Product description

Simrad ME70
Scientific multibeam echo sounder
Simrad ME70

Product description

This document provides a short description of the Simrad ME70 Scientific multibeam echo sounder.
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INTRODUCTION

The purpose of this document is to describe the basic features and functions provided by the Simrad ME70 Scientific multibeam echo sounder.

The following optional systems available for the Simrad ME70 Scientific multibeam echo sounder are provided:

- Bathymetric processing
- Element data logger

These optional systems are described in separate documents.

The specifications for the Simrad ME70, the bathymetric processing system and the element data logger have been worked out in close cooperation with Ifremer in France. For more information about this organization, visit http://www.ifremer.fr.

Note

Windows 2000, XP and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
SYSTEM OVERVIEW

The Simrad ME70 Scientific multibeam echo sounder is designed for fishery research applications including accurate fish stock assessment and fish behaviour studies. The system is designed for data acquisition, and it is characterized by high accuracy, narrow beams, low side lobe levels and large instantaneous dynamic range. Calibration software is included.

The ME70 operates in the frequency range of 70 to 120 kHz, using 800 transmitting and receiving channels.

Two systems are available to expand the utility value of the Simrad ME70 Scientific multibeam echo sounder system:

- Bathymetric processor system for high resolution seabed mapping.
- Element Data Logger for collection of high volume element data.

Topics

Objectives on page 7

Features and functionality on page 8

Simplified system diagram on page 10

System characteristics on page 11
Objectives

The Simrad ME70 Scientific multibeam echo sounder offers quantitative data and high operational flexibility. It provides a configurable wide fan of stabilized and calibrated beams for biomass estimation, fish school characterization and behaviour studies.

All beams can be configured as split beams providing data for single target analysis, such as target strength measurements and target tracking.

The sector of calibrated narrow split beams with low sidelobe levels and short pulse lengths allow for accurate biomass estimation very close to the bottom. The ability to adjust the athwartship centre angle of the fan enables you to use the system for studying fish close to ridges and slopes. The design also permits you to use all the beams over the full frequency range pointing in one direction for frequency comparison.

By adding the optional functionality provided for the Simrad ME70, you will be able to widen the range of application:

- The Bathymetric processing system extends the Simrad ME70 to a complete high resolution seabed mapping system which can for example be used for mapping of fish habitats.
- The Element Data Logger enables collection of high volume element data which allow for more detailed signal analysis such as detailed noise analysis and beamforming algorithm studies.
Features and functionality

Flexibility
Within the bandwidth of the Simrad ME70 transducer, the limits for beam steering, and the minimum achievable beam opening, you can select the directions, frequencies, and opening angles for the beams. You may set up the system to fit your requirements, and the system will provide you with a real-time display for quality control of the current data acquisition.

The system configuration can be tailored to any user requirements, allowing for choice of beamwidths as well as transmission modes.

Low sidelobe levels and beam interleakage
Low sidelobes are important for two reasons. The obvious one is to avoid that strong targets in side lobes are mistaken for weak targets in the main lobe. Secondly, you do not wish to see strong bottom echoes from the sidelobes. Even the vertical receiver beam may benefit from low sidelobes in case of a sloping bottom.

Very low two-way sidelobe levels are obtained by using two-way side lobe suppression. Very low beam interleakage is obtained by using Frequency Rotated Directional Transmission (FRDT) where the frequency band is distributed over all the beams.

Since each beam has its own frequency and the fan width is configurable, the design also allows you to use all the beams over the full frequency range pointing in one direction for frequency analysis of targets.

Calibration
A calibration utility is implemented as a special built-in function in the Simrad ME70 Scientific multibeam echo sounder system. Each beam configuration of interest can be calibrated using a reference target located under the ship.

Individual gain parameters for each beam are adjusted to provide calibrated target strength and volume backscattering strength measurements.

Split beam configuration
All beams can be configured as split beams. In addition, two adjustable reference split beams are available. These allow you to compare ME70 data with data from other split beam systems, for example the Simrad EK60. The reference beams can for example have 7x7° opening angles, and operate on 70 and 120 kHz.

