



***Simrad CS90
Fish Finding Sonar
Sea Acceptance Test***

This is the Sea Acceptance Test for the Simrad CS90 Fish Finding Sonar.

The purpose of this Sea Acceptance Test is to verify the operational functionality of the CS90 that can only be fully tested with the vessel at sea. The test assumes that the Harbour Acceptance Test has been previously done and accepted on the same CS90 system. When all the tasks have been done, the report form must be signed by the relevant parties. The completed document then becomes the official report.

Vessel/Customer

Serial numbers (if applicable)	
Processor Unit	
Operating Panel	
Transceiver Unit	
Hull Unit	
Transducer	

Document information

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- **Document:** Sea Acceptance Test
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Warning

The equipment to which this manual applies must only be used for the purpose for which it was designed. Improper use or maintenance may cause damage to the equipment and/or injury to personnel. You must be familiar with the contents of the appropriate manuals before attempting to operate or work on the equipment.

Kongsberg Maritime disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment.

Disclaimer

Kongsberg Maritime AS endeavours to ensure that all information in this document is correct and fairly stated, but does not accept liability for any errors or omissions.

Support information

If you require maintenance or repair, contact your local dealer. You can also contact us using the following address: simrad.support@simrad.com. If you need information about our other products, visit <https://www.simrad.com>. On this website you will also find a list of our dealers and distributors.

Table of contents

INTRODUCTION.....	5
Purpose.....	6
Personnel and location	6
Referenced documents	7
Tools and test equipment	7
ACCEPTANCE TEST SUMMARY	8
HARDWARE AND SOFTWARE REGISTRATION	9
Verification of previously tested items.....	10
Software items	11
Hardware items	12
Display.....	12
Processor Unit	12
Transceiver Unit	13
Operating Panel	15
Hull Unit.....	15
Transducer	16
TESTING THE CS90 OPERATIONAL FUNCTIONALITY	17
Making a noise/speed curve to determine vessel noise	17
TESTING THE INTERFACES WITH PERIPHERAL DEVICES	24
Verifying the communication with a navigation system (GPS).....	24
Verifying the communication with speed log	25
Verifying the communication with the course gyro	26
Verifying the communication with the motion reference unit (MRU)	28
VERIFYING THE INSTALLATION PARAMETERS	29
Verifying vessel origin and ship dimensions	29
Verifying the installation parameters for the transducer	31
Verifying the installation parameters for the global positioning system (GPS) antenna	32
Verifying the installation parameters for the motion reference unit (MRU)	34
CREATING A BACKUP WITH THE CS90 CONFIGURATION AND SOFTWARE INSTALLATION	36
About CS90 software backup and restore.....	36
Creating a Processor Unit image on a USB flash drive using the Acronis True Image program	37

Restoring a Processor Unit image from a USB flash drive using the Acronis True Image program 38

Creating a bootable USB flash drive using the Acronis True Image program 40

CUSTOMER ACCEPTANCE FORM 42

SECONDARY PROCEDURES 43

Setting up the Operating Panel (Mk2) 43

Introduction

Topics

Purpose, page 6

Personnel and location, page 6

Referenced documents, page 7

Tools and test equipment, page 7

Purpose

This is the Sea Acceptance Test for the Simrad CS90 Fish Finding Sonar.

The purpose of this Sea Acceptance Test is to verify the operational functionality of the CS90 that can only be fully tested with the vessel at sea. The test assumes that the Harbour Acceptance Test has been previously done and accepted on the same CS90 system. When all the tasks have been done, the report form must be signed by the relevant parties. The completed document then becomes the official report.

Personnel and location

Successful completion of the test requires qualified and experienced test engineers and/or technicians.

This Sea Acceptance Test is done on board the vessel, in open waters, with a fully functional CS90 system. The test is done by personnel from Kongsberg Maritime. All personnel must have good knowledge of the product and/or module(s) at hand.

A representative from an authorized dealer or distributor can do the Sea Acceptance Test on behalf of Kongsberg Maritime.

Representatives from the client and/or end user are normally present to witness the test and results.

As with all assembly and test procedures related to advanced technical and/or electronic equipment, the skill of the operator is vital to a successful completion of the tasks. The only way to secure high quality of our products is first rate workmanship and high professional standards throughout the production chain.

It is equally important that all members of the production and test crews show initiative, and are willing to suggest improvements to functionality, design, procedures and documents. If you find a mistake in a document, or find that information is missing, offer this information to the proper authorities without further delay. Likewise, your experience as a skilled worker is valuable. Please forward any suggestions to make improvements to the product, the design, the production method, or any other matters related to your expertise.

Referenced documents

The installation and use of the CS90 is described in several documents and end user manuals. Internal test documents are used throughout the production and test of the CS90.

This list is not complete. Additional documents and end user manuals are available for the CS90. These publications are not relevant for this Sea Acceptance Test.

Note

Unless specified in the applicable procedure(s), the CS90 publications listed here are not required during this Sea Acceptance Test.

All the document numbers refer to the English version of each publication.

End user manuals

- **Reference Manual and On-line Help:** 442700
- **Installation Manual:** 442699

Software documents

- **Software Release Note:** 442717

Customer acceptance test procedures

- **Factory Acceptance Test:** 442721
- **Harbour Acceptance Test:** 442722
- **Sea Acceptance Test:** 442723

Qualifying documents

- **EC Declaration of Conformity:** NYA

Tools and test equipment

Specific tools and test equipment are required for this Simrad CS90 Sea Acceptance Test. The required tools and equipment must be made available before the test can start.

Specific test equipment is not required for this test. The following tools are required.

- Personal computer
- Spreadsheet program

Acceptance test summary

The purpose of this Sea Acceptance Test is to verify that the CS90 system is fully functional, and meets the operational requirements. This acceptance test summary is provided to offer an overview of the functions and items that need to be tested. References are made to the individual chapters in this Sea Acceptance Test.

