EQ 55 OPERATORS MANUAL

950-70017001

Issue 1.2 **February 1998**

KONGSBERG SIMRAD MESOTECH LTD.
WARRANTY STATEMENT

Kongsberg Simrad Mesotech Ltd. warrants that its products are free from defective materials and/or workmanship for a period of 12 months from the date of receipt of goods by the purchaser, or 18 months from date of product shipment from the manufacturing facility (which ever occurs first). Kongsberg Simrad Mesotech will - at no charge - repair or replace (at its option) any part(s) determined to be defective of workmanship or materials, provided the warranty claim is made to either the manufacturing facility, or its authorized repair centres within the warranty period.

The purchaser is responsible for the examination of the product upon receipt. The purchaser is required to report any irregularity to received Kongsberg Simrad Mesotech goods to either the manufacturer - its Sister companies - or Agents, within 15 days of receipt of goods. Proof of date received may be required.

The warranty is void if warranty labels are broken; Kongsberg Simrad Mesotech will not warrant any product which is physically damaged, abused, altered, subjected to accident or negligence or misuse, or is incorrectly installed or used by the purchaser - or purchaser's representative.

Consumable items (including lamps, fuses, and worn O rings or shaft-seals) are excluded by the warranty.

Kongsberg Simrad Mesotech cannot warrant that its products are suitable for any particular or intended purpose. No other warranty is expressed or implied; Kongsberg Simrad Mesotech accepts no liability of consequential damages. Consequential damages include, but are not limited to: loss of profit, property damage, personal injury.

The maximum liability shall not, in any case, exceed the price of the product claimed to be defective.

LIST OF CONTENTS

Part 1 ..... Introduction and System Familiarization

Part 2 ..... Operation of the EQ55

Part 3 ..... Principles of Operation

Part 4 ..... Installation Instructions for the EQ-55, Drawer, and Stand Alone

Part 5 ..... Maintenance, Troubleshooting, Repair and Spare Parts

Part 6 ..... Technical Information

Part 7 ..... Servicing the EQ-55

Part 8 ..... Electrical Drawings

Appendix A ..... Default Settings

Appendix B ..... Glossary

MODIFICATION RECORD

EQ 55 OPERATORS MANUAL

950-70017001
Issue: 1.2

February 1998

Issue No.	Date	Initial	Comments
1.2	02.98		Update
1.1	06.97		Update
1.0	10.96		Update
Draft	09.96		First Release

To assist us in making improvements to the product and this document, Simrad Mesotech welcomes comments and constructive criticisms. Please send all such comments, in writing, to:

Kongsberg Simrad Mesotech Ltd.
Documentation Department
1598 Kebet Way
Port Coquitlam, BC V3C 5M5
CANADA

PART 1

INTRODUCTION AND SYSTEM FAMILIARIZATION

1. INTRODUCTION AND SYSTEM FAMILIARIZATION 1.3

1.1 INTRODUCTION AND SYSTEM FAMILIARIZATION 1.3

1.2 SAFETY SUMMARY 1.3
1.2.1 Fuse and Power Cord 1.3
1.2.2 Grounding 1.3
1.2.3 Safety Statements 1.4
1.2.4 Lifting and Carrying 1.4
1.2.5 Installation 1.4
1.2.6 Getting Started (Quick Start) 1.4
1.2.7 Safety Procedures 1.4

1.3 INSTALLATION 1.4

1.4 GLOSSARY OF TERMS 1.4

1.5 OPERATION 1.5
1.5.1 Maintenance 1.5
1.5.2 Troubleshooting 1.5
1.5.3 Repair and Service 1.5
1.5.4 Principles of Operation 1.5
1.5.5 Default Settings 1.5

1.6 SUMMARY OF EQ 55 FEATURES 1.6
1.6.1 Display Screen Size 1.6
1.6.2 Display Screen Resolution 1.6
1.6.3 Display Screen Colors 1.6
1.6.4 Information on the Display Screen 1.6
1.6.5 Time Marker - Minute Increments 1.6
1.6.6 Auto Range Function 1.6
1.6.7 Units of Measure 1.7
1.6.8 Expansion Ranges 1.7
1.6.9 Color Threshold 1.7

1.6.10 Phased Range....1.7
1.6.11 Transmit Power Reduction....1.7
1.6.12 Ranges....1.7
1.6.13 Dual VRM....1.7
1.6.14 Other Features....1.8

1. INTRODUCTION AND SYSTEM FAMILIARIZATION

1.1 INTRODUCTION AND SYSTEM FAMILIARIZATION

Welcome to SIMRAD's EQ 55 Echo sounder. The EQ 55 is a totally new echo sounder that can be used in any fishery in the world and is fully contained in just one cabinet. Several different configurations of transducers can be purchased separately for the EQ 55.

In this beginning chapter you will find an important **section on safety precautions**, a "**getting started**" **section** that helps you locate the information you need, and a **section that summarizes the features** built into the EQ 55.

Although this manual can be read in any sequence, we strongly encourage all users to first read the Safety Summary. It is also advisable for experienced users to at least scan the whole manual to find out what information is available when a question does arise.

WARNING: CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY SIMRAD MESOTECH. MAY VOID YOUR WARRANTY AND MAY CAUSE INCREASED RADIO FREQUENCY EMISSIONS.

1.2 SAFETY SUMMARY

1.2.1 Fuse and Power Cord

Note that the appropriate fuses must be employed. Ensure that the power cord is firmly attached to the line filter on the rear panel.

1.2.2 Grounding

The EQ 55 is a sophisticated piece of electronic equipment. To reduce risk of electrical shock, properly ground the unit to the ship's ground using the wing nut ground stud on the back of the unit.

1.2.3 Safety Statements

This manual contains boxed information that *notifies*, **cautions** or **WARNS** about various actions. Take note of what they say.

1.2.4 Lifting and Carrying

Use proper lifting and carrying techniques when moving and installing the EQ 55.

1.2.5 Installation

Follow the installation instructions in Chapter 4 for proper, safe installation of the EQ-55. Ensure that the surface that the EQ 55 is mounted to is able to support the weight of the equipment, especially in rough weather.

1.2.6 Getting Started (Quick Start)

This section provides the user with a short, quick overview of the EQ 55 manual.

1.2.7 Safety Procedures

The EQ 55 is an electrical device. For your safety and the safety of your crew and vessel we strongly advise you to read **Section 1.1 - Safety Summary**.

1.3 INSTALLATION

Turn to **Chapter 4 - Installation** for correct procedures to use in installing the EQ 55.

1.4 GLOSSARY OF TERMS

If you have never used an echo sounder before or if you are unsure of how a term is used in this manual, then turn to **Appendix B - Glossary of Terms**.

1.5 OPERATION

If you are not familiar with the operation of the EQ 55, turn to **Chapter 2 - Operating the EQ-55**.

1.5.1 Maintenance

Like all pieces of equipment, the EQ 55 needs to be properly maintained. Check **Section 5.1 Preventive Maintenance** for details.

1.5.2 Troubleshooting

If, after following the instructions in Section - Operation of the EQ 55, you still experience difficulties operating the EQ 55, check with **Section 5.2 - Troubleshooting**.

1.5.3 Repair and Service

In the event the EQ 55 fails to operate, see **Section 5.3 - Repair and Service** for instructions.

1.5.4 Principles of Operation

The scientific principles of the operation of the EQ 55 are explained in **Chapter 3 - Principles of Operation**.

1.5.5 Default Settings

The factory settings for the EQ 55 can be found in **Appendix A - Default Settings**. Included in this section is information on how to reset all the EQ 55 functions to their default settings.

1.6 SUMMARY OF EQ 55 FEATURES

1.6.1 Display Screen Size

14 inches (356 mm) diagonal (nominal)

1.6.2 Display Screen Resolution

640 (horizontal) x 480 (vertical) pixels, .29 mm dot pitch

1.6.3 Display Screen Colors

- Sixteen colors, including background color. Scale lines, depth readings and setting indication will be white.
- Background color selections are blue and black.
- Targets are displayed in 12 colors.

1.6.4 Information on the Display Screen

- Digital scale and digital depth
- 12 color echo strength sample scale
- Ship speed (when optional sensor is employed)
- Water temperature (when optional sensor is employed)
- Ship's position (when position is available via NMEA interface)

1.6.5 Time Marker - Minute Increments

A time marker moves across the top of the screen as a blue bar/light blue bar in 60 second increments.

1.6.6 Auto Range Function

In Auto Range Mode, the range increase and decreases to keep the bottom always on the display screen.

1.6.7 Units of Measure

Meters, fathoms, passi braza and feet.

1.6.8 Expansion Ranges

The EQ 55 can display one of five different Expansion Ranges that are close ups of the bottom or VRM and are displayed across the lower third of the display screen.

1.6.9 Color Threshold

Up to 8 weak echo colors may be erased one at a time to suppress weak and unwanted echoes.

1.6.10 Phased Range

The "start" range, shown at the top of the screen, can be selected.

1.6.11 Transmit Power Reduction

Full Power (1)
Medium Power (1/10)
Low Power (1/100)

1.6.12 Ranges

One of 20 ranges can be selected.

1.6.13 Dual VRM

Variable Range Markers (VRM) for each frequency allows measurement of depth to targets.

1.6.14 Other Features

Gain, STC, White Line, Control Memory,, Brightness & Contrast Controls, Bottom Lock, AScope, Alarms, Adjustable Scroll Speed, Event Markers, Selectable Language, Optional
Color Printer.

PART 2

OPERATION OF THE EQ-55

2. OPERATION OF THE EQ 55 ..... 2.3

2.1 BASIC OPERATION OF THE EQ 55 ..... 2.3
2.1.1 Turning the EQ 55 On. 2.3
2.1.2 Joystick 2.3

2.2 MENU SELECTIONS 2.5
2.2.1 Main Menu 2.5
2.2.2 Low and High Frequency Menu 2.6
2.2.3 Low or High Frequency - Manual Range 2.7
2.2.4 Low or High Frequency - Manual Phase 2.8
2.2.5 Low or High Frequency - Auto Range 2.9
2.2.6 Low or High Frequency - Auto Phase 2.10
2.2.7 Low or High Frequency - Set Auto Phase 2.11
2.2.8 Low or High Frequency - Set VRM (Variable Range Marker) 2.12

2.3 DISPLAY MODE MENU 2.13
2.3.1 Display Mode - LF OR HF 2.14
2.3.2 Display Mode - LF OR HF/ASCOPE 2.15
2.3.3 Display Mode - DUAL/VERT (Dual Vertical) 2.16
2.3.4 Display Mode - DUAL/HORZ (Dual Horizontal) 2.17
2.3.5 Display Mode - Navigation 2.18

2.4 EXPANSION MENU 2.19
2.4.1 Expansion - Bottom Exp. (Bottom Expansion) 2.20
2.4.2 Expansion - VRM EXP (VRM Expansion) 2.21
2.4.3 Expansion - EXP RANGE (Expansion Range) 2.22
2.4.4 Set Marker Menu 2.23

2.5 GAIN MENU 2.24
2.5.1 Gain - LF and HF Gain 2.25

2.6 TRANSMIT POWER MENU 2.26

2.7 CONFIGURATION MENU 2.27
2.7.1 Configuration- Units of Measure 2.28
2.7.2 Configuration - Background Color 2.29
2.7.3 Configuration - Language 2.30
2.7.4 Configuration - EXT I/F (External Interface) Sub-menu 2.31
2.7.5 Configuration - EXT I/F - NMEA 0183 ..... 2.32
2.7.6 Configuration - EXT I/F - Printer 2.33
2.7.7 Configuration - EXT I/F - Ship's Speed 2.34
2.7.8 Configuration - EXT I/F - Water Temperature 2.35
2.7.9 Configuration - EXT I/F - Trigger 2.36
2.7.10 Configuration - Test Pattern 2.37
2.7.11 Configuration - TVG (Time Varying Gain) 2.38
2.7.12 Configuration - Color Threshold 2.39
2.7.13 Configuration - Scroll Speed 2.40
2.7.14 Configuration - Alarms Sub-menu 2.41
2.7.15 Configuration - Alarms - Set Min Depth (Set Minimum Depth) 2.42
2.7.16 Configuration - Alarms - Set Max Depth (Set Maximum Depth) 2.43
2.7.17 Configuration - Alarms - Min and Max Alarms ON/OFF 2.44
2.7.18 Configuration - White Line 2.45
2.7.19 Configuration - Filter 2.46
2.7.20 Configuraiton - STC (Sensitivity Time Control) 2.47
2.7.21 Configuration - Depth Adjust (Depth Adjustment) 2.48
2.7.22 Configuration - Sound Velocity 2.49
2.7.23 Configuration - Save Settings 2.50
2.7.24 Configuration - Load Settings 2.51

2. OPERATION OF THE EQ 55

2.1 BASIC OPERATION OF THE EQ 55

The EQ 55 is an easy to use echo sounder whose functions are quickly accessible through on-screen menus by means of a joystick.

> **Caution: Do not operate the EQ 55 with the transducers out of the water. Operation at full transmit power with the transducers out of the water risks permanent damage to the transducers.**

2.1.1 Turning the EQ 55 On.

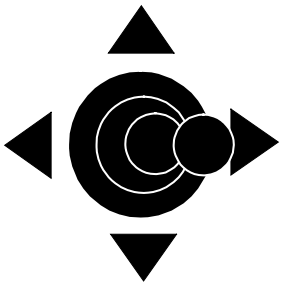
The EQ 55 is turned on by pressing the rocker switch in the lower left hand corner of the control panel.

2.1.2 Joystick

The EQ 55 is controlled through menus that you access by operating a joystick located on the control panel. Below is a list of what happens when you move the joystick. If you get lost in the menus, repeatedly push the joystick to the left, this will move you up to each previous menu until you arrive at the MAIN MENU. To make the MAIN MENU reappear push the joystick once to the right.

Pushing the joystick **UP** causes the cursor highlight to move up the selected menu.

Pushing the joystick to the **LEFT** causes the cursor highlight to move to the previous menu.



Pushing the joystick to the **RIGHT** selects the highlighted function.

Pressing the joystick **DOWN** causes the cursor highlight to move down the selected menu.

