Bundesrepublik Deutschland

Federal Republic of Germany

Bundesamt für Seeschifffahrt und Hydrographie

Federal Maritime and Hydrographic Agency

BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE

Conformance test report of an

AIS system

Equipment under test: **Jotron**

Type: **TR-8000**

Applying test standards: IEC 60945 Ed4 (2002) Sections 6,11.1, 13-15

Test Report No.: BSH/46121/4321890/12-6

Applicant:

Jotron
Østbyveien 1
3280 Tjodalyng
Norway

Hamburg, 18 April 2012
Federal Maritime and
Hydrographic Agency

by order

Heinrich Bartels
Test engineer

by order

Axel Werth
Deputy
Head of section

Federal Maritime and Hydrographic Agency
Bernhard-Nocht-Str. 78
D-20359 Hamburg
Germany

nach EN ISO/IEC 17025:2005
akkreditiertes Prüflaboratorium

Deutscher Akkreditierungs Rat
DAR

DAT-P-086/98

DATech Deutsche Akkreditierungsstelle Technik in der TGA GmbH
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Deutschen AkkreditierungsRat

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Federal Maritime and Hydrographic Agency
Department Shipping
Laboratory for Type Approvals
Bernhard-Nocht-Straße 78

20359 Hamburg

is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out testing in the fields of

Marine Equipment (Navigation Equipment, Radio-Communication Equipment, Life-Saving Appliances)

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Frankfurt/Main, 2008-12-23

Correctness of the english translation confirmed: Frankfurt/Main, 2008-12-23

i.V. Dipl.-Ing.(FH) R. Egner
Head of the Accreditation Body

Member in EA, ILAC, IAF

Translation for information purposes only. The German Accreditation Certificate is authoritative

See notes overleaf

General

Applicant:	Jotron Østbyveien 1, 3280 Tjodalyng, Norway
Equipment under test:	
Type:	TR-8000
Manufacturer:	Jotron Østbyveien 1, 3280 Tjodalyng, Norway
Place of test:	BSH test laboratory Hamburg, Room 916
Start of test:	03 April 2012
End of test:	18 April, 2012

Test standards[1]:

IEC 60945 Ed 4 (2002)
Maritime navigation and radiocommunication equipment and systems-
General requirements – Methods of testing and required test results

[1] Numbers listed in the titles of the test sections of this report refer to the respective sections of IEC 60945 if not stated otherwise.

Summary

Test No.	Reference	Section	Result (passed/ not passed / not applicable / not tested)
2	IEC 60945	5.2.3 Reverse polarity of power supply	Passed
3	IEC 60945	6 Operational checks	Passed
3.1	IEC 60945	6.1 Ergonimics and HMI	Passed
3.2	IEC 60945	6.2 Hardware	Passed
3.3	IEC 60945	6.3 Software	Passed
3.4	IEC 60945	6.4 Inter-unit connection	Passed
4	IEC 60945	10.8 Power supply failure	Passed
5	IEC 60945	11.1 Acoustic noise and signals	Passed
6	IEC 60945	13 Maintenance	Passed
7	IEC 60945	14 Equipment Manuals	Passed
8	IEC 60945	15 Marking and identification	Passed

Edition

Edition No.	Date	Change	Author
1	2012-04-04	First draft	Bartels
2	2012-04-18	Missing items added	Bartels

1 General

1.1 Equipment history

The description of equipment under test and the equipment history (software and hardware updates) is maintained in the main test report (Test according to IEC 61993-2).

Each EUT system described in the main test report has got a equipment number which is used also in this document. So EUT no. 3 is the EUT no. 3 of the main test report

1.1.1 EUT system no 3

Transponder				
Type	TR-8000		Part no.	---
Delivery date	2011-06-01		Serial no.	BSH Godjenning 2
HW Version:	Delivery date	2011-06-01	Version no.	
	Installation date	2011-06-01		
SW Version:	Delivery date	2012-02-07	Version no.	01.00.05-2141
	Installation date	2012-02-08		
SW Version:	Delivery date		Version no.	
	Installation date			

MKD				
Type	Jotron AIS display unit		Part no.	---
Delivery date	2012-03-06		Serial no.	BSH Godjenning 1 0 Serie 1
HW Version:	Delivery date	2012-03-06	Version no.	
	Installation date	2012-03-06		
SW Version:	Delivery date	2012-03-06	Version no.	01.00.06
	Installation date	2012-03-06		SVN 2167
SW Version:	Delivery date	2012-03-13	Version no.	01.00.07
	Installation date	2012-03-13		SVN 2192
SW Version:	Delivery date		Version no	
	Installation date			

GPS antenna			
Type	Procom GPS4	Part No.:	---
Delivery date		Serial number	130604119

1.2 Test environment

Here it is intended to record for which time which EUT system is under test.

1.2.1 Test environment no 1

This Test environment is completely equipped as described in the main test report..

Room	BSH Room 916 (9th floor)
Test engineer	H. Bartels
Location	9°59,103 E 53°32,822 N

Equipment no	Start of test	End of test	Test engineer
3	2012-04-03	2012-04-04	Bartels
3	2012-04-18	2012-04-18	Bartels

1.3 Composition

Minimum Keyboard and display (MKD)

☐ Internal ☒ Remote ☐ external

internal GNSS

☐ sync only ☒ backup pos. sensor

1.4 Legend

Result marking (in the "result" column)[2]:

Passed	Item is ok, test was successful
Not passed	Test of a required item was not successful, change required
N/T	Not tested
N/A	Not applicable

Specific remarks (in the "remark" column, marked "bold italic":)

REC	recommendation (in terms of IEC17025 "opinion"); an improvement or change is Recommended
Note	note or comment (in terms of IEC17025 "interpretation") ; rationale for specific results or interpretation of requirements as appropriate

This table is a templete for more general remarks fo som test items and should be copied if required

Date	Result	Status

Issue of this template: 2012-03-01

[2] Test items maybe colour marked in draft versions of the report as follows:

Passed	no colour marking
Not passed	yellow
N/T	blue
N/A	no colour marking
REC	green

1.5 Test notes

Here are some effects noted which are observed during the normal test but independend of the actual test items.