Procedure

- 1 Record the software and hardware items that are included in the test.
 - [Hardware and software registration, page 9](#)
- 2 Test the main functionality of the CS90.
 - [Testing the CS90 operational functionality, page 17](#)
- 3 Test the interfaces between the CS90 and relevant external devices and/or sensors.
 - [Testing the interfaces with peripheral devices, page 24](#)
- 4 When all the tests have been successfully concluded, open the *Customer acceptance* form, and fill it in with the relevant signatures.
 - [Customer acceptance form, page 42](#)

Hardware and software registration

Topics

[Verification of previously tested items, page 10](#)

[Software items, page 11](#)

[Hardware items, page 12](#)

Verification of previously tested items

It is not necessary to fill in registration tables for software and hardware items that have already been recorded in a previous test.

Are the CS90 user interface software and hardware units the same as those tested during the *Harbour Acceptance Test*? If this is the case, it is not necessary to fill out the registration tables again.

- If no changes have been made to neither the software nor the hardware, sign the table below to verify this.
- If the software has been updated, record the new software version.
- If hardware changes have been made (units are replaced), all serial numbers must be recorded again.

Verification of previously tested items
Neither user interface software nor hardware units have been changed on this CS90 system since the <i>Harbour Acceptance Test</i> . For this reason, the registration tables have not been filled out.
Date and signature

Software items

Every software program that is provided as a part of the CS90 delivery must be registered. Part number and software version must be registered. When software media (USB flash drive, CD, DVD etc) is provided, the part number of the media and the CS90 software version provided on the media must be registered.

Software	Part number	Software version
Simrad CS90 Operational software	442716	

Software media	Part number	Software version
Simrad CS90 Software	442719	
Simrad CS90 End user manuals	442720	N/A
When applicable, the <i>software media</i> item can be any memory device (CD, DVD, USB flash drive, etc) that contains the CS90 software. End user documentation may be included on the same software media, or provided on a separate device.		

Hardware items

Topics

[Display, page 12](#)

[Processor Unit, page 12](#)

[Transceiver Unit, page 13](#)

[Operating Panel, page 15](#)

[Hull Unit, page 15](#)

[Transducer, page 16](#)

Display

Each display provided with the CS90 delivery must be uniquely identified. Make(s), model(s), part number(s) and serial number(s) must be registered. Any unit that is not provided by Kongsberg Maritime AS does not need to be registered.

Display (Make and model ¹)	Part number ²	Serial number	Revision
¹ Fill in the make, model and serial number for each unit that is provided with the CS90 delivery. If applicable, add the part number. The unit contains neither circuit boards nor modules that need to be identified separately.			
² This is the part number on the unit label.			

Processor Unit

The Processor Unit provided with the CS90 delivery must be uniquely identified. Make, model, part number and serial number must be registered.

Processor Unit ¹	Part number ²	Serial number	Revision
CS90 Processor Unit (with CS90 software)	441536		
¹ The unit contains neither circuit boards nor modules that need to be identified separately.			
² This is the part number on the unit label.			

Transceiver Unit

The Transceiver Unit provided with the CS90 delivery must be uniquely identified. Make, model, part number and serial number must be registered. The Transceiver Unit contains circuit boards and modules that must be recorded separately.

CS90 Transceiver Unit

The Transceiver Unit controls the transmission and reception made by the 480 transmitters and 480 receiver channels. 16 identical transceiver boards are used. The Transceiver Unit also holds an Ethernet switch and a large capacitor bank.

Transceiver Unit ¹	Part number ²	Serial number	Revision
CS90 Transceiver Unit	429769		
¹ This unit contains circuit boards or modules that must identified separately. Observe the relevant hardware registration tables.			
² This is the part number on the unit label.			

Transceiver boards

Transceiver boards (From left)	Serial number	Revision
1		
2		
3		
4		

Simrad CS90 Sea Acceptance Test

Transceiver boards (From left)	Serial number	Revision
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
Transceiver board (Type): LPT32 Transceiver Board		
Part number: 425841		

Ethernet switch

Make and model ¹	Part number ²	Serial number	Revision
HP 3600-24	382039		
¹ The unit contains neither circuit boards nor modules that need to be identified separately.			
² This is the part number on the unit label.			

Operating Panel

The Operating Panel provided with the CS90 delivery must be uniquely identified. Make, model, part number and serial number must be registered.

Operating Panel ¹	Part number ²	Serial number	Revision
CS90 Operating Panel Mk1	SH8-203593		
CS90 Operating Panel Power Supply	361102	N/A	N/A
¹ These units do not contain any circuit boards or modules that must be identified separately.			
² This is the part number on the unit label.			

Operating Panel ¹	Part number ²	Serial number	Revision
CS90 Operating Panel Mk2	442454		
¹ The unit contains neither circuit boards nor modules that need to be identified separately.			
² This is the part number on the unit label.			

Hull Unit

The hull unit provided with the CS90 delivery must be uniquely identified. If possible, type, part number and serial number must be registered. Several different hull units are available for the CS90, each with different characteristics. Only one hull unit is supplied with the delivery.

The CS90 Fish Finding Sonar can be provided with one of the following hull units.

Hull Unit	Part number	Lowering depth	Transducer cables	Maximum speed
CS90	439051	1.0 m	4.6 m	20 knots
	439054		10 m	20 knots
CS94	439057	2.1 m	4.6 m	19 knots
	439047		7 m	19 knots
Outline dimensions drawings: - CS90: 439719 - CS94: 439723				

The same transducer is used on all hull unit types.

Hull Unit (Type) ¹	Part number ²	Serial number
Hull Unit		
¹ The unit contains neither circuit boards nor modules that need to be identified separately.		
² This is the part number on the unit label.		