2.2 MENU SELECTIONS

The EQ 55 is operated by making selections from various on-screen menus. This section explains what each menu listing means or does. To select a function, move the joystick up or down so the highlight is on the item you want, then press the joystick to the right to highlight and select the function.

***Note**: In this chapter each menu selection is illustrated with its menu. The highlight is shown as shaded text. The menu being described is shown larger, any previous menus are shown smaller and in sequence as indicated by arrows. The previous menus also have highlighted text that follows the path taken to the present function. This allows you to see the menu selections necessary to select a particular function.*

2.2.1 Main Menu

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

The Main Menu is the starting point for making menu selections for the EQ 55.

***Note:** When the Main Menu is displayed, moving the joystick to the LEFT will remove the Main Menu from the display screen. Moving the joystick once more to the LEFT will also remove the Status Window from the display screen. Moving the joystick to the RIGHT will restore the Status Window, and moving the joystick once more to the RIGHT will restore the Main Menu.*

2.2.2 Low and High Frequency Menu

MAIN MENU
LF SETTINGS
HF SETTINGS
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

LF SETTINGS	
MANUAL RANGE	
MANUAL PHASE	
AUTO RANGE	OFF
AUTO PHASE	OFF
SET AUTO PHASE	
SET VRM	

Selecting LF or HF Settings from the Main Menu will take you to the Low Frequency (LF) Settings Menu or to the High Frequency (HF) menu.

These Menus allow you to configure the Range and Expansion functions of the Frequency channel of the EQ-55.

The selections available in the LF and HF Settings Menus are described on the following pages.

2.2.3 Low or High Frequency - Manual Range

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

LF SETTINGS	
MANUAL RANGE	
MANUAL PHASE	
AUTO RANGE	OFF
AUTO PHASE	OFF
SET AUTO PHASE	
SET VRM	

RANGE
2000
▲
40
▼
20
STATUS

Selecting Manual Range from the LF or HF Settings Menu allows you to adjust the range displayed in the channel.

The selection window displays maximum and minimum ranges. The selected range can be changed by moving the joystick up or down.

The selected range is shown between the maximum and minimum values possible. Once the desired range is shown, press the joystick to the right to take the selection.

2.2.4 Low or High Frequency - Manual Phase

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

The phased range allows you to view a selected "window" below your vessel. The "manual" range (set above) determines the vertical size of the "window." The "phase" range determines the depth of the upper edge of the " window."

↓

LF SETTINGS	
MANUAL RANGE	
MANUAL PHASE	
AUTO RANGE	OFF
AUTO PHASE	OFF
SET AUTO PHASE	
SET VRM	

The selection window displays the "start" range. The range can be changed by moving the joystick up or down. Once the correct range is shown in the selection window, press the joystick to the right to make your selection.

PHASE
40
▲
0
▼
0
STATUS

2.2.5 Low or High Frequency - Auto Range

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION



LF SETTINGS	
MANUAL RANGE	
MANUAL PHASE	
AUTO RANGE	**OFF**
AUTO PHASE	OFF
SET AUTO PHASE	
SET VRM	

By selecting the Auto Range, the EQ 55 will automatically adjust the displayed range, keeping the display of the sea bottom in the lower half of the screen display.

2.2.6 Low or High Frequency - Auto Phase

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

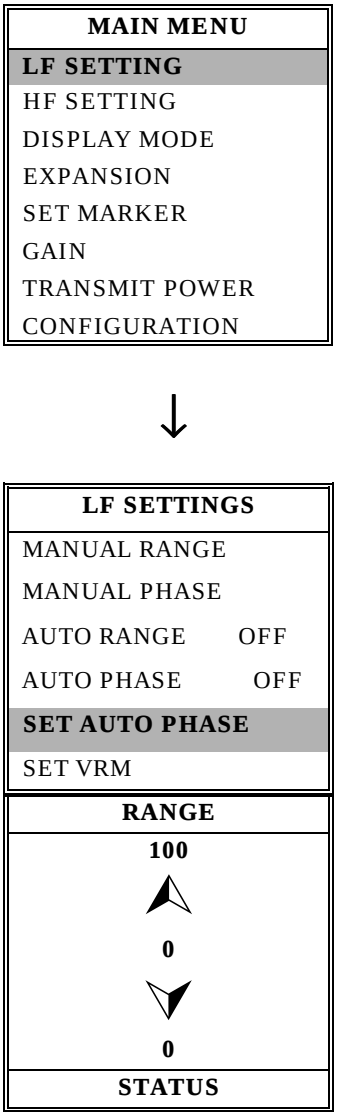
↓

LF SETTINGS	
MANUAL RANGE	
MANUAL PHASE	
AUTO RANGE	OFF
AUTO PHASE	**OFF**
SET AUTO PHASE	
SET VRM	

Selecting the Auto Phase provides a combination of Expansion and Bottom Lock. In this mode, the selected Auto Phase range will be shown as a window. The window will be automatically "phased" up or down to keep the bottom in the window. This mode can be especially useful when used with Bottom Expansion. See page 8 for set AUTO PHASE range

***Note**: When Auto Phase is selected, Auto Range is turned ON. Turning Auto Range OFF will disable Auto Phase.*

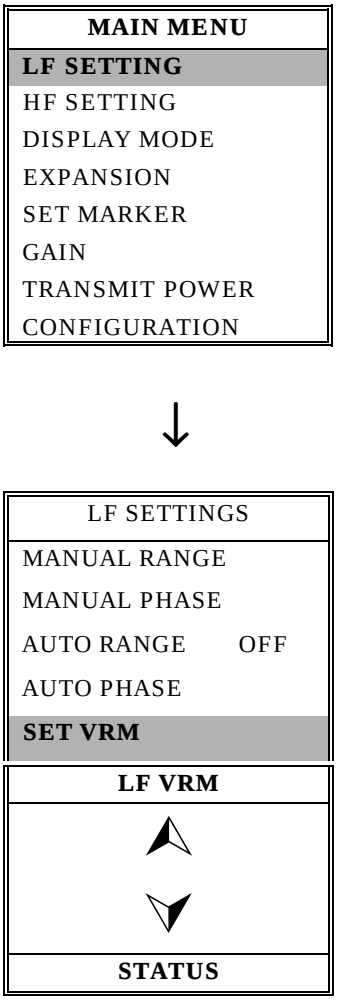
2.2.7 Low or High Frequency - Set Auto Phase



Selecting the Set Auto Phase allows the user to specify the depth off of the bottom that he wishes to display. This range can be set between the ranges of 10 and 100 Meters at specific increments.

***Note**: Set Auto Phase is used in conjunction when Auto Phase is in the on position.*

2.2.8 Low or High Frequency - Set VRM (Variable Range Marker)



Set VRM places a horizontal white line at a selected location. The use of a VRM allows you to measure the depth to any displayed target.

Use the joystick to highlight SET VRM, then press the joystick to the right to make the selection. Now, moving the joystick up or down will move the white VRM line, and the VRM depth will be shown in the STATUS window.

2.3 DISPLAY MODE MENU

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

DISPLAY MODE
LF
LF/ASCOPE
HF
HF/ASCOPE
DUAL/VERT
DUAL/HORZ
NAVIGATION

Selecting Display Mode from the Main Menu will show the possible modes for displaying the information the EQ 55 provides.

Each selection in Display Mode is described on the following pages.

2.3.1 Display Mode - LF OR HF

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

DISPLAY MODE
LF
LF/ASCOPE
HF
HF/ASCOPE
DUAL/VERT
DUAL/HORZ
NAVIGATION

The LF or HF selection of Display Mode dedicates the entire EQ 55 display screen to the display of data from the chosen Frequency channel.

The other transmitter is disabled.

2.3.2 Display Mode - LF OR HF/ASCOPE

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

DISPLAY MODE
LF
LF/ASCOPE
HF
HF/ASCOPE
DUAL/VERT
DUAL/HORZ
NAVIGATION

In ASCOPE mode, the Frequency channel is normally shown on the left side of the display screen and an ASCOPE display is shown on the right side. ASCOPE expands the latest ping into a bar graph.

The other transmitter is disabled.

2.3.3 Display Mode - DUAL/VERT (Dual Vertical)

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

DISPLAY MODE
LF
LF/ASCOPE
HF
HF/ASCOPE
DUAL/VERT
DUAL/HORZ
NAVIGATION

In DUAL/VERT Mode the display screen is split into vertical LF/HF displays.

The Low Frequency channel is shown on the left side of the display screen, and the High Frequency channel on the right.

2.3.4 Display Mode - DUAL/HORZ (Dual Horizontal)

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

DISPLAY MODE
LF
LF/ASCOPE
HF
HF/ASCOPE
DUAL/VERT
DUAL/HORZ
NAVIGATION

In DUAL/HORZ the display screen is split into horizontal LF/HF displays.

The Low Frequency channel is displayed on the upper portion of the display screen, and the High Frequency channel on the lower portion.

2.3.5 Display Mode - Navigation

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

DISPLAY MODE
LF
LF/ASCOPE
HF
HF/ASCOPE
DUAL/VERT
DUAL/HORZ
NAVIGATION

Selecting the Navigation Display Mode will dedicate the entire display to showing navigation data. The present depth is shown in large text. Also provided by (optional) sensors are the vessel's latitude, longitude, speed and local sea water temperature.

2.4 EXPANSION MENU

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

EXPANSION	
BOTTOM EXP	**OFF**
VRM EXP	OFF
EXP RANGE	

The Expansion Menu allows selection of close-up views of the bottom (Bottom Expansion), mid-water (VRM Expansion) and selection of the Expansion Range.

Each selection in the Expansion Menu is described on the following pages.

2.4.1 Expansion - Bottom Exp. (Bottom Expansion)

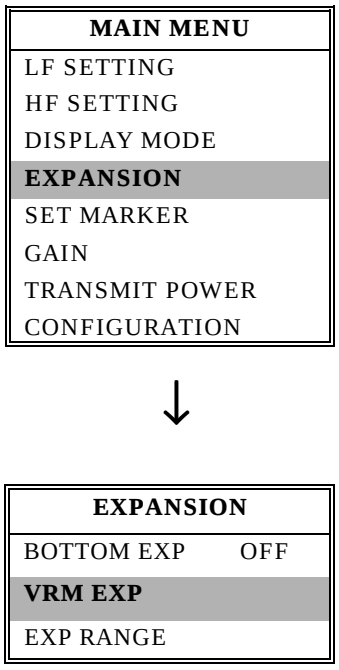
MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

EXPANSION	
BOTTOM EXP	**ON**
VRM EXP	OFF
EXP RANGE	

Bottom Expansion allows for an expanded view of the water column close to the sea floor. Use of Bottom Expansion requires selection of an Expansion Range. See page 2 - 18 for Expansion Range.

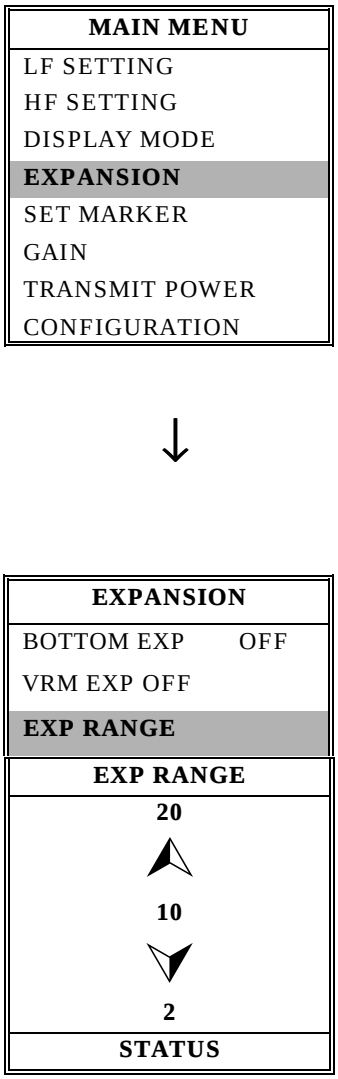
2.4.2 Expansion - VRM EXP (VRM Expansion)



The Low and High Frequency channels each have their own independent VRM(see page 2-9). To move one of the VRM's, select SET VRM from the LF Settings or HF Settings menu, as appropriate, and then move the joystick up or down to direct the VRM to the displayed depth you need.

Subsequent selection of VRM Expansion will allows a close-up view of the water column around the VRM.

2.4.3 Expansion - EXP RANGE (Expansion Range)



The selected Expansion Range defines the size of the water column shown in the Bottom Expansion or the VRM Expansion window.

2.4.4 Set Marker Menu

MAIN MENU
LF SETTINGS
HF SETTINGS
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

Selecting the Set Marker function from the Main Menu, draws vertical marker at a selected location on the display screen.

2.5 GAIN MENU

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

GAIN
LF GAIN
HF GAIN

Selecting the Gain function from the Main Menu allows you to adjust the sensitivity of the EQ 55 receivers. See page 2 - 21 for the description of the Gain function.

2.5.1 Gain - LF and HF Gain

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

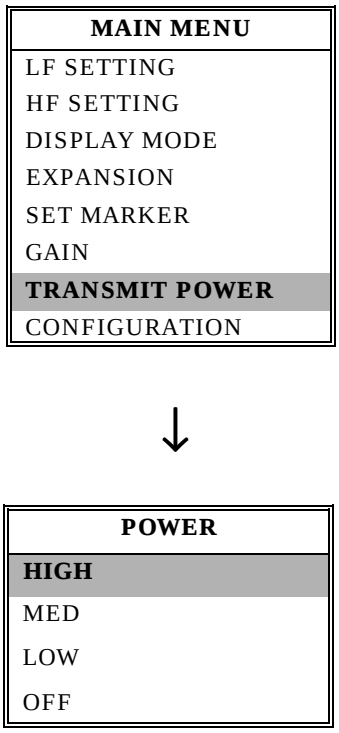
↓

GAIN
LF GAIN
HF GAIN
LF GAIN
15
▲
15
▼
0
STATUS

The Low Frequency and High Frequency channels each have their own receiver, and so each has its own Gain adjustment.

The Gain is adjustable in steps from 0 (minimum) to 15 (maximum). The "correct" Gain setting for your installation depends on many variables affecting the strength of the return echoes, such as Transmit Power settings, transducer election and placement, water conditions and target strength.

2.6 TRANSMIT POWER MENU



Selection of the Transmit Power function from the Main Menu allows for the adjustment of the level of energy being output.