The data from the individual split beams are presented in the same way as on other Simrad scientific sounders.
Data output

It is possible to set up continuous output of all beam data. This can be used for echo integration and three dimensional visualization. The output data for each beam include for example:

- non-TVG compensated sample power and sample angle
- 20 log R compensated sample Sv
- 40 log R compensated sample TS
- 40 log R compensated single target detections
- Detected depth

It is also possible to output the element data for post processing and analysis purposes.

Remote operation

Remote systems, such as data loggers and external post-processing systems, can subscribe to data and parameters from the Simrad ME70. The parameters can also be queried and defined by the remote system. In this way the communication between the ME70 and the remote system can become an efficient, configurable, two-way communication.

Synchronization

The Simrad ME70 Scientific multibeam echo sounder can be synchronized with other systems. Two modes are available:

- Master (The ME70 triggers external systems)
- Slave (An external systems triggers the ME70)

Delays before and after the trigger pulses can be adjusted to control the time for the ME70 acoustic transmission. This allows you to avoid interference with other acoustic systems.
**Simplified system diagram**

A simplified system diagram is shown below.

**Figure 1** Simplified system diagram

(A) Operator Station
(B) Transceiver Unit
*TRXUn* are the three transceiver racks
*ES* is the Ethernet switch
*TRCn* are the six beamforming computers
(C) Power Supply Units
(D) Transducer Array

The main interfaces are provided by:

- (1) Ethernet cable between the ME70 Transceiver Unit and the ME70 Operator Station
- (2) Ethernet cable between the ME70 Operator Station and ship’s local area network
- (3) Ethernet cable to external data logger (optional)
- (4) Serial line communication with Motion Reference sensor
- (5) Serial line communication with external sensors (Global positioning system, Course gyro and Sound velocity sensor)
• (6) Ethernet cable between the Bathymetric Processor Unit and the Bathymetric Operator Station (only if this optional system has been added)

• (7) Five -5- parallel Ethernet cables between the Ethernet Switch ES0 and the Element Data Logger Operator Station (only if this optional system has been added)

The 25 cables from the ME70 Transducer Array (D) are connected to the three transceiver shelves (TRXUn) in the ME70 Transceiver Unit (B). One or two ethernet switches (ESx) controlling two local area networks within the transceiver distribute the processing tasks between the six beamforming computers (TRCn). Two switches are required if the Element Data Logger system is included. The ME70 Operator Station is connected to these networks by means of an ethernet cable (1) to ethernet switch 0 (ES0).

**System characteristics**

This chapter provides a brief technical overview of the Simrad ME70 Scientific multibeam echo sounder.

**Main units**

The basic Simrad ME70 Scientific multibeam echo sounder comprises the following main units:

• Operator Station
• Transceiver Unit
• Power Supply Units
• Transducer array

Additional units are added if the optional Bathymetric and/or Data Logger applications are incorporated.

A motion sensor is required in order to obtain electronic beam stabilization.

Additionally, the following sensors can be connected to the ME70 system:

• Vessel positioning system for associating acoustic data with geographical position, speed, and heading
• Sound velocity profiler for estimating range and transmission loss
• Sound velocity sensor for continuous control of beam steering and beam parameters
• Trawl sensors for associating acoustic data with trawl position
• Synchronization units for synchronizing the Simrad ME70 with other acoustic systems
**Transducer Array**

The Simrad ME70 Transducer Array is plane, and consists of a ceramic-polymer composite matrix. The matching transformer for each transducer element is located within the transducer, this allows a low impedance connection to the Transceiver Unit.

The transducer array is connected to the rear side of the three transceiver racks in the Transceiver Unit using 25 cables.

**Transceiver unit**

The Simrad ME70 Transceiver Unit is housed in a 19-inch instrument rack. In order to reduce the loss in the transducer cables, we recommend that the transceiver is physically located as close as possible to the transducer array. The transceiver performs the signal processing and digital beamforming of the transmitter and receiver channels.