Transducer

The transducer provided with the CS90 delivery must be uniquely identified.

Note

The transducer is not accessible during the Sea Acceptance Test. This hardware registration is then omitted.

Transducer ¹	Part number ²	Serial number	Revision
CS90 Transducer	407951		
¹ The unit contains neither circuit boards nor modules that need to be identified separately.			
² This is the part number on the unit label.			

Testing the CS90 operational functionality

Topics

[Making a noise/speed curve to determine vessel noise, page 17](#)

Making a noise/speed curve to determine vessel noise

The performance of the CS90 will always be limited by different noise sources. During the Sea Acceptance Test, accurate noise measurements are done for different vessel speeds. The weather and sea conditions for the noise measurements will be those at the time of the test.

Prerequisites

The CS90 system is turned on and operates normally. The vessel is at sea. Recommended minimum depth is 100 metres.

If the CS90 is operated from any other compartment than the bridge, an open two-way oral communication channel with the bridge is required.

You need the following equipment:

- Personal computer
- Spreadsheet program

If you wish to do the test with a "silent ship" the following conditions must be met:

- There must be no other vessels in the vicinity.

- As much machinery as possible must be turned off. It is particularly important to turn off electrical motors, as well as cooling systems and hydraulic pumps that may cause electric noise.
- To prevent interference, all other hydroacoustic instruments must be turned off.

If you do this tests in a busy harbour, or with noise sources present, the sensitive receivers will detect all the noise in the nearby waters.

Context

In order to measure the noise, you must record the noise value using the functionality in the **BITE** dialog box. Since the noise will vary with each ping, you must make five measurements for each vessel speed, and then calculate the average noise.

Tip

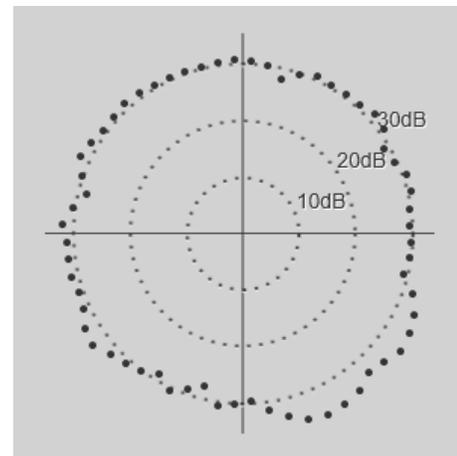
If you record all the raw data during the noise test, you can repeat the test later using the replay file. You may then use more than five noise samples for each vessel speed to make a more accurate curve.

You may wish to make the noise/speed curve under realistic conditions. This means that all relevant vessels systems are in normal use. If you experience very high noise levels, you may wish to repeat the test with "silent ship" settings. To isolate noise sources, turn individual vessel systems off, and check for any changes in the noise level.

Procedure

- 1 Make sure that you have sufficient water depth below the keel before you lower the transducer.
- 2 Lower the transducer to its bottom position.
- 3 If necessary, establish a separate communication line with the bridge to verify the vessel speed during the test.
- 4 Make the following preparations.
 - a At the bottom of the CS90 presentation, select *Bow Up* presentation mode, and activate the *Horizontal* view.
 - b Open the **Operation** menu.
 - 1 Set **Operation** to *Normal*.
 - 2 Set **TX Power** to *Off*.
 - c Open the **Active** menu.
 - 1 Set **TVG** (Time Variable Gain) to *0 log R*.
 - 2 Set **Ping-Ping Filter** to *Off*.

- 3 Set **Pulse Type** to *CW Short*.
 - 4 Set **Frequency** to 70 kHz.
 - 5 Set **Horizontal TX Sector** to *Omni*.
 - 6 Set **Vertical TX Sector** to *Normal*.
 - 7 Set **AGC** (Automatic Gain Control) to *Off*.
 - 8 Set **RCG** (Reverberation Controlled Gain) to 0 (zero).
 - 9 Set **Noise Filter** to *Off*.
- d Open the **Setup** menu.
 - e Select **BITE** to open the **BITE** (Built-In Test Equipment) dialog box.
 - f Select **Noise** to open the page.
 - g Select **Start Noise Measurements**.
- 5 Repeat for for each vessel speed and CS90 frequency.
 - a Ask the bridge to set the speed.
 - b If possible, verify the vessel speed on the top bar.
 - c Read the noise value from the noise circle.
Use the mean value of the readouts at 0 degrees (straight up).
 - d Record the values in the result table.
 - e Make a screen capture of the noise circle.
Save the screen capture using a unique file name that identifies context, date, time and vessel. Attach the image file to the electronic copy of the test report. Print the image in colour if the report is submitted on paper.
 - f Repeat for every 2 kHz up to and including 90 kHz.
 - 1 Increase the operating frequency with 2 KHz.
 - 2 Read the noise value from the noise circle.
 - 3 Record the values in the result table.
 - 4 At the following frequencies, make a screen capture of the noise circle.
 - 86 kHz
 - 90 kHz



