver.	24			10.8.1	.118 (Connected		
Serve	r Delay Port	50017			DCU is	OK	-		10.8.2	.118 (Connected		
Client	Delay Port	50018											
	try to be MASTER	MASTER state	Pari	ty	Stop bit	s	Dat	a bits	Bits per	sec	Time out	Error	Time of set
irt O		Г	None	-	1 Stop Bit	-	8	-	38400	•	255	ОК	00:00:00.000 00-00-0000
rt 1		Г	None	-	1 Stop Bit	-	8	-	4800	-	255	ОК	00:00:00.000 00-00-0000
nt 2			None	•	1 Stop Bit	-	8	-	110 300		255	ОК	00:00:00.000 00-00-0000
rt 3		Γ	None	•	1 Stop Bit	•	8	•	2400		255	ОК	00:00:00.000 00-00-0000
rt 4	Γ		None	•	1 Stop Bit	•	8	•	9600 14400		181	ок	05:25:42.093 28-06-2001
ırt 5		Г	None	•	1 Stop Bit	-	8	•	19200 38400		255	ок	00:00:00.000 00-00-0000
ort 6			None	•	1 Stop Bit	•	8	•	57600 115200		255	ок	00:00:00.000 00-00-0000
ort 7		Г	None	•	1 Stop Bit	•	8	•	4800	•	255	ок	00:00:00.000 00-00-0000
ort 8	Г	Г	None	•	1 Stop Bit	•	8	•	4800	•	255	ОК	00:00:00.000 00-00-0000
ort 9		Г	None	•	1 Stop Bit	-	8	-	4800	-	255	ОК	00:00:00.000 00-00-0000
ort 10	Г	Г	None	•	1 Stop Bit	•	8	-	4800	-	255	ОК	00:00:00.000 00-00-0000
ort 11		Г	None	•	1 Stop Bit	-	8	•	4800	•	255	ОК	00:00:00.000 00-00-0000
rt 12			None	•	1 Stop Bit	-	8	-	4800	-	255	ОК	00:00:00.000 00-00-0000
wF 12	_	Г	None	-	1 Stop Bit	-	8	-	4800	-	255	ОК	00:00:00.000 00-00-0000

- Press the Flush and "Apply" buttons and then close the "Dialog" window;

 To check correctness of the sensor connection in the "DCU Client Simulator" utility window select the VIEW/SHOW ALL menu item:

📇 DCU Clier	it Simulator	
File Config	View Help	
	🖌 Status Bar	
	Cascade	
	Tile	
	Show all	
	Hide all	
	Port #0; slave; none	
	Port #1; slave; none	
	Port #2; slave; none	
	Port #3; slave; none	
	Port #4; slave; none	
	Port #5; slave; none	
	Port #6; slave; none	
	Port #7; slave; none	
	Port #8; slave; none	
	Port #9; slave; none	
	Port #10; slave; none	
	Port #11; slave; none	
	Port #12; slave; none	
	Port #13; slave; none	
	Port #14; slave; none	
	Daub #1E, slaver same	

 If the settings are correct, the utility windows will display information supplied to the DCU ports:

Port #1; slave; none Time delta=2.553	_ _ _×
\$HEHDT,115.01,T*1B \$HERDT03.7_8*32	_
\$HEROT,-03.7,A*32	
\$HEHDT,115.00,T*1A \$HEROT,-03.7,A*32	
\$HBHDT,114.99,T*1B	
\$HEHDT,114.99,T*1B	
\$HEROT,-03.7,&*32 \$HEHDT,114.98,T*1A	
\$HBROT,-03.7,A*32 \$	-
. ^D) Port #2: slave: none Time delta=2.554	
المعالم Port #2; slave; none Time delta=2.554	<u>_0×</u>
Port #2; slave; none Time delta=2.554	<u> </u>
Port #2; slave; none Time delta=2.554	
Port #2; slave; none: Time delta=2.554	
Port #2; slave; none: Time delta=2.554	
Port #2; slave; none: Time delta=2.554 \$GBGLL,0036.04329, S,00206.42077, W,175254.53, A,D*6E \$NVVHW,115.23, T, , H,15.2, N,28.2, K*59	<u>kol</u>
<pre>Port #2; slave; none: Time delta=Z,554 \$CPGLL,0036.04329, S,00206.42077, W,175254.53, A,D*6E \$NVVHW,115.23, T,, M,15.2, N,28.2, K*59 \$CPVTC,116.1, T,,15.2, N,28.2, K,D*4C \$CPCLL,0036.04515, S,00206.41697, W,175255.53, A,D*6D</pre>	<u>×</u>
<pre>Port #2; slave; none: Time delta=Z,554 \$CPGLL,0036.04329, S,00206.42077, W,175254.53, A,D*6E \$NVVHW,115.23, T,, H,15.2, N,28.2, K*59 \$CPVTC,116.1, T,,,15.2, N,28.2, K,D*4C \$CPCTL,0036.04515, S,00206.41697, W,175255.53, A,D*6D \$NVVHW,115.16, T, T, 15.2, N,28.2, K,D*4D \$CPVTC,116.0, T,15.2, N,28.2, K,D*4D</pre>	<u>× </u>
Port #2; slave; none: Time delta=2,554 \$CPGLL,0036.04329, S,00206.42077, W,175254.53, A,D*6E \$NVVHW,115.23, T,, H,15.2, N,28.2, K*59 \$CPVTC,116.1, T,,,15.2, N,28.2, K,D*4C \$CPVTC,036.04515, S,00206.41697, W,175255.53, A,D*6D \$NVVHW,115.16.0, T,,,15.2, N,28.2, K,D*4D \$CPVTC,116.0, 0,T,,15.2, N,28.2, K,D*4D \$CPVTC,116.0, 0,T,015.2, N,28.2, K,D*4D \$CPVTC,116.0, T,,15.2, N,28.2, K,D*4D \$CPVTC,116.0, T,0056.04700, S,00206.41317, W,175256.53, A,D*65 \$NVTHW	
<pre>Port #2; slave; none: Time delta=2,554</pre>	<u>× ם -</u> •
<pre>Port #2; slave; none: Time delta=2,554</pre>	
<pre>Port #2; slave; none: Time delta=2,554 \$CPCLL,0036.04329, S,00206.42077, W,175254.53, A,D*6E \$WVWW,115.23, T,, H,15.2, N,28.2, K*59 \$GPVTG,116.1, T,,,15.2, N,28.2, K,D*4C \$GPCLL,0036.04515, S,00206.41697, W,175255.53, A,D*6D \$WVWWW,115.16, T,, H,15.2, N,28.2, K,D*4D \$CPVTG,116.0, T,,,15.2, N,28.2, K,D*4D \$CPVTG,116.0, T,,,15.2, N,28.2, K,D*4D \$CPVTG,116.0, T,,,15.2, N,28.2, K,D*4D \$CPVTG,116.0, T,,,15.2, N,28.2, K,D*4D \$CPVTG,115.0, T,,,15.2, N,28.2, K,D*4D \$CPVTG,115.0, T,,,15.2, N,28.2, K,D*4D \$CPVTG,115.0, T,,15.2, N,28.2, K,D*4D \$CPVTG,115.0, T,,2</pre>	<u>× .</u>

- Close "DCU Client Simulator" utility;

 Switch to the "Sensors" page and in the line of the device connected to the NS 4000 via the DCU, press the Test button in the Port test column. The "Port DCU monitoring" window will display information supplied via the DCU to the NS 4000:

Port DCU1 monitoring		× LD×
\$GPDTM,W84,,,,,,,,W84*4A \$GPZDA,I75410.53,10,11,2008;GPDTM,W84,,,,,,,,W84*4A \$GPZDA,I75410.53,10,11,2008;GPDTM,W84,,,,,,,W84*4A \$GPDGA,175410.53,0036.17265,5,00206.12658;W,2,04,1.0,,,,,10.0,00 \$GPDTM,W04,,,,,,W84*4A \$GPZDA,175411.53,0036.17265,5,00206.12654;W,2,04,1.0,,,,,10.0,00 \$GPDTM,W04,,,,,,W84*4A \$GPZDA,175411.53,0036.17409,5,00206.12264,W,2,04,1.0,,,,,10.0,00 \$GPDTM,W64,,,,,,W84*4A \$GPZDA,175412.53,10,11,2008,02,00*6D \$GPDTM,W64,,,,,,W84*4A \$GPZGA,175412.53,0036.17562,5,00206.11869;W,2,04,1.0,,,,,10.0,00 \$GPDTM,W64,,,,,,W84*4A \$GPZGA,175412.53,0036.17562,5,00206.11869;W,2,04,1.0,,,,,10.0,00 \$GPDTM,W64,,,,,,W84*4A \$GPZGA,175413.53,10,11,2008,02,00*6C \$GPVTG,111.3,T,,,15.2,N,28.2;K,D*49 \$GPGGA,175414.53,0036.17765,00206.11475;W,2,04,1.0,,,,,10.0,00 \$GPDTM,W64,,,,,,W84*A \$GPZGA,175414.53,0036.17868;5,00206.11081,W,2,04,1.0,,,,,10.0,00 \$GPCGA,175414.53,0036.17868;5,00206.11081,W,2,04,1.0,,,,,10.0,00 \$GPCGA,175414.53,0036.17868;5,00206.11081,W,2,04,1.0,,,,,10.0,00 \$GPCGA,175414.53,0036.17868;5,00206.11081,W,2,04,1.0,,,,,10.0,00 \$GPCGA,175414.53,0036.17868;5,00206.11081,W,2,04,1.0,,,,,10.0,00 \$GPCGA,175414.53,0036.17868;5,00206.11081,W,2,04,1.0,,,,,10.0,00 \$GPCGA,175414.53,0036.17868;5,00206.11081,W,2,04,1.0,,,,,10.0,00 \$GPCGA,175414.53,0036.17868;5,00206.11081,W,2,04,1.0,,,,,10,0,00 \$GPCGA,175414.53,0036.17868;5,00206.11081,W,2,04,1.0,,,,,10,0,00 \$GPCGA,175414.53,0036.17868;5,00206.11081,W,2,04,1.0,,,,,10,0,00 \$GPCGA,175414.53,0036.17868;5,00206.11081,W,2,04,1.0,,,,,10,0,00 \$GPCGA,175414.53,0036.17868;5,00206.11081,W,2,04,1.0,,,,,10,0,00 \$GPCGA,175414.53,0036.17868;5,00206.11081,W,2,04,1.0,,,,,,10,0,00 \$GPCGA,175414.53,0036.17868;5,00206.11081,W,2,04,1.0,,,,,,10,0,00 \$GPCGA,175414.53,0036.17868;5,00206.11081,W,2,04,1.0,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	00*47 00*42 00*49 00*48	Parity Stop bits Parit e 1 Test e 1 Test
Monitoring		
Commissioning DC Table	US U9 U10 U11 U12 U13 U14 U15 U16 T	<u>R</u> emove Sensor
Backup	ОК	Apply Cancel

5. In the Workstation drop-dawn list, select the name of the workstation, which settings will be made for.

- ATTENTION! -

Perform individual settings for each Workstation, selecting them consecutively from the droop-down list **Workstation**. All data will be synchronized at all the Workstations after the settings saving.

THE	Sensors DCU setting	is Targel	ts Subsystem	Alarm Ou	tput	Settings	Este	ernal Alar	m I/C) Settings				
CNIL	Sensor		Allas	Port		Check	sum	Baudra	ate	Bits	Pari	ty	Stop bits	Po te:
* 8	POS1	•		COM1	•	ON	•	4800	•	8 💌	None	•	1 💌	Te
24	POS2	-		COM2	-	ON	-	4800	•	8 💌	None	•	1 💌	Te
lockshipp	LOG1	-		COM3	-	ON	•	4800	-	8 💌	None	-	1 💌	Te
PORSCAUUT	LOG2	-		COM4	-	ON	-	4800	*	8 💌	None	-	1 💌	Te
	DLOG1	-		COM5	-	ON	-	4800	-	8 💆	None	-	1 💌	Te
-	GYRO1	-		COM6	-	ON	-	4800	-	8 💌	None	-	1 💌	Te
Chanta	GYRO2	-		COM7	-	ON	¥	4800	•	8 💌	None	-	1 💌	Te
Sensors	MAGN	•		COM8		ON	-	4800	-	8 💌	None	•	1	Te
20112012	AIS	-		COM9	-	ON	-	4800	-	8 💌	None	-	1	Te
~	NAVTEX	*		COM10	-	ON	-	4800	*	8 💌	None	-	1 💌	Te
Conception 1	WIND	-		COM11	-	ON	-	4800	•	8	None	-	1 💌	Te
1	TEMP	-		COM13	-	ON	-	4800	-	8 💌	None	-	1 💌	Te
Radar	SOUNDER1	-		COM13	-	ON	-	4800	•	8 💌	None	-	1 💌	Te
	RHOTHETA	•		COM14	•	ON	•	4800	-	8 💌	None	-	1	Te
	SEETRAC	-		COM15	-	ON	•	4800	-	8 🔻	None	-	1 🔻	Te
5	WAGO_ADC1	•		COM16	•			4800	•	8 💌	None	•	1	Те
00) - J	NMEA_CUSTOM1	•		COM17	-			4800	•	8	None	-	1 💌	Te
Security	ARPA_OUTPUT1	-		COM18	-			4800	-	8 💌	None	-	1 🔻	Te
		-							-			_	01	
mmissioning Table	Other sensors							C	CUE	iisconnected.			Remove :	Sens

- Check the RS6 I/O ports checkbox if you intend to work with the alarms/warnings via the RS6 computer discrete ports (for the port setup see items 7 and 8).
- 6. Switch to "Targets Subsystem" page:



- Use UAIS Model group to select the model of the transponder:

Press AIS (IEC) radio button to operate with any transponder complying with IEC 61993-2; Press SAAB R4 radio button to operate with SAAB R4 transponder as an MKD.

- Use DR Settings group to set configuration of AIS targets DR mode:

Check Use DR for AIS Targets checkbox to turn on the AIS targets DR mode (recommended); In Minimal SOG to Activate input box, enter the AIS targets minimum speed whereby their positions will be reckoned (recommended SOG – 2 kn).

- Use Miscellaneous group to set AIS targets display mode:

In Maximum Range input box, enter the radius (up to 64 nm) of an area within which the AIS targets will be displayed; Check Always activated checkbox for activation displayed AIS targets (see also document NAVI-SAILOR 4000/4100 ECDIS (v. 2.00.009). FUNCTIONAL DESCRIPTION, Chapter 8, section AIS, paragraph AIS Transponder Interface).

 Use the Bogus targets settings group to set bogus functionality parameters (for NS 4100 installation only when working with the AIS SAAB R4):

From the **Read Port** drop-down list select the SAAB R4 transponder port which the BOGUS_OUT port in the NS 4100 is connected to (see item 3); In **R4 Admin password** input box enter SAAB R4 administrator transponder password (see document **OPERATOR'S MANUAL R4 AIS CLASS A**

TRANSPONDER SYSTEM).

 Use Rhotheta RT-202 settings group for RDF settings (see also document NAVI-SAILOR 4000/4100 ECDIS (v. 2.00.009). ADDITIONAL FUNCTIONS, Chapter 1, section MOB Mode with Use of RDF Rhotheta RT-202):

In Angle Correction input box, enter an exact correction between the initial direction of RDF Rhotheta RT-202 bearing origin and the ship's centreline plane;

Set the necessary correction polarity Positive or Negative by pressing the appropriate radio button.

Note: The correction should be within 180 degrees with a positive (0–179° clockwise) or negative (0–179° counter-clockwise) relative to the own ship centreline plane.

Check MOB Alert Alarm checkbox to turn on the NS 4000 alarm upon reception of bearing from Rhotheta RT-202 or AIS targets (see also document NAVI-SAILOR 4000/4100 ECDIS (v. 2.00.009). ADDITIONAL FUNCTIONS, Chapter 1, section MOB Mode with Use of RDF Rhotheta RT-202). Connection of the external MOB button is detailed in the relevant paragraph of Annex B in the Adjustment of NS 4000 ECDIS MFD Operation with WAGO Modules section.

 Use Seetrac Tracking group to specify the necessary Seetrac tracking mode: Channel Mode or Address Mode, by pressing the appropriate radio button.

Pub Id	Alarm name	NMEA Alarm	WAGO Alarm	WAGO	WAGO	R56 I/O	R56 I/O	RS6 I/O
			0.00000000	IN	OUT	Alarm	contact IN	contact OUT
0	Test alarm						-	-
2	Timer went off		E I			1		
3	End of watch		F					
5	End of route		-		-	—		
6	WP approach							
7	Course difference		H		-			-
8	Out of XTD				-	F -		
9	Traff.separ.zone							
10	Traffic SS crossing		T					
11	Traffic SS roundabout		i i i					
12	Precautionary area							
13	Two-way traff.route							
14	Deepwater route		Ē				-	
15	Recomm.traffic lane							
16	Inshore traffic zone		F					
17	Fairway							
18	Restricted area		i T					
19	Caution area							
20	Offshore prod.area						-	
21	Areas to be avoided							
22	Military area							
23	Seaplane landing	1.1						
24	Submarine transit		i i i i i i i i i i i i i i i i i i i					
	2 3 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	2 Timer went off 3 End of watch 5 End of route 6 WP approach 7 Course difference 8 Out of XTD 9 Traff: separ.zone 10 Traffic SS crossing 11 Traffic SS roundabout 12 Precautionary area 13 Two-way traff.route 14 Deepwater route 15 Recomm.traffic lane 16 Inshore traffic zone 17 Fairway 18 Restricted area 19 Caution area 20 Offshore prod.area 21 Areas to be avoided 22 Military area 23 Seaplane landing	2 Timer went off Image: Second Secon	2 Timer went off Image: Second Secon	2 Timer went off Image: Second Secon	2 Timer went off 3 End of watch 5 End of route 6 WP approach 7 Course difference 8 Out of XTD 9 Traff.separ.zone 10 Traff.separ.zone 11 Traffic S5 rousing 12 Precautionary area 13 Two-way traff.route 14 Deepwater route 15 Recom.trafficiane 16 Inshore traffic zone 18 Restricted area 19 Caution area <	2 Timer went off Image: Sector Secto	2 Timer went off Image: Section of Sectin of Section of Section of Section of Sectin of Section of S

7. Switch to "Alarm Output Settings" page:

- To transfer the alarm from the NS 4000 to the external device via NMEA interface (Output), check the checkbox in the column NMEA Alarm. Therefore, when the certain alarm is triggering off in the NS 4000, the ALR sentence with ID specified in the column Pub Id, will be outputted;
- To transfer the alarm from the NS 4000 to the external device via WAGO Module, check the checkbox in the column WAGO Alarm. In this case, when the certain alarm is triggering off in the NS 4000, the WAGO Module contact specified in the column WAGO contact OUT, will be closed. This alarm will be confirmed by closing the WAGO Module contact specified in the column WAGO contact IN:

In the column WAGO contact IN, specify the WAGO Module contact intended for acknowledgement of the selected alarm; In the column WAGO contact OUT, specify the WAGO Module contact intended for transferring the alarm to the external device.

– To transfer the alarm from the NS 4000 to the external device via RS6 output contacts, check the checkbox in the column RS6 I/O Alarm. In this case, when the certain alarm is triggering off in the NS 4000, the RS6 output contact specified in the column RS6 I/O contact OUT, will be closed. This alarm will be confirmed by closing the RS6 input contact specified in the column RS6 I/O contact IN:

In the column RS6 I/O contact IN, specify the RS6 input contact intended for acknowledgement of the selected alarm; In the column RS6 I/O contact OUT, specify the RS6 output contact intended for transferring the alarm to the external device.

- In the window Dead man signal of the group Other WAGO contacts, specify the number of WAGO Module contact intended for transferring the timer reset signal to the outer Alarm Panel. Therefore, the specified contact will be closed by trackball movement with resetting the "Dead Man" timer on the outer Alarm Panel;
- In the window Alarm Sound of the group Other WAGO contacts, specify the number of WAGO Module contact intended for silencing the alarm sound signal came from outer equipment. Closing the specified contact performs the silencing of all the active alarms.
- 8. Switch to "External Alarm WAGO Settings" page:

	Name	Source	Warning	Alarm State	Alarm	Alarm Sound	Alarm	Alarm Sound
A				In Contact	In Contact	In Contact	Out Contact	
orkstation								
iensors								
							R	emove alarm
Dadar								onoro alam
-RS6	1/O settings							
R56	I/O settings Name	Source	Warning	Alarm State In Contact	Alarm Acknowledge In Contact	Alarm Sound In Contact	Alarm Acknowledge Out Contact	Alarm Sound Out Contact
ecurity	I/O settings Name	Source	Warning	Alarm State In Contact	Alarm Acknowledge In Contact	Alarm Sound In Contact	Alarm Acknowledge Out Contact	Alarm Sound Out Contact
ecurity	I/O settings Name	Source	Warning	Alarm State In Contact	Alarm Acknowledge In Contact	Alarm Sound In Contact	Alarm Acknowledge Out Contact	Alarm Sound Out Contact
isecurity missioning	I/O settings Name	Source	Warning	Alarm State In Contact	Alarm Acknowledge In Contact	Alarm Sound In Contact	Alarm Acknowledge Out Contact	Alarm Sound Out Contact
iecurity	I/O settings Name	Source	Warning	Alarm State In Contact	Alarm Acknowledge In Contact	Alarm Sound In Contact	Alarm Acknowledge Out Contact	Alarm Sound Out Contact
ecurity missioning Table	I/O settings Name	Source	Warning	Alarm State In Contact	Alarm Acknowledge In Contact	Alarm Sound In Contact	Alarm Acknowledge Out Contact	Alarm Sound Out Contact

In WAGO I/O settings group make settings for work with alarms and warnings via WAGO modules:

- In the column Name, enter the alarm name which is to be displayed in NS 4000 by closing/unclosing the WAGO Module contacts specified in the column Alarm State In Contact;
- In the column Source, enter the alarm source name (up to 5 characters) which is to be displayed in the NS 4000 tasks;
- In the Warning column, check checkbox if this alarm is required to be a warning which is to be displayed in the NS 4000 "Warnings" task window;
- In the column Alarm State In Contact, specify the alarm mode:

N/C – normal closed; N/O – normal opened:

Name	Source	Warning	Alarm State In Contact	Alarm Acknowledge In Contact	Alarm Sound In Contact	Alarm Acknowledge Out Contact	Alarm Sound Out Contact	
Autopilot Failed	PT500		2 N/0 🔻	0 N/O 💌	0 N/O 💌	0 N/O 💌	0 N/O 💌	
			N/O	8.7				

Specify the WAGO Module contact by closing/unclosing of which the specified alarm will be triggered off in NS 4000.

 In the column Alarm Acknowledge In Contact, specify the outer source alarm acknowledge mode:

N/C – normal closed; N/O – normal opened.

Specify the WAGO Module contact by closing/unclosing of which the specified alarm will be acknowledged in NS 4000 from the outer source.

- In the column Alarm Sound In Contact, specify the outer source alarm silencing mode:

N/C – normal closed; N/O – normal opened.

Specify the WAGO Module contact by closing/unclosing of which the specified alarm will be silenced in NS 4000 from the outer source.

 In the column Alarm Acknowledge Out Contact, specify the mode of outer source alarm acknowledge from the NS 4000:

N/C – normal closed; N/O – normal opened.

Specify the WAGO Module contact by closing/unclosing of which the specified outer source alarm will be acknowledged from the NS 4000.

 In the column Alarm Sound Out Contact, specify the mode of outer source alarm silencing from the NS 4000:

N/C – normal closed;

N/O - normal opened.

Specify the WAGO Module contact by closing/unclosing of which the specified outer source alarm will be silenced from the NS 4000.

In much the same way, make settings in the RS6 I/O settings group for work with alarms and warnings via RS6 input/output contacts.

NS 4000/4100 Settings

 Press INS button. Open "Network settings" page to set the NS 4000 network parameters (in the case of NS 4000 network configuration). This page is intended for specifying the ECDIS task priority on each NS 4000 Workstation. The priority can only be set for a WS with the Backup role. The highest priority ("0") has a Workstation engaged in primary navigation data processing. The function of navigation data processing is transferred to the Workstations with the lower priority in a queue ("1", "2", etc.) in the case of ECDIS task failure on the Workstation with "0" priority.

If the Slave role is set for a workstation, it can never be used as the ECDIS MASTER.
T	Network settings	General Ship settings	Chart collections	Fallback NMEA Input f	filter		itoul
INS	Workstation		Application	Role	1	Priority	
140	W01		sailor	Backup	-	0	1
	W01		radar	Slave	-		
AP	W02		sailor	Backup	•	1	
10000	W02		radar	Slave	-	10	
orkstation	W03		sailor	Backup	-	2	
	W03		radar	Slave	•		_
~	W04		sailor	Backup	-	3	
HUND	W04		radar	Slave	•		
21. 2 .52	W05		sailor	Backup	-	4	
ensors	W05		radar	Slave	-		
Radar							
Radar Radar Security							

- In Role column, by default set Backup role for ECDIS tasks on all WS.
 For RADAR task on all WS set Slave role;
- Use Priority column to set the workstation priority for ECDIS tasks in accordance with the NS 4000 configuration.
- 2. Switch to "General" page:



- In the field Watches, set the navigation watches schedule;
- In the field Navigational data settings, specify the period of the navigation data processing (milliseconds) (see document NAVI-SAILOR 4000/4100 ECDIS (v. 2.00.009). FUNCTIONAL DESCRIPTION, Chapter 2, section Navigation Sensors, paragraph Consistent Common Reference System);
- Check the Double ended vessel checkbox if it is this type of ship which NS 4000 is installed on;
- Check the SOG calculation from STW+drift enabled check box if it is necessary to have such source for the SOG;
- Keep Integrity check enabled checkbox unchecked for non-certified (DNV, Lloyd's Register) installations (it is strictly recommended!).
- 3. Switch to "Ship settings" page:

System Configura	ition Utility
	ARPA Dutput NMEA Input Track Control Speed Maneuvering Tracks NMEA Custom WAGO NavTex Network settings General Ship settings Chart collections Fallback NMEA Input filter NMEA Output
INS	Site of Stations Select Station to Site Common Station
4)	POS1 POS2 DL0G1 head sensor
Workstation	DLUG1 stem sensor Name KOLA Bridge Elevation 41 m Station Position (meters): Name E000264104 Elevation 41 m
Conner	★ [-93] ±: 0 ±: 100 NO 1003234104 Height (from keel): ±: ±: 100 NO 1003234104
Sensors	
Radar	+Radar External 1 +PDS1 +DEGRA shared external +X
R	+POS2 +AIS External GPS
Security	+Y
Commissioning Table	Select User Ship Contour Default Add
	Current User Ship Contour: Default
Backup	OK Apply Cancel

 In the field Ship Setup, enter the following own ship identification data to be used in the AIS transponder work:

> MMSI; Call Sign; Ship's Name; IMO No.

- In the field Ship Setup, enter the principal dimensions of the own ship:

Beam Overall (in metres); Length Overall (in metres); Bridge Elevation (in metres), the value which is used for lights visibility calculation.

- Enter the Conning Station coordinates and coordinates of the next connected sensor antenna units. Configuration of external devices connection to the NS 4000 ports is performed on the page "Sensors" of the panel "Sensors" (see above). If external device is not connected, the group will be blank:
 - POS1 (D)GPS1;

POS2 – (D)GPS2;

DLOG1 head sensor – the head Dual-Axis Bottom Speed sensor, which will be used for calculations in the NS 4000 (see **Navi-Sailor 4000/4100**

ECDIS (v. 2.00.009). FUNCTIONAL DESCRIPTION, **Chapter 3**, section **Docking Mode**);

DLOG1 stern sensor – the stern Dual-Axis Bottom Speed sensor, which will be used for calculations in the NS 4000;

DLOG1 head conning – head point, which the calculated transverse vector will originate from when displayed on the "Dual" panel of ECDIS task in Docking Mode (see **NAVI-SAILOR 4000/4100 ECDIS (v. 2.00.009).**

FUNCTIONAL DESCRIPTION, **Chapter 3**, section **Docking Mode**); **DLOG1 stern conning** – stern point, which the calculated transverse vector will originate from when displayed on the "Dual" panel of ECDIS task in Docking Mode;

Radar Master 1 – scanner X-band; Radar Master 2 – Scanner S-band; External AIS GPS – (D)GPS for the AIS; Internal AIS GPS – DGPS for the SAAB R4 AIS type only.

Note: Input can be made either with the cursor on the ship's scheme in the middle part of the page or by the direct coordinates entering in Station Position (meters) field. Geographic coordinates of the ship are always referred to the reference point. See document NAVI-SAILOR 4000/4100 ECDIS (v. 2.00.009). FUNCTIONAL DESCRIPTION, Chapter 2, section

(v. 2.00.009). FUNCTIONAL DESCRIPTION, Chapter 2, section Navigation Sensors, paragraph Consistent Common Reference System.

- In the field Height (from keel), specify the heights from the keel for transducers of each Echosounder (+/-);
- In User Ship Contour field, select the User Ship Contour, which is to be displayed on the ECDIS task screen when the ship size comparable scale is selected (the licensed option to be ordered in Transas).
- 4. Switch to "Chart collections" page:
 - In Chart Collections field, specify chart formats required for work with the application. All checkboxes are checked by default, i.e. upon installation of charts of specified formats they will be displayed; if checkbox is not checked, the charts of this format will not be displayed;
 - In Databases group, specify databases required for work with the application (see document NAVI-SAILOR 4000/4100 ECDIS (v. 2.00.009).
 FUNCTIONAL DESCRIPTION, Chapter 7).
 - In Tidal databases group specify databases sources required for work with the NS 4000 in Databases group. Total Tide source can be chosen if Total Tide SW product had been pre-installed and the appropriate option is opened by the license.

	ARPA Output	NMEA Input	Track Control	Speed Maneuvering	Tracks	NMEA Custom W	VAGO NavT
내했다	Network settings	: General	Ship settings	Chart collections	Fallback	NMEA Input filter	NMEA Outpu
INS	- Chart Collectio	ons	1				
	🔽 Transas						
1							
Workstation	T inc						
Norkstauori	I∕ <u>A</u> HUS						
\sim							
Catalon .							
Sensors							
~	- Databases		1				
the second secon	I _idal						
- Badar	🔽 Tidal Cur	rents					
	Surface I	Currents					
®)							
110							
Security	Tidal databas	e	1				
142425	Transas C T L L C						
12							
ommissioning							
Table							

5. Switch to "Fallback" page:

	Network settings Gener	al Shin settings Ch.	art collections Fallback N	MEA Input filter NMEA Output
TRIC	Fallback modes	Position	Heading	Speed
TNP	Totegrity check	V 5 cer	S cer	S cer
	Sensor failure	5 sec	5 sec	S Sec
31	Diff mode lost	✓ 10 sec.	0.000	
1940	Automatic restore	10 sec.	10 sec.	10 sec.
Vorkstation			P	F ired
~				
- POPPOP				
Sensors				
0				
T				
p.d.				
Radar				
B				
12				
Security				
Jocancy				
2				
1				
en en la cia en la c				
Table				
	1			

 If an alarm is required to be generated by the loss of the GPS differential mode, check the Diff. Mode lost checkbox. The rest of the parameters of shifting to the reserve data sources are set by default and not accessible for editing (NAVI-SAILOR 4000/4100 ECDIS (v. 2.00.009). FUNCTIONAL DESCRIPTION, Chapter 2, section NAVIGATIONAL SENSORS, paragraph Navigational Sensors Selection, item Automatic Source Selection with Actuation of Fallback Functionality).

	Network settings	General	Ship settings	Cha	it collections	Fallt	iack N	MEA Input f	ilter	NMEA Outpu
INS	Sensor	Alias	ALL	<u> </u>		r.				
and the second s	POS1		ALL	DTM	GGA	GLL	RMC	VTG	GBS	GN5
800	POS2		ALL	DTM	GGA	GLL	RMC	VTG	GBS	GNS
Al	LOG1		ALL	VBW	VHW					
(2))) (a)	LOG2		ALL	VBW	VHW		1			
rkstation	GYRO1		ALL	HDT	VHW	THS				
	GYRO2		ALL	HDT	VHW	THS				
~	WIND	1	ALL	MWV	MWD	VWR				
and a state	SOUNDER1	[ALL	DBT	DPT					
Radar										
Radar Radar ecurity										

6. Switch to "NMEA Input Filter" page:

The table provides all the messages from the data sources processed in the NS 4000:

- Press the button with the message name to prohibit its processing;
- Press the ALL button to prohibit the processing of all the messages from the source in question;
- In Not processed talkers input field enter talkers of sensors messages from which will be ignored. If necessary to switch-off the talker filter uncheck Talker filter checkbox.
- 7. Switch to "NMEA Output" page:
 - In the field Sensor, select the NMEAOUT where the NMEA sentences will be transmitted from NS 4000. Configuration of NMEAOUT connection to the NS 4000 ports is performed on the page "Sensors" of the panel "Sensors" (see above). If external device is not connected, the page will be blank;
 - By default, some sentences available for transmitting to the external devices will be transmitted by the NS 4000. Clear the corresponding checkboxes to disable the unnecessary sentences transmitting;
 - For the GLL, GGA, VDR and WPL sentences, select the required precision (a number of decimals after the comma) in the Precision column. If necessary, for GGA and VDR sentences disable the status value transmitting by unchecking the checkbox in the Status column;
 - To disable the NMEA sentences checksum transmitting, uncheck the checkbox Check Sum in the Append To All group.

NS 4000 Configuration

T	Network se	ettings	General Ship settings Chart collections Fallback NMEAC	A Input filter	NMEA Outpu	
INS	Sensor 🖡	NMEAOUT	1			
AP	IEC 61162-1,	, 2000 (NMI	EA 0183 v. 3.01, 2002)	1	- Discourse and the second	
	ID	Used	Message Sample	Precision	Status/Magnet	
orkstation	GLL		\$ECGLL,IIII.III,a,yyyyy,yyy,a,hhmmss,A,a*hh	0.001		
	GGA		\$ECGGA,hhmmss.ss,III.III,a,yyyyy.yyy,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxx*hh	0.001		
~	VTG			1979	100	
Copper	VHW					
10.000	VDR		\$ECVDR,nnn.n,T,.n,M,nn.n,N*hh	0.1	1	
Sensors	WPL	¥	\$ECWPL,IIII.III,a,yyyyy,yyy,a,nnn*hh	0.001	7771	
	RTE	×	\$ECRTE,x.x,x.x,a,nnn,nnn,,nnn*hh			
6	ZDA		\$ECZDA,hhmmss,dd,mm,yyyy,zz,xx*hh			
Y	XTE		<u>200</u>	1969		
	GBS		***			
Radar	DTM					
	HDT			7772	2523	
6	ROT					
	VBW					
а 	APB		200	17723	1000	
Security	BOD					
	BWC			111	2227	
17	DPT		270 C		2005	
15	OSD			100		
	RMB			2002))		
Table	- Append To	All ——— <u>k</u> Sum				

8. Switch to "ARPA Output" page:

🖟 System Configur	ation Utility			
INS	Network settings ARPA Output Ni Sensor ARPA_OU	General Ship settings Chart collections Fallba #EA Input Track Control Speed Maneuvering Track TPUT1 💽	ck NMEA Input filter s NMEA Custom V	NMEA Output /AGO NavTex
Workstation	IEC 61162-1, 2000 (NM ID Used RSD	EA 0183 v. 3.01, 2002) Message Sample 	Precision	Status/Magnet
Control	TTM (ARPA) TTM (AIS) TTD (ARPA) TTD (AIS)	*** *** ***		
Sensors				
Radar				
Commissioning Table	- Append To All	_		
Backup	Check Sum		OK Apply	Cancel

- In the field Sensor, select the ARPA_OUTPUT where the NMEA sentences will be transmitted from NS 4000. Configuration of ARPA_OUTPUT connection to the NS 4000 ports is performed on the page "Sensors" of the panel "Sensors" (see above). If external device is not connected, the page will be blank;
- Check the corresponding checkboxes to enable the necessary sentences transmitting to the external devices from NS 4000;
- To disable the NMEA sentences checksum transmitting, uncheck the checkbox Check Sum in the field Append To All.
- 9. Switch to "NMEA Input" page:

🗍 System Configur	ation Utility _ 🗌 🗙
	Network settings General Ship settings Chart collections Fallback NMEA Input filter NMEA Output ARPA Dutput NMEA Input Track Control Speed Maneuvering Tracks NMEA Custom WAGO NavTex
Workstation	Message: \$VBW,x.x,x.x,A,x.x,A,x.x,A,x.x,A*hh
Sensors	
Radar	
Security	
Table	
Backup	OK Apply Cancel

– For each connected DLOG (Dual-Axis Bottom Tracking Log), uncheck checkboxes for VBW sentence fields which should not be processed in the NS 4000 (e.g., due to the absence of relevant sensors). Configuration of external devices connection to the NS 4000 ports is performed on the page "Sensors" of the panel "Sensors" (see above). If external DLOG sensor is not connected, the page will be blank.

	Network settings General Ship settings Chart collections Fallback NMEA Input ARPA Dutput NMEA Input Track Control Speed Maneuvering Tracks NMEA Custom	filter NMEA Outpu
Workstation Sensors Radar Security	Autopilot type Ship Limits and Settings Light Loaded Autopilot PT500A Max speed 30.0 kt 30.0 kt NautoPilot 2025 ''C' Max RDT 1.0 '/sec 1.0 '/sec Autopilot AP3000 Matelot F distance 0.13 nm 0.13 nm Autopilot AP3000 Navie Transas Autopilot 0.5 nm 0.5 nm Transas Autopilot Min tum radius 0.5 nm 1.2.0 1.2.0 Min manoeuvre speed 3.0 kt Max Ruder angle 25 * Initial Pos-Track 1.0 nm Initial HDG-Track 20 * Max course deviation 30 * Default radius 0.5 nm	
Commissioning Table		

10. Switch to "Track Control" page. This page is intended for configuration Track Control functionality.

- Configuration of TCS connection to the NS 4000 ports is performed on the page "Sensors" of the panel "Sensors" (see above). If external device is not connected, the page will be blank;
- In Autopilot type group, select the name of the autopilot used for Track Control mode:

NautoPilot 2025 Plus "C" – with the use of NP2025 autopilot by "Raytheon" for TCS Class C installation;

Autopilot AP3000 – with the use of AP3000 autopilot by "Navis" for TCS Class C installation;

None – Track Control is switched off.

 In Ship limits and Settings group, set the limitations required for the operation of Track Control mode:

Max speed – maximum ship speed (up to 30 knots) (for an empty and loaded ship);

Max ROT – maximum rate of turn within the range of 1.0 to 10.0 degrees per second (for an empty and loaded ship);

F distance – lead distance within the range of 0.01 to 1.00 mile (for an empty and loaded ship);

Min turn radius – minimum radius within the range of 0.1 to 3.0 miles (for an empty and loaded ship);

Altering gain – coefficient of the ownship control accuracy adjustment within 0.1 to 20.0 (for an empty and loaded ship);

Min manoeuvre speed – minimum speed within the range of 1.0 to 10.0 knots; Max rudder angle within the range of 25 to 70 degrees;

Initial Pos-Track – maximum distance of the ship position from the monitored route leg for steering to this leg at the time of turning on Track Control mode. The value is forcedly synchronised with the Max XTD value;

Max XTD – maximum distance from the leg of the monitored route expected to be used in Track Control mode. It is set within the range of 1.0 to 5.0 mile;

Initial HDG-Track – maximum deviation of the current ship course from the monitored route leg for steering to this leg with Track Control mode ON. It is set within the range of 20 to 60 degrees;

Max course deviation – maximum possible deviation of the current ship course from the leg of the monitored route as it is proceeded along in Track Control mode. It is set within the range of 5 to 30 degrees; Set the turn arc radius to be used by default when Quick Track mode is turned on (Default radius), not less than 0.1 mile.

11. Switch to "Speed Maneuvring" page. This page is intended for configuration Trial Manoeuvre functionality:

;]} System Configura	ation Utility	_ _ ×
	Network settings General Ship settings Chart collections Fallback NMEA Input filter NMEA ARPA Output NMEA Input Track Control Speed Maneuvering Tracks NMEA Custom WAGO N	Dutput NavTex
INS	Ship loading Full	
Workstation	Max. Speed (kt) Stopping\acceleration (sec) Turn parameters (0:360) On Full Ahead 13.6 STOP to FULL AHEAD 552 End Speed (rudder 15) 8.4 kt On Half Ahead 12.0 FULL AHEAD to FULL ASTERN 180 End Speed (rudder 35) 7.2 kt On Slow Ahead 10.1 FULL AHEAD to STOP 540 Turn Radius (rudder 15) 0.15 nm	
-	Ahead Tum Radius (rudder 35) 0.10 nm	
Sensors	Advanced settings	
Padar		
Security		
B		
Commissioning Table		
Backup	OK Apply C	ancel

- In the Ship Loading drop-down list, select the ship loading option;
- In the Max. Speed group, set the ship speed in the conditions of the selected ship loading option for the following main engine operating modes (from the Pilot Card):
 - On Full Ahead; On Half Ahead; On Slow Ahead; On Dead Slow Ahead.
- In the Stopping\acceleration group, set the ship acceleration (stopping) time in the conditions of the selected loading option for the following modes (from Pilot Card):

STOP to FULL AHEAD – from 0 ("Stop" engine operating mode)
to the maximum speed ("Full Ahead" main engine operating mode);
FULL AHEAD to FULL ASTERN – maximum speed ("Full Ahead" main engine operating mode) to 0 ("Full Astern" main engine operating mode);
FULL AHEAD to STOP – maximum speed ("Full Ahead" main engine operating mode) to 0 ("Stop" main engine operating mode).

- In the Turn parameters group, set the ship turning circle parameters in the conditions of the selected loading option for the "Full Ahead" main engine operating mode:
 - End Speed (rudder 15) steady turn speed at 15° rudder angle; End Speed (rudder 35) – steady turn speed at 35° rudder angle; Turn Radius (rudder 15) – turn radius at 15° rudder angle; Turn Radius (rudder 35) – turn radius at 35° rudder angle.
- 12. Switch to "Tracks" page:

System Configura	ition Utility			
	Network settings General ARPA Output NMEA Input	Ship settings Chart collections Track Control Speed Maneuvering	Fallback NMEA Input filter Tracks NMEA Custom W	NMEA Output
INS	Track of own ship Primary Position & General Nav.Dat	a 10 sec		
42	Secondary Position	10 • sec		
Workstation	Depth	10 sec		
Connor.	Wind Temperature	60 💌 sec		
Sensors	Tracks of Targets	Les mil est		
	Hacks of Faigets			
A				
Security				
C1 .				
Commissioning Table				
Backup			ОК Аррју	Cancel

In the Track of own ship group, set the time interval for recording the following data (see NAVI-SAILOR 4000/4100 ECDIS (v. 2.00.009). FUNCTIONAL DESCRIPTION, Chapter 6, sections General and Own Ship Track):

Primary Position & General Nav. Data – for own ship position and its motion parameters (HDG/STW/COG/SOG): 10 sec only; Secondary Position – for own ship secondary position: 10 sec only; Route Monitoring Data – for the monitored route name, monitored WPT, XTD, WPT selection mode: 10 or 20 sec; Depth – for depth from echosounder: 10 or 20 sec; Wind – for wind: 10, 20, 30, or 60 sec; Temperature – for temperature: 20, 30, or 60 sec.

- In the Tracks of Targets group, set the time interval (10, 20, or 60 sec) for recording the targets' information (identifiers, coordinates and motion parameters) (see NAVI-SAILOR 4000/4100 ECDIS (v. 2.00.009).
 FUNCTIONAL DESCRIPTION, Chapter 6, sections General and Target Data).
- Switch to the "NMEA Custom" page. For setting up of the reception of customised NMEA-like sentences for the CONNING task see Annex B, section Adjustment of NS 4000 ECDIS MFD Operation with NMEA Custom.

- 14. Switch to the "WAGO" page. For setting up the reception of analog and discrete parameters for the CONNING task via the WAGO modules, see **Annex B**, section **Adjustment of NS 4000 ECDIS MFD Operation with WAGO Modules**.
- 15. Switch to "NavTex" page:

🖟 System Configura	ation Utility		-OX
INS	Network settings General Ship settings Chart collections Fallback NMEA ARPA Output NMEA Input Track Control Speed Maneuvering Tracks NMEA Cu Sensor NAVTEX	Input filter Istom W	NMEA Output
Workstation	Device polling timeout 10 min. IEC 61162-1, 2000 (NMEA 0183 v. 3.01, 2002)		
Sensors	ID Used Message Sample	Precision	Status/Magnet
Seisors			
Radar			
Security			
Commissioning Table			
	Append To All		
Backup	ОК	Apply	Cancel

- Configuration of NAVTEX receiver connection to the NS 4000 ports is performed on the page "Sensors" of the panel "Sensors" (see above). This page is available if only NMEA NAVTEX receiver (no ASCII) connected, otherwise the page will be blank;
- In the Device polling timeout field enter the time interval (from 5 to 60 min) which the NAVTEX Messages database will be updated at (see NAVI-SAILOR

4000/4100 ECDIS (v. 2.00.009). FUNCTIONAL DESCRIPTION, Chapter 7, section NAVTEX Messages);

Note: Where messages are required to be transmitted to the NAVTEX receiver, use the NMEAOUT (see item 7).

Workstation Settings

Press Workstation button. The drop-down Workstation list specifies the name of the workstation which settings will be made for.

- ATTENTION! -

Perform individual settings for each Workstation, selecting them consecutively from the droop-down list Workstation. All data will be synchronized at all the Workstations after the settings saving.

1. Open "Sound" page to set the WS sound parameters:

🕕 System Configu	ration Utility	
INS	Workstation	1
Workstation	 ☞ PC Speaker ☞ Sound Card ☞ Alarm Sound 	
Sensors		
Radar		
Security		
Commissioning Table		
Backup	OK Apply Can	cel //

- In Sound group, select the device for the reproduction of acoustic alarms:
 PC Speaker via the built in speaker;
 Sound Card via the sound card and external speakers.
- Checkbox Alarm Sound must be check on.

2. Switch to "Display" page:

🕕 System Configur	ration Utility	_ 🗆 🗙
	Workstation W01	
INS	Sound Unspray Reyboard Collections Multiunits Skins Additional settings Integrator	
Workstation	Monitor Type Size C CRT Model JH_19T01_MMD_E1 Monitor Size AutoDetect Add new model	
Sensors		
P		
Radar		
Security		
B		
Commissioning Table		
Backup	ОК Арріу Са	ancel

- In Monitor Type group of "Display" page, press LCD radio button, and in Model drop-down list, select the monitor type depending on the display size and WS PC configuration or check AutoDetect checkbox;
- In Monitor Size input window, enter the display diagonal size in mm.
- 3. Switch to "Keyboard" page:

Workstation W01 INS Sound Display: Keyboard Collections Multiunts Skins Additional settings Integrator INS Keyboard settings IVertual keyboard settings Integrator Virtual keyboard settings Virtual keyboard enabled Virtual keyboard enabled Virtual keyboard enabled Security Virtual keyboard enabled Rader Virtual keyboard enabled Security Virtual keyboard enabled	system Configura	tion Utility	
INS Sound Display Keyboard Collections Multiunts Skins Additional settings Integrator Image: Second Settings Type Image: Second Settings Image: Second Settings Image: Second Settings Image: Second Settings		Workstation W01 -	
Image: Second settings Workstation Virtual keyboard extrings Image: Virtual keyboard enabled Sensors Second Second Second Table Deckun OK Andw Complexing Mode Exclusion Virtual keyboard enabled Image: Complexing settings Image: Complexing setting settings Image: Complexing setting	INS	Sound Display Keyboard Collections Multiunits Skins Additional settings Integrator	
Image: Sensors Sensors Image: Sensors		Keyboard settings	
mode E3 Workstation Virtual keyboard settings ✓ Mitual Keyboard enabled Sensors ✓ Sensors ✓ Security ✓ Security ✓ Dominissioning Table ✓ Broken ØK Angle ØK	A	Note ES6	
Vitual keyboard settings Seriors Radar Security Description Backun Description	Workstation	Hode ES3	
Seriors Radar Security Packan Backan OK Ande Carada		Virtual keyboard settings	
Sensors Sensors Rader Security Commissioning Table Beckun (K Annh Cannel	Card Card	Virtual keyboard enabled	
Radar Security Dominissioning Table	Sensors		
Radar Security Demonstanting Table			
Rader Security Definition Table Backun OK Anthe Carcel			
Security Definition of the second se	Badar		
Security Beckun Table Backun OK Annly Cannel			
Security Definition Table Backan OK Annly Cannel	9		
Backun OK Annly Cancel	oaj ∾ Security		
Rackun OK Annik Cancel			
Table Backun	17		
Table *	ommissionina		
Backun OK Anniv Cannal	Table		
Backun OK Annly Cancel			
Backun OK Anniv Cannel			
Backin OK Anniv Cancel			
	Backup		Capcel

- In Keyboard settings group of "Keyboard" page, from Type and Mode drop-dawn lists select the keyboard type and mode (see Chapter 1, section Workstation Installation, paragraph Transas ES6 Dedicated Keyboard with Trackball Installation);
- Check Virtual keyboard enabled checkbox for use the virtual keyboard.
- 4. Switch to "Collections" page.
- **Note:** The settings specified here, are only made for the WS which the SPOS 6 software is installed on:

🖟 System Configura	ation Utility	
IN5	Workstation W01 Image: Sound Display Keyboard Collections Multiunits Skins Additional settings Integrator	1
Workstation	Collections for mapping Collections for mapping Collections for mapping Addinfo	
Sensors		
Radar		
Security		
Table		
Backup	ОК Арріу	Cancel

- In the Collection mapped folder path field, specify the path to the folder for the route exchange and synchronising with the SPOS 6 program (C:\Transas\SPOS_route_exchange);
- Check Route checkbox in Collection for mapping group and press "Apply" button.
- 5. Switch to "Multiunits" page:
 - On "Multiunits" page in Units group, set the measurement units which will be used for the display of the following parameters in the NS 4000:

```
Ship and Target Speed – in knots (kt) or kilometres per hour (km/h);
Distances – in miles (nm), kilometres (km) or statute miles (stm);
Depths/Heights – in metres (m), feet (ft), or fathoms (fms);
Draught – in metres (m) or feet (ft);
Wind Speed – in metres per second (m/s), kilometres per hour (km/h),
or knots (kt);
Temperature – in degrees Celsius (C) or degrees Fahrenheit (F).
```

NS 4000 Configuration

🕕 System Configu	ration Utility	_ 🗆 🗙
	Workstation W01 V	
INS	Sound Display Keyboard Collections Multiunits Skins Additional settings Integrator	
A)]	Ship and Target Speed Distances nm 💌	
Workstation	Precision Distances	
Control Inc.	Draught m	
Sensors	Vind speed IN/S Temperature IC	
P	Pressure hPa 💌	
Radar		
S.		
Security		
Table		
Backup	OK Apply C	ancel

6. Switch to "Skins" page:

🕕 System Configur	ation Utility	_0×
INS	Workstation w01 Sound Display Keyboard Collections Multiunits Skins Additional settings Integrator	
Workstation Workstation Sensors Radar	View Skin Select Skin Theme Blue Cabon Elastic Missing Plastic Missing Plastic Image: Skin Theme Blue Delete chart Figure Data Missing Plastic Blue Static Blue Static Static Shift Object Shift All Objects Static	
Commissioning Table		
Backup	ОК Арріу С	ancel

 Check Use Skin checkbox and select the type of graphic presentation in Select Skin Theme window. 7. Switch to "Additional settings" page:

🕕 System Configur	ration Utility	
INS Workstation	Workstation w01 Sound Display Keyboard Collections Multiunits Skins Additional settings Integrator Video acceleration options Image: Use video acceleration for ICE charts Image: D3D video acceleration adapter	
Sensors		
Radar		
Security		
Commissioning Table		
Backup	ОК Ар	ply Cancel

- Check the Use video acceleration for ICE charts checkbox if the ice charts are to be installed;
- D3D video acceleration adapter checkbox is not used in this version.
- 8. Switch to "Integrator" page:

🕕 System Configura	ation Utility	- 🗆 🗵
INS Workstation	Workstation W01 Sound Display Keyboard Collections Multiunits Skins Additional settings Integrator	
Sensors	C Office 4000	
Radar		
Security		
Commissioning Table		
Backup	OK Apply Ca	incel

 In the Integrator background group select the necessary product for setting the appropriate background for the Transas Integrator.

