



***Simrad ME70
Multibeam scientific echo sounder
Harbour Acceptance Test***

This is the Harbour Acceptance Test for the Simrad ME70 Multibeam scientific echo sounder.

The purpose of this Harbour Acceptance Test is to verify that the ME70 system provided to the vessel is correctly installed, and fully functional. It is then ready for the Sea Acceptance Test. 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	
Transceiver Unit	
Power Supply Unit 1	
Power Supply Unit 2	
Power Supply Unit 3	
Transducer	

Document information

- **Product:** Simrad ME70
- **Document:** Harbour Acceptance Test
- **Document part number:** 307959
- **Revision:** D
- **Date of issue:** 14 May 2020

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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.

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Introduction

Topics

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Purpose

This is the Harbour Acceptance Test for the Simrad ME70 Multibeam scientific echo sounder.

The purpose of this Harbour Acceptance Test is to verify that the ME70 system provided to the vessel is correctly installed, and fully functional. It is then ready for the Sea Acceptance Test. 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.

Note

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

Personnel and location

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

This Harbour Acceptance Test is done on board the vessel, alongside the quay. 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 Harbour 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 ME70 is described in several documents and end user manuals.

This list is not complete. Additional documents and end user manuals may be available for the ME70. These publications are not relevant for this Harbour Acceptance Test.

Note

Unless specified in the applicable procedure(s), the ME70 publications listed here are not required during this Harbour Acceptance Test.

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

End user manuals

- **Reference Manual and On-line Help:** 328588

Software documents

- **Software Release Note:** 308386

Customer acceptance test procedures

- **Factory Acceptance Test:** 307958
- **Harbour Acceptance Test:** 307959
- **Sea Acceptance Test:** 307960

Tools and test equipment

Specific tools and test equipment are required for this Simrad ME70 Harbour Acceptance Test. The required tools and equipment must be made available before the test can start.

The required test equipment is listed. For each item, record the instrument's serial number and - if relevant - its calibration expiry date.

Multimeter (Make and model)	Serial number	Calibration expiry date

Hygrometer (Make and model)	Serial number	Calibration expiry date

Thermometer (Make and model)	Serial number	Calibration expiry date

Camera (Make and model)	Serial number	Calibration expiry date

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Cable tester (Make and model)	Serial number	Calibration expiry date

USB flash drive (Make and model)	Serial number	Calibration expiry date
	N/A	N/A

Acceptance test summary

The purpose of this Harbour Acceptance Test is to verify that the ME70 system provided to the vessel is correctly installed, and fully functional. 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 Harbour Acceptance Test.

Procedure

- 1 Record the software and hardware items that are included in the test.
[Hardware and software registration, page 10](#)
- 2 Do a visual inspection of each unit that is comprised by the ME70 delivery.
[Visual inspection, page 18](#)
- 3 Test the main functionality of the ME70.
[Testing the ME70 operational functionality, page 34](#)
- 4 Make sure that all the relevant installation parameters have been defined correctly.
[Verifying the installation parameters, page 57](#)
- 5 Test the interfaces between the ME70 and relevant external devices and/or sensors.
[Testing the interfaces with peripheral devices, page 62](#)
- 6 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 77](#)

The end user and technical documentation for the ME70 contains several procedures that are also applicable for this Harbour Acceptance Test. These procedures are not part of the Harbour Acceptance Test. They are provided for reference purposes only.

[Secondary procedures, page 78](#)

Hardware and software registration

Topics

[Verification of previously tested items, page 11](#)

[Software items, page 12](#)

[Hardware items, page 13](#)

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 ME70 user interface software and hardware units the same as those tested during the *Factory 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 ME70 system since the <i>Factory 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 ME70 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 ME70 software version provided on the media must be registered.

Software	Part number	Software version
Simrad ME70	308305	

Software media	Part number	Software version
Simrad ME70	387585	
The software version on the software media shall be the same as the version installed on the Processor Unit. End user documentation is included on the same software media.		

Hardware items

Topics

[Display, page 13](#)

[Processor Unit, page 13](#)

[Transceiver Unit, page 14](#)

[Power Supply Unit, page 17](#)

[Transducer, page 17](#)

Display

Each display provided with the ME70 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. If applicable, add the order number.

Display (Make and model) ¹	Part number ²	Serial number	Revision
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.			

Processor Unit

The Processor Unit provided with the ME70 delivery must be uniquely identified. Make, model, part number and serial number must be registered.

Processor Unit ¹	Part number ²	Serial number	Revision
ME70 Processor Unit (with ME70 software)	382922		
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 ME70 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.

ME70 Transceiver Unit

The Transceiver Unit controls the transmission and reception made by the 800 transmitters and 800 receiver channels. 25 identical transceiver boards are used.

Transceiver Unit ¹	Part number ²	Serial number	Revision
ME70 Transceiver Unit	345559		
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.			

LPT32 Transceiver board

Transceiver boards (From right)	Revision	Serial number
TRXU2		
0		
1		
2		
3		

Transceiver boards (From right)	Revision	Serial number
4		
5		
6		
7		
8		
TRXU1		
9		
10		
11		
12		
13		
14		
15		
16		
TRXU0		
17		

Transceiver boards (From right)	Revision	Serial number
18		
19		
20		
21		
22		
23		
24		
Transceiver board (Type): LPT32 Transceiver board		
Part number: 425841		

Ethernet switch

Make and model (Make and model) ¹	Part number ²	Serial number	Revision
Hewlett Packard HP2920-48G	396638		
¹ The unit contains neither circuit boards nor modules that need to be identified separately. If the Hewlett Packard HP2920-48G Ethernet switch is not used with this delivery, fill in information about the replacement type in the empty row.			
² This is the part number on the unit label.			

Power Supply Unit

Each Power Supply Unit provided with the ME70 delivery must be uniquely identified. Make, model, part number and serial number must be recorded.

Power Supply Unit ¹	Part number ²	Serial number
ME70 Power Supply Unit 1	304834	
ME70 Power Supply Unit 2	304834	
ME70 Power Supply Unit 3	304834	
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.		

Transducer

The transducer provided with the ME70 delivery must be uniquely identified.

Transducer ¹	Part number ²	Serial number
ME70 Transducer	312-208110	
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.		

Note

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

Visual inspection

Topics

[Inspecting logistic items, page 19](#)

[Visual inspection of the display, page 20](#)

[Visual inspection of the Processor Unit, page 21](#)

[Visual inspection of the Transceiver Unit, page 23](#)

[Environmental inspection of the Transceiver Unit, page 25](#)

[Visual inspection of the Power Supply Unit, page 27](#)

[Inspecting the transducer installation, page 30](#)

[Making sure that all ME70 cables are properly connected, page 32](#)

Inspecting logistic items

All relevant logistic items that are included with the ME70 delivery shall be inspected. Once the ME70 has been installed, and it is ready for Harbour Acceptance Test, the items must all be on board the vessel. This includes end-user manuals, software and software media. If spare parts are included in the delivery, these shall also be inspected.

Prerequisites

The list of logistic items to be delivered (order confirmation or contract) must be available. All the relevant items must be available for inspection. Neither tools nor instruments are required.

Context

The verification of the operating system license is only applicable if the Processor Unit is provided by Simrad as a part of the ME70 delivery.

Procedure

- 1 Verify that the ME70 end-user manuals have been provided.
- 2 Verify that the applicable ME70 software media (USB flash disk, CD, DVD etc) have been provided.
- 3 Verify that the operating system software license stickers is placed on the Processor Unit.
- 4 Verify that the spare parts provided matches the order confirmation for the ME70 delivery.

Result

Requirements	Results
All logistical items are available on board the vessel.	
Date and signature:	

Visual inspection of the display

A visual inspection of the ME70 display is required to verify that the unit has not been physically damaged during the installation.

Prerequisites

The ME70 is installed as specified in the *ME70 Installation manual*. The ME70 is turned off. You need the following equipment:

- Multimeter

Context

This test procedure is only applicable when the display is provided by Kongsberg Maritime as a part of the ME70 delivery.

Procedure

- 1 Make sure that the unit's serial number has been recorded in the list of hardware items.
- 2 Make sure that the physical installation of the unit has been completed.
 - a Make sure that the structure to which the display is fastened is substantial enough to hold the unit securely under all operating conditions.
 - b If applicable, make sure that the display (or the display mounting bracket) is bolted or welded securely to the deck and/or bulkhead.
 - c If the unit is installed inside a rack or in a closed compartment, make sure that ample ventilation is provided to avoid overheating.
 - d Make sure that ample space is provided around the unit to allow for maintenance and replacement of parts.
 - e Make sure that the bolts, screws or studs holding the unit are of the correct size.
 - f Make sure that the correct flat and shake-proof washers have been used.
 - g Make sure that all nuts have been tightened properly.
 - h Make sure that all welds and brackets have been painted with the correct preservation medium to prevent corrosion.
- 3 Make sure that the display is installed in the correct location, and that it is suitably orientated with respect to ambient light conditions and reflections.
- 4 Make sure that the unit is not physically damaged, and that the paint-work is clean without dents or scratches.

The physical handling of the unit during the installation may have caused some minor scratches to the paint-work. This can be accepted. However, if rough handling has

caused serious damage to the unit, this must be recorded with a written statement and necessary photos, so that corrective actions can be made.

- 5 Make sure that the unit is firmly connected to ship's ground.
 - a The unit must be connected to the ship's ground with an earthing strap. The strap must be in addition to any incidental electrical contact made by the mounting lugs on the unit.
 - b Use a standard multimeter to check that the resistance between the unit and the ship's ground is approximately 0 (zero) Ω .
- 6 Make sure that cable installation has been completed.
 - a Make sure that all cables leading to and from the unit have been properly mounted and secured.
 - b Make sure that enough slack has been provided on each cable to allow for maintenance and replacement.
- 7 Make sure that the unit has been identified with the relevant product label(s), and that one label includes the part and serial numbers.

Result

Requirements	Results
The display is correctly installed with easy access for maintenance and replacement of parts.	
The display is free from scratches, dents or other physical damage.	
Free access to all the connectors on the display is provided. All cables are properly mounted with enough slack.	
The display is properly grounded.	
Date and signature:	

Visual inspection of the Processor Unit

A visual inspection of the ME70 Processor Unit is required to verify that the unit has not been physically damaged during the installation.

Prerequisites

The ME70 is installed as specified in the ME70 *Installation manual*. The ME70 is turned off. You need the following equipment:

- Multimeter

Procedure

- 1 Make sure that the unit's serial number has been recorded in the list of hardware items.
- 2 Make sure that the computer is installed in the correct location, and that it is suitably oriented for replacement and cabling.
- 3 Make sure that the physical installation of the unit has been completed.
 - a Make sure that you have free access to rear and front side connectors on the computer for maintenance purposes.
 - b Make sure that ample space is provided to open/close DVD and/or CD lids (if relevant), and to insert and remove USB flash drives.
 - c If the unit is installed inside a rack or in a closed compartment, make sure that ample ventilation is provided to avoid overheating.
 - d Make sure that ample space is provided around the unit to allow for maintenance and replacement of parts.
 - e Make sure that the bolts, screws or studs holding the unit are of the correct size.
 - f Make sure that the correct flat and shake-proof washers have been used.
 - g Make sure that all nuts have been tightened properly.
 - h Make sure that all welds and brackets have been painted with the correct preservation medium to prevent corrosion.
- 4 Make sure that the unit is not physically damaged, and that the paint-work is clean without dents or scratches.

The physical handling of the unit during the installation may have caused some minor scratches to the paint-work. This can be accepted. However, if rough handling has caused serious damage to the unit, this must be recorded with a written statement and necessary photos, so that corrective actions can be made.

- 5 Make sure that the unit is firmly connected to ship's ground.
 - a Make sure that the unit is securely connected to the ship's ground with an earthing strap. The strap must be in addition to any incidental electrical contact made by the mounting lugs on the unit.
 - b Use a standard multimeter to check that the resistance between the unit and the ship's ground is approximately 0 (zero) Ω .
- 6 Make sure that cable installation has been completed.
 - a Make sure that all cables leading to and from the unit have been properly mounted and secured.
 - b Make sure that enough slack has been provided on each cable to allow for maintenance and replacement.

- 7 Make sure that the unit has been identified with the relevant product label(s), and that one label includes the part and serial numbers.

Result

Requirements	Results
The Processor Unit is correctly installed with easy access for maintenance and replacement of parts.	
The Processor Unit is free from scratches, dents or other physical damage.	
Free access to all the connectors on the Processor Unit is provided. All cables are properly mounted with enough slack.	
The Processor Unit can be fully opened for access to the internal parts.	
The Processor Unit is properly earthed.	
Date and signature:	

Visual inspection of the Transceiver Unit

A visual inspection of the Transceiver Unit is required to verify that the unit has not been physically damaged during the installation.

Prerequisites

The ME70 is installed as specified in the *ME70 Installation manual*. The ME70 is turned off. You need the following equipment:

- Multimeter

Procedure

- 1 Make sure that the Transceiver Unit is installed in the correct location, and that it is suitably oriented for easy maintenance and replacement of parts.
- 2 Make sure that the unit is not physically damaged, and that the paint-work is clean without dents or scratches.

The physical handling of the unit during the installation may have caused some minor scratches to the paint-work. This can be accepted. However, if rough handling has caused serious damage to the unit, this must be recorded with a written statement and necessary photos, so that corrective actions can be made.

- 3 Make sure that the unit has been identified with the relevant product label(s), and that one label includes the part and serial numbers.
- 4 Make sure that the unit's serial number has been recorded in the list of hardware items.