1.5.1 General problems

Here are general problems found in the operation of the EUT, not specific to the actual test point.

	General problems		
Date	Item	Remark	Result

2 5 Methods of testing and required results

2.1.1 5.2.3 Excessive conditions

No	60945	Requirement	Note	Result
1	5.2.3	Reverse polarity of power supply. The EUT shall be subjected to an input from a power supply of reversed polarity for a period of 5 min. After completion of the test, and reset of the protection of the EUT, if required, the power supply shall be connected normally and a proformance check shall be carried out.	2012-04-04 Ba: The power consumption (DC current) is 0 when the power supply is connected with reversed polarity. After completion of the test no reset of a protection is required. After the reverse power condition which was applied for 5 minutes a performance check according to IEC 61993-2 has been successfully performed.	Passed

3 6 Operational checks

3.1 6.1 Ergonomics and HMI

3.1.1 6.1.1 General

No	60945	Requirement	Note	Result
2	6.1.1	A check shall be made that all modes of operation required by the equipment standard are available, and that they may be controlled over the required range. Use shall be made of every position of every control provided to ensure that it performs the function for which it is identified and that it operates in the expected manner.	Covered by IEC61993-2 test report	N/A

3.1.2 6.1.2 Design of control facilities

No	60945	Requirement	Note	Result
3	6.1.2 a)	Check that the number of operational controls, their design and manner of function, location, arrangement and size provide for simple, quick and effective operation of the EUT. Check that the controls are logically grouped according to their function.	Touch screen without additonal physical controls	N/A
4	6.1.2 b)	Check that the shape and size of each control is appropriate to its mode of operation. In the case of trackballs, joysticks and mice check that the controller can produce any combination of x and y axis output values and that the controller does not drive the follower off the edge of the screen. In the case of joysticks, check that there is a “home position” with a capability for a return to that point.		N/A

No	60945	Requirement	Note	Result
5	6.1.2 c)	In the case of touch screens check that the dimension of the response area for a push to activate operation is a minimum of 15 mm height and width and the force required for operation is a maximum of 1,5 N where applicable.	The touch buttons have a size of 15 x 19 mm The size of the keys of numerical or alphanumerical keyboards is 15 x 15 mm The required force is much less than 1,5 N	Passed
6	6.1.2 d)	Check that information presentation is suited to the maximum expected rate of change of information. Analogue presentation is generally more suited to rapid change than digital.	The brightness is displayed digitally and with an analog bar.	Passed
7	6.1.2 e)	Check that rotating controls and indicators turn clockwise for increased function.	There are no rotating controls	N/A
8	6.1.2 f)	Check that linear controls and indicators move upwards or to the right for increased value or effect.	Only applicable for the brightness bar	Passed
9	6.1.2 g)	Check that where users must rapidly discern directional change, digital displays are provided with indications of directions of change.		N/A
10	6.1.2 h)	Check that equipment elements relating to control, and indicators associated with control, are readily distinguishable from elements provided for other functions, such as equipment set-up.	In different screens	Passed

3.1.3 6.1.3 Operation (See 4.2.1.3)

No	60945	Requirement	Note	Result
11	6.1.3 a)	Check that all operational controls permit normal adjustments to be easily performed, and are arranged in a manner which minimises the chance of inadvertent operation.		Passed
12		Check that controls not required for normal operation and which may affect performance are not readily accessible.	They are in separate menues and partly protected by password	Passed
13	6.1.3 b)	Check all operational controls and indications for ease of use and correctness, and for general suitability related to their function and environment, for example expected ambient illumination and sound.	Covered by IEC61993-2 test report	N/A
14	6.1.3 c)	Check that the operation of a control does not cause obscuration of its related indicator where observation of the indicator is necessary for making the adjustment.		Passed
15	6.1.3 d)	Check that in all operations there is a clearly marked or consistent simple action to recover from a mistaken choice or to leave an unwanted state. Check that it is always possible for a user to start, interrupt, resume and end an operation.	In the bottom control bar there is in all screens a “X” button to go up/back one level and a “home” button to go back to the main screen	Passed

3.1.4 6.1.4 Identification

No	60945	Requirement	Note	Result
16	6.1.4 a)	Check that all operational controls and indicators are easy to identify and read from the position where the equipment is normally operated.		Passed
17	6.1.4 b)	Check that instrument and indicator character type is simple and clear. The character height (mm) shall not be less than 3,5 times the reading distance in metres, and the nominal character width shall be 0,7 times the character height.	Character height is 3.5 mm according to 1 m viewing distance	Passed
18		Check that instruments meant to be operated, or fitted in connection with controls are readable from a distance of at least 1 m, and that other instruments are readable from a distance of at least 2 m.		Passed
19	6.1.4 c)	Check that the controls and indicators are identified in English, and that the identifications provided in the equipment standard are used.		Passed
20	6.1.4 d)	Check that indicators are satisfactorily positioned relative to the operator line of sight, and are not obscured when operating associated controls under normal operating conditions.		Passed

