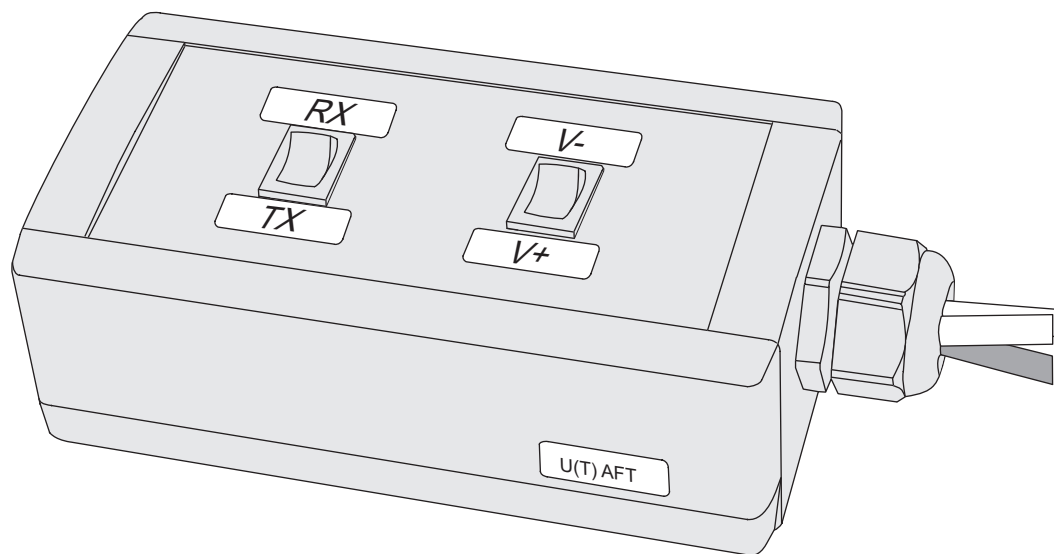


## **Testbox Preamplifier D**

### **Original Documentation**



**Operating Instructions**  
**005005-0125-002/A, 20 Nov 2012**  
**Stock-No. 074884**

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#### Revision Record

Rev.	Date of Issue	Remarks
A	20 Nov 2012	initial release

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# Safety Instructions

## Safety Notice Conventions

Additional safety notes are presented within the individual sections of this document. The following safety conventions are followed:

### DANGER



A **Danger** notice contains an operating or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, **will result in injury or death of personnel.**

### WARNING



A **Warning** notice contains an operating or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, **could result in injury or death of personnel.**

### CAUTION



A **Caution** notice contains an operating or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, **could result in damage to, or destruction of equipment.**

### Note



A **Note** contains an essential operating or maintenance procedure, a condition or a statement, which is considered important enough to be highlighted.

Special safety symbols may be used in this document to indicate:



### Risk of electrical shock.

Used in conjunction with a **Danger** or **Warning** notice.



Electrical components are sensitive to electrostatic discharge.

Used in conjunction with a **Caution** notice.

## General Safety Information

### WARNING



**Risk of injury or death of personnel during transducer installation, maintenance and service procedures when entering confined space**  
Transducers are located in confined space of vessels defined as dangerous working zones.

Do not enter any confined space on a ship without being trained on safety procedures and work practices relating to confined spaces. As a minimum, ensure that the atmosphere in the confined space is safe and breathable. Sperry Marine recommends that a competent person test the atmosphere for oxygen deficiency, combustible gases, hydrogen sulfide, and other hazardous gases that are reasonable to expect in that area. Vent the area, as necessary, to provide a safe, breathable atmosphere.

Never enter a confined space unaccompanied and without a third person's constant supervision from a safe distance or from the entrance to the confined space. Always make sure that all persons involved with carry working flashlights with fresh batteries.

## Safety Instructions for Service Personnel

### DANGER



**Life danger through electrical shock**

Hazardous voltage is present at the transducer terminals located on the fore and aft channel transmit/receive PCBs in the preamplifier D.

Danger of electrical shock or burn when the transducer terminals are touched while power is applied to the preamplifier.

Never touch the transducer terminals and connect or disconnect the transducer cable while power is applied to the preamplifier.

### WARNING



**Risk of electrical shock**

Avoid to install the preamplifier D in hazardous areas.

If it is unavoidable to install the unit in a hazardous area, secure the electronics unit inside an explosion proof housing and the interconnecting cables inside an explosion proof conduit.

### WARNING



**Risk of electrical shock**

Always make sure when wiring up the system that the power supply for the NAVIKNOT system is switched off and is safeguarded against accidental switching-on.