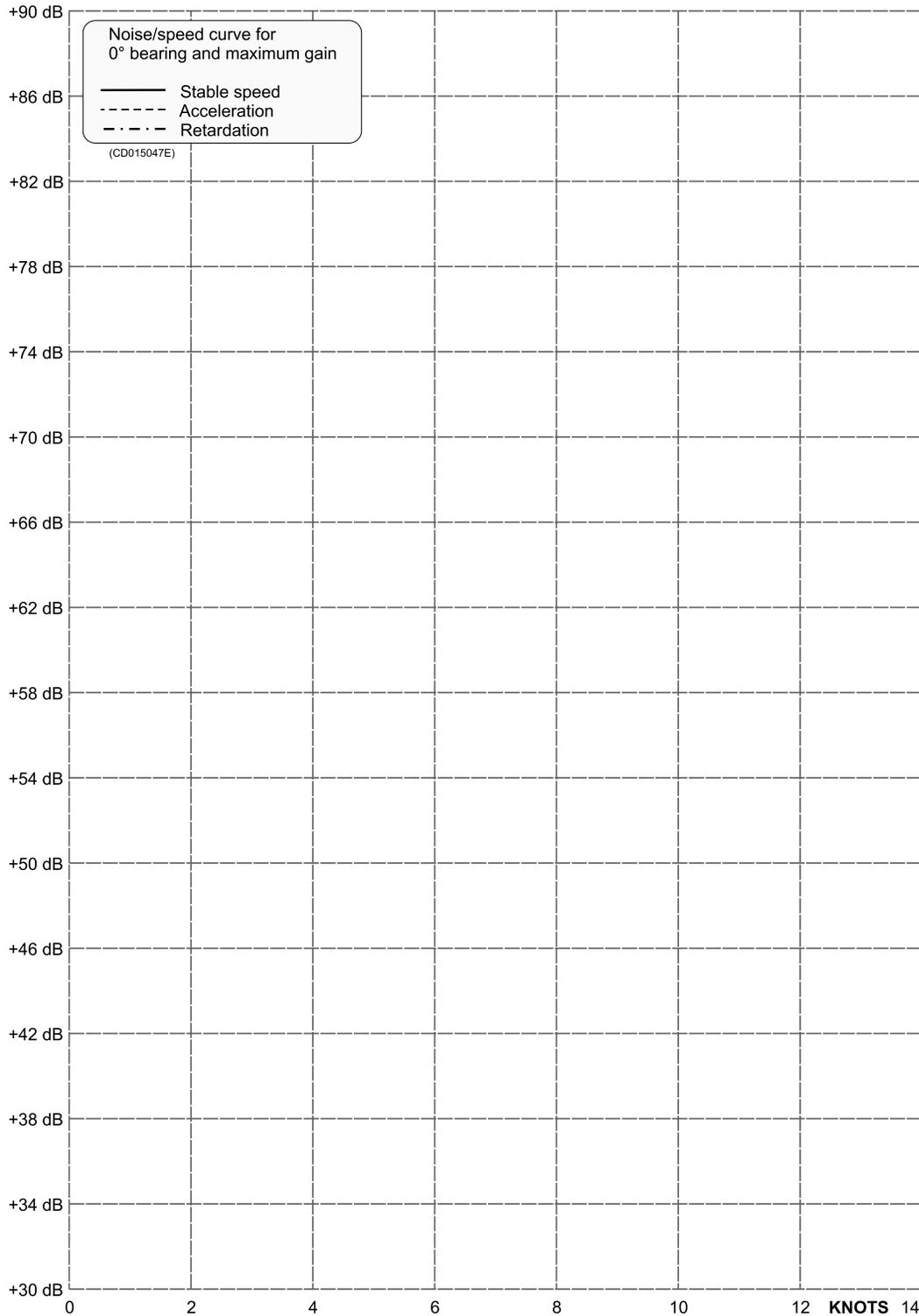
- g Set **Frequency** to 70 kHz.
 - h Ask the bridge to set the next speed.
- 6 When all the measurements have been made, type the data (speed and noise) into a spreadsheet to create the curve.
 - 7 Hoist the transducer to its upper position.

Result

Speed/Frequency/Noise		
Speed	Frequency	Noise level
0		
2		
4		
6		
8		
10		
12		
14		
16		
18		
20		

Speed/Frequency/Noise		
Speed	Frequency	Noise level
Sea state:		
Water depth:		
Use this table to record the values. Print it out and make multiple copies. Alternatively, you can type the values straight into a spreadsheet.		

Use the following plot to record the noise values for 0° bearing. Make additional copies if required, or use the functionality of the spreadsheet program.



Requirements	Results
A noise/speed curve is created.	
Date and signature:	

Testing the interfaces with peripheral devices

Topics

[Verifying the communication with a navigation system \(GPS\), page 24](#)

[Verifying the communication with speed log, page 25](#)

[Verifying the communication with the course gyro, page 26](#)

[Verifying the communication with the motion reference unit \(MRU\), page 28](#)

Verifying the communication with a navigation system (GPS)

For the CS90 to use and offer correct navigational information, one or more external sensors must be connected. The communication with the sensor is tested.

Prerequisites

This procedure assumes that:

- The sensor is connected to the CS90. It is switched on and in normal operation.
- The interface port is set up with the correct communication parameters.
- The vessel is at sea.
- The CS90 system is turned on and operates normally.

Neither tools nor instruments are required.

Context

This interface test was made during the Harbour Acceptance Test. However, that test was limited due to the static information provided by the sensor. It may also have been incomplete due to non-availability or non-functionality of a sensor. The test is therefore repeated using more realistic sensor data.

Procedure

- 1 Observe the top bar.
- 2 Make sure that the information from the sensor is displayed.
If necessary, enable the read-out in the **Display Options** dialog box.
- 3 If possible, use another instrument to verify that the information provided by the CS90 is correct.

Result

Requirements	Results
Position data is provided and displayed.	
Date and signature:	

Verifying the communication with speed log

In order to operate correctly, the CS90 requires input from a speed log. The vessel speed is shown on the top bar if you have enabled this in the **Display Options** dialog box. The communication with the sensor is tested.

Prerequisites

This procedure assumes that:

- The sensor is connected to the CS90. It is switched on and in normal operation.
- The interface port is set up with the correct communication parameters.
- The vessel is at sea.
- The CS90 system is turned on and operates normally.

Neither tools nor instruments are required.