The main components in the basic Transceiver Unit are:

- Three TRXU Transceiver subracks
- Six TRC Beamforming computers
- One Ethernet switch

**Power supplies**

Three external linear Power Supply Units are responsible for providing necessary power to the transceiver.
Operator Station

The Simrad ME70 Operator Station is a high performance marine computer equipped with a colour display. The Operator Station communicates with the Transceiver Unit by means of an Ethernet link. The software on the Operator Station provides you with the following main functionality:

- Operational control of the Simrad ME70
- Communication with peripheral sensors and optional post-processing system(s)
- Echogram presentation
- Menu system
- Context sensitive on-line help

The Operator Station runs on a commercial Microsoft Windows XP® operating system.
INSTALLATION PRINCIPLES

The following is a brief description of the basic principles related to installation of the Simrad ME70 Scientific multibeam echo sounder system.

Topics

*Transducer array* on page 15
*Transceiver Unit* on page 16
*Power supplies* on page 17
*Operator Station* on page 18
**Transducer array**

The transducer array should be mounted in the bottom of a drop keel or in the forward part of the vessel. The shape of the hull, mechanical and electrical noise, potential aeration problems and ease of cable installation must be taken into consideration. The transducer may be fixed to the hull with bolts from the front, either directly on or recessed into the hull, or within sea chests.

*Figure 2*  *Transducer array mounted with clamping ring at the bottom of a drop keel or a blister*

*Figure 3*  *Transducer array mounted at the bottom of a blister*

**Related topics**

*Transducer Array outline (830–208463) on page 55*
*Clamping ring (871–208465) on page 57*
*Mounting ring (871–208461) on page 59*
Transceiver Unit

The Transceiver Unit must be mounted on the deck in a room close to the transducer array. The room used must comply with the environmental requirements specified for the transceiver unit.

*Figure 4  Transceiver unit mounting example*

The unit comprises a 19 inch rack. The distance between the transceiver and the transducer array is limited by the maximum physical length of the cables.

**Related topics**

*Environmental requirements* on page 43

*Transceiver Unit outline (860–281020)* on page 49
Installation principles

Power supplies

The three power supplies are designed for bulkhead installation. The cabinets must be mounted in the vicinity of the transceiver rack. The maximum distance between the cabinets is limited by the cable lengths.

Figure 5  The power supplies inside each Power Supply Unit

The room used must comply with the environmental requirements specified for the power supplies.

Related topics

Environmental requirements on page 43  
Power Supply Unit outline (305397) on page 51  
Power Supply Unit mounting frame outline (308337) on page 54
Operator Station

The Operator Station is a commercial workstation. It is normally used with a large colour LCD monitor. The computer is supplied with a keyboard and a mouse.
OPERATIONAL PRINCIPLES

The Simrad ME70 Scientific multibeam echo sounder is controlled from the Operator Station using an award winning graphical user interface. The software is run under Microsoft Windows XP operating system. The system software includes the necessary features for system installation, testing and operation, as well as calibration. The Simrad ME70 system does not require operator intervention during normal operation.

Topics

Graphical user interface on page 20
Operational features on page 21
**Graphical user interface**

The Simrad ME70 graphical user interface provides the user with a set of displays which enables the user control the system and perform data quality control and data analysis in real time. The list of available views include:

- BITE view of data from all transducer elements
- Swath view of data from all beams
- Echogram views of data from a sequence of pings
- Single target position views
- Target strength histogram views
- A-scope views

In 2007, the graphical user interface designed for the Simrad ME70 Scientific multibeam echo sounder was awarded a prestigious design award by the Norwegian Design Council.

*Figure 6  The Simrad ME70 Scientific multibeam echo sounder was awarded a prestigious design award in 2007*
Operational features

Real time data quality control

Quality control of the acquired data is performed by means of the graphical user interface.

Figure 7  Simrad ME70 Scientific multibeam echo sounder screen capture

In addition to the graphical presentations, messages and alphanumerical displays are provided to allow for a quick overview of the system status. Problems or error conditions related to software, interfaces or hardware are reported immediately.
**Real time data analysis**

The Simrad ME70 includes functionality for real time data analysis.