### CAUTION



**Risk of damage by unprofessional welding**

Unprofessional welding bears high risks and can lead to extensive damage of the vessel's equipment.

Always maintain, that all welding work must be carried out by a qualified welder, examined according to the rules of the relevant classification society.

<p><b>CAUTION</b></p>		<p>Damage to the transducer function caused by cabling changes Cutting or shortening of the transducer cable or connecting new cables with existing old cabling will lead to damage or malfunction. The given length of any specific transducer cable is a necessary element of its performance. Cutting or shortening as connecting to old cabling will harm the performance characteristics of the transducer cable and lead to malfunction of the transducer. Always use the transducer cables in the original length. Never cut or shorten the transducer cables. Rewire excess cable length in a loop if necessary. Never connect a new transducer cable to old cabling.</p>
<p><b>CAUTION</b></p>		<p>Risk of damage or malfunction of the preamplifier D (type 5005) caused by wrong output power adjustment Wrong output power adjustment will cause damage or malfunction to the preamplifier D. Always keep to the right output power adjustment procedure: Potentiometer must be turned to minimum power before switching the fore and aft channels for correction of direction error. After each reconnecting of the cable or exchange of the preamplifier D, the output power adjustment has to be performed again.</p>
<p><b>CAUTION</b></p>		<p>Risk of damage Contamination of or damage to the surface finish of the transducer face will alter the acoustic effectiveness of the transducer and degrade the system accuracy. Do not let the face of the transducer come into contact with grease or other lubricants.</p>
<p><b>CAUTION</b></p>		<p>Risk of damage Incorrect connection of the testbox to the preamplifier may damage the testbox when proceeding with the receive test. Always make sure that the connection is correctly finished, before the start of the receive test.</p>
<p><b>CAUTION</b></p>		<p>Risk of damage of the preamplifier D (type 5005) Connecting a new transducer with the existing transmission power settings (adjustment trim pots R64) of the old transducer and power ON will destroy the preamplifier D (type 5005). Always make sure, that the power is Off and that the potentiometers (adjustment trim pots R64) on the fore and the aft channel transmit/receive PCBs are set to the fully clockwise position (minimum transmit power), before connecting a new transducer.</p>
<p><b>Note</b></p>		<p>The transmission test described is for the functional testing of the preamplifier D only. The adjustment of the transmission power needs to be repeated with the connected transducer afterwards.</p>





# Chapter 1: Description and Test Procedures

## 1.1 Description

The testbox preamplifier D is designed to test the functionality of the preamplifier D, type 5005, installed with the respective NAVIKNOT Doppler speed log systems.

Figure 1-1 shows the top view of the testbox preamplifier D with cabling in overview.

**Figure 1-1:**  
Testbox Preamplifier D  
with cabling

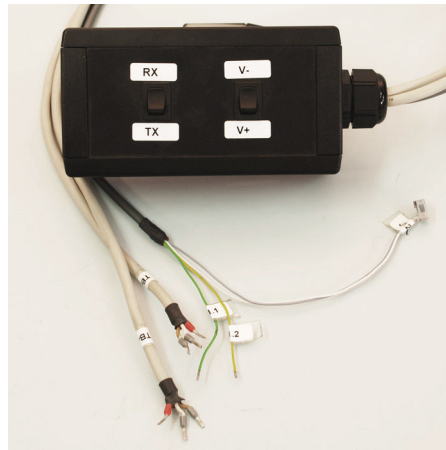


Figure 1-2 and Figure 1-3 show the side views of the testbox preamplifier D with the checkpoints U(T) Aft and U(T) Fore.

**Figure 1-2:**  
Checkpoints U(T) Aft



**Figure 1-3:**  
Checkpoints U(T) Fore



**Note**



The checkpoints U(T) Aft / U(T) Fore are for connecting an oscilloscope.

Figure 1-4 shows the back view of the testbox preamplifier D with a connection information drawing.

**Figure 1-4:**  
Testbox Preamplifier D  
back view

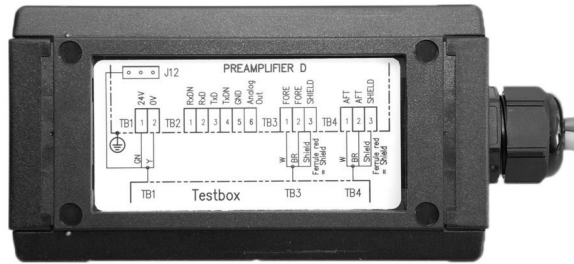


Figure 1-5 shows the side view of the testbox preamplifier D with the type plate.