- 5 Make sure that the physical installation of the unit has been completed.
 - a Make sure that the compartment ("sonar room") is provided with ample ventilation to prevent system units from overheating.
 - b Make sure that the compartment ("sonar room") is clean and dry.
 - c Make sure that the ambient temperature of the compartment ("sonar room") is monitored.
 - d Make sure that ample space is provided around the unit to allow for maintenance and replacement of parts.
 - e Make sure that both the front and rear cabinet doors can be fully opened for unrestricted access.
 - f Make sure that the bolts, screws or studs holding the unit are of the correct size.
 - g Make sure that the correct flat and shake-proof washers have been used.
 - h Make sure that all nuts have been tightened properly.
 - i Make sure that the welds and support brackets to which the unit is fastened are substantial enough to hold the it securely under all operating conditions.
 - j Make sure that all welds and brackets have been painted with the correct preservation medium to prevent corrosion.
- 6 Make sure that the unit is firmly connected to ship's ground.
 - a Make sure that the unit is securely connected to the ship's ground with an earthing strap. The strap must be in addition to any incidental electrical contact made by the mounting lugs on the unit.
 - b Use a standard multimeter to check that the resistance between the unit and the ship's ground is approximately 0 (zero) Ω .
- 7 Make sure that cable installation has been completed.
 - a Make sure that all cables leading to and from the unit have been properly mounted and secured.
 - b Make sure that enough slack has been provided on each cable to allow for maintenance and replacement.

Result

Requirements	Results
The Transceiver Unit is correctly installed with easy access for maintenance and replacement of parts.	
Free access to all the connectors on the Transceiver Unit are provided. All cables connected to the Transceiver Unit are properly mounted with enough slack.	

Requirements	Results
The Transceiver Unit can be fully opened, and you have full access to the circuit boards and modules inside the unit.	
The welds and brackets that support the Transceiver Unit are strong enough to hold the unit securely in place under all operating conditions. The welds and brackets have been painted with the correct preservation medium to prevent corrosion.	
The Transceiver Unit is properly grounded.	
Date and signature:	

Environmental inspection of the Transceiver Unit

Satisfactory environmental conditions are important to ensure long and trouble-free operation of the Transceiver Unit. An environmental inspection of the Transceiver Unit is required to verify the quality of the sonar room.

Prerequisites

The ME70 is installed as specified in the *ME70 Installation manual*. You need the following equipment:

- Thermometer
- Hygrometer

Context

The *sonar room* is the compartment in which the Transceiver Unit and the three Power Supply Units are installed.

The following requirements must be met:

- The compartment in which the Transceiver Unit is installed ("sonar room") is clean and dry.
- A ventilation system is installed.
- The ventilation system is physically connected to the air outlet at the top of the transceiver cabinet.
- The ambient temperature in the sonar room is monitored.
- During normal operation, the maximum permitted air inlet temperature is +33°C.
- During normal operation, the maximum permitted air outlet temperature is +50°C.
- During normal operation, the maximum permitted ambient humidity is 80%.

Observe the installation shipyard's procedures for workmanship, installation of physical units, and installation and termination of cables.

Procedure

- 1 Make sure that the compartment ("sonar room") is clean and dry.
- 2 Make sure that the ambient temperature in the sonar room meets the environmental specifications.
 - a Make sure that the temperature in the sonar room is controlled using a suitable ventilation system.
Record the type of ventilation system that is installed.
 - b Verify that the ventilation system has been physically connected to the air outlet at the top of the transceiver cabinet.
 - c Make sure that the temperature in the sonar room is monitored.
 - d Measure the ambient temperature in the sonar room when the ME70 is switched off.
 - e 30 minutes after the ME70 has been switched on and put to normal operation:
 - Measure the temperature in front of one of the transceiver cabinet's air inlets.
During normal operation, the maximum permitted air inlet temperature is +33°C.
 - Measure the temperature in the transceiver cabinet's air outlet.
During normal operation, the maximum permitted air outlet temperature is +50°C.
- 3 Make sure that the relative humidity in the sonar room meets the environmental specifications.
 - a Measure the relative humidity in the sonar room.
 - b 30 minutes after the ME70 has been switched on and put to normal operation, measure the relative humidity one more time.
- 4 Make sure that the sonar room and the ME70 cabinets have not been subjected to corrosive attacks.

Result

Requirements	Results
The compartment in which the Transceiver Unit is installed ("sonar room") is clean and dry.	
A ventilation system is installed.	

Requirements	Results
Record the type of ventilation system that is installed.	
The ventilation system is physically connected to the air outlet at the top of the transceiver cabinet.	
The ambient temperature in the compartment ("sonar room") is monitored.	
The ambient temperature in the sonar room is monitored.	
During normal operation, the maximum permitted air inlet temperature is +33°C.	
During normal operation, the maximum permitted air outlet temperature is +50°C.	
During normal operation, the maximum permitted ambient humidity is 80%.	
Date and signature:	

Visual inspection of the Power Supply Unit

A visual inspection of the Power Supply Unit is required to verify that the unit has not been physically damaged during the installation. Since more than one Power Supply Unit is used, each must be inspected separately.

Prerequisites

The ME70 is installed as specified in the *ME70 Installation manual*. The ME70 is turned off. You need the following equipment:

- Multimeter

Procedure

- 1 Verify that the Power Supply Unit is installed in the correct location, and that it is suitably oriented for easy maintenance and replacement of parts.
- 2 Make sure that the unit is not physically damaged, and that the paint-work is clean without dents or scratches.

The physical handling of the unit during the installation may have caused some minor scratches to the paint-work. This can be accepted. However, if rough handling has caused serious damage to the unit, this must be recorded with a written statement and necessary photos, so that corrective actions can be made.

- 3 Make sure that the unit has been identified with the relevant product label(s), and that one label includes the part and serial numbers.

- 4 Make sure that the unit's serial number has been recorded in the list of hardware items.
- 5 Make sure that the physical installation of the unit has been completed.
 - a Make sure that the compartment is provided with ample ventilation to prevent system units from overheating.
 - b Make sure that the compartment is clean and dry.
 - c Make sure that ample space is provided around the unit to allow for maintenance and replacement of parts.
 - d Make sure that both the front and rear cabinet doors can be fully opened for unrestricted access.
 - e Make sure that the bolts, screws or studs holding the unit are of the correct size.
 - f Make sure that the correct flat and shake-proof washers have been used.
 - g Make sure that all nuts have been tightened properly.
 - h Make sure that the welds and support brackets to which the unit is fastened are substantial enough to hold the it securely under all operating conditions.
 - i Make sure that all welds and brackets have been painted with the correct preservation medium to prevent corrosion.
- 6 Make sure that the unit is firmly connected to ship's ground.
 - a Make sure that the unit is securely connected to the ship's ground with an earthing strap. The strap must be in addition to any incidental electrical contact made by the mounting lugs on the unit.
 - b Use a standard multimeter to check that the resistance between the unit and the ship's ground is approximately 0 (zero) Ω .
- 7 Make sure that cable installation has been completed.
 - a Make sure that all cables leading to and from the unit have been properly mounted and secured.
 - b Make sure that enough slack has been provided on each cable to allow for maintenance and replacement.
- 8 Repeat for each Power Supply Unit.

Result

Requirements / 1	Results
The Power Supply Unit is correctly installed with easy access for maintenance and replacement of parts.	
The compartment in which the Power Supply Unit is installed is clean and dry with adequate temperature control.	

Requirements / 1	Results
Free access to all the connectors on the Power Supply Unit is provided. All cables connected to the Power Supply Unit are properly mounted with enough slack.	
The Power Supply Unit can be fully opened, and you have full access to the circuit boards and modules inside the unit.	
The welds and brackets that support the Power Supply Unit are strong enough to hold the unit securely in place under all operating conditions. The welds and brackets have been painted with the correct preservation medium to prevent corrosion.	
The Power Supply Unit is properly grounded.	
Date and signature:	

Requirements / 2	Results
The Power Supply Unit is correctly installed with easy access for maintenance and replacement of parts.	
The compartment in which the Power Supply Unit is installed is clean and dry with adequate temperature control.	
Free access to all the connectors on the Power Supply Unit is provided. All cables connected to the Power Supply Unit are properly mounted with enough slack.	
The Power Supply Unit can be fully opened, and you have full access to the circuit boards and modules inside the unit.	
The welds and brackets that support the Power Supply Unit are strong enough to hold the unit securely in place under all operating conditions. The welds and brackets have been painted with the correct preservation medium to prevent corrosion.	
The Power Supply Unit is properly grounded.	
Date and signature:	

Requirements / 3	Results
The Power Supply Unit is correctly installed with easy access for maintenance and replacement of parts.	
The compartment in which the Power Supply Unit is installed is clean and dry with adequate temperature control.	
Free access to all the connectors on the Power Supply Unit is provided. All cables connected to the Power Supply Unit are properly mounted with enough slack.	
The Power Supply Unit can be fully opened, and you have full access to the circuit boards and modules inside the unit.	

Requirements / 3	Results
The welds and brackets that support the Power Supply Unit are strong enough to hold the unit securely in place under all operating conditions. The welds and brackets have been painted with the correct preservation medium to prevent corrosion.	
The Power Supply Unit is properly grounded.	
Date and signature:	

Inspecting the transducer installation

Correct installation of the transducer is critical to successful operation of the ME70.

Prerequisites

The following specific tool is required for this task:

- Camera

Note

Due to the fact that the transducer is physically installed under the hull, its location must be determined on the installation drawings. The installation shipyard must provide all necessary installation drawings.

Context

The installation of the transducer and the transducer cables are described in the ME70 *Installation manual*.

Procedure

- 1 Obtain the installation drawing(s) prepared by the installation shipyard.
- 2 Verify that the transducer has been positioned according to the relevant guidelines in the ME70 *Installation Manual*.
- 3 Record the distance between the transducer and the propellers.
- 4 Record the distance between the transducer and the keel.
- 5 Record what type of anti-fouling paint that has been used on the transducer face.
- 6 Inspect the transducer cables as closely as permitted.
 - a Verify that the transducer cables have been installed as specified in the ME70 *Installation Manual*.

- b Verify that the transducer cables have not been damaged during installation.
 - c Verify that the transducer cables have been installed using steel conduits, cable ducts and/or pipes, and that the cable(s) have been properly secured to these to avoid damage caused by motion and vibration.
 - d Verify that the steel conduits, cable ducts and/or pipes used to secure the transducer cables do not have sharp edges or protruding items that may cause damage.
 - e Verify that the cables have been entered into the steel conduits, cable ducts and/or pipes without causing excessive physical stress.
 - f Verify that enough slack has been provided for the transducer cables to allow maintenance and replacements.
- 7 If the transducer has been installed in a drop keel:
- a Verify that the cables can move freely during lowering and hoisting of the drop keel.
 - b Verify that there are no sharp edges or protruding elements that may cause damage to the cables during lowering and hoisting.
 - c Verify that the cables are not bent too tightly under during lowering and hoisting.
- 8 Use a high resolution digital camera, and take pictures of the installation.
- The pictures must clearly show how the transducer and the transducer cables are installed. Attach the pictures (files and/or prints) to the test report.

Result

Requirements	Results
The transducer is positioned according to the guidelines in the ME70 <i>Installation Manual</i> .	
Record the distance between the transducer and the propellers.	
Record the distance between the transducer and the keel.	
Record what type of anti-fouling paint that has been used on the transducer face.	
The transducer cables are not damaged.	
The steel conduits, cable ducts and/or pipes used to protect the cables are satisfactory.	
Enough slack has been provided for the cables to allow for maintenance and replacements.	
The cable movements inside the drop keel are satisfactory. There are no sharp edges or protruding elements, and the cables are not bent too tightly.	
Date and signature:	

Making sure that all ME70 cables are properly connected

The ME70 relies on communication between each system unit, and between the ME70 and external devices. It is very important that all cables are correctly installed, that the proper cable types have been used, and that all cables are connected correctly.

Prerequisites

The ME70 is installed as specified in the *ME70 Installation manual*.

- All system cables are installed.
- All cable connections are made.
- Correct operating power is available.

You need the following equipment:

- Cable tester
- Multimeter

Context

All cabling is described in the *Cable layout and interconnections* chapter in the *ME70 Installation Manual*. Refer to the cable plan, the cable list and the basic cable requirements.

Procedure

- 1 For each cable that is in used on the ME70:
 - a Make sure that the cable has been installed as specified in the *ME70 Installation Manual*.
Note _____
Pay special attention to transducer cables. These must not be installed too close to power cables.

 - b Verify that the DC power cables from each Power Supply Unit to the Transceiver Unit are installed in metal conduits.
 - c Make sure that the connections made at each end of the cable are correct.
 - d Make sure that the cable is properly identified.
- 2 If possible, use a multimeter or a dedicated cable tester to check the continuity in each cable.

- 3 Use a qualification tester to verify that each Ethernet cable is correctly wired, and meets the specifications related to quality and bandwidth.

Result

Requirements	Results
Each cable is installed correctly.	
All cable connections are made.	
Each cable is properly identified.	
Each Ethernet cable in use meets quality requirement CAT5E STP (Shielded Twisted Pair) or better.	
Date and signature:	

Testing the ME70 operational functionality

Topics

- [Turning on the ME70 Multibeam scientific echo sounder to start the test, page 35](#)
- [Measuring the power supply output voltages in the Transceiver Unit, page 37](#)
- [Recording raw data, page 40](#)
- [Recording element data, page 42](#)
- [Testing the receiver channels with the BITE Matrix functionality, page 44](#)
- [Testing the transmitter channels with the BITE Matrix functionality, page 46](#)
- [Testing the receiver and transmitter channels with the BITE B-Scan functionality, page 48](#)
- [Measuring noise in passive operating mode, page 50](#)
- [Measuring the time between each ping, page 54](#)
- [Verifying long time stability in continuous operation, page 55](#)
- [Verifying the installation parameters, page 57](#)
- [Testing the interfaces with peripheral devices, page 62](#)

Turning on the ME70 Multibeam scientific echo sounder to start the test

Prior to testing the ME70, the complete system must be turned on.

Prerequisites

The ME70 is installed as specified in the ME70 *Installation manual*.

- The ME70 is turned off.
- The vessel is berthed.

Neither tools nor instruments are required.

Context

A selection of basic operating procedures for the ME70 are provided in the *Secondary procedures* chapter in this Harbour Acceptance Test.

Procedure

- 1 Verify that the ME70 units are correctly connected together.
- 2 Turn on the ME70 from the Processor Unit.
- 3 Verify that the Processor Unit and the Transceiver Unit start.
- 4 Verify that the ME70 presentation appears after a few minutes.
- 5 Verify that no error messages are presented during start-up.
- 6 On the **Main** menu, set **Beam Mode** to *Test - Example 1*.
- 7 Open the **Operation** menu.
 - a Set **Operation** to *Normal*.
 - b Set **Range** to: *100 m*.
 - c Set **Ping** to *On*.
 - d Set **Ping Mode** to *Interval*.
 - e Set **Ping Interval** to *1 s*.
 - f Set **Tx Mode** to *Active*
 - g Set **Tx Power** to *Maximum*.
- 8 Open the **BITE B-Scan** page.
 - a Open the **Setup** menu.
 - b Select **BITE** to open the dialog box.