Context

Note

The speed input is essential for CS90 operation. Without speed information, the CS90 will neither be able to present correct navigational information, nor compensate for vessel movements. This lack of compensation will prevent the CS90 from providing correct echo information. If you do not use a dedicated speed log, but rather a GPS system, you can skip this test.

This interface test was made during the Harbour Acceptance Test. However, that test was limited due to the static information provided by the sensor. It may also have been incomplete due to non-availability or non-functionality of a sensor. The test is therefore repeated using more realistic sensor data.

Procedure

- 1 Observe the top bar.
- 2 Make sure that the information from the sensor is displayed.
If necessary, enable the read-out in the **Display Options** dialog box.
- 3 If possible, use another instrument to verify that the information provided by the CS90 is correct.

Result

Requirements	Results
Speed data is provided and displayed.	
Date and signature:	

Verifying the communication with the course gyro

In order to operate correctly, the CS90 requires input from a course gyro. The current heading is shown on the top bar if you have enabled this in the **Display Options** dialog box. The communication with the sensor is tested.

Prerequisites

This procedure assumes that:

- The sensor is connected to the CS90. It is switched on and in normal operation.

- The interface port is set up with the correct communication parameters.
- The vessel is at sea.
- The CS90 system is turned on and operates normally.

Neither tools nor instruments are required.

Context

Note

The input from a course gyro is essential for CS90 operation. Without the input from a course gyro, the CS90 will not be able to present correct navigational information. This lack of compensation will prevent the CS90 from providing correct echo information.

This interface test was made during the Harbour Acceptance Test. However, that test was limited due to the static information provided by the sensor. It may also have been incomplete due to non-availability or non-functionality of a sensor. The test is therefore repeated using more realistic sensor data.

Procedure

- 1 Observe the top bar.
- 2 Make sure that the information from the sensor is displayed.
If necessary, enable the read-out in the **Display Options** dialog box.
- 3 If possible, use another instrument to verify that the information provided by the CS90 is correct.

Result

Requirements	Results
Heading data is provided and displayed.	
Date and signature:	

Verifying the communication with the motion reference unit (MRU)

The information from a motion reference unit (MRU) (normally heave, roll and pitch information) is imported into the CS90 to increase the accuracy of the echo data. The communication with the sensor is tested.

Prerequisites

This procedure assumes that:

- The sensor is connected to the CS90. It is switched on and in normal operation.
- The interface port is set up with the correct communication parameters.
- The vessel is at sea.
- The CS90 system is turned on and operates normally.

Neither tools nor instruments are required.

Context

This interface test was made during the Harbour Acceptance Test. However, that test was limited due to the static information provided by the sensor. It may also have been incomplete due to non-availability or non-functionality of a sensor. The test is therefore repeated using more realistic sensor data.

Procedure

- 1 Observe the top bar.
- 2 Make sure that the information from the sensor is displayed.
If necessary, enable the read-out in the **Display Options** dialog box.

Note _____

In order to read the motion compensation values, the CS90 must be "pinging".

- 3 If possible, use another instrument to verify that the information provided by the CS90 is correct.

Result

Requirements	Results
Motion compensation is operational.	
The compensated values are shown.	
Date and signature:	

Verifying the installation parameters

Topics

[Verifying vessel origin and ship dimensions, page 29](#)

[Verifying the installation parameters for the transducer, page 31](#)

[Verifying the installation parameters for the global positioning system \(GPS\) antenna, page 32](#)

[Verifying the installation parameters for the motion reference unit \(MRU\), page 34](#)

Verifying vessel origin and ship dimensions

The physical length and width of the ship are important parameters that need to be recorded in the CS90 software.

Prerequisites

For accurate location of the ship dimensions, you need the detailed vessel drawings. Neither tools nor instruments are required. The CS90 system is turned on and operates normally.

Context

It is common practice to place the *Ship Origin* at the same position as the motion reference unit (MRU). This will minimize the vectors when your vessel is moving. Use the vessel drawings to establish the offset values between the basic position of the *Ship Origin* and the MRU location.

If you do not have a motion sensor you can place the *Ship Origin* at any location on the vessel. We suggest that you place the origin under the captain's seat on the bridge. All

sensors will then be referenced to this position. Whenever a sonar is used with short ranges, this will provide a more precise presentation.

Procedure

- 1 Open the **Setup** menu.
- 2 On the **Setup** menu, select **Installation**.



Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

- 3 On the left side of the **Installation** dialog box, select the small white triangle next to **Installation Parameters**.

Observe that a menu opens with access to all the individual pages.

- 4 Open the **Ship** page.
- 5 For each parameter, makes sure that the current setting is correct.
- 6 Record the information in the result table.
- 7 Continue your work in the **Installation** dialog box, or select **OK** to close it.

Result

Ship Dimensions	
Length	
Width	

Vessel origin		
X offset	Y offset	Z Offset

Requirements	Results
The ship dimensions are entered in the CS90.	
All values are correct.	

Requirements	Results
All values are recorded in the relevant table.	
Date and signature:	

Verifying the installation parameters for the transducer

Information from a few key sensors are vital for the CS90 accuracy. In order to achieve maximum accuracy, the physical locations of these sensors - normally referred to the *Ship Origin* - must be recorded in the CS90 setup.

Prerequisites

For accurate location of the transducer, you need the detailed vessel drawings. Neither tools nor instruments are required. The CS90 system is turned on and operates normally.

Context

The physical location of the CS90 transducer is important for the CS90 data accuracy. The locations of the transducer and the Global Positioning System (GPS) antenna must be referenced to a common *Ship Origin*.

Procedure

- 1 Open the **Setup** menu.
- 2 On the **Setup** menu, select **Installation**.



Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

- 3 On the left side of the **Installation** dialog box, select the small white triangle next to **Installation Parameters**.