3.1.5 6.1.5 Screen display

No	60945	Requirement	Note	Result
21	6.1.5 a)	Check that menus are grouped according to the task environment. Check that hierarchical menu structures have been designed to minimise the number of steps required and that the user has an indication of current position in the menu.		Passed
22	6.1.5 b)	If menu selections are made of keyed codes, check that each code is the first letter or letters of the displayed option label rather than an arbitrary letter.	There are no key codes for menu selection. Menu items are touched directly in the menu	N/A
23	6.1.5 c)	Check that a menu displays only those options currently available in the current context to the user. Check that menu items are highlighted when the cursor passes over them.		Passed
24	6.1.5 d)	Check that for menu items that can be in an “On” or “Off” state the “On” state should be indicated by making the item perceptually distinct and that selection of menu items with “On” and “Off” states change their state.	“On” state items are marked with a kind of filled radio button	Passed
25	6.1.5 e)	Check that items which appear the same behave consistently by, for instance, 1 – checking for consistent display format and selection logic in hierarchical menus, 2 – checking that menus used in different displays are consistent, 3 – checking that menus are displayed in consistent screen locations, 4 – checking for consistent input prompts and checking that labels are consisten**t.**		Passed
26	6.1.5 f)	Check that the user does not have to remember information from one part of a dialogue to another		Passed
27	6.1.5 g)	Check that the system employs marine terminology conforming with the SMCPs where appropriate.		Passed

No	60945	Requirement	Note	Result
28	6.1.5 h)	Check that displayed text is easy to understand wherever possible.		Passed
29	6.1.5 i)	Check that where additional on-line help is available it is in task dependent form, easy to search and list the steps to be carried out.	No online help is available	N/A
30	6.1.5 j)	Check that in all operations the system state is observable with essential data displayed.	In all sub-screens there is a headline which identifies the state	Passed
31	6.1.5 k)	Check that all information required by the user to perform an operation is available on the current display.		Passed
32	6.1.5 l)	Check that feedback timing is consistent with the task requirements. Check that there is a clear feedback from any action within a short time. Check that where a perceptible delay in response occurs, a visible indication is given.	There is no significant delay of the feedback.	Passed
33	6.1.5 m)	Check that it is possible at any step of a screen supported operation to return with one action to the original status before the operation was started.	Using the “X” button available in all states	Passed
34	6.1.5 n)	Check that any mode in use is distinctively identified by the display.	In all sub-screens there is a headline which identifies the mode	Passed
35	6.1.5 o)	Check that displays present the simplest information consistent with their function, information irrelevant to the task is not displayed, and extraneous text and graphics are not present.		Passed
36	6.1.5 p)	Check that displayed text is clearly legible to the user. Check that the font and size of Alphanumeric characters are consistent. For any font used, check that it is possible to clearly distinguish between the characters: X and K, T and Y, I and L, I and 1, 0, O and Q, S and 5 and U and V.		Passed

No	60945	Requirement	Note	Result
37	6.1.5 q)	Check that the unit of measure is indicated for any data.	A few units are missing or incorrect. See table below for missing units	Passed
38	6.1.5 r)	Check that all information is presented on a background of high contrast.		Passed
39	6.1.5 s)	Check that highlighting is easily recognisable and is disabled when it is no longer applicable.		Passed
40	6.1.5 t)	Check that flashing is only used to signal an alarm and that only a small percentage of the screen is flashing at any one time. Check that if a user is required to read alarm text a marker symbol shall flash rather than the text. z	Flashing is not used	Passed

Sub-screen	Item	Unit	Remark
Own ship	GPS antenna position	m	Missing Retest 2012-04-18 Ba: Unit (m) has been added
Region settings	Transition zone	NM	missing Retest 2012-04-18 Ba: Unit NM has been added for the transitional zone
Advanced/ Current position	ROT	°/min	Incorrect, displayed unit is "°" Retest 2012-04-18 Ba: The unit has been corrected to "°/min".

3.1.6 Voice announcement (see 4.2.1.6)

No	60945	Requirement	Note	Result
41	2.1.6 a)	Check that voice announcements are in plain language, using marine terminology Conforming with the SMCPs where appropriate, and in the English language.	There is no voice announcement	N/A
42	2.1.6 b)	Check that it is possible to adjust the volume to extinction and that sudden changes in loudness do not occur.		N/A
43	2.1.6 c)	Check that voice announcements stop when their associated indication or alarm is Acknowledged.		N/A
44	2.1.6 d)	Check that failure of the voice announcement system by disabling the loudspeaker, does not degrade the operation of the provided indicators and alarms.		N/A

3.1.7 6.1.7 Safety of operation (see 4.2.1.7)

No	60945	Requirement	Note	Result
45	6.1.7 a)	Check that the system attempts to prevent ascertainable user-action error from occurring.		Passed
46	6.1.7 b)	Check that all actions that may be irreversible, require a confirmation before proceeding.	Covered by IEC61993-2 test report	N/A
47	6.1.7 c)	Check that when an action causes a detectable error the system gives clear feedback such as by including UNDO and/or REDO options where possible.	Covered by IEC61993-2 test report	N/A
48	6.1.7 d)	Check that the EUT makes use of any quality indication contained in the input from other systems or sources.	Covered by IEC61993-2 test report	N/A
49	6.1.7 e)	Check that the user has available means to return to a known safe state with a single action.	Using the “Home” button	Passed

3.1.8 6.1.8 Distress alert

No	60945	Requirement	Note	Result
50	6.1.8 a)	Check that a distress alert is only activated by means of a dedicated distress button, and that it is not a key of an ITU-T digital input panel, or of an ISO keyboard on the equipment. Check that the button is physically separated from functional buttons/keys used for normal operation. Check that the button is a single button used for no other purpose than to initiate a distress alert.	Not applicable for AIS	N/A
51	6.1.8 b)	Check that the dedicated distress button Is clearly identified by being red in colour and marked “DISTRESS”. Where a non-transparent protective lid or cover is used check that this is also marked “DISTRESS”.	Not applicable for AIS	N/A
52	6.1.8 c)	Check that the dedicated distress button is protected against inadvertent operation by means of a spring loaded lid or cover permanently attached to the equipment, for example by hinges. Check that it is not necessary for a user to remove additional seals or to break the lid or cover in order to operate the distress button.	Not applicable for AIS	N/A
53	6.1.8 d)	Check that the distress alert initiation requires at least two independent actions. Lifting the protective lid or cover is considered as the first action. Pressing the distress button is considered as the second independent action.	Not applicable for AIS	N/A
54	6.1.8 e)	Check that the equipment indicates the status of a distress alert transmission by checking that the distress button generates a visible and audible indication. Check that when the distress button is pressed a flashing light and intermittent acoustic signal start immediately. Check that after the distress button has been pressed for at least 3 s, the transmission of the distress alert is initiated and the indication becomes steady.	Not applicable for AIS	N/A