Observe that the **BITE** (Built In Test Equipment) dialog box opens.

- c Open the **BITE B-Scan** page.
- 9 Make sure that all the transceiver boards are fully functional.

When you move the cursor over the B-Scan presentation of the ME70 transceiver channels, each element in the transducer is clearly identified as a long coloured vertical rectangle. If you place the cursor on top of one of these B-Scan rectangles, a small yellow tool-tip will identify key information.

To detect unserviceable transducer elements and/or transceiver boards, you must compare the rectangles. During normal operation at sea the colours will be homogeneous. When operating the ME70 in port, the colours will be less homogeneous due to the environmental noise and the shallow depth.

- If a single element is "dead" (no transmit, no receive), the rectangle is easily spotted because its colour is black.
- If a single element is receiving, but not transmitting, the rectangle is normally presented in lighter shades of blue.
- If a transceiver board is "dead" (no transmit, no receive), all the transducer elements connected to the board are easily spotted because they are all black.

- 10 Use the operating system's functionality to make a screen capture of each of the BITE pages.

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.

- 11 Verify that no error messages are presented during normal operation.

Result

Requirements	Results
The ME70 starts when it is turned on from the Processor Unit.	
The ME70 presentation appears after a few minutes.	
All the transceiver boards are fully functional.	
No error messages are presented.	
Date and signature:	

Measuring the power supply output voltages in the Transceiver Unit

The best way to check the operation of the individual power supply modules is to measure the output voltages. However, it is better to check them on the TRXU terminal block on the rear side of the Transceiver Unit. These measurements will also reveal any voltage loss in the power cables.

Prerequisites

The ME70 is installed as specified in the *ME70 Installation manual*.

- The ME70 system is turned on and operates normally.
- The vessel is berthed.

The following specific instrument is required for this task:

- Multimeter

Caution

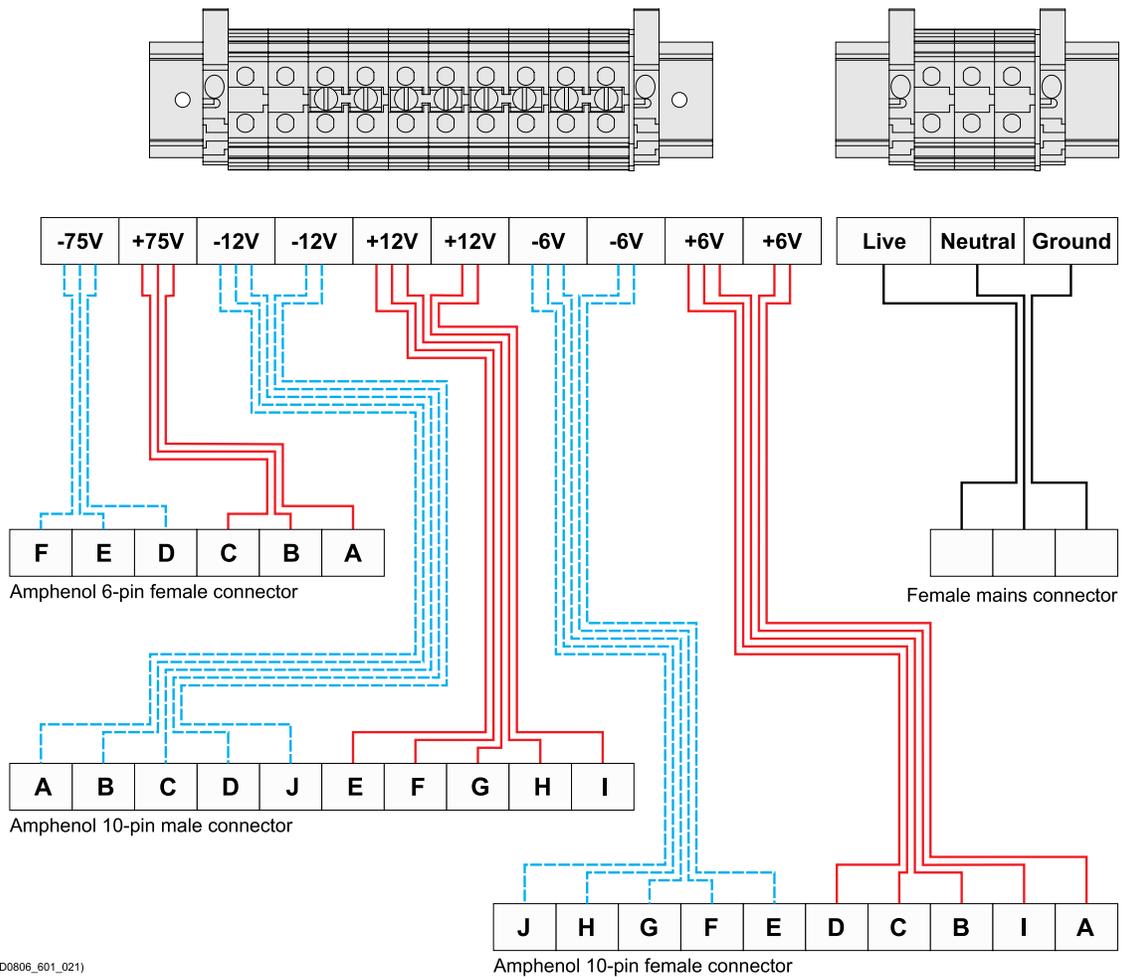
You must never set the ME70 to "ping" unless the transducer is submerged in water. The transducer may be damaged if it transmits in open air.

Context

The outputs from the three power supply modules are connected to the terminal block on the left cabinet wall. The output from the +75 VDC power supply is fed through an NTC resistor. In order to filter out voltage variations caused by noise or load variations, large capacitors are connected to each of the +12 VDC and +6 VDC supplies. These capacitors are physically located in the three TRXU subracks in the Transceiver Unit.

The DC cables from each of the three Power Supply Units to the Transceiver Unit are all separate conductors in a bundle. 230 Vac is also included in order to power the fans in each TRXU subrack.

Inside the Transceiver Unit, the power cables are terminated in three TRXU Terminal blocks, one for each subrack. From these terminal blocks, the three DC cable bundles are fed up to the rear side of the subrack, and terminated with plugs on the Power Connector Panel.



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Each TRXU Terminal block is used to make the connections between the Power Supply Unit and the relevant subrack in the Transceiver Unit. The cables from each Power Supply Unit are connected to the top of the terminal block. Connections are then made to the Amphenol plugs that match the Power Connector Panel.

The AC power provided by the Power Supply Units is also terminated on the Power Connector Panel.

The following cables are included in the bundle:

- 230 VAC to TRXU subrack fans
- +6 VDC (two red cables)
- -6 VDC (two blue cables)
- +12 VDC (one red cable)
- -12 VDC (one blue cable)
- +75 VDC (one red and one blue cable)

The following requirements must be met:

- +6.30 VDC \pm 0.1 VDC
- +12.0 VDC \pm 0.1 VDC
- +75.0 VDC \pm 0.1 VDC

Procedure

WARNING

High voltages are used. This equipment must be serviced only by qualified personnel familiar with the construction and operation of the ME70, as well as the potential hazards involved. Failure to observe this precaution could result in bodily injury.

- 1 On the **Main** menu, set **Beam Mode** to *Test - Example 1*.
- 2 Open the **Operation** menu.
 - a Set **Operation** to *Normal*.
 - b Set **Range** to: *100 m*.
 - c Set **Ping** to *On*.
 - d Set **Ping Mode** to *Interval*.
 - e Set **Ping Interval** to *1 s*.
 - f Set **Tx Mode** to *Passive*
 - g Set **Tx Power** to *Off*.
- 3 Open the rear door on the Transceiver Unit.
- 4 Observe the terminal block on the left side of the cabinet.
- 5 Measure the individual voltages while the ME70 is operating normally.

Verify that the voltages are:

- +6.30 VDC \pm 0.1 VDC
- +12.0 VDC \pm 0.1 VDC
- +75.0 VDC \pm 0.1 VDC

6 Close the rear door on the Transceiver Unit.

Result

Requirements	Results
+6.30 VDC \pm 0.1 VDC	
+12.0 VDC \pm 0.1 VDC	
+75.0 VDC \pm 0.1 VDC	
Date and signature:	

Recording raw data

Use the raw data recording functionality provided by the ME70 to save echo data using the *.raw format. You can save the data to the Processor Unit hard disk, or onto an external storage device.

Prerequisites

The ME70 is installed as specified in the ME70 *Installation manual*.

- The ME70 system is turned on and operates normally.
- The vessel is berthed.

Neither tools nor instruments are required.

Caution

You must never set the ME70 to "ping" unless the transducer is submerged in water. The transducer may be damaged if it transmits in open air.

Context

The **Record** button allows you to start and stop recording. You can split the current recording file (if it gets too large), and set up the file output parameters. Once all the recording parameters have been defined, you can start and stop recording.

- To start recording, select the red circle on the right side of the button.

- To stop recording, select the black rectangle.
- Select the middle of the button to open it and access the available options.

Echo data files may be kept for future references. By means of the *Replay* function you can later play back the recorded file(s) on the ME70. This may prove useful if more a detailed study of the data is requested. You can also use the file(s) to experiment with the ME70 operational settings, as this will help you to gain more experience.

Procedure

- 1 If relevant, define the recording parameters.
- 2 On the **Main** menu, set **Beam Mode** to *Test - SAT Config*.
- 3 Open the **Operation** menu.
 - a Set **Operation** to *Normal*.
 - b Set **Range** to: *50 m*.
 - c Set **Ping** to *On*.
 - d Set **Ping Mode** to *Interval*.
 - e Set **Ping Interval** to *1 s*.
 - f Set **Tx Mode** to *Passive*
 - g Set **Tx Power** to *Maximum*.
- 4 To start data recording, open the **Record** button, and select *On*.
- 5 Allow the data recording to run approximately one minute.
- 6 Stop the recording.
- 7 Use a file manager, and verify that the recorded file(s) have been saved on the chosen disk.
- 8 Set **Operation** to *Replay*.

The replay bar opens automatically. It is positioned directly below the top bar at the top of the ME70 presentation.
- 9 Under **Operation**, select **Replay File** to open the dialog box.
 - a Select **Add** to choose one or more replay files.

A standard operating system dialog box opens. It allows you to select which file(s) to replay.
 - b If you wish to replay the selected file(s) in an "endless" loop, select **Loop**.
 - c Select **OK** to save the selected settings and close the dialog box.
- 10 On the replay bar, select **Play/Pause** to start the playback.

Result

Requirements	Results
The raw data recording and playback is operational	
Date and signature:	

Recording element data

The element data recorded are information extracted from each transducer element before the beamforming takes place.

Prerequisites

The ME70 is installed as specified in the *ME70 Installation manual*.

- The ME70 system is turned on and operates normally.
- The vessel is berthed.

Caution

You must never set the ME70 to "ping" unless the transducer is submerged in water. The transducer may be damaged if it transmits in open air.

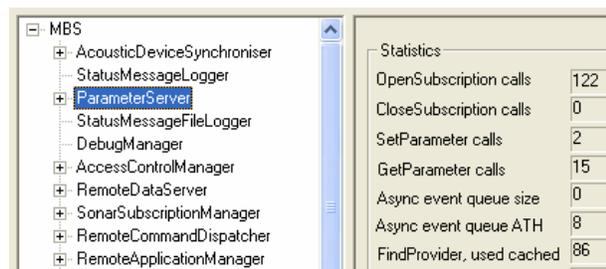
Neither tools nor instruments are required.

Context

This procedure explains how to record element data from five pings. Naturally, you may record element data for more (or fewer) pings. However, note that element data recording require large hard disk capacity.

Note

This procedure is special in the sense that some "hidden" dialog boxes are used. These dialog boxes are designed for technical support and software debugging, and they are not documented elsewhere in this publication. Follow the procedure exactly as described in the steps. Incorrect settings in these dialog boxes may cause the ME70 to become unstable.



Procedure

- 1 Open the **Operation** menu.
- 2 Set **Ping** to *Off*.
- 3 Open the **SMS BeamFormer** parameters in the **Parameter Browser** dialog box.
 - a Press the **Shift** key, and double-click the Simrad logo on the ME70 top bar.
Observe that the **Object Inspector** dialog box opens.
 - b Scroll down the list on the left side of the **Object Inspector** dialog box to locate **ParameterServer**.
 - c Double-click **ParameterServer** to open the **Parameter Browser** dialog box.
- 4 Scroll down the list on the left side of the **Parameter Browser** dialog box to locate **192.168.2.10: SMS BeamFormer**, and select the [+] sign on the left side to open it.
- 5 Scroll down the list to locate **Beamformer**, and select the [+] sign on the left side to open it.
- 6 Select the required values.
Select **Update** for each change you make.
 - a Set **FileIOmode** to 2 ("Record").
 - b Set **FileIORecordSampleStart** to 0 (Zero).
 - c Set **FileIORecordSampleEnd** to 10.000.
 - d Set **FileIORecordPath** to the desired folder.
- 7 Close each dialog box by selecting [X] in the upper-right corner.
- 8 Select **Update**.
- 9 Open the **Operation** menu.
- 10 Make the following adjustments.
 - a Set **Ping Mode** to *Single Step*.
 - b Set **Ping** to *On*.
 - c Select the "ping" symbol on the right side of the **Ping** button five times to transmit five single "pings".
 - d Set **Ping** to *Off*.
- 11 Open the **Parameter Browser** dialog box.
- 12 Scroll down the list to locate **Beamformer**, and select the [+] sign on the left side to open it.
- 13 Set **FileIOmode** to 0 ("Normal").
- 14 Select **Update**.

- 15 Close each dialog box by selecting [X] in the upper-right corner.
- 16 Save the recorded element data with the electronic copy of the test report.