*Figure 8  Simrad ME70 Scientific multibeam echo sounder screen capture*

The system provides dedicated presentations for single target positions, target strength histograms, volume backscattering strength, and area backscattering strength estimates for individual depth layers.
**Calibration**

The graphical user interface includes a dedicated utility for calibration purposes. By means of a sphere located under the hull, this Simrad ME70 utility and a detailed procedure in the system documentation and on-line help, the system can be calibrated.

*Figure 9  Simrad ME70 Scientific multibeam echo sounder calibration*

The calibration utility allows you to analyse the data, and to exclude specific data from the calibration process if so required. A set of calibration reports are automatically generated from the calibration utility.
**Data logging**

The primary purpose of the Simrad ME70 is to log data for further processing. The data can easily be stored to file on the build-in hard disk or a network drive with larger storage capacity. The data files contain beam formed data without TVG compensation and include all the necessary information for further processing. The file formats are public and documented.
POST-PROCESSING

The high quality data produced by the Simrad ME70 Scientific multibeam echo sounder provides an excellent basis for further analysis for applications such as biomass assessment and fish behaviour studies. The data formats are public and documented ensuring that Simrad ME70 is a truly open solution, allowing third party or own software to be developed for post processing.

Figure 10  Simrad ME70 Scientific multibeam echo sounder post–processing example

A set of Matlab functions for reading stored beamformed data into Matlab is available free of charge from Simrad.

EchoView

The Echoview application from Myriax is a powerful software tool for fisheries acoustics and has become an international standard for advanced analysis of marine acoustic surveys. The Echoview application supports data from the Simrad ME70 Scientific multibeam echo sounder.

For more information about this post-processing utility, refer to the Echoview web site: http://www.echoview.com.
**SCOPE OF SUPPLY**

A standard Simrad ME70 Scientific multibeam echo sounder system delivery includes:

1. One ME70 Operator Station with 19 inch LCD monitor
2. One ME70 Transceiver Unit
3. Three ME70 Power Supply Units
4. One ME70 Transducer Array with 15 m transducer cables
5. Signal and control cables connecting the ME70 units
6. All ME70 system software
7. Technical manuals covering system installation, interfaces, operation, and maintenance

**Options**

System options available include:

1. Bathymetric processing system
2. Element Data Logger
3. Non standard transducer cable lengths
4. Mounting ring and clamping ring for transducer mounting
5. Additional monitors
6. Spare parts

**System integration**

The Simrad ME70 Scientific multibeam echo sounder system is prepared for integration with other sensors. Simrad can supply the Simrad ME70 either as a subsystem for integration by the user or other parties, or we can offer complete system solutions tailored to the user's need.

- Multi-frequency solutions covering a wider frequency range can be formed by combining the Simrad ME70 with a number of Simrad EK60 units which are available from 12 kHz to 333 kHz.
- Omni directional solutions providing information from 360 degrees around the vessel can be obtained by combining the Simrad ME70 with Simrad omni directional sonars.
- Trawl instrumentation solutions providing information of e.g. trawl position can be obtained by combining the Simrad ME70 with Simrad trawl instrumentation products.
TECHNICAL SPECIFICATIONS

This chapter provides the technical specifications for the Simrad ME70 Scientific multibeam echo sounder.

Note

In Simrad we are continuously working to improve the quality and performance of our products. Technical specifications may therefore be changed without prior notice.

Topics

System components on page 28
Operation and performance on page 29
Interface specifications on page 36
Operator Station specifications on page 38
Transducer array specifications on page 39
Transceiver Unit specifications on page 40
Power Supply Unit specifications on page 41
Power requirements on page 42
Environmental requirements on page 43
System components

The ME70 Scientific multibeam echo sounder comprises the following units.

**Basic system**
- One Operator Station (commercial computer)
- One Transceiver Unit, including
  - Six beamforming computers
  - Three customised transceiver racks
  - One network controller
- Three Power Supply Units
- One Transducer Array

**Bathymetric processing system (optional)**
- Bathymetric Operator Station
- Bathymetric Processor (physically located in the Transceiver Unit)
- One network controller (if required)

**Element Data Logger (optional)**
- Element Data Logger Operator Station
- One network controller (if required)
Operation and performance

This section contains topics related to operational and performance characteristics.