***Note**: The transmit power is the same on both HIGH and LOW Frequency channels.*

HIGH: Full power, 1000 watts per channel
MED: 100 watts per channel
LOW: 10 watts per channel
OFF: No transmission

Generally speaking, High Power is most useful in deeper water and Low Power is more useful in very shallow water.

2.7 CONFIGURATION MENU

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

CONFIGURATION	
UNITS	
BACK COLOR	
LANGUAGE	
EXT I/F	
TEST	OFF
TVG	
COLOR THRESHOLD	
SCROLL SPEED	
ALARMS	
WHITE LINE	OFF
FILTER	OFF
STC	OFF
DEPTH ADJUSTMENT	
SOUND VELOCITY	
SAVE SETTINGS	
LOAD SETTINGS	

Selection of the Configuration option from the Main Menu allows you to select from a wide variety of features. These features are described on the following pages.

2.7.1 Configuration- Units of Measure

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

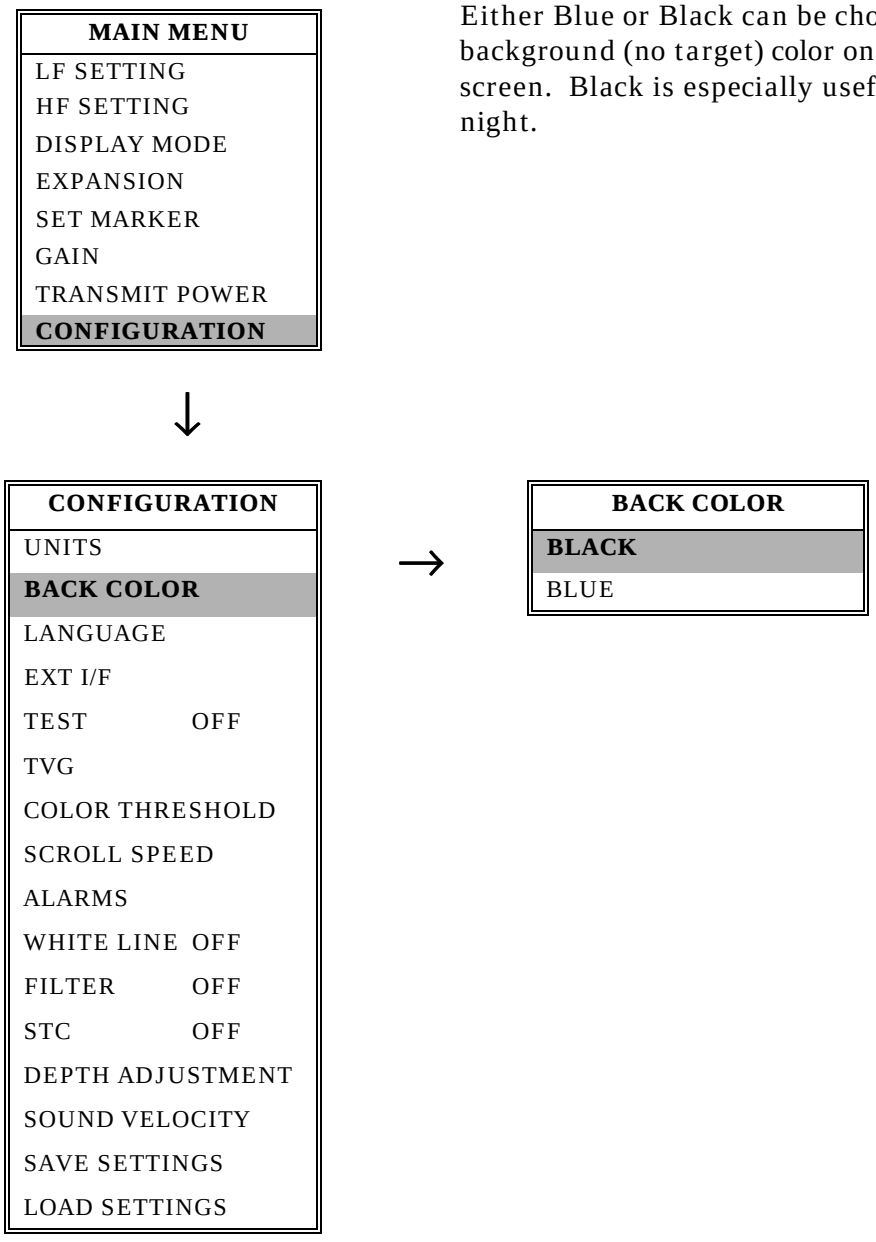
CONFIGURATION	
UNITS	
BACK COLOR	
LANGUAGE	
EXT I/F	
TEST	OFF
TVG	
COLOR THRESHOLD	
SCROLL SPEED	
ALARMS	
WHITE LINE	OFF
FILTER	OFF
STC	OFF
DEPTH ADJUSTMENT	
SOUND VELOCITY	
SAVE SETTINGS	
LOAD SETTINGS	

→

UNITS
METERS
FEET
FATHOMS
PASSI BRAZA

The measurement unit used in the depth measurement and display of the EQ 55 can be meters, feet, fathoms or passi braza. Press the joystick to the right to make a selection.

2.7.2 Configuration - Background Color



Either Blue or Black can be chosen for the background (no target) color on the EQ 55 display screen. Black is especially useful for operation at night.

2.7.3 Configuration - Language

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

CONFIGURATION	
UNITS	
BACK COLOR	
LANGUAGE	
EXT I/F	
TEST	OFF
TVG	
COLOR THRESHOLD	
SCROLL SPEED	
ALARMS	
WHITE LINE	OFF
FILTER	OFF
STC	OFF
DEPTH ADJUSTMENT	
SOUND VELOCITY	
SAVE SETTINGS	
LOAD SETTINGS	

→

LANGUAGE
ENGLISH
FRENCH
GERMAN
ICELANDIC
NORWEGIAN
SPANISH

Any one of six languages may be selected for the EQ-55 menu items.

2.7.4 Configuration - EXT I/F (External Interface) Sub-menu

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

CONFIGURATION	
UNITS	
BACK COLOR	
LANGUAGE	
EXT I/F	
TEST	OFF
TVG	
COLOR THRESHOLD	
SCROLL SPEED	
ALARMS	
WHITE LINE	OFF
FILTER	OFF
STC	OFF
DEPTH ADJUSTMENT	
SOUND VELOCITY	
SAVE SETTINGS	
LOAD SETTINGS	

→

EXT I/F	
NMEA 183	**OFF**
PRINTER	
SPEED	OFF
TEMPERATURE	OFF
TRIGGER	OFF

Selection of the EXT I/F (External Interface) Menu allows you to control the NMEA 0183 interface ports (on the rear panel of the EQ 55), to control the (optional) printer and to turn the speed and temperature interfaces ON or OFF.

2.7.5 Configuration - EXT I/F - NMEA 0183

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

The NMEA 0183 (National Marine Electronics Association) interface allows the EQ 55 to communicate certain data with other devices that may be on your vessel.

The EQ 55 sends out signals on the NMEA 0183 interface giving the water depth it is measuring.

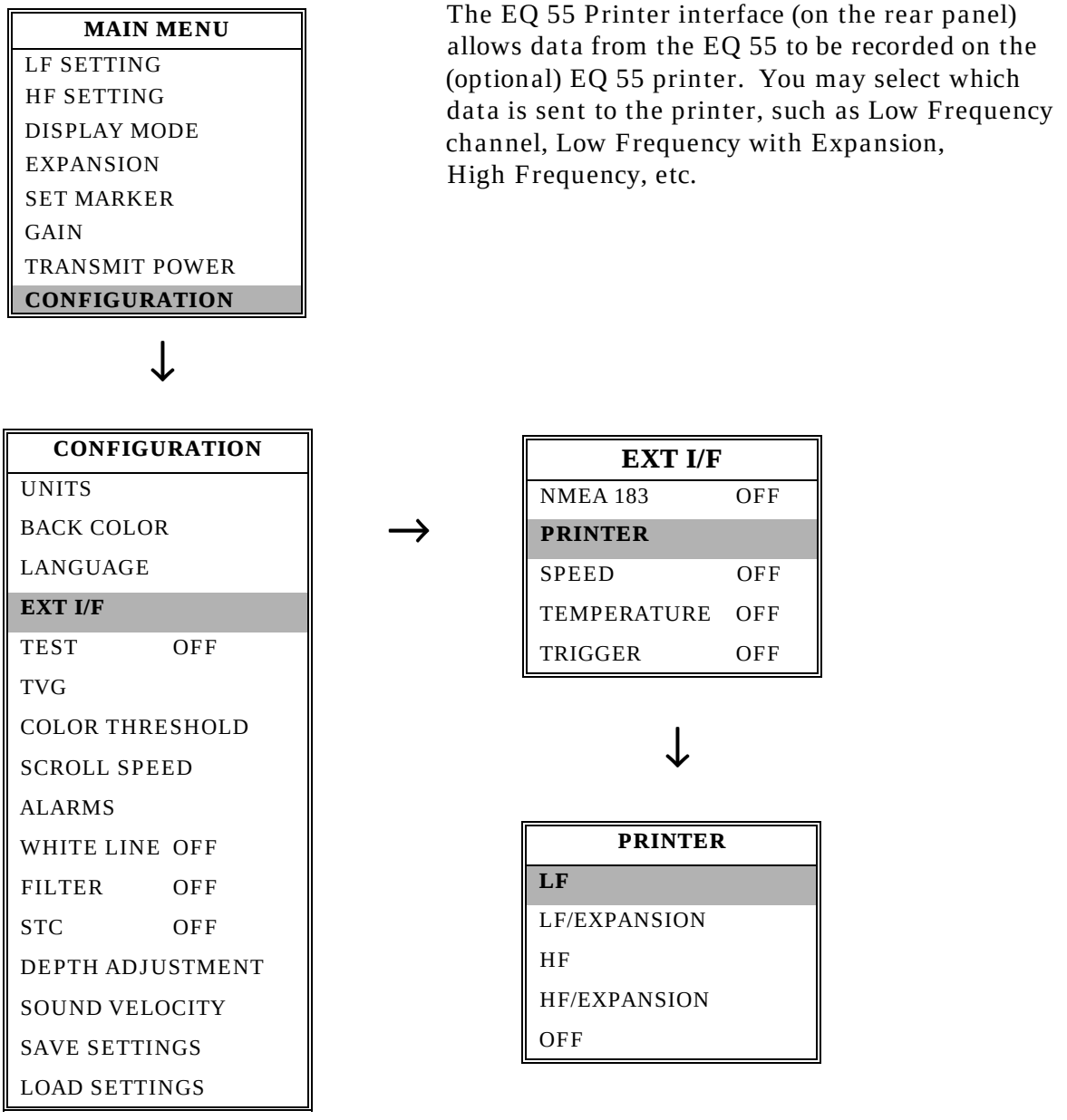
Also, the EQ 55 will receive latitude and longitude information from a Loran, Transit Sat-Nav or GPS receiver. If this the vessel's position to the EQ 55, turning the NMEA 0183 interface will allow the EQ 55 to display the latitude and longitude

CONFIGURATION	
UNITS	
BACK COLOR	
LANGUAGE	
EXT I/F	
TEST	OFF
TVG	
COLOR THRESHOLD	
SCROLL SPEED	
ALARMS	
WHITE LINE	OFF
FILTER	OFF
STC	OFF
DEPTH ADJUSTMENT	
SOUND VELOCITY	
SAVE SETTINGS	
LOAD SETTINGS	

→

EXT I/F	
NMEA 183	**OFF**
PRINTER	
SPEED	OFF
TEMPERATURE	OFF
TRIGGER	OFF

2.7.6 Configuration - EXT I/F - Printer



The EQ 55 Printer interface (on the rear panel) allows data from the EQ 55 to be recorded on the (optional) EQ 55 printer. You may select which data is sent to the printer, such as Low Frequency channel, Low Frequency with Expansion, High Frequency, etc.

2.7.7 Configuration - EXT I/F - Ship's Speed

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

CONFIGURATION	
UNITS	
BACK COLOR	
LANGUAGE	
EXT I/F	
TEST	OFF
TVG	
COLOR THRESHOLD	
SCROLL SPEED	
ALARMS	
WHITE LINE	OFF
FILTER	OFF
STC	OFF
DEPTH ADJUSTMENT	
SOUND VELOCITY	
SAVE SETTINGS	
LOAD SETTINGS	

The use of an (optional) speed sensor allows the vessel speed to be shown on the EQ 55 screen.

Since various speed sensors are available on the market with output from less than 200 to more than 22,000 pulses per nautical mile, a calibration window appears when you turn the Speed function ON.

Adjustment of this calibration value can allow a more accurate speed to be displayed.

EXT I/F	
NMEA 183	OFF
PRINTER	
SPEED	**OFF**
TEMPERATURE	OFF
TRIGGER	OFF

CAL
25000

100

100

STATUS
•
• **LF VRM = 0**
• **HF VRM = 0**
• **SPEED =**
• **00.0 m**
•

Comparison with a speed indicator of know accuracy or operating the vessel on a known measured mile will allow calibration of the vessel speed. Once the calibration is complete the value should be saved with other Menu Selections, see Configurations-Save Settings, pages 2-47.

2.7.8 Configuration - EXT I/F - Water Temperature

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

The use of an (optional) temperature sensor allows the EQ 55 to display the sea water temperature.

The temperature interface is turned ON or OFF by selecting the TEMP option in the EXT I/F Menu and by pressing the joystick to the right.