Result

Requirements	Results
Element data from five pings are recorded.	
Date and signature:	

Testing the receiver channels with the BITE Matrix functionality

The **Matrix** page allows you to monitor the average signal values or signal phases from each of the channels and transducer elements in the ME70. The presentation is provided on a matrix corresponding to the element locations in the transducer. For receiver testing, the ME70 must be operational, and both operational and BITE parameters must be known.

Prerequisites

The ME70 is installed as specified in the *ME70 Installation manual*.

- The ME70 system is turned on and operates normally.
- The vessel is berthed.

Caution

You must never set the ME70 to "ping" unless the transducer is submerged in water. The transducer may be damaged if it transmits in open air.

Context

When you move the cursor over the matrix presentation of the ME70 transceiver channels, each element in the transducer can be clearly identified as a rectangle. If you place the cursor on top of one of these rectangles, a small yellow tool-tip will identify key information.

Procedure

- 1 On the **Main** menu, set **Beam Mode** to *Test - SAT Config*.
- 2 Open the **Operation** menu.
 - a Set **Operation** to *Normal*.
 - b Set **Range** to: *100 m*.

- c Set **Ping** to *On*.
 - d Set **Ping Mode** to *Interval*.
 - e Set **Ping Interval** to *1 s*.
 - f Set **Tx Mode** to *Passive*
 - g Set **Tx Power** to *Maximum*.
- 3 Open the **BITE Matrix** page.
- a Open the **Setup** menu.
 - b Select **BITE** to open the dialog box.



Observe that the **BITE** (Built In Test Equipment) dialog box opens.

- c Open the **BITE Matrix** page.
- 4 Choose these settings:
- a Select **Element amplitude**.
 - b Set **Start Averaging** to *1000*.
 - c Set **Averaging Range** to *400*.
 - d Set **Scale** to *Automatic*.
 - e Set **Element size in pixel** to *Height 24 pixels* and *Width 12 pixels*.
 - f Set **Transmit pulse** to *Current*.
- 5 Observe the average of the samples starting from sample *1000*.
These samples are all inside the receive period of the ping.
- 6 Locate any elements that appear to be noisy, or show significant difference from neighbouring elements..
Record the noisy elements in the result table.
- 7 Evaluate the level for the functional elements by pointing at each element and read the level from the tool tip. Check for neighbouring elements with the maximum deviation.
- 8 Make a screen capture of the **Matrix** page.
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.

Result

Requirements	Results
The information presented by the Matrix page verifies that the ME70 is fully operational.	
Noisy elements:	
A screen capture of the Matrix page is archived.	
Date and signature:	

Testing the transmitter channels with the BITE Matrix functionality

The **Matrix** page allows you to monitor the average signal values or signal phases from each of the channels and transducer elements in the ME70. The **Matrix** page offers a good tool for testing the transmitter and receiver circuitry. The presentation is provided on a matrix corresponding to the element locations in the transducer. For transmitter testing, the ME70 must be operational, and both operational and BITE parameters must be known.

Prerequisites

The ME70 is installed as specified in the ME70 *Installation manual*.

- The ME70 system is turned on and operates normally.
- The vessel is berthed.

Caution

You must never set the ME70 to "ping" unless the transducer is submerged in water. The transducer may be damaged if it transmits in open air.

Context

When you move the cursor over the matrix presentation of the ME70 transceiver channels, each element in the transducer can be clearly identified as a rectangle. If you place the cursor on top of one of these rectangles, a small yellow tool-tip will identify key information.

Procedure

- 1 On the **Main** menu, set **Beam Mode** to *Test - SAT Config*.
- 2 Open the **Operation** menu.
 - a Set **Operation** to *Normal*.

- b Set **Range** to: *100 m*.
 - c Set **Ping** to *On*.
 - d Set **Ping Mode** to *Interval*.
 - e Set **Ping Interval** to *1 s*.
 - f Set **Tx Mode** to *Active*
 - g Set **Tx Power** to *Maximum*.
- 3 Open the **BITE Matrix** page.
- a Open the **Setup** menu.
 - b Select **BITE** to open the dialog box.
- A screenshot of a button with a light gray background and a thin border. On the left side of the button is a double left-pointing arrow symbol '<<'. To the right of the arrow, the text 'BITE' is centered.
- Observe that the **BITE** (Built In Test Equipment) dialog box opens.
- c Open the **BITE Matrix** page.
- 4 Choose these settings:
- a Select **Element amplitude**.
 - b Set **Start Averaging** to *20*.
 - c Set **Averaging Range** to *100*.
 - d Set **Scale** to *Automatic*.
 - e Set **Element size in pixel** to *Height 24 pixels* and *Width 12 pixels*.
 - f Set **Transmit pulse** to *Current*.
- 5 Observe the average of the samples starting from sample *20*.
- 6 Read the bottom text line under the Matrix presentation, and observe any deviation between neighbouring elements in the transmit pulse.
- 7 Make a screen capture of the **Matrix** page.
- 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.
- 8 In the event of unserviceable elements:
- a Set **Scale** to *Manual*.
 - b Set **Minimum** value to *35*.
 - c Set **Maximum** value to *45*.
 - d Evaluate the level for the functional elements with the maximum deviation. Record the weak elements in the result table.

- e Make a screen capture of the **Matrix** page.

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.

Result

Requirements	Results
The information presented by the Matrix page verifies that the ME70 is fully operational.	
Weak elements:	
A screen capture of the Matrix page is archived.	
Date and signature:	

Testing the receiver and transmitter channels with the BITE B-Scan functionality

The **B-Scan** page allows you to monitor the time series of data that is received from each of the elements in the ME70 transducer. The start sample and the number of samples to be displayed are adjustable.

Prerequisites

The ME70 is installed as specified in the *ME70 Installation manual*.

- The ME70 system is turned on and operates normally.
- The vessel is berthed.

Caution

You must never set the ME70 to "ping" unless the transducer is submerged in water. The transducer may be damaged if it transmits in open air.

Context

When you move the cursor over the B-Scan presentation of the ME70 transceiver channels, each element in the transducer is clearly identified as a long coloured vertical rectangle. If you place the cursor on top of one of these B-Scan rectangles, a small yellow tool-tip will identify key information.

- The identification of the transducer element

- The identification of the transceiver board
- The current sample you are looking at
- The measured echo value (in dB)

Procedure

- 1 On the **Main** menu, set **Beam Mode** to *Test - SAT Config*.
- 2 Open the **Operation** menu.
 - a Set **Operation** to *Normal*.
 - b Set **Range** to: *100 m*.
 - c Set **Ping** to *On*.
 - d Set **Ping Mode** to *Interval*.
 - e Set **Ping Interval** to *1 s*.
 - f Set **Tx Mode** to *Active*
 - g Set **Tx Power** to *Maximum*.
- 3 Open the **BITE B-Scan** page.
 - a Open the **Setup** menu.
 - b Select **BITE** to open the dialog box.

Observe that the **BITE** (Built In Test Equipment) dialog box opens.
 - c Open the **BITE B-Scan** page.
- 4 Choose these settings:
 - a Select **Element amplitude**.
 - b Set **Start sample** to *0*.
 - c Set **Sample range** to *1000*.
 - d Set **Decimation Method** to *Peak*.
 - e Set **Scale** to *Automatic*.
 - f Set the **Sample Pixel Size** to fit your preferences.
- 5 Make sure that the channels are uniform.
- 6 Make sure that there are no weak elements in the transmission sample range.
If any weak elements are detected, record these in the result table.

- 7 Make sure there are no black lines in the transmission and reception sample range.
A black line indicates an unserviceable transducer element. If any such elements are detected, record these in the result table.
- 8 Make a screen capture of the **B-Scan** page.
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.

Result

Requirements	Results
The information presented by the B-Scan page verifies that the ME70 is fully operational.	
All elements are operational in both transmit and receive. The maximum number of unserviceable elements is 16. 4.	
Weak elements:	
Unserviceable elements:	
A screen capture of the B-Scan page is archived.	
Date and signature:	

Measuring noise in passive operating mode

Low noise is a key factor for high quality and reliable measurements. The performance of the ME70 will always be limited by different noise sources. The noise is measured while the ME70 operates in *Passive* mode with the transmit pulses disabled.

Prerequisites

The ME70 is installed as specified in the *ME70 Installation manual*.

- The ME70 system is turned on and operates normally.

Caution

You must never set the ME70 to "ping" unless the transducer is submerged in water. The transducer may be damaged if it transmits in open air.

- All relevant external sensors are connected to the ME70. The sensors are turned on and operate normally.
- The vessel is berthed.

Note

This test must be considered as indicative. With the vessel in port, the environmental conditions are not satisfactory. In the shallow waters of the port, noise from other vessels, dockyard workers or machinery will cause unreliable test results. 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.

The test is therefore repeated during the Sea Acceptance Test.

Context

To read the noise level, use the *Numerical* view.

Note

This test must be considered as indicative. With the vessel in port, the environmental conditions are not satisfactory. In the shallow waters of the port, noise from other vessels, dockyard workers or machinery will cause unreliable test results. The test is therefore repeated during the Sea Acceptance Test.

Procedure

- 1 On the **Main** menu, set **Beam Mode** to *Test - SAT Config*.
- 2 Open the **Operation** menu.
 - a Set **Operation** to *Inactive*.
 - b Set **Range** to: *500 m*.
 - c Set **Ping** to *On*.
 - d Set **Ping Mode** to *Maximum*.
 - e Set **Tx Mode** to *Passive*
 - f Set **Tx Power** to *Maximum*.
- 3 Open the **Active** menu.
- 4 Select **Echogram** to open the dialog box.
 - a Set **Reference** to *Surface*.
 - b Set **Backscatter** to *Sv (20 log)*.
 - c Select **OK** to save the selected setting and close the dialog box.
- 5 To start data recording, open the **Record** button, and select *On*.

- 6 In the *Numerical* view, read the noise level estimates for the centre beam (beam 3) and from one of the outer beams (beam 0).

Record the values in the result table.

- 7 In the *Echogram* view, for the centre beam (beam 3) and for one of the outer beams (beam 0), estimate the range to where the noise becomes visible.

Record the values in the result table.

- 8 Open the **BITE B-Scan** page.

- a Open the **Setup** menu.
- b Select **BITE** to open the dialog box.



Observe that the **BITE** (Built In Test Equipment) dialog box opens.

- c Open the **BITE B-Scan** page.
- 9 Choose these settings:
- a Select **Element amplitude**.
 - b Set **Start sample** to *0*.
 - c Set **Sample range** to *1000*.
 - d Set **Decimation Method** to *Peak*.
 - e Set **Scale** to *Automatic*.
 - f Set the **Sample Pixel Size** to fit your preferences.
- 10 Make a screen capture of the **B-Scan** page.

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.

- 11 Select the **Matrix** tab to open the page.

- 12 Choose these settings:

- a Select **Element amplitude**.
- b Set **Start Averaging** to *140*.
- c Set **Averaging Range** to *40*.
- d Set **Scale** to *Automatic*.
- e Set **Element size in pixel** to *Height 24 pixels* and *Width 12 pixels*.
- f Set **Transmit pulse** to *Current*.

13 Make a screen capture of the **Matrix** page.

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.

14 Choose these settings:

- a Select **Element amplitude**.
- b Set **Start Averaging** to *500*.
- c Set **Averaging Range** to *100*.
- d Set **Scale** to *Automatic*.
- e Set **Element size in pixel** to *Height 24 pixels* and *Width 12 pixels*.
- f Set **Transmit pulse** to *Current*.

15 Make a screen capture of the **Matrix** page.

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.

16 Stop the recording.

Save the data using a unique file name that identifies context, date, time and vessel. Attach the data file to the electronic copy of the test report.

Result

Noise level centre beam	Noise level outer beam	Range centre beam	Range outer beam

Requirements	Results
The noise level in <i>Passive</i> mode is acceptable.	
Date and signature:	

Measuring the time between each ping

The time between each ping (sometimes referred to as the *pulse repetition frequency (PRF)*) must be verified for different range settings. Longer ranges will increase the time between each ping.

Prerequisites

The ME70 is installed as specified in the *ME70 Installation manual*.

- The ME70 system is turned on and operates normally.
- The vessel is berthed.

Caution

You must never set the ME70 to "ping" unless the transducer is submerged in water. The transducer may be damaged if it transmits in open air.

Context

You can measure the time between pings by setting the horizontal axis in the *Echogram* view to a defined number of pings, and measure the time it takes to "fill" the echogram. The horizontal scale controls how "fast" the echograms move from right towards left across the ME70 presentation. You can change the horizontal scale on the **Horizontal Axis** page in the **Echogram** dialog box.

The following requirement must be met:

- 50 meters range: < 400 ms
- 500 meters range: < 1670 ms

Procedure

- 1 On the **Main** menu, set **Beam Mode** to *Test - SAT Config*.
- 2 Open the **Operation** menu.
 - a Set **Operation** to *Normal*.
 - b Set **Range** to: *20 m*.
 - c Set **Ping** to *On*.
 - d Set **Ping Mode** to *Maximum*.
 - e Set **Tx Mode** to *Active*
 - f Set **Tx Power** to *Maximum*.
- 3 To start data recording, open the **Record** button, and select *On*.

- 4 For each range setting in the result table, use the *Echogram* view to find the time between each ping.
- 5 Stop the recording.
Save the data using a unique file name that identifies context, date, time and vessel. Attach the data file to the electronic copy of the test report.
- 6 Set **Range** to: *500 m*.
- 7 Measure the time between ping with the data recording switched off.

Result

Range (m)	Record	Results
20	On	
50	On	
100	On	
200	On	
500	On	
500	Off	

Requirements	Results
Time between pings are recorded in the result table.	
Date and signature:	

Verifying long time stability in continuous operation

The ME70 is designed for stable operation during long time continuous use. It shall be able to record raw data continuously, provided that the available data storage capacity is sufficient.

Prerequisites

The ME70 is installed as specified in the *ME70 Installation manual*.

- The ME70 system is turned on and operates normally.
- The vessel is berthed.

Caution

You must never set the ME70 to "ping" unless the transducer is submerged in water. The transducer may be damaged if it transmits in open air.