**Figure 1-5:**  
Testbox Preamplifier D  
type plate

## 1.2 Technical Data

### Testbox Wire Assignment

Testbox Cable	Wire	Function
TB 1 (grey cable)	TB 1.1 (green) TB 1.2 (yellow)	Connection to TB1 of Doppler speed log (power supply from bridge)
TB 1 (grey cable)	J 12 plug (white, silver)	Connection to J 12 of preamplifier D PCB
TB 3 (white cable)	TB 3 red (shield) TB 3 white TB 3 brown	Connection to TB 3 of preamplifier D (instead of transducer)
TB 4 (white cable)	TB 4 red (shield) TB 4 white TB 4 brown	Connection to TB 4 of preamplifier D (instead of transducer)

### Testbox Switch Configuration

Switch	Function	Setting
Switch 1: RX / TX	Selection of test mode	TX: Transmission test mode RX: Receive test mode
Switch 2: V- / V+	Inversion of test speed (Receive test mode only)	By pressing, signals are switched to the other channel

### Testbox Checkpoints

Checkpoint	Function	Location
U(T) Aft	Access for transmission test of channel U(T) Aft	Side wall of testbox preamplifier D
U(T) Fore	Access for transmission test of channel U(T) Fore	Side wall of textbox preamplifier D

### **1.3 Connection of Testbox to Preamplifier D**

1. Separate the transducer cables from the preamplifier D.
2. Connect the wires of the white cables TB 3 (Fore) and TB 4 (Aft) of the testbox to TB 3 and TB 4 of the preamplifier D.
3. Separate the jumper from the J 12 terminal of the preamplifier D PCB.
4. Connect the triple-pole J 12 plug cable (grey cable, white and silver wires) to the J 12 terminal of the preamplifier D PCB.
5. Connect the wires of the grey cable TB 1.1 (green) and TB 1.2 (yellow) to TB 1 of the preamplifier D (parallel to incoming 24 V power supply of preamplifier D).

## 1.4 Test Procedures

### Transmission Test

The transmission test checks, the transmission performance of the preamplifier D. Load resistances of  $90\ \Omega$  are switched on to both channels Aft / Fore and consecutively the transmission process of the preamplifier is released over the J 12 connection.

Then, with an oscilloscope connected to the sidepins of the testbox, the transmission power of the preamplifier D can be determined.

1. Make sure, that the testbox is correctly connected to the preamplifier D.
2. Select switch 1 to setting TX.
3. Connect an oscilloscope at U(T) Aft / U(T) Fore to test the transmission power of the preamplifier D channels.

Note



The tested transmission power should show a sinus frequency of 2 MHz with an amplitude of around 85 Vpp.

Note



The transmission test described is for the functional testing of the preamplifier D only. The adjustment of the transmission power needs to be repeated with the connected transducer afterwards.

### Receive Test

CAUTION



Risk of damage

Incorrect connection of the testbox to the preamplifier may damage the testbox when proceeding with the receive test.

Always make sure that the connection is correctly finished, before the start of the receive test.

With the setting of switch 1 to position RX the receive test is started. The transmission process of the preamplifier is being disabled and constant test signals are fed to the Fore and Aft receive channels of the preamplifier D. The amplitude of the test signals of 1990 and 2010 KHz is consistent with a real receive signal, resulting in a test speed of 30,6 Kn.

By setting switch 2 between V- / V+, the test signals are switched to the other channel and the test speed is being inverted.

1. Make sure, that the testbox is correctly connected to the preamplifier D.
2. Select switch 1 to setting RX.
3. Determine and check the test speeds of the preamplifier channels.
4. Determine and check the inverted test speeds of the preamplifier channels, by setting switch 2 between V- / V+.

Note



The resulting test speeds are to be read from the CDU of the respective NAVIKNOT system.