Radar Settings

Press Radar button. The drop-down Workstation list specifies the name of the Workstation which settings will be made for.

Perform individual settings for each Workstation, selecting them consecutively from the droop-down list Workstation. All data will be synchronized at all the Workstations after the settings saving.

1. Open "General" page:

🖟 System Configu	iration Utility	-
INS	Workstation W01 V	1
Workstation	Interswitch Interswitch ✓ PM enable For the second secon	
Sensors		
Radar		
Security		
Commissioning Table		
Backup	OK Apply Can	:el

- The Interswitch button is pressed by default for the control of the RIB6 with the NS 4000 (it is strictly recommended that it should remain in the depressed state);
- If the scanner in use has a Performance Monitor, check PM enable checkbox;
- Set the radar picture recording parameters in Overlay recording group (see document NAVI-SAILOR 4000/4100 ECDIS (v. 2.00.009). FUNCTIONAL DESCRIPTION, Chapter 6, paragraph Radar Overlay):
 - Recording enabled to turn on (by checking the checkbox) the radar picture recording function;
 - Interval to set the recording interval (1–60 seconds).

2. Switch to "Radar settings" page:

System Configu	ration Utility	_10
	Workstation W01 +	
INS	General Radar settings	
100000	Radar mode Radar External 1 🗾	
5 W	Scanner type Constitum Selesmar(with NMEA converter) 🔹 Connection RIB6 🗨 📮 Demo mode	
2.40	Antenna settings	
Workstation	Band X-band Vickout 0000 hrs	
	Posicial window special 128	
	Antenen kanse widte den 1	
. (Bhite.	Anterina bean with, deg	
Sensors	Antenna height, m 10	
	Scanner control settings	
and the second s	IP Primary 10 , 8 , 1 , 209	
Radar	IP secondary 10 . 0 . 2 . 203	
æ	Port 4172	
3		
Security	Video source settings	
	Video polarity Positive Tingger	
174	Divider 0	
120	Amplification 255 Front Leading Falling Threshold 4.00 V	
Commissioning	Shift 0.00 V Not	
	Surger count Front Leading Falling Threshold 4.00 V	
	Sweep length 648	
Backup	OK Apply	Cancel

There may be two configurations in setting up the radar operation:

- connected to the WS is an external radar which only supplies the signals (video, trigger, heading marker and bearing marker) via RIB 6;
- DEMO mode (for demo purposes at the exhibitions), the signals is supplied from the previously recorded *.raf or *.rax files.

If external radar is connected:

- In Radar mode, select "External Radar";
- Select the type scanner in the drop-down list Scanner type;
- Set the following antenna parameters in Antenna settings group:

In the box Band, select the range of scanner connected to the WS; Antenna rotation speed – rate of revolutions (rpm); Bearing number per rev. – number of bearing sensor pulses per one revolution;

Antenna beam width – beam width;

Antenna height – antenna installation height above the waterline.

Specify IP addresses:

In IP Primary input box enter "10.8.1.209";

In IP Secondary input box enter "10.8.2.209".

When installing the NS 4100 you can connect two RIB6 to a single WS. In this case, when the RIB6 is selected from the **Connection** drop-down list, an additional tab appears where you can select the second radar.

🕕 System Configur	ation Utility	_ 🗆 🗙
	Workstation W01 General Radar settings Radar External 1 Radar External 2	1
Workstation	Radar mode Radar External 2 Scanner type Connection RIBS Demo mode Emulation Antenna settings	
Sensors	Band X-band Antenna rotation speed 26 Workout 0000 hrs Bearing number per rev. 128 Enable reset counter Antenna beam width, deg 1 Reset workout counter	
Radar	Antenna neight, m 10 Scanner control settings IP Primary 10 . 8 . 1 . 210	
Security	IP Secondary 10 8 2 210 Port 4172	
Commissioning Table	Video source settings Video polarity Positive Divider 0 Amplification 255 Shift 0.00 Video polarity Front Leading Falling Threshold 2.00 Video polarity Positive Front Leading Front Leading Front Leading Threshold 4.00 V. Nord Sweep count 2048	
Backup	OK Apply	Lancel

 Make settings in much the same way as for the previous radar, for the IP addresses specify the following values:

In IP Primary input box enter "10.8.1.210";

In IP Secondary input box enter "10.8.2.210".

Demo Mode:

	Workstation W01 V
INS	General Radar settings Radar mode Radar External 1
41	Scanner type Consilium Selesmar(with NMEA converter) Connection RIB6 Conscium Selesmar(with NMEA converter) Connection RIB6 Connection RIB6 Constitution Conterna settings
Workstation	Band X-band Antenna rotation speed 26 Workout 00000 hrs
Grand	Bearing number per rev. 120 Antenna beam width, deg 1 Reset workout counter
Sensors	Antenna height, m 10
Radar	Scanner control settings IP Primary 10 . 8 . 1 . 209 IP Secondary 10 . 8 . 2 . 209
R	Port 4172
Security	Video source settings
	RAF file streams: RAF file D:\RAF_files\demo.raf
T.	Stream Name Original host Original port Output port Baudrate
-	
.ommissioning Table	

- In Radar mode drop-down list, select "Master Radar" or "External Radar";
- Check Demo mode checkbox;
- In the RAF file input field of Video source settings group specify the path to the folder with *.raf or *.rax files;
- If necessary, in the Video source settings group, select from drop-down list the required ports of the Workstation computer, where the NMEA sentences will be transmitted from the selected file (for connection these ports, see paragraph Sensors Settings). Specify in the drop-down list the baud rate for selected ports.

Security Settings for NS 4000

Press Security button.

🖟 System Configur	ation Utility					
	Users and access lev	els table				
		User			Level	
INS	Master		person			2
Workstation						
Sensors						
Radar						
Security						
Commissioning Table						
					Change password	Remove user
Backup				ОК	Apply	Cancel

 In the User column enter the name of the user permitted to edit the electronic ship logbook and press <Enter>;

📕 System Configu	ration Utility					_ _ ×
	Users and access l	evels table				r
THE	Macter	User	Dercop		Level	
Workstation	Master		person			× •
Sensors		Enter password:	<u>I</u>	×		
Radar		Password: ****** Verify password: ****** OK	Cancel			
Security						
Commissioning Table						
					Change password Rer	nove user
Backup				ОК	Apply	Cancel

- Enter the password and the password confirmation and press the "OK" button;
- Set all the users whom access is granted to.

- ATTENTION! -

After completion of settings of all the Workstations, press the "Apply" button to save all changes done without exiting the System Configuration utility; or press the "OK" button to save all settings and exit the System Configuration utility.

After restart PC, run ECDIS on all WS and check performed settings.

Security Settings for NS 4100

Press Security button.

ALC: 1.1	Users and access levels cable		
INS	User	Level	
	Commander	co	
Al	Navigator	NO	
	Watch	wo	
Vorkstation			
dia.			
Sensors			
Contraction of the second			
T			
Radar			
B			
10			
Security			
Socorrey			
V			
-			
ommissioning Table	J		
Table		Change pas	sword Remove us
			and the second second

In the Users column enter the user name for configuring access to protected functions (the name can include the following characters only: "A"-"Z", "a"-"z", "0"-"9", ".", "_");

⁾ System Configur	ration Utility	أأساد الشباب المتا			_0
	lleare Duminit				
		ns			
INS	Users and access	s levels table			T
	Converden	User	60	Level	
× 19	Commander		NO		
13.1-	Watch		wo		-
Workstation	Admin		co		
~					
Country					
Sensors					
				ž.	
6		Enter password:	×		
1		Password: ******			
Dadar		Varifu pacquardi ******			
Kauar		veni y password.			
		OK	Cancel		
8		3. 1 .			
~					
Security					
13					
-					
Commissioning Table					
	1				
				Change password	Remove user
	Maximum logon	attempts for all users before lockout ()	means no restrictions):	-	
	maximum rogori i	accompts for an users before lockbut (i	sinearis no resulctions): [5		
Backup				OK Apply	Cancel

	Users Permissions		
	Users and access levels table		
CNIL	User	Level	
	Commander	co	
A	Navigator	NO	
Construction of the local division of the lo	Watch	wo	
/orkstation	Admin	CO	
~		WO	เขาเขาเขาเขาเขาขางสมายหายหายหายหายหาย
Country .			
pensors			
1			
Radar			
readar.			
5-10.05			
\$			
6 S			
Security			
VP			
-			
mmissioning			
Table			
		Change pas	sword Remove us
	Maximum logon attempts for all users before locko	t (0 means no restrictions): 3	
	in a second	ter in the second se	

• Enter the password and the password confirmation and press the "OK" button;

• In the Level column, select the required access level from the listbox.

The NS 4100 system has three preset user categories and access levels:

- Commander ("CO" access level Commanding Officer);
- Navigator ("NO" access level Navigation Officer);
- Watch ("WO" access level Watch Officer).

By default, the following passwords are used for the three user categories:

User	Password
Commander	TRANSASCO
Navigator	TRANSASNO
Watch	TRANSASWO

For a more detailed description of the NS4100 access protection system configuring, see NAVI-SAILOR 4100 ECDIS (v. 2.00.009). SPECIAL FUNCTIONS, section NS4100 Security Access System.

- ATTENTION! -

After completion of settings of all the Workstations, press the "Apply" button to save all changes done without exiting the System Configuration utility; or press the "OK" button to save all settings and exit the System Configuration utility.

After restart PC, run ECDIS on all WS and check performed settings.

SPOS WEATHER MODULE ADJUSTMENT

ATTENTION!

The SPOS 6 program setup is only made on the WS, which it is installed in.

This paragraph describes settings of the SPOS program and its integration with the NS 4000 for work in FILE mode.

Run SPOS program utility by selecting the appropriate item in the START menu (START\PROGRAMS\SPOS\SPOS):



In command line, press "File". Select "System Settings" from the fall-off list.

1 commune	ation MAPI Uptions :	seakeeping	
Update			
When updating t Update folder, W this location,	he weather forecast, SP hen you receive a new	'OS searches for new fo forecast file via e-mail, i	precast files in the t should be copied to
Update folder:	C:\Transas\SPOS		Browse
Share	data and settings with o	other SPOS users.	
SPUS may share		E1) before changing thi	
WARNING: Chei lose	ck the manual (or press settings.	r tj belore changing th	s path since you may

Open the page "Folders". In the **Update folder** field, specify path to the folder SPOS which was created automatically (*C*:*Transas*\SPOS).

Open the page "Communication":

Folders Communication MAPI Options Seakeeping Select method for weather update: I. Via MAPI: direct connection to your e-mail program Test MAPI: Press the test button to see wether your mail program supports MAPI. If a mail message appears and can be send, select this option. If nothing happens or an error is reported, select option 2. If a FILE: store message in file, send file via e-mail The weather subscription messages are not send directly to your mail program but saved in a file. You should manually send this file to Meteo Consult. Enter the destination folder for this subscription file: C\Transas\SPOS Browse	iystem S	ettings					x
Select method for weather update:	Folders	Communication	MAPI Options	Seakeeping			-1
 1. Via MAPI: direct connection to your e-mail program Test MAPI Press the test button to see wether your mail program supports MAPI. If a mail message appears and can be send, select this option. If nothing happens or an error is reported, select option 2. 2. Via FILE: store message in file, send file via e-mail The weather subscription messages are not send directly to your mail program but saved in a file. You should manually send this file to Meteo Consult. Enter the destination folder for this subscription file: C\Transas\SPOS 	Select	method for weath	er update:				
Press the test button to see wether your mail program supports MAPI. If a mail message appears and can be send, select this option. If nothing happens or an error is reported, select option 2. 2 Via FILE: store message in file, send file via e-mail The weather subscription messages are not send directly to your mail program but saved in a file. You should manually send this file to Meteo Consult. Enter the destination folder for this subscription file: C.\Transas\SPOS Browse	C	1. Via MAPI: dire	ect connection t	o your e-mail program		Test MAPI	
Via FILE: store message in file, send file via e-mail The weather subscription messages are not send directly to your mail program but saved in a file. You should manually send this file to Meteo Consult. Enter the destination folder for this subscription file: C:\Transas\SPOS Browse		Press the test MAPI. If a mai option. If nothi	button to see w I message appe ing happens or a	ether your mail program ars and can be send, s an error is reported, sele	i supports elect this ect option 2.		
The weather subscription messages are not send directly to your mail program but saved in a file. You should manually send this file to Meteo Consult. Enter the destination folder for this subscription file: C\Transas\SPOS Browse	۰	2. Via FILE: store	e message in file	e, send file via e-mail			
Enter the destination folder for this subscription file: C:\Transas\SPOS Browse		The weather s program but sa Meteo Consul	ubscription mes aved in a file. Yo t.	sages are not send dire ou should manually sen	actly to your n d this file to	nail	
C:\Transas\SPOS Browse		Enter the dest	ination folder for	r this subscription file:			
		C:\Transas\S	POS			Browse	
			ОК	Cancel	Apply	Help	

Select method for the messages sending by checking the checkbox 2. Via FILE: store message in file, send file via e-mail. Specify the path to the folder SPOS as described above (*C*:*Transas*\SPOS).

Note: For selection the method "Via MAPI", each installation shall be examined individually, depending on the e-mail client installed on the bridge workstation.

Press "OK" button to save the performed settings and close "System Settings" window.

On the "Weather" page, press the button Weather Subscription. In the opened window, select the region(s) of the weather forecast coverage and press Add to subscription button. Several regions are available for selection depending on the sailing area:

Europe coastal (1.0°) 📃		8 / h.
21 Norwegian & Barends Sea 22 Iceland 23 North Sea & Baltic 24 United Kingdom 25 Biskaye & Gibraltar 26 Mediterranean Sea		
	In the second seco	 Contraction of the second secon
Range: © 5 days C 9 days ype: C Standard © Extended Add to subscription		
Range: © 5 days © 9 days ype: © Standard © Extended Add to subscription ubscription: 26. Mediterranean Sea	Edaus Ext	Send daily updates at 00 UTC
Range: © 5 days © 9 days ype: © Standard © Extended Add to subscription ubscription: 26 Mediterranean Sea	5 days Ext	Send daily updates at 10 UTC Send daily updates at 12 UTC
Range: © 5 days © 9 days Type: © Standard © Extended Add to subscription abscription: 26 Mediterranean Sea	5 days Ext.	Send daily updates at 00 UTC Send daily updates at 12 UTC Send twice daily updates at 100 & 12 UTC

Select the frequency of the forecast update. Press the **Submit** button. The following dialog box will be displayed:

Submit status	×
Subscription exported in: C:\Transas\SPOS\spossub.txt	
Send this file to: Subscription@!	5pos.eu
ОК	

Press the "OK" button. The subscription request spossub.txt will be saved in the folder SPOS (C:\Transas\SPOS\spossub.txt).

To make sure that SPOS settings were carried out properly, run Data Tool utility by selecting the appropriate item in the Start menu (START\PROGRAMS\MULTIFUNCTIONAL DISPLAY/ DATA TOOL):



Open internal group SPOS:

Data Tool Data Tool Exit Select App Navi-Sa	Deselect Info		Eutorinal Co.		
Filename	Date and Time	Size		Date and Time	Size
spossub.txt	14/10/08 15:52	1.53 KB			
Location: SPOS Disk size: 39.06 GB Selected: 0 items (0	, free space: 1.85 GB bytes)		Location: C:\ Disk size: 39.06 Gl Selected: 0 items (B , free space: 1.85 GB 0 bytes)	

The file spossub.txt shall be displayed in the above mentioned group showing propriety of the SPOS program settings. The file should be copied onto the outer carrier (e.g. floppy disc) by means of the Data Tool utility and sent to the e-mail address: Subscription@spos.eu via ship's communication workstation. Received weather forecasts should be copied later to internal *SPOS* folder.

NAVI-CONNING 4000 ADJUSTMENT

ATTENTION! -

The Navi-Conning 4000 program setup is made separately for each WS, which it is installed in. For the correct setup it is necessary that the ECDIS tasks be run on this WS. In the ECDIS task create a route and load it for monitoring (see NAVI-SAILOR 4000/4100 ECDIS (v. 2.00.009). USER MANUAL, Chapter 4, section Loading of Route and Schedule in the Navigation Mode).

General

The indicators contained in the CONNING Screen View windows are set up automatically except for the following indicators:

- Weather window:
 - Air temperature;
 - Barometric Pressure;
 - Humidity.
- Ship Contour window:
 - Bow Thruster;
 - Rudder;
 - Lights.
- Engine window:
 - Engine Telegraph;
 - RPM.

These indicators are set up by the service engineer at the installation stage.

- ATTENTION!

Parameters for the setup of these indicators will not be available in the program database unless they were previously created in the System Configuration utility. If the data is supplied via the WAGO interface, the parameter will have the WAGO_ADC_parameter_name for a name (see **Annex B** section **Adjustment of NS 4000 Operation with WAGO Modules**). If the data is supplied via the NMEA Custom, the parameter will be named NMEA_CUSTOM_parameter_name (see **Annex B** section **Adjustment of NS 4000 Operation with NMEA Custom**). To avoid the incorrect operation of the NC4000 program, it is not advisable to connect to the indicators parameters whose names are different from those listed above.

We will consider the indicator setup procedure using the Air Temperature as an example.

Run the CONNING task by selecting the appropriate item in the START menu (START\PROGRAMS\MULTIFUNCTIONAL DISPLAY/NAVI-CONNING):



After the program start, the NC 4000 Screen Views will be displayed.



Press Setup button.

Screen View Configuration Utility		- ×
Screen Views Configuration Screen Views Configuration		
Edit Back Save Save as	Password.	 Show hidden properties

In the "Screen View Configuration Utility" window open the SCREEN VIEWS CONFIGURATION/ NAVIGATION/WEATHER WINDOW/TEMPERATURE menu.



In the right hand part of the "Screen View Configuration Utility" window select the AIR TEMPERATURE VALUE line from the menu and press the button.

Docking		id	Temperature	
Navigation	- 21	Border	client	
 Weather Window Wind 		Text	Temperature	
Temperature		Water temperature value view data	Data Access/WaterTemp/View	
Drift Window		Water temperature value unit label	°C	
Depth digital Window		Water temperature value	Data Access/WaterTemp/Valu	
Route Window Route Graphic Window		Air temperature value view data	3	200
+ Ship Window		Air temperature value unit label	°C	2.1.1
Applications switcher Window		Air temperature value	0	
- Time Window		Barometric pressure digital value cal	¢1	[None]
Position datum Window		Barometric pressure digital value viet	v 3	[New]
- CoaSoaHda Window		Barometric pressure digital value uni	t hPa	Data Acces
- STW Window		Barometric pressure digital value	0	Flags
Engine telegraph Window		Humidity didital value calculating coe	۴1 ·	NSGU

From the menu which will open up, select the DATA ACCESS/NMEA_CUSTOM_AIR_TEMPERATURE/ VALUE line.



The selected source for the parameter value will be displayed in the right hand part of the "Screen View Configuration Utility" window in the AIR TEMPERATURE VALUE line.

+ Docking		id	Temperature	
 Navigation 		Border	client	
Weather Window		Text	Temperature	
Temperature		Water temperature value	Data Access/WaterTemp/ViewData	33
Drift Window		Water temperature value	°C	-
Depth digital Window		Water temperature value	Data Access/WaterTemp/Value	
Route Window Route Graphic Window		Air temperature value vie	3	
+ Ship Window		Air temperature value un	°C	
Applications switcher Window		Air temperature value	Data Access/NMEA_CUSTOM1_Air_Temp	
Time Window		Barometric pressure dig	1	
Position datum Window		Barometric pressure dig	3	
- CoaSogHdg Window		Barometric pressure dig	hPa	
- STW Window		Barometric pressure dig	0	
Engine telegraph Window	-	Humidity digital value ca	1	
Edit Back Save Save		Password	Show hidden propertie	20

In the right hand part of the "Screen View Configuration Utility" window select the AIR TEMPERATURE VALUE VIEW DATA line from the menu and press the button.



From the menu which will open up, select the DATA ACCESS/NMEA_CUSTOM_AIR_TEMPERATURE/ VIEWDATA line.

Navigation Weather Window Wind Temperature Drift Window Depth digital Window Route Graphic Window Applications switcher Windo Time Window Position datum W Latitude Longitud CogSogHdg Win STW Window Fingine telegraph Gog Currentcha Dcu_P	W oNav + afts + Stations + als +	Borde Text Wate Wate Wate Air te Air te Air te Air te NevMasb PITCH	er r temperature value view r temperature value unit r temperature value mperature value view d mperature value JSTOMI_Ar_Temperature er	client Temperatu w da Data Acce t labe °C Data Acce lata 3 bel °C Data Acce	ure ess/Wate ess/Wate ess/NME	erTemp/View[erTemp/Value A_CUSTOM lue	Dat
Weather Window Wind Temperature Dritt Window Depth digital Window Route Graphic Window Applications switcher Windo Time Window Applications switcher Windo Time Window Astrgtads Astrgtads Astrgtads STW Window Engine telegraph Atsrgtads Cog SogHdg Win Astrgtads Cog Currentcha Double Cog	W ioNav ► afts ► Stations ► als ►	Text Wate Wate Wate Air te Air te Air te Nex_CL NaviMaste	er temperature value vie r temperature value unit r temperature value imperature value view d imperature value unit lat imperature value JSTOMI_Air_Temperature er	Temperatu w da Data Acce t labe °C Data Acce lata 3 bel °C Data Acce	ure ess/Wate ess/Wate ess/NME	erTemp/ViewL erTemp/Value A_CUSTOM WOata	Dat
Wind Temperature Drift Window Popth digital Window Route Graphic Window * Ship Window Applications switcher Windo Time Window Position datum W Latitude Longitud CogSogHdg Win STW Window Engine telegraph Applications Cog Cog Currentcha Drift Window	W ToNav ► afts ► Stations ► als ►	VVate VVate VVate Air te Air te Air te NMEA_CU NaviMaste PITCH	r temperature value vie r temperature value unit r temperature value mperature value view d mperature value unit lat imperature value JSTOML_Ar_Temperature er	w da Data Acce t labe °C Data Acce lata 3 bel °C Data Acce	ess/Wate ess/Wate ess/NME	erTemp/ViewE erTemp/Value A_CUSTOM:	Dat
Temperature Drift Window Depth digital Window Route Graphic Window * Ship Window Applications switcher Windo Time Window Position datum W Latitude Longitud CogSogHdg Win STW Window Engine telegraph Cog Cog Currentch	W ^r oNav → afts → Stations → als →	VVate VVate VVate Air te Air te Air te NMEA_CU NaviMastr PITCH	r temperature value vie ir temperature value uni ir temperature value imperature value view d imperature value unter value JSTOMI_Ar_Temperature er	w da Data Acce t labe °C Data Acce lata 3 bel °C Data Acce	ess/Wate ess/Wate ess/NME ess/NME	erTemp/View[erTemp/Value A_CUSTOM [:] Woata	Dat
Drift Window Depth digital Window Route Window Route Graphic Window * Ship Window Applications switcher Window Time Window Position datum W Latitude Longitud CogSogHdg Win STW Window Engine telegraph Cog Currentcha	W ToNav + afts + Stations + als +	Wate Wate Air te Air te Air te NMEA_CU NaviMastr PITCH	r temperature value uni r temperature value mperature value view d mperature value unit lat mperature value JSTOMI_Ar_Temperature er	t labé*C Data Acce lata 3 bel *C Data Acce	ess/Wate ess/NME Val	erTemp/Value A_CUSTOM ¹ WData	I
Depth digital Window Route Window * Ship Window Applications switcher Windo Time Window Position datum W Latitude Longitud CogSogHdg Win STW Window Engine telegraph Cog Cog Currentcha	W FoNav > afts > Stations > als >	Wate Air te Air te Air te Air te NMEA_CU NaviMastr PITCH	ir temperature value imperature value view d imperature value unit lat imperature value JSTOMI_Air_Temperature er	Data Acce lata 3 bel °C Data Acce	ess/Wate ess/NME Val	erTemp/Value A_CUSTOM wData	I_Flags
Route Window * Ship Window Applications switcher Windo Time Window Position datum W Latitude Longitud CogSogHdg Win STW Window Engine telegraph Cog Cog Currentcha DCU_P	W FoNav ► afts ► Stations ► als ►	Air te Air te Air te Air te NMEA_CU NaviMaste PITCH	mperature value view d mperature value unit lat mperature value JSTOM1_Ar_Temperature er	lata 3 bel °C Data Acce	ess/NME Val	A_CUSTOM	[Nonv [Nonv 1_4 [New [Scrip Data Flags
Ship Window Applications switcher Windo Time Window Position datum W Latitude Longitud CogSogHdg Win STW Window Engine telegraph APJ	W FoNav > afts > Stations > als >	Air te Air te NMEA_CL NaviMaste PITCH	mperature value unit lai mperature value JSTOM1_Air_Temperature er	bel °C Data Acce	ess/NME Value Vier	A_CUSTOM lue wData	[Non/ 1_/ [New Scrip Data
Applications switcher Windo Time Window Position datum W Latitude Longitud CogSogHdg Win STV Window Engine telegraph Cog Cog Cog Cog Cog Cog Cog Cog	W FoNav • afts • Stations • als •	Air te NMEA_CL NaviMaste PITCH	mperature value JSTOM1_Air_Temperature er	Data Acce	ss/NME Vali	A_CUSTOM [®] lue wData	1_/ [New [Scrip Data Flags
Time Window Position datum W Latitude Longitud CogSogHdg Win- STW Window Engine telegraph Cog Cog Cog Cog Cog Currentch DCU_IP	roNav	NMEA_CL NaviMaste PITCH	JSTOM1_Air_Temperature	Data Acce	Val	lue wData	 [Scrip Data Flags
Position datum W Latitude Longitud CogSogHdg Win STW Window Engine telegraph Cog Cog Cog Cog Cog Cog Cog Cog Cog Cog	ToNav	NMEA_CL NaviMast PITCH	JSTOM1_Air_Temperature er		Val	wData	Data Flags
ARPATarge Cog CurrentCha DCU_IP	node ►	PosDRTim PosDiverç PrimPos	ne ge		 Sa Se So So 	atellitesInfo econdPos og ogDLog	• N5GL
Cog CurrentCha DCU_IP	os ▶	PrimaryDa	atum		50	ounderDepth	•
DCU_IP	-hT=6- h	PrimaryG	PS_RAIM_Indicator		 Steps 	woles	, PS
0.00_1		ROU	10204		- 50 TC	SData	
Depth	() ()	ROT) TO	SRudderOrder	
DockingMor	le 🕨	RadarSer	verVSScanner0ControlRoute_Mar	sterToServer	▶ Tir	me	
Draft	*	RadarSer	verV5Scanner0ControlRoute_Ser	rverToMasterAndSlave	s 🕨 Tr.	ackControlModeOn	()
Drift	▶ .	RadarSer	verV5Scanner0IR		 W. 	atchDist	•
GPSQuality	indicator 🕨	RadarSer	verV5Scanner0MasterCollisionCor	ntrol_Broadcasting	• W.	aterTemp	•
GeoPanelIn	fo 🕨	RadarSer	verV5Scanner0Range		► Wi	indRelative	•
Hdg		REMonitor	100.1			in dToole	•

If connected correctly, parameters will be shown dynamically on the relevant indicators, there is not need to restart Navi-Conning 4000.

Press the "Save" button in the "Screen View Configuration Utility" window.

- Warning! -

For each indicator both characteristics VALUE and VIEWDATA should be adjusted. For each Screen View the indicator is set up individually. I.e., in the "Screen View Configuration Utility" window, it is necessary to repeat the setup procedure for the "NavData" Screen View (SCREEN VIEWS CONFIGURATION/NAvDATA SV/WEATHER WINDOW/ TEMPERATURE).

Indicator Setup Table

Set up the indicators in accordance with the above procedure by using the following table:

Indicator	Window	Screen Views	Path
Air Temperature	Weather/Temperature Tab	Navigation	SCREEN VIEWS CONFIGURATION/ NAVIGATION SV/WEATHER WINDOW/ TEMPERATURE
Air 100 - 100 80 - 80 60 - 60 40 - 40 20 - 20 0 - 0 -20 - 20 0		NavData	SCREEN VIEWS CONFIGURATION/ NAVDATA SV/WEATHER WINDOW/TEMPERATURE
Barometric Pressure	Weather/Temperature Tab	Navigation	SCREEN VIEWS CONFIGURATION/ NAVIGATION SV/WEATHER WINDOW/ TEMPERATURE
Barometric Pressure 1030 Hpa		NavData	SCREEN VIEWS CONFIGURATION/ NAVDATA SV/WEATHER WINDOW/TEMPERATURE

Indicator	Window	Screen Views	Path
Humidity	Weather/Temperature Tab	Navigation	SCREEN VIEWS CONFIGURATION/ NAVIGATION SV/WEATHER WINDOW/ TEMPERATURE
Humidity		NavData	SCREEN VIEWS CONFIGURATION/ NAVDATA SV/WEATHER WINDOW/TEMPERATURE
Bow Thruster	Ship Contour	Docking	SCREEN VIEWS CONFIGURATION/ DOCKING SV/SHIP WINDOW
		Navigation	SCREEN VIEWS CONFIGURATION/ NAVIGATION SV/SHIP WINDOW
Rudder Digital	Ship Contour	Docking	SCREEN VIEWS CONFIGURATION/ DOCKING SV/SHIP WINDOW
RUDDER 10.0°		Navigation	SCREEN VIEWS CONFIGURATION/ NAVIGATION SV/SHIP WINDOW
Rudder Graphic	Ship Contour	Docking	SCREEN VIEWS CONFIGURATION/ DOCKING SV/SHIP WINDOW
40 20 0 20 40		Navigation	SCREEN VIEWS CONFIGURATION/ NAVIGATION SV/SHIP WINDOW
Lights	Ship Contour	Navigation	
n1 02	1 – Top Light, Front		SCREEN VIEWS CONFIGURATION/ NAVIGATION SV/SHIP WINDOW
	2 – Anchor Light, Front		SCREEN VIEWS CONFIGURATION/ NAVIGATION SV/SHIP WINDOW
	3 – Top Light, Rear		SCREEN VIEWS CONFIGURATION/ NAVIGATION SV/SHIP WINDOW
ი 3 ¢4 5 þ	4 – Port Side Light		SCREEN VIEWS CONFIGURATION/ NAVIGATION SV/SHIP WINDOW
	5 – Stb Side Light		SCREEN VIEWS CONFIGURATION/ NAVIGATION SV/SHIP WINDOW/
• 6 ~ 7	6 – Anchor Light, Rear		SCREEN VIEWS CONFIGURATION/ NAVIGATION SV/SHIP WINDOW
	7 – Stern Light		SCREEN VIEWS CONFIGURATION/ NAVIGATION SV/SHIP WINDOW/
Engine Telegraph	Engine	Docking	SCREEN VIEWS CONFIGURATION/ DOCKING SV/ENGINE TELEGRAPH WINDOW
		Navigation	SCREEN VIEWS CONFIGURATION/ NAVIGATION SV/ENGINE TELEGRAPH WINDOW
		Chart	SCREEN VIEWS CONFIGURATION/ CHART SV/ENGINE TELEGRAPH WINDOW
PORT RPM (see the next Item)	Engine	Docking	SCREEN VIEWS CONFIGURATION/ DOCKING SV/ENGINE TELEGRAPH WINDOW
PORT RPM 80.0 RPM		Navigation	SCREEN VIEWS CONFIGURATION/ NAVIGATION SV/ ENGINE TELEGRAPH WINDOW
		Chart	SCREEN VIEWS CONFIGURATION/ CHART SV/ENGINE TELEGRAPH WINDOW

Indicator	Window	Screen Views	Path
STBD RPM (see the next Item)	Engine	Docking	SCREEN VIEWS CONFIGURATION/ DOCKING SV/ENGINE TELEGRAPH WINDOW
STED RPM 320.0 RPM		Navigation	SCREEN VIEWS CONFIGURATION/ NAVIGATION SV/ENGINE TELEGRAPH WINDOW
		Chart	SCREEN VIEWS CONFIGURATION/ CHART SV/ENGINE TELEGRAPH WINDOW

Note: Do not forget to set up the same indicators individually for each Screen View (see the Warning in the previous item).

If there is one engine on the ship, neither the parameter source nor the rules of displaying the second engine telegraph handle are specified for the Engine Telegraph indicator.

CHARTS INSTALLATION AND CHART ASSISTANT ADJUSTMENT

Run Chart Assistant utility by selecting the appropriate item in the START menu (START\Programs\Multifunctional Display\Chart Assistant):



Charts Installation

Insert the CD with a chart folio into the CD drive. Press Update button.

In the "Scan Disk" window, which will open up, specify the external storage containing chart collection:

Scan Disk		×
	CD (D:\)	
	Floppy (A:\)	
	USB Storage device (E:\)	
	Browse	

If necessary, press "Browse" button and specify the path to the directory, which contains the chart collection:



Press "OK" button in the search window.

Chart Assistant will scan the external storage, will automatically identify the chart format and type of data it contains, and will produce a list of available actions:

Actions available for E:\		X
🔽 Load TX97 Catalogue	TX97 CD WK22-08 (WF 40)	
Show TX97 Disk Content	Transas World Folio, Issue WF 40, Main Collection CD 1	
🔽 Install TX97 charts	Transas World Folio, Issue WF 40, Main Collection CD 1	
Synchronize charts collection		
🔽 View report		
OK Cancel		

Install TX97 charts checkbox is checked by default, in this case all charts, contained on the disk, which the licenses are available for, will be automatically installed.

Press "OK" button.

After chart installation, general log is displayed:

Thart Assistant I	ast operation log					<u>_</u>
Close	Back				E-Mail	Export Prin
09-01-2008 08	:23:45 UTC WS	Charts install	lation			
Source: Trans	as World Folio,	Issue WF 37, Ma:	in Collecti	on CD 1		
Chart	Format	Scale	Size	Result		
a1019	Tx97	1:10000	17Kb	Installation	ок	
a1106	Tx97	1:50000	105Kb	Installation	OK	
-1183	Tx97	1:100000	162 Kb	Installation	OK	
21100				11000011001011	(MAN)	
a1185 a1185	Tx97	1:25000	92 Kb	Installation	OK	
a1185 a1186a	Tx97 Tx97	1:25000 1:12500	92 Kb 66 Kb	Installation Installation	OK	
1185 1185 1186a 1186b	Tx97 Tx97 Tx97	1:25000 1:12500 1:12500	92 Kb 66 Kb 47 Kb	Installation Installation Installation	OK OK	
a1185 a1185 a1186a a1186b a1350	Tx97 Tx97 Tx97 Tx97 Tx97	1:25000 1:12500 1:12500 1:20000	92 Kb 66 Kb 47 Kb 93 Kb	Installation Installation Installation Installation	OK OK OK	
a1185 a1185 a1186a a1186b a1350 a1351	Tx97 Tx97 Tx97 Tx97 Tx97 Tx97	1:25000 1:12500 1:12500 1:20000 1:15000	92 Kb 66 Kb 47 Kb 93 Kb 71 Kb	Installation Installation Installation Installation Installation	OK OK OK	

Close the log. Chart installation process is completed.

By using the tab in the left top corner, switch to "Network" panel.

ellection v.2 creat	ed 14:26 23-03-2005 on master		Help 👻	Synchronize charts
state	collection	status		collection
running running running	v.2 14:26 23-03-2005 on master v.2 14:26 23-03-2005 on master v.2 14:26 23-03-2005 on master	up to date up to date up to date		Backup charts collection
running	v.2 14:26 23-03-2005 on master	up to date		Restore from backup
	Ilection v.2 creat state running running running running	Idection v:2 created 14:26 23-03-2005 on master state collection running v:2 14:26 23-03-2005 on master running v:2 14:26 23-03-2005 on master	Idection status state collection status running v.2 14:26 23-03-2005 on master up to date running v.2 14:26 23-03-2005 on master up to date running v.2 14:26 23-03-2005 on master up to date running v.2 14:26 23-03-2005 on master up to date running v.2 14:26 23-03-2005 on master up to date running v.2 14:26 23-03-2005 on master up to date	Illection v.2 created 14:26 23:03:2005 on master tate collection status running v.2 14:26 23:03:2005 on master up to date running v.2 14:26 23:03:2005 on master up to date

To synchronize the collection at all the workstations, press the Synchronize charts collection button.

Chart Assistant Adjustment

Use the appropriate tab in the top left corner of the screen to switch to "Ship Collection" or "Catalogue" panel:



Press button and open "E-Mail" page.

Charts Installation and Chart Assistant Adjustment

neral E-mail	FTP	ENC options	ECC Remote Update	Reports
E-mail settings				
	MS Excha	inge Settings		1
				1
Send to:	Chartservi	ce@ltansat.co/	n]
🔲 Check Inbox	tor replies			
Reply				
	E	mail message si	ize limit : 🛛 1024 🔄	КЬ 🛛
E-mail:	user@use	r.com		
Manual files transf	er			
Inbox folder:	F:\CA_Int	юх		Browse
Outbox folder:	F:\CA_Ou	itbox		Browse
H H H H	an an an	5 V.		
Use E-mail a	pplication for	orders transfer		

On "E-Mail" page uncheck Use E-Mail application for orders transfer checkbox if it is checked.

In Manual files transfer group fill appropriate fields as follows (e.g., for a USB flash drive):

- Inbox <Name of Disk>:\CA_Inbox;
- Outbox <Name of Disk>:\CA_Outbox.

In Reply group it is necessary to input the following:

- E-Mail the ship's e-mail address should be written here;
- E-Mail message size limit select necessary size of answer request. The answer request size can be selected from a list.

Create and send an order to make a subscription for chart corrections (see paragraph **Ordering Data in On-line Mode**). As the result, the order will be saved on the diskette or memory stick in the *CA_Outbox* folder.

Take off the diskette or memory stick and send a file from the CA_Outbox folder (this will be a file with *.cdf extension) as an attachment to chartservice@transas.com. No special subject or text is necessary. Then delete the *.cdf file from the memory stick to prevent mixing up with other orders (files which will be saved by CA in the future).

When you receive an e-mail from chartservice@transas.com, save attachment(s) (these will be *.cdf files) to memory stick in the CA_Inbox folder. Then insert the memory stick into the computer with the Chart Assistant utility. When the Chart Assistant detects new data in the memory stick, it offers to install updates. Press "OK" and apply chart corrections.

Open "ENC options" page.
M	Lontim charts deletion
	Confirm installing older chart issues
Г	Manual accepting of S57 updates
Π	Do not accept last update
V	Use catalogue for install
V	Use catalogue for update
V	Confirm deleting update

On this page, all the checkboxes are checked by default. Uncheck the relevant checkboxes for performing the following operations when handling S-57 format charts:

- Confirm delete to delete charts without additional warning;
- Confirm install old to install new charts automatically on the charts already installed;

- ATTENTION! -

By default, the next checkboxes Manual Accept and Do not accept last update are unchecked, and in this case updating of ENC charts will be accepted automatically.

- Manual accept to install the successive updating automatically, without prompt for accepting previous updating;
- Do not accept last to accept automatically the latest updating (if the checkbox is checked, the latest updating should be accepted on "ENC" page of "Ship Collection" panel);
- Use catalogue for install file with chart catalogue (CATALOG.031) will not be used during the chart installation;
- Use catalogue for update file with chart catalogue (CATALOG.031) will not be used during the chart updating;
- Confirm deleting update to confirm automatically the deleting updating.

SETTINGS IN AUTOPILOT

Raytheon Heading Control System NP 2025 (NP 2025 Plus)

To provide compliance to Track control standard there are should be done following settings:

HW Settings

- Sensors connection as per service manual;
- NS serial data connection ("Autopilot" port) as described below:



Software Settings

Service part - "parameter" mode (provided by service engineer):

- DV Bus No;
- ECDIS Yes;
- Turn Type HTR;
- XTD nautical miles;
- TrScal (0–5, depends on ship maneuverability (for NP2025+ only). Gain setting
 of track controller to increase (bigger values) or reduce accuracy and activity (0
 by default).

Typical settings for TrScal:

Fast Ferry	Container Ship	Tanker
+2	+2	+2

- EcdisSRoTW Set "Y". Set ROT is calculated using ship's speed through water in NS (for NP2025+ only);
- TPosfilt 50 by default, 0-200 depends on ship maneuverability (for NP2025+ only). Determines drift estimation and time constant. If set 0 drift estimation off;

Typical settings for TPosfilt:

Fast Ferry	Container Ship	Tanker
150	50	50

- Time out 10-30 (10 sec by default);
- Speed VHW;
- HSC off.

Other data is ship's type depending and/or ship's model tuning characteristics.

User part – Ship and environment conditions.

Parameter Y/R/C – correct settings shall be provided before track control settings.

For the different type of vessel should be used different values, as a default next settings can be applied, note that this parameters can be changed depend on environment.

Typical Settings for Yawing:

Fast Ferry	Container Ship	Tanker
2	2	1

Typical Settings for Rudder:

Fast Ferry	Container Ship	Tanker
7	4	5

Typical Settings for Counter Rudder:

Fast Ferry	Container Ship	Tanker
1	2	2

Navis Heading Control System AP 3000

To provide compliance to Track control standard there are should be done following settings:

HW Settings

- Sensors connection as per service manual;
- NS serial data connection ("Autopilot" port) as described below:



Software Settings

Service part:

- "INSTALLATION" main menu (provided by service engineer only);
- "DOCKTRIAL" menu:
 - TrackMode: ExtHTC;
 - ECDIS presents: Yes.
- "INTERFACE" menu:
 - * IN (submenu):

COMP1: GYRO1; COMP2: GYRO2 (if available); LOG: LOG; ECDIS: ECDIS.

- * ECDIS OUT (submenu): Yes:

Baud: 9600; Freq: 1; HTD: Yes; RSA: Yes.

- * COMP1: GYRO1;
- * COMP2: GYRO2 (if available).

Press "NMEA testt" button in the "Main Installation menu" to identify all connected sensors:

- "PARAMETERS" menu:
 - Vessel Length: actual vessel length in meters;
 - Vmax: actual maximum speed in knots;
 - Vmin: minimal manoeuvring speed in knots;
 - Wmax: maximum Rate of Turn, deg/ per minute.

Make "AP Turning" procedure as described in AP3000 "Installation Guide".

Press "Master Reset" button.

User part, press "Menu" button in operating mode:

- "SET DEVICES" menu:
 - Set compass: GYRO1 or GYRO2 (if available);
 - Set position: ECDIS;
 - Speed: LOG;
 - Heading Monitor: (ON/OFF) in case if GYRO2/MAGN is connected).
- "PARAMETERS" menu:
 - Turn Rate: operating Rate of Turn value (deg. per minute);
 - Rudder Limit: operating manoeuvring Rudder limit;
 - Sensetivity: Set up actual sensitivity value (depending on ship type and weather conditions);
 - Heading Alarm: 20 degrees.

Typical Settings for AP3000 after AP Turning procedure:

Parameter/Vessel type	Fast Ferry	Container Ship	Tanker
PARAM1	1,15	1,08	1,40
PARAM2	2,34	0,44	0,48
PARAM3	5,00	5,00	5,00
Rudder	5	8	9
Speed	20	19	10
Unstab	01	00	00
Vmax	30	36	10
Vmin	3	3	3
Wmax	300 deg per min	110 deg per min	60 deg per min
Lenght	64	250	350

ATTENTION!

Autopilot settings should match the ship characteristics. Otherwise, frequent deviations from the course and, as a consequence, frequent use of the steering gear will be inevitable.

PROCEDURE OF TCS CONTROL SETUP ALGORITHMS

Essentials

TCS algorithm settings are stored in <code>nm.cfg,tcs.cfg,tcsfull.cfg</code> and <code>tcshalf.cfg</code> files.

To adjust control algorithms for a particular ship, use the following procedure:

- 1. Adjust "Track control" section in System Configuration utility as per settings specified for the given ship type.
- 2. Open tcs.cfg, tcsfull.cfg and tcshalf.cfg files in stored in C:\Program Files\Common Files\Transas Shared\Navigation\NSS directory.
- 3. Change the settings as required by using the fine adjustment procedure described below and save the files.

Fine Adjustment

The fine adjustment procedure is intended for improving accuracy of steering the ship along the route and should be made, as required, by a system engineer only, and checked in the process of sea trials. It is necessary to take into account the fact that the TCS system adjustment is maid for "ship+autopilot" combination on the whole, so considerable changes in the autopilot settings may require the re-adjustment of the control system parameters as well.

Fine adjustment consists primarily in the selection of correct temporal ship characteristics. Such characteristics are set separately for a loaded (tcsfull.cfg file), half loaded (tcshalf.cfg) and empty (tcs.cfg) ship condition. tcsNNNN.cfg files are expected to be edited with the aid of NotePad editor included in Windows OS.

Passing-of-Turn Settings

- PivotX. Average shift of the ship's pivot point forward relative to the ship's geometric centre, in meters. If set incorrectly, the ship may tend to go inside (to correct this, it is necessary to increase PivotX) or outside (reduce the PivotX) relative to the set turn trajectory. PivotY is normally "0".
- TurnRelaxROTChange. Characteristic time of the ship ROT change in milliseconds. The larger TurnRelaxROTChange corresponds to smaller ship manoeuvrability relative to the present configuration, and the other way round.

Typical Parameters:

Ship Type	Fast Ferry	Container Ship	Tanker
Parameter in milliseconds	5000	4000	8000

3. ROTDriftKoeff Characteristic of the ship ROT change. The approximate value can be calculated as a constant ship drift angle during the turn/ROT grad/min. If set incorrectly, the ship always goes inside (to correct this, it is necessary to increase value) or outside (reduce the value) relative to the set turn trajectory.

Typical Parameters:

Ship Type	Fast Ferry	Container Ship	Tanker
Parameter (value)	0.26	0.14	0.115

Note: In the case of excessive value reduction which is not commensurate with the actual manoeuvring characteristics, there may be the ship track oscillation.

Motion-Along-Straight-Line Settings

For Raytheon (Anshutz) NP 2025 (NP2025+) autopilot, this values are of no importance.

 TimeOnLeg – Characteristic time of the ship's HTS change in milliseconds. The larger TimeOnLeg corresponds to a smaller ship manoeuvrability relative to the ready configuration, and the other way round.

Typical Parameters:

Ship Type	Fast Ferry	Container Ship	Tanker
Parameter in milliseconds	12 000	50 000	30000

2. XTEs; XTE_Ks – values which determine width of ranges and their corresponding course correction in the direction which will bring back to the route leg. The change of values is required in the case of incorrect ship behaviour as it moves along the straight line under constant environmental conditions (motion along a pronounced sinusoid or motion at a large distance off the route leg). If the ship moves along a sinusoid around the route leg, the course correction coefficient should be decreased within the observed amplitude. If the ship's mean position is off the route leg, the coefficient is required to be increased, or a new band should be set. In any case, it is advisable to leave a band with zero coefficient (deadband). The table provides initial range value and their corresponding correction coefficients.

XTEs (Width of Range, nm)	XTE_Ks (Course correction, deg)	Value (example)
0.000	0.0	Deadband
0.01	0.0	
0.0101	2.0	2 deg
0.04	2.0	
0.04001	4.0	4 deg
0.10	4.0	
0.10001	6.0	6 deg
0.5	6.0	
0.50001	6.0	

XTEs (Width of Range, nm)	XTE_Ks (Course correction, deg)	Value (example)
0.75	8.0	8 deg
1.00	8.0	

Plausibility Check Adjustments

 MaxHDGJump – threshold value of course change in degrees. As the course changes by a value larger than the setting within the period of one second, the Track Control mode will be stopped. On ships with a high rate of turn (Fast Ferry), it is necessary to set the appropriate value in order to avoid unfounded stops.

Typical Parameters:

Ship Type	Fast Ferry	Container Ship	Tanker
Parameter in degrees	~ 15–20	~ 15–20	~ 10–15

 MaxLogJump – threshold value of speed change in knots. As the speed changes by a value larger than the setting within the period of one second, the Track Control mode will be stopped. On ships with high acceleration/stopping value(Fast Ferry), it is necessary to set the appropriate value in order to avoid unfounded stops.

Typical Parameters:

Ship Type	Fast Ferry	Container Ship	Tanker
Parameter in knots	~ 15–20	~ 5–10	~ 5

Sample of tcsNNNN.cfg File (Editable strings are highlighted).

```
[DeltaHTS XTE]
LinesCount=10
MaxDTW=0.1
0.75.1.00
XTE Ks=0.0,0.00,2.0000,2.00,4.00000,4.00,6.00000,6.0,6.00000,
8.00,8.00
FixedXTE=ON
Test=ON
[DriftCalc]
DriftAddPeriod=2000
DriftMaxROT=4
DriftAvgPeriod=10000
UseSmartWay=OFF
Test=ON
IqnoreDriftTest=OFF
UseDeltaDrift=ON
[COG Evaluator]
PivotX=60
PivotY=0
Test=ON
[TurnManager]
EndOutrun=0.07
EndOfTurnTime=5
StopTurnAsCurve=OFF
DriftPredictDist=0.3
Tau=60000
QTrackXTE=0.15
XTEReduceTime=300000
TurnDeltaHTS K=1.0
```

```
[COGCalc]
MaxROT_Min=0.5
TimeOnLeg=90000
LargeDeltaCOG=99
TurnPercChangeROT=0.000001
TurnRelaxROTChange=10000
NoDriftROT=6.0
DecreaseDriftLock=OFF
ROTDriftKoeff=0.571
```

[ConstantError] Use=ON TotalPeriod=600000 KoefAvgError=0.0

```
[DriftUpload]
Use=ON
DriftUploadTime=000000
Dgr2XTE=-5
```

```
[JumpDetector]
MaxHDGJump=5
MaxLogJump=5
```

ALARM STATION SETUP

Note: For Alarm Station licensed option only.

Press "Start" button of the Main menu and select "Run" line.

For registry edit in "Open" input window enter "regedit".



Press "OK" button.

Open HKEY_LOCAL_MACHINE\Software\Transas\AlarmMon folder.

Eule Mew Favorites Help				1	
🕀 🧰 Mirabilis	<u> </u>	Name	Туре	Data	
😟 🧰 MozillaPlugins		ab)(Default)	REG_SZ	(value not set)	
😐 🧰 Netscape		AlarmStationMode	REG_SZ	on	
		abBuild	REG_SZ	1067	
		ab Copyright_String	REG_SZ	Copyright (c) 2001 - 2008 Transas Ltd.	
Program Groups		ab Full_Name	REG_SZ	Alarm Monitoring System	
PROject MT		ab License_Path	REG_SZ	C:\Transas\IB5\	
Rainbow Technologies		abPID	REG SZ	265	
		ab Root Path	REG SZ	C:\Transas\IBS\AMS\	
Secure		ab Version String	REG SZ	Version 1.11.009 (b.1067)	
i⊞ • ⊡ classe			1000 C		
Diskype		1			
		1			
indisas					
		1			
		1			
ChartAssistant		1			
		1			

In AlarmMon folder select AlarmStationMode and press < Enter>.

Edit String	? ×
Value <u>n</u> ame:	
AlarmStationMode	
⊻alue data:	
or	
	OK Cancel
	OK Cancel

Type "on" in "Value data" line and press "OK" button.

Note: Changes in the registers should be made individually on each workstation where the Alarm Station will be installed.