↓

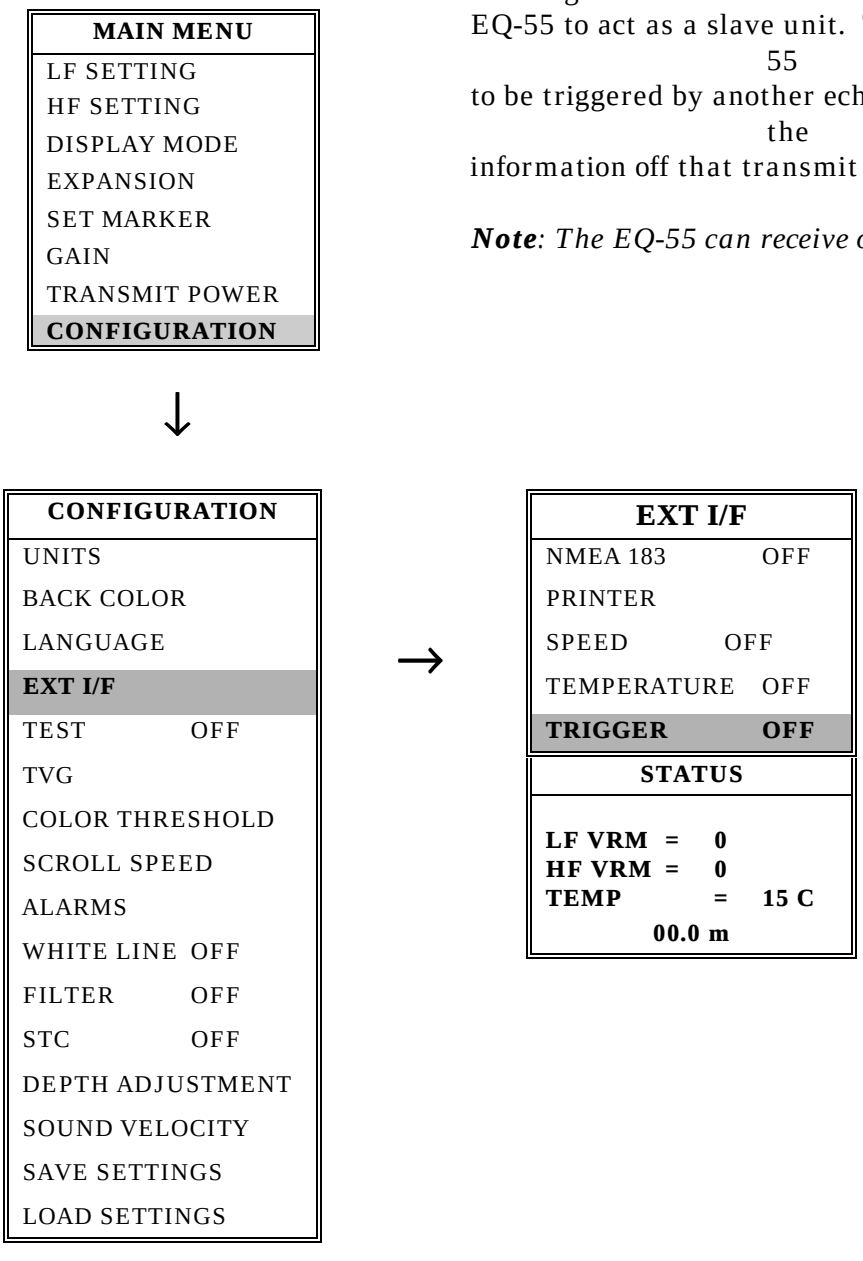
CONFIGURATION	
UNITS	
BACK COLOR	
LANGUAGE	
EXT I/F	
TEST	OFF
TVG	
COLOR THRESHOLD	
SCROLL SPEED	
ALARMS	
WHITE LINE	OFF
FILTER	OFF
STC	OFF
DEPTH ADJUSTMENT	
SOUND VELOCITY	
SAVE SETTINGS	
LOAD SETTINGS	

→

EXT I/F	
NMEA 183	OFF
PRINTER	
SPEED	OFF
TEMPERATURE	**OFF**
TRIGGER	OFF

STATUS
LF VRM = 0
HF VRM = 0
TEMP = 15 C
00.0 m

2.7.9 Configuration - EXT I/F - Trigger



Turning the TRIGGER function ON will enable the EQ-55 to act as a slave unit. This will allow the EQ-55 to be triggered by another echo sounder and receive the information off that transmit burst.

***Note**: The EQ-55 can receive only on the LF channel.*

2.7.10 Configuration - Test Pattern

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

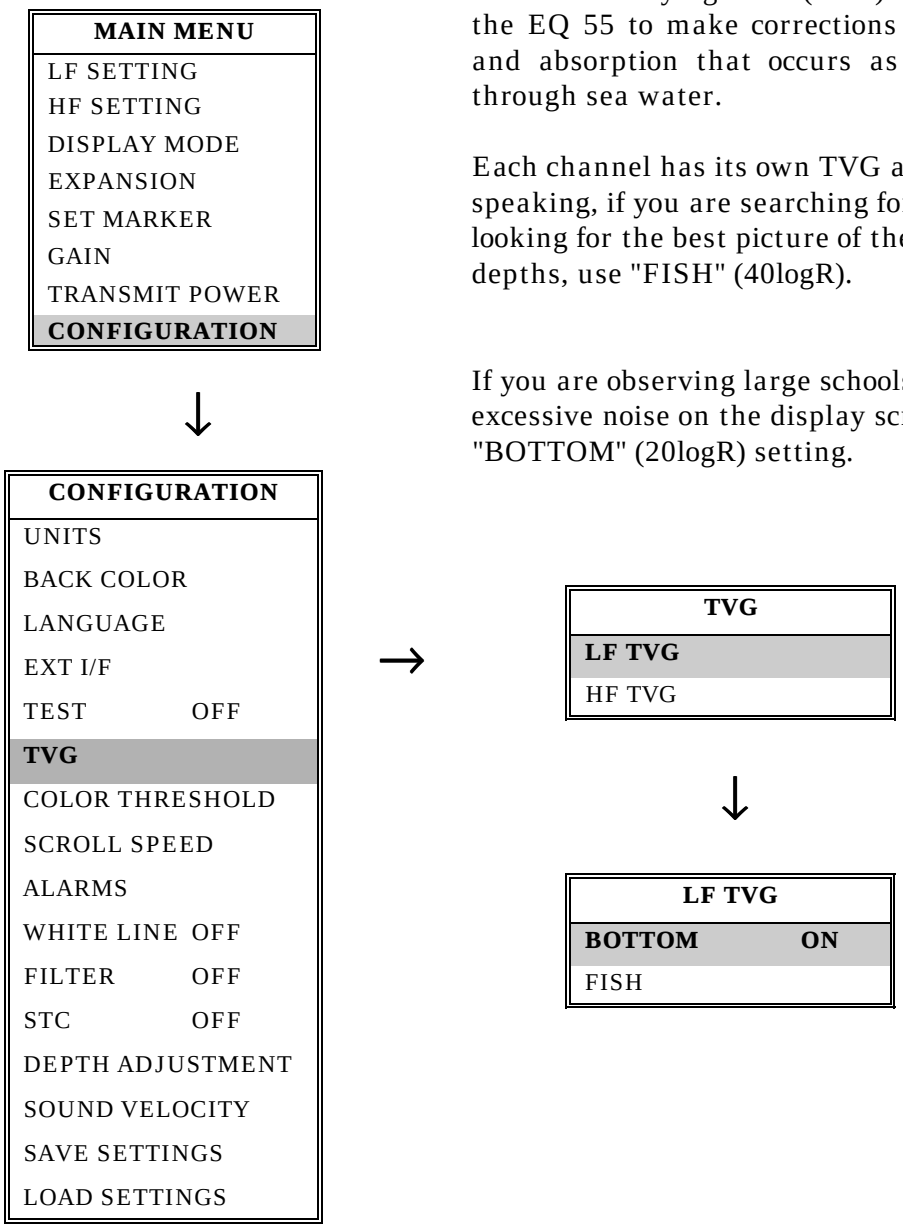
↓

CONFIGURATION	
UNITS	
BACK COLOR	
LANGUAGE	
EXT I/F	
TEST	**ON**
TVG	
COLOR THRESHOLD	
SCROLL SPEED	
ALARMS	
WHITE LINE	OFF
FILTER	OFF
STC	OFF
DEPTH ADJUSTMENT	
SOUND VELOCITY	
SAVE SETTINGS	
LOAD SETTINGS	

When the Test Pattern is turned ON it injects a test signal into the EQ 55 receiver channel input. This allows the user or a technician to evaluate the gain controls and display.

***Note**: The EQ 55 software revision (computer program revision) number is shown in the Status Windows when TEST is ON.*

2.7.11 Configuration - TVG (Time Varying Gain)



The Time Varying Gain (TVG) is a control that allows the EQ 55 to make corrections for most of the losses and absorption that occurs as sound energy passes through sea water.

Each channel has its own TVG adjustment. Generally speaking, if you are searching for small targets or are looking for the best picture of the bottom at great depths, use "FISH" (40logR).

If you are observing large schools of fish or have excessive noise on the display screen, try the "BOTTOM" (20logR) setting.

2.7.12 Configuration - Color Threshold

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

CONFIGURATION	
UNITS	
BACK COLOR	
LANGUAGE	
EXT I/F	
TEST	OFF
TVG	
COLOR THRESHOLD	
SCROLL SPEED	
ALARMS	
WHITE LINE	OFF
FILTER	OFF
STC	OFF
DEPTH ADJUSTMENT	
SOUND VELOCITY	
SAVE SETTINGS	
LOAD SETTINGS	

On the EQ 55 display screen, smaller and weaker targets are shown in blue or green colors. These weaker targets may be removed from the display screen by using the Color Threshold function to eliminate these "weaker" colors. Up to 8 colors may be removed and the color bar on the extreme left side of the display screen indicates those colors that have been eliminated.

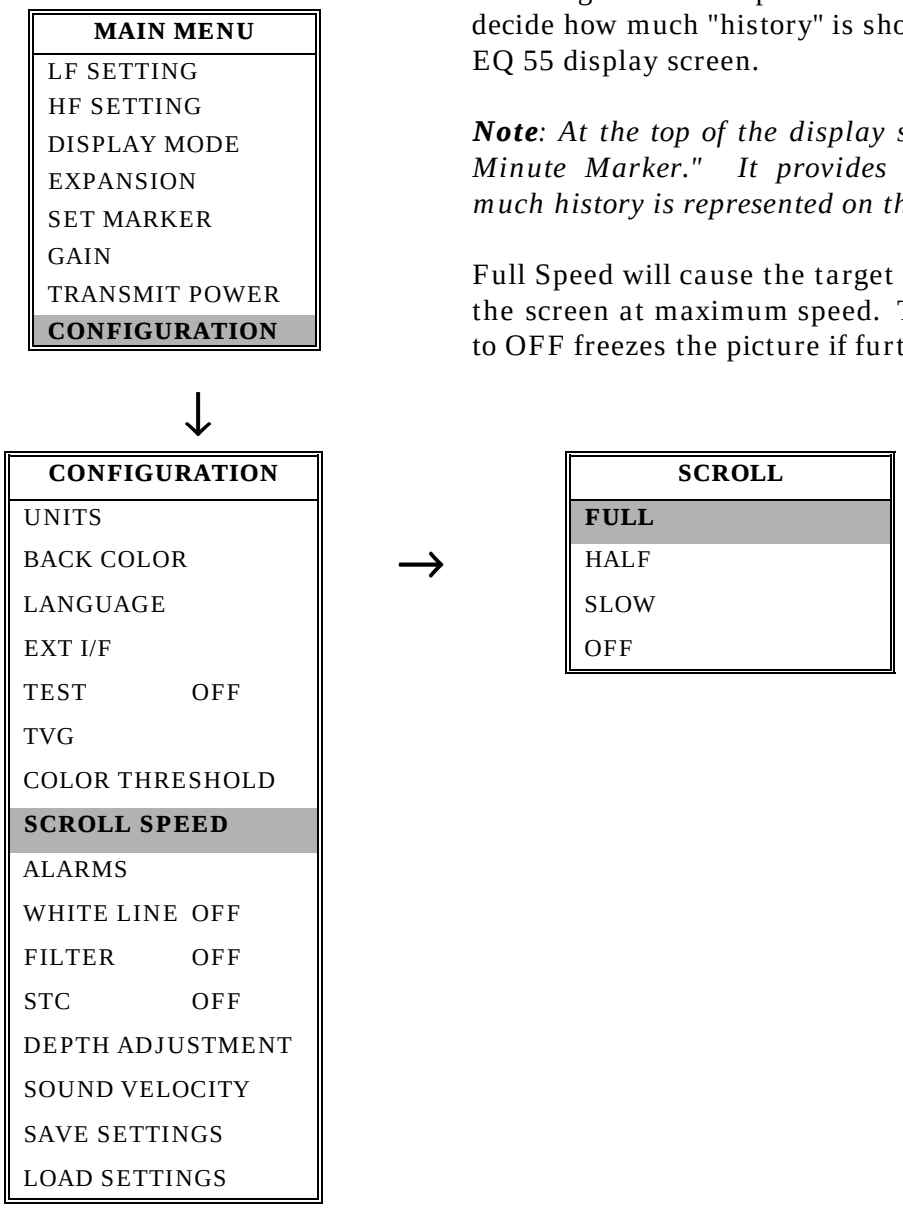
→

THRESHOLD
8

0

0
STATUS

2.7.13 Configuration - Scroll Speed



Selecting the Scroll Speed control allows the user to decide how much "history" is shown on the EQ 55 display screen.

***Note**: At the top of the display screen is the blue "One Minute Marker." It provides an indication of how much history is represented on the display screen.*

Full Speed will cause the target data to move across the screen at maximum speed. Turning Scroll to OFF freezes the picture if further study is desired.