The Simrad ME70 Scientific multibeam echo sounder is a flexible instrument allowing for a variety of different configurations optimized for different survey objectives. As many of the system parameters are mutually dependent the performance specification numbers will depend on the specific operation configuration.

Please note that it will not be possible to obtain the limits for all performance parameters simultaneously as they are mutually dependent.

Note

All beam opening angles are specified as one way values and apply to a downwards pointing beam.
Configuration settings

Frequency band

- Upper frequency: 70 to 120 kHz
- Lower frequency: 70 to 120 kHz
- Frequency/Beam spacing: Linear, Optimized, Manual
- Frequency/Space distribution: I, V, Inverse V
- Pulse duration: 64 to 5120 µsec
- Pulse forms: CW, Linear FM
- Number of beams transmitted simultaneously: 1 to 4

Figure 11  "Beam mode administration” dialog, “Frequency band” tab
## Reference beams

- Number of reference beams: 0 to 2
- Frequency: 70 to 120 kHz
- Athwartship beam opening angle: 2.2° to 20°
- Alongship beam opening angle: 2.2° to 20°
- Athwartship steering angle: -75° to 75°
- Alongship steering angle: -5° to 5°

**Figure 12** "Beam mode administration" dialog, “Reference beams” tab

![Reference beams dialog](image-url)
Fan of beams

- Number of beams in fan: 3 to 45
- Number of split beams in fan: 3 to 45
- Athwartship beam opening angle: 2.2° to 20°
- Alongship beam opening angle: 2.2° to 20°
- Athwartship centre of fan: -75° to 75°
- Alongship centre of fan: -5° to 5°
- Beam spacing: Linear, Optimized, Manual
- Linear beam spacing: 0° to 50°
- Optimized beam spacing: -6 to -1 dB

Figure 13 "Beam mode administration" dialog, “Fan of beams” tab
Operational performance

Swath width
- 2.2° to 60° (Maximum 150° with reduced side lobe suppression)

Figure 14  Frequency plot

Figure 15  Beam directions plot

Motion compensation
- Roll compensation: ≤ ±10°
- Pitch compensation: ≤ ±5°
**Sidelobe level**
- -35 dB to -70 dB alongship and athwartship, selected depending on chosen beamwidth

**Transmit and receive**
- Source level: ≤ 225 dB
- Receiver dynamic range: 150 dB (instantaneous)
- Individual transmitter channels: 800
- Individual receiver channels: 800

**Ping rate**
- Ping rate: ≤ 2 Hz

**Sample rates**
- Input sample rate: 4 MHz
- Output sample rate: 977 Hz to 62.5 kHz
- Output sample rate (in meters): 2.4 cm to 1.5 m (sound speed 1500 m/s)
Power Supply Unit performance

- Output voltages:
  - +6 Vdc, 20 A
  - +12 Vdc, 10 A
  - +75 Vdc, 4 A
- Nominal power delivered to TRXU load: 270 W
Interface specifications

Serial lines
All serial lines are provided with operator adjustable baud rate, data bits, parity, and talker ID.

• Inputs:
  – Position: NMEA 0183 (GGA, GLL, or RMC)
  – Speed: NMEA 0183 (VBW, VTG, or RMC)
  – Heading: NMEA 0183 (HDM, HDT, HDG, or VHW)
  – Distance: NMEA 0183 (VLW) or 1/200 nmi contact pulses
  – Sound speed at transducer face: AML Smart Sensor Format
  – Trawl: Simrad ITI, Simrad PI, or Ifremer (Pacha and Scanmar)
  – Motion: Kongsberg EM Attitude
  – Synchronization (Slave): CTS and RTS

• Outputs:
  – Depth: NMEA 0183 (DBS, DBT, DPT, Simrad, and Atlas)
  – Synchronization (Master): CTS and RTS

Ethernet
All Ethernet interfaces are provided with operator adjustable IP address and port number. The Ethernet interface may also be used to connect to the ship network to access file data.