Observe that a menu opens with access to all the individual pages.

- 4 Select **Transducer** to open the page.
 - a Obtain the offset and rotation (angle) information from the personnel that installed the transducer.
 - b Make sure that the correct offset values have been inserted.
 - c Make sure that the correct installation angles have been inserted.

- d Record the information in the result table.
- 5 Continue your work in the **Installation** dialog box, or select **OK** to close it.

Result

Transducer offsets		
X offset	Y offset	Z offset
Installation angle X	Installation angle Y	Installation angle Z

Requirements	Results
All offset values and installation angles are entered in the CS90.	
All values are correct.	
All values are recorded in the relevant table.	
Date and signature:	

Verifying the installation parameters for the global positioning system (GPS) antenna

Information from a few key sensors are vital for the CS90 accuracy. In order to achieve maximum accuracy, the physical locations of these sensors - normally referred to the *Ship Origin* - must be recorded in the CS90 setup. For future reference, the offset values for each sensor is recorded.

Prerequisites

For accurate location of the global positioning system (GPS) antenna, you need the detailed vessel drawings. Neither tools nor instruments are required. The CS90 system is turned on and operates normally.

Context

The physical location of the global positioning system (GPS) antenna relative to the transducer is required to allow the CS90 to show the correct navigational information in the CS90 presentation. The locations of the transducer and the Global Positioning System (GPS) antenna must be referenced to a common *Ship Origin*.

Procedure

- 1 Open the **Setup** menu.
- 2 On the **Setup** menu, select **Installation**.



Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

- 3 On the left side of the **Installation** dialog box, select **Sensor Installation**.
- 4 Select the relevant sensor in the **Installed Sensors** list.
- 5 Make sure that the correct offset values have been inserted.
- 6 Fill in the result table.

Result

Global positioning system (GPS) offsets	
X offset	
Y offset	
Z offset	

Requirements	Results
All offset values are entered in the CS90.	
All values are correct.	
All values are recorded in the relevant table.	
Date and signature:	

Verifying the installation parameters for the motion reference unit (MRU)

The physical location of the motion reference unit (MRU) relative to the transducer is required to allow the CS90 to adjust for roll and pitch as accurately as possible. This task is only applicable if you are using an external motion reference unit on your CS90.

Prerequisites

For accurate location of the motion reference unit (MRU), you need the detailed vessel drawings. The information about the installation angles must be retrieved from the reports provided by the personnel that installed the equipment. Neither tools nor instruments are required. The CS90 system is turned on and operates normally.

Context

The information from a motion reference unit (MRU) (normally heave, roll and pitch information) is imported into the CS90 to increase the accuracy of the echo data. The CS90 is provided with a built-in motion sensor. It is placed inside the Motor Control Unit. For improved operational accuracy, an external motion reference unit (MRU) may be used. The motion reference unit (MRU) measures the roll and pitch motions of the vessel. Some sensor models also measure heave.

On the **MRU** page, you must define the physical location of the motion reference unit related to the reference point you created on the **Ship** page. The rotation around the X, Y and Z axis is used to compensate for misalignments made during the physical installation of the motion reference unit. Such misalignments occur if the sensor is not placed in parallel with the vessel's horizontal and/or vertical planes. The required accuracy of the offset and rotation angles depends on the accuracy requirement for the CS90 data.

Procedure

- 1 Open the **Setup** menu.
- 2 On the **Setup** menu, select **Installation**.



Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

- 3 On the left side of the **Installation** dialog box, select the small white triangle next to **Installation Parameters**.

Observe that a menu opens with access to all the individual pages.

- 4 Select **MRU** to open the page.

- a From the vessel drawings, extract the relevant offset information, and insert those values.
- b From the information provided by the personnel installing the motion sensor, obtain the relevant rotation information.
- c Make sure that the correct offset values have been inserted.
- d Make sure that the correct installation angles have been inserted.
- e Record the information in the result table.

Note

The Kongsberg Seapath® - and other GPS systems - allow you to define the MRU location in the positioning system. If this is done, the MRU offset values in the CS90 must be set to 0 (zero) to avoid "dual compensation". The rotation information is normally not recorded by the positioning system, and must therefore be defined in the CS90.

- 5 Select **Cancel** to close the dialog box without making any changes.

Result

Motion reference unit (MRU) offsets		
X offset	Y offset	Z offset
Installation angle X	Installation angle Y	Installation angle Z

Requirements	Results
All offset values and installation angles are entered in the CS90.	
All values are correct.	
All values are recorded in the relevant table.	
Date and signature:	

Creating a backup with the CS90 configuration and software installation

Topics

[About CS90 software backup and restore, page 36](#)

[Creating a Processor Unit image on a USB flash drive using the Acronis True Image program, page 37](#)

[Restoring a Processor Unit image from a USB flash drive using the Acronis True Image program, page 38](#)

[Creating a bootable USB flash drive using the Acronis True Image program, page 40](#)

About CS90 software backup and restore

Once all CS90 configuration and testing have been finalized, it is good practice to back up the configuration data and software installation. Software backup is provided using dedicated software applications and commercial storage devices.

Note

We strongly advise you to create your own backup once the installation has been completed. Your backup will then include the operating system, the CS90 software, as well as all the interface parameters that you have defined.

A backup "image" is a very useful feature. It allows you to create and save a complete copy of all the files on the Processor Unit hard disk. Once a backup image exist, you can restore the content of the Processor Unit hard disk in case of a failure.

Creating a Processor Unit image on a USB flash drive using the Acronis True Image program

A backup "image" is a very useful feature. It allows you to create and save a complete copy of all the files on the Processor Unit hard disk. The software used is *Acronis True Image*. The software is installed on the Processor Unit. It is also copied onto the USB flash drive that is provided with the CS90.