2.7.14 Configuration - Alarms Sub-menu

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

CONFIGURATION	
UNITS	
BACK COLOR	
LANGUAGE	
EXT I/F	
TEST	OFF
TVG	
COLOR THRESHOLD	
SCROLL SPEED	
ALARMS	
WHITE LINE	OFF
FILTER	OFF
STC	OFF
DEPTH ADJUSTMENT	
SOUND VELOCITY	
SAVE SETTINGS	
LOAD SETTINGS	

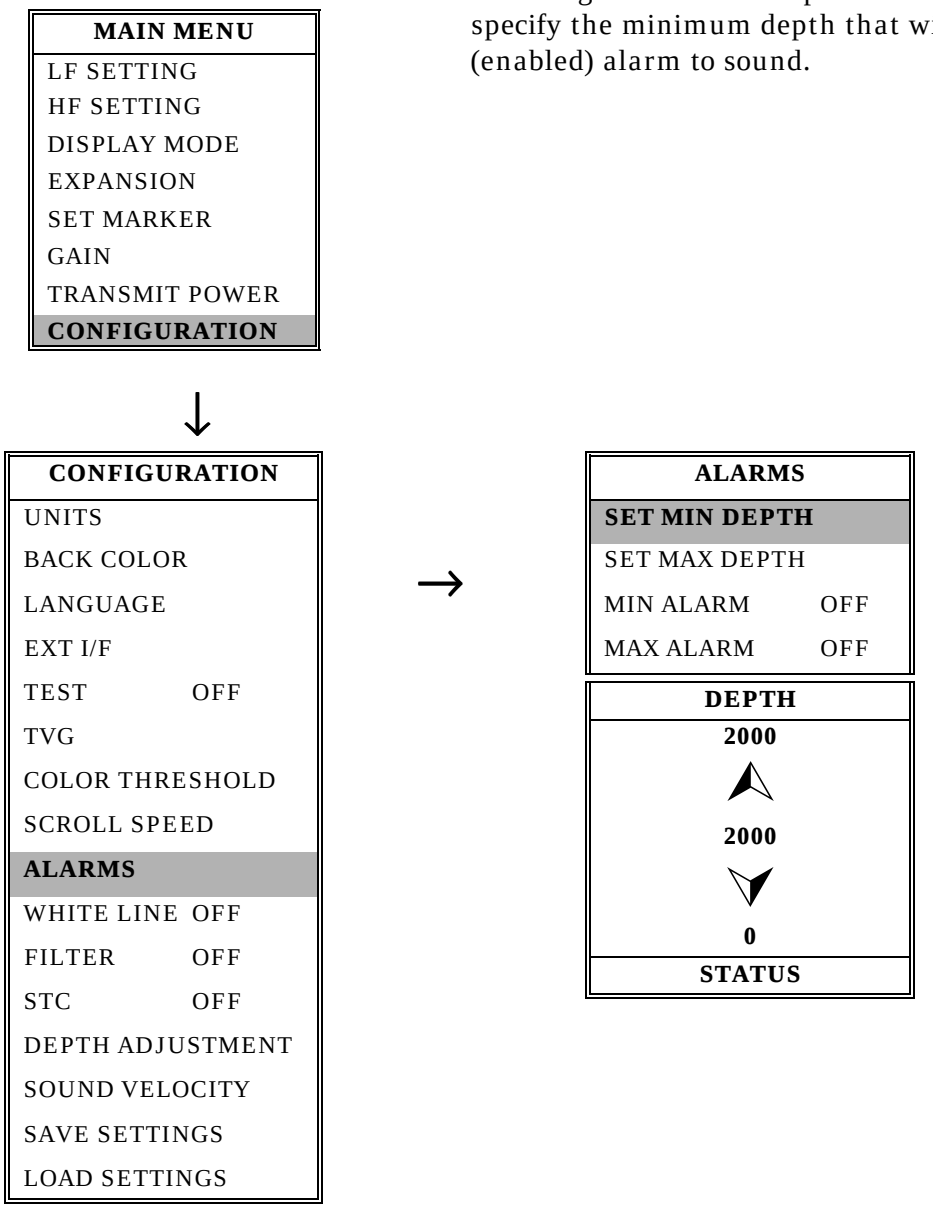
The EQ 55 includes alarms that can be used to notify the user if the bottom tracking indicates that the bottom is shallower than a Minimum Depth or deeper than a Maximum Depth.

The alarm is a "beeper" built into the EQ 55.

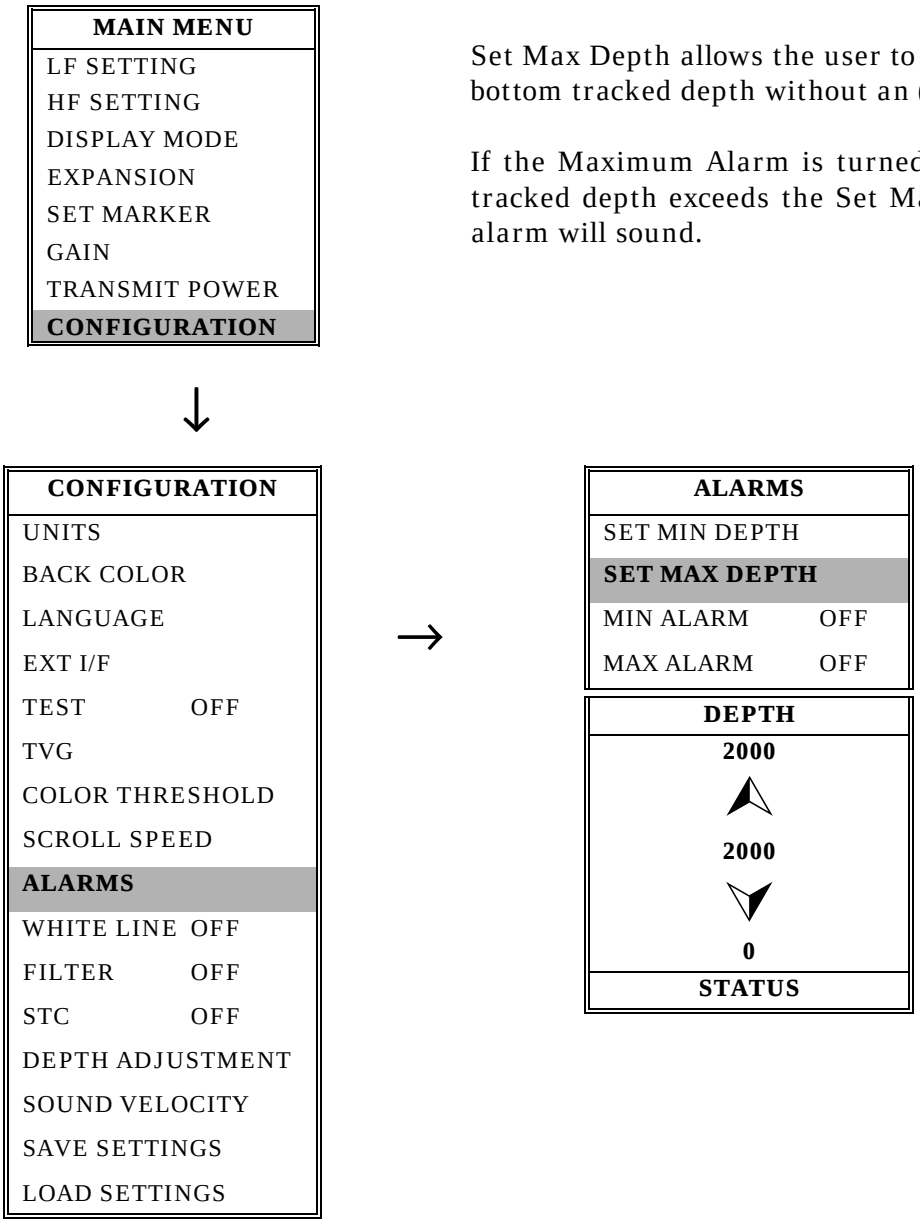
The following pages describe the alarms that can be selected.

2.7.15 Configuration - Alarms - Set Min Depth (Set Minimum Depth)

Selecting the Set Min Depth function allows the user to specify the minimum depth that will not cause an (enabled) alarm to sound.



2.7.16 Configuration - Alarms - Set Max Depth (Set Maximum Depth)



Set Max Depth allows the user to specify the maximum bottom tracked depth without an (enabled) alarm.

If the Maximum Alarm is turned ON and the bottom tracked depth exceeds the Set Max Depth setting, the alarm will sound.

2.7.17 Configuration - Alarms - Min and Max Alarms ON/OFF

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

CONFIGURATION	
UNITS	
BACK COLOR	
LANGUAGE	
EXT I/F	
TEST	OFF
TVG	
COLOR THRESHOLD	
SCROLL SPEED	
ALARMS	
WHITE LINE	OFF
FILTER	OFF
STC	OFF
DEPTH ADJUSTMENT	
SOUND VELOCITY	
SAVE SETTINGS	
LOAD SETTINGS	

→

ALARMS	
SET MIN DEPTH	
SET MAX DEPTH	
MIN ALARM	**ON**
MAX ALARM	OFF

The Minimum and Maximum Depth alarms may be enabled or disabled without disturbing the alarm depth settings.

2.7.18 Configuration - White Line

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

CONFIGURATION	
UNITS	
BACK COLOR	
LANGUAGE	
EXT I/F	
TEST	OFF
TVG	
COLOR THRESHOLD	
SCROLL SPEED	
ALARMS	
WHITE LINE	**ON**
FILTER	OFF
STC	OFF
DEPTH ADJUSTMENT	
SOUND VELOCITY	
SAVE SETTINGS	
LOAD SETTINGS	

White Line is a function that, when turned ON, places a white line just below what the EQ 55 evaluates as the bottom." The purpose of the White Line function is to low the user to see more clearly those targets that are close to the bottom and which have a tendency to "blend in" with the bottom echo.

2.7.19 Configuration - Filter

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

CONFIGURATION	
UNITS	
BACK COLOR	
LANGUAGE	
EXT I/F	
TEST	OFF
TVG	
COLOR THRESHOLD	
SCROLL SPEED	
ALARMS	
WHITE LINE	OFF
FILTER	**ON**
STC	OFF
DEPTH ADJUSTMENT	
SOUND VELOCITY	
SAVE SETTINGS	
LOAD SETTINGS	

The EQ 55 includes a software filter that can automatically reduce noise and interference on the display screen.

If you experience noise or interference problems, use of the Filter may improve the performance of the system.

2.7.20 Configuraiton - STC (Sensitivity Time Control)

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

CONFIGURATION	
UNITS	
BACK COLOR	
LANGUAGE	
EXT I/F	
TEST	OFF
TVG	
COLOR THRESHOLD	
SCROLL SPEED	
ALARMS	
WHITE LINE	OFF
FILTER	OFF
STC	**ON**
DEPTH ADJUSTMENT	
SOUND VELOCITY	
SAVE SETTINGS	
LOAD SETTINGS	

The STC (Sensitivity Time Control) is used to decrease the amount of signal from small targets that are close to the surface. The effect is to reduce the EQ 55 receiver sensitivity in the top few meters of water close to the transducer.

The use of STC may be especially useful when operating in shallow waters.

2.7.21 Configuration - Depth Adjust (Depth Adjustment)

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

CONFIGURATION	
UNITS	
BACK COLOR	
LANGUAGE	
EXT I/F	
TEST	OFF
TVG	
COLOR THRESHOLD	
SCROLL SPEED	
ALARMS	
WHITE LINE	OFF
FILTER	OFF
STC	OFF
DEPTH ADJUSTMENT	
SOUND VELOCITY	
SAVE SETTINGS	
LOAD SETTINGS	

The Depth Adjustment function acts as a draft offset, allowing the digital depth indicator in the lower left corner of the display screen to indicate the depth from the surface, rather than depth from the transducer.

The value shown above "Status" in the Status window, when making the depth adjustment, is the depth, in meters, which is added to the depth from the transducer to give the digital displayed depth.

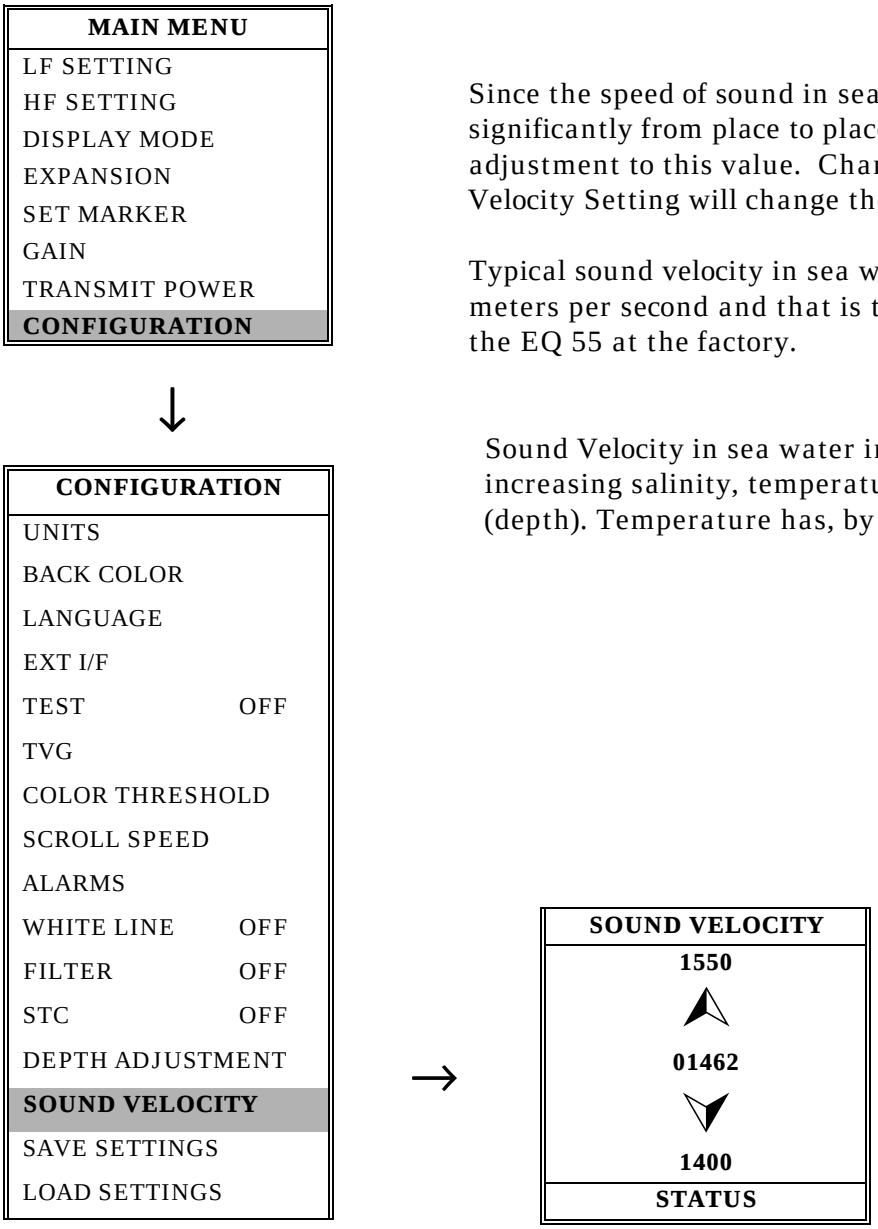
Note: The target data and the scales shown alongside the target data do not change.