Run AMS task by selecting the appropriate item in the START menu (START\Programs\Multifunctional Display\Alarm Monitoring System):



After the program loading, the Alarm Station screen will be displayed.



Press the <Ctrl>+<Shift>+<Q> buttons: the "Alarms/warnings groups editor" window will appear.

Alarm Station Setup

st of grou	ips;	Group's name:			Type of elements:
E	Emergency a	alarms 🚽 Emergen	cy alarms	Add Del	Warnings
st of elen	nents:				
In/Out	ID	Name	Alias		
Off	3:0:1	End of watch			
Off	5:0:1	End of route			
Off	9:0:1	Traff. separ. zone			
Off	10:0:1	Traffic SS crossing			
Off	11:0:1	Traffic SS roundabout			
Off	12:0:1	Precautionary area			
Off	13:0:1	Two-way traff.route			
Off	14:0:1	Deepwater route			
Off	15:0:1	Recomm.traffic lane			
	1.001				1.0

From the List of groups listbox select a group of alarms which should be formed. By default, the list contains 6 groups. To add a group name to the list, enter it in the Group's name input box and press the Add button. To delete a group name from the list, select it and press the Del button.

or or groe	ips,	-	oroup's name.			i y	pe of elements.
E	Emergency a	alarms	Eme	ergency alarms	Add I	Del	Warnings
Emergen	cy alarms						
Distress, Primary a	urgency and larms	i safety alarms		Alias		_	
Secondar Varnings	y alarms						
communi	cation fail		ne				
Off	10:0:1	Traffic SS ci	ossing				
Off	11:0:1	Traffic SS ro	undabout				
Off	12:0:1	Precautiona	ry area				
Off	13:0:1	Two-way tra	ff.route				
Off	14:0:1	Deepwater r	oute				
Off	15:0:1	Recomm.tra	ffic lane				
	Treat	1.1					t »

From the Type of elements listbox select the alarms and/or warnings which will be shown in the table.

list of grou	ips;	Group's name: Type c			
Distress,	urgency and	l safety alarms 🗸 Distress, urg	ency and safety alarms Add De	Alarms, warnings	
ist of elen	Alarms				
In/Out	ID	Name	Alias	Alarms, warnings	
Off	0:0:1	Test alarm			
Off	2:0:1	Timer went off			
Off	3:0:1	End of watch			
Off	4:0:1	Off chart			
Off	5:0:1	End of route			
Off	6:0:1	VVP approach			
Off	7:0:1	Course difference			
Off	8:0:1	Out of XTD			
Off	9:0:1	Traff.separ.zone			
-	1.004	7			

You can sort the alarms in the table by the name and ID by pressing on the relevant column name. Press the Off button to the left of the name of the alarm (warning), which should be included in the group (Off is replaced with On).

or or groe	ihe'	ups, Group's name.		Type of elements.
Distress,	urgency and	safety alarms 🚽 Distress, urger	Distress, urgency and safety alarms Add Del Alarms, wa	
st of elen	nente:			
In/Out	ID	Name	Alias	
Off	1004:0:1	SOUNDER: no data		
Off	64:0:1	SOUNDER: no input		
Off	261:0:1	STW Integrity Failed		
Off	266:0:1	STW Integrity doubtful		
Off	117:0:1	Safe scale changed		
Off	74:0:1	Safety contour		
On	73:0:1	Safety contour changed		
Off	207:0:1	Scanner Control		
Off	207:1:1	Scanner Control		
1.0"		6 A . I		1 P

If necessary, enter the name of the alarm (warning) under which it will be displayed in the Alarm Station, in the Alias column.

ist of group	05;	Group's name:			Type of elements:
Distress, u	urgency and safety alarms 🚽	Distress, urg	ency and safety alarms	Add Del	Alarms, warnings
ist of elem	ents:				
ID	Name		Alias	-	1
267:0:1	SOG Integrity doubtful				
1013:0:1	SOUNDER invalid				
1004:0:1	SOUNDER: no data				
64:0:1	SOUNDER: no input				
261:0:1	STW Integrity Failed				
266:0:1	STW Integrity doubtful				
117:0:1	Safe scale changed				
74:0:1	Safety contour		SAFETY		
73:0:1	Safety contour changed				
77 <u></u>	· ·				

Set all the alarms (warnings) which will be included in the group

Note: The alarms (warnings) supplied by the external devices via the NMEA interface are required to be generated for the recording. It is only then they will appear on the list, and can be included in a group.

After configuring all the groups, press the "Apply" button.

ACTIVATION OF TRANSAS INTEGRATOR

ATTENTION!

This procedure is performed for each WS.

Activate Transas Integrator by selecting the appropriate item in the START menu (START\PROGRAMS\MULTIFUNCTIONAL DISPLAY\ACTIVATE INTEGRATOR):



Upon computer restart, the Transas Integrator window will be opened:



Run all the tasks on the all the WS's and check their correct operation.

COMMISSIONING TABLE CREATION AND SYSTEM CONFIGURATION BACK UP

Restart all WS.



Press button for run System Configuration utility.



Commissioning Table Creation

Press Commissioning Table button:



In Filename input field specify the path to Commissioning Table file (by default, *C:\Transas\IBS*).

Press "Save" button.

When the Commissioning Table is created, this should be done at each WS. Also, after each change of configuration (e.g., if a new GPS is connected) the Commissioning Table should be made anew at each WS.

When making up a Commissioning Table, it is necessary to remember that the BRG/Dist offset is only saved on that station, which RIB is installed on.

NS 4000 Configuration Back Up

	Commissio	ning table generation				5
INS	ANNEX K	allows to generate standard commissionning t from the user documentation.	able report according to			
- 1	Filename	C:\Transas\IBS\report.htm		<u>S</u> ave	⊻iew	
21-						
Workstation						
Sensors						
0						
Radar						
B						
110						
Security						
P						
ommissioning						
			_			10. 20.
Backup				OK	Apply	Cancel

Press "Backup" button in the left bottom corner of the window.

System	Configuration Utility	1	×
?	INS configuration w Are you sure to bac	ill be applied befo kup INS configur	ore backup. ation?
	Yes	No	

Press "Yes" button.

i ⊕ ⊖	Test	
🗏 🕀 🗋	tlpatch	
🗏 🕀 🗋	TopPlan2006_lenobl	- 14
•	Transas	
•	WINNT	
	AlarmAckID	
	AlarmHistory	
	AUTOEXEC	
	bitsetup	
	CONFIG.SYS	
	current.trace	
	CurrentTrace index	

Specify the path here backup the file will be stored, and press "OK" button.

Backu	p/Restore/Reset utility	 (c) Transas Ltd.
Comm	and line parsed	
Prepa	ring to backup configur	ration
Host '	foramar" skipped.	
Host '	navtechbook" skipped.	s.
Host '	vapxp" skipped.	
Host '	vm-w2k" skipped.	
Readi	ng data from host "red	fox",
Data I	rom host "redfox" read	d.
Readi	ng ADB data	
Writin	g file "C:\Program Files	;\Transas\backup\tins.xml".
Writin	g file "C:\Transas\tins.	xml",
Done		

Press "OK" button.

System (Configuration Utility	x
٩	INS configuration backup succesfully co	ompleted.
	ОК	

Press "OK" button.

Note: The Navi-Conning configuration in the new product version is saved simultaneously with the NS 4000 configuration backup.

Commissioning Table Creation and System Configuration Back Up

NS 4000 Registry

Press button for run First Aid utility.





Switch to "Registry" page:

FirstAid 3.0			2
Product System F	legistry		
Registration			
Ship		Sensors	
Place:	Hamburg		
Who performed:	John Smith		
Certificate:	Transas		
Agent name:	Katz GMBH		
Ship owner:	Columbia Shipping		
Ship name:	Stella del Mare		
Call sign:	ZSDF		
Hardware			
Computer type:	RS6		
Service			
Make Registry			
Service Make Registry			

Fill in all the lines and press the Make Registry button.

SOFTWARE UPGRADE

Upgrade of Entire NS 4000 Product

Perform the NS 4000 Configuration Backup procedure on one of the WS with RIB6 installed.

Deactivate Transas Integrator on each WS. To do this, press <Ctr>+<Alt>+<Shift>+<F8> keys.

ОК	Cancel
	OK

Enter password and press "OK" button, PC will be restarted.

Run to START\CONTROL PANEL. Click "Add or Remove Programs" icon:

🗗 Control Panel								- 🗆 ×
<u>File E</u> dit <u>V</u> iew F <u>a</u> vorites <u>T</u> ools	Help							M
🕝 Back + 🕥 + 🎓 🔎 Sex	arch 👘 Folde	rs 🛄 •						
Address 🕞 Control Panel							•	→ Go
Control Panel 🖈	Ġ,	Ż	6	50	4	P	R	
Switch to Category View	Accessibility Options	Add Hardware	Add or Remove Programs	Administrative Tools	Automatic Updates	Date and Time	Display	
See Also 🌣	D	Ca	age		Z	÷	Ċ	
👋 Windows Update	Folder Options	Fonts	Game Controllers	Guardant drivers	Internet Options	Keyboard	Mouse	
Help and Support				< 🕰		۲	3	
	Network Connections	Network Setup Wizard	Phone and Modem	Power Options	Printers and Faxes	Regional and Language	Scanners and Cameras	
	B	V		O,	S	S		
	Scheduled Tasks	Security Center	SoundMAX	Sounds and Audio Devices	Speech	System	Taskbar and Start Menu	
	82	6	(Ca					
	User Accounts	Windows Firewall	Wireless Network Set	e				

Software Upgrade

Select "Multifunctional Display".

Remove Programs			
Currently installed programs:	Show up <u>d</u> ates	Sort by: Name	
		5160	- cojeri io
FAR file manager		Size	5,43MB
词 Google Earth		Size	21,03MD
GO Google Toolbar for Internet Explorer		Size	26,02MB
🐻 Guardant driver			
間 ICQ6		Size	41,83MB
Marvell Miniport Driver		Size	0,46MB
🗒 Microsoft .NET Framework 2.0 Service Pack I		Size	186,00MB
B Microsoft NET Framework 3.0 Service Pack 1		Size	245,00MB
Microsoft Office 2000 SR-1 Premium		Size	87,21MB
間 MSXML 4.0 SP2 (KB927978)		Size	2,56MB
過 MSXML 4.0 SP2 (KB936181)		Size	2,62MB
MSXML 6.0 Parser (KB933579)		Size	1,31MB
🖶 Multifunctional Display		Size	233,00MB
Click here for support information.		Used	frequently
		Last Used On	24.03.2008
To remove this program from your computer, click Remov	э.		Remove
得 NTE		Size	6,87MB
NVIDIA Drivers			

Press "Remove" button.

Add or R	emove Progr	ams			×
2	Are you sure	you want to remove	Multifunctional	l Display from your compu	iter?
		Yes	No	J	

Press "Yes" button.

After program deinstallation, restart PC.

Install new version of NS 4000 (see section **Software Installation**, paragraph **Installation of NS 4000**).

Run First Aid utility by selecting the appropriate item in the START menu (START\PROGRAMS\MULTIFUNCTIONAL DISPLAY\FIRST AID):



On "Product" page in Name drop-down list, press 🖬 button and select product (if necessary).

FirstA	d 3.0	X
Product	System Registry	
Product	name and location	
Name:	Multifunctional Display - Version 2.00.009 (b.11d Location: C:\Transas\IBS\ Locate	
-Select I	he trouble you have faced with	
	Navigation system cannot be run. The following message is displayed on the monitor screen: 'L50002. This program requires Dongle to run'	
	Navigation system cannot be run. The following message is displayed on the monitor screen: 'L50007. The frozen dongle is attached'	
	Navigation system cannot be run. The following message is displayed on the monitor screen: 'LS0004. Evaluation License has expired'	
	Navigation program would not start or has hung up at the start	
-		-

Press Navigation program would not start or has hung up at the start button:

elect the trouble	rou have Faced with	
Na	Navigation program would not start or has hung up at the start en:	
Na	Press 'Restore' button. (You should first close all the running programs and utilities). Press 'Make Report' button to compile a report to be sent to the representative of TRANSAS MARINE Ltd.	1
Nar	Restore Make Report Cancel en:	

Press Restore button.

FirstAid	×
⚠	After performing this operation all configuration changes made since selected backup date will be lost! Continue?
	<u>Yes</u> <u>N</u> o

Press "Yes" button.

Software Upgrade

Select custom ba	ackup file or pre	ess [Cancel] to use def	ault one		?×
Look jn:	问 FirstAid		•	+ 🗈 💣 🎫	
My Recent Documents	firstaid.				
Desktop My Documents					
My Computer					
My Network	File <u>n</u> ame:	firstaid		•	<u>O</u> pen
Places	Files of type:	IBS backup (*.xml)			Cancel

Specify the path to back up file and press "Open".

roduct System	Registry		1
Product name and Name: Multifund Select the trouble Na	l location - itional Disp vou have First Aid	Restoring Backup/Restore/Reset utility. (c) Transas Ltd. Command line parsed Updating backup file from "1.11.009.1083" version to Using update data in directory "C:\Program Files\Com Preparing to restore configuration Preparing to clear configuration on "W01"	Locate
Na [,]	Press Press 'M	Configuration clearing on "W01" succeeded. Restoring data on "W01" Restoring database Preparing to commit on "W01" Commit succeeded on "W01" Done	ns and en:
Na [,]	Res		en:
		Ok	

The configuration will be restored. Press "OK" button and close First Aid utility.

Activate Transas Integrator (see section Activation of Transas Integrator).

Upgrade Navi-Conning 4000

To start Data Tool utility press the button.





After the utility is run the screen displays a control window:

App Navi-S	ailor 4000	•			
Internal System	Log Book/Tracks/Targets	-	External 🖂		
Filename	Date and Time Size	_	Elename	Date and Time	969
[01-01-2008]	01/01/08 03:00				
[01-12-2008]	01/12/08 16:27				
[02-02-2009]	02/02/09 16:48				
[02-12-2008]	02/12/08 17:12				
[03-02-2009]	03/02/09 10:09				
[03-10-2008]	03/10/08 17:09				
[03-12-2008]	03/12/08 15:02				
[04-01-2008]	04/01/08 12:49				
[04-02-2009]	04/02/09 14:24				
[04-12-2008]	04/12/08 14:05				
[05-02-2009]	05/02/09 10:32				
[05-11-2008]	05/11/08 18:31				
[06-02-2009]	06/02/09 12:51				
Fno 10 00001	N0/10/N0 11/10				
Location: System	Log Book/Tracks/Targets	¢.	Location: C:\		
Disk size: 39.06 GB , tree space: 1.04 GB Selected: 0 items (0 bytes)			Disk size: 39.06 GB , tree space: 1.04 GB Selected: 0 items (0 bytes)		

Select from the App drop-down list the Navi-Conning 4000 application.



Select from the Internal drop-down list the Conning group.

App Internal	Navi-Conning 4000			
	Picture			
	Picture			
	Conning			

...

In External group press call button to the right of the window and specify the path to the folder with new configuration file <code>conning.dat</code>.

Exit <u>S</u> elect App Navi- Internal Conn	Descleo: Info Conning 4000	•	External 🖂		¥ B
Filename	Date and Time	Size	Flename	Date and Time	Size
Location: Connir Disk size: 0 MB , Selected: 0 items	g ree space: 0 MB (0 bytes)		Location: C:\ Disk size: 39.06 GE Selected: 0 items (1) , free space: 1.04 GB) bytes)	

Press Copy button in the utility toolbar.

Pata Too	ol Eopy Ma	Delete S	elect Dese	L Rect Info		<u>ud x</u>
App	Navi-Connin	g 4000		External Cit		राजा का
Internal	JConning	(manufacture and a			1 - 7 - 7 -	
infilter ner me	20	Lare and Time		Filename	Date and Time	Size
Location: Conning Disk size: 0 MB , free space: 0 MB Selected: 0 items (0 bytes)			Location: C:\ Disk size: 39.06 GB , free space: 1.03 GB Selected: 1 items (35.34 KB)			

Exit from the Data Tool utility.

Restart Navi-Conning 4000.

CHAPTER 3

Technical Specification

GENERAL

NS 4000 Physical Layout

The purpose of the NS 4000 is to provide maximum to simplify and facilitate the officer in charge of the navigational watch (OOW), planning, monitoring, and control the voyage of a vessel.

Sensors and control systems are not the part of NS 4000 but just connected equipment with none or minimal modification in order to ensure proper integration.

More detailed block-diagrams, and also cable list and RS6 connectors layout see in **Annex G**. The technical specification at components of WS's, see in the section **NS 4000 ECDIS MFD Hardware Components**.

Integrating Equipment

Integrating Equipment includes two Ethernet switches Moxa EDS-305/308/316 series.

The technical specification at components of Integrating equipment, see in the section **NS 4000 Hardware Components**.

Detailed block-diagrams and connection diagrams on connection Integrating Equipment see in **Annex G**.

NS 4000 HARDWARE COMPONENTS

RS6 Dedicated Computer

General

The main hardware part of the NS 4000 system is the RS6 computer.

Dimensions and View of RS6 Computer







Fig. 35. View of RS6 front side



Fig. 36. View of RS6 rear side

RS6 Housing

- RS6 mountable chassis (shown on figures above);
- Cooling unit: Cooltek 80 x 80 x 25 mm 16 CFM fan;
- Indicators: LEDs for power and HDD activity;
- Buttons: system reset;
- Dimensions: 572 x 390 x 780 mm (W x H x L);
- Power Supply: 24V DC -10/+30%.

RS6 Computer Based on ICES200 Intel® Socket, Core TM Duo/Celeron M Processor COM Express Module



Fig. 37. View of ICES200 Module

ICES200 Features

The ICES 200 is a Type 2 COM Express Module featuring Intel_®945GME and ICH7M chipset, switch supports Intel_®Core 2 Duo and Intel_®Core 2 Duo LV processors with 533/667 MHz FSB and one DDR2 memory socket up to 2GB. The ICES 200 integrated with Intel_® Graphics Media Accelerator (GMA950).

RS6 Technical Specifications

- CPU:
 - CPU1 Intel® Core™2 CPU T7400 2.16 GHz;
 - CPU2 Intel® Core™2 CPU T7400 2.16 GHz.
- Main Memory: 1 x DDR2 SO-DIMM 2 Gb;
- Chipset:
 - Intel 945GME;
 - ICH7M I/O Controller Hub.
- BIOS:
 - Award System BIOS;
 - Plug & Play support;
 - 4M bits Flash ROM.
- LAN: 2 x RJ45 (Gbit);
- Graphics:
 - NVIDIA GeForce 9600M GT (512 MB);
 - Resolution up to 2048 x 1536 @ 60 Hz, 1600 x 1200 @ 85 Hz.
- Audio:
 - Line In;
 - Line Out.
- Interfaces:
 - 1 x VGA1 (module 9600M GT);
 - 1 x VGA2 (GMA950);
 - 2 x USB 2.0 (front side);
 - 2 x USB 2.0 (rear side);
 - 2 x PS/2 (Keyboard/Mouse);
 - 1 x LPT;
 - 4 x RS232;
 - 4 x RS422/NMEA Input (Opto isolated);
 - 4 x Digital In (Opto isolated);
 - 4 x Digital Out (Opto isolated).
- Storage:
 - HDD Fujitsu MHV2080BH 80GB G2;
 - Device with removable storage: Optiarc CD-RW CRX880A.
- Environment conditions:
 - Operating temperatures: -15 to +55 °C;
 - Storage temperatures: -20 to 70 °C;
 - Relative humidity: Operating 10-95%, non-condensing.

Uninterruptible Power Supply Unit UPS6

General

This Uninterruptible Power Supply (UPS) is designed to prevent blackouts, brownouts, sags and surges from reaching computer with NS 4000. This UPS also filters out small utility line fluctuations and isolates equipment from large disturbances by internally disconnecting from the utility line, while supplying power from its internal batteries until the utility line returns to safe level.

UPS6 consists of following Phoenix modules:

- Low Frequency Filter;
- Primary-Switched Power Supply Unit QUINT-PS/1AC/24DC/20;
- Uninterruptible Power Supply Unit for Universal Use QUINT-DC-UPS/24DC/20;
- Battery Module 24 V DC, 3.4 Ah QUINT-BAT/24DC/3.4AH (7.2 or 12 AH).

QUINT-PS/1AC/24DC/20 Primary-Switched Power Supply with SFB Technology, 1 AC, Output Current 20 A

Description

QUINT POWER power supply units – highest system availability due to SFB technology.

Compact power supply units of the new QUINT POWER generation maximize the availability of your system. Even the standard power circuit-breakers can be tripped reliably and quickly with the SFB technology (Selective Fuse breaking Technology) and six times the nominal current for 12 ms. Defective current paths are is connected selectively, the defect is limited and the important system parts remain in operation. A comprehensive diagnostics is carried out by continuously monitoring the output voltage and current. This preventive function monitoring visualizes the critical operating modes and reports them to the control unit before an error occurs.

Features

- Quick tripping of standard power circuit breakers with dynamic SFB technology power reserve;
- Reliable starting of difficult loads with static POWER BOOST power reserve;
- Preventive function monitoring;
- Can be used worldwide;
- High degree of operational safety due to high MTBF > 500 000 h, long mains buffering times > 20 ms, high dielectric strength up to 300 V AC.

Ordering Data

- Product: Primary-switched power supply with SFB technology, 1 AC, output current 20 A;
- Type: QUINT-PS/1AC/24DC/20;
- Order No: 28668776.

Technical Data

- Input data:
 - Nominal input voltage range: 100...240 V AC;
 - Input voltage range: 85...264 V AC, 90...350 V DC;
 - Short-term input voltage: 300 V AC;
 - Frequency range: 45...65 Hz (0 Hz at DC input);
 - Current consumption: approx. 5.1 A (120 V AC) and 2.3 A (230 V AC);
 - Inrush current limitation < 20 A (typical);
 - Power failure bypass: > 20 ms (for 120 V AC) and > 20 ms (for 230 V AC);
 - Typical response time: < 0.5 s;
 - Protective circuit: transient surge protection varistor;
 - Input fuse, integrated: 12 A (slow-blow, internal);
 - Recommended backup fuse: circuit breaker 10 A or 16 A (characteristic B);
 - Discharge current to PE: < 3.5 mA;
 - Stripping length: 7 mm.
- Output data:
 - Nominal output voltage: 24 V DC ±1%;
 - Setting range for the output voltage: 18...29.5 V DC (>24 V constant capacity);
 - Output current: 20 A (-25...+70 °C), 26 A (with POWER BOOST, < 40 °C permanent), 120 A (with SFB technology, 12 ms);
 - Derating: from +60 °C 2.5% per Kelvin;
 - Control deviation: < 1% (change in load, static 10% ... 90%), < 2% (change in load, dynamic 10% ... 90%), < 0.1% (change in input voltage ±10%);
 - Power loss nominal load max: 46 W;
 - Maximum power dissipation idling: 10 W;
 - Efficiency: > 93 % (for 230 V AC and nominal values);
 - Ascent time: < 0.5 ms;
 - Residual ripple: < 80 mVpp (with nominal values);
 - Connection in parallel: yes, for redundancy and increased capacity;
 - Connection in series: yes;
 - Surge protection against internal surge voltages: yes, limited to approx. 35 V DC;
 - Resistance to reverse feed: max. 35 V DC;
 - Stripping length: 7 mm.
- Signal output DC OK active:
 - Output description: Uout > 0.9 x Un: high signal;
 - Voltage: + 24 V DC;
 - Current: ≤ 1 A (short circuit resistant);
 - Status display: "DC OK" LED green/Uout < 0.9 x Un: LED flashing.

- Signal output DC OK floating:
 - Output description: relay contact, Uout > 0.9 x Un: contact closed;
 - Voltage: \leq 30 V AC/DC;
 - Current: \leq 1 A;
 - Status display: "DC OK" LED green/Uout < 0.9 x Un: LED flashing.
- Signal output POWER BOOST active:
 - Output description: lout < In: high signal;
 - Voltage: + 24 V DC;
 - Current: ≤ 1 A (short circuit resistant);
 - Status display: LED "BOOST", yellow/lout > In: LED on.
- General Data:
 - Insulation voltage input/output: 4 kV AC (type test)/2 kV AC (routine test);
 - Insulation voltage input/PE: 3.5 kV AC (type test)/2 kV AC (routine test);
 - Insulation voltage output/PE: 500 V DC (routine test);
 - Mounting position: on horizontal NS 35 DIN rail according to EN 60715;
 - Degree of protection: IP20;
 - Protection class: I, with PE connection;
 - MTBF: > 500,000 h according to IEC 61709 (SN 29500);
 - Housing version: steel sheet, zinc-plated;
 - Weight: 1.7 kg;
 - Dimensions (width x height x depth) state of delivery: 90 x 130 x 125 mm;
 - Dimensions (width x height x depth) 90° tuned: 122 x 130 x 93 mm.
- Ambient conditions:
 - Ambient temperature (operation): -25 ... 70 °C (> 60 °C derating);
 - Ambient temperature (storage/transport): -40 ... 85 °C;
 - Max. permissible relative humidity (operation): 95% (at 25 °C, no condensation).

Dimensions







Fig. 39. EMC Filter dimensional drawing

Uninterruptible Power Supply Unit for Universal Use QUINT-DC-UPS/24DC/20

Description

Uninterruptible Power Supply Units for Buffering Long-Term Power Interruptions:

- Saves space thanks to the compact, uniform design;
- Integrated diode saves money through isolation of loads;
- Maximum system availability through optimum battery management and reliable signaling;
- Minimum installation time due to ready-to-use plug-in bridges and integrated timeout.

QUINT-DC-UPS uninterruptible power supply units with long-life lead-acid batteries provide long buffer times at high currents. Even in the event of a longer supply voltage failure, the units ensure that all connected devices continue to operate without interruption.

The devices have a narrow and uniform design, which makes them ideal for use on the DIN rail where space is limited. In addition, short wiring paths ensure order and clarity in the control cabinet.

The high level of availability and the particularly long service life of the battery modules are achieved through professional battery management. An automatic presence check (every minute), automatic quality test (once a week), temperature-determined charging, and electronic over current protection ensure the battery modules are ready to operate at all times. Power is therefore available in the event of an error and the service life of the battery module is maximized.

The actual state must be determined quickly so that the right decision can be made in an emergency. Optimum signaling is thus required for maximum system availability. Three floating PDT contacts and three LEDs are provided for function monitoring, which indicate all the operating states clearly.

So that relay signaling is more reliable and more durable than before, an additional positive supply output has been provided. The contact, which is current-limited and resistant to continued short circuits, is located next to the relay connections and enables easy bridging. In the event of wiring errors, the shortcircuit protection prevents any welding of the relay contacts. This ensures that the user can rely on an OK signal. Even in the event of connection errors, currents remain below 100 mA, which prevents damage to the relay contacts.

A system is switched off after a specific time that can be set on the device or by an external signal.

No additional installation is required for shutdown. In addition, ready-to-use plug-in bridges minimize the installation time.

The connected devices can be divided into buffered and unbuffered loads using the isolated input. This extends the buffer time, which depends on the output current. If only critical devices are protected using fuses, smaller battery modules can be used that save money and space in the control cabinet. In addition, the isolated input protects the connected devices against errors in the internal network.

Ordering Data

- Product: Uninterruptible power supply unit;
- Type: QUINT-DC-UPS/24DC/20;
- Order No: 2866239.

Technical Data

- Input data:
 - Nominal input voltage: 24 V DC;
 - Input voltage range: 22.5-30 V DC;
 - Current consumption (no load/charging/maximum): 0.1 A/2.0 A/22.0 A;
 - Switching threshold: U_a < 22 V; dynamic U_{in} 1 V/0.1 s;
 - Buffer time (can be configured): 0.5; 1; 2; 3; 5; 10; 15; 20; 30; continuous;
 - Input fuse: internal, 25 A;
 - Maximum power dissipation (ready/buffer mode): 15 W/20 W.
- Output data: Can be connected in parallel (battery module): yes, to increase the buffer time.
- Output data in normal operation:
 - Nominal output voltage: 24 V DC;
 - Output voltage: Uin;
 - Output current: 20 A;
 - Current limit: None;
 - Overload fuse: Internal, 25 A.
- Output data in buffer mode:
 - Nominal output voltage: 24 V DC;
 - Output voltage (maximum): 27.9 V DC;
 - Output current: 20 A;
 - Current limit: 27 A;
 - Overload fuse: electronic;
 - Level of efficiency (typical): 95%;
 - Remote shutdown: yes.
- Charging:
 - Charge characteristic curve: I/U characteristic curve;
 - End-of-charge voltage: temperature compensated;
 - Charge current: < 2.5 A;
 - Battery presence check/time interval: 60 seconds;
 - Battery quality test/time interval: 180 hours.
- Memory medium: external:
 - Nominal voltage: 24 V DC;
 - Nominal capacity: 3.4 Ah, 7.2 Ah, 12 Ah;
 - Charge current: < 2.5 A.
- Signaling:
 - Power In OK: green LED;
 - Alarm: red LED, floating PDT, 30 V AC/DC, maximum; 1 A, maximum;
 - Battery mode: yellow LED, floating PDT, 30 V AC/DC, maximum; 1 A, maximum;
 - Battery charge: yellow LED, flashing, floating PDT, 30 V AC/DC, maximum;
 1 A, maximum.

- General data:
 - Insulation voltage (Input/output to housing): 1 kV AC type test/1 kV AC routine test;
 - Mounting position: on a horizontal 35 mm (1.378 in.) DIN rail EN 60715;
 - Degree of protection: IP20;
 - Class of protection: II;
 - MTBF According to IEC 1709 (SN 29 500): > 500,000 h;
 - Housing version: AluNox (AIMg1), closed;
 - Dimensions (W x H x D) default upon delivery: 66 x 130 x 125 mm;
 - Dimensions (W x H x D) rotated 90°: 122 x 130 x 69 mm;
 - Weight (approximately): 0.8 kg.
- Ambient conditions:
 - Ambient temperature (operation): -25 °C ... 70 °C (> 60 °C derating);
 - Ambient temperature (storage/transport): -40 °C ... 85 °C;
 - Max. permissible relative humidity (operation): 95% (at 25 °C, no condensation).

Dimensions



Fig. 40. Uninterruptible Power Supply Unit

QUINT-DC-UPS/24DC/20 dimensional drawing

Battery Modules 24 V DC

- Ordering Data:
 - Product: Battery Module 24 v DC, 3.4 Ah;
 - Type: QUINT-BAT/24DC/3.4AH;
 - Order No: 2866349.
Technical Data

Technical data of Battery modules presented in the table below:

Table 13.	Battery	v modules	technical	specification

Technical data/Type	QUINT- BAT/24DC/3.4AH	QUINT- BAT/24DC/7.2AH	QUINT- BAT/24DC/12AH
Order No.	28 66 34 9	28 66 35 2	28 66 36 5
Nominal voltage	24 V DC	24 V DC	24 V DC
Nominal capacity	3,4 Ah	7,2 Ah	12Ah
Max. charging current	0,8 A	1,8 A	3,0 A
End-of-charge voltage (at 20 °C)	27,6 V	27,6 V	27,6 V
Buffer period	20 A/4,5 min.	20 A/10 min.	20 A/22,5 min.
	25 A/3 min	40 A/4,5 min	40 A/9 min
Nominal output current, max	25 A	50 A	50 A
Output fuse, internal	25 A	2 x 25 A	2 x 25 A
Connection in parallel, to increase the buffer time	Yes		
Degree of protection/Protection class	IP20/III		
Service life (years)	6 (20 °C)		
Housing	Galvanized sheet steel		
Dimensions (W x H x D) mm	112 x 145 x 123	164 x 156 x 123	231 x 156 x 123
Weight approx.	3,54 kg	6 kg	9 kg
Rechargeable battery type	Panasonic UP-RW1220P1	Panasonic LC- R127R2PG	Panasonic LC- RA1212PG

Dimensions



Fig. 41. QUINT-BAT/24DC/3.4AH battery dimensional drawing



Fig. 42. QUINT-BAT/24DC/7.2AH battery dimensional drawing



Fig. 43. QUINT-BAT/24DC/12AH battery dimensional drawing



Fig. 44. Battery modules mounting brackets dimensional drawing

Transas ES6 Dedicated Keyboard with Trackball

General

- ES6 keyboard with Trackball (the ES6 in what follows) is a control unit inside the Transas systems;
- The ES6 consists of:
 - The PC compatible keyboard unit with two fields (QWERTY- and function-keys);
 - Separate trackball unit with trackball, two left buttons (one on each side of the Trackball), one right button and an optional scroll wheel.
- Dimensions remain unchanged (ES3 and ES4);
- Power supply 24VDC (-10/ +30% according to IEC 60945);
- Possibility to connect external KBD and pointing device via CAN-bus interface;
- Possibility to connect external pointing device via PS/2 interface;
- Possibility to connect to PC via USB interface by means of a built in USB hub;
- RS232 interface is compatible with ES3.

Keyboard Unit Overview

The keyboard unit is made up of basically four parts:

- Plastic front part with holes for keys, indicators and rotational controls e.g. Rain, Gain, Dimmer;
- Silicon rubber keypad with contact pads for the QWERTY-keys;
- Printed circuit board with LEDs for background light and indicators, tactile switches for function keys, rotary encoders, control electronics and connectors;
- Plastic back cover.

Keyboard QWERTY-Field

The keys are designed (looks and feel) and placed in a way to resemble a standard English-American laptop keyboard.

All keys are backlit with orange/yellow LEDs (Light Emitting Diodes). The keys are printed with a "hiding-effect", i.e. the key legends are normally invisible when not lit. The QWERTY-field is normally not lit, when a key is pressed the backlight is switched on and this first key press is not sent to the PC. When no key of the QWERTY-field is pressed for more than 30 seconds the backlight will be switched off.

Keyboard Function Field

All function keys have a tactile switch on the PCB to give a distinct "click" feeling.

The tracking keys are printed with a "hiding-effect", i.e. the key legends are normally invisible when not lit. They are lit only when the tracking function is active.



Fig. 45. View of ES6 keyboard

Functional Keys

Table 14. ES6 Functional keys

N/N	ES6 key/control	Function	Comment
1	ECDIS	To turn on the ECDIS task	
2	RADAR	To turn on the RADAR task	
3	CONNING	To turn on the CONNING task	
4	AUX	Not used	
5	TX/STBY	Not used	
6	SHOW RADAR	To backlight the radar picture on the screen	 For ECDIS task as you press this button and keep it depressed: To turn on the overlay; Transparency value – 0; Chart Base display. For RADAR task as you press this button and keep it depressed: Display of ARPA and AIS targets is turned off; Turns off CHARTS and MAPS. Display of chart information is switched to "Gray transparency" colour palette; Display of "Radar Rings" is turned off. As the button is released, the system returns to the initial display mode
7	SHOW CHART	To select chart information	 For ECDIS task as you press this button and keep it depressed: Transparency value – 3; No targets are displayed; No tides or currents are displayed; No Add Info objects are displayed. For RADAR task as you press this button and keep it depressed, contours of chart objects are backlighted. As the button is released, the system returns to the initial display mode

N/N	ES6 key/control	Function	Comment
8	ALL LAYERS	To turn on display of all the possible chart information layers	
9	OVERLAY	To turn on/off the Overlay mode	
10	DAY/NT	To switch successively colour palettes	 Daylight; Twilight; Dusk; Night; Dusk inverted; Night inverted
11	AHEAD	To turn on the Navigation mode	 For RADAR task also: In Relative Motion: To switch to a new stabilisation course value; In True Motion: To set the ship symbol to the initial state on the Plan Position Indicator
12	TGT	To turn on/off display of ARPA and AIS targets on NS screen	
13	МОВ	To turn on the Man Overboard alarm mode	
14	EVENT	To make an instant position recording in the electronic log	
15	ST. DISP	To turn on presentation of the Primary Chart Information Set	
16	N/H/C UP	To switch successively to North UP/Heading UP/Course UP motion mode	North Up;Head Up;Course Up
17	TM/RM	To switch between True Motion and Relative Motion modes	
18	EBL 12	To adjust the electronic bearing line value EBL1 and EBL2. A press on this switches the control between EBL1 and EBL2	EBL1 is displayed in the form of a solid light blue coloured line originating from the centre of the own ship mark. EBL2 is displayed on the PPI as dashed light blue coloured line. By default, the direction of EBL is set at 0°
19	EBL ON/OFF	To turn on/off EBL	
20	VRM 1 2	To adjust the variable range marker value VRM1 and VRM 2 A press on this switches the control between VRM1 и VRM2	VRM1 is displayed in the form of a solid light blue coloured ring with centred on the own ship mark centre. VRM2 is displayed as dashed light blue coloured ring. By default, VRM1 radius is set to 0.25 mile
21	VRM ON/OFF	To turn on/off VRM	
22	TRACK	To turn on the Track Control mode	
23	Qtrack	To turn on the mode for creating a temporary route (Quick Track)	
24	STOP	To turn off the Track Control mode	
25	ZOOM OUT	To reduce the chart display scale in the ECDIS task. To reduce the radar picture scale by one value with a single press in the RADAR task	
26	ZOOM IN	To increase the chart display scale in the ECDIS task. To increase the radar picture scale by one value with a single press in the RADAR task	

N/N	ES6 key/control	Function	Comment
27	ALARM	To display and acknowledge alarms	 Each press on the button acknowledges successively active alarms in NS system. The indicator can assume the following values depending on the alarm status: The button is highlighted in red, flashing red indicator – active unacknowledged alarm; The button is highlighted in red – active acknowledged alarm; The button is not highlighted in red – no active alarms
28	DIM	To control the keybords's backlighting	The illumination intensity is controlled by using Dimmer
29	GAIN	To adjust the video signal gain level	
30	SEA	To adjust the sea clutter suppressions	
31	RAIN	To adjust the rain clutter suppressions	

Dimensions



339mm



Fig. 46. Transas ES6 dedicated keyboard dimensional drawing

Transas Monitors

Jakob Hatteland LCD Maritime Multi Displays (MMD)

General

As a dedicated part of systems Transas Marine Ltd uses Industrial Colour Monitors manufactured for Transas by Jakob Hatteland Display AS. The following types of monitors are used:

- 19" TFT Hatteland JH19T14 MMD Series 1, ref no: JH19T14MMD-D(A)A1-AOAA;
- 23" TFT Hatteland JH23T12 MMD, Series 1 ref no: JH23T12MMD-D(A)A1-AAAA;
- 19" TFT Hatteland JH19T02 MMD, Series 1 ref. no: JH19T02MMD-E1/JH19T02-E2;
- 23" TFT Hatteland JH23T02 MMD, Series 1 ref. no: JH23T02MMD-E1/JH23T02-E2;
- 19" TFT Hatteland HD19T03 MMD, Series 2 ref. no: HD19T03BOAA+HDMMD01-A02. (HD19T03BOAA – Display module; HDMMD01-A02 – Backpack module).

Features

Hatteland Display's marine monitors are based on high quality and state-of-art components with the highest specifications, and meet all requirements for harsh maritime use. These color displays are industrialized versions of a high quality Sharp and Fujitsu TFT based display with MVA Premium technology. The MMD allows you to display professional applications with clarity and enhanced color and image quality, VGA STD input, Video input and PIP (Picture in Picture) functions. The display provides you with automatic compatibility with multiple upgrading platforms and a vast array of graphic standards allowing resolution upgrades without upgrading the display.

The key features for the Maritime Multi Display Series 2 range are optically bonded, modular backpacks, slimmest design possible, PIP) functionality, easy operation with either the IP22 1-button user controls + USB connector in front.

Products HD19T03, JH19T14 and JH23T12 Specification

	19" TFT Hatteland HD19T03 MMD	19" TFT Hatteland JH19T14 MMD	23" TFT Hatteland JH23T12 MMD		
TECHNICAL DES	TECHNICAL DESCRIPTION				
TFT Characterist	tics				
TFT Technology	Color Active Matrix LCD Mo MVA Premium Technology Thin Film Transistor (TFT)	Color Active Matrix LCD Module MVA Premium Technology (TFT) Thin Film Transistor (TFT)			
TFT size	19 inch viewable image size	e	23.1 inch viewable image size		
Pixel number	1280 x 1024	1280 x 1024	1600 x 1200		
Pixel pitch (RGB)	0.294 (H) x 0.294 (V) mm	0.294 (H) x 0.294 (V) mm	0.294 (H) x 0.294 (V) mm		
Response Time	12 ms (typical) black to white to black	12 ms (typical), "black" to "white"	10 ms (typical), "black" to "white"		
Contrast Ratio	600:1 (typical)	900:1 (typical)	500:1 (typical)		
Light Intensity	450 cd/m ² (typical)	300 cd/m ² (typical)	250 cd/m ² (typical)		
Viewable Angle	+/- 89 deg. (typical) (Up/Down/Left/Right)	+/- 85 deg. (typical) (Up/Down/Left/Right)	+/- 85 deg. (typical) (Up/Down/Left/Right)		
Active Display Area	376.32 (H) x 301.056 (V) mm	376.32 (H) x 301.056 (V) mm	470.4 (H) x 352.8 (V) mm		
Max Colors	16.7 millions	16.7 millions	16.7 millions		

 Table 15. Jakob Hatteland LCD Maritime Multi Displays HD19T03, JH19T14 and JH23T12

 Characteristics

	19" TFT Hatteland HD19T03 MMD	19" TFT Hatteland JH19T14 MMD	23" TFT Hatteland JH23T12 MMD
Synchronization	<u>.</u>	1	1
Sync Signal	 Digital separate synchro Composite synchroniza Synchronization on gree Interlaced and non inter 	onization; tion; en; laced	
	Auto detect VGA -> UXGA	Auto detect VGA -> SXGA	
Synchronization	Range	1	
Horizontal	31,5 kHz to 80 kHz	1,5 kHz to 80 kHz 31,5 kHz to 91,1 kHz	
Vertical	60 Hz [*] to 87 Hz	60 Hz [*] 1	to 85 Hz
Supported Signa	al Inputs		
Resolutions	1		
VGA	6	640 x 480 (including 640 x 350	0)
SVGA	8	300 x 600 (including 720 x 40)	0)
• XGA		1024 x 768	
• SXGA		1280 x 1024	
• UXGA	1600 x 1200		1600 x 1200
Video Signals	 Interlaced NTSC and P/ Composite video 	AL/SECAM video;	
Power Specifica	tions		
Power Supply option	115&230VAC – 50/60 Hz +	- 24 VDC	
Power Consumption	Operating: 66 W (max)	Operating: 100 W (max)	
MECHANICAL D	ESCRIPTION	1	
Physical Consid	erations		
Physical Dimensions	416 (W) x 372 (H) x 75 (D) mm	483 (W) x 444 (H) x 82 (D) mm	584 (W) x 534 (H) x 85 (D) mm
Weight	9.0 kg (approx)	11.5 kg (approx w/bracket)	20 kg (approx w/bracket)
Signal Terminals	5		
DVI-I Signal In	1 x 24p DVI-I (or as RGB IN with adapter)	1 x 29p DVI Female (or as	RGB IN with adapter)
RGB Signal In	15p HD-SUB (female)		
RGB Signal Out		15p HD-SUB (female) – Clo	one of RGB IN
Comp. Video IN	1xRCA Phono (female)		
S-Video IN	1xSVHS S-VIDEO (female)		
HATTELAND I/O		1 x 160p D-SUB (female) –	Also see table below
USB IN	1xUSB TYPE A (for loopthrough)		
USB OUT	1xUSB TYPE A (for loopthrough)	1 x TYPE B Connector (fen	nale)
AC power IN		1 x Std IEC Inlet	
AC power OUT		1 x Std IEC Outlet	
DC power IN	1xScrew Terminals	1 x 2p D-SUB Connector (r	nale) – Amphenol FCC17

^{*} Recommended for optimum picture quality.

^{**} Recommended for optimum picture quality (60 Hz only).

	19" TFT Hatteland HD19T03 MMD	19" TFT Hatteland JH19T14 MMD	23" TFT Hatteland JH23T12 MMD	
Available Options/Accessories				
COM2	1 x D-SUB 9P (female)			
Bracket	 HD VESA 19TBR-A1 – VESA bracket for complete unit; HD 19TBR CMB-A1 – Console Mounting Bracket for complete unit 	JH MMD BR	JH 23TBR T01-A1	
Rotary Bracket		JH MMDROSTD-A1		
User Controls				
On front bezel	Power On/Off and On Scre	en Display Menu (push butto	n).	
	Brightness control (up/down – push buttons).			
		Hotkeys (left/right - push bu	uttons).	
	Mode status Red/Green Illu	iminated LED-Ring Indicator		
Environmental Considerations				
Operating	Temperature -15 °C to +55 °C. Humidity 30% to 90% (non condensing)			
Storage	Temperature -20 °C to +60 °C. Humidity 10% to 90% (non condensing)			
Safety Considerations	Even although the test conditions for bridge units provide for a maximum operating temperature of 55 °C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25 °C. This is a necessary prerequisite for a long life and low service costs			

HD19T03, JH19T14 and JH23T12 MMD Dimensions



Fig. 47. 19" TFT Hatteland JH19T14 MMD. Standard View



Fig. 48. 19" TFT Hatteland JH19T14 MMD. Bracket View



Fig. 49. 19"/23" TFT Hatteland JH19T14/JH23T12 MMD. Rotary Bracket View



Fig. 50. 23" TFT Hatteland JH23T12 MMD. Standard View



Fig. 51. 23" TFT Hatteland JH23T12 MMD. Bracket View



Fig. 52. 19" TFT Hatteland HD19T03 MMD. Standard View



Fig. 53. 19" TFT Hatteland HD19T03 MMD Bracket View



Fig. 54. 19" TFT Hatteland HD19T03 MMD Console Bracket View



Fig. 55. 19" TFT Hatteland HD19T03 MMD Vesa Bracket View

Products JH19T02 and JH23T02 Specification

Table 16. Jal	kob Hatteland LCE) Maritime Multi [isplays JH ⁻	I19T02 and J	IH23T02 Characteristics
---------------	-------------------	--------------------	-------------------------	--------------	-------------------------

	19" TFT Hatteland JH 19 T02 MMD E1/E2	23" TFT Hatteland JH 23 T02 MMD E1/E2	
TECHNICAL DESC	RIPTION		
TFT Technology	19.0 inch viewable image size	23.1 inch viewable image size	
	Active Matrix		
	Thin Film Transistor (TFT)	Thin Film Transistor (TFT)	
	MVA Premium technology	MVA Premium technology	
TFT Characteristics	5		
Pixel number	1280 x 1024	1600 x 1200	
Pixel pitch (RGB)	0.294 (H) x 0.294 (V) mm	0.294 (H) x 0.294 (V) mm	
Response Time	15 ms (typical), "black" to "white"	20 ms (typical), "black" to "white"	
Contrast Ratio	600:1 (typical)	
Light Intensity	250 cd/m	² (typical)	
Viewable Angle	+/- 80 deg. (typical) (Up/Down/Left/Right)	+/- 85 deg. (typical) (Up/Down/Left/Right)	
Active Display Area	376.32 (H) x 302.056 (V) mm	470.4 (H) x 352.8 (V) mm	
Max Colors	262.144 (depending on graphic card)	16.777.26 (depending on graphic card)	
Video Signal	Analog RGB 0,7 Vp-p. Ir	nput Impedance 75 Ohm	
Synchronization			
Sync Signal	 Digital separate synchronization; Composite synchronization; Synchronization on green; Auto detect VGA -> SXGA interlaced 	and non interlaced	
Synchronization Ra	ange		
Horizontal	31.5 to 91.1 kHz	31.5 to 106.259 kHz	
Vertical	60 to	85 Hz	
Supported Signal I	nputs		
Resolutions:			
• VGA	640 x 480 (inclu	ding 640 x 350)	
• SVGA	800 x 600 (inclu	ding 720 x 400)	
• XGA	1024	x 768	
• SXGA	1280 >	x 1024	
• UXGA		1600 x 1200	
Video Signals:	 Interlaced NTSC and PAL/SECAM video; Composite video; S-Video; Component video (YCrCb) 		
Power Specificatio	ns		
Power supply option	115VAC/60Hz & 230VAC/50Hz for E1 se	eries and 24 VDC for E2 series	
Power Consumption	Operating: 40 W (max)	Operating: 100 W (max)	
MECHANICAL DES	CRIPTION		
Physical Dimensions	483 (W) 444 (H) 68 (D)	584 (W) 534 (H) 72 (D)	
Weight	14 kg (approx w/bracket)	17 kg (approx w/bracket)	
Input Signal Termin	nal		
RGB (PC) signal	15 pin mini D-SUB (female)		
Composite Video	RCA Phono plug		
S-Video signal	S-Video (SVHS) plug		
AC power signal	Std IEC Inlet		

	19" TFT Hatteland JH 19 T02 MMD E1/E2	23" TFT Hatteland JH 23 T02 MMD E1/E2
Accessories		
Touch screen	1 x D-SUB 9P Connector (female)	
Remote Control	2 x D-SUB 9P Connector (female)	
User Controls		
On front bezel	 Power On/Off (push button); Brightness control; 2 x hotkeys; Mode status LED 	
Behind hatch	On Screen Display control (OSD/OSM)	
Environmental Cor	siderations	
Operating	Temperature of -15 °C to +55 °C. Humidity 30% to 90% (non condensing)	
Storage	Temperature of -20 °C to +60 °C. Humidity 10% to 90% (non condensing)	
Safety Conside- rations	Even although the test conditions for bric operating temperature of 55 °C, continuo components should, if possible, take plac 25 °C. This is a necessary prerequisite for	lge units provide for a maximum us operation of all electronic ce at ambient temperatures of only or a long life and low service costs

JH19T02 and JH23T02 MMD Dimensions





Fig. 56. 19" TFT Hatteland JH 19 T02 MMD. Standard View



Fig. 57. 19" TFT Hatteland JH 19 T02 MMD. Bracket View



Fig. 58. 23" TFT Hatteland JH 23 T02 MMD. Standard View

EXEL EXEL



Fig. 59. 23" TFT Hatteland JH 23 T02 MMD. Bracket View

Radar Integrator Board RIB6

General Description

The Radar Integrator Board (what's follow RIB6) is designed for the reception of analog video signals from the radar and their digitizing, pre-processing and relay of the radar signal to the dual network as per network protocols for the TRANSAS navigational products.

The RIB6 enables the automatic detection, automatic acquisition and automatic tracking of targets, calculations of targets coordinates and motion parameters, and on-line transmission of this data to the system, as well as the formation of a radar picture to be displayed in combination with an electronic chart.

The RIB6 is intended as means to connect radars from different manufacturers to a personal computer executing the Transas Navi-Radar and Navi-Sailor software.

The signal processing is performed in the following order.

At a Trigger signal, the digitizing of the input signal is performed in a pulse sweep whose size is calculated from the set number of output samples and decimation coefficients.

After the IFA band matched filters the random pulse interference rejection algorithm and pulse matched filter is implemented. The resulting sector presented at stage A in the figure below.

Stage B in the figure below presents the result after the azimuth integration algorithm. The resulting sector shall correspond to the center of all sectors used in the integration which is presented in stage C in the figure below.

The incoming data flow, regardless of the trigger repetition rate and antenna rpm, is reduced to the set number of sectors per an antenna revolution. So before sending the determined outgoing sector, RIB6 has to perform range compression and sector interpolation of the 16-bits samples related to stage D in the figure below.



Concurrently with the operation of the data reception and processing algorithm, data is transmitted and received via the RS422 serial port.

OUT[0..N] = outgoingl processed sector, where N=[512, 1024, 2048] default value -1024.

Fig. 60. Radar signal processing

Electrical Characteristics

- Control Signal:
 - Electrical format: RS422.
 - Signal type: binary or alpha numeric (NMEA).
 - Information:

TX ON/OFF; Rotation ON/OFF; Pulse length; Trigger PRF; Magnetron current; Heating; Tuning indicator; BIT; PM control.