• Inputs:
  – Position: NMEA 0183 (GGA, GLL, or RMC)
  – Speed: NMEA 0183 (VBW, VTG, or RMC)
  – Heading: NMEA 0183 (HDM, HDT, HDG, or VHW)
  – Distance: NMEA 0183 (VLW)
  – Trawl: Simrad ITI, Simrad PI, or Ifremer (Pacha and Scanmar)
  – Remote control: ME70 Remote control commands (proprietary)
  – Data subscription: ME70 Data subscription commands (proprietary)

• Outputs:
  – Depth: NMEA 0183 (DBS, DBT, DPT, Simrad, and Atlas)
  – Remote control: ME70 Remote control responds (proprietary)
  – Data subscription: A wide variety of ME70 output data
File

- Inputs:
  - Beam mode configuration parameters
  - Calibration data
  - User settings
  - Sound speed profile for the water column
  - Previously recorded data for replay

- Outputs:
  - Beam mode configuration parameters
  - Calibration data
  - User settings
  - Raw data for replay

Other interfaces

Depending on the choice of Operator Station model various interfaces are available such as Firewire, USB 2.0, and CD/DVD recorder.
Operator Station specifications

The ME70 Operator Station will meet the following minimum technical requirements.

**Hardware**

- Processor: Pentium IV or later
- Processor speed: Minimum 3 GHz
- Memory capacity: Minimum 2 Gb
- Hard-disk capacity: Minimum 20 Gb

**Software**

- Operating system: Microsoft® Windows XP®
- Scientific multibeam echo sounder application: Custom Simrad software
Transducer array specifications

This section contains topics specifying the physical and technological properties of the transducer array.

Physical properties

• Overall diameter: 677 mm
• Height, main body: 313 mm
• Maximum length of transducer cables: 30 m
• Weights:
  – Weight without cables: 250 kg
  – Weight of transducer cables: 8,75 kg per meter
  – Weight of transducer cables with protective hose: 12,5 kg per meter
  – Weight of transducer array with 15 m cables: 382 kg

Technology and performance

• Technology: Ceramic polymer composite
• Number of individual elements: 800
• Frequency range: 70 to 120 kHz

Related topics

Transducer Array outline (830–208463) on page 55
Environmental requirements on page 43
Transceiver Unit specifications

This section contains topics specifying the physical and technological properties of the ME70 Transceiver Unit.

Physical properties

- Width: 600 mm
- Depth: 900 mm
- Height (excluding air outlet): 1921 mm

Technology and performance

- TRC Computers: Dell PowerEdge 1950
- TRXU Transceivers: Custom ME70
- Ethernet switch: Hewlett Packard Procurve 2848

Related topics

Transceiver Unit outline (860–281020) on page 49
Power requirements on page 42
Environmental requirements on page 43
Power Supply Unit specifications

This section contains topics specifying the physical and technological properties of the ME70 Power Supply Unit.

Physical properties

• Width: 600 mm
• Depth: 418 mm
• Height: 812 mm
• Weight, total: 82 kg

Cables

• Ethernet:
  – Length: 10 m
  – Type: CAT 6
• DC voltage cables:
  – Maximum length: 10 m
  – Total weight, all power cables: 14 kg

Related topics

Power Supply Unit performance on page 35
Power requirements on page 42
Environmental requirements on page 43
Power requirements

This section contains topics specifying the power requirements for the various system units.

ME70 Operator Station
- Voltage requirement: 230 Vac / 50–60 Hz
- Power consumption: Approximately 400 W
- Recommended circuit breaker: 10 A, slow

Bathymetric Operator Station (Optional)
- Voltage requirement: 230 Vac / 50–60 Hz
- Power consumption: Approximately 400 W
- Recommended circuit breaker: 10 A, slow

Data Logger Operator Station (Optional)
- Voltage requirement: 230 Vac / 50–60 Hz
- Power consumption: Approximately 400 W
- Recommended circuit breaker: 10 A, slow

ME70 Transceiver Unit
- Voltage requirement: 230 Vac / 50–60 Hz
- Power consumption: Approximately 2.5 kW
- Recommended circuit breakers: 2 x 10 A, slow

ME70 Power Supply Unit
- Voltage requirement: 230 Vac / 50–60 Hz
- Power consumption (each cabinet): Approximately 800 W
- Recommended circuit breaker (for each cabinet): 10 A, slow
Environmental requirements

This section contains topics specifying the environmental conditions.