***Caution**: The Depth Adjustment should be used with care since incorrect interpretation could lead to the impression of MORE water under the vessel than is truly present.*

→

THRESHOLD
20
▲
0
▼
0
STATUS

2.7.22 Configuration - Sound Velocity



Since the speed of sound in sea water can vary significantly from place to place, the EQ 55 offers an adjustment to this value. Changing the EQ 55 Sound Velocity Setting will change the depth indication.

Typical sound velocity in sea water is close to 1,462 meters per second and that is the value loaded into the EQ 55 at the factory.

Sound Velocity in sea water increases with increasing salinity, temperature and pressure (depth). Temperature has, by far, the most effect.

2.7.23 Configuration - Save Settings

MAIN MENU
LF SETTING
HF SETTING
DISPLAY MODE
EXPANSION
SET MARKER
GAIN
TRANSMIT POWER
CONFIGURATION

↓

CONFIGURATION	
UNITS	
BACK COLOR	
LANGUAGE	
EXT I/F	
TEST	OFF
TVG	
COLOR THRESHOLD	
SCROLL SPEED	
ALARMS	
WHITE LINE	OFF
FILTER	OFF
STC	OFF
DEPTH ADJUSTMENT	
SOUND VELOCITY	
SAVE SETTINGS	
LOAD SETTINGS	

The Save Setting function allows the user to store in memory all adjustments currently in effect on the EQ 55. The display screen mode, gain and power settings, language, units, and so on, are all saved in memory.

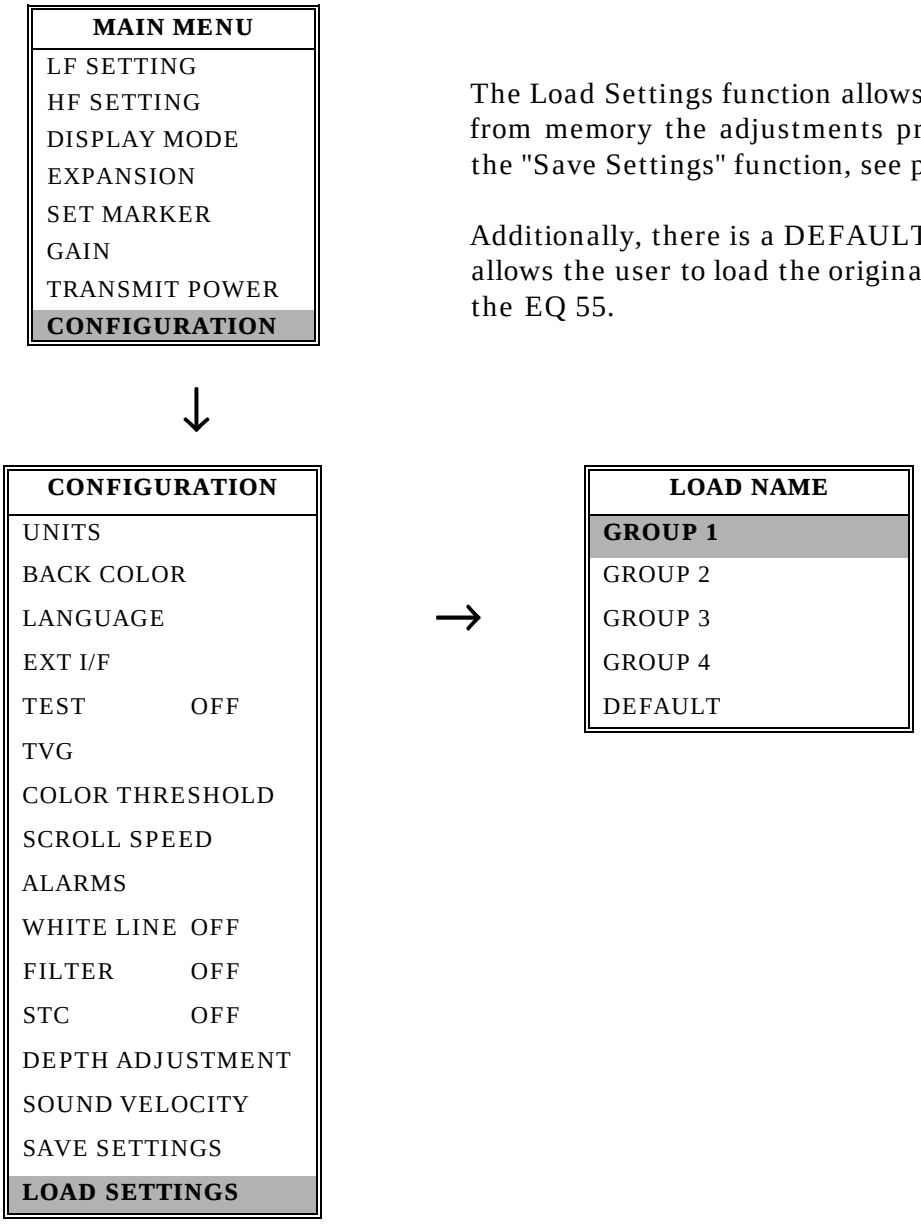
Four completely different "groups" of adjustments can be saved separately. This allows the EQ 55 to be configured, for example, for a particular fishery or a particular region. These settings can then be "saved" as a group and recalled months later, exactly as they were saved.

The settings saved as Group 1 are loaded into the EQ 55 automatically upon power up.

→

SAVE NAME
GROUP 1
GROUP 2
GROUP 3
GROUP 4

2.7.24 Configuration - Load Settings



The Load Settings function allows the user to from memory the adjustments previously saved using the "Save Settings" function, see previous page.

Additionally, there is a DEFAULT selection, which allows the user to load the original factory settings into the EQ 55.

PART 3

PRINCIPLES OF OPERATION OF AN ECHO SOUNDER

3. PRINCIPLES OF OPERATION OF AN ECHO SOUNDER 3.3

3.1 PARTS OF AN ECHO SOUNDER.....3.3
3.1.1 Display Screen.....3.3
3.1.2 Processor 3.3
3.1.3 Receiver/Transmitter 3.3
3.1.4 Transducer(s) 3.4

3.2 HOW THE EQ-55 WORKS 3.4

3.3 TRANSDUCER BEAMWIDTH.....3.5

3.4 CHOICE OF FREQUENCY 3.8

3.5 EFFECTS OF THE VESSEL'S SPEED.....3.8

3. PRINCIPLES OF OPERATION OF AN ECHO SOUNDER

3.1 PARTS OF AN ECHO SOUNDER

An echo sounder is composed of the display screen, processor, and receiver/transmitter unit which in case of the EQ 55, are housed in one unit which should be installed in an easily accessible location aboard ship. Connected to this unit by shielded cables are the transducer(s) which are mounted horizontally on the bottom of the hull.

3.1.1 Display Screen

The display screen presents in graphic and numerical form the information the processor is receiving and accumulating from the transducer(s).

3.1.2 Processor

The processor is the "brains" of the echo sounder. It is sealed inside the unit which protects it from harm. The processor is composed of highly sophisticated microprocessor, memory and logic circuitry.

3.1.3 Receiver/Transmitter

The receiver/transmitter (often called the "transceiver") section of your echo sounder takes it's commands from the processor. The processor tells the transceiver to activate the transmitter. The transmitter sends a high voltage transmit "ping" to the transducer mounted on the hull. At that point the transmitter's job is done and the receiver takes over. See Figure 3.1

The receiver is also connected to the transducer and amplifies the very small signals received as echoes from fish and the sea floor which arrive at the transducer (see Figure 3.2). The receiver is designed to reject other signals as much as possible and to provide enough amplification to see even relatively small targets at long ranges. The amplified receiver signals are then sent to the processor to be shown on the display screen.

3.1.4 Transducer(s)

A transducer is composed of a number of elements embedded in a housing which has been reinforced with polyester or fiberglass. The transducer is attached horizontally to the bottom of the hull. **It is essential that the transducer be mounted properly** as echo transmissions are radiated at right angles from the transducer face. Shielded cables connect the transducer with the echo sounder.

3.2 HOW THE EQ-55 WORKS

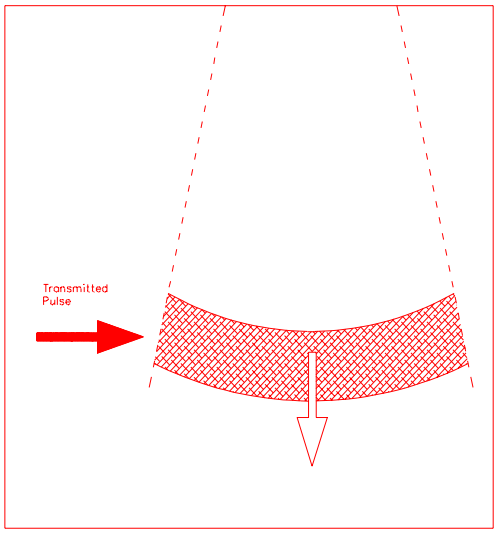
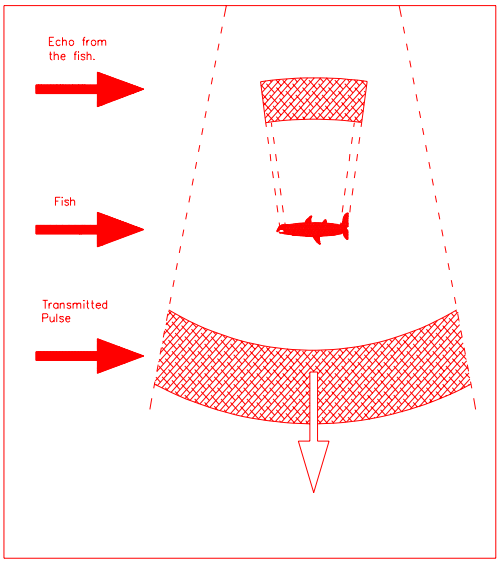


Figure 3.1 Transmitted "ping" from the receiver/transmitter

When the EQ-55 is turned on the processor begins to send an electrical voltage to the transducer. The cylindrical resonators in the transducer have a special property which enables them to change dimensions slightly when a varying voltage is applied. The voltage is thus converted to mechanical vibrations (sound waves) which are then transmitted down through the water. See figure 3.1



The sound waves move through the water until they encounter a change in density, such as a fish or the bottom. This causes the sound waves to " echo " back up through the water. When the reflected sound waves (echoes) hit the transducer the ceramic disks vibrate at the same frequency. This voltage goes back up through the cables to the receiver. The EQ-55 processes the signals and presents them on the display screen. See Figure 3.2

Figure 3.2 Echoes returning to the receiver

3.3 TRANSDUCER BEAMWIDTH

The transducer mounted to the hull of your vessel serves as both a "speaker" when transmitting, and as a "microphone" when the echo sounder is receiving. Similar to the way a flashlight focuses light, most of the sound from your transducer is focused downwards with a smaller amount going out to the sides. The amount of focusing of the sound beam is expressed as a "beamwidth".

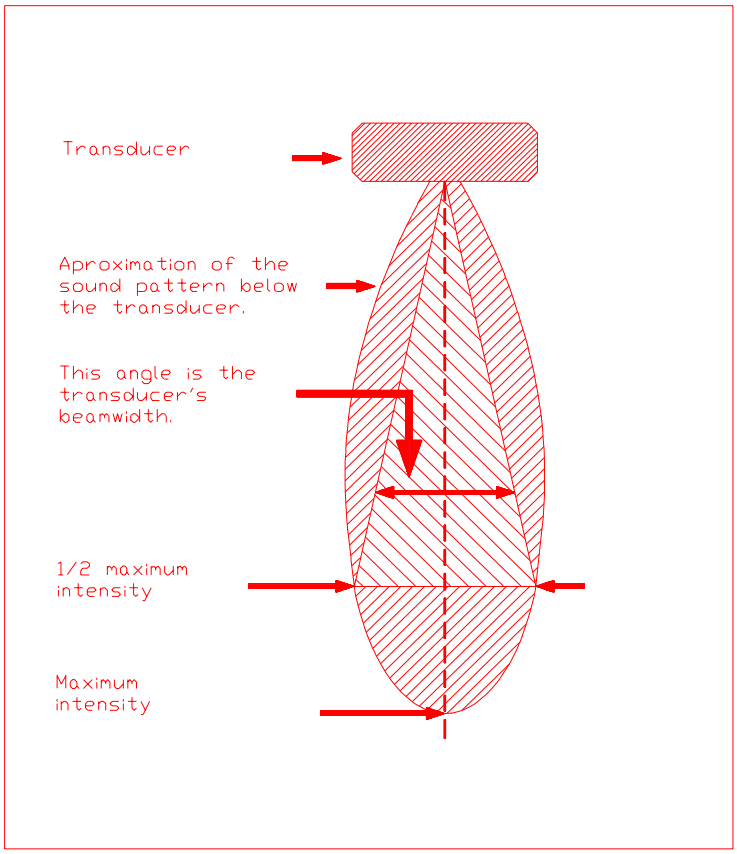


Figure 3.3 A representation of a transducer beamwidth

The center of the sound beam is the most intense, then as you move out towards the sides of the sound beam there is a point where the intensity of the sound is 1/2 what it was in the center. The distance moved is the "beamwidth". It is nothing more than a number telling you if your transducer is functioning more as a spotlight (a narrow beamwidth) or as a floodlight (a wide beamwidth) See figure 3.3

A narrow beamwidth transducer will do a better job of showing two separate fish schools that are close to each other (see figure 3.4), whereas a wider beamwidth will tend to show them as one large school (see figure 3.5). Since a narrow beamwidth transducer focuses the sound better, it is usually capable of seeing deeper targets than the wider beamwidth transducer.