- Generic radar video signal:
 - Maximum voltage: +/- 25 V;
 - Input Impedance: 10 KOhm, 1 KOhm, 75 Ohm, 50 Ohm (manually selectable by jumper);
 - Signal type: analog;
 - Singled ended and differential input for generic radar (manually selectable by jumper);
 - The video and the combined video signal shall use the same connector.

- Trigger:
 - Maximum voltage: +/- 25 V;
 - Input Impedance: 10KOhm, 1 KOhm, 75 Ohm, 50 Ohm (manually selectable by jumper);
 - Signal type: square pulse;
 - Singled ended and differential input (manually selectable by jumper);
 - Pulse length of not less than 100 ns. Protection from pulse interference of less than 50 ns. Implemented by means of a low pass filter;
 - Electronic adjustment of the operation threshold within +/-10 V.
- Azimuth:
 - Maximum voltage: +/- 25 V;
 - Input Impedance: 1 KOhm, 10 KOhm, or a pull up resistor of 500 ohm to 12 V power supply for connection to open collector driver (manually selectable by jumper);
 - Signal type: square pulse;
 - Singled ended and differential input (manually selectable by jumper);
 - Rejection of pulse interference not less than 1 us. Valid pulse assumed to be at least 2 us;
 - Electronic adjustment of the operation threshold within +/-10 V.
- Heading:
 - Maximum voltage: +/- 25 V;
 - Input Impedance: 1 KOhm, 10 KOhm, or a pull up resistor of 500 ohm to 12 V power supply for connection to open collector driver (manually selectable by jumper);
 - Singled ended and differential input (manually selectable by jumper);
 - Rejection of pulse interference of less than 1 us. Valid pulse assumed to be at least 2 us;
 - Electronic adjustment of the operation threshold within +/-10 V.
- Output: 2 x 100 Mbit LAN;
- Power supply: 24 VDC.

Environmental Requirements

RIB6 operates from -40 °C to +85 °C in dry air.

RIB6 is for "Protected" category of IEC 60945 standard (temperature range: from -15 to +55 $^{\circ}$ C).

Dimensions



Fig. 61. RIB6. Dimensional drawing

Data Collector Unit DCU6

General

Data Collecting Unit (what's follow DCU), this device through which is realized connection of navigational data sources (such as GPS, GYRO, LOG, AIS, etc) using NMEA standard (IEC 61162) to Transas Workstations.

DCU power supply is performed with the cable connected to the external 24 VDC power supply.

The purpose of Data Collecting Unit (DCU) is:

- to convert data from RS 422 to Ethernet and visa versa;
- to share resources (data) between multiple clients.

DCU6 maximum dimensions are shown in figure below.

General Technical Characteristics

Table 17. Technical (cnaracteristics

Input voltage	24 V DC
Power consumption, max	25 Watts
Humidity (relative, operating and storage)	0 ÷ 95%, without condensation
EMC	IEC 60945 edition 4
Acoustic pressure of loud speaker (distance 1 m)	80dB
Working temperature	-15 ÷ +55 °C
Storage temperature	-25 ÷ +70 °C
Dimensions	430(+40)x200x44 mm
Weight	2.7 kg

Interfaces Description

Table 18. Input/Output channels

	Description	Notes
Quantity	16 x RS 422 bi-directional channels (default configuration)	1–14 ports are RS 422 bi-directional channels. 15 and 16 ports are RS 422 bi-directional channels by default and may be configured by jumpers X16 and X17 accordingly as follows: Output channels transmit RS 232 signal; Input channels receive RS 422 signal
Data format	IEC 61162 ed. 1/2 (NMEA 0183) Any type of binary data	
Parity	None Even Odd	
Baud rate	1200 2400 4800 9600 19200 38400 57600 115200	 Limitations: In case if all 16 RS ports will be loaded by bi-directional data transferring with baud rate between 1200 and 38400 then no more than 25 Transas Workstations could work with same DCU; Baud rate 57600 – then no more than 15 Transas Workstations could work with same DCU; Baud rate 115200 – then no more than 10 Transas Workstations could work with same DCU
Data transfer delay	30 to 255 msec	Adjusted by operator
Ethernet	2 (two) LAN 10/100 Mbits/sec adapters	

Dimensions





WAGO I/O Modules

MODBUS Fieldbus Coupler (750-314)

This buscoupler allows connection of the WAGO-I/O-SYSTEM as a slave to the MODBUS fieldbus. The buscoupler is capable of supporting all bus modules. The bus coupler automatically configures, creating a local process image which may include analog, digital or specialty modules. Analog and specialty module data is sent via words and/or bytes, digital data is sent bit by bit.

MODBUS allows the storing of the process image in the corresponding Master control (PLC, PC or NC).

The data of the analog modules is stored in the process image which is created automatically according to the order in which the modules are connected to the buscoupler. The bits of the digital modules are sent byte by byte and added to the analog data (registers). If the amount of digital information exceeds 8 bits, the buscoupler automatically starts with a new byte.



Fig. 63. WAGO MODBUS Fieldbus Coupler

	Table 19.	WAGO	MODBUS	specification
--	-----------	------	--------	---------------

Description	
MODBUS/ RS 232/ 150-19200 Bd	750-314
General specifications	
Dimensions from upper edge of DIN 35 rail (mm) W x H x L	51 x 65 x 100
Weight	200 g
Wire connection CAGE CLAMP	0.08–2.5 mm ² ; AWG 28–14, 8–9 mm/0.33 in stripped length
System data	
No. of nodes	99 with repeater
No. of I/O points	Ca 6000 (depends on master)
Transmission medium	Shielded Cu cable 2 (4) x 0.25 mm ² /AWG 23
Max. length of fieldbus segment	1200 m (depends on baud rate/on the cable)
Baud rate	(1200) 150 baud (115200) 19200 baud
Buscoupler connection	1 x D-SUB 9, socket
Technical data	
Max. no. of I/O modules	64
Fieldbus Input/Output process image	max. 512 bytes
Configuration	DIP switch and 2 decimal Coder or via PC or PLC
Voltage supply	DC 24 V (-25% +30%)
Input current (max.)	500 mA at 24V
Efficiency of the power supply	87%
Internal current consumption	350 mA at 5 V
Total current for I/O modules	1650 mA at 5 V
Isolation	500 V system/supply
Voltage via power jumper contacts	DC 24 V (-25% +30%)
Current via power jumper contacts (max.)	DC 10 A

4-Channel Digital Input Module DC 24 V (750-403)

2- to 3-conductor Connection; High-side Switching

The digital input modules receive control signals from digital field devices (sensors, etc.). Each input module has a noise-rejection filter. This filter is available with different time constants. An optocoupler is used for electrical isolation between the bus and the field side.



Fig. 64. 4-Channel Digital Input Module DC 24 V

Description	
4DI 24V DC 0.2 ms	750-403
General specifications	
Dimensions from upper edge of DIN 35 rail (mm) W x H x L	12 x 64 x 100
Weight	50 g
Wire connection CAGE CLAMP	0.08–2.5 mm ² ; AWG 28–14,
	8–9 mm/0.33 in stripped length
Technical data	
No. of inputs	4
Current consumption (internal)	7.5 mA
Voltage via power jumper contacts	DC 24 V (-25% +30%)
Signal voltage (0)	DC -3 V +5 V
Signal voltage (1)	DC 15 V 30 V
Current supply (typ.)	4.5 mA
Isolation	500 V system/supply
Internal bit width	4 bits

Table 20. 4-Channel Digital Input modules DC 24 V specification

2-Channel Analog Input Module 4–20mA (750-454)

The analog input module receives signals with standardized values of 4-20 mA. The input signal is electrically isolated and will be transmitted with a resolution of 12 bits. The internal system supply (via the data bus contacts) is used for the power supply of the module. The input channels are differential inputs. The shield (screen) is directly connected to the DIN rail.



Fig. 65. 2-Channel Analog Input Module 4-20 mA

Table 21. 2-Channel Analog Input modules 4-20 mA specification

Description		
2AI 4-20 mA Different Inputs.	750-454	
General specifications		
Dimensions from upper edge of DIN 35 rail (mm) W x H x L	12 x 64 x 100	
Weight	55 g	
Wire connection CAGE CLAMP	0.08–2.5 mm ² ; AWG 28–14, 8–9 mm/0.33 in stripped length	

Technical data	
No. of inputs	2
Voltage supply	Via system voltage DC /DC
Current consumption typ. (internal)	70 mA
Common mode voltage (max.)	35 V
Signal current	4 mA - 20 mA (750-454)
Input resistance	< 220 Ohm at 20 mA
Resolution	12 bits
Conversion time (typ.)	2 ms
Measuring error (25 °C)	<±0.2% of the full scale value
Temperature coefficient	<±0.01%/K of the full scale value
Isolation	500V system/supply
Bit width	2 x 16 bits data and 2 x 8 bits control/status (option)

2-Channel Analog Input Module ± 10 V (750-476)

The analog input module receives signals with the standard-ized values +/- 10 V. The input signal is electrically isolated and will be transmitted with a resolution of 16 bits. The internal system supply is used for the power supply of the module. The input channels of a module have one common reference potential. The 24 V supply is derived from the power jumper contacts. The shield (screen) is directly connected to the DIN rail.



Fig. 66. 2-Channel Analog Input Module +/-10 V

Table 22.	2-Channel	Analog	Input	modules	+/-10	V	specification
-----------	-----------	--------	-------	---------	-------	---	---------------

Description	
2AI +/-10 V DC 16 Bit single-ended.	750-476
General specifications	
Dimensions from upper edge of DIN 35 rail (mm) W x H x L	12 x 64 x 100
Weight	55 g
Wire connection CAGE CLAMP	0.08–2.5 mm ² ; AWG 28–14,
	8–9 mm/0.33 in stripped length
Technical data	
No. of inputs	2
Voltage supply	Via system voltage DC /DC
Current consumption typ. (internal)	75 mA
Common mode voltage (max.)	24 V
Signal voltage	+/-10 V (750-476)
Internal resistance (typ.)	130 kOhm + sign bit
Resolution	15 bits

Conversion time (typ.)	80 ms
Measuring error (25 °C)	<±0.1% of the full scale value
Temperature coefficient	<±0.01%/K of the full scale value
Isolation	500V system/supply
Bit width	2 x 16 bits data and 2 x 8 bits control/status (option)
Input filter	50 Hz
Noise rejection at sampling frequency	<-100 dB
Noise rejection above sampling frequency	<-40 dB

4-Channel Analog Input Module 0-10 V (750-468)

The analog input module receives signals with the standardized values of 0-10 V. The input signal is electrically isolated and will be transmitted with a resolution of 12 bits. The internal system supply is used for the power supply of the module. The input channels of a module have one common ground potential. The shield (screen) is directly connected to the DIN rail.



Fig. 67. 4-Channel Analog Input Module 0–10 V

Table 23.	4-Channel Analo	g Input module 0–10	V specification

Description	
4AI 0–10 V DC single-ended.	750-468
General specifications	
Dimensions from upper edge of DIN 35 rail (mm) W x H x L	12 x 64 x 100
Weight	55 g
Wire connection CAGE CLAMP	0.08–2.5 mm ² ; AWG 28–14,
	8–9 mm/0.33 in stripped length
Technical data	
No. of inputs	4
Voltage supply	Via system voltage DC /DC
Current consumption typ. (internal)	60 mA
Common mode voltage (max.)	35 V
Signal voltage	0 V - 10 V
Internal resistance (typ.)	133 kOhm
Resolution	12 bits
Conversion time (typ.)	4 ms
Measuring error (25°C)	<±0.2% of the full scale value
Temperature coefficient	<±0.01%/K of the full scale value
Isolation	500V system/supply
Bit width	4 x 16 bits data and 4 x 8 bits control/status (option)

2-Channel Relay Output Module AC 230 V, DC 30 V

The connected load is switched via the digital output (relay contacts) from the control system. The internal system voltage is used to trigger the relay. The NO contacts are electrically isolated. The switched status of the relay is shown by a LED. The module is a 2-channel, 4-conductor device and actuators with a ground (earth) wire may be directly connected to the module.



Fig. 68. 2-Channel Relay Output Module AC 230 V, DC 30 V

Description				
2DO 230 vAC 2.0 A/Relay 2NO/Potential Free	750-513			
General specifications				
Dimensions from upper edge of DIN 35 rail (mm) W x H x L	12 x 64 x 100			
Weight	55 g			
Wire connection CAGE CLAMP	0.08–2.5 mm ² ; AWG 28–14, 8–9 mm/0.33 in stripped length			
Technical data				
No. of outputs	2 make contacts			
Current consumption typ. (internal)	100 mA			
Switching voltage	AC 250 V/DC 30 V			
Switching power	500 VA/60 W			
	cos jmax = 0.4; L/Rmax = 7 ms			
Switching current (max.)	AC/DC 2A			
Switching current (min.)	10 mA at 5 V DC			
Switching rate (max.)	30/min (at nominal load)			
Pull-in time (max.)	10 ms			
Bounce time (typ.)	1.2 ms			
Drop out time (max.)	10 ms			
Contact material	silver alloy			
Mechanical life (min.)	2 x 107 switching operations			
Electrical life (min.)	3 x 105 switching operations (AC 2A/250 V) or (DC 2A/30 V)			
Isolation	1.5 KV eff. (field /system)*			
	* 2.5 kV Rated surge voltage			
	Overvoltage category III			
Internal bit width	2 DITS			

		• · · · · •	/		
Table 24.	2-Channel Relay	′ Output module A	C 230 V.	DC 30 V	specification

End Module (750–600)

After the fieldbus node is assembled with the correct buscoupler and selected I/O modules, the end module is snapped onto the assembly. It completes the internal data circuit and ensures correct data flow. One is required for each buscoupler.



Delivery without miniature WSB

Fig. 69. End Module

MOXA Switch Type Approved EDS-305/308/316 Series



Fig. 70. Appearance of MOXA switch type approved EDS-305/385/316 series

The EDS-305/308/316 are 5, 8, and 16-port Ethernet switches that provide an economical solution for your industrial Ethernet connections. The built-in relay warning function alerts network engineers when power failures or port breaks occur, and the switches are designed for harsh industrial environments.

The EDS-305/308/316 series switches can be installed easily on a DIN-Rail or in a distribution box.

Features

- Redundant dual 24 VDC power inputs;
- Relay output warning for power failure and port break alarm;
- Broadcast storm protection;
- Transmits VLAN tag packets transparently;
- -40 to 75 °C operating temperature range (T models).

Specification

Technology

- Standards: IEEE802.3, 802.3u, 802.3x;
- Processing type: Store and Forward;
- Flow control: IEEE802.3x flow control, back pressure flow control.

Interface

- RJ45 ports: 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection;
- Fiber ports: 100BaseFX ports (SC/ST connector);
- LED indicators: PWR1, PWR2, Fault, 10/100M (TP port), and 100M (Fiber port);
- DIP switch: port break alarm mask;
- Alarm contact: one relay output with current carrying capacity of 1A @ 24 VDC.

Power Requirements

- Input voltage: 24 VDC (12 to 45 VDC), redundant inputs;
- Input current (@ 24 VDC): 0.27A (EDS-316), 0.13A (EDS-308, EDS-305);
- Overload Current Protection: 1.6A (EDS-316), 1.1A (EDS-305, EDS-308);
- Connection: removable 6-pin terminal block;
- Reverse polarity protection: present.

Physical Characteristics

- Housing: IP30 protection, metal case;
- Dimensions (W x H x D):
 - EDS-305/308 series: 53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in);
 - EDS-316 series: 80.5 x 135 x 105 mm (3.16 x 5.31 x 4.13 in).
- Weight:
 - EDS-309/308/305 series: 630 g;
 - EDS-316 series: 1140 g.
- Installation: DIN-Rail mounting, wall mounting (optional kit).

Environmental Limits

- Operating temperature: -40 to 75 °C (-40 to 167 °F) (T models);
- Storage temperature: -40 to 85 °C (-40 to 185 °F);
- Ambient relative humidity: 5 to 95% (non-condensing).

Dimensional Drawing

Dimensions (unit = mm)

EDS-309/308/305 Series



Side View

Front View

Panel Mounting Kit

Rear View



Fig. 71. MOXA switch type approved EDS-305/308/316 series dimensional drawing

CHAPTER 4

Interface Capabilities

GENERAL

In order to operate adequately in conjunction with navigational sensors, the NS 4000 should receive certain data from them. This data is required to be transmitted in accordance with Standard IEC 61162-1 MARITIME NAVIGATION AND RADIO COMMUNICATION EQUIPMENT AND SYSTEMS. DIGITAL INTERFACES. PART1: SINGLE TALKER AND MULTIPLE LISTENERS or in NMEA-0183 format. In addition, there is also a range of navigation equipment using specific data exchange protocols. NS 4000 allows operation with several types of such equipment.

Note: Non-compliance of the sentence Talker ID with the specified standards does not affect its processing in the NS 4000. This has been done for ensuring the NS 4000 compatibility with devices operating according to earlier versions of standards.

- ATTENTION! -

It is necessary to verify that GPS transmits geographical coordinates referred to WGS-84 Datum. If it does not, use GPS settings to select WGS-84.

"Primary/Secondary Not WGS 84" alarm status does not change when invalid DTM sentence is received.

In the processing of all NMEA sentences by the NS 4000, the maximum admissible reception interval between them, whereby no alarm is triggered off, is accepted to be equal to 5 seconds. The exceptions are provided by DTM (35 seconds).

FORMAT OF DATA EXCHANGE USED IN ACCORDANCE WITH IEC 61162-1 STANDARD

Input

Summary Table

The summary table shows the principles of operation with each navigation sensor.

Sensor	Data type transmitted by sensor	Sentences carrying this data	NS 4000 channel which the sensor is connected to	
GPS (GLONASS, DECCA, LORAN)	Position (Lat. and Lon.)	GGA GLL RMC	POS 1 (POS 2)	
	COG and SOG	RMC VTG	POS 1 (POS 2)	
	Satellite information	GGA	POS 1 (POS 2)	
	Datum Reference	DTM	POS 1 (POS 2)	
	GPS RAIM Indicator	GBS	POS 1 (POS 2)	
	UTC time	ZDA	UTC	
	UTC date	ZDA	UTC	
SOUNDER	Depth under the sounder transducer	DBT DPT	SOUNDER 1 (SOUNDER 2)	
COMPASS	Heading	HDT VHW THS	GYRO 1 (GYRO 2)	
MAGNETIC COMPASS	Heading	HDG	MAGN 1 (MAGN 2)	
RATE OF TURN INDICATOR	Direction and rate-of-turn	ROT	ROT	
SPEED LOG	Speed through the water	VHW VBW	LOG 1 (LOG 2)	
DUAL AXIS LOG	Dual Axis Speed	VBW	DLOG 1 (DLOG 2)	
AIS	AIS targets information	AIQ, ALR AIQ, SSD AIQ, TXT AIQ, VSD ABK ABM ALR BBM SSD TXT VDM VDO VSD For SAAB R4 also proprietary format used	AIS	
ARPA	ARPA targets information	ТТМ	ARPA_A, ARPA_B	
DIGITAL ANEMO-METER	Wind direction and speed	MWD MWV VWR	WIND	
DIGITAL THERMOMETER	Water temperature	MTW	ТЕМР	
YEOMAN DIGITIZER	WPT position (Lat. and Lon.)	WPL	YEOMAN 1 (YEOMAN 2)	
Sensor	Data type transmitted by sensor	Sentences carrying this data	NS 4000 channel which the sensor is connected to	
----------------------	------------------------------------	------------------------------	--------------------------------------------------------	
ALARM STATION	Alarm state and acknowledgement	ALR ACK	ALARM STATION 1 (ALARM STATION 2)	
NMEA NAVTEX	NAVTEX Messages	CRQ NRX NRM	NAVTEX	
ASCII NAVTEX	NAVTEX Messages	ASCII format	ASCIINAVTEX	
RDF "Rhotheta RT202"	Direction finder value	ASCII format	RHOTHETA	
SEETRAC	Seetrac targets information	Proprietary format	SEETRAC	

Format of Input Data

This section describes format of all the sentences of IEC 61162-1 or/and NMEA 0183 standards, received from different types of navigational sensors.

Format of the sentences consists of the following parts.

Ν	Field	Description
1	\$	Start of sentence
2		Talker ID
3	AAA	Mnemonic code of data type identification
4	,	Data field delimiter
5	x.x,a,cc	Data
6	*hh	Checksum field
7	<cr><lf></lf></cr>	End of sentence

ACK – Acknowledge Alarm

Standard: IEC 61162-1, 2000.

\$--ACK, xxx¹*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	xxx	Local alarm identifier	Alarm number	

ALR – Set Alarm State

Standard: IEC 61162-1, 2000.

\$--ALR, hhmmss.ss¹,xxx²,A³,A⁴,c--c⁵*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	hhmmss.ss	Time of alarm condition change	Hours, minutes, seconds (UTC)	
2	ххх	Local alarm identifier	Alarm number	
3	A	Alarm condition	A = threshold exceeded, V = not exceeded	
4	A	Alarm's acknowledge state	A = acknowledged, V = unacknowledged	
5	CC	Alarm's description text		

DBT – Depth Below Transducer

Standard: IEC 61162-1, 2000.

\$--DBT, x.x¹, f², x.x³, M⁴, x.x⁵, F⁶*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	x.x	Depth	Depth value	
2	f	Measurement unit	"f" – feet	
3	x.x	Depth	Depth value	
4	М	Measurement unit	"M" – meters	
5	X.X	Depth	Depth value	
6	F	Measurement unit	"F" – fathoms	

DPT (Depth) – Depth

Standard: IEC 61162-1, 2000 IMO Resolution A.224 (VII).

Contains values of depth measured from the sounder vibrator and the vibrator position correction.

\$--DPT, x.x¹, x.x², x.x³*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	x.x	Depth (in meters)		
2	x.x	Correction (in meters)		Not processed
3	X.X	Maximum range scale in use		Not processed

DTM – Datum Reference

Standard: IEC 61162-1, 2000.

Contains information on the reference ellipsoid which the received coordinates are referred to.

Ν	Field	Name	Value	Comments
1	ccc	Local datum	"W72" – WGS 72 "W84" – WGS 84 "IHO" – IHO terminology reference ellipsoid "999" – user determined reference ellipsoid "S85" – SGS85 "P90" – PE90	"W84" value is processed only
2	а	Local datum subdivision code		Not processed
3	x.x	Lat. offset, min		Not processed
4	а	Hemisphere	"N" – North "S" – South	Not processed
5	x.x	Lon. offset, min		Not processed
6	а	Hemisphere	"E" – East "W" – West	Not processed
7	x.x	Altitude offset, m		Not processed
8	ссс	Reference datum	"W84" – WGS84 "W72" – WGS72 "S85" – SGS85 "P90" – PE90	Not processed

\$--DTM, ccc¹, a², x.x³, a⁴, x.x⁵, a⁶, x.x⁷, ccc⁸*hh<CR><LF>.

GBS – GPS Satellite Fault Detection

Standard: NMEA 0183 v.3.00, 2000.

This message is used to support Receiver Autonomous Integrity Monitoring (RAIM). Given that a GNSS receiver is tracking enough satellites to perform integrity checks of the positioning quality of the position solution a message is needed to report the output of this process to other systems to advice the system user.

Ν	Field	Name	Value	Comments
1	hhmmss.ss	UTC time of the GGA or GNS fix associated with this sentence	Hours, minutes, seconds	
2	х.х	Expected error in latitude	Meters due to bias, with noise = 0	
3	x.x	Expected error in longi- tude	Meters due to bias, with noise = 0	
4	x.x	Expected error in altitude	Meters due to bias, with noise = 0	Not processed
5	Xx	ID number of most likely failed satellite		Not processed
6	x.x	Probability of missed detection for most likely failed satellite		Not processed
7	x.x	Estimate of bias on most likely failed satellite	Meters	Not processed
8	X.X	Standard deviation of bias estimate		Not processed

\$--GBS,hhmmss.ss,x.x,x.x,x.x,x.x,x.x,x.x,x.x* hh<CR><LF>.

GGA – Global Positioning System Fix Data

Standard: IEC 61162-1, 2000.

Contains time, position, and fix related data for a GPS receiver.

\$--GGA, hhmmss.ss¹, IIII.II², a³, yyyyy.yy⁴, a⁵, x⁶, xx⁷, x.x⁸, x.x⁹, M¹⁰, x.x¹¹, M¹², x.x¹³, xxxx¹⁴*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	hhmmss.ss	UTC time of position fix	Hours, minutes, seconds	Not processed
2	1111.11	WPT latitude	Degrees, minutes, tenths of minutes	
3	а	Hemisphere	"N" – North "S" – South	
4	ууууу.уу	WPT longitude	Degrees, minutes, tenths of minutes	
5	а	Hemisphere	"E" – East "W" – West	
6	x	GPS positioning quality indicator	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 = RTK Mode, fix valid 5 = Float RTK. Satellite system used in RTK mode, floating integers 6 = Estimated (DR) mode 7 = Manual Input mode 8 = Simulator mode	Values from "4" through "8" are not processed
7	хх	Number of satellites in use	From 0 to 12	

Ν	Field	Name	Value	Comments
8	x.x	Horizontal dilution of precision		
9	x.x	Antenna altitude re: mean-sea-level		Not processed
10	М	Measurement units	"M" – metres	Not processed
11	х.х	Geoidal separation	Vertical difference between the WGS-84 earth ellipsoid and mean-sea-level (geoid), "-" = mean-sea-level below ellipsoid	Not processed
12	М	Measurement units	"M" – metres	Not processed
13	X.X	Differential GPS data age (in seconds)		
14	XXXX	Differential GPS station code	From 0000 to 1023	

GLL – Geographic Position – Latitude/Longitude

Standard: IEC 61162-1, 2000.

Contains: coordinates of the current vessel position, time of position fix, and data status.

Ν	Field	Name	Value	Comments
1	1111.11	WPT latitude	Degrees, minutes, tenths of minutes	
2	а	Hemisphere	"N" – North "S" – South	
3	ууууу.уу	WPT longitude	Degrees, minutes, tenths of minutes	
4	а	Hemisphere	"E" – East "W" – West	
5	hhmmss.ss	Position fix UTC time	Hours, minutes, seconds	Not processed
6	A	Status of data received from the sensor	"A" – Data valid "V" – Data not valid	
7	а	Positioning system Mode indicator	"A" – Autonomous "D" – Differential "E" – Estimated (dead reckoning) "M" – Manual input "S" – Simulator "N" – Data not valid	Not processed

\$--GLL, IIII.II¹, a², yyyyy.yy³, a⁴, hhmmss.ss⁵, A⁶, a⁷*hh<CR><LF>.

HDG – Heading, Deviation, and Variation

Standard: IEC 61162-1, 2000 IMO Resolution A.382 (X).

\$--HDG, x.x¹, x.x², a³, x.x⁴, a⁵*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	x.x	Magnetic Sensor Heading (degrees)		
2	x.x	Magnetic Deviation (degrees)		
3	А	Deviation hemisphere	E/W	
4	x.x	Magnetic Variation (degrees)		Not processed
5	А	Variation hemisphere	E/W	Not processed

HDT - Heading, True

Standard: IEC 61162-1, 2000 IMO Resolution A.424 and A.821.

\$--HDT, x.x¹, T²*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	x.x	Heading (degrees)		
2	Т	Heading type	"T" – True	

MTW – Water Temperature

Standard: IEC 61162-1, 2000.

\$--MTW, x.x¹, C²*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	X.X	Temperature		
2	С	Measurement units	"C" – degrees, C	

MWD – Wind Direction and Speed

Standard: IEC 61162-1, 2000.

Contains: wind speed and direction, data status.

\$MWD, x,x ¹ , T ² , x,x ³ , M ⁴ , x,x ⁵ , N ⁶ , x,x ⁷ , M ⁸ *hh·	<cr><lf></lf></cr>

Ν	Field	Name	Value	Comments
1	x.x	Wind direction	In degrees (from 0 to 359)	
2	Т	Wind type	"T" – true	
3	x.x	Wind direction	In degrees (from 0 to 359)	
4	М	Wind type	"M" – magnetic	
5	X.X	Wind speed		
6	Ν	Measurement units	"N" – knots	
7	x.x	Wind speed		
8	М	Measurement units	"M" – meters/second	

MWV – Wind Speed and Angle

Standard: IEC 61162-1, 2000.

Contains: wind speed and direction, data status.

\$--MWV, x.x¹, a², x.x³, a⁴, A⁵*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	x.x	Wind direction	In degrees (from 0 to 359)	
2	а	Wind type	"R" – relative "T" – theoretical, calculated actual wind	
3	x.x	Wind speed		
4	а	Measurement units	"K" – km per hour "M" – meters/second "N" – knots	
5	A	Status	"A" – Data valid "V" – Data not valid	

RMC – Recommended Minimum Specific GPS Data

Standard: IEC 61162-1, 2000.

Contains: time, date, position, course and speed data provided by a GPS receiver.

-RMC, hhmmss.ss¹, A², IIII.II³, a⁴, yyyyy.yy⁵, a⁶, x.x⁷, x.x⁸, xxxxxx⁹, x.x¹⁰, a¹¹, a¹²*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	hhmmss.ss	Position fix UTC time	Hours, minutes, seconds	
2	A	Data status	"A" = Data valid "V" = Data invalid	
3	1111.11	Latitude	Degrees, minutes, tenths of minutes	
4	а	Hemisphere	"N" – North "S" – South	
5	ууууу.уу	Longitude	Degrees, minutes, tenths of minutes	
6	а	Hemisphere	"E" – East "W" – West	
7	х.х	Speed over ground (knots)		
8	х.х	Course over ground, degrees true		
9	XXXXXX	Date (ddmmyy)		
10	X.X	Magnetic variation		Not processed
11	а	Hemisphere	"E" – East "W" – West	Not processed
12	а	Positioning system Mode indicator	 "A" – Autonomous mode "D" – Differential mode "E" – Estimated (dead reckoning) mode "M" – Manual input mode "S" – Simulator mode "N" – Data not valid 	

ROT – Rate of Turn

Contains: rate of turn and direction of turn.

\$--ROT,x.x¹,A²*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	x.x	Rate of turn	Degrees, minute	"-" = Bow turns to port
2	A	Status	A = Data valid B = Data invalid	

THS – True Heading and Status

Standard: IEC 61162-1, 2007.

\$--THS,x.x¹,a²*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	X.X	Heading	Degrees true	
2	a	Indicator mode	A – Autonomous E – Estimated (dead reckoning) M – Manual input S – Simulator mode V – Data not valid (including standby)	

TTM – Tracked Target Message

Standard: IEC 61162-1, 2007.

-TTM, xx¹, x.x², x.x³, a⁴, x.x⁵, x.x⁶, a⁷, x.x⁸, x.x⁹, a¹⁰, c--c¹¹, a¹², a¹³, hhmmss.ss¹⁴, a¹⁵ *hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	xx	Target number	00 to 99	
2	x.x	Target distance from own ship		
3	x.x	Bearing from own ship	Degrees	
4	а		T – True, R – Relative	
5	x.x	Target speed		
6	x.x	Target course	Degrees	
7	а		T – True, R – Relative	
8	x.x	Distance of closest- point-of-approach		
9	x.x	Time to CPA	min	"-" Increasing
10	а	Speed/distance units	K/N/S	
11	CC	Target name		
12	а	Target status	L = Lost, tracked target has been lost, Q = Query, target in the process of acquisition, T = Tracking	
13	а	Reference target	"R" – reference target Null field otherwise	
14	hhmmss.ss	Time of data (UTC)		
15	а	Type of acquisition	A = Automatic, M = manual, R = reported	

VBW – DUAL Ground/Water Speed

Standard: IEC 61162-1, 2000.

Contains: X and Y components of speed through the water and over the ground.

\$--VBW, x.x¹, x.x², A³, x.x⁴, x.x⁵, A⁶, x.x⁷, A⁸, x.x⁹, A¹⁰*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	x.x	Longitudinal compo- nent of speed through the water, knots		Negative aftward
2	x.x	Transverse component of speed through the water, knots		Negative to the portside
3	A	Data status	"A" – reliable data "V" – unreliable data	Shall not be null
4	x.x	Longitudinal compo- nent of speed over the ground, knots		Negative aftward
5	X.X	Transverse component of speed over the ground, knots		Negative to the portside
6	A	Data status	"A" – reliable data "V" – unreliable data	Shall not be null
7	X.X	Stern transverse water speed (knots)		Negative to the portside

Ν	Field	Name	Value	Comments
8	A	Data status	"A" – reliable data "V" – unreliable data	Shall not be null
9	x.x	Stern transverse ground speed (knots)		Negative to the portside
10	A	Data status	"A" – valid data "V" – invalid data	Shall not be null

VHW – Water Speed and Heading

Standard: IEC 61162-1, 2000.

\$--VHW, x.x¹, T², x.x³, M⁴, x.x⁵, N⁶, x.x⁷, K⁸*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	x.x	Heading (degrees)		Not processed
2		Туре	"T" – True	Not processed
3	x.x	Heading (degrees)		Not processed
4	М	Туре	"M" – Magnetic	Not processed
5	x.x	Speed		
6	N	Measurement units	"N" – Knots	
7	х.х	Speed		Processed if field "5" is transmitted empty
8	К	Speed units	"K" – Km/hr	Processed if field "5" is transmitted empty

VTG – Course Over Ground and Ground Speed

Standard: IEC 61162-1, 2000.

\$--VTG, x.x¹, T², x.x³, M⁴, x.x⁵, N⁶, x.x⁷, K⁸, A⁹*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	х.х	Course over ground (degrees)		
2	Т	Туре	"T" – True	
3	x.x	Magnetic course (degrees)		Not processed
4	М	Туре	"M" – Magnetic	Not processed
5	x.x	Speed		
6	Ν	Measurement units	"N" – Knots	
7	x.x	Speed		Processed if field "5" is transmitted empty
8	К	Measurement units	"K" – Km/hr	Processed if field "5" is transmitted empty
9	A	Positioning system mode indicator	"A" – Autonomous mode "D" – Differential mode "E" – Estimated (dead reckoning) mode "M" – Manual input mode "S" – Simulator mode "N" – Data not valid	Not processed

VWR – Relative (Apparent) Wind Speed and Angle

Standard: IEC 61162-1, 2000.

-VWR, x.x¹, a², x.x³, N⁴, x.x⁵, M⁶, x.x⁷, K⁸ *hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	X.X	Measured wind angle relative to the vessel	In degrees (from 0 to 180)	
2	а	Left/right of the vessel heading	"L" – left "R" – right	
3	X.X	Measured wind speed		
4	Ν	Measurement units	"N" – knots	
5	x.x	Wind speed		
6	М	Measurement units	"M" – meters/second	
7	X.X	Wind speed		
8	К	Measurement units	"K" – Km/hr	

WPL – Waypoint Location

Standard: IEC 61162-1, 2000.

Contains: WPT latitude and longitude.

\$--WPL, IIII.II¹, a², yyyyy.yy³, a⁴, c—c⁵*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	1111.11	WPT latitude		
2	а	Hemisphere	"N" – North "S" – South	
3	ууууу.уу	WPT longitude		
4	а	Hemisphere	"E" – East "W" – West	
5	c—c	WPT number		Not processed

ZDA – Time & Date

Standard: IEC 61162-1, 2000.

Contains: UTC, day, month, year, and local time zone.

\$--ZDA, hhmmss.ss¹, xx², xx³, xxxx⁴, xx⁵, xx⁶*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	hhmmss.ss	UTC time	Hours, minutes, seconds	
2	хх	Day (UTC)	01–31	
3	хх	Month (UTC)	01–12	
4	хххх	Year (UTC)		
5	xx	Local zone, hours	00 h to +/- 13 h	Not processed
6	хх	Local zone, minutes	Time zone minutes	Not processed

Output

The NS 4000 system has a strictly fixed data transmission frequency (on a certain data channel) for each group of data in use:

Data channel in "System Configuration Utility"	Sentence transmitted
NMEA output	APB, BOD, BWC, DTM, DPT, GBS, GGA, GLL, HDT, OSD, RTE, ROT, TTM, VBW, VTG, VHW, VDR, WPL, XTE, ZDA
Autopilot output	APB, BOD, BWC, GLL, HDT, OSD, RTE, VTG, VHW, VDR, WPL, XTE, ZDA
YEOMAN	GLL

Group of transmitted data	Data channel in "System Configuration Utility"	Sentence transmission rate
NAV DATA (ALR, ACK, DTM; GLL; HDT; ZDA; OSD; DPT)	NMEA output	Every second
NAV DATA	AUTOPILOT	Every second
Ownship position (GLL)	YEOMAN	Once every 3 seconds

Device	Channel for the sensor connection via "System Configuration Utility"	Type of transmitted data
Any navigation equipment which requires reception of the ownship motion data	NMEA output	NAV DATA
Autopilot	Autopilot	NAV DATA
YEOMAN digitizer	YEOMAN	Ownship position

Format of Output Data

This section describes formats of all the output sentences of IEC 61162-1 or/and NMEA 0183 standards output onto the navigational sensors connected to the NS 4000 system.

- ATTENTION! -

The sentences are transmitted to the output in the following order:

- for positioning system sentences transmitted from the source selected as Primary Positioning System;
- for the rest of data sentences transmitted from the sources selected in "Navigation" panel of the NS.

Sentence format consists of the following parts:

\$--AAA,x.x,a,c---c,...*hh <CR><LF>.

Ν	Field	Description
1	\$	Start of sentence
2		Talker ID
3	AAA	Mnemonic code of identifying the data type
4	,	Data field delimiter
5	x.x,a,cc	Data
6	*hh	Checksum field
7	<cr><lf></lf></cr>	End of sentence

ACK – Acknowledge Alarm

Standard: IEC 61162-1, 2000.

\$--ACK, xxx¹*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	ххх	Local alarm identifier	Alarm number	

ALR – Set Alarm State

Standard: IEC 61162-1, 2000.

-ALR, IIIIIIIISS.SS, XXX, A, A, CC, IIISCR2SLF	\$ALR,	hhmmss.ss	¹ ,xxx ² ,A	³ ,A ⁴ ,c	c ⁵ *hh <c< th=""><th>R><lf></lf></th></c<>	R> <lf></lf>
------------------------------------------------	--------	-----------	-----------------------------------	---------------------------------	-----------------------------------------------------------	--------------

Ν	Field	Name	Value	Comments
1	hhmmss.ss	Time of alarm condition change	Hours, minutes, seconds (UTC)	
2	ххх	Local alarm identifier	Alarm number	
3	A	Alarm condition	A = threshold exceeded, V = not exceeded	
4	A	Alarm's acknowledge state	A = acknowledged, V = unacknowledged	
5	CC	Alarm's description text		

APB – Heading/Track Controller (Autopilot) Sentence B

Standard: IEC 61162-1, 2007.

\$--APB, A¹, A², x.x³, a⁴, N⁵, A⁶, A⁷, x.x⁸, a⁹, c--c¹⁰, x.x¹¹, a¹², x.x¹³, a¹⁴, a¹⁵*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	A	Status	A = Data valid, V = LORAN-C blink or SNR warning, V = general warning flag for other navigation systems when a reliable fix is not available	
2	A	Status	A = OK or not used, V = LORAN-C cycle lock warning flag	
3	X.X	Magnitude of XTE		
4	а	Direction to steer	L/R	
5	N	XTE units	Nautical miles	
6	A	Status	A = arrival circle entered, V = arrival circle not passed	
7	A	Status	A = perpendicular passed at waypoint, V = perpendicular not entered	
8	x.x	Bearing origin to destination		
9	а		M/T	
10	CC	Destination waypoint ID		
11	x.x	Bearing, present position to destination		
12	а		Magnetic or true	
13	x.x	Heading to steer to destination waypoint		
14	а		Magnetic or true	
15	а	Mode indicator	A = Autonomous mode; D = Differential mode; E = Estimated (dead reckoning) mode; M = Manual input mode; S = Simulator mode; N = Data not valid	Values "E", "M", "S" are processed as "N"

BOD – Bearing Origin to Destination

Standard: IEC 61162-1, 2007.

\$--BOD, x.x¹, T², x.x³, M⁴, c--c⁵, c--c⁶*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	x.x	Bearing	Degrees	
2	Т	True		
3	x.x	Bearing	Degrees	
4	М	Magnetic		
5	CC	Destination waypoint ID		
6	CC	Origin waypoint ID		

BWC – Bearing and Distance to Waypoint – Great Circle

Standard: IEC 61162-1, 2007.

\$--BWC, hhmmss.ss¹, IIII.II², a³, yyyyy.yy⁴, a⁵, x.x⁶, T⁷, x.x⁸, M⁹, x.x¹⁰, N¹¹, c--c¹², a¹³*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	hhmmss.ss	UTC of observation		
2	.	Waypoint latitude		
3	а		N/S	
4	ууууу.уу	Waypoint longitude		
5	а		E/W	
6	x.x	Bearing	Degrees	
7	Т	True		
8	x.x	Bearing	Degrees	
9	М	Magnetic		
10	x.x	Distance	Nautical miles	
11	Ν	Units	Nautical miles	
12	CC	Waypoint ID		
13	a	Mode indicator	A = Autonomous mode, D = Differential mode, E = Estimated (dead reckoning) mode, M = Manual input mode, S = Simulator mode, N = Data not valid	Values "E", "M", "S" are processed as "N"

DTM – Datum Reference

See paragraph Format of Input Data of this section.

DPT – Depth

See paragraph Format of Input Data of this section.

GBS – GPS Satellite Fault Detection

See paragraph Format of Input Data of this section.

GGA – Global Positioning System Fix Data

See paragraph Format of Input Data of this section.

GLL – Geographic Position – Latitude/Longitude

See paragraph Format of Input Data of this section.

HDT – Heading, True

See paragraph Format of Input Data of this section.

OSD – Own Ship Data

Standard: IEC 61162-1, 2007.

\$--OSD, x.x¹, A², x.x³, a⁴, x.x⁵, a⁶, x.x⁷, x.x⁸, a⁹*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	x.x	Heading, true	Degrees	
2	А	Heading status	A = data valid, V = data invalid	
3	x.x	Vessel course, true	Degrees	
4	a	Course reference	B = bottom tracking log, M = manually entered, W = water referenced, R = radar tracking (of fixed target), P = positioning system ground reference	
5	x.x	Vessel speed		
6	а	Speed reference	 B = bottom tracking log, M = manually entered, W = water referenced, R = radar tracking (of fixed target), P = positioning system ground reference 	
7	x.x	Vessel set, true	Degrees	Manually entered
8	X.X	Vessel drift (speed)		Manually entered
9	а	Speed units	K = km/h, N = knots, S = statute miles/h	

RMB – Recommended Minimum Navigation Information

Standard: IEC 61162-1, 2007.

\$--RMB, A¹, x.x², a³, c--c⁴, c--c⁵, IIII.II, a⁶, yyyyy.yy,a⁷,x.x⁸, x.x⁹, x.x¹⁰, A¹¹, a¹² *hh<CR><LF>

Ν	Field	Name	Value	Comments
1	A	Status	The positioning system mode indicator field supplements the status field (field No. 1) which should be set to V = invalid for all values of Mode indicator except for A = Autonomous and D = Differential. The positioning system mode indicator and status fields should not be null fields	
2	х.х	Cross track error	nautical miles If cross track error exceeds 9,99 nautical miles, display 9,99	
3	а	Direction to steer	L/R	
4	СС	Origin waypoint ID		
5	СС	Destination waypoint ID		
6	IIII.II, a	Destination waypoint latitude, N/S		
7	ууууу.уу,а	Destination waypoint longitude, E/W		
8	X.X	Range to destination,	nautical miles	
9	X.X	Bearing to destination	degrees	

N	Field	Name	Value	Comments
10	x.x	Destination closing velocity	knots	
11	А	Arrival status		
12	a	Mode indicator	A = Autonomous mode, D = Differential mode, E = Estimated (dead reckoning) mode, M = Manual input mode, S = Simulator mode, N = Data not valid	

RTE – Routes

Standard: IEC 61162-1, 2007.

-RTE, x.x¹, x.x², a³, c--c⁴, c--c⁵, ...⁶, c--cⁿ*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	x.x	Total number of sentences being transmitted		
2	x.x	Sentence number		
3	а	Message mode	c = complete route, all waypoints, w = working route, first listed waypoint is "FROM", second is "TO" and remaining are rest of route	
4	CC	Route identifier		
5	CC	Waypoint identifier		
6	CC	Additional waypoint identifiers		
n	CC	Waypoint "n" identifier		

ROT – Rate of Turn

See paragraph Format of Input Data of this section.

TTM – Tracked Target Message

See paragraph Format of Input Data of this section.

VBW – DUAL Ground/Water Speed

See paragraph Format of Input Data of this section.

VTG – Course Over Ground and Ground Speed

See paragraph Format of Input Data of this section.

VHW – Water Speed and Heading

See paragraph Format of Input Data of this section.

VDR – Set and Drift

Standard: IEC 61162-1, 2007.

\$--VDR, x.x¹, T², x.x³, M⁴, x.x⁵, N⁶*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	x.x	Direction, true	Degrees	
2	Т	True		
3	x.x	Direction, magnetic	Degrees	
4	М	Magnetic		
5	x.x	Current speed	Knots	
6	N	Knots		

WPL – Waypoint Location

See paragraph Format of Input Data of this section.

XTE – Cross-Track Error, Measured

Standard: IEC 61162-1, 2007.

\bullet \cdot	\$XTE,	A ¹ ,	A^2 ,	x .x ³ ,	a ⁴ ,	N ⁵ ,	a ⁶ *h	h <cr></cr>	∙ <lf< th=""></lf<>
-------------------------------------------------------------------------------------------	--------	------------------	---------	----------------------------	------------------	------------------	-------------------	-------------	---------------------

Ν	Field	Name	Value	Comments
1	A	Status	A = data valid, V = LORAN – C blink or SNR warning	
2	A	Status	A = data valid, V = Loran-C cycle lock warning flag	
3	X.X	Magnitude of cross- track error		
4	а	Direction to steer	L/R	
5	N	Units	Nautical miles	
6	A	Mode indicator	A = Autonomous mode, D = Differential mode, E = Estimated (dead reckoning) mode, M = Manual input mode, S = Simulator mode, N = Data not valid	Values "E", "M", "S" are processed as "N"

ZDA – Time & Date

See paragraph Format of Input Data of this section.

UNIVERSAL AIS TRANSPONDER INTERFACE

Description of Universal AIS Transponder Interface

General

This section describes functionality associated with the data reception/transmission with the Universal AIS Transponder connected to the NS 4000.

Universal AIS Transponder is an interface developed strictly in accordance with the following standards:

- IEC 61993-2, 2001-11-09 "Maritime navigation and radiocommunication equipment and systems – Class A Shipborne installation of the Universal Shipborne automatic identification system (AIS) using VHF TDMA techniques";
- IEC 61162-1, 2001-07 "Maritime navigation and radiocommunication equipment and systems digital interfaces";
- ITU-R M.1371, 2000 "Technical characteristics for a universal shipborne automatic identification system using time division multiple access in the VHF maritime mobile band";
- IALA Technical Clarification on Recommendation ITY-R M.1371-1 Edition 1.3.

Reception of current own ship identifiers (IMO number, MMSI number) from the transponder is by VDO sentence (VHF Data-link Own-vessel message).

Data on UAIS targets is received by using VDM sentence (VHF Data-link message).

Reception and transmission of different information between the transponders are strictly on definite channels (A and B).

Level 3

Data processing is implemented to a full extent according to the descriptions provided below in sections:

• IALA Technical Clarifications on Recommendation ITU-R M.1371 Edition 1.3 Standard Sentences;

• Sentences Transmitted by the ECDIS via AIS Channel in the Operation with a Transponder.

Summary Table

Message	NS 4000 channel	Direction	Transmission Interval	Standard
AIQ, ALR	AIS	Transmission	At the NS 4000 start;At the transponder restart	
AIQ, SSD	AIS	Transmission	 At the NS 4000 start; As change occurs; At the transponder restart 	
AIQ, TXT	AIS	Transmission	At the NS 4000 start;At the transponder restart	
AIQ, VSD	AIS	Transmission	 At the NS 4000 start; As change occurs; At the transponder restart; Once in 10 minutes 	
ABK	AIS	Reception	As event occurs	IEC 61993-2, 2001-11-09
ABM	AIS	Transmission	As event occurs	IEC 61993-2, 2001-11-09
ACK	AIS	Transmission	Alarm acknowledgment	
ALR	AIS	Reception and Transmission	As event occurs	IEC 61162-1, 2001-07
BBM	AIS	Transmission	As event occurs	IEC 61993-2, 2001-11-09
SSD	AIS	Reception and Transmission	As event occurs	IEC 61993-2, 2001-11-09
ТХТ	AIS	Reception	As event occurs	IEC 61162-1, 2001-07
VDM	AIS	Reception	AIS Data	IEC 61993-2, 2001-11-09
VDO	AIS	Reception	Own ship data	IEC 61993-2, 2001-11-09
VSD	AIS	Reception and Transmission	As change occurs	IEC 61993-2, 2001-11-09

Data Exchange Format

Format of the sentences consists of the following parts:

\$--AAA,x.x,a,c---c,...*hh <CR><LF>.

Ν	Field	Description
1	\$ or !	Start of sentence
2		Talker ID
3	AAA	Mnemonic code of identifying the data type
4	3	Data field delimiter
5	x.x,a,cc	Data
6	*hh	Checksum field
7	<cr><lf></lf></cr>	End of sentence

As NS 4000 system receives a sentence with a field containing an ignored value, no processing of information in this field is performed.

IALA Technical Clarifications on Recommendation ITU-R M.1371 Edition 1.3 Standard Sentences

VDO – VHF Data-Link Own-Vessel Message

The NS 4000 for the reception uses this sentence only. It contains information on the own ship set in the ship UAIS station.

Standard: IEC 61993-2, 2001-11-09.

!--VDO, x¹, x², x³, a⁴, s--s⁵, x⁶*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	X	Total number of sen- tences needed to transfer the message	1 to 9	
2	Х	Sentence number	1 to 9	
3	x	Sequential message identifier	0 to 9	
4	А	AIS channel	"A" or "B"	
5	s—s	Encapsulated ITU-R M.1371 radio message		See Note
6	Х	Number of fill-bits	0 to 5	

Note: Sentences 1, 2, 3, 5, 18 of ITU-R M.1371 standard are processed.

VDM – VHF Data-Link Message

The NS 4000 for the reception uses this sentence only. It contains target information received by the NS 4000 from the ship UAIS station.

Standard: IEC 61993-2, 2001-11-09.

!--VDM, x¹, x², x³, A⁴, s--s⁵, x⁶*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	x	Total number of sen- tences needed to transfer the message	1 to 9	
2	x	Sentence number	1 to 9	
3	x	Sequential message identifier	0 to 9	
4	A	AIS channel	"A" or "B"	
5	SS	Encapsulated ITU-R M.1371 radio message		See Note
6	х	Number of fill-bits	0 to 5	

Note: Sentences 1, 2, 3, 4, 5, 6, 8, 9, 12, 14, 17, 18, 19, 21, 22 of ITU-R M.1371 standard are processed.

1, 2, 3 – Position Report (in VDO and VDM Sentences)

The NS 4000 for the reception uses this sentence only.