**ME70 Operator Station**
- Ambient operating temperature (typical):
  - During operation: 0°C to 30°C
  - During storage: −40°C to 65°C
- Maximum ambient relative humidity (typical):
  - During operation: 8 to 85%, no condensation
  - During storage: 8 to 95%, no condensation

**Bathymetric Operator Station (Optional)**
- Same as ME70 Operator Station

**Data Logger Operator Station (Optional)**
- Same as ME70 Operator Station

**ME70 Transceiver Unit**
- Ambient operating temperature:
  - During operation: 0°C to 30°C
  - During storage: 40°C to 65°C
- Maximum ambient relative humidity:
  - During operation: 8 to 85%, no condensation
  - During storage: 8 to 95%, no condensation

**ME70 Power Supply Units**
- Ambient operating temperature:
  - During operation: 0°C to 30°C
  - During storage: −40°C to 65°C
- Maximum ambient relative humidity:
  - During operation: 8 to 85%, no condensation
  - During storage: 8 to 95%, no condensation
CUSTOMER SUPPORT

As a major supplier of multibeam echo sounders with many years of experience, Kongsberg Maritime AS has developed a marketing and service organization tuned to customer needs.

Installation

As part of the discussions with the client Kongsberg Maritime AS will - free of charge and without any obligations - give advice regarding the practical installation of the ME70 system. We will also - upon request - prepare proposals for the supply of complete instrument packages and/or systems. A project manager will usually be appointed to supervise the delivery, installation and testing of larger instrumentation systems. The installation and final testing of an ME70 system should be done according to our documentation. If required, our field engineers can be made available to:

- Supervise the installation
- Perform the measurement of final location and attitude of the transducers and/or sensors
- Perform system check-out and final testing

Documentation

The Simrad ME70 is delivered with complete documentation for installation, operation and maintenance. If required, the manuals may optionally be modified to reflect the actual system on the client’s vessel. The user manuals are provided on A4 paper format in the required quantity and on CD in PDF and CHM (on-line help) formats. All electronic documentation is interactive. The ME70 also provides a comprehensive context sensitive on-line help system.

Training

Kongsberg Maritime AS can conduct the training of operators and maintenance personnel to the extent required by the client. Such training courses can take place on the vessel, on any of our facilities, or any other location decided by the client.

Service

The Kongsberg Maritime AS service department has a 24 hour duty arrangement, and can thus be contacted by telephone at any time. The service department will assist in solving all problems that may be encountered during the operation of the system, whether the problem is caused by finger trouble, insufficient documentation, software bugs or equipment breakdown.
**Warranty and maintenance contract**

The normal warranty period of the Simrad ME70 is 24 months after delivery.

A system maintenance contract tailored to fit the needs of the client is available. This contract can be defined so that it covers repair work only, or complete support for preventive maintenance, repair work, and system upgrading of both hardware and software as the system design is improved by Kongsberg Maritime AS.
COMPANY PROFILE

Simrad

Simrad is the world’s most recognized brand in professional fish finding and fishery research equipment. The brand name “Simrad” is fully owned by Kongsberg Maritime AS.

Through the history of Simrad, Kongsberg Maritime AS has more than 60 years of experience in design and manufacturing of advanced fishery sonars, echo sounders and catch monitoring systems. Kongsberg Maritime will always take pride in offering the fisherman the best tools for efficient, selective and sustainable fishery. Simrad fish finding instruments have been used by professional fishermen since 1950.

Kongsberg Maritime also provides the benchmark equipment for the world wide fishery research community. Every day, Simrad equipment is aiding scientist estimating the biomass of the oceans, a factor so important for sustainable fishery.