Prerequisites

To create the backup image, you need the bootable USB flash drive provided with the CS90. You can also use any commercial USB flash drive, but it must be bootable, and it must have the necessary storage capacity.

Context

The software in use is created by Acronis. For more information about this company and their products, see their website:

- <http://www.acronis.com>

Procedure

- 1 Boot the Processor Unit from the USB flash drive.
 - a Connect a mouse and a computer keyboard to the Processor Unit.
 - b Insert the bootable USB flash drive.

Use the USB sockets on the rear side of the Processor Unit. Avoid the blue USB sockets, as these do not support the boot functionality
 - c Power up the Processor Unit manually using the on/off button.
 - d Observe that the Processor Unit boots from the USB flash drive.

If the Processor Unit does not start from the USB flash drive, reboot, and press **F11** to select boot device.
- 2 Start the Acronis True Image program.
- 3 On the first page, select **Back Up**→**My Disks**.
- 4 On page **Partitions to back up**, observe that the only partition available is selected.
- 5 Select **Next**.
- 6 On page **Target backup archive**:
 - a Select **Create new backup archive**.

- b Select **Browse** to define the location of the backup file.
 - c Wait while the Processor Unit processes your request.
This may take some time (up to several minutes) if you are using a new USB flash drive.
- 7 In the **Browse for location** dialog box, select the USB flash drive, the folder you wish to use, and the file name.
 - 8 Click the small arrow button on the right side of the **Generate name** button to add date to the file name.
 - 9 Select **OK**.
 - 10 Select **Next**.
 - 11 Select **Proceed**.
 - 12 Wait for the backup process to finish.
 - 13 Stop the Acronis True Image program.
 - 14 Remove the USB flash drive.
 - 15 Restart the Processor Unit.

Restoring a Processor Unit image from a USB flash drive using the Acronis True Image program

Once a backup image exist, you can restore the content of the Processor Unit hard disk in case of a failure. The software used is *Acronis True Image*. The software is installed on the Processor Unit. It is also copied onto the USB flash drive that is provided with the CS90.

Prerequisites

To restore, you will need the USB flash drive containing a backup image. We recommend that you use the image you made after the CS90 installation was completed.

Context

You can restore the image from generic backup image, or from an image created for your installation.

Note

If you restore your Processor Unit from a generic image, you must change the Windows license and then activate it before you can use the CS90. You must also reinstall the CS90 software. We recommend that you use the image you made after the CS90 installation was completed.

The software in use is created by Acronis. For more information about this company and their products, see their website:

- <http://www.acronis.com>

Procedure

- 1 Boot the Processor Unit from the USB flash drive.
 - a Connect a mouse and a computer keyboard to the Processor Unit.
 - b Insert the bootable USB flash drive.

Use the USB sockets on the rear side of the Processor Unit. Avoid the blue USB sockets, as these do not support the boot functionality
 - c Power up the Processor Unit manually using the on/off button.
 - d Observe that the Processor Unit boots from the USB flash drive.

If the Processor Unit does not start from the USB flash drive, reboot, and press **F11** to select boot device.
- 2 Start the Acronis True Image program.
- 3 On the first page, select **Recover**.
- 4 On the second page, select **Browse for backup**.
- 5 Locate and select the backup file.

The backup file is provided on the *.tib format.
- 6 Select **OK**.
- 7 On the list of image files, right-click on the image, and select **Recover** in the short-cut menu.
 - a On page **Choose recovery method**, select **Recover whole disks and partitions**.
 - b Select **Next**.
 - c On page **Select the items to recover**, select **Disk 1**.
 - d Select **Next**.
 - e On page **Disk properties**, select **Disk 1**.

- f Select **Next**.
If the hard disk on the Processor Unit contains data, a confirmation dialog box appears to remind you that all data on the hard disk will be lost.
 - g Select **OK**.
 - h Select **Proceed**.
 - i Select **Shut down the computer when recovery is completed**.
- 8 Wait for the recovery process to finish.
Once completed, the Processor Unit is switched off.
 - 9 Remove the USB flash drive.
 - 10 Restart the Processor Unit.

Creating a bootable USB flash drive using the Acronis True Image program

A bootable USB flash drive is required for CS90 backup purposes. The software used is *Acronis True Image*. The software is installed on the Processor Unit. It is also copied onto the USB flash drive that is provided with the CS90.

Prerequisites

In order to create a bootable USB flash drive you will need the actual device. We strongly recommend that you use a high capacity and high speed version. Avoid typical "give-away" USB flash drives and commercial low budget types.

Context

The software in use is created by Acronis. For more information about this company and their products, see their website:

- <http://www.acronis.com>

Procedure

- 1 Insert the USB flash drive you wish to use.
- 2 Start the Acronis True Image program.
- 3 Select the **Backup and recovery** tab, and then select **Create bootable media** tool bar.
 - a On page **Welcome to Acronis Media Builder**, do nothing.
 - b Select **Next**.

- c On page **Rescue media contents selection**, select **True Image**.
 - d Select **Next**.
 - e On page **Bootable media options**, do nothing.
 - f Select **Next**.
 - g On page **Bootable media type selection**, select **Removable Disk**.
 - h Select **Next**.
 - i On page **Acronis Media Builder is ready to start....**, select **Proceed**.
- 4 Wait while the USB flash drive is made bootable.
 - 5 Remove the USB flash drive from the computer using the "Safely remove hardware" feature in the operating system.

Customer acceptance form

Fill in and sign this form for formal acceptance of the Simrad CS90 system.