Parameter	Number of bits	Description	Comments
Message ID	6	Identifier for message 1, 2, or 3	
Repeat Indicator	2		Not processed by the NS 4000
User ID	30	MMSI number	

Parameter	Number of bits	Description	Comments
Navigational status	4	0 = Underway using engine 1 = At anchor 2 = Not under command 3 = Restricted manoeuvrability 4 = Constrained by her draught 5= Moored 6 = Aground 7 = Engaged in Fishing 8 = Underway sailing 9 = HSC (High Speed Craft) 10 = WIG (Wing In Ground) 11–14 = Reserved for future use 15 = Not defined = default	
Rate of turn ROT _{AIS}	8	 0+126 = turning right at up to 708 degrees per minute or higher. 0126 = turning left at up to 708 degrees per minute or higher. Values between 0 and 708 degrees/min coded by ROT_{AIS} = 4.733 SQRT (ROT_{sensor}) degrees/min where ROT_{sensor} is the Rate of Turn as input by an external Rate of Turn Indicator. ROT_{AIS} is rounded to the nearest integer value. + 127 = turning right at more than 5°/30s (No TI available). -127 = turning left at more than 5°/30s (No TI available). -128 (80 hex) indicates no turn information available (default). ROT data should not be derived from COG information 	
SOG	10	Speed over ground in 1/10-knot steps (0–102.2 knots). 1023 = not available; 1022 = 102.2 knots or higher	
Position accuracy	1	 1 = high (< 10 m; Differential Mode of, e.g. DGNSS receiver). 0 = low (> 10 m; Autonomous Mode of, e. g. GNSS receiver or of other Electronic Position Fixing Device); default = 0 	
Longitude	28	Longitude in 1/10 000 min. (±180 degrees, East = positive (as 2's complement), West = negative (as 2's complement). 181 degrees (6791AC0 hex) = not available = default)	
Latitude	27	Latitude in 1/10 000 min. (±90 degrees, North = positive (as 2's complement), South = negative (as 2's complement), 91 degrees (3412140 hex) = not available = default)	
COG	12	Course over ground in 1/10 degrees (0–3599). 3600 (E10 hex)= not available = default; 3601–4095 should not be used	
True Heading	9	Degrees (0–359) (511 indicates not available = default)	
Time stamp	6		Not processed by the NS 4000
Reserved for regional applications	4		Not processed by the NS 4000
Spare	1		Not processed by the NS 4000
RAIM-Flag	1		Not processed by the NS 4000
Communication State	19		Not processed by the NS 4000
Total number of bits	168		

4 – Base Station Report (VDM)

The NS 4000 for the reception uses this sentence only.

Message ID 6 Identifier for message 4 4 = UTC and position report from base station Repeat Indicator 2 Not processed b the NS 4000 User ID 30 MMSI number UTC year 14 Not processed b the NS 4000 UTC month 4 Not processed b the NS 4000 UTC day 5 Not processed b the NS 4000 UTC hour 5 Not processed b the NS 4000 UTC hour 5 Not processed b the NS 4000 UTC minute 6 Not processed b the NS 4000 UTC second 6 Not processed b the NS 4000 Position accuracy 1 1 = high (< 10 m; Differential Mode of e.g. DGNSS receiver, or of another Electronic Position Fixing Device), default = 0 Longitude 28 Longitude in 1/10 000 minute (±180 degrees, East = positive (as 2's complement), Nets = negative (as 2's complement), Nets 1 degrees (6791AC0 hex) = not available = default Latitude 27 Latitude in 1/10 000 minute (±90 degree, North = positive (as 2's complement), South = negative (as 2's complement), South = negative ('arameter
Repeat Indicator2Not processed b the NS 4000User ID30MMSI number	lessage ID
User ID30MMSI numberUTC year14Not processed b the NS 4000UTC month4Not processed b the NS 4000UTC day5Not processed b the NS 4000UTC hour5Not processed b the NS 4000UTC hour5Not processed b the NS 4000UTC minute6Not processed b the NS 4000UTC second6Not processed b the NS 4000Position accuracy11 = high (< 10 m; Differential Mode of e.g. GNSS receiver). 0 = low (> 10 m; Autonomous Mode of e.g. GNSS receiver, or of another Electronic Position Fixing Device), default = 0Longitude28Longitude in 1/10 000 minute (±180 degrees, East = positive (as 2's complement)). 181 degrees (6791AC0 hex) = not available = defaultLatitude27Latitude in 1/10 000 minute (±90 degree, North = positive (as 2's complement), South = negative (as 2's complement), 91 degrees (3412140 hex) = not available = defaultType of Electronic Position Fixing Device4Use of differential corrections is defined by field "position accuracy" above: 0 = Undefined (default); 1 = GPS	Repeat Indicator
UTC year14Not processed b the NS 4000UTC month4Not processed b the NS 4000UTC day5Not processed b the NS 4000UTC day5Not processed b the NS 4000UTC hour5Not processed b the NS 4000UTC minute6Not processed b the NS 4000UTC second6Not processed b the NS 4000Position accuracy11 = high (< 10 m; Differential Mode of e.g. GNSS receiver). 0 = low (> 10 m; Autonomous Mode of e.g. GNSS receiver, or of another Electronic Position Fixing Device), default = 0Longitude28Longitude in 1/10 000 minute (±180 degrees, East = positive (as 2's complement)). 181 degrees (6791AC0 hex) = not available = defaultLatitude27Latitude in 1/10 000 minute (±90 degree, North = positive (as 2's complement), South = negative (as 2's complement). 91 degrees (3412140 hex) = not available = defaultType of Electronic Position Fixing Device4Use of differential corrections is defined by field "position accuracy" above: 0 = Undefined (default); 1 = GPS	Jser ID
UTC month4Not processed b the NS 4000UTC day5Not processed b the NS 4000UTC hour5Not processed b the NS 4000UTC hour6Not processed b the NS 4000UTC minute6Not processed b the NS 4000UTC second6Not processed b the NS 4000UTC second6Not processed b the NS 4000Position accuracy11 = high (< 10 m; Differential Mode of e.g. DGNSS receiver). 0 = low (> 10 m; Autonomous Mode of e.g. GNSS receiver, or of another Electronic Position Fixing Device), default = 0Longitude28Longitude in 1/10 000 minute (±180 degrees, East = positive (as 2's complement)). 181 degrees (G91AC0 hex) = not available = defaultLatitude27Latitude in 1/10 000 minute (±90 degree, North = positive (as 2's complement), South = negative (as 2's complement)). 91 degrees (3412140 hex) = not available = defaultType of Electronic Position Fixing Device4Use of differential corrections is defined by field "position accuracy" above: 0 = Undefined (default); 1 = GPS	JTC year
UTC day5Not processed b the NS 4000UTC hour5Not processed b the NS 4000UTC minute6Not processed b the NS 4000UTC second6Not processed b the NS 4000Position accuracy11 = high (< 10 m; Differential Mode of e.g. DGNSS receiver). 0 = low (> 10 m; Autonomous Mode of e.g. GNSS receiver, or of another Electronic Position Fixing Device), default = 0Longitude28Longitude in 1/10 000 minute (±180 degrees, East = positive (as 2's complement)). 181 degrees (6791AC0 hex) = not available = defaultLatitude27Latitude in 1/10 000 minute (±90 degree, North = positive (as 2's complement), South = negative (as 2's complement)). 91 degrees (3412140 hex) = not available = defaultType of Electronic Position Fixing Device4Use of differential corrections is defined by field "position accuracy" above: 0 = Undefined (default); 1 = GPS	JTC month
UTC hour5Not processed b the NS 4000UTC minute6Not processed b the NS 4000UTC second6Not processed b the NS 4000Position accuracy11 = high (< 10 m; Differential Mode of e.g. DGNSS receiver). 0 = low (> 10 m; Autonomous Mode of e.g. GNSS receiver). 0 = low (> 10 m; Autonomous Mode of e.g. GNSS receiver, or of another Electronic Position Fixing Device), default = 0Longitude28Longitude in 1/10 000 minute (±180 degrees, East = positive (as 2's complement), West = negative (as 2's complement)). 181 degrees (6791AC0 hex) = not available = defaultLatitude27Latitude in 1/10 000 minute (±90 degree, North = positive (as 2's complement)). 91 degrees (3412140 hex) = not available = defaultType of Electronic Position Fixing Device4Use of differential corrections is defined by field "position accuracy" above: 0 = Undefined (default); 1 = GPS	JTC day
UTC minute6Not processed b the NS 4000UTC second6Not processed b the NS 4000Position accuracy11 = high (< 10 m; Differential Mode of e.g. DGNSS receiver). 0 = low (> 10 m; Autonomous Mode of e.g. GNSS receiver, or of another Electronic Position Fixing Device), default = 0Longitude28Longitude in 1/10 000 minute (±180 degrees, East = positive (as 2's complement)). 181 degrees (6791AC0 hex) = not available = defaultLatitude27Latitude in 1/10 000 minute (±90 degree, North = positive (as 2's complement), South = negative (as 2's complement)). 91 degrees (3412140 hex) = not available = defaultType of Electronic Position Fixing Device4Use of differential corrections is defined by field "position accuracy" above: 0 = Undefined (default); 1 = GPS	JTC hour
UTC second6Not processed b the NS 4000Position accuracy11 = high (< 10 m; Differential Mode of e.g. DGNSS receiver). 0 = low (> 10 m; Autonomous Mode of e.g. GNSS receiver, or of another Electronic Position Fixing Device), default = 0Longitude28Longitude in 1/10 000 minute (±180 degrees, East = positive (as 2's complement), West = negative (as 2's complement)). 181 degrees (6791AC0 hex) = not available = defaultLatitude27Latitude in 1/10 000 minute (±90 degree, North = positive (as 2's complement), South = negative (as 2's complement), 91 degrees (3412140 hex) = not available = defaultType of Electronic Position Fixing Device4Use of differential corrections is defined by field "position accuracy" above: 0 = Undefined (default); 1 = GPS	JTC minute
Position accuracy11 = high (< 10 m; Differential Mode of e.g. DGNSS receiver). 0 = low (> 10 m; Autonomous Mode of e.g. GNSS receiver, or of another Electronic Position Fixing Device), default = 0Longitude28Longitude in 1/10 000 minute (±180 degrees, East = positive (as 2's complement), West = negative (as 2's complement)). 181 degrees (6791AC0 hex) = not available = defaultLatitude27Latitude in 1/10 000 minute (±90 degree, North = positive (as 2's complement), South = negative (as 2's complement), South =	JTC second
Longitude28Longitude in 1/10 000 minute (±180 degrees, East = positive (as 2's complement), West = negative (as 2's complement)). 181 degrees (6791AC0 hex) = not available = defaultLatitude27Latitude in 1/10 000 minute (±90 degree, North = positive (as 2's complement), South = negative (as 2's complement)). 91 degrees (3412140 hex) = not available = defaultType of Electronic Position Fixing Device4Use of differential corrections is defined by field "position accuracy" above: 0 = Undefined (default); 1 = GPS	osition accuracy
Latitude 27 Latitude in 1/10 000 minute (±90 degree, North = positive (as 2's complement), South = negative (as 2's complement)). South = negative (as 2's complement)). 91 degrees (3412140 hex) = not available = default Type of Electronic Position Fixing Device 4 Use of differential corrections is defined by field "position accuracy" above: 0 = Undefined (default); 1 = GPS	ongitude
Type of Electronic Position Fixing Device4Use of differential corrections is defined by field "position accuracy" above: 0 = Undefined (default); 1 = GPS	atitude
2 = GLONASS 3 = Combined GPS/GLONASS 4 = Loran-C 5 = Chayka 6 = Integrated Navigation System 7 = Surveyed 8–15 = Not used	ype of Electronic osition Fixing Jevice
Spare 10 Not processed b the NS 4000	spare
RAIM-Flag 1 Not processed b the NS 4000	≀AIM-Flag
Communication 19 Not processed b State the NS 4000	Communication
Total number of bits 168	otal number of bits

5 – Static and Voyage Related Data (In Sentences VDO and VDM)

The NS 4000 for the reception uses this sentence only.

Parameter	Number of bits	Description	Comments
Message ID	6	Identifier for message 5	
Repeat Indicator	2		Not processed by the NS 4000
User ID	30	MMSI number	
AIS Version Indicator	2		Not processed by the NS 4000
IMO number	30	1–9999999999; 0 = not available = default	
Call sign	42	7 x 6 bit ASCII characters, "@@@@@@@@" = not available = default	
Name	120	Maximum 20 characters 6 bit ASCII, "@@@@ @@@@@@@@@@@@@@@@@" = not avai- lable = default	
Type of ship and cargo type	8	0 = not available or no ship = default 1–99 = as defined in Table "Type of ship" (see above) 100–199 = reserved, for regional use 200–255 = reserved, for future use	
Overall Dimen- sion/Reference for Position	30	Reference point (VDM 1, 2, 3) for reported position. Indicates the dimension of ship in metres (see SSD message)	
Type of Electro- nic Position Fixing Device	4	0 = Undefined (default) 1 = GPS 2 = GLONASS 3 = Combined GPS/GLONASS 4 = Loran-C 5 = Chayka 6 = Integrated Navigation System 7 = surveyed 8–15 = not used	
ETA	20	Estimated Time of Arrival; MMDDHHMM UTC Bits 19–16: month 1–12 0 = not available = default Bits 15–11: day 1–31 0 = not available = default Bits 10–6: hour 0–23 24 = not available = default Bits 5–0: minute 0–59 60 = not available = default	
Maximum Present Static Draught	8	in 1/10 m 255 = draught 25.5 m or greater 0 = not available = default in accordance with IMO Resolution A.851	Maximum per- missible draft in the NS 4000 is 25.5 m
Destination	120	Maximum 20 characters using 6-bit ASCII; "@@@@@@@@@@@@@@@@@@@@@@@@" = not available	
DTE	1		Not processed by the NS 4000
Spare	1		Not processed by the NS 4000
Number of bits	424		

6 – Addressed Binary Message (In VDM)

The NS 4000 for the reception uses this sentence only.

Standard: ITU-R M.1371, 2000.

Parameter	Number of bits	Description	Comments
Message ID	6	Identifier for message 6	
Repeat Indicator	2		Not processed by the NS 4000
Source ID	30	MMSI number of source station	
Sequence Number	2	0–3	Not processed by the NS 4000
Destination ID	30	MMSI number of destination station	
Retransmit Flag	1	Retransmit Flag should be set upon retransmission: 0 = no retransmission = default; 1 = retransmitted	Not processed by the NS 4000
Spare	1		Not processed by the NS 4000
Binary Data	Max 936	Application Identifier always contains: DAC (Designated Area Code) = 001 (IAI – International Application Identifier); FI (Function Identifier) = 00 (text telegram using 6-bit ASCII, general FI Group) – 16 bit Application Data – 920 bit maximum	
Maximum Number of bits	Max 1008	Occupies 1 to 5 slots subject to the length of sub- field Message Content	

8 – Binary Broadcast Message (In VDM)

The NS for the reception uses this sentence only.

Parameter	Number of bits	Description	Comments
Message ID	6	Identifier for message 8	
Repeat Indicator	2		Not processed by the NS 4000
Source ID	30	MMSI number of source station	
Spare	1		Not processed by the NS 4000
Binary Data	Max 968	Application Identifier always contains: DAC (Designated Area Code) = 001 (IAI – International Application Identifier);	
		FI (Function Identifier) = 00 (text telegram using 6-bit ASCII, general FI Group) – 16 bit Application Data – 952 bit maximum	
Maximum Number of bits	Max 1008	Occupies 1 to 5 slots	

9 – Standard SAR Aircraft Position Report (In VDM)

The NS 4000 for the reception uses this sentence only.

	Standard:	ITU-R	M.1371,	2000.
--	-----------	-------	---------	-------

Parameter	Number of bits	Description	Comments
Message ID	6	Identifier for message 9; always 9	
Repeat Indicator	2		Not processed by the NS 4000
User ID	30	MMSI number	
Altitude (GNSS)	12	Altitude (derived from GNSS) expressed in metres (0–4094 metres). 4095 = not available; 4094 = 4094 metres or higher	
SOG	10	Speed over ground in knot steps (0–1022 knots) 1023 = not available; 1022 = 1022 knots or higher	
Position accuracy	1	 1 = high (< 10 m; Differential Mode of e.g. DGNSS receiver). 0 = low (> 10 m; Autonomous Mode of e. g. GNSS receiver or of other Electronic Position Fixing Device); default = 0 	
Longitude	28	Longitude in 1/10 000 min (\pm 180 degrees, East = positive (as per 2's complement), West = negative (as per 2's complement). 181 degrees (6791AC0 hex) = not available = default)	
Latitude	27	Latitude in 1/10 000 min (± 90 degrees, North = positive (as per 2's complement), South = negative (as per 2's complement). 91 degrees (3412140 hex) = not available = default)	
COG	12	Course over ground in 1/10 degrees (0–3599). 3600 (E10 hex)= not available = default; 3601–4095 should not be used	
Time stamp	6		Not processed by the NS 4000
Reserved for regional applications	8		Not processed by the NS 4000
DTE	1	Data terminal ready (0 = available 1 = not available = default)	
Spare	5		Not processed by the NS 4000
RAIM-Flag	1		Not processed by the NS 4000
Communication State	19		Not processed by the NS 4000
Total number of bits	168		

12 – Addressed Safety Related Message (In VDM)

The NS 4000 for the reception uses this sentence only.

Standard: ITU-R M.1371, 2000.

Parameter	Number of bits	Description	Comments
Message ID	6	Identifier for Message 12; always 12	
Repeat Indicator	2		Not processed by the NS 4000
Source ID	30	MMSI number of station which is the source of the message	
Sequence Number	2		Not processed by the NS 4000
Destination ID	30	MMSI number of station which is the destination of the message	
Retransmit Flag	1		Not processed by the NS 4000
Spare	1		Not processed by the NS 4000
Safety related text	Max 936	6-bit ASCII	
Total Maximum Number of bits	Max 1008	Occupies 1 to 5 slots subject to the length of text	

14 – Safety Related Broadcast Message (In VDM)

The NS 4000 for the reception uses this sentence only.

Standard: ITU-R M.1371, 2000.

Parameter	Number of bits	Description	Comments
Message ID	6	Identifier for message 14; always 14	
Repeat Indicator	2		Not processed by the NS 4000
Source ID	30	MMSI number of source station of message	
Spare	2		Not processed by the NS 4000
Safety related Text	Max 968	6-bit ASCII	
Total Number of bits	Max 1008	Occupies 1 to 5 slots subject to the length of text	

18 – Standard Class B Equipment Position Report (In VDO and VDM)

The NS 4000 for the reception uses this sentence only.

Parameter	Number of bits	Description	Comments
Message ID	6	Identifier for message 18; always 18	
Repeat Indicator	2		Not processed by the NS 4000
User ID	30	MMSI number	
Reserved for regional or local applications	8		Not processed by the NS 4000
SOG	10	Speed over ground in 1/10 knot steps (0–102.2 knots): 1023 = not available; 1022 = 102.2 knots or higher	

Parameter	Number of bits	Description	Comments
Position accuracy	1	1 = high (< 10 m; Differential Mode of e.g. DGNSS receiver). 0 = low (> 10 m; Autonomous Mode of e.g. GNSS receiver or of other Electronic Position Fixing Device); default = 0	
Longitude	28	Longitude in 1/10 000 min. (±180 degrees, East = positive (as per 2's complement), West = negative (as per 2's complement). 181 degrees (6791AC0 hex) = not available = default)	
Latitude	27	Latitude in 1/10 000 min. (±90 degrees, North = positive (as per 2's complement), South = negative (as per 2's complement); 91 degrees (3412140 hex) = not available = default)	
COG	12	Course over ground in 1/10 degrees (0–3599): 3600 (E10 hex)= not available = default; 3601–4095 should not be used	
True Heading	9	Degrees (0–359) (511 indicates not available = default)	
Time stamp	6		Not processed by the NS 4000
Reserved for regional applica- tions	4		Not processed by the NS 4000
Spare	4		Not processed by the NS 4000
RAIM-Flag	1		Not processed by the NS 4000
Communication State Selector Flag	1		Not processed by the NS 4000
Communication State	19		Not processed by the NS 4000
Total number of bits	168		

19 – Extended Class B Equipment Position Report (In VDM)

The NS 4000 for the reception uses this sentence only.

Parameter	Number of bits	Description	Comments
Message ID	6	Identifier for message 19; always 19	
Repeat Indicator	2		Not processed by the NS 4000
User ID	30	MMSI number	
Reserved for regional or local applications	8		Not processed by the NS 4000
SOG	10	Speed over ground in 1/10 knot steps (0–102.2 kts): 1023 = not available; 1022 = 102.2 knots or higher	
Position accuracy	1	1 = high (> 10 m; Differential Mode of e.g. DGNSS receiver). 0 = low (< 10 m; Autonomous Mode of e.g. GNSS receiver or of other Electronic Position Fixing Device); default = 0	

Parameter	Number of bits	Description	Comments
Longitude	28	Longitude in 1/10 000 min. (±180 degrees, East = positive (as per 2's complement), West = negative (as per 2's complement). 181 degrees (6791AC0 hex) = not available = default)	
Latitude	27	Latitude in 1/10 000 min. (±90 degrees, North = positive (as per 2's complement), South = negative (as per 2's complement); 91 degrees (3412140 hex) = not available = default)	
COG	12	Course over ground in 1/10 degrees (0–3599): 3600 (E10 hex)= not available = default; 3601–4095 should not be used	
True Heading	9	Degrees (0–359). (511 indicates not available = default)	
Time stamp	6		Not processed by the NS 4000
Reserved for regional applica- tions	4		Not processed by the NS 4000
Name	120	Maximum 20 characters 6 bit ASCII, "@@@@@ @@@@@@@@@@@@@@@@" = not available = default	
Type of ship and cargo type	8	0 = not available or no ship = default 1–99 = as defined in Table "Type of ship" (see above) 100–199 = reserved, for regional use 200–255 = reserved, for future use	
Dimension of Ship/Reference for Position	30	Reference point for reported position; Also indicates the dimension of ship in metres (see SSD message)	
Type of Electronic Position Fixing Device	4	0 = Undefined (default) 1 = GPS 2 = GLONASS 3 = Combined GPS/GLONASS 4 = Loran-C 5 = Chayka 6 = Integrated Navigation System 7 = surveyed 8–15 = not used	Not processed by the NS 4000
RAIM-Flag	1		Not processed by the NS 4000
DTE	1	Data terminal ready (0 = available 1 = not available = default)	
Assigned Mode Flag	1		Not processed by the NS 4000
Spare	5		Not processed by the NS 4000
Total number of bits	312		

21 – Aids-to-Navigation Report

The NS 4000 for the reception uses this sentence only.

Standard:	ITU-R	M.1371,	2000.
-----------	-------	---------	-------

Parameter	Number of bits	Description	Comments
Message ID	6	Identifier for message 21; always 21	
Repeat Indicator	2		Not processed by the NS 4000
ID	30	MMSI number	
Type of Aids-to- Navigation	5	See table below	
Name of Aids-to- Navigation	120	Maximum 20 characters 6 bit ASCII, "@@@@@@@@@@@@@@@@@@@@@@@" = not available = default.	
		extended by the parameter "Name of Aid-to-Navigation Extension" below	
Position accuracy	1	1 = high (< 10 m; Differential Mode of e.g. DGNSS receiver). 0 = low (> 10 m; Autonomous Mode of e.g. GNSSW receiver or of other Electronic Position Fixing Device). Default = 0	
Longitude	28	Longitude in 1/10 000 min of position of an Aid-to-Navigation. (±180 degrees, East = positive, West = negative. 181 degrees (6791AC0 hex) = not available = default)	
Latitude	27	Latitude in 1/10 000 min of position of an Aid-to-Navigation. (±90 degrees, North = positive, South = negative, 91 degrees (3412140 hex) = not available = default)	
Dimension/Refe- rence for Position	30	Reference point for reported position; also indicates the dimension of Aids-to-Navigation in meters ¹	
Type of Elec- tronic Position Fixing Device	4	0 = Undefined (default) 1 = GPS 2 = GLONASS 3 = Combined GPS/GLONASS 4 = Loran-C 5 = Chayka 6 = Integrated Navigation System 7 = Surveyed. For fixed A-to-Ns and virtual/pseudo A-to-Ns, the surveyed position should be used. The accurate position enhances its function as a radar reference target 8–15 = not used	

 1 – the following should be observed:

- for fixed Aids-to-Navigation, virtual and pseudo A-to-Ns, and for off-shore structures, the orientation established by the dimension A should point to true north;
- for floating aids larger than 2 m x 2 m, the dimensions of the Aids to Navigation should always be given approximated to a square, i.e. the dimensions should always be as follows A=B=C=D≠0. (This is due to the fact, that the orientation of the floating Aid to Navigation is not transmitted. The reference point for reported position is in the center of the square.);
- A=B=C=D=1 should indicate objects (fixed or floating) smaller than or equal to 2 m x 2 m. (The reference point for reported position is in the center of the square.).

Parameter	Number of bits	Description	Comments
Time Stamp	6	UTC second when the report was generated by the EFPS (0–59, or 60 if time stamp is not available, which should also be the default value, or 61 if positioning system is in manual input mode, or 62 if Electronic Position Fixing System operates in estimated (dead reckoning) mode, or 63 if the position system is inoperative)	
Off-Position Indicator	1	For floating Aids-to-Navigation only: 0 = on position; 1 = off position. Note: This flag should only be considered valid by receiving station, if the Aid-to-Navigation is a floating aid, and if Time Stamp is equal to or below 59. For floating A-to-N, the guard zone parameters should be set on installation	
Reserved for regional or local application	8	Reserved for definition by a competent regional or local authority. Should be set to zero, if not used for any regional or local application. Regional application should not use zero	Not processed by the NS 4000
RAIM-Flag	1		Not processed by the NS 4000
Virtual/pseudo A-to-N Flag	rtual/pseudo to-N Flag10 = default = real A-to-N at indicated position; 1 = virtual/pseudo A-to-N, does not physically exist, may only be transmitted from an AIS station nearby under the direction of a competent authority2ssigned Mode ag1		
Assigned Mode Flag			Not processed by the NS 4000
Spare	1	Spare. Not used. Should be set to zero	
Name of Aid-to- Navigation Extension	0, 6, 12, 18, 24, 30, 36, , 84	This parameter of up to 14 additional 6-bit-ASCII characters for a 2-slot message may be combined with the parameter "Name of Aid-to-Navigation" at the end of that parameter, when more than 20 characters are needed for the Name of the Aid-to-Navigation. This parameter should be omitted when no more than 20 characters for the name of the A-to-N are needed in total. Only the required number of characters should be transmitted, i.e. no @-character should be used	
Spare	0, 2, 4, or 6	Spare. Used only when parameter "Name of Aid-to-Navigation Extension" is used. Should be set to zero. The number of spare bits should be adjusted in order to observe byte boundaries	
Number of bits	272–360	Occupies two slots	

Note: The competent international body for Aids-to-Navigation, IALA, defines an Aid-to-Navigation as: "a device or system external to vessels designed and operated to enhance safe and efficient navigation of vessels and/or vessel traffic" (IALA Navguide, Edition 1997, Chapter 7). The IALA Navguide stipulates: "A floating aid to navigation, which is out of position, adrift or during the night is unlighted, may itself become a danger to navigation. When a floating aid is out of position or malfunctioning, navigational warnings must be given". Therefore, a station, which transmits Message 21, could also transmit Safety Related Broadcast Message (Message 14) upon detecting that the floating Aid-to-Navigation has gone out of position or is malfunctioning, at the competent authority's discretion.

 $^{^{2}}$ – when transmitting virtual/pseudo Aids to Navigation information, i.e. the virtual/pseudo Aids to Navigation Target Flag is set to one (1), the dimensions should be set to A=B=C=D=0 (default). This should also be the case, when transmitting "reference point" information (see table below).

Table "Type of Aids to Navigation"

The nature and type of A-to-N can be indicated with 32 different codes, as shown below:

	Code	Definition
	0	Default, Type of A-to-N not specified
	1	Reference point
	2	RACON
	3	Structure off shore, such as oil platforms, wind farms, rigs. (Note: This code should identify an obstruction that is fitted with an Aid-to-Navigation AIS station.)
	4	Spare
Fixed A-to-N	5	Light, without sectors
	6	Light, with sectors
	7	Leading Light Front
	8	Leading Light Rear
	9	Beacon, Cardinal N
	10	Beacon, Cardinal E
	11	Beacon, Cardinal S
	12	Beacon, Cardinal W
	13	Beacon, Port hand
	14	Beacon, Starboard hand
	15	Beacon, Preferred Channel port hand
	16	Beacon, Preferred Channel starboard hand
	17	Beacon, Isolated danger
	18	Beacon, Safe water
	19	Beacon, Special mark
Floating A-to-N	20	Cardinal Mark N
	21	Cardinal Mark E
	22	Cardinal Mark S
	23	Cardinal Mark W
	24	Port hand Mark
	25	Starboard hand Mark
	26	Preferred Channel Port hand
	27	Preferred Channel Starboard hand
	28	Isolated danger
	29	Safe Water
	30	Special Mark
	31	Light Vessel/LANBY

Note: The types of Aids to Navigation listed above are based on the IALA Maritime Buoyage System, where applicable.

There is potential for confusion when deciding whether an aid is lighted or unlighted. Competent authorities may wish to use the regional/local section of the message to indicate this.

Sentences Transmitted by the NS 4000 via AIS Channel in the Operation with a Transponder

AIQ, ALR – Monitoring of Set Alarm State

The NS 4000 in following cases transmits this sentence:

- At the NS 4000 start;
- At the transponder restart.

\$xxAIQ, ALR¹*hh<CR><LF>.

Ν	Field	Name	Comments
1	ALR	Request for set alarm state information	In response to this request, the NS 4000 receives the sentence from the SAAB R4 transponder

AIQ, SSD – Monitoring of Static Ship Data

The NS 4000 in following cases transmits this sentence:

- At the NS 4000 start;
- As change occurs;
- At the transponder restart.

\$xxAIQ, SSD¹*hh<CR><LF>.

Ν	Field	Name	Comments
1	SSD	Request for static ship data	In response to this request, the NS 4000 receives the sentence from the SAAB R4 transponder

AIQ, TXT – Monitoring of Text Transmission

The NS 4000 in following cases transmits this sentence:

- At the NS 4000 start;
- At the transponder restart.

\$xxAIQ, TXT¹*hh<CR><LF>.

Ν	Field	Name	Comments
1	ТХТ	Request for static ship data	In response to this request, the NS 4000 receives the sentence from the SAAB R4 transponder

AIQ, VSD – Monitoring of Voyage Information

The NS 4000 in following cases transmits this sentence:

- At the NS 4000 ECDIS MFD start;
- As change occurs;
- At the transponder restart;
- Once in 10 minutes.

\$xxAIQ, VSD1*hh<CR><LF>.

Ν	Field	Name	Comments
1	VSD	Request for voyage information	In response to this request, the NS 4000 receives the sentence from the SAAB R4 transponder

ABK – Addressed Binary and Safety Related Message

This sentence is used by the NS 4000 for the reception only via AIS channel in NS 4000.

The ABK-sentence is generated when a transaction, initiated by reception of an ABM, AIR, or BBM sentence, is completed or terminated.

This sentence provides information about the success or failure of a requested ABM broadcast of either ITU-R M.1371 messages 6 or 12. The ABK process utilizes the information received in ITU-R M.1371 messages 7 and 13. Upon reception of either a VHF Data-link message 7 or 13, or the failure of messages 6 or 12, the AIS unit delivers the ABK sentence to the external application.

This sentence is also used to report to the external application the AIS unit's handling of the AIR (ITU-R M.1371 message 15) and BBM (ITU-R M.1371 messages 8 and 14) sentences. The external application initiates an interrogation through the use of the AIR-sentence, or a broadcast through the use of the BBM sentence. The AIS unit generates an ABK sentence to report the outcome of the AIR or BBM broadcast process.

Standard: IEC 61993-2, 2001-11-09.

Ν	Field	Name	Value	Comments
1	xxxxxxxx	MMSI of the addressed destination AIS unit	Identifies the distant addressed AIS unit involved with the acknowledgement. If more than one MMSI are being addressed (ITU-R M.1371 message 15), the MMSI of the first distant AIS unit, identified in the message, is the MMSI reported here. When the Message ID is a general broadcast (ITU-R M.1371 messages 8 or 14), this field is null	
2	а	AIS channel of reception		Not processed by the NS 4000
3	х.х	ITU-R M.1371 message ID	This indicates to the external application the type of ITU-R M.1371 message that this ABK sentence is addressing. Also see the message IDs listed in Note 1	
4	x	Message Sequence Number		See note 1
5	x	Type of acknow- ledgement		See note 2

\$--ABK, xxxxxxxx¹, a², x.x³, x⁴, x⁵*hh<CR><LF>.

Note: The message sequence number, together with the ITU-R M.1371 message ID and MMSI of the addressed AIS unit, uniquely identifies a previously received ABM, AIR, or BBM sentence. Generation of an ABK sentence makes a sequential message identifier available for reuse. The ITU-R M.1371 Message ID is used to determine the origin of the message sequence identifier number. The following table lists the origins by message ID:

ITU-R M.1371 Message ID	Message Sequence Number source
6	Sequential message identifier from ABM-sentence, IEC 61162-1
7	Addressed AIS unit's message 7, sequence number, ITU-R M.1371
8	Sequential message identifier from BBM-sentence, IEC 61162-1
12	Sequential message identifier from ABM-sentence, IEC 61162-1
13	Addressed AIS unit's message 13, sequence number, ITU-R M.1371
14	Sequential message identifier from BBM-sentence, IEC 61162-1
15	No source, field shall be null

Note: Acknowledgements provided are:

- 0 = message (6 or 12) successfully received by the addressed AIS unit;
 1 = message (6 or 12) was broadcast, but no acknowledgement by the distant addressed AIS unit;
- 2 = message could not be broadcast;
- 3 = requested broadcast of message (8, 14, or 15) has been successfully completed;
- 4 = late reception of a message 7 or 13 acknowledgement "addressed to ownship" MMSI – identified by; destination MMSI, acknowledgement source MMSI, message sequence identifier, and message type. Late reception means that the AIS unit did not have an acknowledgement process active for the acknowledgement that was received.

ABM – Addressed Binary and Safety Related Message

This sentence is used by the NS 4000 for the transmission only via AIS channel in NS 4000.

This sentence supports ITU-R M.1371 messages 6 and 12. It provides an external application with a means to exchange data using AIS. The message data is defined by the application only – not the AIS. This message offers great flexibility for implementing system functions that use the AIS like a communications device. After receiving this sentence, the AIS initiates a radio broadcast on the VHF Data Link (VDL) of either message 6 or 12. The AIS will make up to four broadcasts of the message. The actual number will depend on the reception of an acknowledgement from the addressed "destination" AIS. The default time between retries is 4 sec. Retries will not be attempted more frequently than 4 sec. Retries stop when the appropriate acknowledgement (See ITU-R M.1371 messages 7 and 13) is received. The AIS will make up to 4 broadcasts, original broadcast plus three retires. This process could take 32 sec to complete.

The success or failure of the reception of this broadcast by the intended AIS unit is confirmed through the use of the "Addressed and binary Broadcast Acknowledgement (ABK)" sentence formatter, and the processes that support the generation of an ABK-sentence. The AIS is also limited in the amount of encapsulated data that can be sent in each slot and frame. If the length of the message would exceed five slots, or the AIS broadcast would exceed the limit of 20 RATDMA slot transmissions for the current frame, the AIS will return an ABK-sentence with an acknowledgement of "2" – message could not be broadcast.

Standard: IEC 61993-2, 2001-11-09.

!ABM, x ¹ , x ² , x ³	, xxxxxxxx ⁴ , x ⁴	⁵ , x.x ⁶ , ss ⁷	x ⁸ *hh <cr><lf></lf></cr>
--------------------------------------------------------	------------------------------------------	---------------------------------------------------	---------------------------------------

Ν	Field	Name	Value	Comments
1	x	Total number of sen- tences needed to transfer the message	1 to 9	
2	x	Sentence number	1 to 9	
3	x	Sequential message identifier	0 to 3	
4	XXXXXXXXX	The MMSI of destination AIS unit for the ITU-R M.1371 message		
5	x	AIS channel for broad- cast of the radio message		
6	x.x	ITU-R M.1371 message	6 or 12	6 – normal text 12 – safety text
7	SS	Encapsulated data	156 characters if field "6" = 12 153 characters if field "6" = 6	
8	x	Number of fill-bits	0 to 5	

ALR – Set Alarm State

This sentence is used by the NS 4000 for the transmission and reception via AIS channel in NS 4000.

Local alarm condition and status. This sentence is used to report an alarm condition on a device and its current state of acknowledgment.

Standard: IEC 61162-1, 2001-07.

-ALR, hhmmss.ss¹, xxx², A³, A⁴, c—c⁵*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	hhmmss.ss	Time of alarm condition change, UTC		
2	ххх	ID number of the alarm source		
3	A	Alarm condition	A = threshold exceeded V = not exceeded	
4	A	Alarm's acknowledge state	A = acknowledged V = unacknowledged	
5	CC	Alarm's description text		

BBM – Broadcast Binary Message

This sentence is used by the NS 4000 for the transmission only via AIS channel in NS 4000.

Standard: IEC 61993-2, 2001-11-09.

!BBM, x', x ⁻ , x', x', x.x', ss', x ^nn <cr></cr>	BBM,	x ² , x ³ , x ⁴ , x.x ⁵ , s	ss ⁶ , x ⁷ *hh <cr><lf></lf></cr>	>.
---------------------------------------------------------------	------	-------------------------------------------------------------------------	---------------------------------------------------------	----

Ν	Field	Name	Value	Comments
1	x	Total number of sen- tences needed to transfer the message	1 to 9	
2	х	Sentence number	1 to 9	
3	x	Sequential message identifier	0 to 9	
4	x	AIS channel for broad- cast of the radio message		
5	x.x	ITU-R M.1371 message	8 or 14	8 – normal text 14 – safety text
6	SS	Encapsulated data	156 characters if field "5" = 14 153 characters if field "5" = 8	
7	x	Number of fill-bits	0 to 5	

Note: Transmission of a target from the NS 4000 is made in ABM, BBM safety related sentences in the form of text information containing the target identifier, coordinates, COG, SOG as of the moment of the target acquisition by the NS 4000 operator.

SSD – Ship Static Data

This sentence is used by the NS 4000 for the transmission and reception via AIS channel in NS 4000.

Standard: IEC 61993-2, 2001-11-09.

\$SSD	. cc ¹	. cc ² .	. xxx ³ .	xxx^4 .	xx ⁵	. xx ⁶ .	. c ⁷ .	aa	⁸ *hh <cr:< th=""><th>><lf>.</lf></th></cr:<>	> <lf>.</lf>
+ - - -		, ,				, ,				

Ν	Field	Name	Value	Comments
1	CC	Ship's call sign	1 to 7	Set in "System Configuration" utility
2	CC	Ship's name	1 to 20	Set in "System Configuration" utility
3	ххх	Pos. ref. Point distance "A", from bow	0 to 511 (meters)	See Note
4	ххх	Pos. ref., "B", from stern	0 to 511 (meters)	See Note
5	хх	Pos. ref., "C", from port beam	0 to 63 (meters)	See Note
6	хх	Pos. ref., "D", from starboard beam	0 to 63 (meters)	See Note
7	С	DTE indicator flag		Transmitted by the with value = 0
8	аа	Source identifier		Not transmitted by the NS 4000

Note: Coefficients A, B, C, D depend on LOA, BOA, X/Y Conning Station or External GPS parameters set in "System Configuration" utility. NS 4000 transmits to SAAB R4 transponder parameters (A, B, C, D) of the internal and external GPS receiver antenna units, by using the internal data exchange protocol. In this case, fields 3-6 in SSD sentence are transmitted empty.



Fig. 72. Dimensions of the Vessel

TXT – Text Transmission

This sentence is used by the NS 4000 for the reception only via AIS channel in NS 4000.

For the transmission of short text messages. Using multiple sentences may transmit longer text messages.

Standard: IEC 61162-1, 2001-07.

\$--TXT, xx¹, xx², xx³, c—c⁴*hh<CR><LF>

Ν	Field	Name	Value	Comments
1	х.х	Total number of messages	01 to 99	Not processed by the NS 4000
2	Х.Х	Message number	01 to 99	Not processed by the NS 4000
3	x.x	Text identifier	The text identifier is a number, 01 to 99, used to identify different text messages	
4	CC	Text message	ASCII characters, and code delimiters if needed, up to the maximum permitted sentence length (i.e. up to 61 characters including any code delimiters)	

VSD – Voyage Static Data

This sentence is used by the NS 4000 for the reception and transmission via AIS channel in NS 4000.

Standard: IEC 61993-2, 2001-11-09.

\$--VSD, x.x¹, x.x², x.x³, c--c⁴, hhmmss.ss⁵, xx⁶, xx⁷, x.x⁸, x.x⁹*hh<CR><LF>.

Ν	Field	Name	Value	Comments
1	X.X	Type of ship and cargo category	0 to 255	See the table below
2	x.x	Maximum current static draught	0 to 25.5 (meter)	
3	x.x	Persons on board	0 to 8191	
4	CC	Destination	1 to 20 characters	
5	hhmmss.ss	Est. UTC time of arrival at destination	Hours, minutes, and seconds	Only hours and minutes are processed in NS 4000
6	хх	Est. day of arrival at destination	00 to 31 (UTC)	
7	хх	Est. month of arrival at destination	00 to 12 (UTC)	
8	x.x	Navigational status	0 = Underway using engine 1 = At anchor 2 = Not under command 3 = Restricted manoeuvrability 4 = Constrained by draught 5 = Moored 6 = Aground 7 = Engaged in fishing 8 = Under way sailing 9 = High Speed Craft (HSC) 10 = Wing In Ground (WIG) 15 = Undefined (default)	
9	x.x	Regional application flags	0 to 15	Transmitted by the NS 4000 with value = 0

Ship and Cargo Type

Ships/Cargo type	VSD message identifier
WIG (Carrying DG, HS, or MP IMO hazard or pollutant category A)	21
WIG (Carrying DG, HS, or MP IMO hazard or pollutant category B)	22
WIG (Carrying DG, HS, or MP IMO hazard or pollutant category C)	23
WIG (Carrying DG, HS, or MP IMO hazard or pollutant category C)	24
WIG (No additional information)	29
Fishing vessel	30
Towing vessel	31
Towing vessel (length of the tow exceeds 200 m, breadth exceeds 25 m)	32
Vessel engaged in dredging or underwater operations	33
Vessel engaged in diving operations	34
Vessel engaged in military operations	35
Sailing vessel	36
Pleasure craft	37
HSC (Carrying DG, HS, or MP IMO hazard or pollutant category A)	41
HSC (Carrying DG, HS, or MP IMO hazard or pollutant category B)	42
HSC (Carrying DG, HS, or MP IMO hazard or pollutant category C)	43

Ships/Cargo type	VSD message identifier
HSC (Carrying DG, HS, or MP IMO hazard or pollutant category D)	44
HSC (No additional information)	49
Pilot vessel	50
Search and rescue vessel	51
Tug	52
Port tender	53
Vessel with antipollution facilities	54
Law enforcement vessel	55
Medical transport (as defined in the 1949 Geneva Conventions)	58
Ship according to Resolution No 18 (Mob – 83)	59
Passenger ship. All ships of this type	60
Passenger ship (Carrying DG, HS, or MP IMO hazard or pollutant category A)	61
Passenger ship (Carrying DG, HS, or MP IMO hazard or pollutant category B)	62
Passenger ship (Carrying DG, HS, or MP IMO hazard or pollutant category C)	63
Passenger ship (Carrying DG, HS, or MP IMO hazard or pollutant category D)	64
Passenger ship (No additional information)	69
Cargo ship. All ships of this type	70
Cargo ship (Carrying DG, HS, or MP IMO hazard or pollutant category A)	71
Cargo ship (Carrying DG, HS, or MP IMO hazard or pollutant category B)	72
Cargo ship (Carrying DG, HS, or MP IMO hazard or pollutant category C)	73
Cargo ship (Carrying DG, HS, or MP IMO hazard or pollutant category D)	74
Cargo ship (No additional information)	79
Tanker. All ships of this type	80
Tanker (Carrying DG, HS, or MP IMO hazard or pollutant category A)	81
Tanker (Carrying DG, HS, or MP IMO hazard or pollutant category B)	82
Tanker (Carrying DG, HS, or MP IMO hazard or pollutant category C)	83
Tanker (Carrying DG, HS, or MP IMO hazard or pollutant category D)	84
Tanker (No additional information)	89
Other type. All ships of this type	90
Other type (Carrying DG, HS, or MP IMO hazard or pollutant category A)	91
Other type (Carrying DG, HS, or MP IMO hazard or pollutant category B)	92
Other type (Carrying DG, HS, or MP IMO hazard or pollutant category C)	93
Other type (Carrying DG, HS, or MP IMO hazard or pollutant category D)	94
Other type (No additional information) – (its default)	99

Additional Information

Position Sensors Fallback Conditions

Priority	Position Sensor status	Position (Latitude/Longitude)
1	External DGNSS in use (differential corrected)	Lat/Lon (external)
2	Internal DGNSS in use (differential corrected) Lat/Lon (internal)	
3	Internal DGNSS in use (differential corrected, beacon). Appli- cable only if (optional) an internal beacon receiver is provided	
4	External Positioning Fixing System in use (differential uncorrected)	Lat/Lon (external)
5	Internal GNSS in use (differential uncorrected)	Lat/Lon (internal)
6	Manual position input	Lat/Lon (manual)
	Dead reckoning position	Lat/Lon (dead reckoning)
	No position	Not available

The AIS automatically selects the position source with the highest priority available. If data availability changes, the AIS automatically switch to the position source with the highest priority available after 5 sec when switching downwards, or 30 sec when switching upwards. During this period, the latest valid position is used for reporting.

ing Intervals

Type of Ship	Reporting interval	
Ship at anchor or moored and not moving faster than 3 knots	3 min	
Ship at anchor or moored and moving faster than 3 knots	10 s	
Ship with a speed of between 0–14 knots	10 s	
Ship with a speed of between 0–14 knots and changing course	3 1/3 s	
Ship with a speed of between 14–23 knots	6 s	
Ship with a speed of between 14–23 knots and changing course	2 s	
Ship with a speed of greater than 23 knots	2 s	
Ship with a speed of greater than 23 knots and changing course	2 s	

Note: The reporting rate shall increase to once per 2 sec in accordance with Recommendation ITU-R M.1371-1, Annex 1, Chapter 4.2.1, Footnote (1), when the station determines that it is the semaphore.

If the autonomous mode requires a higher rate than the assigned mode, the AIS shall use the autonomous mode.

Reporting Intervals For Equipment Other Than Class A Shipborne Mobile Equipment

Platform's Condition	Nominal Reporting Interval		
Class B Shipborne Mobile Equipment not moving faster than 2 knots	3 min		
Class B Shipborne Mobile Equipment moving 2–14 knots	30 sec		
Class B Shipborne Mobile Equipment moving 14–23 knots 15 sec			
Class B Shipborne Mobile Equipment moving > 23 knots	5 sec		
Search and Rescue aircraft (airborne mobile equipment)	10 sec		
Aids to Navigation	3 min		
AIS base station ³	10 sec		

ROT Sensor Fallback Conditions

The AIS automatically select the ROT source with the highest priority available as given in table below:

Priority	Position Sensor status	Contents of ROT field Affected data in messages 1, 2, 3 (ITU-R M.1371, 2000)
1	Rate of Turn Indicator in use⁴	0+126 = turning right at up to 708 degrees per minute or higher; 0126 = turning left at up to 708 degrees per minute or higher. Values between 0 and 708 degrees/min shall be coded by ROT _{AIS} = 4.733 SQRT (ROT _{sensor}) degrees/min ROT _{sensor} is the Rate of Turn as input by the external Rate of Turn Indicator (TI). Values of 709 degrees per minute and above shall be cut to 708 degrees per minute
2	Other ROT source in use ⁵	+127 = turning right at more than 5°/30s (No TI is available); -127 = turning left at more than 5°/30s (No TI is available)
3	No valid ROT information available	-128 (80 hex) indicates no turn information available (default)

 3 – the base station rate should increase to once per $3^{1}/_{3}$ seconds after the station detects that one or more stations are synchronizing to the base station.

⁴ – rate of turn indicator according to IMO A.526 (13); determined by talker ID.

 5 – i.e. based on compass information.
NAVTEX SENSOR DATA EXCHANGE FORMAT

NMEA Format

NRX – NAVTEX Received Message

The NRX sentence is used to transfer the contents of a received NAVTEX message from the NAVTEX receiver to another device. As the length of a single NAVTEX message may exceed the number of characters permitted in a single sentence, many NRX sentences may be required to transfer a single NAVTEX message.

 $-NRX, xxx^{1}, xxx^{2}, xx^{3}, aaxx^{4}, x^{5}, hhmmss.ss^{6}, xx^{7}, xx^{8}, xxxx^{9}, x.x^{10}, x.x^{11}, A^{12}, c-c^{13} + h < CR > <LF >.$

Ν	Field	Name	Value	Comments
1	ххх	Number of sentences	001–999	
2	ххх	Sentence number	001–999	
3	xx	Sequential message id	00–99	
4	aaxx	NAVTEX message code	The first character identifies the transmitter coverage area, and the second character identifies the type of message. The remaining two characters are restricted to numerals with a range of 00 to 99 and represent a serial number for each type of message	
5	x	Frequency table index 0–9	The frequency indicator identifies the frequency that the NAVTEX message was received on: 0 = not received over air (e.g. test messages); 1 = 490 kHz; 2 = 518 kHz; 3 = 4209.5 kHz	
6	hhmmss.ss	UTC of receipt of message		
7	хх	Day	1–31	
8	xx	Month	1–12	
9	xxxx	Year		
10	х.х	Total number of characters in this series of NRX sentences	The total number of characters indicates the expected size of the message body sent in this sequence of NRX sentences	
11	X.X	Total number of bad characters		
12	A	Status indication	A = correct message reception, V = incorrect message reception	
13	CC	Message body		

NRM – NAVTEX Receiver Mask

This command is used to manipulate the configuration masks that control which messages are stored, printed, and sent to the NS 4000 port of the NAVTEX receiver.

Ν	Field	Name	Value	Comments
1	x	Function code	The function code is used to further identify the purpose of the sentence. The meaning of the function code is as follows: 0 – request messages for the given mask; 1 – set/report the storage mask; 2 – set/report the printer mask; 3 – set/report the NS 4000 mask	
2	x	Frequency table index	The frequency indicator identifies the frequency that the NAVTEX message was received on: 1 = 490 kHz; 2 = 518 kHz; 3 = 4209.5 kHz	
3	hhhhhhh	Transmitter coverage area mask	The transmitter coverage area mask is defined as a 32 bit hex field where the least significant bit represents transmitter coverage area "A", the next bit is "B" and so on up to bit 25 which is "Z"	
4	hhhhhhh	Message type mask	The message type mask is defined as a 32 bit hex field where the least significant bit represents message type "A", the next bit is "B" and so on up to bit 25 which is "Z"	

\$--NRM,x¹,x²,hhhhhhhh³,hhhhhhhh⁴*hh<CR><LF>.

When another device wishes to determine the current values of the bit masks it sends a query sentence to the NAVTEX receiver as follows: \$--CRQ,NRM*hh<CR><LF>.

ASCII Format

NAVTEX messages have the following format (the message shown in the drawing serves as an example):

ZCZC SA43 (Error rate: 0 percent) WZ 250. ENGLAND, SOUTH COAST. APPROACHES TO PLYMOUTH. HANDS DEEP LIGHTBUOY 50-13N 004-21W MISSING CANCEL WZ 247 (SA41) NNNN

Fig. 73. NAVTEX Message

- ZCZC message start identifier;
- S transmitting station identifier (S Nitone);
- A message type identifier (A navigational warnings);
- 43 message number (43);
- Error rate message reception error transmitted by the NAVTEX receiver;
- WZ 250 warning type identifier and its current number:
 - Text of the message.
- CANCEL WZ 247 (SA41) indicates cancellation of WZ 247 warning sent in message SA41. It is highlighted with the red colour;
- NNNN message end identifier.

DESCRIPTION OF THE NS 4000 AND RHOTHETA RT-202 RDF INTERFACE

The NS 4000 is processing a constant data flow supplied by Rhotheta RT-202 radio direction finder according to certain rules. No messages are transmitted from the NS 4000 to RT-202. The message format is described in detail in **RHOTHETA RT-202**

OPERATING INSTRUCTION. This document specifies the rules of processing messages from RT202:

Data output protocol.