No	60945	Requirement	Note	Result
55	6.1.8 f)	Check that it is not possible to interrupt the transmission of a distress alert or distress message which is in progress, but that it is possible to interrupt repetitive transmissions of a distress message.	Not applicable for AIS	N/A

3.2 6.2 Hardware

3.2.1 6.2.1 General (see 4.2.2.1)

No	60945	Requirement	Note	Result
56	6.2.1 a)	Check that provision has been made for the removal of, or for blocking off, the position of controls of any optional facilities which are not fitted.	There are no optional facilities	N/A
57	6.2.1 b)	Check that operational controls, the inadvertent exercise of which could switch off the equipment, lead to performance degradation, or to false indications not obvious to the operator, are specially protected against unintentional operation.	Covered by IEC61993-2 test report	N/A
58	6.2.1 c)	Check that the design of the EUT is such that misuse of the controls required for normal operation, and which are accessible to the operator, shall not cause damage to the equipment or injury to personnel.	Use of controls cannot damage the equipment. Critical input items are protected by password	Passed
59	6.2.1 d)	Check that where a digital input panel with the digits “0” to “9” is provided, the digits are arranged to conform with ITU-T Recommendation E.161 (4x3 array) or, alternatively, where an alpha-numeric keyboard layout, as used on office machinery and data processing equipment, is provided, the digits “0” to “9” are arranged to conform with ISO 3791.	The digit “1” to “9” are arranged to conform with ITU-T Recommendation E.161. Digit “0” is because of space limitations not below the “8” but right of the “9”.	Passed

3.2.2 6.2.2 Alarms and indicatiors (see 4.2.2.2)

No	60945	Requirement	Note	Result
60	6.2.2 a)	Check that the EUT is provided with facilities which permit the testing of all operational indicators (alarm, warning and routine), displays and audible devices. Check audible alarms as described in 11.1.	Not applicable because there are no indicators in addition to the screen.	N/A

No	60945	Requirement	Note	Result
61	6.2.2 b)	Check that alarm indications are red, or if on displays, red or otherwise highlighted.	The alarm indication in the top line is red	Passed
62	6.2.2 c)	Check that warning and alarm indications show no self-illumination, except to outline the alarm area on CRT or LCD displays, in the "safe" condition, and that any indirect illumination is low enough to avoid false indications.	The Alarm indication in the top line is not visible if no alarm is active	Passed

3.2.3 6.2.3 Illumination (see 4.2.2.3)

No	60945	Requirement	Note	Result
63	6.2.3 a)	Check that any illumination provided in the EUT is adequate for operation of the equipment under all expected conditions of ambient illumination. Check that it can be adjusted for night use so that the night vision of the officer of the watch is not harmed by it.		Passed
64	6.2.3 b)	Check that means are provided for dimming the output of any light source of the equipment which is capable of interfering with navigation.		Passed
65	6.2.3 c)	Check that any external illumination required is clearly identified in the equipment manual.	No external illumination is required	N/A
66	6.2.3 d)	Check that warning and alarm indicator lamps cannot be dimmed below reading intensity.	There are no that warning and alarm indicator lamps	N/A
67	6.2.3 e)	Check that the illumination dazzle-free and adjustable to extinction, except for those warning and alarm indicators which are illuminated in the warning/alarm condition, and indicators required for equipment reactivation or distress alerting, which are to be clearly visible in all appropriate conditions of ambient illumination.		Passed

No	60945	Requirement	Note	Result
68	6.2.3 f)	Check that controls which are not illuminated, such as tracker balls, are locatable easily and unambiguously by tactile means.	There are no controls which are not illuminated except the on/off button which is locatable easily and unambiguously by tactile means.	Passed
69	6.2.3 g)	Check that all information is presented with high contrast on a low-reflectance background which emits negligible light at night.	In the Night mode of the display	Passed
70	6.2.3 h)	Check that transparent covers to instruments cannot cause reflections which reduce readability to an unacceptable level.	There are no transparent covers	N/A
71	6.2.3 i)	Check that adjustable dimming from full brightness is provided for all lamps which are to be used in conditions of varying ambient illumination.		Passed

3.3 6.3 Software

3.3.1 6.3.1 General

No	60945	Requirement	Note	Result
72	6.3.1	Check documentation for compliance with 4.2.3.1.: The code of practice employed in the design and testing of the software integral to the operation of the equipment under test shall be specified and conform to a quality control system audited by a competent authority. The code of practice shall define the methodology used in the development of the software and the standards applied. It shall, amongst others, include the following criteria: – complex software shall be structured to support separate testing of single modules or of groups of associated modules. Functions of safety protection linked with control functions shall always give priority to safety. – the structure shall support maintenance and up-dates of software by minimizing the risk of undetected problems and failures. The manufacturer shall supply documentation demonstrating that the software of the EUT is Developed and tested according to the code of practice and the requirements of 4.2.3 e.g. by block, data flow or status diagram.	Documented by: File IEC 60945 Software development.doc, supported by file: “Process Description Development_Ver.3.pdf” and confirmed by the accreditation document from Nemko, file:“Accreditation Document 09.02.2011.pdf”	Passed