Procedure

- 1 On the **Main** menu, set **Beam Mode** to *Test - SAT Config*.
- 2 Open the **Operation** menu.
 - a Set **Operation** to *Normal*.
 - b Set **Range** to: *100 m*.
 - c Set **Ping** to *On*.
 - d Set **Ping Mode** to *Maximum*.
 - e Set **Tx Mode** to *Active*
 - f Set **Tx Power** to *Maximum*.
- 3 To start data recording, open the **Record** button, and select *On*.
- 4 Leave the ME70 running continuously for minimum 12 hours.
- 5 Verify that no error messages are presented during normal operation.
- 6 Stop the recording.

Save the data using a unique file name that identifies context, date, time and vessel.
Attach the data file to the electronic copy of the test report.
- 7 Power down the ME70.

Result

Requirements	Results
The ME70 is stable after minimum 12 hours continuous operation.	
No error messages are presented.	
Date and signature:	

Verifying the installation parameters

Topics

[Verifying the installation parameters for the GPS antenna, page 57](#)

[Verifying the installation parameters for the MRU, page 58](#)

[Verifying the installation parameters for the transducer, page 60](#)

Verifying the installation parameters for the GPS antenna

Information from a few key sensors are vital for the ME70 accuracy. In order to achieve maximum accuracy, the physical locations of these sensors - normally referred to the *Ship Origin* - must be recorded in the ME70 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 ME70 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 ME70 to show the correct navigational information in the ME70 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 ME70.	
All values are correct.	
All values are recorded in the relevant table.	
Date and signature:	

Related topics

[Verifying the installation parameters, page 57](#)

Verifying the installation parameters for the MRU

The physical location of the motion reference unit (MRU) relative to the transducer is required to allow the ME70 to adjust for roll and pitch as accurately as possible.

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. For maximum accuracy, we strongly recommend that you use the information provided by a dimensional survey.

Neither tools nor instruments are required. The ME70 system is turned on and operates normally.

Context

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 ME70 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 ME70 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 ME70.

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

Result

Motion reference unit (MRU) offsets		
X Offset	Y Offset	Z Offset

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

Requirements	Results
All offset values and installation angles are entered in the ME70.	
All values are correct.	
All values are recorded in the relevant table.	
Date and signature:	

Related topics

[Verifying the installation parameters, page 57](#)

Verifying the installation parameters for the transducer

Information from a few key sensors are vital for the ME70 accuracy. In order to achieve maximum accuracy, the physical locations of these sensors - normally referred to the *Ship Origin* - must be recorded in the ME70 setup. For future reference, the offset values for each sensor is recorded.

Prerequisites

For accurate location of the transducer, you need the detailed vessel drawings. Neither tools nor instruments are required. The ME70 system is turned on and operates normally.

Context

The physical location of the ME70 transducer is important for the ME70 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 Make sure that the correct mounting has been selected.
 - e Record the information in the result table.
- 5 Continue your work in the **Installation** dialog box, or select **OK** to close it.

Result

Transducer		
X Offset	Y Offset	Z Offset
Installation angle X	Installation angle Y	Installation angle Z
Mounting		

Requirements	Results
All offset values and installation angles are entered in the ME70.	
All values are correct.	
All values are recorded in the relevant table.	
Date and signature:	

Related topics

[Verifying the installation parameters, page 57](#)

Testing the interfaces with peripheral devices

Topics

[Verifying the communication with a navigation system \(GPS\), page 62](#)

[Verifying the communication with an external trawl or catch monitoring system, page 65](#)

[Verifying the communication with a synchronization system, page 67](#)

[Verifying the communication with the motion reference unit \(MRU\), page 69](#)

[Verifying the communication and data import from a fixed sound speed sensor, page 72](#)

[Verifying the data import from a deployed sound speed sensor, page 75](#)

Verifying the communication with a navigation system (GPS)

Accurate and reliable information from navigation systems are vital to the ME70 operation. The information provided by the navigation systems is used by the ME70 software. Navigational data are also included in the raw data export formats. The information from the navigation sensors are shown on the top bar.

Prerequisites

The ME70 is installed as specified in the *ME70 Installation manual*.

- The sensor is connected to a communication port on the ME70. The sensor is on and in normal operation.
- The interface port is set up with the correct communication parameters.
- You are familiar with NMEA and other relevant datagram formats.
- You know how to set up the parameters for serial and local area network (LAN) communication.
- The vessel is berthed or at sea.
- All relevant vessel drawings, installation reports and/or measurement results are available.
- The ME70 system is turned on and operates normally.
- The vessel is berthed.

Neither tools nor instruments are required. For connections and communication parameters, see the relevant end-user documentation from the sensor manufacturer.

Context

Most global positioning system (GPS) receivers provide NMEA 0183 datagrams containing geographical latitude and longitude information, as well as current speed and sailed distance. Some GPS systems will also provide the current heading, but this information is normally taken from the gyro.

The properties of each of the available communication ports are defined on the **I/O Setup** page. The **Sensor Installation** page allows your ME70 to communicate with external sensors and systems. To make sure that the information from the "most reliable" sensors are used by the ME70, use the **Sensor Configuration** page to define a datagram priorities.

The communication parameters defined for NMEA 0183 are:

- **Baud rate:** 4800 bit/s
- **Data bits:** 8
- **Parity:** Even
- **Stop bits:** 1

Some instruments may provide other parameters and/or options. You must always check the relevant technical documentation supplied by the manufacturer.

Procedure

- 1 If applicable: Turn on the ME70, and set it to normal use.
- 2 Open the **Operation** menu.
 - a Set **Operation** to *Normal*.
 - b Set **Range** to: *100 m*.
 - c Set **Ping** to *On*.
 - d Set **Ping Mode** to *Interval*.
 - e Set **Ping Interval** to *1 s*.
 - f Set **Tx Mode** to *Active*
 - g Set **Tx Power** to *Maximum*.
- 3 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.

- 4 On the left side of the **Installation** dialog box, select **I/O Setup**.
 - a Observe that the available serial interface ports on the Processor Unit are listed.

- b Select the port you wish to check.
 - c Select **Monitor** to open the **Port Monitor** dialog box.
 The **Port Monitor** dialog box provides one text box for incoming messages (**Rx Data**), and one for outgoing messages (**Tx Data**). Use these boxes and your knowledge of the data communication to investigate the datagrams.
 - d Select **Cancel** to close the dialog box without making any changes.
- 5 On the left side of the **Installation** dialog box, select **Sensor Installation**.
 - a Select the relevant sensor in the **Installed Sensors** list.
 - b Make sure that the correct installation parameters are used for the sensor.
 - 6 On the left side of the **Installation** dialog box, select **Sensor Configuration**.
 - a Select the relevant sensor in the **Sensor** list.
 - b Make sure that the correct parameters are used for sensor configuration.
 - 7 Close the **Installation** dialog box without making any changes.
 - 8 Observe the top bar.
 - 9 Make sure that the information from the sensor is displayed.
 If necessary, enable the read-out in the **Display Options** dialog box.
 - 10 If possible, use another instrument to verify that the information provided by the ME70 is correct.
 - 11 Fill in the result tables.

Result

Sensor	Source sensor	Datagram	Port	Baud rate
Position				
Speed				
Distance				
Heading				

X Offset	Y Offset	Z Offset

Requirements	Results
Position data is provided.	
Speed data is provided.	

Requirements	Results
Distance data is provided.	
Heading data is provided.	
The relevant communication parameters are recorded.	
Date and signature:	

Related topics

[Testing the interfaces with peripheral devices, page 62](#)

Verifying the communication with an external trawl or catch monitoring system

By interfacing a trawl system, you can import relevant information about your deployed trawl, and show this information the ME70 presentation. By interfacing a catch monitoring system, you can import relevant information about your deployed gear, and show this information in the ME70 presentation.

Prerequisites

The ME70 is installed as specified in the *ME70 Installation manual*.

- The sensor is connected to a communication port on the ME70. The sensor is on and in normal operation.
- The interface port is set up with the correct communication parameters.
- You are familiar with NMEA and other relevant datagram formats.
- You know how to set up the parameters for serial and local area network (LAN) communication.
- The vessel is berthed or at sea.
- All relevant vessel drawings, installation reports and/or measurement results are available.
- The ME70 system is turned on and operates normally.
- The vessel is berthed.

Neither tools nor instruments are required. For connections and communication parameters, see the relevant end-user documentation from the sensor manufacturer.

Context

Communication with external trawl systems is based on NMEA and proprietary telegrams.

The properties of each of the available communication ports are defined on the **I/O Setup** page. The **Sensor Installation** page allows your ME70 to communicate with external sensors

and systems. To make sure that the information from the "most reliable" sensors are used by the ME70, use the **Sensor Configuration** page to define a datagram priorities.

The communication parameters defined for NMEA 0183 are:

- **Baud rate:** 4800 bit/s
- **Data bits:** 8
- **Parity:** Even
- **Stop bits:** 1

Some instruments may provide other parameters and/or options. You must always check the relevant technical documentation supplied by the manufacturer.

Procedure

- 1 If applicable: Turn on the ME70, and set it to normal use.
- 2 Open the **Operation** menu.
 - a Set **Operation** to *Normal*.
 - b Set **Range** to: *100 m*.
 - c Set **Ping** to *On*.
 - d Set **Ping Mode** to *Interval*.
 - e Set **Ping Interval** to *1 s*.
 - f Set **Tx Mode** to *Active*
 - g Set **Tx Power** to *Maximum*.

- 3 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.

- 4 On the left side of the **Installation** dialog box, select **I/O Setup**.
 - a Observe that the available serial interface ports on the Processor Unit are listed.
 - b Select the port you wish to check.
 - c Select **Monitor** to open the **Port Monitor** dialog box.

The **Port Monitor** dialog box provides one text box for incoming messages (**Rx Data**), and one for outgoing messages (**Tx Data**). Use these boxes and your knowledge of the data communication to investigate the datagrams.

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

- 5 On the left side of the **Installation** dialog box, select **Sensor Installation**.
 - a Select the relevant sensor in the **Installed Sensors** list.
 - b Make sure that the correct installation parameters are used for the sensor.
- 6 On the left side of the **Installation** dialog box, select **Sensor Configuration**.
 - a Select the relevant sensor in the **Sensor** list.
 - b Make sure that the correct parameters are used for sensor configuration.
- 7 Close the **Installation** dialog box without making any changes.
- 8 Verify that the relevant trawl information is shown in the *Swath* view.

Result

Sensor	Source system	Port	Baud rate
Trawl			
Catch Monitoring			

Requirements	Results
A catch or trawl system is connected to a communication port on the Processor Unit.	
Catch or trawl data is provided.	
Relevant communication parameters are recorded in the result table.	
Trawl data is shown in the <i>Swath</i> view.	
Date and signature:	

Related topics

[Testing the interfaces with peripheral devices, page 62](#)

Verifying the communication with a synchronization system

Whenever more than one hydroacoustic system is installed on a vessel, interference may occur. The ME70 offers functionality for remote transmit synchronization. It can be set up to operate in either *Master* or *Slave* mode. Synchronization is required in order to avoid interference if the ME70 is used simultaneously with other hydroacoustic instruments within the same frequency range. You do not need to do this test if the ME70 shall only operate in *Standalone* mode.

Prerequisites

The ME70 is installed as specified in the ME70 *Installation manual*. To make sure that the the interface is functional, a relevant synchronization system must be connected to the ME70.

- The ME70 system is turned on and operates normally.
- For "slave" operation, a remote system (for example *K-Sync* or *Simrad TU40*) must be available to provide trigger pulses.
- For "master" operation, a remote hydroacoustic system (sonar, echo sounder) is connected. This remote system must be set up in "slave" mode.
- The vessel is berthed.

Neither tools nor instruments are required.

Context

Whenever more than one hydroacoustic system is installed on a vessel, interference may occur. To avoid interference, you have these options:

- The systems are all connected to a common synchronization system.
- One of the acoustic systems is set up as "master", and controls the transmissions on the other systems.

Procedure

- 1 Test the synchronization when ME70 operates in *Master* mode.
 - a On the **Setup** menu, select **Installation**.
 - b Select **Synchronization**.
 - c Record the communication parameters in the result table.
 - d Select synchronization mode.
 - e Select the synchronization delay.
 - f Make sure that relevant hydroacoustic systems connected to the ME70 are synchronized.
- 2 Test the synchronization when ME70 operates in *Slave* mode.
 - a Make sure that the synchronization system is connected.
 - b On the **Setup** menu, select **Installation**.
 - c Select **Synchronization**.
 - d Record the communication parameters in the result table.
 - e Select synchronization mode.
 - f Select the synchronization delay.
 - g Make sure that the ME70 operates normally when triggered by the remote synchronization system.

Result

Sensor	Source system	Port
Synchronization		

Requirements	Results
The external synchronization system is connected to provide trigger pulses (if relevant).	
The ME70 operates in <i>Slave</i> mode.	
The ME70 operates in <i>Master</i> mode.	
Relevant communication parameters are recorded.	
Date and signature:	

Related topics

[Testing the interfaces with peripheral devices, page 62](#)

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 ME70 to increase the accuracy of the echo data.

Prerequisites

The ME70 is installed as specified in the *ME70 Installation manual*.

- The sensor is connected to a communication port on the ME70. The sensor is on and in normal operation.
- The interface port is set up with the correct communication parameters.
- You are familiar with NMEA and other relevant datagram formats.
- You know how to set up the parameters for serial and local area network (LAN) communication.
- The vessel is berthed or at sea.
- All relevant vessel drawings, installation reports and/or measurement results are available.
- The ME70 system is turned on and operates normally.
- The vessel is berthed.

Neither tools nor instruments are required. For connections and communication parameters, see the relevant end-user documentation from the sensor manufacturer.

Context

A motion reference unit (MRU) measures the vessel's pitch and roll movements in the sea. The information provided by the motion sensor is used by the ME70 to stabilize the beams and the echo presentation.

Note

The input from the motion reference unit (MRU) is of vital importance to the ME70. An unserviceable - or inaccurate - sensor will render the scientific data useless. Due to the importance of the motion sensor data, the ME70 will stop "pinging" if the information from the sensor is lost.

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 **Motion Reference Unit**.
- 4 Make sure that the sensor has been connected.
- 5 Write down the interface parameters for the motion reference unit (MRU).
- 6 On the left side of the **Installation** dialog box, select **Installation Parameters** to open the page.
 - a Open the **MRU** (Motion Reference Unit) page.
 - b Make sure that the installation parameters for the motion sensor (offset and rotation) are correct.