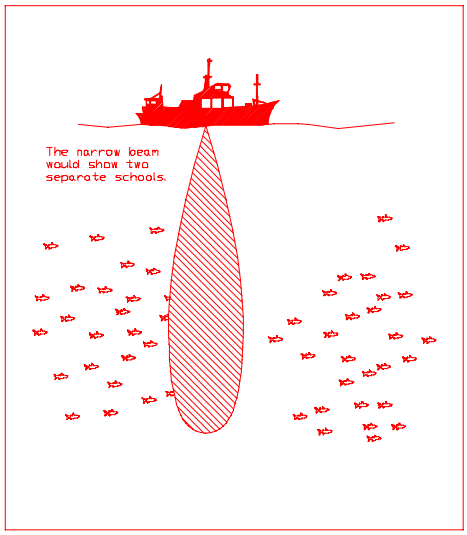


Figure 3.4 A narrow beam transducer.

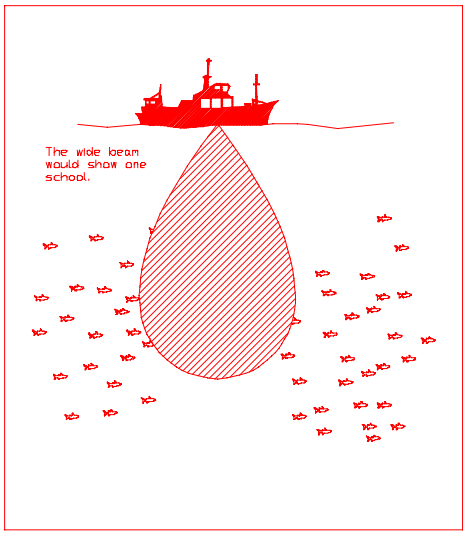


Figure 3.5 A wide beam transducer

However, narrow beamwidth transducers have drawbacks too. As a vessel rolls, the sound beam swings back and forth, and can occasionally be pointing too far to port or starboard to see a small target clearly. The choice of transducer beamwidth is always a compromise. See 3.6

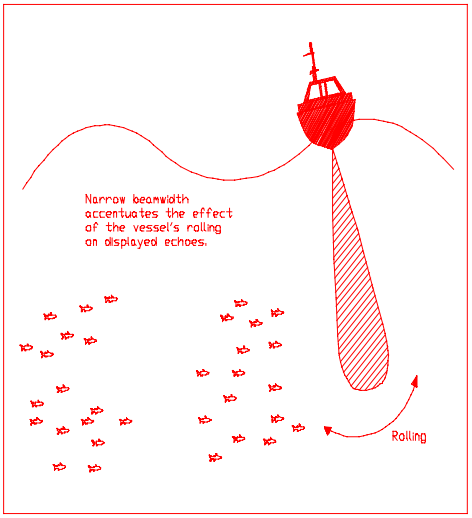


Figure 3.6 Effects of a vessel rolling with a narrow beam transducer.

3.4 CHOICE OF FREQUENCY

Your EQ-55 has two built-in frequencies. The lower frequency is most useful for work in deep water. The high frequency will not usually be able to see as deep as the lower frequency, but the higher frequency is best for seeing small targets and greater detail. For example, looking for small bait fish is best done with the high frequency. The operations section of this manual will show how to choose the frequency displays you need. See Figure 3.7

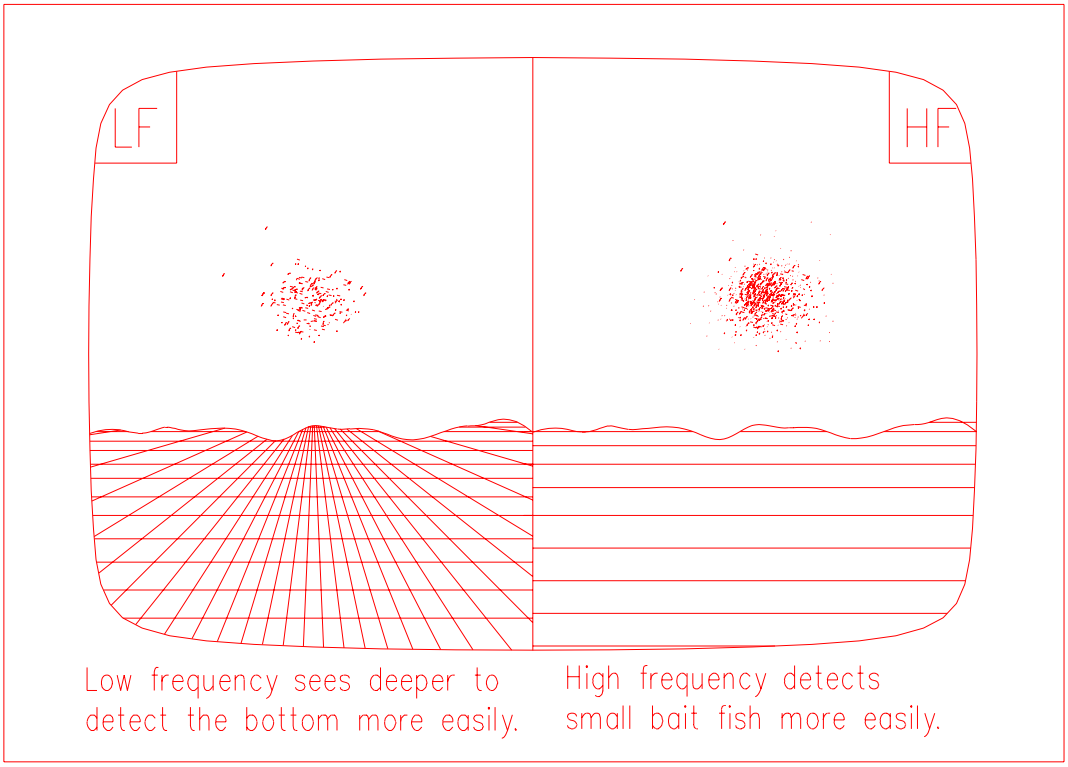


Figure 3.7 - A representation of low frequency versus high frequency.

3.5 EFFECTS OF THE VESSEL'S SPEED

The display of fish on the EQ-55 depends directly on the vessel's speed, as well as on the depth of the fish. When the vessel is at rest, the echo traces will appear stretched out and flattened. As the vessel's speed becomes greater, the echo traces will become shorter and more arched. The reason for this change in

appearance is that the vessel's speed increases, fewer number of sound "pings" strike each fish A low vessel speed will provide the most accurate information of where fish are located. See figure 3.8

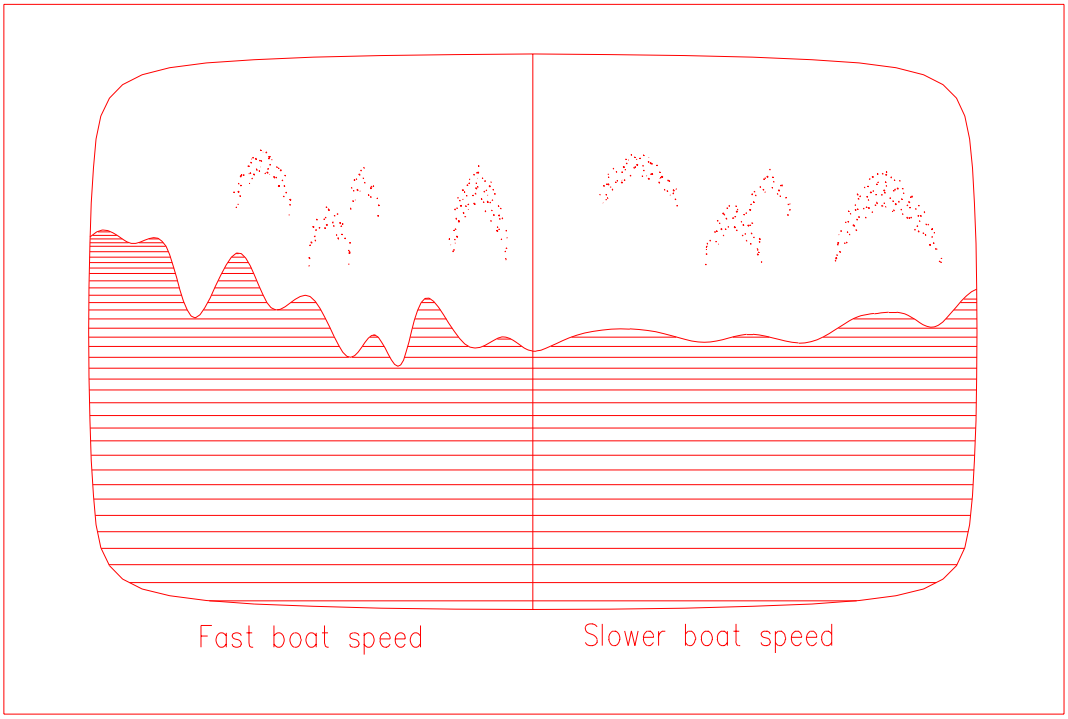


Figure 3.8 - A representation of the effects of vessel speed on the displayed echoes.

PART 4

INSTALLATION INSTRUCTIONS FOR THE EQ-55

4. INSTALLATION INSTRUCTIONS FOR THE EQ 55. ..... 4.3

4.1 BASIC INFORMATION 4.3
4.1.1 Power Supply Requirements for Installation.....4.3
4.1.2 Cable and Transducer Information 4.3

4.2 TRANSDUCERS AND SPEED/TEMPERATURE SENSORS 4.4
4.2.1 EQ 55 High Performance 200 kHz Transducer 4.5
4.2.2 EQ 55 Standard Performance Transducers 4.6
4.2.3 EQ 55 Standard Performance Transducers, 50 kHz and 50/200 kHz.4.7
4.2.4 EQ 55 Standard Performance Transducers, 200 kHz.....4.8
4.2.5 EQ 55 High Performance Transducers, 50 and 38 kHz.....4.9
4.2.6 Speed/Temperature Sensor.....4.10

4.3 DETERMINING THE POSITION FOR THE TRANSDUCER.....4.11
4.3.1 General.....4.11
4.3.2 Go Deep 4.11
4.3.3 The Boundary Water Layer 4.11
4.3.4 Propeller Noise.....4.12
4.3.5 Vessel Heave 4.13
4.3.6 Noise From Protruding Objects on the Hull 4.13
4.3.7 Summing up on Transducer Location 4.13
4.3.8 Thru-hull Installation.....4.14
4.3.9 EQ 55 Standard Transducer Mounted to Wood or Fiberglass Hull ..4.15
4.3.10 EQ 55 Standard Transducer Mounted to Wood or Fiberglass Hull.4.17
4.3.11 Adapter plate for EQ 55 Standard Transducer Mounted to a Steel Hull.....4.18
4.3.12 EQ 55 Standard Transducer Mounted to a Steel Hull. 4.19
4.3.13 EQ 55 Standard Transducer Mounted to a Steel Hull. 4.20
4.3.14 Steel Stuffing Tube for EQ 55 Standard Transducer. 4.21

4.4 DISPLAY UNIT INSTALLATION.....4.22
4.4.1 EQ 55 Dimensions.....4.23
4.4.2 EQ 55 Mounting Bracket Hole Pattern (option) 4.24

4.5 ELECTRICAL CONNECTIONS 4.25
4.5.1 Power Supply Connections 4.25
4.5.2 Fuse 4.25
4.5.3 Cabinet Grounding 4.26
4.5.4 Rear Panel Receptacles 4.26
4.5.5 Speed and Temperature Sensor Connections 4.26
4.5.6 NMEA 0183 Interface Connections 4.26
4.5.7 Color Printer Connection 4.26
4.5.8 Location of Fuse and Rear Panel Receptacles 4.27
4.5.9 Transducer Connectors (European) 4.28
4.5.10 Transducer Connectors (North American) 4.29
4.5.11 Speed Temperature Connectors 4.30
4.5.12 NMEA Connectors 4.31

4.6 MOUNTING BRACKET ASSEMBLY DRAWING 4.32

4.7 OUTLINE & INSTALLATION DRAWING - EQ55 ECHO SOUNDER 4.33

4.8 OUTLINE & INSTALLATION DRAWING - EQ55SA ECHO SOUNDER 4.34

4. INSTALLATION INSTRUCTIONS FOR THE EQ 55.

4.1 BASIC INFORMATION

4.1.1 Power Supply Requirements for Installation

The system will operate at either 115 or 230 VAC, at a frequency of 50 or 60 Hz. The power input connector contains two fuses each rated at 2 amperes. To remove or replace the fuses, pry the cover off the connector using a small screwdriver. The AC voltage selection is done manually. To change this voltage, the selector card inside the line filter has to be placed in the correct position. See figure

4.1.2 Cable and Transducer Information

The installation should be carefully planned in advance, keeping in mind the standard cable length of 32 feet (10 meters) which will be connected to each transducer. In the event where the standard cable is not long enough, up to an additional 32 feet (10 meters) may be connected without affecting the performance of the transducer. The cable must be of the same type as the standard two core shielded cable. Coaxial cable must not be used.

The use of longer cable runs, while possible, always increases the likelihood of increased interference and decreased performance. Care must be taken when increasing the cable lengths to ensure that proper, adequate and consistent shielding is maintained, that cable of adequate cross section is used, and that all connections are properly made and protected from the effects of the marine environment.

If possible, running the transducer cable through a grounded conduit will greatly decrease the likelihood of interference. Likewise, the EQ 55 transducer cable should be run as far as possible from other electrical cabling. If it is absolutely necessary to pass close to other cabling, it is best to keep as much distance as possible, and to make all crossings as close to a right angle as possible.

The EQ 55's transmitter is designed to match the following transducers: (see Section 4.1.3 on the next page).