Each message starts with a header-sign (ASCII-sign for identifying the type of message). Following headers are possible: "S" = hex53, "P" = hex50, "V" = hex56, "A" = hex41, "L" = hex4C, "N" = 0x4E. Then follows the proper information, consisting of three ASCII decimals: "0" to "9" = hex30 to hex39. As end mark two ASCII final marks are used: "CR" = hex0D (CarriageReturn) and "LF" = hex0A (LineFeed).

Header	Content	Specification
S	xxx	Status output:
	= 0xx	no received signal (no bearing);
	= 2xx	received signal but active frequency storage; (no bearing/error caused by exceeding frequency deviation of transmitted signal (> \pm 6 kHz);
	= 1xx	receiving signal (bearing active)
Р	××× = 000…099	Level of received signal/field intensity in %
V	^{xxx} = 050280	Display of supplied voltage, e.g. 132 corresponds to 13.2 Volt
Ν	^{xxx} = 000255	Low audio-frequency (averaged about 100 ms) in 10 Hz, e.g. 124 corresponds to 1240 Hz
A	^{xxx} = 000353	Averaged DF value in degrees (average-value, resolution 2 degrees)
1	^{xxx} = 000359	Unvaried DF value in degrees (momentary value, resolution 1 degree)

Remarks.

The unaveraged DF value shows a certain spread, depending on the received signal. It can be used, if required, as indicator of the DF value quality. When working with the direction finder only the displayed averaged value should be used:

- Field "S" is the first to be processed. The message is further ignored if "S" field contains 0xx or 2xx parameters. And, vice versa, it is processed if the message contains 1xx parameter meaning that a bearing signal has been received;
- The second step is to analyse "P" field. Field "P" contains information (in per cent) on the intensity level of the received MOB bearing signal (transmitter of 121.5 MHz signal). Accordingly, the lower the level, the weaker signal has been received. It should be noted that the signal processing level is set direct from RT-202 sensor (for a detailed description, see **RHOTHETA RT202 OPERATING INSTRUCTION**). The optimum condition would be to make an identical setting of the processed signal level in RT-202 sensor and in on "SAR" page of "Tasks" panel of ECDIS task. The signal is analysed by comparing a parameter from "P" field and data entered by the operator in "Use the signal with the level of intensity more than XX %" input window on "SAR" page of "Tasks" panel of ECDIS task. If "P" parameter is lower than the signal processing level set by the operator, the message is ignored. Otherwise, the message is accepted for further processing;

If the two above conditions are fulfilled, the NS 4000 processes field "A" containing information on the MOB object bearing. It should be noted that this is a relative bearing, whereas to be plotted in the ECDIS task or transmitted to other ships via the AIS, the bearing should be corrected to true.

- ATTENTION! -

For the NS 4000 "MAN OVERBOARD" functionality to operate with the radio direction finder and AIS, the NS 4000 is required to receive a valid compass heading value. Otherwise, it will be impossible to plot a true MOB object bearing on the electronic chart, or to transmit it to other targets via AIS facilities.

ANNEX A

Cisco PIX-501-BUN-K9 Firewall Installation and Adjustment

CONFIGURING THE PIX-501-BUN-K9

There are two ways of configuring PIX-501-BUN-K9:

- Configuring using the Console Port;
- Configuring using the PDM.

Configuring the PIX-501-BUN-K9 Using Console Port



You can access the Command Line Interface (CLI) for administering by using the console port on the PIX Firewall. To do so, run a serial terminal emulator on the PC which will be used for configuring.

Follow these steps to connect a console for local administrative access:

- 1. Plug one end of the PC terminal adapter (74-0495-01) into a standard 9-pin serial port.
- 2. Plug one end of the blue console cable (72-1259-01) into the PC terminal adapter.
- 3. Plug the other end of the blue console cable into the Console port.
- 4. Power on the PIX Firewall.
- 5. Start your terminal emulation program (i.e. "Hyper Terminal") and configure the terminal for 9600 baud, 8 data bits, no parity, and 1 stop bit.
- 6. After startup messages appear, you are prompted with the following unprivileged mode prompt: pixfirewall>. Enter enable and press the <Enter>.
- 7. The following prompt appears: Password. Press the <Enter>.
- 8. You are now in privileged mode. The following prompt appears: pixfirewall#. Enter configure terminal command and press <Enter>. You are now in configuration mode: pixfirewall(config)#.
- 9. Enter configure factory-default 10.8.1.100 255.255.255.0 command and press <Enter>.
- 10. Enter ip address outside 10.8.0.1 255.255.0 command and press <Enter>.
- 11. To save configuration, enter write memory command and press <Enter>.
- 12. Enter reload command and press <Enter>.
- 13. To confirm the reboot, press <Enter>.

Configuring the Firewall PIX-501-BUN-K9 is completed now.

Configuring the PIX-501-BUN-K9 Using PDM Version 3.(0)2

The PIX-501-BUN-K9 contains an integrated configuration utility called Cisco PIX Device Manager (PDM). PDM is a web browser-based configuration tool designed to help you set up, configure, and monitor the PIX Firewall. PDM is preinstalled on the PIX-501-BUN-K9. To access PDM, make sure that JavaScript and Java software are enabled in your web browser. Use Native (built-in) JVM (VM 3809) or Java Plug-in 1.4.2. You can download the latest Java Plug-in from Sun Microsystems (www.java.sun.com). For best performance, use Microsoft Internet Explorer 6.0.

The following requirements are set for a PC which will be used for configuring:

- SOFTWARE. PDM is not supported on Macintosh, Windows 3.1, Windows 95, Windows 98, Windows ME, Windows NT operating systems;
- Hardware Requirements for Windows platforms using PDM 3.0:
 - Processor: Pentium III or equivalent running at 450 MHz or higher;
 - Random Access Memory: 256 MB;
 - Display Resolution and Colors: 1024x768 pixels and 256 colors;
 - Minimum of at least 4 MB of temporary disk space to load into the browser.

HTTP 1.1 – Settings for *Internet Option*/Advanced/HTTP 1.1 settings should use HTTP 1.1 for both proxy and non-proxy connections.

Use Ethernet cable to connect the configuring PC to one of the four switched inside ports on the rear panel of the PIX Firewall.

Check the LINK LED to verify that configuring PC has basic connectivity to the PIX Firewall on one of the inside ports (1 through 4). When connectivity occurs, the LINK LED on the front panel of the PIX Firewall lights up solid green.

Follow these steps to configure the PIX-501-BUN-K9:

1. Run to Start\Settings\Control Panel.

Double-click the "Network and Dial-up Connections" icon:



2. Click on "Local Area Connection" icon, press right mouse button and select PROPERTIES:



3. Select "Internet Protocol (TCP/IP)" and press "Properties" button:

al Area Connection 1 Properties	?)
General Sharing	
Connect using:	
Intel(R) PRO/1000 MT Mobile Connection	
۰ ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰	Configure
Install	Properties
Internet Protocol (TCP/IP) Install Description Transmission Control Protocol/Internet Protocol wide area network protocol that provides comm across diverse interconnected networks	Properties The default unication
Internet Protocol (LCP/IP) Install Description Transmission Control Protocol/Internet Protocol. wide area network protocol that provides comminacross diverse interconnected networks. Show icon in taskbar when connected	Properties The default unication

4. Switch on "Obtain an IP address automatically" and "Obtain DNS server address automatically". Press "OK" button:

s capability. Otherwise, you n e appropriate IP settings.	eed to ask your network administrator for
 Obtain an IP address auto 	omatically
Use the following IP addr	ess:
[P address:	
S <u>u</u> bnet mask:	14 A A
<u>D</u> efault gateway,	
Obtain DNS server addre	ss automatically
 Use the following DNS set 	erver addresses:
Preferred DNS server:	4 4 4
Alternate DNS server:	

5. Run to START/SETTING/CONTROL PANEL. Double-click the "Internet Options" icon:



6. Switch to "Connections" tab and press "LAN Settings..." button:

ternet Propert	es	?
Seneral Securit	y Content Connections Pro	ograms Advanced
Use the connect	e Internet Connection Wizard to t your computer to the Internet	Setup
LANCK	12	A <u>d</u> d
		Remove
		Settings
C Dial <u>when</u>	ever a network connection is no al my default c <u>o</u> nnection	t present
Current	None	Set Default
Local Area Ne	twork (LAN) settings	LAN Settings
		Cancel

7. Check "Automatically detect settings" checkbox and press "OK" button:

utomatic configuration m se of manual settings, di	iay override manual sel sable automatic configi	ttings. To ensure the uration.
Automatically detect s	ettings	
Use automatic configu	ration <u>s</u> cript	
Address		
roxy server		
Use a proxy server		
Address:	Port:	Advanged
🗖 Bypass proxy serv	ver for local addresses	

8. To access the PDM, enter the URL: https://192.168.1.1 into your browser.

Note: Remember to add the "s" to "https" or the connection fails.

🚰 about:blank - Microsoft Internet Explorer	_ 🗆 🗵
Elle Edit View Favorites Iools Help	(B)
← Back + → + Ø 🖸 🔏 Ø Search 🝙 Favorites 🕉 History 🖏 - 🎒 🖬 🗐 🚉	
Address 🕙 https://192.168.1.1	💌 🤗 Go 🛛 Links »
	×
	1000
Connecting to site 192.168.1.1	A Internet

9. Press "OK" button:

(i)	You are about to view pages over a secure connection
Ĺ	Any information you exchange with this site cannot be viewed by anyone else on the Web.
	In the future, do not show this warning

10. Press "Yes" button:

Security	/ Alert 🛛 🗶
ß	Information you exchange with this site cannot be viewed or changed by others. However, there is a problem with the site's security certificate.
	① The security certificate was issued by a company you have not chosen to trust. View the certificate to determine whether you want to trust the certifying authority.
	The security certificate date is valid.
	<u> A</u> The name on the security certificate does not match the name of the site.
	Do you want to proceed?
	Yes <u>V</u> iew Certificate

11. Leave both the "User Name" and "Password" input windows empty. Press "OK" button and wait for loading PDM:

Enter Net	work Passwo	rd		<u>?×</u>
()	Please type y	our user name and	password.	
3	Site:	192.168.1.1		
	Realm	PIX		
	<u>U</u> ser Name	1		
	<u>P</u> assword	10		_
	□ <u>S</u> ave this	, password in your pa	assword list	
		[OK	Cancel
15		ξ		



12. Check "Always trust content from Cisco Systems" checkbox and press "Yes" button:



Home C	onfiguration Mon	itoring Ref	esh Save	ି Help			Cisco Sys
Device Info	mation			Interface St	atus		
Host Name :	pixfirewall.ciscopi	x.com		Interface	IP Address/Mask	Link	Current Kbps
PIX Version:	6.3(4)	PDM Version :	3.0(2)	inside	192.168.1.1/24	O up	5
Device Type :	PIX 501	Total Memory:	16 MB	outside	(DHCP configured)	😡 up	U
License:	[Not Applicable]	Total Flash:	8MB				
Licensed Fe Encryption:	atures 3DES-AES	Inside Hosts:	10				
Failover:	[Not Applicable]	IKE Peers:	10				
Max Physical	· · · ·	Мах	2				
Interfaces:	2	Interfaces:	2	Select an interface	e to view input and outpu	t Kbps	
VPN Status				Traffic Statu	18		
IKE Tunnels:	0	IPSec Tunnels:	0	- Connections	Per Second Usage		
System Reso CPU 0%	Durces Status CPU Usage (percen 96 64 32 0			09.15:32	09:17:02 TCP: 0	• • • • • • • • • • • • • • • • • • •	
Memoru	Memory Usage (MB)	02		outside' Inter	face Traffic Usage (Kbps)	
11MB 09:18:22	16 12 	•••••••• •••••••	++++++++	2 1.5 0.5 0.5 09:15:32	AA. 	<u>.</u>	
Memory (MB)	Free: 5.09	Total: 1	6	Input Kbps	: 0 🔳 0	utput Kbps:	0

13. Run to FILE menu and click on RESET FIREWALL TO THE FACTORY DEFAULT CONFIGURATION:

efresh PDM with the Running C eset Firewall to the Factory De	Configuration on the Firew. fault Configuration) ? re Help		Cisco Syst
how Running Configuration in N	lew Window		Interface St	alue	
ave Running Configuration to F	lash		Interface	IP Address /Mask	Link Current Khns
ave Running Configuration to T ave Running Configuration to S	FTP Server Standby Unit		inside outside	192.168.1.1/24 (DHCP configured)	Oup 4 Oup 1
rint					
lear PDM Cache		-			
xit					
Max Physical Interfaces: 2	Max Interfaces:	2	Select an interfac	e to view input and outpu	ut Khos
VPN Status			I rathe State	us	
IKE Tunnels: 0	IPSec Tunnels	s: O	Connections	Per Second Usage	
- System Resources Stat	tus		1		
96			0.5		
64			09:15:32		
09:16:02 09:15:32	******		UDP: 0	TCP: 0	Total: 0
Memory Memory Us	sage (MB)		outside' Inte	rface Traffic Usage (Kbp:	s)
161			11/		
11MB 8-			U.S		
09:16:02 09:15:32			09:15:32		
Memory (MB)			Input Kbps	s: 0 🔳 0	lutput Kbps: 1

This restores the PIX configurati	on back to the original factory default setting	gs.
You can configure the inside IP DHCP server and HTTP setting: after making this change.	address and subnet mask. By doing so, this s. If you do not preserve this address, you v	s may also affect the vill need to restart PDM
Use this address for the in	iside interface	
Inside IP Address	192.168.1.1	
Inside Subnet Mask:	255.255.255.0	

14. In the "Inside IP Address" field enter the value 10.8.1.100 and in "Inside Subnet Mask" field choose 255.255.255.0. Press "OK" button:

Reset Firewall to the Factory	Default Configuration	1	×
This restores the PIX configuration	n back to the original factory	y default settings.	
You can configure the inside IP a DHCP server and HTTP settings after making this change.	address and subnet mask. B If you do not preserve this	y doing so, this may also affect the address, you will need to restart PDM	
☑ Use this address for the ins	ide interface		
Inside IP Address:	10.8.1.100		
Inside Subnet Mask:	255.255.255.0	•	
OK	Cancel	Help	

15. Press "Yes" button and wait for one minute:

This will reset the configuration back to its factory default values. If you on a DHCP server on your network, this may take awhile. PDM will lose the to the PIX after making this change. You may be able to reconnect by re PDM using the new IP address. Are you sure you want to do this?	lo not have connection starting

16. Press "OK" button and wait while PDM is loading the current configuration from Firewall:



17. Press "OK" button:



18. Run to FILE menu and select EXIT:

efresh PDM with the Running Configuration on the Firewall eset Firewall to the Factory Default Configuration	Save	ହୁ Help			Cisco Syst
now Running Configuration in New Window		1.1.6.0	•		
ave Running Configuration to Flash		Interrace Sta		a and a second	0.00
ave Running Configuration to TFTP Server		Interface	192 168 1 1/24	LINK 2 n/a	Current Kbps
ave Running Configuration to Standby Unit		outside	(DHCP configured)	? n/a	
int					
	-				
ear PDM Cache					
xit					
Max Physical Max					
Interfaces: 2 Interfaces: 2		L	Circurell		
		Lost connection to	riiewali.		
VPN Status		Traffic Status	8 Der General Hanza		
INC Furthers. IP Sec Furthers.			er second osage		
- System Resources Status			rooren on en		2.02.02.02.02.02.02.02
		0.5	Lost connection to	Firewall.	
96 84		09:15:32	09:17:02 0	9:18:32	•••••
0% 32 Lost connection to Firewall.	nini ninasi		TCD.	Tak	
n/a 09:15:32 09:17:02 09:18:32	····	ODP:	TUP:	100	al;
Memory Memory Heads (MB)		'outside' Interf	ace Traffic Usage (Kbps	:)	
memory stage (mb)	Dimension	21		Λ	
10 12 •••••		1.5		<u></u>	gp
OMB 8 4 Lost connection to Firewall		0.6	Lost connection to	V	\mathcal{V}
p/a 09.15:32 09:17:02 09:18:32		09:15:32	09:17:02 0	9:18:32	an ann se
Memory (MB)		Innut Khns:	n	utnut Khns:	
monoly (no)		mpor ropo.		alparitippo.	

19. Press "Save" button and wait while PDM is saving the running configuration to flash memory.



20. Press "OK" button:

Warning		×
\triangle	PDM did not get a response from the server in the last 60 seconds. Please check to see that the network connections are still up and try to reconnect by refreshing PDM.	
	ОК	

21. Press "Yes" button:

Are you su	re?	×
	Are you sure that you want to exit from Cisco PIX Device Manager?	
?	If you choose to exit, please remember to close all browser windows since your account information is still cached by the browser and will remain in its memory until you close it.	
	Click "Yes" to exit from PDM or "No" to continue using PDM	
	Yes No	

22. Run to START\SETTINGS\CONTROL PANEL. Double-click the "Network and Dial-up Connections" icon:

🔯 Control Panel								×
Ele Edit Yiew Favorites Tools	Help							
] ← Back → → → 🛍 🛛 🖓 Search	🔁 Folders 🔇	History 📴 😤 🔅	X 🔊 🖬 •					
Aduress 🐼 Control Panel							- @GU	Links »
		Aa	M	Ġ.	Ś	3	Ø	<u>^</u>
Control Panel	Network an Dial-up	Eurits	Administrative Tools	Customizes	accessibility featur	es for your compu	ter	
Network and Dial-up Connections Connects to other computers, networks, and the Internet	Connections	A.		2	112		4	
Windows Update Windows 2000 Support	Keyboard	Sounds and Multimedia	Scanners and Cameras	Phone and Modern Options	Date/Time	Add/Remove Programs	Folder Options	
		Ŷ		10	Ó		el.	
	Display	Internet Options	System	Automatic Updates	Fax	Printers	Gaming Options	
	\blacktriangleright	0		*		ų		_
	SoundMAX	Scheduled Tasks	Mail	Bluetooth Configuration	Text Services	Power Options	ThinkPad Configuration	<u>.</u>

23. Click right button mouse on "Local Area Connection" icon and click on DISABLE:

📴 Network and Dial-up Connections	8		×
File Edit View Favorites Tools	Advanced Help		
] ← Back → → → 🖬 🛛 🐼 Search	Brolders 3Histo	ry ≌ ≌ X ∽ ፼•	
Address 🚇 Netwurk and Dial-up Cu	unnections		→ C Go Links *
Network and Dial- pconnections Local Area Connection 1 Type: LAN Connection Status: Enabled Intel(R) PRO/1000 MT Mobile Cornection	Make New Connection	Local Area Cornection Disable Status Create Shortut Defete Rename Properties	
🖳 Disconnects the selected connection.			li.

24. Then click on ENABLE:



25. To access the PDM, enter the URL: https://10.8.1.100 into your browser and press <Enter>:



26. Press "Yes" button:

ß	Information you exchange with this site cannot be viewed or changed by others. However, there is a problem with the site's security certificate.
	The security certificate was issued by a company you have not chosen to trust. View the certificate to determine whether you want to trust the certifying authority.
	The security certificate date is valid.
	The name on the security certificate does not match the name of the site.
	Do you want to proceed?
	Yes View Certificate

27. Press "OK" button:

er Netv	work Passwo	ord	? :
)	Please type ;	your user name and password.	
<u></u>	Site:	10.8.1.100	
	Realm	PIX	
	<u>U</u> ser Name		
	Password		
	□ <u>S</u> ave this	password in your password list	
		OK C	ancel
			-

28. Click on "Configuration" icon:

Cisco PIX Device	Manager 3.0 - 10.8 Options Tools Wia	.1.100 ards Help					-O×
Home C	onfiguration Mon	itoring Ref	resh Save	ୁ Help			Cisco Systems
Device Info	mation			Interface St	atus		
Host Name :	pixfirewall.ciscopi	K.COM		Interface	IP Address/Mask	Link	Current Kbps
PIX Version:	6.3(4)	PDM Version :	3.0(2)	inside	10.8.1.100/24	Qup 4	
Device Type :	PIX 501	Total Memory:	16 MB	outside	(DHCP configured)	joup (,
License:	[Not Applicable]	Total Flash:	8MB				
Licensed Fe	atures						
Encryption:	3DES-AES	Inside Hosts:	10				
Failover:	[Not Applicable]	IKE Peers:	10				
Max Physical	2	Max	2				
interraces;		interraces:		Select an interfac	e to view input and outpu	t Kbps	
WDN Ctabus				T			
IKE Tunnels:	0	IPSec Tunnels:	0	Connections	Per Second Usage		
System Reso CPU	ources Status CPU Usage (percent]		0.5			
0%	96 64			09.28:52			
09:29:12	09:28:52			UDP: 0	TCP: 0	Total:	0
Memory	Memory Usage (MB)			outside' Inter	rface Traffic Usage (Kbps)	
нтмв 09:29:12	16 12 • • 4 09:28:52		+++++++++	0.5		tat tatat ta	
Memory (MB) Used: 10,92	26 Free: 5,074	Total: 1	6	Input Kbps	x 0 🔳 0	utput Kbps:	0
Device configuration I	oaded successfully.		<admin></admin>	NA (15)	€ 09:29	12 UTC Tue O	ot 31 2006

29. Switch to "System Properties" tab and select the outside interface from the table to edit its parameters:

File	sco PIX Device Manager 3.0 Rules Search Options Too Configuration	0 - 10.8.1.10 Ils Wizards Monitoring	Help Refresh	Save	9 Help			LIDIX
A	Ccess Rules	Rules	VPN) Ho	sts/Networks	System Properties]	
Ē		Interface Select an ir	es nterface from the	table to edit i	ts parameters.			
E E	F ▼ DHCP Services F ▼ Administration	Enabled	Name	Security Level	IP Address	Subnet Mask	Hardware	
E .) ▼ AAA ● UBL Filtering	Yes	inside	100	10.8.1.100	255.255.255.0	ethernet1	Edit
t	 Auto Update Intrusion Detection 	Yes	outside	0	(DHCP)		ethernet0	
	 Advanceu → Multicastics 				Αρρίν	Reset		
_					NA (15)		:34:32 UTC Tue C	Jet 31 2006

30. Press "Edit" button:

✓ Enable Interface			
F			
Interface Name:	utside		
Security Level:			
IP Address	C Use DHCP	C Use PPPoE	
The interface automatica	ally gets its IP address using DI	ICP.	
🔽 Obtain default route u	ising DHCP		
Retry Count: 4			
Click here to release and	Irenew DHCP address:	New Lease	
1			

- 31. In the "IP Address" group, press "Static IP Address" button and enter:
 - IP address: 10.8.0.1;
 - Subnet Mask: 255.255.255.0.

Press "OK" button:

Interface Name:	outside		
Security Level:	0		
IP Address	ss C Use DHCP	C Use PPPoE	
IP Address:	10.8.0.1		
Subnet Mask:	255.255.255.0	•	

32. Press "Apply" button:

Home Confi	guration	Monitoring	Refresh	Gave	י ₽ Help			CISCO SYS
ccess Rules	Translation F	Rules	VPN) Ho	sts/Networks	System Properties)	
Categories	35	Interface Select an in	es nterface from the Name	table to edit il	is parameters. IP Address	Subnet Mask	Hardware	
▼ Logging ▼ AAA		Yes	inside	Level 100	10.8.1.100	255.255.255.0	ethernet1	Edit
Gurb L Filtering Auto Update Intrusion Dete Advanced Multicast History Metrics	ction:	Yes	outside	0	10.8.0.1	255.255.255.0	ethernet0	
					Apply	Reset		

33. You can check the running configuration. Select in FILE menu SHOW RUNNING CONFIGURATION IN NEW WINDOW:

ave Running Configuration to Flash ave Running Configuration to TFIP Server ave Running Configuration to Standby Unit trint dear PDM Cache	now Running Configuration in I	fault Configu	iration	Save	a Help			lltut
rint Jear PCM Cache xit: ♥ ✓ Logging ● ♥ AAA ● URL Filtering ● ♥ Advanced ● ♥ Multicast ● ♥ Multicast	ave Running Configuration to ave Running Configuration to ave Running Configuration to	Flash IFTP Server Standby Unit] но	sts/Networks	System Properties		
sit	int Iear PDM Cache			to edit i	s parameters.			
B→ Cagging Yes inside 100 10.8.1.100 255.255.0 ethernet1 - ♦ URL Filtering - ♦ Auto Update Yes outside 0 10.8.0.1 255.255.0 ethernet0 B→ < Intraine Detection B→ < Intraine Detection 0 10.8.0.1 255.255.0 ethernet0 B→ < Intraine Detection B→ < Multicast - + History Metrics -	dit			ecurity	IP Address	Subnet Mask	Hardware	
● UHL hiltering • Auto Update ● Auto Update 10.8.0.1 ● ▼ Advanced ● ▼ Muticost • History Metrics	±r ▼ Logging Er ▼ AAA	Yes	inside	100	10.8.1.100	255.255.255.0	ethernet1	Edit
	 → Auto Update → Intrusion Detection → Advanced → → Multicast → History Metrics 	Yes		U	10.8.0.1	255.255.0		

Attps://10.8.1.100/exec/write term - Microsoft Internet Explorer	×
Ele Edit View Favorites Icols Help	188)
Address 🔊 https://10.8.1.100/exec/write%20term	▼ @Go Links »
	<u>*</u>
Building configuration	
: Saved	
and an entropy of the second	
Pix version 6.3(4)	
interface etherneti 100	
name i acterneti contaida convitu	
nameli etherneti ingide security100	
enable massword Bu2Vilut7DDVI/4 engrunted	
nassed 2kFonbWidt_2kYoU encrypted	
hostname pixtirewall	
domain-name ciscopix.com	
fixup protocol dns maximum-length 512	
fixup protocol ftp 21	
fixup protocol h323 h225 1720	
fixup protocol h323 ras 1718-1719	
fixup protocol http 80	
fixup protocol rsh 514	
fixup protocol rtsp 554	
fixup protocol sip 5060	
fixup protocol sip udp 5060	
fixup protocol skinny 2000	
fixup protocol smtp 25	
fixup protocol sqinet 1521	
fixup protocol titp 69	
names	
pager lines 24	
mtu outside isuu	
incu inistile 1300	
in address buckle 10.9.1.100.253.253.255.	
in sudit info section slarm	
in sudit streads action slarm	
ndm logging informational 100	
Done	🕒 🍘 Internet
Ahttos://10.8.1.100/exec/write.term - Microsoft Internet Explorer	
File Edit View Favorites Tools Help	1
jer en sen sen sen sen sen +Back - → - @ @ @ @ @ Search @Eavorites @History	
Address a https://10.8.1.100/exer./write%20term	▼ ∂Go Links »
ndm logging informational 100	
ndm history enable	<u> </u>
arn timeout 14400	
dlobal (outside) 1 interface	

Address @ https://10.8.1.100/exec/write%20term	C GO Links
pdm logging informational 100	-
pdm history enable	
arp timeout 14400	
global (outside) 1 interface	
nat (inside) 1 0.0.0.0 0.0.0.0 0 0	
timeout xlate 0:05:00	
timeout conn 1:00:00 half-closed 0:10:00 udp 0:02:00 rpc 0:10:00 h225 1:00:00	
timeout h323 0:05:00 mgcp 0:05:00 sip 0:30:00 sip_media 0:02:00	
timeout uauth 0:05:00 absolute	
aaa-server TACACS+ protocol tacacs+	
aaa-server TACACS+ max-failed-attempts 3	
aaa-server TACACS+ deadtime 10	
aaa-server RADIUS protocol radius	
aaa-server RADIUS max-failed-attempts 3	
aaa-server RADIUS deadtime 10	
aaa-server LOCAL protocol local	
http server enable	
http 10.8.1.0 255.255.255.0 inside	100
no snmp-server location	
no snmp-server contact	
snmp-server community public	
no snmp-server enable traps	
floodguard enable	
telnet timeout 5	
ssh timeout 5	
console timeout O	
dhcpd address 10.8.1.101-10.8.1.132 inside	
dhcpd lease 3600	
dhcpd ping_timeout 750	
dhcpd auto_config outside	
dhcpd enable inside	
terminal width 80	
Cryptochecksum:b90205e6c7f2fa107dca9e5ecb096da6	
: end	
[OK]	
(#] Done	A Internet

Refresh PDM with the Running Configuration on the Firewali Reset Firewall to the Factory Default Configuration			Save	? Help			Cisco Syst
ihow Running Configuration in	New Window						AIIIIIIIIIIIII
iave Running Configuration to	Flash			ete Matuorke	Sustem Properties	r	
iave Running Configuration to iave Running Configuration to	TFTP Server. Standby Unit		1 10	3(3/146(W0IK3	oforem r reberroor		
rint							
lear PDM Cache			to ealt i	ts parameters.			
xit			ecurity evel	IP Address	Subnet Mask	Hardware	
Er ♥ Logging	Yes	inside	100	10.8.1.100	255.255.255.0	ethernet1	Edit
	Yes	outside	0	10.8.0.1	255.255.255.0	ethernet0	
H → Multicast							

34. Select in FILE menu SAVE RUNNING CONFIGURATION TO FLASH:

35. To save the running configuration, press "Apply" button:

Save Runnir	ng Configuration to Flash		x
Â	Do you want to save the runnin	g configuration to flash memory	17
	Apply	Cancel	

36. To leave PDM, select in FILE menu option EXIT:



Press "Yes" button:

	Are you sure that you want to exit from Cisco PIX Device Manager?
0	If you choose to exit, please remember to close all browser windows since your account information is still cached by the browser and will remain in its memory until you close it.
	Click "Yes" to exit from PDM or "No" to continue using PDM.
	Always display this dialog before exiting from PDM.

Configuring the PIX-501-BUN-K9 is completed.

SETTINGS ON COMMUNICATION COMPUTER

On the PC which the communication program is installed on, make the following settings:

1. Run to START\SETTINGS\CONTROL PANEL. Double-click the "Network and Dial-up Connections" icon:

🖾 Control Panel								- U ×
Ele Edit View Favorites Tools	Help							311
] ← Back → → 📩 @ Search	🔁 Folders 🔇	History 📴 😨	X 🔊 💷 •					
Address 🐼 Control Panel							▼ 🔗 GO	Links "
		K ^A a	M	Ġ.	×		Ø	<u>^</u>
Control Panel	Network an	d Fonts	Administrative Tools	Customizes	Add/Remove	Regional Options	Mouse	
Network and Dial-up Connections Connects to other computers, networks, and the Internet Windows Ubdate Windows 2000 Support	کرینان Connection کرینین Keyboard	s Sounds and Multimedia	Scanners and Cameras	Phone and Modern Options	112 Date/Time	Add/Remove Programs	Folder Options	
	Display	Internet Options	System	Automatic Updates	Fax	Printers	Gaming Options	
	SoundMAX	Scheduled Tasks	Mail	Bluetooth Configuration	Text Services	Power Options	ThinkPad Configuration	_
Connects to other computers, networks, ar	nd the Internet							

2. Click on "Local Area Connection" icon, click right mouse button and select PROPERTIES:

Network and Dial-up Connection	ns		>
File Edit View Favorites T	ools Advanced Help		
🗕 🖶 Back 🔹 🤿 🔹 🖹 📿 Sear	rch 强 Folders 🎯 History	階階×3回・	
Address 🙆 Network and Dial-up	Connections		🚽 😥 Go 🗍 Links 🤅
Network and Dial- up Connections	Make New Connection	Local Area Connection Disable Status Create Stortout Delete Rename Properties	2

3. Select "Internet Protocol (TCP/IP)" and press "Properties" button:

Area Connection	1 Properties	
eneral Sharing		
Connect using:		
Intel(R) PRO/10	000 MT Mobile Connection	
		Configure
omponents checked	l are used by this connection:	
🗹 📇 Client for Micro	osoft Networks	
🖌 🛄 Eile and Drinte	y Charing for Microsoft Mohus	dea
🗹 📇 File and Printe	er Sharing for Microsoft Netwo	ırks
 File and Printe Internet Proto 	er Sharing for Microsoft Netwo col (TCP/IP)	irks
✓ Pile and Printe ✓ Internet Proto	er Sharing for Microsoft Netwo col (TCP/IP)	rks
File and Printe Proto	er Sharing for Microsoft Netwo col (TCP/IP) Uninstall	rks P <u>r</u> operties
File and Printe Finternet Proto Install	er Sharing for Microsoft Netwo col (TCP/IP)	rks P <u>r</u> operties
File and Printe File and Printe Internet Proto Install Description Transmission Contre wide area network across diverse intere	er Sharing for Microsoft Netwo col (TCP/IP)	Properties The default nication
File and Printe Internet Proto Install Description Transmission Contri wide area network across diverse inter	er Sharing for Microsoft Netwo col (TCP/IP) Uninstall of Protocol/Internet Protocol. protocol that provides commu connected networks.	rks Properties The default mication
File and Printe Internet Proto Install Description Transmission Contru wide area network across diverse inter Show icon in taskl	er Sharing for Microsoft Netwo col (TCP/IP) Uninstall of Protocol/Internet Protocol. protocol that provides commu connected networks: bar when connected	Properties The default mication
File and Printe Install Description Transmission Contri wide area network across diverse inter Show icon in taskl	er Sharing for Microsoft Netwo col (TCP/IP) of Protocol/Internet Protocol. protocol that provides commu connected networks. bar when connected	rks P <u>r</u> operties The default nication
File and Printe File and Printe Internet Proto Install Description Transmission Contrivide area network across diverse inter Show icon in task!	er Sharing for Microsoft Netwo col (TCP/IP) Uninstall ol Protocol/Internet Protocol. protocol that provides commu connected networks. bar when connected	rks Properties The default inication

- 4. Press "Use the following IP addresses" button and enter the following:
 - IP address: 10.8.0.2;
 - Subnet mask: 255.255.255.0.

Leave the fields "Default gateway" and "Use the following DNS server addresses" empty. Press "OK" button:

and the second sec	
'ou can get IP settings assigned his capability. Otherwise, you ne he appropriate IP settings.	automatically if your network supports ed to ask your network administrator for
C Obtain an IP address autor	natically
Use the following IP addres	18:
<u>I</u> P address:	10 . 8 . 0 . 2
S <u>u</u> bnet mask:	255 . 255 . 255 . 🚺
Default gateway:	
C (1) (1) (1)	a di m
 Uptain UNS server address 	automatically
- I Use the following DNS serv	let addresses.
 Use the following DNS serv Preferred DNS server: 	/er addresses:
Use the following DNS serv Preferred DNS server: Alternate DNS server:	

5. To install the FTP Server, switch to the START\SETTINGS\CONTROL PANEL. Double-click the "Add/Remove Programs" icon:

🔯 Control Panel								- 🗆 ×
Ele Edit View Favorites Tools	Help							311
] ← Back → → ← 🖬 🔕 Search	EFolders	History 📴 😳	× 50 III+					
Address 🖃 Control Panel								Links "
	æ	A	M	હ	**	3	Ø	*
Control Panel	Network and Dial-up Co	Fonts	Administrative Tools	Accessibility Options	Add/Remove Hardware	Regional Options	Mouse	
Add/Remove Programs Installs and removes programs and Windows components	د ک			O	112 (1)	1000	-A	
Windows Update Windows 2000 Support	Keyboard	Sounds and	Scanners and	Phone and Modern Ontions	Date/Time	Add/Remove	Folder Options	
		Multimetia	Callielas	Modern Opdons		Installs a	and removes progran	ns and Wir
		F		20	Ô	S	2	
	Display	Internet Options	System	Automatic Updates	Fax	Printers	Gaming Options	
	\blacktriangleright	ō		*	∕₽	ų		
	SoundMAX	Scheduled Tasks	Mail	Bluetooth Cunfiguration	Text Services	Power Options	ThinkPad Configuration	•
Installs and removes programs and Window	s components						A My Computer	11.

		a sugar a linear	
7	Currently installed programs:	Sort by: Name	ð
ge or	🐢 ABBYY Lingvo 8.0 English-Russian Edition	Size	<u>260M</u>
ams	Click here for support information.	Last Used On	10.06.2004
2	To change this program or remove it from your computer, click Change or Remove.	<u>C</u> hange	<u>R</u> emove
3	🔠 Adobe Acrobat 4.0	Size	5,93ME
ams	🛃 Adobe Flash Player 9 ActiveX		
-	🛃 Agere Systems AC'97 Modem		
H	👹 Ahead Nero - Burning Rom	Size	19,8ME
Nove	📳 ATI - Software Uninstall Utility		
ows peots	🖾 ATI Control Panel	Size	13,1ME
	🛃 ATI Display Driver		
-	BSPlayer (remove only)	Size	1,74M
a Ioram	😳 Chart Assistant	Size	66,3ME
and	₽ CloneCD	Size	3,78ME
uius	🥑 DVD-lab PRO 1.00	Size	41,2ME
	FAR file manager	Size	5,42M
	FIRE GL driver for 3D Studio MAX/VIZ	Size	1,05M

6. Press "Add/Remove Windows Components" button:

7. Select "Internet Information Services (IIS)" and press "Details" button:

/indows Components You can add or remove compo	onents of Windows 2000.	
To add or remove a componer part of the component will be in	nt, click the checkbox. A sh nstalled. To see what's incl	naded box means that only uded in a component, click
Components:		
Service		0,0 MB 🔺
🗹 🥌 Internet Explorer		0,0 MB
🗹 💐 Internet Information Se	ervices (IIS)	18,3 MB
🗆 🖹 Management and Mon	iitoring Tools	0,9 MB
🕅 🚾 Message Queuing Ser	vices	26 MB 🔟
Description: IIS services (Wel transactions, ASF	b and FTP support) along w ^D s, database connections, a	ith support for FrontPage, and receiving of posts.
	0.0 MB	Details 1
Total disk space required:		

8. Check "File Transfer Protocol (FTP) Server" checkbox and press "OK" button:

the shirthway at the	and the Construct (IIC).		
on Files	ormation pervices (itp):	1.0 MB	
mentation		3,5 MB	
ansfer Protocol	(FTP) Server	0,1 MB	
age 2000 Serve	er Extensions	4,1 MB	
✓ The Internet Information Services Snap-In			
nal Web Manag	er	1,4 MB	
Service		5,0 MB 📘	
Support for the sites (for upload	File Transfer Protocol (FTP), ling and downloading of files	, allowing you to set up FTP s).	
ce required:	0,0 MB	<u>D</u> etails	
	is of rifeer ection on Files nentation ansfer Protocol 1 'age 2000 Serve et Information Se nal Web Manage Service Support for the sites (for uploac ce required:	as of internet information services (ins): on Files nentation ansfer Protocol (FTP) Server 'age 2000 Server Extensions et Information Services Snap-In nal Web Manager Service Support for the File Transfer Protocol (FTP) sites (for uploading and downloading of files ce required: 0.0 MB	

9. Press "Next >" button:

indows Components You can add or remove compone	ents of Windows 2000.	4
To add or remove a component, part of the component will be inst Details.	click the checkbox. A s alled. To see what's inc	haded box means that only luded in a component, click
<u>C</u> omponents:		
🗹 🗩 Indexing Service		0,0 MB 🔺
🗹 🧭 Internet Explorer		0,0 MB
🗹 📽 Internet Information Servi	ices (IIS)	18,3 MB
🔲 🚉 Management and Monito	ring Tools	0,9 MB
🗌 🗆 🚾 Message Queuing Servic	:AS	26 MB 🔟
Description: IIS services (Web a	ind FTP support) along v	with support for FrontPage, and receiving of posts
transactions, ASPs,	database connections,	and recenting or poore.
transactions, ASPs, Total disk space required:	0,0 MB	Details

10. Insert Windows boot CD into CD-ROM and press "OK" button:

	· · · · · · · · · · · · · · · · · · ·	
٢	Please insert the Compact Disc labeled 'Windows 2000 Professional CD' into your CD-ROM drive (G:) and then click OK.	Cancel
	You can also click OK if you want files to be copied from an alternate location, such as a floppy disk or a network server.	

11. Wait for setup and click on "Finish" button. FTP Server is installed now:

Windows Components Wizard	×
Configuring Components Setup is making the configuration changes you requested.	M
Please wait while Setup configures the components. This may take several minutes, depending on the components selected.	
Status: Configuring Internet Information Services	T
<u> ≪ B</u> ack <u>N</u> ext >	



12. Run to START\SETTINGS\CONTROL PANEL. Double-click the "Administrative Tools" icon:



13. Double-click the "Computer Management" icon:



14. Go to Services and Applications/Internet Information Services, select option Default FTP Site. Press right trackball button and from drop dawn menu select PROPERTIES:

🖵 Computer Management				
$ $ Action View $ $ $\Leftrightarrow \Rightarrow$ $ $ E		n 11		
Tree	Description	State	Host Header Name	IP Ac
Computer Management (Local) System Tools Storage WMI Control Services and Applications WMI Control Service Indexing Service Thermation Service Default FTP Site Default FTP Site Default SMTP Virtual Ser	Default FTP Site Default Web Site Default SMTP Virtual Ser	Running Running Running	Explore Open Browse Start Stop Pause New All Tasks Refresh Properties Help	* All * All * All
الک السیات Opens property sheet for the current selection) D			

15. Switch to "Security Accounts" tab and uncheck "Allow Anonymous Connections" checkbox. Press "Apply" button:

		[1	
	Anonymous Conr	ections			
Select th	e Windows User	Account to u	se for anonymou	s access to this r	esource
<u>U</u> seman	e: IUSR_MOZ	Ğ		Brows	e
Passwor	<u>1</u>				
	□ Allow or	ly anonymou:	connections		
	🔽 Allo <u>w</u> IIS	to control pa	ssword		
FTP Sile O	peratore -				
Grant op	erator privileges (o Windows L	ser Accounts for	this FTP site onl	g.:
	🖇 🕰 Administ	ators		A <u>d</u> d	
Operator				Bema	ove
Operator					
Operator					

16. Press "Yes" button:



17. Switch to "Home Directory" tab and check "Read", "Write", "Log visits" checkboxes:

/hen connectin	g to this resource, the content should come from: a girectory located on this computer a share located on another computer	
FTP Site Direct		- 7
L <u>o</u> cal Path:		rowse
	₩ Read	
	I Log ⊻isits	
Directory Listing) Style	
C UNI <u>X</u> ®		
	0	

Press "OK" button.

18. Install the "MailUtility" on communication PC.

Edit the Mailhandler.ini file (C:\Transas\MailUtility by default) intended for configuring the mail program:

🖉 MailHandler - Notepad	_ 🗆 🗵
Eile Edit Format Help	
[ProductConfig] Computers="WS1;WS2;WS3;WS4;WS5"	*
[ServerConfig] ;Server - FTP server name or IP address (without ftp:// type prefixes) Server="10.8.0.2"	
, server Login="anonymous" ;ServerPassword its password ServerPassword its password ServerPassword folder from the FTP root where the received mail will be stored, will b	e divi
InboxFolder="Inbox" ;outboxFolder - folder from the FTP root where queries received from other computers, outboxFolder="outbox"	will b
[MailConfig] Profile="MS Exchange Settings" SendTo="Chartservice@transas.com" SendFrom="user@domain.com"	
	-

- in the [ProductConfig] section, replace the Computers key value with the actual list of computer names separated with the ";" semicolon (i.e., WS1; WS2; WS3; WS4; WS5);
- in the [ServerConfig] section, replace the Server key value with the IP address or name of the communication PC (i.e., the PC which the FTP Server is installed on). In this case, the ftp:// type prefix should not be specified (i.e., 10.8.0.2);
- in the [ServerConfig] section, replace the ServerLogin key value with the name of the communication PC user (i.e., the user of the PC which the FTP Server is installed on);
- in the [ServerConfig] section specify the password for the communication PC in the ServerPassword key;

- in the [MailConfig] section, replace the SendFrom key value with the user E-mail address (User@domain.com);
- define the Microsoft Exchange configuration. In the [MailConfig] section, replace the Profile key value with the configuration name. By default, the "MS Exchange Settings" configuration is used (this same configuration is used in the "Outlook").

The settings on communication PC are completed.

SETTINGS ON PC WITH CHART ASSISTANT

On the PC which the "Chart Assistant" utility is installed on (for the NS 4000 MFD on all the WS's), make the following settings:

1. Run to START\SETTINGS CONTROL PANEL. Double-click the "Network Connections" icon:



2. Click on "Network 1" icon, press right mouse button and select PROPERTIES:



3. Press "Configure" button:



 Switch to "Advanced" tab and in "Property" field set "Link Speed/Duplex Mode". Press "OK" button:

on the right.	Walkier
802.10/1p VLAN Tagging Flow Control Jumbo Frame Link Speed/Duplex Mode Network Address Offload Checksum Offload CPC_LargeSend Wake-On-Lan After Shutdown	Auto Negotiation

5. Click on "Network 1" icon, press right mouse button and select PROPERTIES:



6. Select "Internet Protocol (TCP/IP)" and press "Properties" button:

Realtek RTL816	58C(P)/8111C(P) PCI-	Configure
-	he following items	
 File and Printe QoS Packet S Internet Proto 	er Sharing for Microsof Scheduler col (TCP/IP)	t Networks
A	Uninstall	Properties
Install		

- 7. Press "Use the following IP addresses" radio button and enter the following for WS1:
 - IP address: 10.8.1.101;
 - Subnet mask: 255.255.255.0;
 - Default gateway: 10.8.1.100.

Press "OK" button:

eneral		
You can get IP settings assigned this capability. Otherwise, you ne the appropriate IP settings.	d automatically if your network support ed to ask your network administrator	s for
Use the following IP address	ss	
IP address:	10 . 8 . 1 . 101	
S <u>u</u> bnet mask:	255 . 255 . 255 . 0	
Default gateway:	10 . 8 . 1 .100	
C Obtain DNS server address	automatically.	
 Use the following DNS service 	ver addresses:	
Preferred DNS server:	N 10 10	
Alternate DNS server:	y y z	
	Advance	±

- For WS2 IP address: 10.8.1.102;
- For WS3 IP address: 10.8.1.103;
- For WS4 IP address: 10.8.1.104;
- For WS5 IP address: 10.8.1.105;
- "Subnet mask" and "Default gateway" must be the same for each station: 255.255.255.0 and 10.8.1.100 (inside IP address of Firewall PIX-501-BUN-K9).

Press "Close" button in the window "Network 1 Properties".

8. On each PC (W01–W05), run to START\SETTINGS\CONTROL PANEL. Double-click the "Internet Options" icon:

- Control Panel			_						-0
<u>File Edit View Favorites</u>	Tools	Help							A
🕞 Back 🔹 🕥 🔸 🏂 🔒	O Sei	arch 😥 Folde	rs 🛄 •						
Address 🕞 Control Panel								•	→ Go
Control Panel	*	Ġ,	Solo and a second se	I	ND	45	Ð	Ŗ	
Switch to Category View	,	Accessibility Options	Add Hardware	Add or Remov	Administrative Tools	Automatic Updates	Date and Time	Display	
See Also	*	D	Ca			Ø	Ś	Ċ	
🍓 Windows Update		Folder Options	Fonts	Game Controllers	Guardant drivers	Internet Options	Keyboard	Mouse	
W Help and Support						3	۲	3	
		Network Connections	Network Setup Wizard	Phone and Modem	Power Options	Printers and Faxes	Regional and Language	Scanners and Cameras	
		B	Ŵ		O,	23	S		
		Scheduled Tasks	Security Center	SoundMAX	Sounds and Audio Devices	Speech	System	Taskbar and Start Menu	

 Switch to "Advanced" tab and check "Enable folder view for FTP sites" checkbox. Press "OK" button:

A	ccessibility
H	Move system caret with focus (selection changes
B	rowsing
	Always send URLs as UTF-8
Ē	Automatically check for Internet Explorer updates
	Close unused folders in History and Favorites
	Disable script debugging
	Display a notification about every script error
	Enable folder view for FTP sites
	Enable Install On Demand
	Enable offline items to be synchronized on a schedule
	Enable page his counting
	Enable page transitions Enable Personalized Eavorities Menu
	Inable Personalized Lavonces Mend Notify when downloads complete
4	

10. Edit ca.cfg file (by default, *C:\Transas\IBS\ChartAssistant*) intended for configuring the "Chart Assistant" utility:



In the [REQUESTS] section, set the key FixedPaths=1.

11. Run Chart Assistant utility by selecting the appropriate item in the START menu (START\PROGRAMS\MULTIFUNCTIONAL DISPLAY\CHART ASSISTANT):



12. Use the appropriate tab in the top left corner of the screen to switch to "Ship Collection" or "Catalogue" page:

🐨 ChartAssistant		_ 6 ×
Table Ship Collection Catalogue Network		
Format: TX97 Vupdate Info Reports V	Help V Exit	
Image: Start Discrete Transmission Image: Start		· · · · · · · · · · · · · · · · · · ·
Statistics / Selection Current Request Old Requests	Find chart: Find next	
Issue: TX97; WF 40 (28.05.2008) OUTDATED Selection:	Filter settings	
All Selected Al Charts 15063 Load Ist Piberd 15063 Load Ist To be corrected 0 Add Ist To be corrected 0 Add Ist Lucrosed (observed) 0 Save Ist. Lucrosed (observed) 0 Benow Ist. Lucrosed (observed) 0 Benow Ist. Lucrosed (observed) 0 Benow Ist.	TAX Orbits (Active layer) EXC/ENC Charts (Not active - AUXAyre) Show all Show a	
Request for data Catalogue Aleverations Updates Noveltonses Australian Auto adjust Nap and Tree views	Date filter If Al (xtual collectorit) First Issue after: 01.01.1990 New Issue after: 01.01.1990	
0.0.006		
13. Press 🖄 button:

1000 6000000	2
Server:	10.8.0.2
Login:	NS
Password:	NS
 This cor C External Reply 	mputer is connected to the "Communication station" by LAN
 This cor External Reply 	IFTP E-mail message size limit 1024 Kb
 This cor External Reply E-mail: 	mputer is connected to the "Communication station" by LAN IFTP E-mail message size limit 1024 Kb userfriend@user.com
 This cor External Reply E-mail: 	mputer is connected to the "Communication station" by LAN IFTP E-mail message size limit 1024 v Kb userfriend@user.com

- Open "FTP" page;
- In the Server line of FTP parameters group, enter the IP-address of the communication PC (i.e., the PC which the FTP Server is installed on 10.8.0.2). In this case, the ftp:// type prefix should not be specified;
- In the Login line of FTP parameters group, enter the name of the communication PC user (i.e., user of the PC which the FTP Server is installed on);
- In the Password line of FTP parameters group, enter the password for the communication PC;
- In E-mail line of Reply group, specify the e-mail address, which Transas chart server will be sending processed requests to;
- Press "OK" button.

The settings on PC are completed.

PIX-501-BUN-K9 CONNECTIONS

Place the chassis on a flat stable surface. The chassis is not rack mountable.



If the firewall is connected direct to the communication PC, use the orange Ethernet crossover cable (72-3515-01) to connect Port 0 of PIX 501 (the outside Ethernet port) to the Ethernet port of the communication PC.

If the firewall is connected to the communication PC via a switch or a hub, use the yellow Ethernet straight cable (72-1482-01) to connect Port 0 of PIX501 to the switch or hub. Then:

- Connect HP Network switch (LAN 1) with the yellow Ethernet cable to one of the four switched PIX 501 inside ports (numbered 1 through 4);
- Connect the power supply (341-0008-01) with power cable;
- Connect the small, round connector of the power supply cable to the power connector on the rear panel of the PIX-501-BUN-K9;
- Connect the AC power connector of the power supply input cable to an electrical outlet;
- Check the power LED, if it is solid green, then the device is powered on;
- Check the LINK/ACT LED indicators on the front panel of the PIX Firewall. LED indicators are normally solid green when a link is established, and flashing green when the ports are active. Each inside Ethernet interface (1 through 4) has two LEDs to indicate the operating speed and that the physical link is established.



The PIX-501-BUN-K9 Firewall is ready for use.