The physical location of the sensor (X, Y and Z offsets) must be extracted from the detailed vessel drawings, or from the reports provided by the personnel that did the actual installation. The information about the installation angles must be extracted from the reports provided by the personnel that did or measured up the actual installation.

- 7 Close the **Installation** dialog box without making any changes.
- 8 Observe the top bar.
- 9 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 ME70 must be "pinging". As long as the vessel is in port, you can not expect major changes in the values.

- 10 If possible, use another instrument to verify that the information provided by the ME70 is correct.
- 11 Fill in the result tables.

Result

Sensor	Source system	Baud rate	Port	Protocol
Motion Reference Unit				

X Offset	Y Offset	Z Offset
Rotation Around X	Rotation Around Y	Rotation Around Z

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

Related topics

[Testing the interfaces with peripheral devices, page 62](#)

Verifying the communication and data import from a fixed sound speed sensor

In order to ensure accurate measurements, a dedicated sound speed sensor is positioned close to the transducer. The sound speed sensor connects to the Processor Unit. This is normally done with a serial line.

Prerequisites

The ME70 is installed as specified in the ME70 *Installation manual*.

- The sensor is connected to a communication port on the ME70. The sensor is on and in normal operation.
- The interface port is set up with the correct communication parameters.
- You are familiar with NMEA and other relevant datagram formats.
- You know how to set up the parameters for serial and local area network (LAN) communication.
- The vessel is berthed or at sea.
- All relevant vessel drawings, installation reports and/or measurement results are available.
- The ME70 system is turned on and operates normally.
- The vessel is berthed.

Neither tools nor instruments are required. For connections and communication parameters, see the relevant end-user documentation from the sensor manufacturer.

Context

A dedicated sensor is used to measure the sound speed in the water. The sensor measures the temperature and/or the salinity, and this information is used to calculate the sound speed. Sound speed sensors may be used in two different ways; *fixed* or *deployed*.

- A *fixed* sound speed sensor is positioned close to the transducer.

The sensor is normally a permanent installation, but on many vessels a method for lowering and hoisting the sensor has been designed. Then the sensor can be lowered only when required for measurements. The sound speed sensor connects to the Processor Unit. This is normally done with a serial line. In the ME70 user interface, the sound speed sensor is often referred to as a *probe*.

- The *deployed* sound speed sensor, frequently referred to as a *CTD (conductivity, temperature and depth)* sensor, is lowered into the water to make measurements at certain depth intervals.

After use, the sensor is connected to a computer, and the measurements are transferred to a data file. Once the information has been collected, it is transferred to the Processor Unit on a suitable medium. The information from a CTD (conductivity, temperature and depth) sensor is normally referred to as a *profile*.

Communication with the sound speed sensor is based on proprietary datagrams. For connections and communication parameters, see the relevant end-user documentation from the sensor manufacturer.

The properties of each of the available communication ports are defined on the **I/O Setup** page. The **Sensor Installation** page allows your ME70 to communicate with external sensors and systems. To make sure that the information from the "most reliable" sensors are used by the ME70, use the **Sensor Configuration** page to define a datagram priorities.

The communication parameters defined for NMEA 0183 are:

- **Baud rate:** 4800 bit/s
- **Data bits:** 8
- **Parity:** Even
- **Stop bits:** 1

Some instruments may provide other parameters and/or options. You must always check the relevant technical documentation supplied by the manufacturer.

Procedure

- 1 Connect the sound speed sensor to the Processor Unit.
- 2 Select **Monitor** to open the **Port Monitor** dialog box.

The **Port Monitor** dialog box provides one text box for incoming messages (**Rx Data**), and one for outgoing messages (**Tx Data**). Use these boxes and your knowledge of the data communication to investigate the datagrams.

- 3 On the left side of the **Installation** dialog box, select **I/O Setup**.
 - a Observe that the available serial interface ports on the Processor Unit are listed.
 - b Select the port you wish to check.
 - c Select **Monitor** to open the **Port Monitor** dialog box.

The **Port Monitor** dialog box provides one text box for incoming messages (**Rx Data**), and one for outgoing messages (**Tx Data**). Use these boxes and your knowledge of the data communication to investigate the datagrams.

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

- 4 On the left side of the **Installation** dialog box, select **Sensor Installation**.
 - a Select the relevant sensor in the **Installed Sensors** list.
 - b Make sure that the correct installation parameters are used for the sensor.
- 5 On the left side of the **Installation** dialog box, select **Sensor Configuration**.
 - a Select the relevant sensor in the **Sensor** list.
 - b Make sure that the correct parameters are used for sensor configuration.
- 6 Close the **Installation** dialog box without making any changes.
- 7 Open the **Setup** menu.
- 8 Select **Environment** to open the dialog box.



- 9 Open the **Transducer Face** page.
 - a Select **Manual**.
 - b Set **Sound Speed** to a very low and unrealistic value.
 - c Select **Probe**.
 - d Observe that the sound speed value changes when the information from the sensor is imported.
This may take some time.
 - e Select **OK** to save the selected settings and close the dialog box.

Result

Sensor	Source system	Port	Baud rate
Sound speed (fixed)			

Requirements	Results
The sensor is connected to a communication port on the Processor Unit.	
Sensor data is provided to and accepted by the ME70.	
Relevant communication parameters are recorded in the result table.	
Date and signature:	

Related topics

[Testing the interfaces with peripheral devices, page 62](#)

Verifying the data import from a deployed sound speed sensor

In order to ensure accurate depth determination in the survey area, a *deployed* sound speed sensor is used to measure the temperature and salinity on various water depths. Once the information has been collected, it is transferred to the Processor Unit on a suitable medium.

Prerequisites

The ME70 system is turned on and operates normally. A CTD (conductivity, temperature and depth) sensor is available. For the relevant procedures, refer to the end-user documentation provided by the manufacturer.

In order to do this task, you need a USB flash drive. Neither tools nor instruments are required.

Context

A dedicated sensor is used to measure the sound speed in the water. The sensor measures the temperature and/or the salinity, and this information is used to calculate the sound speed. Sound speed sensors may be used in two different ways; *fixed* or *deployed*.

- A *fixed* sound speed sensor is positioned close to the transducer.

The sensor is normally a permanent installation, but on many vessels a method for lowering and hoisting the sensor has been designed. Then the sensor can be lowered only when required for measurements. The sound speed sensor connects to the Processor Unit. This is normally done with a serial line.

- The *deployed* sound speed sensor, frequently referred to as a *CTD* (*conductivity, temperature and depth*) sensor, is lowered into the water to make measurements at certain depth intervals.

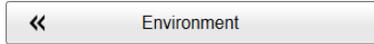
After use, the sensor is connected to a computer, and the measurements are transferred to a data file. Once the information has been collected, it is transferred to the Processor Unit on a suitable medium. The information from a CTD (conductivity, temperature and depth) sensor is normally referred to as a *profile*.

Communication with the sound speed sensor is based on proprietary datagrams. Data conversion may be required.

Procedure

- 1 Lower the sound speed sensor into the water, and retrieve a collection of data samples.
For the relevant procedures, refer to the end-user documentation provided by the manufacturer.
- 2 Open the **Setup** menu.

- 3 Select **Environment** to open the dialog box.



- 4 Open the **Transducer Face** page.
- 5 Select **Profile**.
- 6 Select **Apply** to save your settings without closing the dialog box.
- 7 Open the **Profile** page.
- 8 Select **Browse** to choose the file provided by the sensor.

You can not do anything with the current profile. The presentation is for information only.

- 9 Select **Apply** to save your settings without closing the dialog box.
- 10 Select **OK** to save the selected settings and close the dialog box.

Result

Sensor	Source system	File format
Sound speed (deployed)		

Requirements	Results
Sensor data is provided to and accepted by the ME70.	
Date and signature:	

Related topics

[Testing the interfaces with peripheral devices, page 62](#)

Customer acceptance form

Fill in and sign this form for formal acceptance of the Simrad ME70 system.

The Simrad ME70 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 ME70 contains several procedures that are also applicable for this Harbour Acceptance Test. These procedures are not part of the Harbour Acceptance Test. They are provided for reference purposes only. If you scan a completed Harbour Acceptance Test for archiving or reporting purposes, it is not necessary to include these procedures.

Topics

[Turning on the ME70, page 78](#)

[Turning off the ME70, page 80](#)

[Defining the file and folder settings for raw data recording, page 81](#)

[Inserting the installation parameters, page 83](#)

[Setting up the interfaces to peripheral devices, page 91](#)

Turning on the ME70

In order to use the ME70, you must first turn it on. You must first turn on the display and the Processor Unit. The remaining ME70 units are turned on from the ME70 program.

Prerequisites

The ME70 is installed as specified in the *ME70 Installation manual*.

The ME70 has been set up with its hardware units connected as specified in the *ME70 Installation manual*.

Context

The ME70 program is not automatically started when the Processor Unit is turned on. On the Processor Unit desktop, double-click the ME70 icon to start the program.

Caution

You must never turn on the ME70 when the ship is in dry dock. The transducer may be damaged if it transmits in open air. To prevent inadvertent use of the ME70, pull out the mains plug on the Processor Unit whenever your vessel is in dry dock. Additional precautionary measures should be considered.

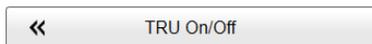
Procedure

- 1 If your transducer is mounted on a drop keel, lower it.
- 2 Turn on the display. If required, refer to the instructions provided by the display manufacturer.
- 3 Turn on the Processor Unit. Wait while the operating system loads.
- 4 Double-click the icon on the Processor Unit desktop to start the program.
- 5 Once the ME70 program has started, observe that the presentation fills the entire screen. The ME70 starts up using the same settings as the last time you used it. If you wish to alter any of the settings, see the relevant procedures.

- 6 Select the **Setup** icon.

The icon is located under the **Main** menu. It is used to open the **Setup** menu.

- 7 Select **TRU On/Off** to open the dialog box.



- 8 In the **TRU On/Off** dialog box, select **Start**.
 - a Allow the three Power Supply Units and the Transceiver Unit to start up.
 - b Observe the status indicators in the **TRU On/Off** dialog box during the sequence.
 - c Verify that the ME70 does not issue any error messages.
 - d Close the dialog box.
- 9 On the **Main** menu, set **Beam Mode** to *Example 1 Sector Uniform Weighting*
- 10 Open the **Operation** menu.
 - a Set **Operation** to *Normal*.
 - b Set **Range** to: *100 m*.
 - c Set **Ping** to *On*.
 - d Set **Ping Mode** to *Interval*.
 - e Set **Ping Interval** to *1 s*.
 - f Set **Tx Mode** to *Active*

- g Set **Tx Power** to *Maximum*.
- 11 Observe that the ME70 starts.

Turning off the ME70

When you do not use the ME70, turn off the entire system. To power down the three Power Supply Units and the Transceiver Unit, use the functionality in the ME70 program.

Context

You must never turn off the ME70 by means of the on/off switch on the Processor Unit. You may damage the software and the interface settings used to communicate with external devices. You must always follow this procedure.

Note

Turning off the Processor Unit will not automatically turn off the Transceiver Unit and the three power supplies.

If the ME70 will remain unused for a longer period of time, disengage all the circuit breakers, and stop the ventilation fans for the sonar room. This will prevent dust from entering the Transceiver Unit.

Procedure

- 1 Open the **Operation** menu.
- 2 Choose these settings:
 - a Set **Operation** to *Inactive*.
 - b Set **Ping** to *Off*.
 - c Set **Tx Mode** to *Passive*
- 3 Open the **Setup** menu.
- 4 Select **TRU On/Off** to open the dialog box.



- 5 In the **TRU On/Off** dialog box, select **Shutdown**.
 - a Allow the three Power Supply Units and the Transceiver Unit to power down.
 - b Observe the status indicators in the **TRU On/Off** dialog box during the sequence.
 - c Verify that the ME70 does not issue any error messages.

- d Close the dialog box.
- 6 Select **Exit** on the top bar.
Observe that the ME70 program closes down.
- 7 If the Processor Unit does not turn itself off automatically, use the functionality provided by the operating system to turn it off manually.
- 8 Turn off the display.
If required, refer to the instructions provided by the display manufacturer.
- 9 If your transducer is mounted on a drop keel, retract it.

Defining the file and folder settings for raw data recording

The ME70 allows you to record raw echo data. The data are saved on the Processor Unit hard disk, or on an external data storage device, according to the preferences you have defined.

Prerequisites

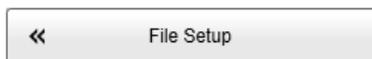
Before you start recording, make sure that you have defined where you wish to store the data files. If you wish to save your recorded data on an external hard disk, make sure that it is connected to the Processor Unit.

Context

The purpose of the **File Output** settings is to define the file and folder properties for the echo data files that are recorded by the ME70. You can select the disk and folder for the files, you can define the maximum file size, and you can choose a prefix for the file names.

Procedure

- 1 Open the **Operation** menu.
- 2 Locate the **Record** button.
- 3 Select the middle of the button to open it and access the available options.
- 4 Select **File Setup** to open the dialog box.



- 5 Open the **Raw Data** page.
 - a Click **Save raw data** to enable the recording function.

- b Type a prefix into the **File name prefix** text field.
- c Define the **Range** to collect echo data from.
- d Define a limit (in nautical miles) for the maximum distance to be contained in one recorded file.

Set the value to 0 (zero) if you do not want any limit.

- e In the **Max. file size** field, define a maximum size for the data files.
Set the value to 0 (zero) if you do not wish to limit the file size. The **Split File** function will start a new file with the next ping regardless of the maximum file size you have defined.

Note _____

The data files will normally become very large. If you wish to record large amounts of ME70 data, make sure that you have enough space on your hard disk. The ME70 is not provided with unlimited disk capacity. We recommend that you save the data files to an external storage device.

- f Observe the **Current file size** field.
The current size of the file you are recording is shown in this field. Data is only shown while recording is taking place.
 - g Select required sailing distance (in nautical miles) before raw data output is initiated.
- 6 Select **OK** to save the selected settings and close the dialog box.