3.3.2 6.3.2 Safety of operation (see 4.2.3.2)

No	60945	Requirement	Note	Result
73	6.3.2 a)	Check documentation for compliance with 4.2.3.2.: Facilities shall be provided to protect all operational software incorporated in the equipment..		
		Any software required in an equipment to facilitate operation in accordance with its equipment standard, including that for its initial activation/reactivation, shall be permanently installed with the equipment, in such a way that it is not possible for the user to have access to this software.		Passed
		It shall not be possible for the operator to augment, amend or erase, during normal use, any program software in the equipment required for operation in accordance with the equipment standard.		Passed
		Data used during operation and stored in the system shall be protected in such a way, that necessary modifications and amendments by the user cannot endanger its integrity and correctness.		Passed
		Default values shall be inserted whenever relevant to facilitate the required operation of the equipment.		Passed
		Display and update of essential information available in the equipment as well as safety related functions shall not be inhibited due to operation of the equipment in any particular mode, for example dialogue mode.	Essential information is displayed in a top status line which is always visible	Passed
		When presented information is uncertain or derived from conflicting sources, the equipment shall indicate this		Passed

No	60945	Requirement	Note	Result
74	6.3.2 b)	Check that software defaults, where applicable, are inserted in all modes of operation and that the default value: – facilitates the preferred or expected operation of the equipment in accordance with the applicable equipment standards – does not lead to an unexpected or invalid operation, and – has the effect of minimising the number of inputs or transmissions into the system – under which it operates.		Passed
75	6.3.2 c)	Check that the software prevents an operation or warns an operator when attempting an input that leads to an invalid operation of the equipment.		Passed
76	6.3.2 d)	Check that the operator has the possibility to choose a value other than the default value.		Passed
77	6.3.2 e)	Check that operations not required for normal operation, or which may adversley affect system performance, are not readily accessible.	They are in separate menues and partly protected by password	Passed

3.3.3 6.3.3 Monitoring (see 4.2.3.3)

No	60945	Requirement	Note	Result
78	(1)	Check documentation for compliance with 4.2.3.3. The manufacturer shall provide information on how to produce a non-recoverable error.	Covered by IEC61993-2 test report	N/A
79	(2)	Carry out the non-automatically recoverable error according to the above information. Check that the alarm can be recognized as noted in the manufacturers documentation.	Covered by IEC61993-2 test report	N/A

3.3.4 6.3.4 Operation (see 4.2.3.4)

No	60945	Requirement	Note	Result
80	6.3.4	Check documentation for compliance with 4.2.3.4. : The system may allow function keys to speed up selection of common sequences.	No function keys available	N/A

3.4 6.4 Inter-unit connection (see 4..2..4)

No	60945	Requirement	Note	Result
81	6.4	Check with the manufacturer of the EUT, using equipment documentation if necessary, that when it is connected to, and operating with, other units of equipment, arrangements have been provided to maintain the performance of the EUT and of the other units. In particular:		
82	6.4 a)	check that the software interfaces between the EUT and other equipment are tested, and that special test software is provided for this purpose if necessary;	Covered by IEC61993-2 test report	N/A
	6.4 b)	ensure that arrangements have been made to achieve electrical separation and isolation between the EUT and the equipment to which it may be connected, if appropriate, such as by checking that:		
83		1) an exchange of any signals between units is carried out with minimum effect on the signal source;	Covered by IEC61993-2 test report	N/A

No	60945	Requirement	Note	Result
84		2) there is no loading of circuits or mismatch of transmission lines, particularly on high-frequency or fast-rise time signals;	Covered by IEC61993-2 test report	N/A
85		3) a capability exists of sustaining a 1 kV isolation between units of equipment.	Covered by IEC61993-2 test report	N/A

4 10 Immunity to electromagnetic environment

4.1 10.8 Immunity to power supply failure

No	60945	Requirement	Note	Result
86a	6.3.4	The EUT shall be subjeted to three breaks in power supply of duration 60 s each. The requirements of the EMC performance check shall be met after the test in accordance with the prformance criterion C, as described in 10.2. There shall be no corruption of operational software or loss of essential data.	2012-04-04 Ba During the power supply failure periods the EUT is completely switched off. The EUT fulfilles the requirements according to criterion C, but no user action is required after the test to continue normal operation. A performance check according to IEC 61993-2 has been successfully performed after each power off period.	Passed

5 11.1 Acoustic noise and signals

5.1.1 11.1.3 Required result

No	60945	Requirement	Note	Result
(all equipment intended for installation in wheel-house and bridge wings) see 4.5.2)				
		4.5.2 (A.694/6.2) *Mechanical noise from all units* shall *be limited so as not to prejudice the hearing of sounds on which the safety of the ship might depen*d.		
86	(1)	The acoustic pressure shall not exceed a level of 60 dB(A) at a distant of 1 m from any part of the EUT.	The unit does not generate any noise, no fans are used	Passed
87	(2)	With audible alarms switched on, the acoustic noise pressure of an alarm shall be at least 75 dB(A) but not greater than 85 dB(A) at a distant of 1 m from any part of the EUT which is accessible for ist operation.	Not applicable, AIS units use an output relay for exteranal alarm	N/A