Kongsberg Maritime AS

Kongsberg Maritime is a leading supplier of advanced maritime automation and instrumentation systems. The company has approximately 2400 employees and an annual turnover of MNOK 3.700 (year 2004). Kongsberg Maritime owns subsidiaries in Canada, Italy, the Netherlands, Germany, Sweden, Singapore, China, Korea, the UK and the USA in addition to four locations in Norway. Decentralisation lets subsidiary company optimize customer relationships while providing maximum flexibility in relation to product design, production and marketing. Kongsberg Maritime currently exports its products to all of the world’s major markets.

Kongsberg Maritime’s main office is situated in Horten, Norway.

The premises located at Strandpromenaden in Horten houses the hydroacoustic activities. The professionals in this facility share more than 60 years of experience in single and multibeam echo sounding, sonar technology and underwater communication and instrumentation. The facility’s location close to the waterfront provides excellent surroundings for the design, test and manufacturing of the advanced products. Two in-house test tanks, a sea based test station as well as two vessels are available for extensive testing and quality control.

The product range provided by Kongsberg Maritime’s Strandpromenaden facility in Horten includes:
- Sonars, echo sounders and catch monitoring systems for the world’s professional fishing and scientific communities
- Scientific multibeam echo sounders and sonars for the international fishery research community
- Single and multibeam echo sounders for hydrographic applications
- Underwater communication
- Underwater positioning reference systems (including the highly accurate HiPAP® system)
- Naval sonars and echo sounders (hull mounted and towed systems)
- The world renowned HUGIN remotely operated vehicle

Kongsberg Maritime AS is fully owned by the Kongsberg Group.

**Kongsberg Group**

Kongsberg Gruppen ASA (the Kongsberg Group) is one of Norway’s leading high-technology companies. With an annual turnover of approximately MNOK 6.400 (in 2004), it is listed at the Oslo Stock Exchange. The largest shareholder is the Norwegian Ministry of Industry and Energy holding 51% of the shares. The rest is publicly owned. The Kongsberg Group operates through two major business areas:

- Kongsberg Defence & Aerospace AS
- Kongsberg Maritime AS

These companies are fully owned by the Kongsberg Group. Kongsberg Defence & Aerospace is engaged in defence activities, while the commercial market activities are allocated within Kongsberg Maritime. The Kongsberg Group is represented world wide.

**DRAWING FILE**

This chapter holds all referenced drawings related to the installation of the ME70 Scientific multibeam echo sounder system.

The drawings provided in this chapter are for information only.

**Drawings**

- *Transceiver Unit outline (860–281020)* on page 49
- *Power Supply Unit outline (305397)* on page 51
- *Power Supply Unit mounting frame outline (308337)* on page 54
- *Transducer Array outline (830–208463)* on page 55
- *Clamping ring (871–208465)* on page 57
- *Mounting ring (871–208461)* on page 59
Transceiver Unit outline (860–281020)

Note:
All measurements are in mm.
The drawing is not in scale.
Note:
All measurements are in mm.
The drawing is not in scale.
Power Supply Unit outline (305397)

Note:
All measurements are in mm.
The drawing is not in scale.
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The drawing is not in scale.
Note:
All measurements are in mm.
The drawing is not in scale.
Power Supply Unit mounting frame outline (308337)

Note:
All measurements are in mm.
The drawing is not in scale.
Transducer Array outline (830–208463)

Note:
All measurements are in mm.
The drawing is not in scale.
Optional sacrificial diode inside the blister

Electrical connection

Side view
(Cross section of mounting and clamping rings)

Bottom view

12 ea M12x55 bolts, stainless steel, AQ4 class 80
12 ea flat washer, stainless steel
Torque: 76 NM
Use Loctite 243

Orientation bolt M6x10 Stainless steel A4

Note:
All measurements are in mm.
The drawing is not in scale.
Clamping ring (871–208465)

Bottom view

Material:
Carbon steel St52
or equivalent

Note:
All measurements are in mm.
The drawing is not in scale.
Simrad ME70

Side view

Note:
All measurements are in mm.
The drawing is not in scale.
Mounting ring (871–208461)

Note:
All measurements are in mm.
The drawing is not in scale.
Material:
Carbon steel St52
or equivalent

Note:
All measurements are in mm.
The drawing is not in scale.
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