ANNEX B

Additional Settings for Navi-Conning 4000

ADJUSTMENT OF NS 4000 OPERATION WITH WAGO MODULES

General

Run the System Configuration utility by selecting the appropriate item in the START menu (START\PROGRAMS\MULTIFUNCTIONAL DISPLAY\SYSTEM CONFIGURATION):



Press INS button and switch to "WAGO" page. This page is intended for creating and editing the database of parameters supplied to the NS 4000 via WAGO modules. Configuration of WAGO modules connection to the NS 4000 ports is performed on the page "Sensors" of the panel "Sensors" (see **Chapter 2**, section **NS 4000 Configuration**, paragraph **Sensors Settings**). If WAGO modules are not connected, the page will be blank.

;]) System Configur	ion Utility
	Network settings General Ship settings Chart collections Fallback NMEA Input filter NMEA Output ARPA Output NMEA Input Track Control Speed Maneuvering Tracks NMEA Coston WAGO NavTex
INS	Sensor WAGO_ADC1
* 19	WAGO modules
3	NN Type Description
Workstation	
-	
Sensors	
Radar	
\$	New Delete
Security	WAGO module parameters
174	
1 Var	
Table	
	New Delete:
Backup	OK Apply Cancel

In WAGO modules group, press New button. Position the cursor on a cell in Type column and double click the left trackball/mouse button:

1-1-1

	Network settings	General	Ship settings	Chart coll	lections	Fallback	NMEA Inp	out filter	NMEA Output
INS				Speed Man	euvering	Tracks	NMEA CUSIC	m waac	- Navie:
Automa .	Sensor Twartingthe	1							
1 1	WAGO modules	-							
75.00	1 750-468	туре	▼ 4 Channel Ar	alog Inputs M	odule (0-10	V)	0		
Vorkstation	750-468	0				2			
	750-454 750-476								
	750-403	43							
dia.									
Sensors									
63									
And and a second se									
1									
T Badar									
T Radar									
T Radar									
Radar	New De	elete							
Radar	New De	slete							
Radar	New De WAGO module paramete	elete	Alarm if no input	Chan.	Unit	Min Phys.	Max Phys,	Min Val.	Max Vali
Radar Security	New De WAG0 module paramete Name WAG0_ADC1	elete	Alarm if no input	Chan.	Unit	Min Phys,	Max Phys.	Min Val.	Max Val.
Radar Radar Security	New De WAG0 module paramete Name WAG0_ADC1	elete ers Alm type	Alarm if no input	Chan.	Unit	Min Phys,	Max Phys.	Min Val.	Max Val.
Radar Radar Security	New De WAG0 module paramete Name WAG0_ADC1	elete	Alarm if no input	Chan.	Unit	Min Phys.	Max Phys.	Min Val.	Max Val.
Radar Security ommissioning Table	New De WAG0 module paramete Name WAG0_ADC1	ers Alm type	Alarm if no input	Chan.	Unit	Min Phys,	Max Phys.	Min Val.	Max Val.
Radar Security ommissioning Table	New De WAG0 module paramete Name WAG0_ADC1	ers	Alarm if no input	Chan.	Unit	Min Phys.	Max Phys.	Min Val.	Max Val.
Radar Security Demissioning Table	New De WAG0 module paramete Name WAG0_ADC1	elete	Alarm if no input	Chan.	Unit	Min Phys.	Max Phys.	Min Val.	Max Val.
Radar Security	New De WAG0 module paramete Name WAG0_ADC1	elete	Alarm if no input	Chan.	Unit	Min Phys.	Max Phys.	Min Val.	Max Val.

In the drop-down list, which will open up, select the device included in WAGO module.

- ATTENTION! -

The first unit to be adjusted is the one, which is located next to 750-314 "Main Module" on the DIN rail.

🕕 System Configura	ation Utility							_O×
	Network settin	gs General NMEA Input Ti	Ship settings Ch. rack Control Speer -	art collections d Maneuvering	Fallback Tracks	NMEA In NMEA Cust	put filter N om WAGO	IMEA Output NavTex
INS	Sensor WA	GO_ADC1						
A	WAGO modules	Туре			Descriptio	n		
Workstation	1 7	50-476	2 Channel Analog Inp	uts Module (-10,	(+10 V)			
Sensors								
Radar								
	New	Delete						
Security	WAGO module	parameters						
1	Name WAGO_A	DC1 Alm type Al ALM 🔽	arm if no input Chan.	Unit 1.00000	Min Phys.	Max Phys. 0.000	Min Val. 0.000	Max Val. 0.000
12								
Commissioning Table								
	New	Delete						
	. <u></u>							
Backup					0	к	Apply	Cancel

In WAGO module parameters group, press New button to adjust parameters supplied by the installed unit:

Use the Name column to enter the parameter name:

System Configura	ation Utility
	Network settings General Ship settings Chart collections Fallback NMEA Input filter NMEA Output ARPA Dutput NMEA Input Tracks Control Speed Maneuvering Tracks NMEA Custom WAGO NavTex
INS	Sensor WAGO_ADC1
5 M	WAGD modules
Workstation	Two Type Description 1 750-476 2 Channel Analog Inputs Module (-10/+10 V)
Control of the second	
Sensors	
\$	
Radar	
R	New Delete
Security	WAGD module parameters
C 1.	Name WAGO_ADC1 Alm type Alarm if no input Chan. Unit Min Phys. Max Phys. Min Val. Max Val. Rudder_Angle ALM ▼ Rudder_Angle 1 ▼ 1.00000 0.000 0.000 0.000 0.000
Commissioning Table	
	New Delete
Backup	OK. Apply Cancel

In the Alarm if no input column, after the input of the parameter name, the screen displays automatically the name of the alarm (warning) which will be shown in the NS 4000 in the absence of a signal at the WAGO module input. Edit the alarm (warning) name as required.

From the drop-dawn list in Alm type column, select the type of an alarm generated by the absence of a signal at the WAGO module input:

- None no alarm;
- ALM an alarm is triggered off;
- WRN a warning is triggered off.

🖟 System Configur	ation Utility	×
INS	Network settings General Ship settings Chart collection ARPA Dutput NMEA Input Track Control Speed Maneuver Sensor WAGO_ADC1 Y	ns Failback NMEA Input filter NMEA Output ing Tracks NMEA Custom WAGO NavTex
Workstation	WAG0 modules NN Type 1 750-476 2 Channel Analog Inputs Module	Description (-10/+10 V)
Sensors		
Radar		
Security	New Delete	
1010000	Name WAGO_ADC1 Alm type Alarm if no input Chan. Unit	Min Phys. Max Phys. Min Val. Max Val.
Commissioning Table	Rudder_Angle ALM Rudder_Angle 1 1 1.00000	0.000 0.000 0.000 0.000
	New Delete	
Backup		OK Apply Cancel

From drop-dawn list in **Channel** column, select the channel of the WAGO unit, which the parameter is supplied by:

🕕 System Configura	ation Utility								_101×
	Network settings ARPA Output NME	General A Input	Ship settings Track Control	Cha Speed	rt collections Maneuvering	Fallback Tracks	NMEA Ir NMEA Cust	put filter om WAG1	NMEA Output
INS	Sensor WAGO_ADC1		÷						
AL	WAGO modules	уре				Descriptio	n		
Workstation	1 750-476		2 Channel An	alog Inp	uts Module (-10	l/+10 V)			
Sensors									
Radar									
Q	New De	ete							
創2	WAGO module paramete	I\$							
Security	Name WAGO_ADC1	Alm type	Alarm if no input	Chan.	Unit	Min Phys.	Max Phys.	Min Val.	Max Val.
144.7974	Rudder_Angle	ALM 💌	Rudder_Angle	1 💌	1.00000	0.000	0.000	0.000	0.000
B				1 2					
Commissioning Table									
	New De	lete							
Backup						0	K	Apply	Cancel

In Unit column, set translation coefficient ("1" by default).

In Min Phys. column, set the minimum, and in Max Phys. column, set the maximum physical value (of current, voltage, etc.), which is supplied to the ADC and corresponds to the maximum and minimum parameter value.

- ATTENTION! -

In Min Phys. and Max Phys. columns, the voltage value is required to be set in millivolts (10 V are specified as 10000), whereas the current value should be specified in microamperes (for 4 mA 4000 is specified).

🖟 System Configura	ation Utility						_O×
	Network settings ARPA Output NME	General Ship settin A Input Track Contro	gs Chart col I Speed Mar	ections Fallback euvering Tracks	NMEA Ir NMEA Cust	iput filter om WAGI	NMEA Output
Workstation	WAGO modules NN T 1 750-476	ype 2 Channe	l Analog Inputs M	Descripti odule (-10/+10 V)	n		
Sensors							
Radar							
Security	New Del	lete		T	1		
	Name WAGO_ADC1 Rudder_Angle	Alm type Alarm if no in ALM Rudder_Angl	put Chan. e 1 <u>¥</u> 1.00	Unit Min Phys. 000 -10000.000	Max Phys.	Min Val. 0.000	Max Val. 0.000
Commissioning Table							
	New De	lete					
Backup					ж	Apply	Cancel

In Min Val. column, set the minimum, and in Max Val. column, set the maximum value of the associated parameter:

🖟 System Configu	ation Utility								
	Network settings ARPA Output NME Sensor WAGO_ADC	General A Input	Ship settings Track Control	Cha Speed	rt collections Maneuvering	Fallback Tracks	NMEA Ir NMEA Cust	iput filter om WAGC	NMEA Output
Workstation	WAGD modules NN 1 1 750-476	Гуре	2 Channel An	alog Inp	uts Module (-10	Descriptio)/+10 V)	n	_	
Sensors									
Radar									
S	New De	lete rs							
Security	Name WAGO_ADC1	Alm type	Alarm if no input	Chan.	Unit	Min Phys.	Max Phys.	Min Val.	Max Val.
Commissioning Table	New De	slete	Kuuuer_Angle	1 _	1.00000	10000,000	10000.000	1-331000	33,000
Backup						0		Apply	Cancel

Another parameter can be set for other ADC channel. By using New button in WAGO module parameters window, specify all the parameters, which received via this WAGO module.

By using New button in WAGO modules window, specify all the units, which WAGO Conning Box consists of.

- ATTENTION! -

Adjustment of WAGO CB units should be performed in the order of their positions on the DIN rail from 750-314 "Main Module".

Press "OK" button to save the settings you have made, and exit from the System Configuration utility.

Connection of External MOB Button

- 1. Press the Sensors button. The drop-down Workstation list specifies the name of the workstation which the external MOB button will be connected to.
- 2. Open "Sensors" page.

TNIC	Sensors DCU set	ttings													
- 140	Sensor	Alias	Port		Workstation	Chi SL	eck Jm	Baudrate		Bits		Parity		Stop bits	P ti
主領	POS1	•	COM1	•	•	ON	•	4800	-	8	- No	ne j	• 1		T
73.4	POS2	•	COM2	•	•	ON	-	4800	•	в	No	ne 🛓	• 1		T
orkstation	LOG1	•	COM3	-		ON	•	4800	-	в	 No 	ne	• 1		T
Sinacación	LOG2	-	COM4	-	-	ON	-	4800	•	в]	No	ne 🛓	• 1	•	T
	DLOG1	*	COM5	-		ON	•	4800	-	в	No	ne 🛓	• 1		T
\sim	GYRO1		COM6	-	-	ON	-	4800	-	в	No	ne	• 1	-	T
Children	GYRO2	-	COM7	-	-	ON	-	4800	•	8	No	ne	• 1	-	T
Sensors	MAGN	•	COM8	-	¥	ON	-	4800	•	в	No	ne 🛓	• 1		T
	AIS	-	COM9	-	-	ON	-	4800	-	в	- No	ne	• 1		T
~	NAVTEX	•	COM10	-	-	ON	-	4800	•	в]	- No	ne 🛓	• 1	•	T
and the second	WIND	-	COM11	-	-	ON	-	4800	-	в	No	ne	• 1	•	T
Ц	TEMP		COM13	-		ON	-	4800	-	в	No	ne	• 1		T
Radar	SOUNDER1	-	COM13	-	-	ON	-	4800	-	в	No	ne	• 1	•	T
	RHOTHETA	*	COM14	-	•	ON	-	4800	•	в	• No	ne	• 1	-	T
(P)	SEETRAC	•	COM15	-		ON	-	4800	-	в	- No	ne	• 1	-	T
9	ARPA_OUTPUT1	•	COM18	-		1		4800	•	8	- No	ne	• 1		T
ିଆ ଏ	TCS	•	COM1	-		ON	•	4800	-	в	- No	ne	• 1	•	T
5ecurity				127				07							
B															
nmissioning Table															
	Sensors Accurac	y					DCL	J Disconnec	ted				Re	move :	5en
	Log Accuracy Gyro Accuracy	2 % 1 °													