# Appendix

## A Drawings

The following drawing is appended to this document:

Designation	Drawing No.
Wiring Diagram NAVIKNOT 450D PREAMPLIFIER TESTBOX	5005-0115-02

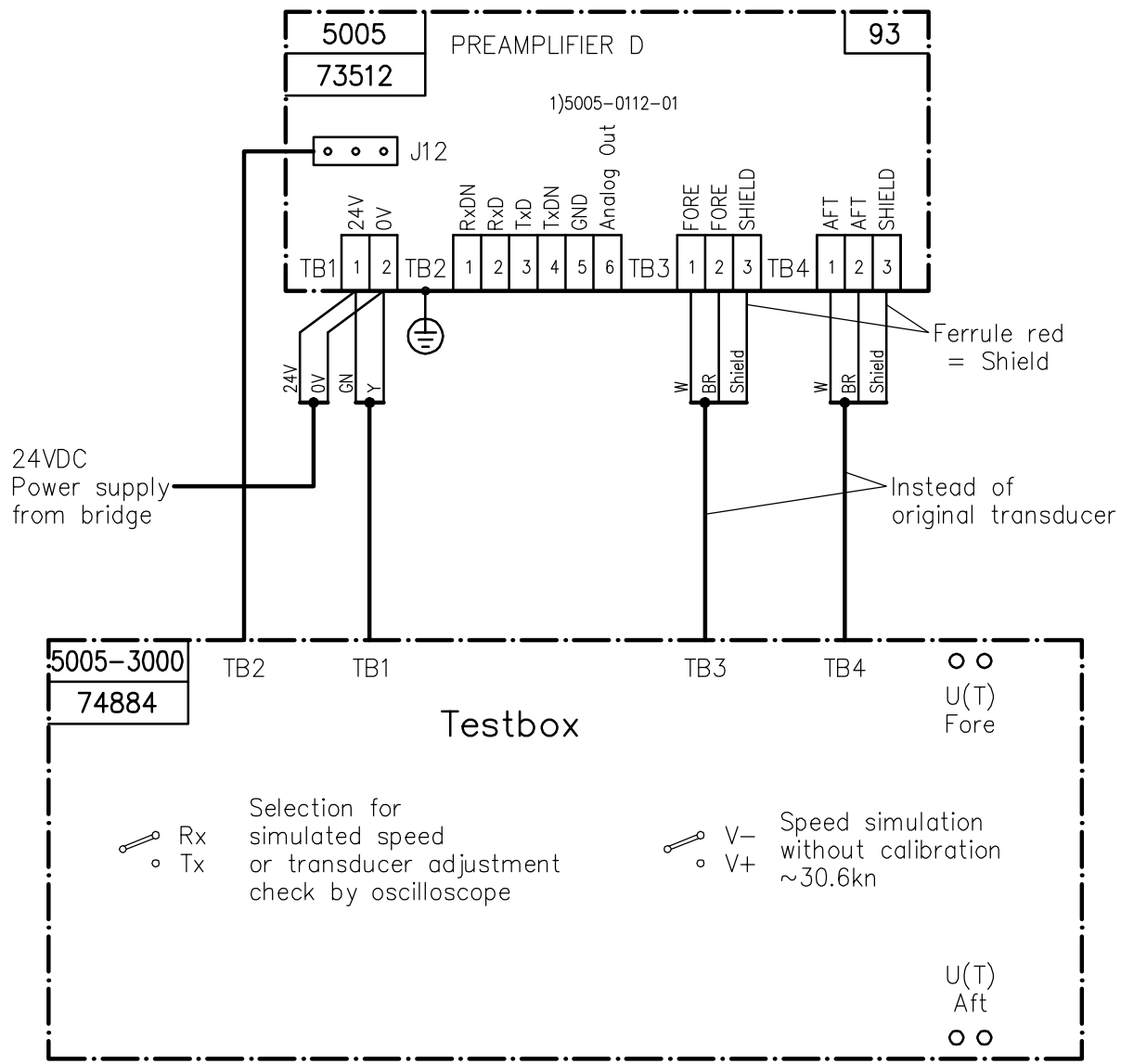
**Note**



All appended drawings are revision-controlled separately at Sperry Marine. In case of doubt, verify the current revision status of the drawings with Sperry Marine. This document's revision status does not change when the revision of an appended drawing changes.







					Date	Name	TITLE <b>NAVIKNOT 450D PREAMPLIFIER TESTBOX</b>	
				DRAWN	08.07.2009	Geisler		
				DESIGN	08.07.2009	Magner		
				01150124\5005-0115-01S02	CHD ECO			
<b>NORTHROP GRUMMAN</b>  Sperry Marine Hamburg Germany							DRAWING No. <b>5005-0115-02 /B</b>	SHEET 1 SHEETS 1
B	.	27.08.12	Geisler					© NORTHROP GRUMMAN SPERRY MARINE 08.07.2009 Each modification of this drawing requires the approval from NORTHROP GRUMMAN SPERRY MARINE HAMBURG in written form.
A	.	08.07.09	Geisler					
REV	ECO-No.	DATE	NAME					



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