6 13.1 Maintenance

No	60945	Requirement	Note	Result
(all equipment categories)				
		The EUT shall be checked for conformity with the requirements of 4.7, paying due regard to any restriction likely to be imposed by the installation spatial environment.		
88	4.7.1 (1)	**Maintenance of hardware** (A.694/8.1) The equipment shall be so designed that the main units can be replaced readily, for on-board repair, without elaborate recalibration or readjustment.		Passed
89	4.7.1 (2)	(A.694/8.2) Equipment shall be so constructed and installed that it is readily accessible for inspection and maintenance purposes.		Passed
90	4.7.2 (1)	**Maintenance of software** – Equipment shall be so designed that maintenance of software can be readily carried out on board. – Maintenance shall be supported by labelling in accordance with 4.9 (Marking and identification). – No user retraining shall be necessary after maintenance.	– Passed – See Note) of section 15. – For item 2 we need a declaration that no user retraining shall be necessary after maintenance. 2012-04-18 Ba: In section 2 of revision D of the manual there is a declaration that no user retraining shall be necessary after maintenance	Passed Passed Passed
91	4.7.2 (2)	On board documentation shall be updated with the software maintenance to reflect any changes introduced.	See Note) of section 15	Passed

7 14 Equipment manuals

No	60945	Requirement	Note	Result
(all equipment categories)				
92		The equipment manuals shall be checked for compliance with 4.8. Examples of typical operational and equipment setting up procedures shall be checked for ease of use and effectiveness, and examples to typical fault-finding routines shall be checked for ease of use and effectiveness under simulated fault conditions. (A.694/8.3) Adequate information shall be provided to enable the equipment to be properly operated and maintained by suitably qualified members of the ship's crew.		Passed
93	4.8 a)	Operating and servicing manuals shall: be written in English	Covered by IEC61993-2 test report	N/A
94	4.8 b)	identify the category of the equipment or units to which they refer (4.4);	For the transponder the category is clearly expressed as "exposed". For the Display the IEC 60945 is not clearly exposed. It is defined as "IP54". It is not clear if this is the IEC 60945 category "protected" or "Exposed". This should be clarified. Retest 2012-04-18 Ba: For the display the category "Protected" has been added	Passed Passed
95	4.8 c)	- (A.694/8.3.1) in the case of equipment so designed that fault diagnosis and repair down to component level are practicable, provide full circuit diagrams, component layouts and a component parts list;	Not applicable for the EUT	N/A

No	60945	Requirement	Note	Result
96	4.8 d)	- (A.694/8.3.2) in the case of equipment containing complex modules in which fault diagnosis and repair down to component level are not practicable, contain sufficient information to enable a defective complex module to be located, identified and replaced. Other modules and those discrete components which do not form part of modules shall also meet the requirements of 4.8 c) above.	Not applicable because the EUT does not consist of complex modules.	N/A
97	4.8 (2)	Moreover adequate information shall be provided to allow equipment to be installed so that it operates in accordance with the requirements of the relevant equipment standard, taking into account limitations imposed by the operation of other equipment also required to be installed on the bridge.	Covered by IEC61993-2 test report	N/A

8 15 Marking and identification

No	60945	Requirement	Note	Result
(all equipment categories)				
		The EUT shall be checked for compliance with 4.9. (A.694/9) Each unit of the equipment should be marked externally with the following information which, where practicable, should be clearly visible in the normal installed position:		
		There is no type label on the EUT. Please provide a drawing or photo of the final type label 2012-04-18 Ba: Technical drawings of the type labels have been provided. The following results are based on these drawings		
98	4.9 1)	– identification of the manufacturer;		Passed
99	4.9. 2)	– equipment type number or model identification under which it was type tested;	Transponder: TR-8000 Transponder Unit P/N: 853000 TR-8000 Display: TR-8000 Display unit P/N: 854000 TR-8000	Passed
100	4.9 3)	– serial number of the unit.		Passed
101	4.9. (2)	Alternatively, the marking may be presented on a display at equipment start-up.		N/A
102	4.9 (3)	The equipment shall be marked either before delivery to the ship, or on the ship at the time of installation.	Before deleivery to the ship	Passed
103	4.9 (4)	– The title and version of each software element included in the installed software system shall be either marked or displayed on command on the equipment.	The software version of the transponder and MKD are displayed on the MKD. See also note)	Passed

No	60945	Requirement	Note	Result
104	4.9 (5)	When the marking and the title and the version of the software are displayed only on the display, such information shall also be included in the equipment manual.	See Note)	Passed

Note)

We need a declaration how the software version is provided regarding the labelling and manual, in general and especially in case of software maintenance to fulfill the requirements of IEC 60945 13.1 and 15. That means, we need information if the label is updated with the new software version or if it is included in the manual, e.g. as a sticker.

I understand IEC 60945 in the way that in addition to displaying the software version on the display it has to be shown either on the equipment label or in the manual.

Retest 2012-04-18 Ba:

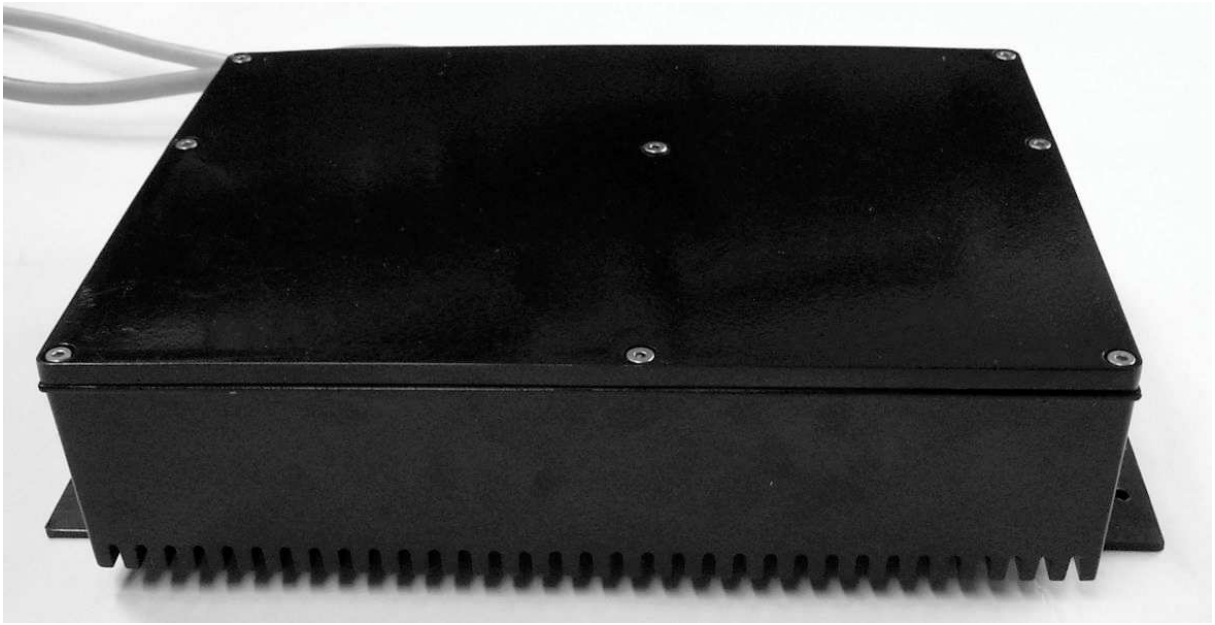
Revision D of the Operator and Instruction Manual:

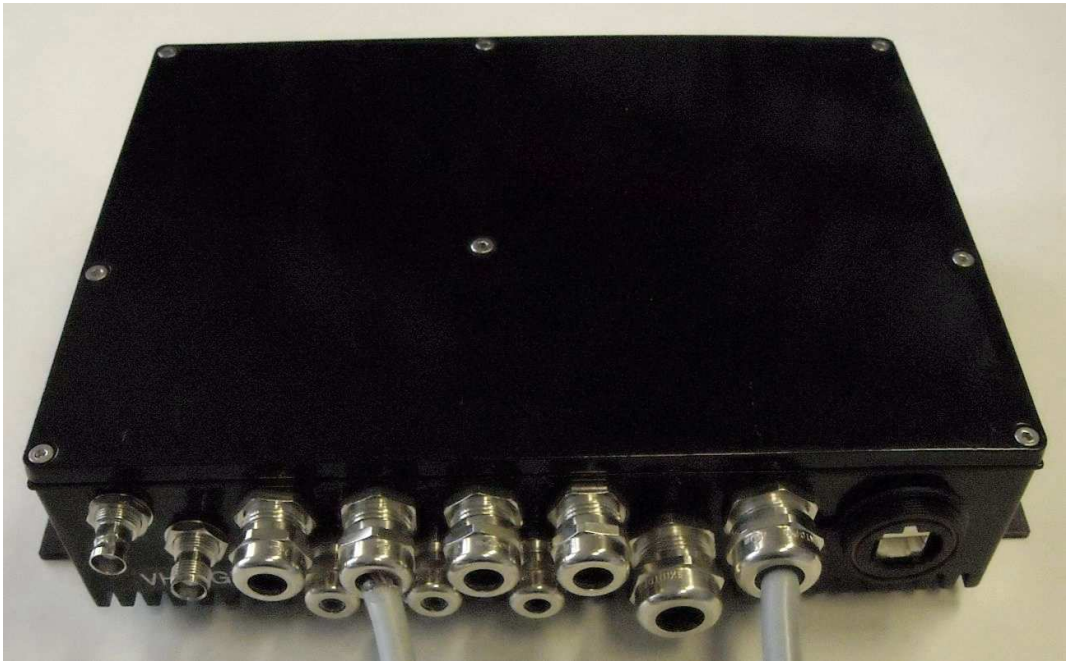
According to section 2 Software revisions the software version at delivery time are included in the manual.

There are empty lines in the manual. When the software is updated the new software version numbers have to be added manually in the next empty line.

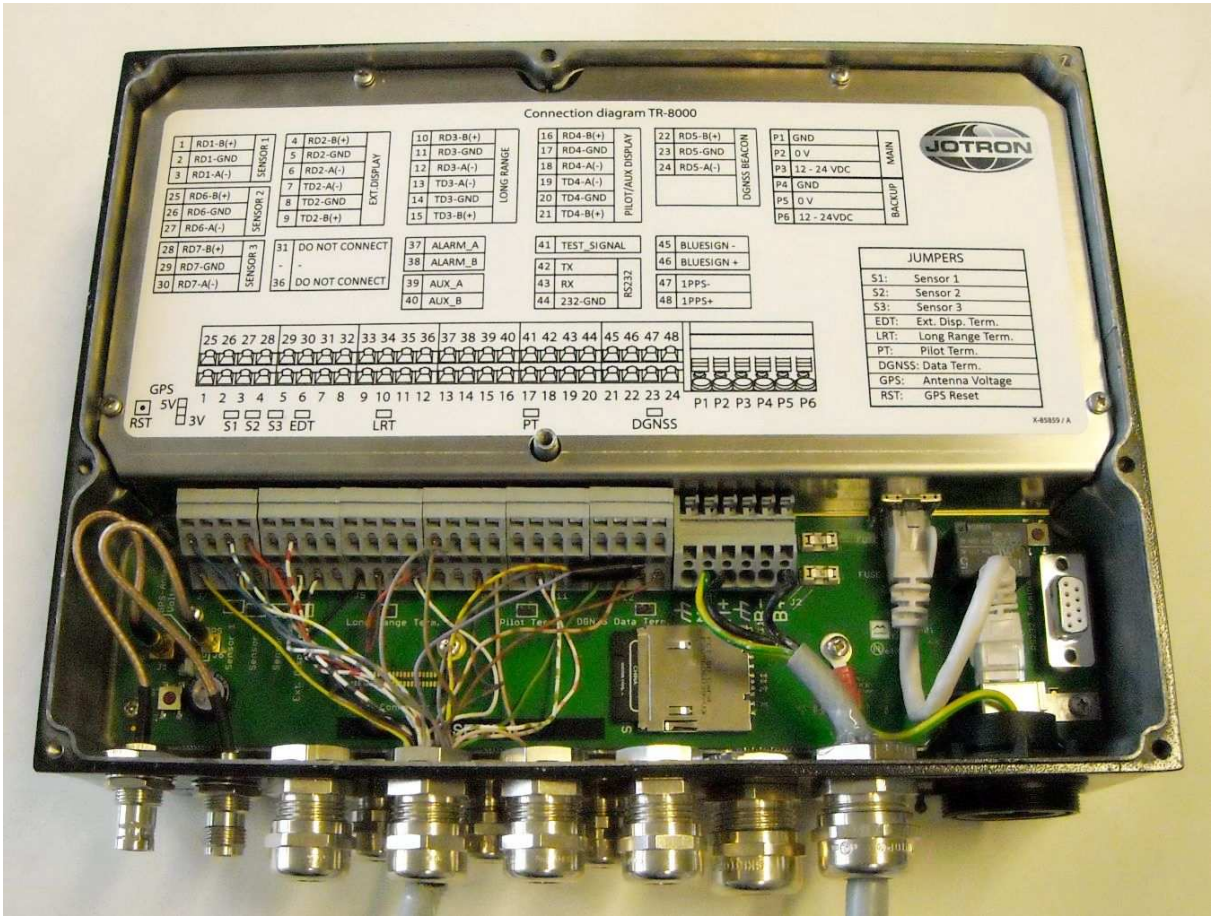
Annex A Photos of equip m e nt under test