The Simrad CS90 system is (<i>tick relevant column</i>):		
Accepted	Accepted with comments	Not accepted
Vessel/Customer		
Place and date		
Comments		
Test done by (name)	Company/Position	Date and signature
Test accepted by (name)	Company/Position	Date and signature
When this test procedure has been completed with all relevant signatures and applicable forms filled in, the document must be sent to the Simrad Support Department at Strandpromenaden 50, P.O.Box 111, 3191 Horten, Norway. Alternatively, scan all the pages to PDF using minimum 200 DPI resolution, and send the file to simrad.support@simrad.com .		

Secondary procedures

The end user and technical documentation for the CS90 contains several procedures that are also applicable for this Sea Acceptance Test. These procedures are not part of the Sea Acceptance Test. They are provided for reference purposes only. If you scan a completed Sea Acceptance Test for archiving or reporting purposes, it is not necessary to include these procedures.

Topics

[Setting up the Operating Panel \(Mk2\), page 43](#)

Setting up the Operating Panel (Mk2)

The Operating Panel offers all necessary control functions for normal operation of the CS90. Before it can be put to use, the Operating Panel must be configured to permit Ethernet communication between the panel and the Processor Unit.

Prerequisites

The Operating Panel is installed as specified in the CS90 *Installation manual*. The CS90 Processor Unit is turned on.

The following specific items are required for this task.

- Computer mouse
- Computer keyboard

Neither tools nor instruments are required.

Context

When supplied, the Operating Panel is set up with the following communication parameters:

- IP address: 157.237.60.20

- Subnet mask: 255.255.255.0
- Gateway: 157.237.60.1

To set up the Ethernet communication, you must define the IP address for the panel, and identify the Processor Unit in the panel software. These settings allow you to use more than one Operating Panel on the Processor Unit. You can also control more than one Processor Unit from a single Operating Panel.

The IP and MAC addresses for your Processor Unit are contained in a text file named `IPandMACaddress.txt`. The file contains the product name, IP address and MAC address in the following format (example):

If the text file is missing you must find the information manually. We suggest that you do this, and create the necessary folder and txt file before you start the setup process. See step 1 in the procedure.

Note

If the Operating Panel fails to establish contact with the Processor Unit it will time out and switch itself off after two minutes. When this happens the blue indicator light stops flashing.

Procedure

If required, locate the IP and MAC addresses on the ETH1 Ethernet adapter in the Processor Unit.

- 1 Obtain the IP address.

The IP and MAC addresses for your Processor Unit are contained in a text file named `IPandMACaddress.txt`. If the text file is missing you must find the information manually.

- a In the bottom-left corner of your desktop, select the Windows® **Start** button.
- b On the menu, select **Settings**.
- c Observe that the **Windows Settings** dialog box opens.
- d Select **Network & Internet**.
- e Select **Change adapter options**.
- f Select the relevant network adapter, then right-click and select **Properties** on the short-cut menu.
- g On the list of connections, select **Internet Protocol 4 (TCP/IPv4)**, and then **Properties**.
- h Observe the IP address for the Ethernet adapter.
- i Write down the information.

j Close all the dialog boxes.

Obtain the MAC address.

- a In the bottom left corner of your desktop, select the looking glass to search the operating system.
- b Type "Command", do the search, and open the **Command Prompt** window.
- c Type **ipconfig /all** and press the **Enter** key.
- d Observe the "Physical Address" (MAC address) for the relevant Ethernet adapter.
- e Write down the information.
- f Close the **Command Prompt** window.

Select the adapter that the Operating Panel is connected to. On the CS90, the Ethernet adapter is named Simrad Connect.

Prepare the Operating Panel for use.

2 Make the following preparations.

- a Connect the power cable from the Operating Panel to the power outlet on the uninterruptible power supply (UPS).
- b Connect the Ethernet cable from the Processor Unit to the Operating Panel.
Make sure that you use the correct Ethernet socket on the rear side of the Processor Unit: ETH1
- c Connect the keyboard and the mouse to USB sockets on the front panel of the Processor Unit.
- d On the Processor Unit, close any programs that are running, and return to the desktop.
- e On the Operating Panel, press **Power**, and keep it depressed for a few seconds.
The blue indicator light in the button flashes while the Operating Panel establishes contact with the Processor Unit. When you start the panel for the first time the interface must be configured to establish this connection. When the connection has been made, the blue indicator light is lit permanently.
- f On the Processor Unit desktop, open folder `SIMRAD-Shortcut`.
- g Double-click file `IPandMACaddress.txt` to open it in a text editor.
- h Double-click the URL shortcut to open the Operating Panel configuration page in the default web browser.

Observe that the Operating Panel configuration page opens on page 157.237.60.20:5000

3 Define the configuration parameters.

- a Select **SOP Configuration** on the top menu to open the page.
 - b Observe the default values.
If you wish to keep these default values, do nothing. The default values are well suited if you have one single panel communicating with one single Processor Unit. For other configurations, see the relevant procedures.
- 4 Add a single Processor Unit to the Operating Panel configuration.
- a Select **Sonar PCs Configuration** on the top menu to open the page.
 - b Type or copy the IP address into the relevant box.
 - c Type or copy the MAC address into the relevant box.
 - d Select **ADD Sonar PC**.
 - e Observe that your Processor Unit is added to the list.
 - f Close the web browser.
- 5 Make sure that the Operating Panel is functional.
- a Make sure that the blue indicator is lit, and check that you can move the cursor on the screen.
 - b On the Processor Unit desktop, double-click the CS90 icon to start the program.
Wait until the CS90 operates normally.
 - c Press and hold **Power** depressed four minimum four seconds to turn off the Operating Panel.
Observe that the **Transceiver On/Off** dialog box opens automatically.
Make sure that the CS90 is turned off.
 - d Turn on the CS90 with the **Power** button on the Operating Panel.
 - e Make sure that you can control the cursor, and that you can make selections in the menu system.
 - f Press and/or turn selected buttons, and make sure that the corresponding function is activated in the user interface.

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