Inserting the installation parameters

Topics

[Defining the ship origin and dimensions, page 83](#)

[Defining the installation parameters for the transducer, page 85](#)

[Defining the installation parameters for the motion reference unit \(MRU\), page 87](#)

[Defining the installation parameters for the GPS antenna, page 89](#)

Defining the ship origin and dimensions

When you have several different sensors and transducers on your vessel, and you wish each of them to provide accurate data, you need to know their relative physical positions. To do this, you must establish one or more common reference points. This reference point is also used to position the sonar echoes relative to the ship symbol on the ME70 presentation.

Prerequisites

For accurate ship dimensions you need the detailed vessel drawings. Neither tools nor instruments are required. The ME70 system is turned on and operates normally.

Context

On the **Ship** page you can use the ship's physical dimensions to create a virtual reference point (the *Ship Origin*) in a dedicated coordinate system for the ME70. The *Ship Origin* is normally located in the following position:

- **X position:** Half the ship's length
- **Y position:** Half the ship's width
- **Z position:** On the waterline

If you want to change the location of the *Ship Origin*, you can do this by providing offset values in the X, Y and/or Z directions. To do this you will need the ship drawings.

Tip

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.

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 Insert the physical dimensions of your vessel (length and width).

Do this as accurately as possible. This information is used to create a new origin in the ME70 coordinate system.

- 6 Offset:
 - a If you want to keep the default reference point (*origin*), leave all offset values to 0 (zero).
 - b If you want to move the reference point to another location, use the necessary offset values.

To find these offset values, consult the vessel drawings. Do this as accurately as possible.

- 7 At the bottom of the page, select **Apply** to save your settings.
- 8 Continue your work in the **Installation** dialog box, or select **OK** to close it.

Result

A common reference point for the ME70 sensors and transducer has now been established.

Further requirements

You must proceed by defining the locations of the navigation system antenna, the motion reference sensor, and the transducer. These locations are all referenced to the same reference point.

Related topics

[Inserting the installation parameters, page 83](#)

Defining the installation parameters for the transducer

The physical location and the installation angles of the ME70 transducer are critical for the ME70 data accuracy. Incorrect angles will greatly reduce the data accuracy.

Prerequisites

For accurate location of the transducer, you need the detailed vessel drawings. You also need the alignment angle that was recorded when the hull unit was installed. Neither tools nor instruments are required. The ME70 system is turned on and operates normally.

Note

Determining the relative positions and orientations of the sensors and each transducer with high accuracy is important. This requires professional land surveying done by qualified and trained surveyors using proven survey equipment and methods. We recommend that you use third-party consultants with well proven experience with vessel dimensional control. The information provided by the dimensional survey is entered into the ME70 software as installation parameters.

Context

The physical location and the installation angles of the ME70 transducer are critical for the ME70 data accuracy.

Use the centre of the transducer face as reference, and define the offset values related to the *Ship Origin*. The installation angles relevant for the transducer must also be defined. These values were recorded during the transducer installation, and they define the direction of the transducer face.

Note

The required accuracy of the offset and rotation angles depends on the accuracy requirement for the ME70 data. It is very important that the transducer installation angles are measured and recorded accurately during the installation. These angles must be accurately defined in the ME70 software. Incorrect angles will greatly reduce the data accuracy.

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.
- 5 Insert the relevant offset values.
 - a **X Offset**: Insert the horizontal distance on the x-axis (fore-and-aft direction) between the transducer and the *Ship Origin*.
 - b **Y Offset**: Insert the horizontal distance on the y-axis (athwartship direction) between the transducer and the *Ship Origin*.
 - c **Z Offset**: Insert the vertical distance on the Z axis between the transducer and the *Ship Origin*.

To do this you will need the ship drawings.

- 6 Obtain the alignment angle from the dimensional survey report.
 - a **Rotation Around X**: Specify an angle (in degrees) to compensate for any deviation from the X axis (fore-and-aft direction) in the coordinate system. If the transducer is properly installed without unintentional skew, this angle can be set to 0 degrees.
 - b **Rotation Around Y**: Specify an angle (in degrees) to compensate for any deviation from the y-axis (athwartship direction) in the coordinate system. This angle is normally 0 degrees.
 - c **Rotation Around Z**: Specify an angle (in degrees) to compensate for any deviation from the Z axis (vertical direction) in the coordinate system. This is the alignment angle.. This angle is normally 0 degrees.

Do this as accurately as possible.

- 7 In **Mounting** define how the transducer is mounted on the vessel.
 - **Hull-Mounted**: The transducer is mounted on the vessel's hull.
 - **Drop Keel**: The transducer is mounted on the drop keel of the vessel.

Note _____

*If you select **Drop Keel** and the transducer is pointing down, depth calculations will automatically account for the drop keel position.*

- 8 At the bottom of the page, select **Apply** to save your settings.
- 9 Continue your work in the **Installation** dialog box, or select **OK** to close it.

Related topics

[Inserting the installation parameters, page 83](#)

Defining 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 ME70 to adjust for roll and pitch as accurately as possible.

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. For maximum accuracy, we strongly recommend that you use the information provided by a dimensional survey.

Note

Determining the relative positions and orientations of the sensors and the transducer with high accuracy is important. This requires professional land surveying done by qualified and trained surveyors using proven survey equipment and methods. We recommend that you use third-party consultants with well proven experience with vessel dimensional control. The information provided by the dimensional survey is entered into the ME70 software as installation parameters.

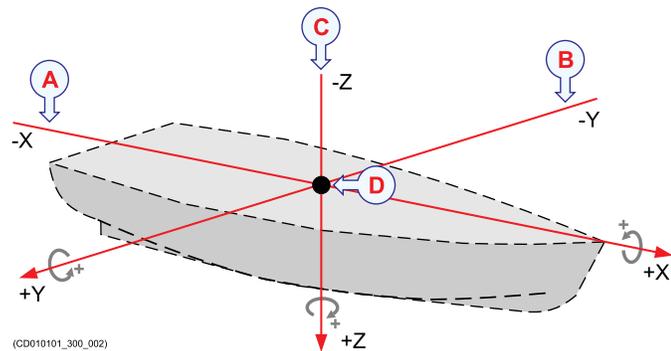
Neither tools nor instruments are required. The ME70 system is turned on and operates normally.

Context

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 ME70 data.

- A** *Rotation around the x-axis:
In the positive horizontal direction (forward), a positive rotation is clockwise.*
- B** *Rotation around the y-axis:
In the positive horizontal direction (starboard), a positive rotation is clockwise.*
- C** *Rotation around the z-axis: In the positive vertical direction (down), a positive rotation is clockwise.*
- D** *Reference point (Ship Origin)*



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 ME70 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 ME70.

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 dimensional survey report, extract the relevant information.
 - b Insert the correct values. Do this as accurately as possible.
 - c Record the information in the result table.
- 5 At the bottom of the page, select **Apply** to save your settings.
- 6 Continue your work in the **Installation** dialog box, or select **OK** to close it.

Result

Motion reference unit (MRU) offsets	
X Offset	
Y Offset	
Z Offset	
Installation angle X (α_X)	
Installation angle Y (α_Y)	
Installation angle Z (α_Z)	

Related topics

[Inserting the installation parameters, page 83](#)

Defining the installation parameters for the GPS antenna

The physical location of the global positioning system (GPS) antenna relative to the transducer is required to allow the ME70 to show the correct navigational information in the ME70 presentation.

Prerequisites

For accurate location of the global positioning system (GPS) antenna, you need the detailed vessel drawings. Neither tools nor instruments are required. The ME70 system is turned on and operates normally.

Note

Determining the relative positions and orientations of the sensors and each transducer with high accuracy is important. This requires professional land surveying done by qualified and trained surveyors using proven survey equipment and methods. We recommend that you use third-party consultants with well proven experience with vessel dimensional control. The information provided by the dimensional survey is entered into the ME70 software as installation parameters.

Context

The physical location of the global positioning system (GPS) antenna relative to the transducer is required to allow the ME70 to show the correct navigational information in the ME70 presentation. The locations of the transducer and the Global Positioning System (GPS) antenna must be referenced to a common *Ship Origin*.

Note

The physical location of this sensor was specified when the communication parameters were defined. If this was done correctly, it is not necessary to do it one more time.

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 If necessary:
 - a From the dimensional survey report, extract the relevant information.
Do this as accurately as possible.
 - b Select **Edit** to change the sensor parameters.
 - c Make the necessary adjustments.
 - d Select **Save** to keep the changes you have made.
 - e At the bottom of the page, select **Apply** to save your settings.
 - f Continue your work in the **Installation** dialog box, or select **OK** to close it.

Related topics

[Inserting the installation parameters, page 83](#)

Setting up the interfaces to peripheral devices

Topics

- [Installing navigation sensors and other sensors, page 91](#)
- [Defining the serial and Ethernet \(LAN\) port parameters, page 92](#)
- [Setting up the input from a navigation system \(GPS\), page 94](#)
- [Setting up the input from a sound speed sensor, page 96](#)
- [Setting up the input from a motion reference unit \(MRU\), page 98](#)
- [Setting up the ME70 in a synchronized system, page 100](#)
- [Setting up the interface between the ME70 and the Simrad TD50, page 103](#)
- [Checking the data transfer on an external interface line, page 104](#)

Installing navigation sensors and other sensors

For the ME70 to use and offer correct navigational information, one or more external sensors must be connected. Typical sensors are those providing navigational information (heading, speed or geographical position). To set up the communication parameters on the serial and LAN ports, use the **I/O Setup** page. To select which sensors to install, use the **Sensor Installation** page. The **Sensor Configuration** page allows you to define a datagram priority, so that the information from the "most reliable" sensor is used by the ME70. You can also define manual values in case a sensor is unserviceable, or not installed.

Prerequisites

The new sensor is physically connected to the ME70 using a serial or network cable.

Context

The **Sensor Installation** page allows your ME70 to communicate with external sensors and systems. However, in order to communicate with each sensor, you must first set up the relevant communication parameters. Once the communication has been established and the sensor is connected, you must define the datagram priority and finalize the configuration.

Note

*Just making changes and selecting **OK** at the bottom of the page will not install anything. Select what to install, define the relevant parameters, and then select **Add**.*

Procedure

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



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

- 3 Set up the interfaces to the navigation sensors.
 - a On the left side of the **Installation** dialog box, select **I/O Setup**.
 - b Set up the relevant serial or Ethernet (LAN) communication parameters.
 - c At the bottom of the page, select **Apply** to save your settings.
 - d On the left side of the **Installation** dialog box, select **Sensor Installation**.
 - e Select the type of sensor you want to interface, and define the relevant parameters.
 - f Select **Add** to save the new sensor interface you have defined.
 - g On the left side of the **Installation** dialog box, select **Sensor Configuration**.
 - h Define the priority of the datagrams, and set up relevant configuration parameters.
 - i At the bottom of the page, select **Apply** to save your settings.
- 4 Repeat for each sensor interface that you need to set up.
- 5 Continue your work in the **Installation** dialog box, or select **OK** to close it.

Related topics

[Setting up the interfaces to peripheral devices, page 91](#)

Defining the serial and Ethernet (LAN) port parameters

For any sensor interface to work, the communication parameters must be set up correctly. The ME70 software automatically scans the Processor Unit to locate and identify the available communication ports. Once the software has established a list of valid interfaces, you can set up and control the communication parameters.

Prerequisites

This procedure assumes that:

- You have a vacant interface port on your Processor Unit.
- You are familiar with NMEA and other relevant datagram formats.

- You know how to set up the parameters for serial and local area network (LAN) communication.
- The communication parameters required for the sensor interface are known.

Context

The **I/O Setup** page provides two lists; one for serial ports and one for Ethernet (LAN) ports. Each list is supported with a set of functions to set up and monitor the communication ports. Select the port you want to work with and then select one of the buttons below the list.

Tip

*The **Sensors** page in the **BITE (Built-In Test Equipment)** dialog box provides an overview of all the communication lines and sensors in use. All relevant status information is provided. You open the **BITE** dialog box from the **Setup** menu.*

When you work in the **Installation** dialog box, you must always select **Apply** to save the changes made on a page. You must do this before you continue working on a different page.

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 **I/O Setup**.
- 4 Observe that the available serial and network interface ports on the Processor Unit are listed.
- 5 Set up the relevant serial or Ethernet (LAN) communication parameters.
 - a Select the interface port you wish to set up.
 - b Select **Setup** below the list to open the **Serial Port Setup** or **LAN Port Setup** dialog box.
 - c Set up the relevant serial or Ethernet (LAN) communication parameters.

The communication parameters defined for NMEA 0183 are:

- **Baud rate:** 4800 bit/s
- **Data bits:** 8
- **Parity:** Even
- **Stop bits:** 1

Some instruments may provide other parameters and/or options. You must always check the relevant technical documentation supplied by the manufacturer.

- d Select **OK** to save the selected settings and close the dialog box.
- 6 At the bottom of the page, select **Apply** to save your settings.
- 7 Repeat for any other communication ports that you need to set up.
- 8 Close the **Installation** dialog box.

Related topics

[Setting up the interfaces to peripheral devices, page 91](#)

Setting up the input from a navigation system (GPS)

For the ME70 to use and offer correct navigational information, one or more external sensors must be connected. Typical sensors are those providing navigational information (heading, speed or geographical position). To select which sensors to install, use the **Sensor Installation** page. Your current position is shown on the top bar if you have enabled this in the **Display Options** dialog box.

Prerequisites

This procedure assumes that:

- You have a vacant interface port on your Processor Unit.
- You are familiar with NMEA and other relevant datagram formats.
- You know how to set up the parameters for serial and local area network (LAN) communication.
- The interface port is set up with the correct communication parameters.
- The ME70 system is turned on and operates normally.
- The new sensor is physically connected to the ME70 using a serial or network cable. The sensor is on and in normal operation.

Neither tools nor instruments are required.

Context

The **Sensor Installation** page allows your ME70 to communicate with external sensors and systems. You must specify which communication port to use (LAN (Local Area Network) or serial port). You can type a custom name to identify the sensor import. In the list of valid datagram formats, select the format(s) to be accepted by the ME70. For each relevant sensor you must insert the offset values that define the its physical location relative to the vessel's coordinate system.

Note

*Just making changes and selecting **OK** at the bottom of the page will not install anything. Select what to install, define the relevant parameters, and then select **Add**.*

Procedure

- 1 Connect the navigation system to an available communication port on your Processor Unit.