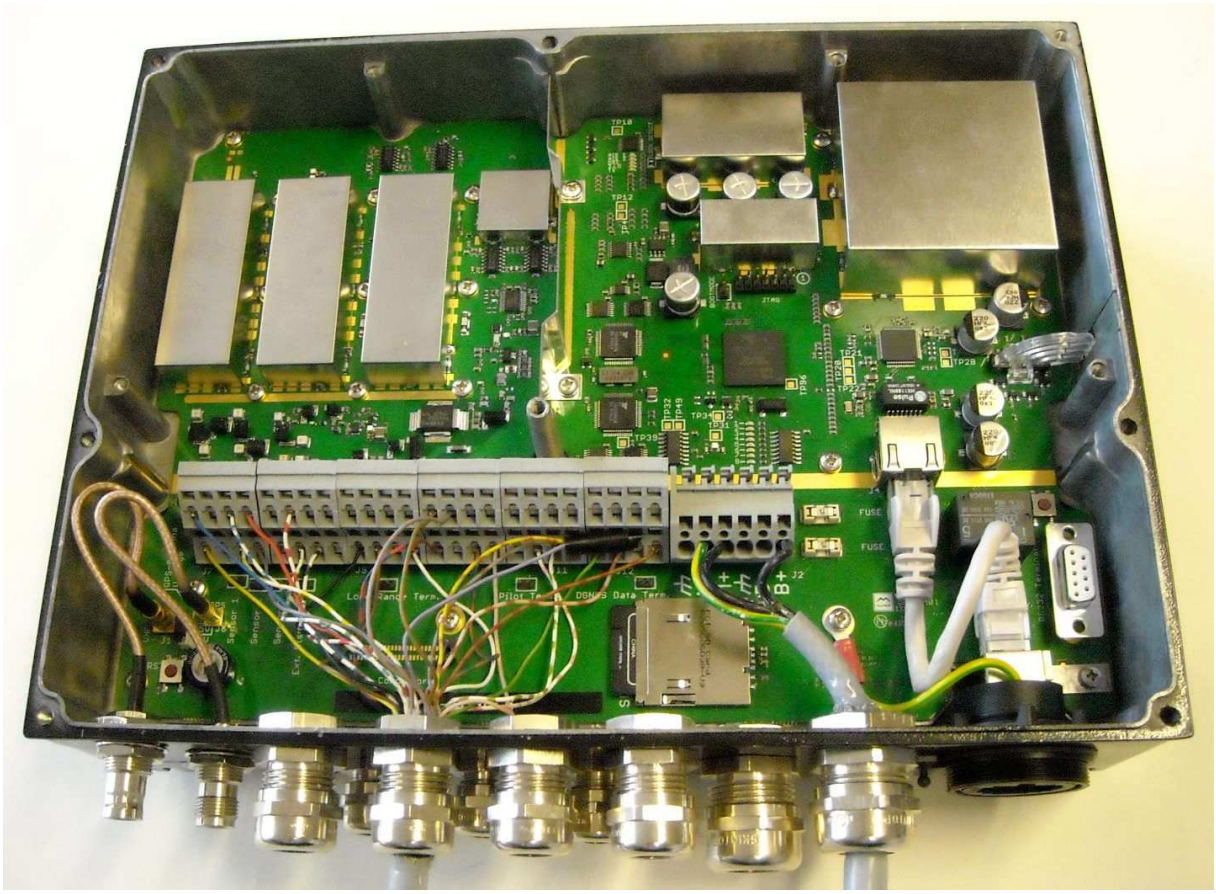
A.1 TR-8000 Transponder Unit






BSH GODJENNING 1
TX
RX
ALARM
OK


Connection diagram TR-8000
JOTRON
JUMPERS
S1: Sensor 1
S2: Sensor 2
S3: Sensor 3
EDT: Ext. Disp. Term.
LRT: Long Range Term.
PT: Pilot Term.
DGNSS: Data Term.
GPS: Antenna Voltage
RST: GPS Reset
GPS
RST
5V
3V
S1 S2 S3 EDT
LRT
PT
DGNSS
P1 P2 P3 P4 P5 P6



A.2 TR-8000 Display unit


3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