INS	Sensor	Alias	Port		Workstation	Ch	eck m	Baudra	ate	BI	ts	Pari	:y	Stop bits	
1.15	POST	*I	COM1	-	•	ON		4800	-	8	•	None	-	1 -	
2	POS2	*	COM2	-		ON	-	4800	-	8	•	None		1	'n
	LOG1	-	COM3	-	•	ON	-	4800	-	8	-	None	-	1 -	ĩ
rkstation	LOG2	•	COM4	-	¥	ON	-	4800	-	8	-	None	-	1	ÌT.
	DLOG1	*	COM5	-	-	ON	•	4800	•	8	-	None	-	1 -	ĩ
~	GYRO1	•	COM6	-	•	ON	-	4800	-	8	•	None	-	1 🔻	Ē
CHARME	GYRO2	•	COM7	-	¥	ON	•	4800		8	•	None	-	1 🔻	Ē
ensors	MAGN	*	COM8		-	ON	-	4800	-	8	•	None	-	1	T
0113013	AIS	•	COM9	-	•	ON	-	4800	-	8	•	None	-	1 🔻	ĩ
~~~~	NAVTEX	*	COM10	-	-	ON	-	4800	-	8	-	None	-	1 🔻	ſ
and the second	WIND	•	COM11	-	•	ON	•	4800	•	8	•	None	-	1 💌	ſ
Ш	TEMP	-	COM13	-	~	ON	-	4800	-	8	•	None	•	1 💌	ſ
Radar	SOUNDER1	<b>•</b>	COM13	-	-	ON	-	4800	•	8	-	None	•	1	ſ
	RHOTHETA		COM14	-	•	ON	•	4800	-	8	•	None		1	
æ	SEETRAC	-	COM15	-	-	ON	-	4800	-	8	•	None	-	1 💌	ſ
5	ARPA_OUTPUT1	•	COM18	-	•			4800	•	8	•	None	•	1	
(H) -	TCS	*	COM1	•		ON	•	4800	٠	8	•	None	•	1 💌	
iecurity	WAGO_ADC1	•	COM1		•			9600	•	8	•	None	•	1	
Dissioning Table	- Sensors Accurac Log Accuracy Gyro Accuracy	y 2 % 1 °		1			DCL	J Disconr	ecte	<u>.</u>				<u>R</u> emove	Sei

- Select WAGO ADC sensor from the drop-down list in the column Sensor:

- In the column Port, select from drop-down list the required COM-port of the Workstation computer, which this sensor is physically connected to;
- In the Check sum column, if required disable the checksum by selected "OFF" from drop-down list;
- Specify in the drop-down list the following COM port parameters:

Baud Rate: 9600; Data Bits: 8; Parity: None; Stop Bits: 1.

- Press "Apply" button.
- 3. Press INS button and switch to "WAGO" page.
  - In WAGO modules group, press New button. Position the cursor on a cell in Type column and double click the left trackball/mouse button. Select "750-403 Digital Inputs Module":

🖟 System Configura	stion Utility
	Network settings         General         Ship settings         Chart collections         Fallback         NMEA Input filter         NMEA Output           ARPA Output         NMEA Input         Track Control         Speed Maneuvering         Tracks         NMEA Custom         WAGO         NavTex
INS	Sensor WAGQ_ADC1
* 19	WAGD modules
2010	NN Type Description
Workstation	1 750-468 T Chamee Analog Inputs module (0-10 V) 750-468 750-454 750-454 750-454
Sarah	750-403
Sensors	
Radar	
1	
創め	New Delete
Security	WAGO module parameters
	Name WAGO_ADC1 Alm type Alarm if no input Chan. Unit Min Phys. Max Phys. Min Val. Max Val.
1	
Commissioning Table	
	New Delete
Backup	OK Apply Cancel

 In the WAGO module parameters group, press the New button. Use the Name column to enter the parameter name. It is exactly the following "MOB_ON_CONTACT" name which should be entered:

🖟 System Configur	ation Utility				_ <b>_ _ _ _</b>
	Network settin ARPA Output	gs   General     NMEA Input   ⁻	Ship settings   Chart o Track Control   Speed M	collections   Fallback   NMEA.In aneuvering   Tracks   NMEA.Cust	put filter NMEA Output   om WAGO NavTex
INS	Sensor W/AI	10_ADC1	2		
Workstation	WAGO modules	Type	Digital Inputs Module	Description	
Sensors					
1					
Radar					
S.	I New	Delete			
Security	WAGO module	parameters			
-	Name	WAGO_ADC1	Alm type	Alarm if no input	Chan.
	mob_on_con	ACT	ALM	NOB_ON_CONTACT: No data	1
Commissioning Table					
	New	Delete			
		10 <b>7</b>			
Backup				ОК	Apply Cancel

 From the drop-down list in the Channel column select the channel of the WAGO unit which the external MOB button is connected to:

🖟 System Configur	ation Utility				×
	Network setti ARPA Output	ngs   General     NMEA Input   1	Ship settings   Chart co Frack Control   Speed Ma	ollections Fallback NMEA neuvering Tracks NMEA C	A Input filter NMEA Output   iustom WAGO NavTex
INS	Sensor 📈	GO_ADC1	-		
	WAGO module	s			
24	NN	Туре	Diaital Iopute Medula	Description	
Workstation		50-403	Digical Inputs Module		
223					
and a lot					
Sensors					
Radar					
	New	Delete			
Security	WAG0 module	parameters			
2000 Carlos Carlos	Name	WAGO_ADC1	Alm type	Alarm if no input	Chan.
P	MOB_ON_CON	FACT	ALM	MOB_ON_CONTACT: no data	
Commissioning					3
Table					4 ···
	1				
	New	Delete			
Backup				OK .	Apply Cancel

4. Press "OK" button to save the settings you have made, and exit from the System Configuration utility.

## ADJUSTMENT OF NS 4000 OPERATION WITH NMEA CUSTOM

Run the System Configuration utility by selecting the appropriate item in the START menu (START\PROGRAMS\MULTIFUNCTIONAL DISPLAY\SYSTEM CONFIGURATION):



Press INS button and switch to "NMEA Custom" page. This page is intended for creating and editing the database of user sentences supplied to the NS 4000 input. Configuration of NMEA Custom sensor connection to the NS 4000 ports is performed on the page "Sensors" of the panel "Sensors" (see **Chapter 2**, section **NS 4000 Configuration**, paragraph **Sensors Settings**). If NMEA Custom sensor is not connected, the page will be blank:

System Configur	ation Utility
	Network settings General Ship settings Chart collections Fallback NMEA Input filter NMEA Output     APPA Dutput NMEA Loguk Track Control Speed Maneuvering Tracks NMEA Custom WAGD NavTex
INS	Sensor NMEA_CUSTOM1
× 19	Messages and parameters
1240	Sentence Parameters
Workstation	
Constan	
bensors	
~	
Li Radar	
R	
Security	
B	
Commissioning Table	
1.0010	Selected message
	New Edit Delete Parameters
Backup	OK Apply Cancel

## General

#### **Sentence Structure**

A special Sentence Editor is used for the aforementioned purposes. The Editor contains the database of like NMEA sentences, which are processed by the NS 4000.

When creating or editing sentences, the user specifies to the NS 4000 the rules which this sentence will be processed by.

Sentence header Start symbol C \$ C 1 C Other \$	Talker	Sentence structure Number of Fields	
			( <del>11</del>

The first step in the setting of parameter extraction rules is the determining of the structure of a sentence containing parameters. Press New button.

While creating the sentence structure, the user sets the criterion for checking the correctness of the sentence, which is being received. If at least one of the characteristics of a newly created sentence does not correspond to the characteristics of the sentence, which is being received, it will be ignored. The sentence has the following characteristics:

- Start Symbol sentence start symbol;
- Talker information source identifier. If the identifier is specified, only those sentences, which have the set identifier, will be processed. The rest of the sentences, even if they have the same structure, will be ignored. If a identifier isn't specified, all the sentences which have this structure, will be processed regardless of the information source identifier;
- Name sentence identifier. If the identifiers of the sentence which is being received and which is being created do no match, they will be ignored;
- Number of fields number of fields in the sentence. Where the number of fields in a received sentence does not correspond to the value set by the user, the sentence will be ignored;
- Checksum a mandatory validity check performed on the data contained in the sentences, calculated by the external device, appended to the message, then re-calculated by the NS 4000 for comparison to determine if the message was received correctly. If these checksums do no match, the sentence will be ignored.

Set several fields and press the "Next >" button. An example of creating a custom NMEA will be provided in the next paragraph:

essage <b>MWV ,</b> ,	<b>*</b> hh				
MWV, <b></b> ,	*hh				
ield properties					
Number 1	Type Empty	Value	Unit	Status	Reference
- Field type properties-	242	17 - 13 	· · · · · · · · · · · · · · · · · · ·	<i>u</i> .	AL
risis (po properties					
		[r	Back	Πŀ	Canool

The next step is to determine the structure of sentence fields. Each field in a sentence can contain the following characteristics:

- Value parameter value;
- Unit parameter measurement units;
- Status parameter status;
- Reference parameter reference;
- Empty field.

By default, fields in the sentence structure are empty, which corresponds to the pressed **Empty** button.

To determine which parameter characteristics the selected field contains (value, measurement units, status or reference), position the cursor on the necessary field and press the appropriate button.

#### **Parameter Value**

Parameters may have digital and symbol values, which may be of constant or variable length; this is why it is necessary to determine the format of the field containing the parameter value. These settings are made at the fields' structure formation stage.

Number 1	Туре	Empty	Value	Unit	Status	Reference
- Field type proper	ties	-				
Value type	Normal		-			
_ Normal field-	Normal String					
Strong	format 1	-				
C Free-tu	pe format					

Field formats are provided in the table below:

Format type	Format	Notation in the sentence structure	Field description
Normal	Free-type Format	х.х	Fields of variable length containing integers or numbers with floating point
Normal	Strong Format	x	Fixed length field containing the number of digits as determined by the user
String	Text	с— —с	Variable length field containing any permitted characters
			Empty field

#### **Parameter Measurement Units**

The parameter has the measurement units determined by the measurement unit identifier, which arrives in a separate field of the same sentence as the parameter itself. It is necessary to specify all the possible identifier values, which may arrive in this field. Appropriate measurement units will be selected according to this identifier. These settings are made at the field structure formation stage.

ield propertie	s	Finel	[ v.i	11-3	Chalan	1
Number	4 Type	Empty	Value	Unit	Status	Heference
Field type p	properties					
Symbol	MultiUnit		Add			
К	3.6					
м	1.0000	1	Remove			
N	1.9438					

Factors for re-calculating all the measurement units to the system which the NS 4000 operates with are specified separately in MultiUnit column.

#### **Parameter Status**

The parameter may have a status, which determines its reliability. The status always has two values: Valid/Invalid. The user determines characters, which may arrive in Status field, at the field structure formation stage.

eld properties					
Number 5	Type Empty	Value	Unit	Status	Reference
Field type proper	ties			*	19. 
Symbol	Comments				
	Yes, data valid				
	res, uata valiu				
V [	No, data invalid				

#### **Parameter Reference**

The parameter may have an additional characteristic: a reference, which may be of two types:

• Parametric, which differs the parameter from other parameters, whose value arrives in the same sentence field. E.g. in MWV sentence, the reference indicates theoretical or relative wind is specified in the given sentence.

ield propertie	s						
Number	2	Туре	Empty	Value	Unit	Status	Reference
- Field type (	properties-					10	
Туре	Para	meter 4	C Sign				
	Ten	de .		· · · · 1			
R	167			Mdu			
				Remove			

 Sign, which allows a positive or negative value to be assigned to the parameter and then taken into account in the further processing. This reference always has two values only. E.g. it is used in GLL for the ship coordinates ("+" – North, "-" – South) or XTD to specify the direction ("+" – starboard, "-" – port).

atus Reference

Characters, which may arrive in **Reference** field, are determined by the user at the field structure formation stage.

#### **Empty Fields**

An empty field (Empty button is pressed) is not processed by NS 4000.

## **Creating New Sentences Structure**

As an example, we will consider an algorithm for retrieving parameters from the NMEA MWV sentence, which can be used in much the same way for retrieving parameters from any customised NMEA like sentence.

In	"NMEA	Custom"	window	press	New	button:
----	-------	---------	--------	-------	-----	---------

s,≢hh		
Sentence header Start symbol Start symbol St	Taiker   Name	Sentence structure Number of Fields 1
<u> </u>		

In "Sentence header and structure" window, which will open up, in **Start Symbol** group set the necessary start symbol by choosing the appropriate option button. E.g. for MWV sentence, select "\$":

Start symbol	
• • •	
C I	
C Other	\$
C Other	_ <b>]</b> \$

In Talker box set the identifier of the device, which the sentence is supplied by; to do this, enter it in block letters in Manual input box. The number of entered identifier characters should be two. E.g. for MWV sentence which is supplied by the wind sensor imitator, the identifier will be "TE". Use Name text box to enter the sentence identifier. The number of entered sentence identifier characters should be three:

Talker	TE
Name	MWV

Use Number of Fields text box to enter the number of fields in the sentence, which is being created. E.g. for MWV sentence, it is 5. If necessary, check Check Sum checkbox for checksums comparison:

Number of Fields	Ξ	
CheckSum	2	-

The formed sentence structure will be displayed in the information line in the top part of "Sentence header and structure" window:

Sentence header	, <b>≇hh</b> Talker TE Name MWV	Sentence structure Number of Fields	
		Next>>	Canc

#### Press "Next >" button.

Specify the fields, which will contain parameter characteristics. E.g. for MWV sentence, position the cursor on the first field containing the parameter value, and press Value button:

e	value _	Unit	Status	Reference
	[			
	T.			
1 -				
1				
	<u> </u>	Ţ	1	

Specify the format type for the field describing the parameter value. To do this, select the required value from the drop-down list. E.g. "Normal" for the given value of a MWV sentence parameter:

Value type	Normal 💌
-Normal field	Normal String
<ul> <li>Strong for</li> </ul>	rmat 1
C Free-type	format

For Normal field type, set the format by selecting the appropriate option button in Normal Field group. E.g. for "Wind Angle" parameter of MWV sentence, set Free-Type Format. This will be a variable length field containing integers or numbers with floating point. If Strong Format is set, the field will have a fixed value and contain numbers with a set number of digits:

	-	
C Strong format	1	-
<ul> <li>Free-type format</li> </ul>		

Use a similar procedure to specify fields containing values of other parameters, e.g. the third field for MWV sentence.

Position the cursor on the field containing the parameter measurement units (e.g. wind speed measurement units in MWV sentence) and press Unit button:

e propertie	lype s	Empty	Value	Unit	Status	I Beterence
e propertie	s					
ol	MultiUnit		Add			
		F	lemove			
		n Placonc		Remove	Remove	Remove

Press Add button. Position the cursor on a cell in Symbol column and double click the left trackball/mouse button. Enter the measurement unit symbol and press <Enter>. In MultiUnit column, enter the coefficients for re-calculating the measurement units to the system which the NS 4000 operates corresponding to the unit symbol, and press <Enter>.

Use Add button to enter all the possible measurement units for the given parameter:



Position the cursor on the field containing the parameter status, and press Status button:

Number 5	Type Empty	Value	Unit	Status	Reference
- Field type propert	ies			h	
Sumbol	Comments				
	Yes, data valid				
V F	No, data invalid				

Set the symbols corresponding to reliable and unreliable data in **Symbol** column. As the set symbols are received, the NS 4000 as valid or invalid will assess the edited parameter.

Position the cursor on the field containing the parameter reference (e.g. the second field in MWV sentence) and press **Reference** button:

ntence fields description					
/lessage					
ŞTEMWV,x.x, <mark>B</mark> ,x.x,K	.A <b>≭h</b> h				
Field properties					
Number 2 Type	Empty	Value	Unit	Status	Reference
Field type properties		9			
Type C Parameter	• Sign				
Positive (+)					
New York					
Negative (-)					
					-

In Type line, select the reference type (for MWV sentence – "Parameter").

Press Add button. Position the cursor on **Symbol** column cell and double click the left trackball/mouse button. Enter the reference symbol and press <Enter> key.

Use Add button to enter all the possible reference symbols for the given sentence:

Text	Add
R T	Remove

Formation of the sentence structure is completed. Press "OK" button.

System Configura	ation Utility
	Network settings         General         Ship settings         Chart collections         Fallback         NMEA Input filter         NMEA Output           ARPA Output         NMEA Input         Track Control         Speed Maneuvering         Tracks         NMEA Custom         WAGD         NavTex           Sensor         NMEA CUSTOM1         Y         Image: Sensor         NMEA CUSTOM1         Y
Wedetation	Messages and parameters Sentence Parameters MWV
workstation	
Sensors	
Radar	
Security	
Commissioning Table	
	Selected message SMWV,x.x,R,x.x,K,A*hh
Backup	Cancel

In Messages and parameters group the entered sentence will be added in the top part in "Sentence" column:

It is then necessary to set rules for the extraction of parameters from the sentence which you are editing.

## **Defining Parameter Extraction Rules**

To define rules for extracting parameters from the sentence, press Parameters button:

MWV,x.	x,R,x.x,K	,A*hh			
	Name	Alarm if no input	Unit type	Status type	Reference

#### **Addition of New Parameters**

The previously set sentence structure is displayed in "Parameters list" cannot be edited at this stage.	window a	and

To add a parameter, which the extraction-from-sentence rules should be defined for, press Add button of "Parameters list" window:

arameter descripti	DN		
Name NMEA	CUSTOM1_		
Message			
\$ <b>MWV,</b> x.x,R	.x.x,K,A*hh		
Value © Talker © Field 0	Units © None C Field 0	Status     None     Field	Reference     O     Field
No data scheme			Reference value
Name			
- Out of range schem		Min 0.0	
Type None Name	•	Max 0.0	
			OkCancel

In Name field, enter the parameter name.

**Note:** There should be no spaces in the parameter name; it is advisable to replace them with underlines. The parameter name cannot be the same as that of indicators on the Navi-Conning 4000.

arameter descriptio	n		
Name NMEA_C	CUSTOM1_ Wind_Angle_	Relative	
Message			
ŞMWV,x.x,R,	x.x,K,A*hh		944 17
Value	- Units	- Status	
<ul> <li>Talker</li> </ul>	None	None	None
C Field	C Field	C Field 0	C Field
			Reference value
No data scheme			
Type Alarm	-		
Name Wind_Ang	le_Relative: no data		
Out of range scheme		Min 0.0	
Type None	•	Max 0.0	
Name Wind_Ang	le_Relative: Out of range		
			Ok Cancel

Position the cursor on the field of the sentence containing the value of the necessary parameter, and press the right trackball/mouse button:

	NMEA_COSTOM1_  Wind_An	gle_Helative	
essage			
MWV,	Set as Value		
/alue • Talke	Set as Status	Status • None	Reference None
C Field	0 C Field 0	C Field 0	C Field
			Reference value
lo data∶ 	scheme		
lype	Alarm		
Name	Wind_Angle_Relative: no data		
Out of ra	ange scheme		
		Min 0.0	
Туре	None	Max Julu	

To set the parameter value, select SET AS VALUE line from the pop-up menu. E.g. for MWV sentence, the first field should contain the value of the wind angle. The field, which you are editing, will be colored in red.

Position the cursor on the field determining the parameter status, and press the right trackball/mouse button:

arameter	r descriptio	n			
Name	NMEA_0	CUSTOM1_ Wind_Ang	le_Relative		
Message					
şmwv,	<b>x.x</b> ,R,	x.x,K,/= Set as Set as	s Value		
Value C Talke	er	Units Set as	s Status s Reference	Reference	
€ Field	1	C Field	C Field 0	C Field 0	
				Reference value	Ŧ
No data	scheme				
Туре	Alarm	•			
Name	Wind_Ang	le_Relative: no data			
- Out of ra	ange scheme		Min 0.0		
Туре	None	•	Max 0.0		
Name	Wind_Ang	le_Relative: Out of rang	je		
					Cancel

To set the parameter status, select SET AS STATUS line from the pop-up menu. The edited field will be coloured in khaki.

Position the cursor on the field determining the parameter reference, and press the right trackball/mouse button:

rameter	descripti	on					
Name	NMEA	_CUSTOM1_ W	/ind_Angle_Re	elative			
Message							
şmwv,	<b>x.x</b> ,F	Set as Value					
Value		Set as Status		-Status		Reference	
C Talke	a T	Set as Refere		C None		None	
🖲 Field	1	C Field	0	🕫 Field	5	C Field	
						Reference valu	e 🗾
No data :	scheme					(a) <del></del>	
Туре	Alarm	•					
Name	Wind_Ar	igle_Relative: no	data				
- Out of ra	nge schem	e		Min 0.	0		
Туре	None	•		Max 0.	0		
Name	Wind_Ar	ngle_Relative: 0	ut of range				
						Ok	Cancel

To set the parameter reference, select SET AS REFERENCE line from the pop-up menu. The edited field will be coloured in dark blue.

Use **Reference Value** input box of **Reference** group to select a reference from the drop-down list corresponding to the parameter, which is being set (see paragraphs **Parameter Reference** and **Creating of New Sentences**). E.g. for "Wind angle, 0 to 359 degrees, Relative" parameter in MWV sentence, this will be "R".

WWV, x.x,	,x.x,K,A*hh		
alue Talker Field 1	C Freid	Status None Field 5	Reference C None C Field 2 Reference value R
o data scheme ype Alarm Name Wind_An	igle_Relative: no data		<del>T</del>
	e	Min 0.0	

If necessary, in the **No data scheme** group use the **Type** drop-down list to select the type of the alarm generated by the absence of the parameter:

- None no alarm;
- ALM an alarm is triggered off;
- WRN a warning is triggered off.

In the Name text box, after the input of the parameter name, the screen displays automatically the name of the alarm (warning) which will be generated in the NS 4000 by the absence of this parameter. Edit the alarm (warning) as required.

Parameter	descriptior	1		
Name [	NMEA_C	USTOM1_ Wind_Ang	Je_Relative	
Massaga				
Message				
ŞM#¥,		x.x,K, <u>M</u> -UU		
⊤ Value —		- Units		Reference
C Talke	er	None	C None	C None
© Field	1	C Field 0	Field 5	Field 2
55 100210	1			
				Reference value R
– No data :	scheme	1		
Туре	Alarm	-		
100000	None			
Name	Alarm Warning	re: no data		
- Out of ra	nae scheme-			-
			Min 0.0	
Туре	None	•	Max 0.0	
Name	Wind Ang	le_Relative: Out of ran	ge	
	1			
				Ok Cancel

If necessary, in the **Out of range scheme** group use the **Type** drop-dawn list to select the type of an alarm generated by the parameter exceeding the set values:

- None no alarm;
- ALM an alarm is triggered off;
- WRN a warning is triggered off.

In the Name text box, after the input of the parameter name, the screen displays automatically the name of the alarm (warning), which will be generated in the NS 4000 if the parameter exceeds the set values. Edit the alarm (warning) as required.

Name NME	A_CUSTOM1_ Wind_Ar	gle_Relative	
lessage			
MWV, x.x.	,x.x,K,A*hh		
Value C Talker © Field 1	Units None Field	C None	© None
No data scheme - Tupe Alarm			Reference value R
Name Wind_	Angle_Relative: no data		]
Out of range sche	me	Min 0.0	]
Type Alarm Name Alarm Warn	re: Out of rai	max  0.0	
	- KS		Ok Cancel

In the Min. and Max. input boxes set the minimum and maximum parameter values. When these are exceeded, an alarm will be generated.

<b></b>				
K				
	A≢hh			
		Status	Reference	
Non	e (	C None	C None	
C Field	0	Field 5	C Field 2	
			Reference value	R
L				
arm 💌				
ind_Angle_Relative:	no data			
scheme				
larm 💌	1	Max 360.0		
/ind_Angle_Relative:	Out of range			
	I Units Noni Field me Iarm Scheme Iarm Vind_Angle_Relative:	I Units None	I Units Status None None None Field 5	Units Status   None None   Field Field   Field Field   Reference value     me   arm   ind_Angle_Relative: no data     Min   0.0   Max   360.0

Press "OK" button.

Name	Alarm if no input	Unit type	Status type	Reference
IEA_CUSTOM1_Wind_Angl	e [ALM] Wind_Angle_Relat		Field 5	R

"Parameters list" window will open up. Input of rule for the extraction of a sentence parameter is completed. The parameter is added to the table.

Enter the rules of retrieving the next sentence parameter, e.g. "Wind Speed Relative", which contains measurement units. To do this, press **Add** button:

arameter descripti	on		
Name NMEA	_CUSTOM1_		
Message			
\$ <b>TE</b> MWV,x.x	,R,x.x,K,A*h	h	
Value Talker Field 0	Units © None © Field 0	Status © None © Field 0	Reference © None © Field 0
1.20 M. 10			Reference value
-No data scheme Type Alarm	•		
Name			
- Out of range schem	e	Min 0.0	_
Type None	<b>•</b>	Max 0.0	
Name			
1			Ok Cancel

In Name field, enter the parameter name.

**Note:** There should be no spaces in the parameter name, it is advisable to replace them with underlines. The parameter name cannot be the same as that of indicators on the Navi-Conning 4000.

nameter descripti Name NMEA	on _CUSTOM1_ Wind_Spe	ed_Relative	
Message			
Ş <b>TE</b> MWV,x.x	,R,x.x,K,A*h	h	
Value Talker C Field 0	C Field	Status © None © Field 0	Reference © None © Field 0 Reference value
No data scheme Type Alarm			
Name  Wind_Sp Out of range schem	eed_Relative: no data	Min 0.0	]
Type None Name Wind_Sp	Deed_Relative: Out of rar	Max 0.0	

Position the cursor on the field of the sentence containing the value of the necessary parameter, and press the right trackball/mouse button:

arameter	r description	ı			
Name	NMEA_C	CUSTOM1_ Wind_Spee	d_Relative		
Message					
S <b>TEMW</b> Value © Talke	W,x.x,	R x Set as Value Set as Value Set as Unit Set as Status Set as Refere	atus	Reference	
C Field	0	C Field	C Field 0	C Field 0	¥
No data	scheme				
Туре	Alarm	-			
Name	Wind_Spe	ed_Relative: no data			
Out of ra	ange scheme		Min 0.0		
Туре	None	•	Max 0.0		
Name	Wind_Spe	ed_Relative: Out of rang	je		
				Ok Canc	el

To set the parameter value, select SET AS VALUE line from the pop-up menu. E.g. for MWV sentence, the first third should contain the value of the wind speed. The field, which you are editing, will be colored in red. Position the cursor on the field determining the parameter units, and press the right trackball/mouse button:

arameter descrip	tion			
Name NME	A_CUSTOM1_ Wind_Speed	_Relative		
Message				
STEMWV,x.:	x,R,x.x,F Set as V	alue		
-Value	Units Units Set as D	nit tatus R	Reference	
Field 3	C Field	C Field 0	C Field 0	
			Reference value	
No data scheme -	], [			
Type Alarm	<b>X</b>			
Name Wind_	Speed_Relative: no data		]	
- Out of range sche	me	Min 0.0		
Type None	<b>_</b>	Max 0.0		
Name Wind_	Speed_Relative: Out of range		]	
				Cancel

To set the parameter measurement units, select SET AS UNITS line from the pop-up menu. The edited field will be coloured in green.

Position the cursor on the field determining the parameter status, and press the right trackball/mouse button:

arameter descriptio	n		
Name NMEA_	CUSTOM1_ Wind_	Speed_Relative	
Message			
ŞTEMWV,x.x,	.R. <b>z.z.K</b> .i	Set as Value Set as Unit	
Value C Talker C Field 3	Units None Field 4	Set as Status Set as Referend None	Reference  None  Field
			Reference value
No data scheme			
Type Alarm	•		
Name Wind_Sp	eed_Relative: no dat	a	
Out of range scheme Type None Name Wind_Sp	eed_Relative: Out of	Min 0.0 Max 0.0	
7			Ok Cancel

To set the parameter status, select SET AS STATUS line from the pop-up menu. The edited field will be coloured in khaki.

If necessary, in the No data scheme and Out of range scheme groups set the type and name of alarms for the parameter in question (see above).

Press "OK" button:

None	Alarm if an innuk	Linik kuno	Chabus kriste	Deference
IMEA CUSTOM1 Wind Angle	[ALM] Wind Angle Relat	Unic type	Field 5	R
IMEA_CUSTOM1_Wind_Spee	[None]	Field 4	Field 5	TX.

"Parameters list" window will open up. Input of rule for the extraction of a sentence parameter is completed. The parameter is added to the table.

Press "OK" button:

🕕 System Configura	tion Utility
	Network settings         General         Ship settings         Chart collections         Fallback         NMEA Input filter         NMEA Output           ARPA Output         NMEA Linput         Track Control         Speed Maneuvering         Tracks         NMEA Custom         WAGD         NavTex
INS	Sensor NMEA_CUSTOM1
1	Messages and parameters
1	Sentence Parameters
Workstation	\$TEMWV NMEA_CUSTOM1_Wind_Angle_Relative, NMEA_CUSTOM1_Wind_Speed_Relative
Sensors	
~	
Radar	
R	
Security	
B	
Commissioning Table	
	Selected message
	\$TEMWV,x.x,R,x.x,K,A*hh
	New Edu Delete Parameters
Backup	OK Apply Cancel

The entered sentence with set parameters is displayed in the table. Input of new sentence and its parameters in the databases is completed.

Press "OK" button to save the entered parameters and the sentence in the appropriate databases, and exit from the System Configuration utility.

#### **Editing of Parameters**

In Messages and parameters group, select a sentence whose parameter is required to be edited, and press Parameters button:

JIEMWV,x.x,R,x.x	,K,A <b></b> ≢hh			
Name	Alarm if no input	Unit type	Status type	Reference
VMEA_CUSTOM1_Wind_Angle	[ALM] Wind_Angle_Relat.		Field 5	R
IMEA_CUSTOM1_Wind_Spee	[None]	Field 4	Field 5	

Use the table to select the parameter required to be edited.

Press Edit button. Edit the parameter characteristics:

arameter descrip	ion		
Name NME/	CUSTOM1_ Wind_And	gle_Relative	
Message			
ŞTEMWV, x. x	, <b>,</b> ,x.x,K,A*h	h	
Value	Units	Status	Reference
C Talker	None	C None	C None
🕫 Field 🛛 1	C Field 0	Field	C Field 2
			Reference value  R
-No data scheme		1.8	
Type Alarm	•		
Name Wind 4	ngle. Belative: no data		-
Hand Lines			
Out of range scher	ne		
		Min -180.0	
Type Warnin	g 🗾	Max 180.0	
Name Wind_4	ngle_Relative: Out of ran	ge	
			Ok Cancel

#### - ATTENTION! -

In the editing mode, it is possible to change parameter characteristics within the framework of the existing sentence structure. For the editing of the sentence structure, see the next paragraph.

Press "OK" button:

	Name	Alarm if no input	Linit type	Status type	Reference
MEA CUSTO	M1 Wind Anale	[ALM] Wind Angle Relat.	Onecype	Field 5	R
MEA_CUSTO	M1_Wind_Spee	[None]	Field 4	Field 5	

"Parameters list" window will open up. Input of rule for the extraction of a sentence parameter is completed. The parameter is added to the table.



}]} System Configura	ation Utility	×
	Network settings         General         Ship settings         Chart collections         Fallback         NMEA Input filter         NMEA Dutput           ARPA Output         NMEA Input         Track Control         Speed Maneuvering         Tracks         NMEA Custom         WAGO         NavTex	
INS	Sensor NMEA_CUSTOM1	
. 10	Messages and parameters	
44	Sentence Parameters	
Workstation	\$TEMWV NMEA_CUSTOM1_Wind_Angle_Relative, NMEA_CUSTOM1_Wind_Speed_Relative	
Conside .		
Sensors		
Radar		
<b>A</b>		
Security		
Jecuity		
Th		
<b>1</b>		
Commissioning Table	I	
	Selected message	
	<b>ΊΙΜΠΥ,Χ.Χ,Κ,Χ.Χ,Κ,Α*</b> ΠΠ	
	New Edit Delete Parameters	
Backup	OK Apply Cancel	
		1//

The entered sentence with set parameters is displayed in the table. Input of new sentence and its parameters in the databases is completed.
Press "OK" button to save the entered parameters and the sentence in the appropriate databases and exit from the System Configuration utility.

#### **Parameters Deletion**

In Messages and parameters group, select a sentence whose parameter is required to be edited, and press Parameters button:

JIEMWV,x.x,R,x	.x,K,A≢hh			
Name	Alarm if no input	Unit type	Status type	Reference
IMEA_CUSTOM1_Wind_Ang	le [ALM] Wind_Angle_Relat		Field 5	R
IMEA_CUSTOM1_Wind_Spe	e [None]	Field 4	Field 5	

Use the table to select the parameter required to be edited.

Press Delete button:

EA_CUSTOM1_Wind_Spee [None] Field 4 Field 5

The parameter will be deleted from the table.

Press "OK" button.

;]} System Configura	tion Utility
	Network settings         General         Ship settings         Chart collections         Fallback         NMEA Input filter         NMEA Output           ARPA Output         NMEA Input         Track Control         Speed Maneuvering         Tracks         NMEA Custom         WAGO         NavTex
INS	Sensor NMEA_CUSTOM1
1	Messages and parameters Septence Parameters
Workstation	\$TEMWV NMEA_CUSTOM1_Wind_Speed_Relative
Course	
Sensors	
~	
Radar	
R	
Security	
B	
Commissioning Table	
	Selected message
	\$TEMWV,x.x,R,x.x,K,A*hh
	New Edit Delete Parameters
Backup	OK Apply Cancel

The entered sentence with set parameters is displayed in the table. Input of new sentence and its parameters in the databases is completed.

Press "OK" button to save the entered parameters and the sentence in the appropriate databases, and exit from the System Configuration utility.

### **Editing Sentence Structure**

In Messages and parameters group, select a sentence whose structure is required to be edited. Press Edit button:

TEMWV,x.x,R,x.	x,K,A*hh	
Sentence header Start symbol C 1 C Other	Talker TE Name MMM	Sentence structure Number of Fields 5
		Next >> Cance

In "Sentence header and structure" window, you can change start symbol, talker, sentence name, number of fields and leave or remove checksum. Press "Next" button:

Field properties						
Number 1	Type	Empty V	alue	Unit	Status	Reference
- Field type properti	38					
Value type	Normal	•				
Normal field		¥				
C Strong f	ormat 0	*				
Free-typ	e format					

In "Sentence fields description" window, you can change the order of sentence fields and edit their structure by using Value, Unit, Status, or Reference buttons. You may leave the field empty as required by pressing Empty button.

Press "OK" button:

🖟 System Configura	ation Utility
	Network settings         General         Ship settings         Chart collections         Fallback         NMEA Input filter         NMEA Output           ARPA Output         NMEA Input         Track Control         Speed Maneuvering         Tracks         NMEA Custom         WAGO         NavTex           Sensor         NMEA_CUSTOM1         Y         Y         Y         Y
Workstation	Messages and parameters           Sentence         Parameters           \$TEMWV         NMEA_CUSTOM1_Wind_Speed_Relative
Sensors	
P	
Radar	
Security	
Commissioning Table	Selected message STEMWV, x. x, R, x. x, K, A≭hh
	New Edit Delete Parameters
Backup	OK Apply Cancel

Set the parameters anew in the edited sentence structure (see the previous paragraph).

Press "OK" button to save the entered parameters and the sentence in the appropriate databases, and exit from the System Configuration utility.

#### **Sentences Deletion**

In Messages and parameters group, select a sentence, which is required to delete:

	Network settings General Ship settings Chart collections Fallback NMEA Input filter NMEA Output
-	ARPA Uutput   NMEA Input   Track Control   Speed Maneuvering   Tracks   NMEA Custom   WAGU   NavTe
INS	Sensor NMEA_CUSTOM1
	Messages and parameters
1	Sentence Parameters
Workstation	\$TEMWV NMEA_CUSTOM1_Wind_Speed_Relative
$\sim$	
Charles.	
Sensors	
Dudes.	
Kadar	
æ.	
10	
Security	
12	
-	
Commissioning Table	
	Selected message
	\$TEMWV,x.x,R,x.x,K,A*hh
	New Edit Delete Parameters

Press Delete button. The sentence will be deleted from the database:

	Network settings Ge	neral Ship settings	Chart collections	Fallback	NMEA Input filte	er   NM	EA Output
		nput   Track Control	Speed Maneuvering	Tracks	NMEA Custom	WAGU	Naviex
	Handle Hamel Coston						
AL	Sentence		Par	ameters			
Workstation							
George							
Sensors							
A la							
Radar							
R							
Security							
B							
mmissioning Table							
	Selected message						
	New Edit.	Delete	Parameters				
Dealers 1						11	92 - 29

Press "OK" button to save the entered parameters and the sentence in the appropriate databases, and exit from the System Configuration utility.

### CHECK OF SETTINGS AND CONNECTION OF PARAMETERS TO NAVI-CONNING

#### - ATTENTION! -

For the parameters (supplied via the WAGO modules or extracted from custom NMEA sentences), set and saved in the System Configuration utility, to be processed in the NS 4000, it is necessary to run the ECDIS task.

Run ECDIS task by selecting the appropriate item in the START menu (START\Programs\Multifunctional Display\Navi-Sailor):



Open "Config" panel by selecting the appropriate line of TASKS LIST menu on the Control panel:



Use the tab in the top part of "Config" panel, which will open up, to switch to "COM trace" page:

General Radar settings T	me Zone License I	Info COM Trace		
Connected sensors: Po	t	Trace:		
NMEA_CUSTOM1	WS2 COM 6	Sensor	Data	
WAGO_ADC1	WS3 COM 7			
		Clear tra	ce Output filter	Record COM trace

To display the traffic between the NS 4000 and NMEA Custom external device, press the button in the **Connected sensors** column:

General Radar settings	Time Zone License In	fo CO	M Trace		
Connected sensors:	Port:	Ti	race:		
NIMEA CUSTOMI	WS2 COM 6		iensor	Data	
INIMEA_COSTONIT	Hot com c		NMEA_CUSTOM1	\$TEMWV,120.00,R,10.00,K,A*1B	
WAGO ADC1	WS3 COM 7		NMEA_CUSTOM1	\$TEMWV,120.00,R,10.00,K,A*1B	
			NMEA_CUSTOM1	\$TEMWV,120.00,R,10.00,K,A*1B	
		<u>_</u>	Clear trace	Input filter     Output filter	Record COM trace

The data flow will be shown in the **Trace** window. If the data is not displayed, it may not be arriving in the NS 4000. This can only be checked on the WS which the NMEA Custom external device is physically connected to. Press the **Record COM** trace button:

COM Trace				*>
Ports list: Map to: COM6 Null	Port Data			
	Clear	Duration (hh:mm:ss): 00:30:00	Start record	Close
			Settings	

In the "COM Trace" window which will open up, in **Ports list** column press the button with name of port, which NMEA Custom external device connected to:

rts list: Map to:	Port	Data	1
	> VRT1	\$TEMWV, 120.00, R, 10.00, K, A*1B	
OM6 Null -	> VRT1	\$TEMWV,120.00,R,10.00,K,A*1B	
	> VRT1	\$TEMWV,120.00,R;10.00,K,A*1B	
	> VRT1	\$TEMWV,120.00,R,10.00,K,A*1B	
	> VRT1	\$TEMWV,120.00,R,10.00,K,A*1B	
	Clear	Duration (thirmm:ss): 00:30:00 Start record	Close
	Ciedi	Startietord	Close
		Settings	1

If the data is supplied to the port but is not processed by the NS 4000, this means that the NMEA Custom sentence or extracted parameters set in the System Configuration utility do not correspond to the received sentence. Check the settings described in the previous chapter. Also check parameters which are supplied via the WAGO modules.

# **ANNEX C**

## **Commissioning Table**

## **PRODUCT INFORMATION**

Product name	
Version	
Build	
License expiration date	
Copy registration number	
Dongle number	

## **NETWORK CONFIGURATION**

Location: System Configuration\INS\Network Settings.

Workstation's name	Role	Priority

## SHIP'S SETTINGS

1. Ship setup (System Configuration\INS\Ship Settings).

Parameter	Value
MMSI	
Call sign	
Name	
IMO No	
Beam Overall	
Length Overall	
Bridge elevation	

2. Equipment layout (System Configuration\INS\Ship Settings).

	X	Y
Conning station		
PS1		
PS2		
DLOG1 head sensor		
DLOG1 stern sensor		
DLOG1 head conning		
DLOG1 stern conning		
External AIS GPS		
AIS Internal GPS		
Radar Master 1		
Radar Master 2		
Radar External 1		

3. Equipment height from keel (System Configuration\INS\Ship Settings).

	Equipment height from keel
Sounder 1	
Sounder 2	

## WORKSTATIONS SETTINGS

Location: System Configuration\Workstation\Sound and Display.

Workstation's name	Alarm sound	Sound source	Display type	Display model	Display size, mm
W01					
W02					
W03					
W04					
W05					

## **CHARTS SETTINGS**

#### **Chart Collections**

Location: System Configuration\INS\Chart Collections.

Chart Collection	Used
Transas	
ENC	
ARCS	

#### Databases

Location: System Configuration\INS\Chart Collections.

Database	Used
Tidal	
Tidal currents	
Surface currents	

## **NMEA OUTPUT**

Location: System Configuration\INS\NMEA output.

Sensor	ZDA	DTM	HDT	DPT	OSD	WPL	RTE	GLL	GLL (precision)	GLL (status)	Checksum
NMEAOUT1											
UPLOAD ROUTE											

## NMEA INPUT

1. NMEA Input.

Location: System Configuration\INS\NMEA input.

DLOG.

Transverse water speed	
Stern transverse water speed	
Stern transverse ground speed	

2. NMEA Input Filter.

Location: System Configuration\INS\NMEA input filter.

Sensor	Alias	Messages					
POS1		DTM=ON	GGA=ON	GLL=ON	RMC=ON	VTG=ON	GBS=ON
POS2		DTM=ON	GGA=ON	GLL=ON	RMC=ON	VTG=ON	GBS=ON
LOG1		VBW=ON	VHW=ON				
LOG2		VBW=ON	VHW=ON				
GYRO1		HDT= N	VHW=ON				
GYRO2		HDT=ON	VHW=ON				
SOUNDER1		DBT=ON	DPT=ON				
SOUNDER2		DBT=ON	DPT=ON				

3. NMEA Input miscelanious.

Location: System Configuration\INS\NMEA input filter.

Talker filter	
Not processed talkers	

## **SENSORS**

Location: System Configuration\Sensors\Sensors.

1. COM ports.

Sensor	Alias	Workstation	Port	Baud rate	Check sum

2. VIRT ports.

Sensor	Alias	Workstation	Port	Check sum

3. DCU ports.

Sensor	Alias	Workstation	Port	Check sum

4. Alarm output settings.

Location: System Configuration\Sensors\Alarm Output Settings.

Workstation	Alarm	Туре			
	name	NMEA alarm WAGO alarm			
			WAGO contact IN	WAGO contact OUT	

5. External alarm WAGO settings.

Location: System Configuration\Sensors\Ext. Alarm WAGO settings.

Work- station	Alarm name	Source	Alarm state IN contact	Alarm ack. IN contact	Alarm sound IN contact	Alarm ack. OUT contact	Alarm sound OUT contact

## TARGET SUBSYSTEM SETTINGS

Location: System Configuration\Sensors\Target Subsystem.

AIS Settings	
UAIS model	
Maximum range, nm	
Always activated	
DR for ais targets	
Minimal SOG to activate DR mode for ais targets, kt	
Rhotheta RT-202 Settings	
Angle correction	
MOB Alert Alarm	
Seetrack Settings	
Seetrack Tracking mode	

## **DCU SETTINGS**

Location: System Configuration\INS\DCU settings.

DCU 1-1 nIP nIP	
DCU 1-2 nIP nIP	

## FALLBACK

Location: System Configuration\INS\Fallback.

Fallback modes	Position ON	Position time, sec	Heading ON	Heading time, sec	Speed ON	Speed time, sec
Integrity check	X	5	X	5	x	5
Sensor failure	X	5	X	5	X	5
Diff mode lost	10					
Automatic restore	х	10	х	10	х	10

## TRACK CONTROL SETTINGS

- 1. Autopilot type: AP3000 Navis.
- 2. Autopilot is connected to the Workstation, port.
- 3. Ship limits and settings.

Location: System Configuration\INS\TrackControl.

Parameter	Light	Loaded
Max Speed		
Max ROT		
F Distance		
Min turn radius		
Altering gain		
Min maneuver speed		
Max rudder angle		
Initial Pos-Track		
Max XTD		
Initial HDG-Track		
Max Course deviation		
Default radius		

## SPEED MANEUVERING SETTINGS

1. Full ship loading.

Location: System Configuration\INS\Speed maneuvering\Ship loading full.

Basic parameters.

Parameter	Value
Max. Speed on FSA, kt	
Max. Speed on FA, kt	
Max. Speed on MA, kt	
Max. Speed on SA, kt	
Time 0 – Max. Speed on FSA, sec	
Time Max. Speed – 0 on FSBW, sec	
Time Max. Speed – 0 on STOP, sec	
Stable Turn Speed 15, kt	
Stable Turn Speed 35, kt	
Conf. Turn Radius 15, nm	
Conf. Turn Radius 35, nm	

Advanced parameters.

Annuniciator state	Acceleration	Slowdown	Max. Speed (kt)	Turn. Speed 15 (kt)	Turn. Speed 35 (kt)
FSBW					
FBW					
MBW					
SBW					
STOP					
SA					
MA					
FA					
FSA					

2. Empty ship loading.

Location: System Configuration\INS\Speed maneuvering\Ship loading empty.

Basic parameters.

Parameter	Value
Max. Speed on FSA, kt	
Max. Speed on FA, kt	
Max. Speed on MA, kt	
Max. Speed on SA, kt	
Time 0 – Max. Speed on FSA, sec	
Time Max. Speed – 0 on FSBW, sec	
Time Max. Speed – 0 on STOP, sec	
Stable Turn Speed 15, kt	
Stable Turn Speed 35, kt	
Conf. Turn Radius 15, nm	
Conf. Turn Radius 35, nm	

#### Advanced parameters.

Annuniciator state	Acceleration	Slowdown	Max. Speed (kt)	Turn. Speed 15 (kt)	Turn. Speed 35 (kt)
FSBW					
FBW					
MBW					
SBW					
STOP					
SA					
MA					
FA					
FSA					

# ANNEX D

## **COM-Ports Interfaces**

#### GENERAL

NS 4000 ECDIS MFD system is equipped with NMEA ports, which are completely corresponding to IEC 61162-1,2 Standard requirements.

The following terms are used in this Annex:

- Talker NMEA port Output, which transmits data to other devices;
- Listener NMEA port Input, which receives data from another device.



Fig. 74. COM-Ports interface diagram

All signal line A connections are connected in parallel with all device A connections, and all signal line B connections are connected in parallel with all device B connections. The shields of all Listener cables should be connected to the talker chassis only and should not be connected at each listener.

The idle, marking, logical 1, OFF or stop bit states are defined by a negative voltage on line A with respect to line B.

The active, spacing, logical 0, ON or start bit states are defined by a positive voltage on line A with respect to line B.

To meet the demand of high reliability in industrial environment and to prevent the boards from damage caused by lighting or high potential voltage, an optical isolation (2 kV DC) is implemented in the Listener's receive circuit.

The Listener's receive circuit is designed for the operation with a minimum differential input voltage of 2,0 V and shall not take more than 2,0 mA from the line at that voltage.

The drawing below shows the connection corresponding to the Talker/Listener Interface.



Fig. 75. Talker/Listener interface diagram

## DCU6 RS422 PORTS SCHEMATIC

Optocoupler Fairchild H11L1 input-output isolation voltage 7500 V minimum.



Fig. 76. DCU6. RS422 ports isolation

## **RS6 COMPUTER RS422 AND ETHERNET PORTS ISOLATION SCHEMATICS**

### RS6 RS422 EBK RS6-IO Schematic



Fig. 77. RS6. RS422 ports isolation drawing

#### RS6 RS422 Ports PCB DRSE-00-0017 Schematic



Fig. 78. RS6. Additional extension board RS422 ports isolation drawing



### **RS6 Ethernet ports LAN1 and LAN2 Schematic**



Fig. 79. RS6. Ethernet ports isolation drawing

# **ANNEX E**

## Upgrade RS3 and RS4 to RS6 Computer

## RS6 COMPUTER WITH DRSE-00-0017 EXTENSION BOARD (ADDITIONAL SERIAL PORTS)

#### General

RS6 computer with additional extension serial board is delivered for upgrade of RS3 and RS4 computers.

The serial extension board has three Dsub connectors (see figure below):

- J3 Dsub-37 connector 2 x NMEA0183, 2 x configured as NMEA0183 or RS232;
- J4 Dsub-37 connector 2 x NMEA0183, 2 x configured as NMEA0183 or RS232;
- J5 Dsub-62 connector 8 x RS232.



Fig. 80. RS6 computer. Extension board's connectors layout

The board is connected inside the RS6 to the motherboard with a 26 pin ribbon cable.

If the ribbon cable is connected to the header J1 marked "168-mode" the J5 is active.

If the ribbon cable is connected to the header J2 marked "114-mode" the J3 and J4 are active.

### **Ports Configuration**

Each configurable port has 4 jumpers to move to change from NMEA0183 to RS232.

000000	RS232
000000	NMEA/RS422

Fig. 81. RS6 computer. Ports RS232/RS422

configuration jumpers

The jumpers to select NMEA0183 or RS232 are placed between the J1 and J2 headers inside the RS6.



Fig. 82. RS6 computer. Jumpers position

# **ANNEX F**

## RS4v2 Computer Based Hardware

## WORKSTATIONS INSTALLATION

The NS 4000 ECDIS MFD Workstation consists of the following elements:

- RS4v2 dedicated Computer;
- TFT Monitor;
- ES4 (ES3) Keyboard;
- Connection Board X1 (optional);
- Connection Board X2 (optional);
- 24 VDC Power Supply (optional);
- WAGO set of Modules (optional).

#### **RS4v2** Computer

The basic component of Workstation is the RS4v2 Dedicated Computer containing an Interface Boards. Installation and performance test is provided by supplier.

Specification and location of Interface Boards for Workstation is presented on drawing below:



Fig. 83. RS4v2 computer. Board configuration

- 1. Empty
- 2. Radar Integrator Board (RIB2)
- 3. MOXA CP114I Card
- 4. Empty
- 5. 4xRS232 4456A Card (optional)
- 6. MOXA CP114I Card
- 7. MOXA CP114I Card (optional)



Layout of RS4v2 computer connectors for Workstation is described in drawing below:

Fig. 84. RS4v2 computer. Connectors layout

- 1. Power
- 2. PS/2 Keyboard
- 3. PS/2 Trackball
- 4. COM1 (RS232)
- 5. LPT
- 6. VGA onboard
- 7. USB
- 8. USB
- 9. 1394 (OPT)
- 10. USB
- 11. USB
- 12. LAN onboard (LAN1)
- 13. Mic
- 14. Line Out
- 15. Line In
- 16. RIB LF (Optional Radar Processor Card)
- 17. RIB HF (Optional Radar Processor Card)
- 18. COM6 (RS232/RS422/RS485), COM7 (RS232/RS422/RS485), COM8 (RS422/RS485), COM9 (RS422/RS485)
- 19. COM2, COM3, COM4, COM5 (Optional PCI-E 4xRS232 4456A Card)
- 20. COM10 (RS232/RS422/RS485), COM11 (RS232/RS422/RS485), COM12 (RS422/RS485), COM13 (RS422/RS485)
- 21. COM14 (RS232/RS422/RS485), COM15 (RS232/RS422/RS485), COM16 (RS422/RS485), COM17 (RS422/RS485) (Optional 3-rd Moxa card)

#### **Additional Serial Ports**

Additional serial ports interface provides by two type of interface board. First is optional 4xRS232 PCI Express Serial Board Sunix 4456A. This board is not configurable and has four RS232 interfaces. Second are two MOXA CP114I boards. This board is configurable and supports the following physical interfaces: RS232; RS422; RS485.

The installation of the MOXA CP114I board includes hardware and software installation. The hardware installation is detailed in this paragraph.



Fig. 85. CP-114I Moxa Board

Before installing the board into the slot, you should set all the jumpers to desired position.

The default (manufacturer's) settings are as follows: Port 1, Port 2, Port 3 and Port 4 RS-485, Automatic Data Direction Control mode, no Termination Resistor, indicated as *:

- JP5/6 Interface Selection Jumper for Port 1/2:
  - Left* Set the port interface to RS-422/RS-485;
  - Right Set the port interface to RS-232.
- S1 RS-422/485 Selection Switch for Port 1/2/3/4:
  - ON* Set the port interface to RS-485;
  - OFF Set the port interface to RS-422.
- S2 Data Mode Selection Switch for Port 1/2/3/4.

(Valid if JP5/6 is Left and S1 is ON):

- ON* Set the RS-485 port to Automatic Data Direction Control Mode;
- OFF Set the RS-485 port to By RTS Mode.
- JP1/2/3/4 Termination Resistor Port 1/2/3/4.

(Valid if JP5/6 is Left and S1 is ON):

- Open* Not using Termination Resistor;
- Short Using Termination Resistor.

The Boards installation is described below:

The BIOS automatically assigns the IRQ number and I/O addresses for the MOXA CP114I PCI board. Hence, it is a must to have the board plugged first before installing the software driver. After this, simply install the control board into the PC and then connect the connection cable:

• Power off the PC.

#### - ATTENTION! -

Make sure your system is switched off before you start installing any board. If you don't, you may risk damaging your system and the board.

• Remove the slot cover bracket if present.

Plug the MOXA CP114I PCI control board firmly into a PCI slot according to Fig. 83 "RS4v2 computer. Board configuration":

- Fasten the holding screw to fix the control board in place;
- Connect the Moxa cable DB37;
- Power on the PC and the BIOS will automatically set the IRQ and I/O address.
- **Note:** Each board must occupy one unique IRQ and four 8-byte I/O addresses, which are assigned automatically by the BIOS. However, you can select a free IRQ number manually via the PC's BIOS setup for the PCI slot, but normally this method is not available for the I/O address. The possible IRQ numbers are 2, 3, 4, 5, 7, 10, 11, 12, and 15. The possible I/O addresses are from 0x0000 to 0xFFFF.
- Proceed with the software (driver) installation.

#### **RIB2** Installation

#### - ATTENTION! -

Check that technical characteristics of the connected equipment match characteristics of the RIB Input\Output signals specified in section **Technical Specification**, paragraph **Radar Integrator Board**, item **Interface Capabilities**.

#### Cabling

Cables are run and installed in accordance with the cabling schedules.

The LF-box is connected with the PCI board by means of a standard computer cable with a common screen and DB25 connectors on both ends. Connection of cable cores with the connector contacts is identical on both sides.

External communication lines to the LF-box are connected by means of screw terminals. Any types of cables with a wire cross section of up to 1.5 mm² can be used. In case of considerable length of external cables, a screened cable is recommended.

HF-box is connected with the PCI board by means of a standard category 5 screened cable used in Ethernet 10/100 Mbit networks. The cable contains 4 twisted pairs within the common screen and has RJ-45 connectors on both ends. Connection of cable cores with the connector contacts is identical on both sides.

Cables of this type are produced within 2–60 m range of lengths. A non-standard length cable can be assembled by using special tools manufactured by companies like AMP, Molex, and others. Assembly is carried out in accordance with the manual delivered with the tool. In doing this, it is necessary to arrange the twisted pairs in the connector as recommended. Only the screened cable and appropriate connectors should be used. The maximum cable length is 100 m, however it would be preferable to limit the cable length to 30 m if a high quality radar signal is to be obtained.

External lines to the HF-box are connected by means of coaxial cables with BNC connectors (plug). If the connection is made to the already existing matched coaxial line (internal matching in the HF-box is turned off), a tap cable to the HF-box should have a minimum length (preferably not more than 1 m). With the matching turned on, however, the maximum length of the cable is determined by the characteristics of the cable used and may be several hundred metres.

#### Directions on the Splicing of Category 5 Cable for RJ-45 Connection

Baring of category 5 cables with four twisted pairs is carried out with a special HT-501 type tool.

The cable is bared for the length of 14 mm from the end of the cable. When baring the cable, be careful not to cut off the cable screen lead-out (the screening foil is removed together with the insulation).

Before laying the wires, set the appropriate fixtures on the cable, including RJ-45 connection screen.

The laying of wires in both RJ-45 connectors is identical to that in the standard "patch" cable.



Pin	Color	Signal
-----	-------	--------

- 1. White/Orange Video +
- 2. Orange/White Video -
- 3. White/Green Ground
- 4. Blue/White Trigger +
- 5. White/Blue Trigger -
- 6. Green/White LED
- 7. White/Brown -12V
- 8. Brow/Whiten +12V

Before putting on the screen on RJ-45 connector, turn the cable screen lead-out by 180 degrees so that it is under the squeezed part of RJ-45 connector screen. Cut off the surplus of the cable screen lead-out.

Having completed operations on the laying of the cable lead-outs and the screening lead-out, and having put on the screen on RJ-45 connector, crimp RJ-45 connection. For crimping use a special Molex 69008-1100 type tool designed for the screened cable with four twisted pairs.

Check cable making by means of RJ-45 link tester.

## Procedure for Checking the Correct Installation of the RIB2 Driver

Upon installation NS 4000 or NS 4100 ECDIS and restarting of the computer with assistance of Device Manager Utility (START MENU\CONTROL PANEL\SYSTEM\HARDWARE), make sure that RIB drivers are installed properly:



If RIB drivers were installed improperly, the above window will look as follows:


ultimedi	a Controller Pro	operties
General	Driver Details	Resources
O,	Multimedia Cont	roller
	Driver Provider:	Unknown
	Driver Date:	Not available
	Driver Version:	Not available
	Digital Signer:	Not digitally signed
Driv	er Details	To view details about the driver files,
Ugd	ate Driver	To update the driver for this device.
Roll Back Driver		If the device fails after updating the driver, roll back to the previously installed driver.
Î	<u>J</u> ninstall	To uninstall the driver (Advanced).

In this case, double click the respective line in the window:

In the opened "Multimedia Controller Properties" window press the button "Update Driver":

Hardware Update Wizard	
	Welcome to the Hardware Update Wizard
7	Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission). <u>Read our privacy policy</u>
	Can Windows connect to Windows Update to search for software?
	C ⊻es, this time only
	<ul> <li>C Yes, now and every time I connect a device</li> <li>No, not this time</li> </ul>
	Click Next to continue.
	< Back Next > Cancel

Select "No, not this time" and press "Next >" button:

Hardware Update Wizard	
	is wizard helps you install software for: Multimedia Controller
	If your hardware came with an installation CD or floppy disk, insert it now.
W	hat do you want the wizard to do? C Install the software automatically (Recommended) © Install from a list or <u>specific location (Advanced)</u>
Cli	ck Next to continue.

dware Update Wizard			
Please choose your search and instal	llation options.		50
Search for the best driver in these loss	cations.		
Use the check boxes below to limit or paths and removable media. The bes	r expand the default t driver found will be	search, which installed.	includes local
Search removable media (flopp	py, CD-ROM)		
Include this location in the sea	irch:		
C:\WINDOWS\RadarDriver	anon.	• E	3īowse
C Don't search I will choose the driver	to install		
Choose this option to select the devic the driver you choose will be the best	ce driver from a list. match for your hard	Windows does Iware.	not guarantee tha
		<u></u>	
	< Back	Next >	Cancel

Select "Install from a list or specific location (Advanced)" and press "Next >" button:

Check the checkbox "Include this location in the search". Press the "Browse" button and specify path to required files (*C:\WINDOWS\RadarDriver*). Press the "Next >" button:



Press the "Finish" button. Computer will be restarted.

#### **Power Supply**

Workstation requires 220 VAC 1Ph. This power must be provided from ship's distribution board with Main/Emergency Automatic Switch.

### **Discrete Signal Interface**

Discrete signal interface for alarms distribution is provided by WAGO set of modules.

Detailed information on WAGO Modules is presented in **Chapter 1**, section **Workstations Installation**, paragraph **WAGO I/O Modules for Conning** and in **Chapter 3**, section **NS 4000 Hardware Components**, paragraph **WAGO I/O Modules**.

## **NETWORK**

Network is basement of NS 4000 MFD for communication between Workstations and Sensors interfaces. The physical layer is Ethernet; the transport layer is TCP/IP.

## **Physical Layout**

NS 4000 MFD network could be connected by means of FTP Cat.5 cables. The HP J4812A is a multiport high-speed switch which can be used for building of the highperformance communication. This switch is store-and-forward device offering low latency for high-speed networking. For technical specification of this unit see section **Technical Specification**, paragraph **Ethernet Switch 12xRJ45 ACHP J4812A** of this **Annex**.

## **IP Addresses**

IP addresses table is shown below:

Station	LAN IP address	Subnet mask
Workstation 1 (W01)	10.8.1.101	255.255.255.0
Workstation 2 (W02)	10.8.1.102	255.255.255.0
Workstation 3 (W03)	10.8.1.103	255.255.255.0
Workstation 4 (W04)	10.8.1.104	255.255.255.0
Workstation 5 (W05)	10.8.1.105	255.255.255.0

## **TECHNICAL SPECIFICATION**

## **RS4v2** Dedicated Computer

#### General

The main hardware part of the NS 4000 MFD systems is the RS4v2 BASIC marine industrial computer produced for TRANSAS by CAPAX.

### **RS4 Basic Data Processing Unit**

#### **RS4** Dimensions



Front out-side view

Fig. 86. RS4v2 dimensions

#### **RS4v2 Housing**

- 19" 4U rack mountable chassis;
- Cooling units: 2 x 9 cm ball bearing fans;
- Drive bays: 3 x 5.25", 1 x 3.5" FDD;
- Expansion slots: 4 PCI-slots, 2 PCI Express x 1, PCI Express x 16;
- Indicators: LED for power and HDD activity;
- Buttons: power on/off, system reset;
- Dimensions: 480 x 177 x 451 mm (W x H x D);
- Power supplies 300 W 115/230 VAC.

#### Intel D945GNT Motherboard



Fig. 87. View of D945GNT motherboard

- Form Factor:
  - ATX (12.00" x 9.60") desktop board D945GNT.
- Processor:
  - Support for an Intel® Pentium® D, Pentium® 4, and Celeron® D processor in the LGA775 package with a 1066/800/533 MHz system bus;
  - Hyper-Threading Technology Support.
- Memory:
  - Four 240-pin, 1.8 V SDRAM Dual Inline Memory Module (DIMM) sockets;
  - 667/533/400 MHz single or dual channel DDR2 SDRAM interface;
  - Support for up to 4 GB of system memory.
- Chipset Intel 945G Express:
  - Intel® 82945G Graphics and Memory Controller Hub (GMCH) with Direct Media Interface;
  - Intel® 82801GB I/O Controller Hub (ICH7) or 82801GR I/O Controller Hub (ICH7R) supporting Intel® Matrix Storage Technology;
  - Firmware Hub (FWH).
- Graphics:
  - Intel® 945G Express Chipset with Intel® Graphics Media Accelerator 950.
- Audio:
  - Intel 945G Express Chipset;
  - Intel® High Definition Audio interface;
  - SigmaTel codec.
- Expansion Capabilities:
  - Four PCI bus ad-in card connectors (SMBus routed to PCI bus 2);
  - One PCI Express x 16 connector;
  - Two PCI Express x 1 connectors.

- Peripheral Interfaces:
  - Up to eight USB 2.0 ports (four ports routed to the back panel, four ports routed to two USB headers);
  - Four Serial ATA (SATA) channels (3.0 GB/s), via the ICH7 or ICH7R, one device per channel;
  - One IDE interface with ATA-66/100 support (two devices);
  - One VGA connector;
  - One diskette drive interface;
  - One serial port;
  - One parallel port;
  - PS/2* keyboard and mouse ports;
  - Optionally up to 3 digital optical IEEE 1394a ports (1 back port);
  - Optionally Intel® 82562GZ 10/100 Mbit/sec Platform LAN Connect (PLC) device with RJ-45 connector;
  - Optionally Intel® 82573E or 82573V gigabit Ethernet Controller with RJ-45 connector.
- BIOS:
  - Intel® Platform Innovation Framework for extensible firmware interface;
  - 4 Mbit symmetrical flash memory;
  - Support for SMBIOS;
  - Intel® Rapid BIOS Boot;
  - Intel® Express BIOS Update.
- Power Management:
  - Support for Advanced Configuration and Power Interface (ACPI);
  - Suspend to RAM (STR);
  - Wake on USB, PCI, PCI Express, PS/2, LAN, and front panel.
- Hardware Management. Hardware Monitor with:
  - Three fan sensing inputs used to monitor fan activity;
  - Remote diode temperature sensing;
  - Intel® Precision Cooling Technology fan speed control;
  - Voltage sensing to detect out of range values;
  - Optionally Trusted Platform Module;
  - Optionally Intel® Active Management Technology.

#### CPU

CPU-IP42-3400/800, Intel Pentium® D, 3400 GHz, 800 MHz FSB, 512 KB.

#### Memory

1 GB RAM, 2 x RAM-DDR2-512-533-G, RAM DDR2 512MB, 533 MHz.



Fig. 88. View of DDR2 512 MB 533 MHz memory

#### Storage

HDI3-WD360GD, Western Digital 36 GB 10000 rpm SATA.

#### **Devices with Removable Storage**

- DVD-SAM-162WBEBN, Samsung DVD-RW 16X IDE;
- FDD-SONY-BL, 1.44" MB 3.5" Floppy drive.

#### I/O Device Moxa CP114I PCI Serial Board.

Moxa Industio products are smart, multiport serial I/O solutions for industrial applications. The CP-114I Series boards are RS-232/RS-422/RS-485 4-port serial communication interface board for 32-bit PCI bus with "Plug and Play" feature. Industio products support all three serial interfaces, RS-232, RS-422, and RS-485, in one board, and provide a reliable communication link over a longer distance (up to 4000 ft for ports set to the RS-422/485 interface). Two of the four ports are RS-422/485 ports and the other two ports can be configured to RS-232 or RS-422/485 individually. Each RS-422/RS-485 port can control up to 32 devices in a multi-drop environment.

The board complies with PCI Spec. 2.1 and has neither switch nor jumper. The BIOS automatically assigns the hardware configuration for the IRQ number and memory addresses. Hence, the board must be plugged first before installing the software driver.

To ease the 2-wire RS-485 half-duplex control, Automatic Data Direction Control intelligence is built on Industio CP-114I Series boards, eliminating the need of software interference. Hence, the applications can manage the RS-485 port without extra code to control the half-duplex protocol.



Fig. 89. View of PCI COM4xRS232/422/48 card

With a well-designed and fine-tuned device driver, the Industio products make full use of the 32 byte Tx/Rx FIFO and on-chip H/W flow control, so that it can transfer data without loss even at high speed such as 921.6 bps, providing a reliable and high performance solution for serial multiport communications.

COM-4 ports CP114I PCI Serial Board:

- Supports all three interfaces in one board (2 ports for RS-232 or RS-422/485, selectable by jumper, 2 ports for RS-422/485);
- High speed 16C550C Communication Controllers with on-chip hardware flow control guarantees no data loss and data integrity;
- High speed up to 921.6 Kbps each port;
- Support optical isolation, max. 2KV (RS422/485);
- Support surge protection (25KV ESD) for all signal lines to prevent interference and noise and protect your system and minimize the system down time;
- Support 2-wire RS485 half-duplex operation;
- Supports ADDC (Automatic Data Direction Control) intelligence to simplify the RS485 software programming;
- RS-485 data control: Auto (ADDC) or by RTS;
- Built-in termination resistors eliminates impedance matching headaches;
- Compatible with PC standard COM ports;
- Powerful Serial Comm tool Pcomm and API-232;
- Support popular OS Windows 2000/XP/2003, Windows NT, Windows 95/98, and DOS.

#### I/O Device Sunix 4456A PCI Express Serial Board

RS232 Golden I/O series is a line of PCI Express Multi-port Serial Communication Board with independent high-speed RS232 V24 standard serial interfaces. The card attaches 4 independent DB9 or DB25 RS232 serial ports on your system for industrial communication and automation applications. It is compatible with PCI Express x1, x2, x4, x8, x16 lane Bus, allowing this multi-port serial card to be installed in virtually any available PC system and compatible with all major operating systems. Users do not need to manually set jumpers to configure I/O addresses and conflicts with other cards or devices:

COM-4xRS232 4456A PCI Express Serial Board:

- Expands 4 RS-232 serial ports with communication speeds up to 921.6 Kbps;
- Designed to meet PCI Express Base Specification Revision 1.1;
- Single-lane (or x1) PCI Express throughput up to 2.5 GBps;
- Supports x1, x2, x4, x16 (lane) PCI Express Bus connector keys;
- High speed 16C650 compatible communication controller with SUN1889 chip hardware flow control to guarantee no data loss and best technical support;
- Each serial port has built-in 64 byte hardware FIFO & 128K byte software FIFO;
- Built-in 15KV ESD protection for all serial signals;
- Certified by Microsoft WHQL, CE, FCC approval;
- Support Linux, Microsoft Windows 2000, XP and 2003;
- Ready for the Intel® and AMD® 32/64-bit CPU system.



Fig. 90. View of PCI 4xRS232 Sunix 4456A card

## **Transas Dedicated Keyboards**

#### **Transas ES4 Dedicated Keyboard**

#### **Functional Description**

The Trackball-Keyboard consists of two keyboard fields ("QUERTY", function and DIM-keys) and a separate Trackball:

1. Keyboard.

All key are backlit with yellow LEDs (Light Emitting Diodes). The QUERTY-field is printed with a "hiding-effect", i.e. the key legends are normally invisible when not lit. The QUERTY-field normally is not lit. When a key is pressed the backlight is switched on and the first key press is not sent to the PC. When the light is dimmed down to the lowest level, the QUERTY-field will be lit with full brightness (daylight operation). Above this level the brightness of both fields are equal. When no key of the QUERTY-field is pressed for more than 30 seconds the backlight of will be switched off. With the keys "Dimmer +" and "Dimmer -" the brightness can be adjusted in 255 steps.

The keyboard has a standard PS/2 Interface to the PC. On the back of the keyboard is a PS/2-plug, which accepts a standard PS/2 compatible keyboard. Key codes from this keyboard will be forwarded transparently to the PC.

The QUERTY-field produces standard key codes according to the imprinted legend. The coding is for an US-keyboard. Some key have a second code imprinted on their upper half. This is sent when the key is pressed together with the FN-key.

Legend	Key-Code
A	<alt> + <g></g></alt>
В	<alt> + <k></k></alt>
С	<alt> + <t></t></alt>
Ahead	<f8></f8>
Alarm	<ctrl> + <a></a></ctrl>
Zoom In	<+> (from Num-block)
N/H/C Up	<alt> + <h></h></alt>

The Function-have the following coding:

Legend	Key-Code
Standard-Display	<shift> + <f7></f7></shift>
Zoom Out	<-> (from Num-block)
Night/Day	Cyclic the codes <alt> + <f1><alt> + <f6></f6></alt></f1></alt>
All Layers	<shift> + <f8></f8></shift>
Event	<f4></f4>
Screen Shot	<ctrl> + <print screen=""></print></ctrl>
Target Table	<alt> + <j></j></alt>
Trial-Manoeuvre	<f9></f9>
Overlay On/Off	<alt> + <q></q></alt>
Target On/Off	<shift> + <f11></f11></shift>
Plot Target	<alt> + <s></s></alt>

2. Trackball.

The Trackball works as a standard PS/2-mouse with two buttons. In release 2 of the keyboard, the buttons of the trackball can be backlit, too. When connected with the plug on the back of keyboard the light will be dimmed together with the keyboard.

3. Loudspeaker.

The keyboard has an integrated loudspeaker and an audio-amplifier with an output power of approximately 1W. With the "Volume +/-" keys the loudness can be adjusted between approximately 75 ... 85 db, assuming an input signal of 1Vss.

4. Power supply.

Keyboard and trackball are supplied from PS/2 interface. The supply voltage should be 5V-DC +/- 10%.

The backlight and the audio amplifier are supplied with 12V-DC from an AC PSU with an input range of 85 ... 260 V-AC.

#### **Keyboard Legend**



Fig. 91. ES4 keyboard

#### **Technical Data**

Dimensions:

- Keyboard alone: 350 x 150 x 63 mm (W x H x D);
- Trackball alone: 100 x 150 x 60 mm (W x H x D);
- Keyboard with trackball: 450 x 150 x 63 mm (W x H x D).

Power supply:

- Keyboard electronics: 5V-DC +/- 10 %, approximately 60 mA;
- Trackball electronics: 5V-DC +/- 10 %, approximately 30 mA;
- Backlight + Audio: 12V-DC +/- 10 %, approximately 1.2 A;
- PSU for 12V: 85...260V-AC 50–60Hz, approximately 20 W.

#### **Rear Panel**



Fig. 92. ES4 rear panel sockets scheme

Interfaces:

- PS/2 for keyboard, cable with PS/2 connector, length 3 m;
- PS/2 for trackball, cable with PS/2 connector, length 3 m;
- PS/2 plug for external keyboard;
- Connector for trackball backlight (12V PWM);
- Audio input, 1Vss;
- Optional CAN-bus for connecting other input devices, not supported in current software.

#### Transas ES3 Dedicated Keyboard

#### Appointment

Keyboard ES3, further ES3, it is a control unit inside Transas systems. ES3 consists of three units inside: PC compatible keyboard, functional keyboard, and two-buttons trackball.

PC compatible keyboard and trackball are connected to PC by PS/2 interface and use standard keyboard PC protocol and Microsoft mouse correspondingly.

Functional keyboard is connected to PC by RS 232 interface and use special done protocol.

Functional keyboard unit controls highlighting of buttons, loudspeaker, and control buttons.

ES3 power supply is 220 Volts AC.

#### **External Connections**

ES3 has possibility of external connections (PC compatible keyboard and mouse) via standard mini-DIN plugs, situated on backside of keyboard. It is necessary to push buttons to connect external PS/2 devices.

#### **Technical Characteristics**

Input voltage	85–264 VAC
Input voltage frequency	47–63 Hz
Power consumption, max	25 Watts
Humidity	0–95%, without condensation
EMC	IEC 60945 edition 4
Acoustic pressure of loud speaker (distance 1 m)	80 dB
Working temperature	-15 +55 °C
Storage temperature	-30 +70 °C
Dimensions	450 x 150 x 95 mm
Weight	2.7 kg
Cables length	2.6 m

#### Specification of ES3 Communications Protocol by RS-232 Interface

Physical level - RS-232, baud rate 19200, No parity, 8 bits, 1 stop bit.

Format of NMEA parcel:

#### \$AACMD [,arguments ]*CC\r\n

Ν	Field	Description
1	\$	Start of sentence
2	AA	ID of sender: NS (Navi-Sailor), ES (ES3 keyboard)
3	CMD	Code of command
4	CC	Checksum of NMEA command



Fig. 93. ES3 keyboard. Front view



Fig. 94. ES3 keyboard. Back view







Fig. 96. Transas ES3 dedicated keyboard. Assembly drawing without mounting frames



Fig. 97. Transas ES4 dedicated keyboard. Dimensional drawing of Trackball



Fig. 98. Transas ES4 dedicated keyboard. Dimensional drawing of Keyboard



Fig. 99. Transas ES4 dedicated keyboard. Dimensional drawing of combined Keyboard and Trackball



Fig. 100. Transas ES4 dedicated keyboard. Trackball mounting hole



Fig. 101. Transas ES4 dedicated keyboard. Keyboard mounting hole



Fig. 102. Transas ES4 dedicated keyboard. Combined Keyboard and Trackball mounting

## **Radar Integrator Board**

#### **General Description**

The Radar Integrator board (RIB) is a module operating in combination with an IBM PC compatible computer to enhance functional capabilities of the ECDIS system.

The Radar Integrator board is designed for the reception of analog video signals from the radar and their processing. The RIB enables the automatic detection, automatic acquisition and automatic tracking of targets, calculations of targets coordinates and motion parameters and on-line transmission of this data to the ECDIS system as well as the formation of a radar picture to be displayed in combination with an electronic chart.

#### Purposes

#### Input of Radar Signals

- Analog/digital conversion of radar signals;
- Reception of information on the course and speed.

#### **Selection of Radar Targets**

- Suppression of sea clutter, interference from operating radars and other occasional clutter;
- Detection of radar echoes with an adaptive threshold;
- Selection of objects by size out of the set range of values;
- Determining of targets' gravity centers and measurement of their coordinates;
- Automatic acquisition and automatic tracking of targets.
- **Note:** The criterion for selecting targets for tracking is the availability; in several consecutive scans, of an echo with a higher intensity as compared to the background within a spatial locality fitting the set range in size and discrimination.
- Automatic assigning of names to new targets;
- Determining of the targets' current courses and speeds;
- Recording of target loss time;
- Computation, preparation, and transmission to the Navi-Sailor series systems of all the tracked targets' data cards including the following parameters:
  - Number or name assigned to the target;
  - Target status or type:

New target; Steadily tracked target; Target not observed; Target lost.

- Target's range (in nautical miles);
- Target's true bearing (in degrees);
- Target's relative course (in degrees);
- Target's relative speed (in knots);
- Target's true course (in degrees);
- Target's true speed (in knots).

#### Formation of a Radar Image

- Formation of a digital radar image, enhancement of sea surface, and coastline presentation (filtering and clutter suppression);
- Conversion of the radar picture coordinates, orientation, and scale;
- Offsetting the effect of non-uniformity of antenna rotation on the formation of the radar picture;
- Scan-to-scan accumulation for an improved quality of presentation;
- Formation of surface radar images converted to suit the set parameters, for the display in the Navi-Sailor system.

#### **Interface Capabilities**

#### **HF-Box Input Signals**

"Video" - an analog signal from the radar receiver output:

- Amplitude of up to 12 V;
- Polarity is positive or negative (program selectable);
- Dynamic range of up to 60 dB;
- 20 MHz band;
- Switchable impedance: 75 Ohm or > 1 kOhm.

"Video" input could be used for the reception of a complex signal containing an analog signal, start pulses, and digital information. The signal components are program extractable.

"Trigger" – pulses coincident with the radar's outgoing pulse:

- Amplitude of up to 20 V;
- Minimum length of 30 nS;
- Repetition frequency of up to 4000 Hz;
- Polarity is positive or negative (program selectable);
- Switchable impedance: 75 Ohm or >1 kOhm.

#### **LF-Box Input Signals**

"Head marker" - origin of reading of antenna turn angle:

- Pulses with amplitude of 3–50 V;
- AC input;
- Input resistance of > 50 kOhm;
- Polarity is positive or negative (program selectable).

"Bearing" – pulses of change in the antenna turn angle:

- Logic signals with the following levels: "0" not more than 1.2 V, "1" – within the range of 3–100 V;
- Input resistance of > 50 kOhm;
- Active level is program selectable.

"IN1–IN4" – additional programmable inputs:

- Logic signals with the following levels: "0" not more than 1.2 V, "1" – within the range of 3–100 V;
- Impedance of > 50 kOhm.

"LOG" and "GND" – input of log signals in the form of a closing relay contact. "LOG" contact is connected with source +5 V via 4.7 kOhm resistor.

"LOG+" and "LOG-" is opto-isolated log input.

"CMPSR+" and "CMPSR-" – opto-isolated input of the gyro's reference voltage.

"CMPS1+" and "CMPS1-", "CMPS2+" and "CMPS2-", "CMPS3+" and "CMPS3-" – opto-isolated inputs of gyro phases.

All the opto-isolated inputs have identical parameters:

- Input logic levels: "0" not more than 1.5 V, "1" not less than 3.5 V in the absence of a jumper in the relevant channel;
- "0" not more than 3 V, "1" not less than 6 V with a jumper available;
- Maximum permissible input constant voltage 200 V, pulse voltage 400 V;
- Protection from the reverse voltage of up to 400 V;
- Input currents not more than 0.3 mA at the voltage of 3.5 VL:
  - Not more than 1 mA at the voltage of 50 V;
  - Not more than 4 mA at the voltage of 400 V.
- Isolation voltage 1000 V.

Compass inputs can be used for both compasses with stepper output and for compasses with an output in the form of synchrovoltage within 12–220 V range. The mode is program selectable.

Minimum lengths for all the signals are set by program controllable filters.

#### **LF-Box Output Signals**

"OUT1-OUT4" – programmable logic outputs:

- Level "0" not more than 0.5 V, level "1" switchable, not less than 4 V or not less than 10 V;
- Maximum load 5 mA;
- Pulse front length not more than 2 mkS.

#### **Technical Specification**

#### **Hardware Components**

The Radar Integrator consists of a short (120 mm) PCI standard Radar Processor board and two external modules: a high-frequency module (HF-box) and a low-frequency modules (LF-box), connected to the PCI board with cables.

The high-frequency module (HF-box) has two BNC connectors for the input signals, whilst the external lines are connected to the low-frequency module (LF-box) by means of screw terminals.

The high-frequency module (HF-box) is connected to the Radar Processor board via RJ45 connector. The low-frequency module (LF-box) is connected to the Radar Processor board via DB25 connector.

#### **Software Components**

The software package stored on a standard Transas CD, is designed for supporting the Radar Integrator board's operation and enables control of this unit's operating modes, reception, processing, and transmission of a radar picture as well as the extraction and tracking of radar targets.

The package includes:

- RIB2 driver transas.sys for Windows XP;
- A set of libraries with configuration file: i_radar.dll, second.dll, rad_int.dll, rad_int.cfg;
- Testing program: (System Configuration Utility\Radar\General, "Test Radar" button) (RTest.exe).

The installation package enables the necessary software to be copied into the folder determined by the user, ensures the necessary registration of software by the operating system, and runs the configuring utility which provides the package's referencing to the parameters of the installed radar equipment.

The Radar Configuration utility is designed for:

- Selecting two types of radars (named "Radar 1" and "Radar 2" respectively) which can be connected to the system if Interswitch unit is available;
- Enabling additional manual adjustment of the system parameters used when the customer has radar whose type is not on the radar type selection menu, and for taking into account parameters of particular radar, such as the beam width, bearing, and distance offsets.

The Test Radar utility is a facility for testing the previously installed and configured "Radar processor libraries" package jointly with the Radar Integrator board. The program ensures the formation of a radar picture and also displays the results of the signal and tracked targets processing.

#### **Description of the Delivery Set**

The Radar Integrator Board delivery set includes the components listed in table below.

Ν	Item	Quality
1	Radar Processor board with a bracket	1
2	High Frequency box	1
3	Low Frequency box	1
4	Extension cable DB25 – DB25, 1 m in length	1
5	Coaxial cable with BNC type connector on one end, 1 m in length	2
6	RJ45 connector	2
7	Jumper	10
8	Documentation (Radar Integrator User and Installation Manuals (B5 format))	1 set
9	LF box installation kit:	
	Velcro type connection;	2
	Screw	4
10	HF box installation kit:	
	Velcro type connection	1

#### Weight and Dimensions

Weight of the HF box: 0.15 kg.

Weight of the LF box: 0.3 kg.

Overall and installation dimensions are specified in Fig. 103–51.

#### **Replacement Parts**

The Radar Integrator is not subject to repairs in the shipboard conditions.

The Radar Processor's serviceability is restored on the ship, in the port or at a plant by replacing it with a new unit bought from the manufacturer.

#### **Separate Delivery Units**

The separate delivery units include:

- HF box;
- LF box.

#### **PC Resources Required**

The Radar Processor takes up the following processor unit resources via the PCI interface:

- One IRQ line (3–7, 9–15);
- Power supply from the processor unit's organic (internal) supply module: +5.0V/0.7A, +12V/0.1A, -12V/0.1A.



Fig. 103. RIB Radar processor card. General view





Casing material: plastic Weight: 0,3 kg Fixture is with double-faced scotch tape (applied in the installation kit)

Fig. 104. RIB Low frequency box



Cover backside with connection table



Fig. 105. RIB Low frequency box. General view











## Ethernet Switch 12xRJ45 ACHP J4812A

Ethernet switch ACHP J4812A in conjunction with marinizing kit Mariner MS630:



Fig. 108. Appearance of Ethernet switch 12xRJ45 ACHP J4812A

- Provide 12 RJ-45 10/100Base-TX ports (IEEE 802.3 Type 10Base-T; 802.3u Type 100Base-TX);
- 9.6 GBps switch fabric integrated on-chip: high performance switch design with a non-blocking architecture: automatically adjusts for straight-through or crossover cables on all 10/100 and 100/1000 ports;

- Stacking capability: single IP address management for a virtual stack of up to 16 switches including the 1600M, 2400M, 2424M, 2512M, 2524M, 4000M, and 8000M;
- RMON and extended RMON: provide advanced monitoring capabilities;
- Certificate IEC 60945, DNV;
- Dimensions: 17.4 x 8.0 x 1.8 in. (44.2 x 20.3 x 4.6 cm);
- Weight: 6.0 lb. (2.7 kg);
- Mounting. Mounts in a standard 19 in. rack;
- Environment:
  - Temperature: -15 to 55 °C;
  - Relative humidity: 15% to 95% @ (40 °C), non-condensing;
  - Shock and vibration: HP759, HP760 (similar to EN 60068, IEC 68).
- Electrical characteristics:
  - Heat dissipation: 123 BTU/hr;
  - Power: 36 W;
  - Voltage: 100-127 VAC/200-240 VAC;
  - Current: 2.4 A max/1.2 A max;
  - Frequency: 50/60 Hz.
- Safety. EN 60950/IEC 950 UL 1950 3rd edition cUL (CSA 950) NOM-019-SCFI-1994.

Type approval valid only with marinizing kit Mariner MS630 installed.

# **ANNEX G**

## Diagrams

The following Diagrams are enclosed in this Annex: NS 4000 ECDIS MFD WS. Base Configuration. Block Diagram; NS 4000 ECDIS MFD RS6 Computer. Connectors Layout; NS 4000 ECDIS MFD WS. Base Configuration. Connection Diagram; NS 4000 ECDIS MFD System (WS1 and WS2). Optional Configuration. Block Diagram; NS 4000 ECDIS MFD System (WS1). Optional Configuration. Connection Diagram; NS 4000 ECDIS MFD System (WS2). Optional Configuration. Connection Diagram; NS 4000 ECDIS MFD System (WS2). Optional Configuration. Connection Diagram; NS 4000 ECDIS MFD System (WS2). Optional Configuration. Connection Diagram; NS 4000 ECDIS MFD System (WS1). Optional Configuration. Power Supply Distribution. Connection Diagram; NS 4000 ECDIS MFD System (WS1 and WS2). Optional Configuration.

(WS1 and WS2). Optional Configuration. Data Flow Diagram;

WAGO Set for Conning. Connection Diagram;

Connection of RIB6 to Some Radar Types. Connection Diagrams.

#### NS 4000/4100 ECDIS MFD WS. BASE CONFIGURATION. BLOCK DIAGRAM



#### RS6 COMPUTER. CONNECTORS LAYOUT


# NS 4000/4100 ECDIS MFD WS. BASE CONFIGURATION. CONNECTION DIAGRAM



## NS 4000/4100 ECDIS MFD (WS1 AND WS2). OPTIONAL CONFIGURATION. BLOCK DIAGRAM





## NS 4000/4100 ECDIS MFD WS1. OPTIONAL CONFIGURATION. CONNECTION DIAGRAM

## NS 4000/4100 ECDIS MFD WS2. OPTIONAL CONFIGURATION. CONNECTION DIAGRAM



# NS 4000/4100 ECDIS MFD (WS1 AND WS2). CABLES LIST

CABLES LIST				
CABLES N	TYPE CABLE REQUIREMENT	QUANTITY	SLPPLIER	NOTES
Y1	3x1.5	2	YARD	220VAC POWER-X1 BOARD
Y2	3x1.5	2	YARD	220VAC POWER X1-EMC FILTER
Y3	3x1.5	2	YARD	220VAC POWER FILTER-UPS
Y4	2x2.5	2	YARD	24VDC-CONTROL UNIT (CU)INPUT
Y5	2x2.5	2	TSC	CU-BATTERY (PART OF UPS)
Yő	2x2.5	2	YARD	24VDC UPS-TERMINAL X1
¥7	4x0.75	2	YARD	CU UPS-RS6 DIGITAL INPUTS
Y8	2x1.5	2	YARD	24VDC POWER-RS6 COMPUTER
Y11	2x1.5	2	YARD	24VDC POWER-ETHERNET SWITCH
Y12	2x1.5	2	YARD	24VDC POWER-RIB6
Y13	2x1.5	2	YARD	24VDC POWER-DCU6
Y14	2x1.5	2	YARD	24VDC POWER-ES6 KBD
Y15	2x1.5	2	YARD	24VDC POWER-MONITOR
Y16	USB KBD CABLE	2	TSC	ES6 KBD USB-RS6 USB
Y17	VGA CABLE	2	TSC	RS6 VGA1-MONITOR
Y18	RS232 SERIAL CABLE	2	TSC	RS6(COM1)-DISPLAY DB9M-F
Y19-21	2x0.75	6	YARD	SENSORS-RS6 RS422 PORTS
Y22	1x0.75	2	YARD	SENSOR AIS-RS6 RS422 PORT
Y23-24	4x0.75	4	YARD	RS6 DI/DO-ALARM PANEL
Y25	FTP CAT 5	2	TSC	RS6 LAN1-E.SWITCH 1 RJ45
Y26	FTP CAT 5	2	TSC	RS6 LAN2-E.SWITCH 2 RJ45
Y27	FTP CAT 5	2	TSC	DCU6 LAN1-E.SWITCH 1 RJ45
Y28	FTP CAT 5	2	TSC	DCU6 LAN2-E.SWITCH 2 RJ45
Y29	FTP CAT 5	2	TSC	RIB6 LAN1-E.SWITCH 1 RJ45
Y30	FTP CAT 5	2	TSC	RIB6 LAN2-E.SWITCH 2 RJ45
Y31	2x1.5	1	YARD	24VDC POWER-WAGO SET
Y32	RS232 SERIAL CABLE	1	TSC	WAGO-RS6 (COM2) DB9M-F
Y33-37	2x0.75	10	YARD	SENSORS-DCUS6 RS422 PORTS
Y38	4x0.75	2	YARD	SENSOR AIS-DCU6 RS422 PORT
Y39	MULTICORE CABLE	1	YARD	RIB6-RADAR X-BAND
Y40	MULTICORE CABLE	1	YARD	RIBG-RADAR S-BAND

## NS 4000/4100 ECDIS MFD WS. OPTIONAL CONFIGURATION. POWER SUPPLY DISTRIBUTION. CONNECTION DIAGRAM







# WAGO SET FOR CONNING. FUNCTIONAL DIAGRAM



# CONNECTION OF RIB6 TO SOME RADAR TYPES. CONNECTION DIAGRAMS





ATLAS 8600





### JRC JMA 9000 SERIES

NUCLEUS 6000



MDEO 1 GROUND 2 TRIGGER 3





FURUNO FR 21XX, FR 28XX SERIES