This is described in the ME70 *Installation manual*.

- 2 Open the **Setup** menu.
- 3 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.

- 4 On the left side of the **Installation** dialog box, select **Sensor Installation**.
- 5 For **Type**, select the *GPS* sensor to import information from a global positioning system.
- 6 Select which port you want to import the sensor information on.
- 7 If you want to check the communication parameters, select **Inspect Port**.

Note

*You cannot make any changes here. To change the communication parameters, use the *I/O Setup* page.*

- 8 If you want to check that the peripheral system is transmitting data to the ME70, select **Monitor**.

The **Port Monitor** dialog box provides one text box for incoming messages (**Rx Data**), and one for outgoing messages (**Tx Data**). Use these boxes and your knowledge of the data communication to investigate the datagrams. The **Port Monitor** dialog box is a tool for debugging purposes. It is neither required nor intended for normal operation of the ME70.

- 9 Type a custom name to identify the interface in other dialog boxes.
- 10 Select which datagram(s) you want to import from the sensor.
- 11 If relevant, specify a dedicated talker ID.

- 12 Provide the accurate physical location of the sensor (or its antenna) with reference to the vessel's coordinate system.

The position of certain sensors must be defined as an *offset* to the *Ship Origin* in the coordinate system to maximize performance. These offset values are all required to allow the ME70 to give you as accurate information as possible. The degree of accuracy offered by the ME70 is directly related to the accuracy of the information you enter on the **Sensor Installation** page.

- a Select the offset value on the X axis (fore-and-aft direction) from the *Ship Origin*. Adjust with a positive value for X if the sensor is located ahead of the ship origin.
 - b Select the offset value on the Y axis (athwartship) from the *Ship Origin*. Adjust with a positive value for Y if the sensor is located on the starboard side of the ship origin.
 - c Select the offset value on the Z axis (vertical) from the *Ship Origin*. Adjust with a positive value for Z if the sensor is located under the ship origin.
- 13 Select **Add** to save the new sensor interface you have defined.

The sensor interface is added to the **Installed Sensors** list on the **Sensor Installation** page.
 - 14 At the bottom of the dialog box, select **Apply** to save your settings.
 - 15 Repeat for each sensor interface that you need to set up.
 - 16 Continue your work in the **Installation** dialog box, or select **OK** to close it.

Further requirements

On the left side of the **Installation** dialog box, select **Sensor Configuration**. Define the priority of the datagrams, and set up relevant configuration parameters.

Related topics

[Setting up the interfaces to peripheral devices, page 91](#)

Setting up the input from a sound speed sensor

If you have a sound speed sensor located close to the transducer face, you can import the information from this sensor. This will result in more accurate ME70 data.

Prerequisites

This procedure assumes that:

- You have a vacant interface port on your Processor Unit.
- You are familiar with NMEA and other relevant datagram formats.

- You know how to set up the parameters for serial and local area network (LAN) communication.
- The interface port is set up with the correct communication parameters.
- The ME70 system is turned on and operates normally.
- The new sensor is physically connected to the ME70 using a serial or network cable. The sensor is on and in normal operation.

Neither tools nor instruments are required.

Context

The **Sensor Installation** page allows your ME70 to communicate with external sensors and systems. You must specify which communication port to use (LAN (Local Area Network) or serial port). You can type a custom name to identify the sensor import. In the list of valid datagram formats, select the format(s) to be accepted by the ME70.

Note

*Just making changes and selecting **OK** at the bottom of the page will not install anything. Select what to install, define the relevant parameters, and then select **Add**.*

Communication with the sound speed sensor is based on proprietary datagrams.

Procedure

- 1 Connect the sound speed sensor to an available serial communication port on your Processor Unit.
- 2 Open the **Setup** menu.
- 3 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.

- 4 On the left side of the **Installation** dialog box, select **Sensor Installation**.
- 5 For **Type**, select *Sound Speed* to import information from a sound speed sensor.
- 6 Select which port you want to import the sensor information on.
- 7 If you want to check the communication parameters, select **Inspect Port**.

Note

*You cannot make any changes here. To change the communication parameters, use the **I/O Setup** page.*

- 8 If you want to check that the peripheral system is transmitting data to the ME70, select **Monitor**.

The **Port Monitor** dialog box provides one text box for incoming messages (**Rx Data**), and one for outgoing messages (**Tx Data**). Use these boxes and your knowledge of the data communication to investigate the datagrams. The **Port Monitor** dialog box is a tool for debugging purposes. It is neither required nor intended for normal operation of the ME70.

- 9 Type a custom name to identify the interface in other dialog boxes.
- 10 Select which datagram(s) you want to import from the sensor.
- 11 If relevant, specify a dedicated talker ID.
- 12 Select **Add** to save the new sensor interface you have defined.
The sensor interface is added to the **Installed Sensors** list on the **Sensor Installation** page.
- 13 Select **Apply** and then **OK** to save your setting(s) and close the **Installation** dialog box.

Related topics

[Setting up the interfaces to peripheral devices, page 91](#)

Setting up the input from a motion reference unit (MRU)

The information from a motion reference unit (MRU) (normally heave, roll and pitch information) is imported into the ME70 to increase the accuracy of the echo data.

Prerequisites

This procedure assumes that:

- You have a vacant interface port on your Processor Unit.
- You are familiar with NMEA and other relevant datagram formats.
- You know how to set up the parameters for serial and local area network (LAN) communication.
- The interface port is set up with the correct communication parameters.
- The ME70 system is turned on and operates normally.
- The new sensor is physically connected to the ME70 using a serial or network cable. The sensor is on and in normal operation.

Neither tools nor instruments are required.

Context

A motion reference unit (MRU) measures the vessel's pitch and roll movements in the sea. The information provided by the motion sensor is used by the ME70 to stabilize the beams and the echo presentation.

Note

The input from the motion reference unit (MRU) is of vital importance to the ME70. An unserviceable - or inaccurate - sensor will render the scientific data useless. Due to the importance of the motion sensor data, the ME70 will stop "pinging" if the information from the sensor is lost.

Procedure

- 1 Connect the motion sensor system to an available communication port on your Processor Unit.

This is described in the ME70 *Installation manual*.

- 2 Open the **Setup** menu.
- 3 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.

Note

*If you want to use a serial line to interface the motion sensor, and no COM ports are available, you must first release a port on the **I/O Setup** page. If you choose a serial COM port to interface the motion sensor, make sure that you do not put the same COM port to other use on the **I/O Setup** page.*

- 4 Release an unused serial port (COM) port.
 - a On the left side of the **Installation** dialog box, select **I/O Setup**.
 - b Observe that the available serial and network interface ports on the Processor Unit are listed.
 - c If you have a vacant COM port, select it, then select **Remove** to delete it from the list.
 - d At the bottom of the page, select **Apply** to save your settings.
 - e Close the **Installation** dialog box.

- f Restart the ME70.
Restarting allows the Processor Unit to "free" the port.
- g When the ME70 has started, proceed to the **Motion Reference Unit** page to put the communication port to use.
- 5 On the left side of the **Installation** dialog box, select **Motion Reference Unit**.
- 6 Set up the interface.
 - a Select the Ethernet port or serial port you want to use.
 - b Select which protocol (datagram sentence) you want to use.
 - c If you are using a serial line, define the baud rate.
- 7 At the bottom of the dialog box, select **Apply** to save your settings.
- 8 Continue your work in the **Installation** dialog box, or select **OK** to close it.

Related topics

[Setting up the interfaces to peripheral devices, page 91](#)

Setting up the ME70 in a synchronized system

If you want to use the ME70 as a master or slave in a synchronized system, you must set it up for such operation. To do this, you must select which communication port to use for the synchronization interface, and you must select the requested synchronization mode.

Prerequisites

This procedure assumes that:

- The vessel is berthed or at sea.
- You have a vacant interface port on your Processor Unit.

For "slave" operation, a remote system (for example *K-Sync*) must be available to provide trigger pulses. For "master" operation, a remote hydroacoustic system (sonar, echo sounder) is connected. This remote system must be set up in "slave" mode.

Context

Whenever more than one hydroacoustic system is installed on a vessel, interference may occur. To avoid interference, you have these options:

- The systems are all connected to a common synchronization system.
- One of the acoustic systems is set up as "master", and controls the transmissions on the other systems.

The ME70 offers functionality for remote transmit synchronization. It can be set up to operate in either *Master* or *Slave* mode.

Note

When you work in the **Installation** dialog box, you must always select **Apply** to save the changes made on a page. You must do this before you continue working on a different page.

Procedure

- 1 Connect the synchronization cable from the remote system to an available communication port on your Processor Unit.

This is described in the *ME70 Installation manual*.

- 2 Turn on the ME70, and set it to normal use.
- 3 Open the **Setup** menu.
- 4 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.

- 5 On the left side of the **Installation** dialog box, select **Synchronization**.
- 6 Select **Synchronization Mode**.

- *Stand-alone*

Synchronization is turned off. This synchronization mode is used if the ME70 is working by itself and with no synchronization required. This is the default setting. The ME70 operates using its internal ping interval parameters, independent of any trigger signals arriving at the synchronization port.

The **Synchronization Delay** setting is not applicable when synchronization is switched off.

- *Master*

Master mode is used if the ME70 is going to act as the controlling unit in a synchronized system. The peripheral hydroacoustic system(s) are only permitted to transmit when enabled by the ME70. When *Master* mode is selected, the ME70 will run using its internal ping interval parameters and send trigger signals to the peripheral system(s).

This mode is unavailable if you set **Synchronization Port** to *Transceiver Auxiliary Port*.

- *Slave*

Slave mode is used if the ME70 is going to transmit only when permitted by a peripheral system. When *Slave* mode is selected, the ME70 does not transmit ("ping") unless an external trigger appears on the chosen synchronization port. The peripheral system may be any other hydroacoustic product (for example an echo sounder or sonar), or even a dedicated synchronization system.

7 Select **Synchronization Delay**.

This delay parameter is used differently depending on the chosen synchronization mode.

- *Stand-alone*

The **Synchronization Delay** setting is not applicable when synchronization is switched off.

- *Master*

In *Master* mode, the ME70 waits for the delay time after the external trigger signal has been sent to the slaves before transmitting the ping. This is often referred to as a *pre-trigger*.

Note

This delay will only work when the synchronization is set up using a serial port.

- *Slave*

In *Slave* mode, the ME70 waits for the delay time after the external trigger signal has arrived before transmitting the ping. This is often referred to as a *post-trigger*.

8 From the list of ports available, select **Synchronization Port**.

This is the interface port currently used to transmit or receive synchronization signals. It must be an RS-232 serial port. Since the synchronization function only uses the *Request To Send (RTS)* and *Clear To Send (CTS)* signals on a serial port, you can use a port that is already used for other purposes. For the same reason, you do not need to define any baud rate.

9 At the bottom of the page, select **Apply** to save your settings.

10 Continue your work in the **Installation** dialog box, or select **OK** to close it.

Related topics

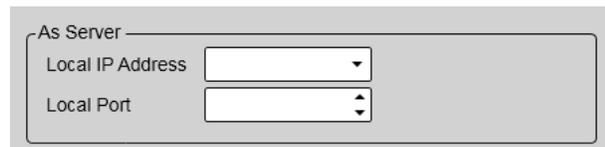
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Setting up the interface between the ME70 and the Simrad TD50

The ME70 can be set up to communicate with the Simrad TD50 3D Visualization Software. In this context, the ME70 is regarded as the "source system". The interface between the ME70 and the TD50 computer uses a high-speed Ethernet connection. The relevant IP addresses must be defined on both computers.

Prerequisites

It is assumed that you are familiar with the Windows® operating systems, computer technology, and interface principles.



The Ethernet adapter in the ME70 Processor Unit is set up with the correct IP addresses.

Context

All the steps in this procedure are done in the ME70 user interface.

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 **Remote Control** and then **As Server** to open the page.
 - a Select the **Local IP Address**.
This is the Internet Protocol (IP) address of the Ethernet interface adapter located in your Processor Unit.
 - b Keep the present value in **Local Port**.
- 4 Select **Remote Control**, then **Application Information** to open the page.
- 5 Provide relevant application information.
- 6 At the bottom of the page, select **Apply** to save your settings.
- 7 Select **OK** to close the dialog box.

Related topics

[Setting up the interfaces to peripheral devices, page 91](#)

Checking the data transfer on an external interface line

The communication between the Processor Unit and peripheral devices takes place using "datagrams". These datagrams are self-contained and independent entities of data carrying information. When setting up or maintaining the ME70, it is always useful to verify that the communication lines with external devices are operational.

Prerequisites

- The relevant peripheral system is connected to the ME70 Processor Unit.
- The connection has been made using a serial or Ethernet communication port.
- All the relevant communication parameters have been defined.
- The peripheral system is turned on, and it transmits data.

Neither tools nor instruments are required.

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 **I/O Setup**.
- 4 Make sure that each input port is functional.
 - a Select the relevant communication port.
 - b Select **Monitor** to open the **Port Monitor** dialog box.
 - c Make sure that there is data traffic on the input port (shown in the **Rx Data** box).

In order to see this data traffic, the peripheral system must be turned on, and transmitting information to the ME70.
 - d If you are unable to see any data traffic on the communication port, we suggest the following:
 - 1 Make sure that the peripheral system has been turned on.
 - 2 Make sure that the peripheral system is in fact transmitting information.

- 3 Make sure that the cable has been properly connected.
 - 4 Make sure that you have connected the peripheral system to the communication port that you are observing.
- e Select **OK** to close the **Port Monitor** dialog box.
- 5 Make sure that each output port is functional.
 - a Select the relevant communication port.
 - b Select **Monitor** to open the **Port Monitor** dialog box.
 - c Make sure that there is data traffic on the output port (shown in the **Tx Data** box).

In order to see this data traffic, your ME70 must be active and transmitting information to the peripheral system.
 - d If you are unable to see any data traffic on the communication port, we suggest the following:
 - 1 Make sure that the appropriate output data from your ME70 have been routed to the correct output port.
 - 2 Make sure that the output is enabled.
 - e Select the [**X**] in the upper-right corner of the **Port Monitor** dialog box to close it.

Related topics

[Setting up the interfaces to peripheral devices, page 91](#)

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