4.2 TRANSDUCERS AND SPEED/TEMPERATURE SENSORS

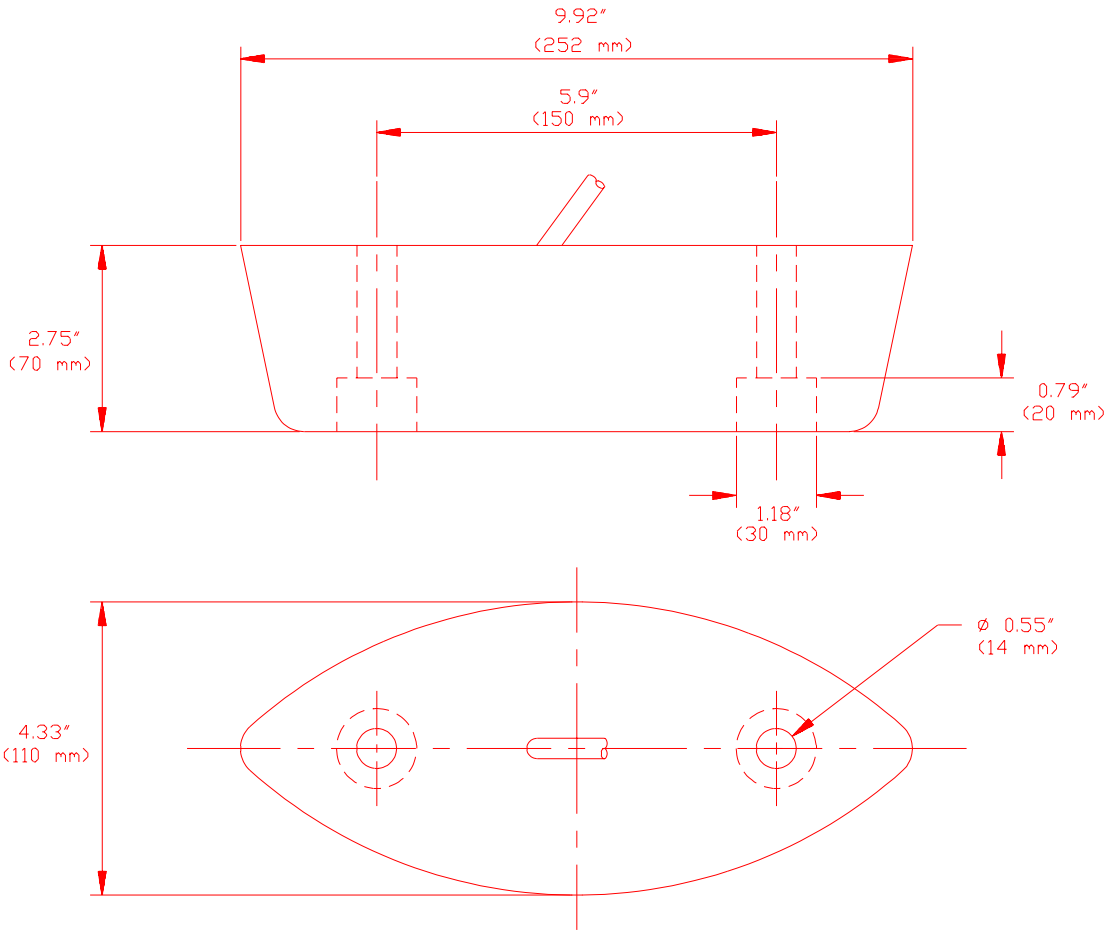
Standard Transducers (includes temperature transducer)			
Reference No.	**Frequency**	**Beamwidth**	**Housing**
312-105452	38 kHz	11° x 18°	Resin
312-105451	50 kHz	14°	Resin
312-105450	200 kHz	6.5°	Resin
312-105453	50/200 kHz	16°/6.5°	Resin

High Performance Transducers (does not include temperature transducer)			
Reference No.	**Frequency**	**Beamwidth**	**Housing**
191600	38 kHz	12° x 20°	Resin
193600	50 kHz	10° x 17°	Resin
KSV-065414	200 kHz	7°	Resin

Speed and Temperature Sensor	
Reference No.	**Description**
303-105606	Speed and temperature sensor (combined in bronze thru-hull case)

4.2.1 EQ 55 High Performance 200 kHz Transducer

Reference number: KVS-065414 (200-7-F)

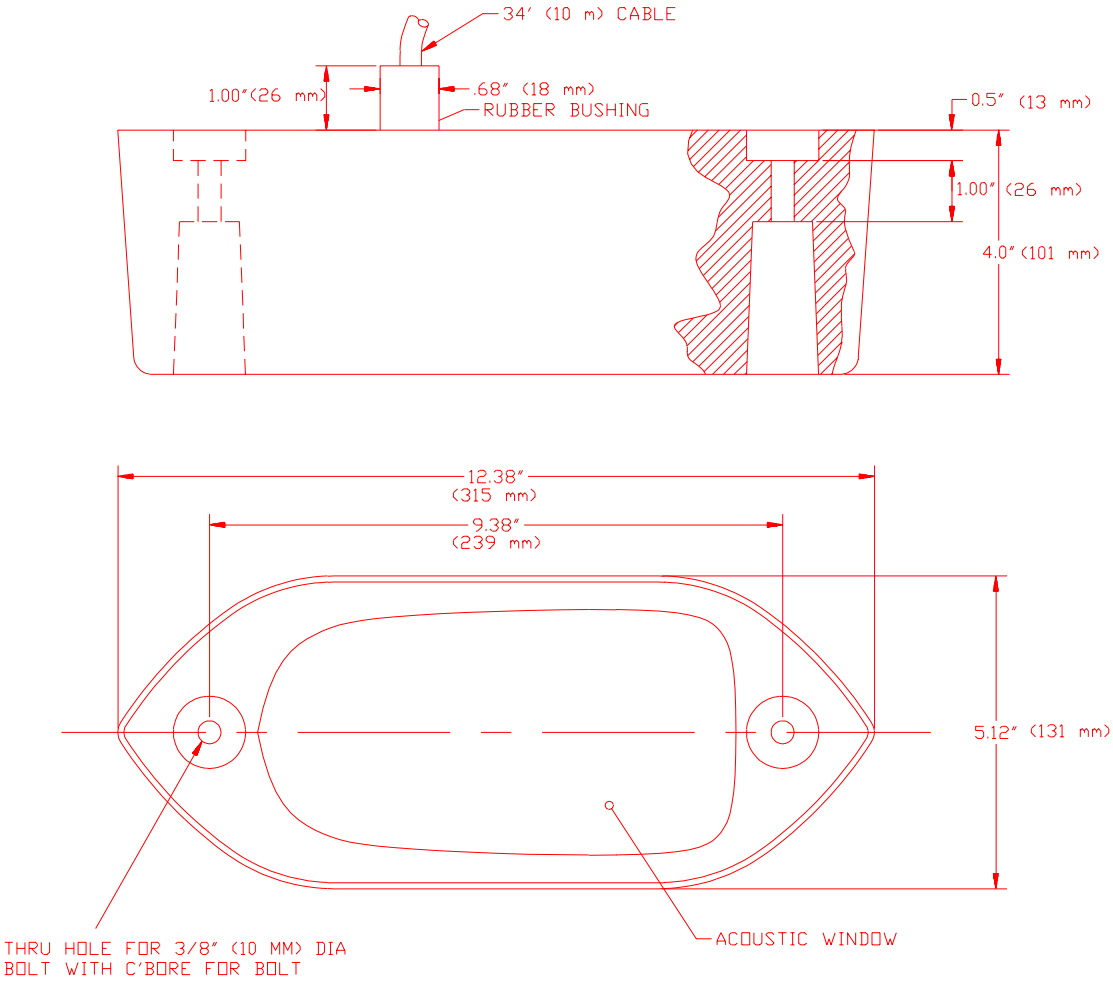


EQ 55 High Performance 200 kHz Transducer Wire Color Code

Transducer:	Black
Transducer:	Blue
Shield:	Bare

4.2.2 EQ 55 Standard Performance Transducers

Reference Numbers: 312-105452, AM-38

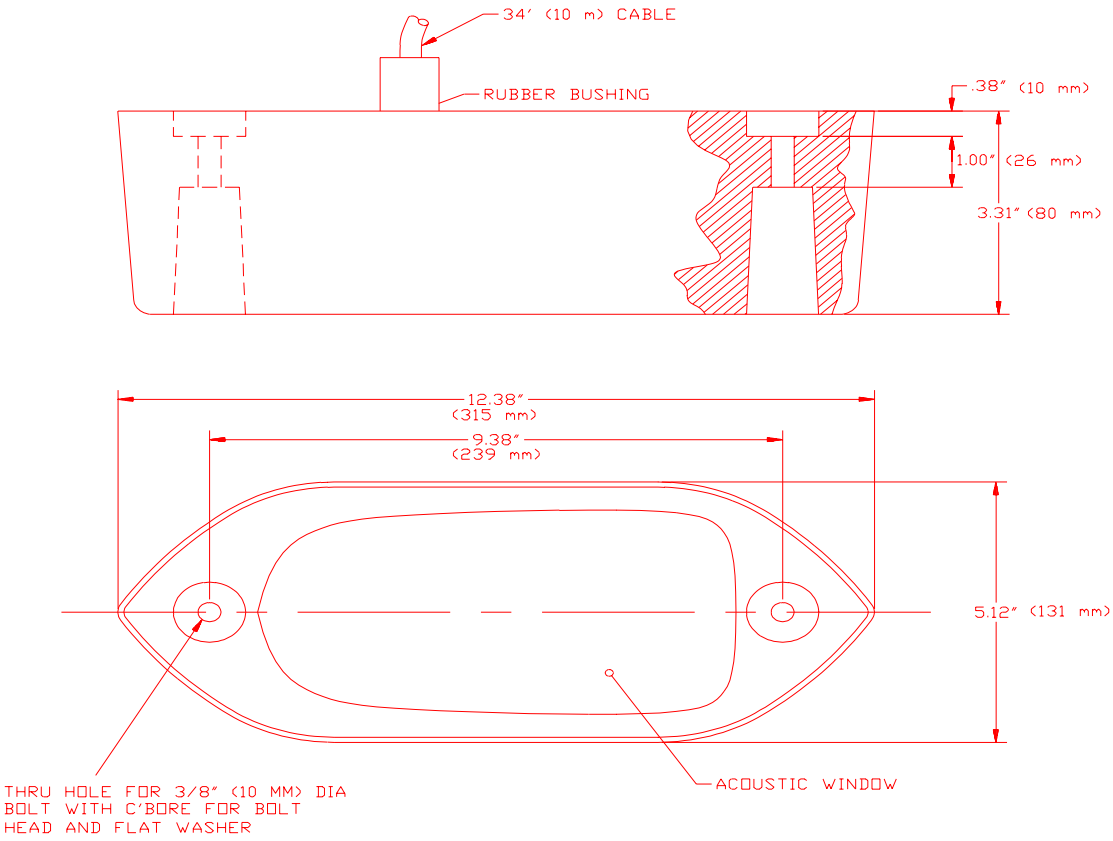


EQ 55 Standard Performance 38 kHz Transducer Wire Color Code

Transducer:	Black/White
Transducer:	Yellow
Shield:	Bare
Temperature:	Brown
Temperature:	White

4.2.3 EQ 55 Standard Performance Transducers, 50 kHz and 50/200 kHz

Reference Numbers: 312-105451, AM-50
312-105453, AM-50/200



EQ 55 Standard Performance 50/200 kHz Transducer Wire Color Code

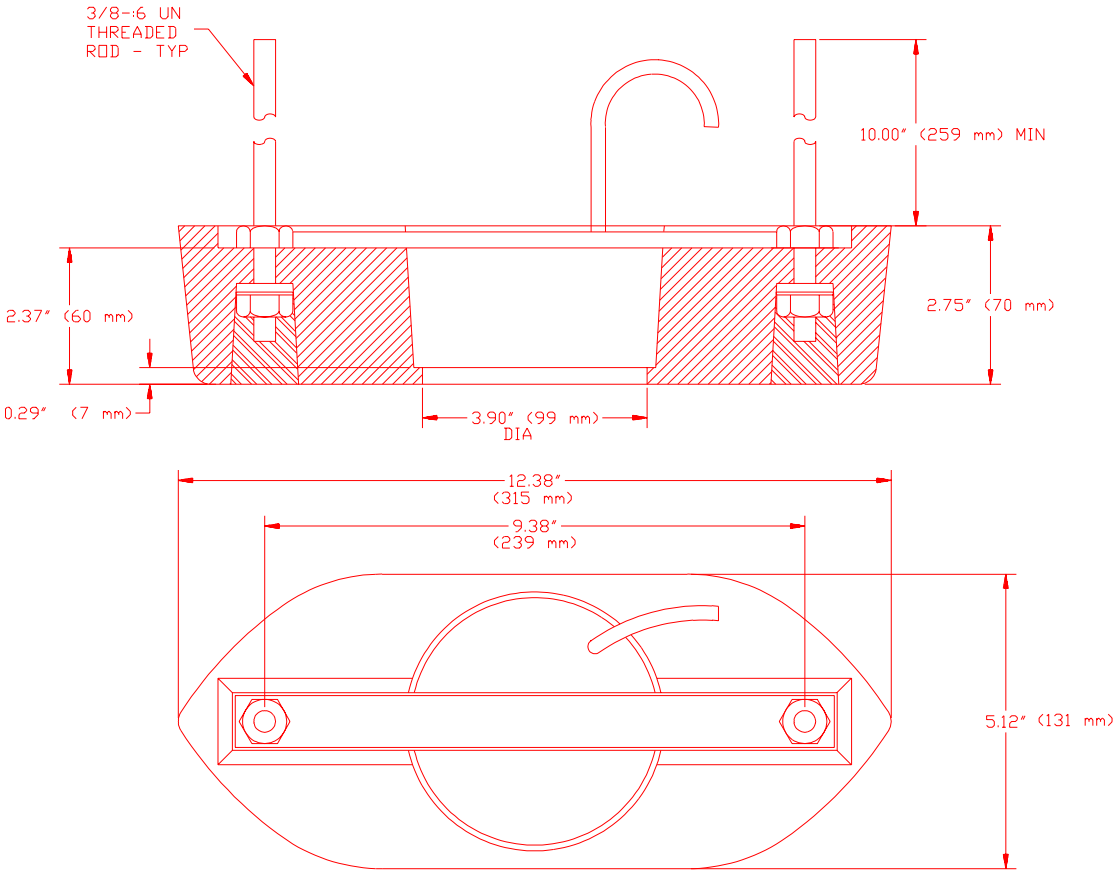
50 kHz	Transducer: Black/White
50 kHz	Transducer: Yellow
200 kHz	Transducer: Black
200 kHz	Transducer: Blue
Shield:	Bare
Temperature:	Brown
Temperature:	White

EQ 55 Standard Performance 50 kHz Transducer Wire Color Code

Transducer:	Black/White
Transducer:	Yellow
Shield:	Bare
Temperature:	Brown
Temperature:	White

4.2.4 EQ 55 Standard Performance Transducers, 200 kHz

Reference Number: 312-105450, AM-200

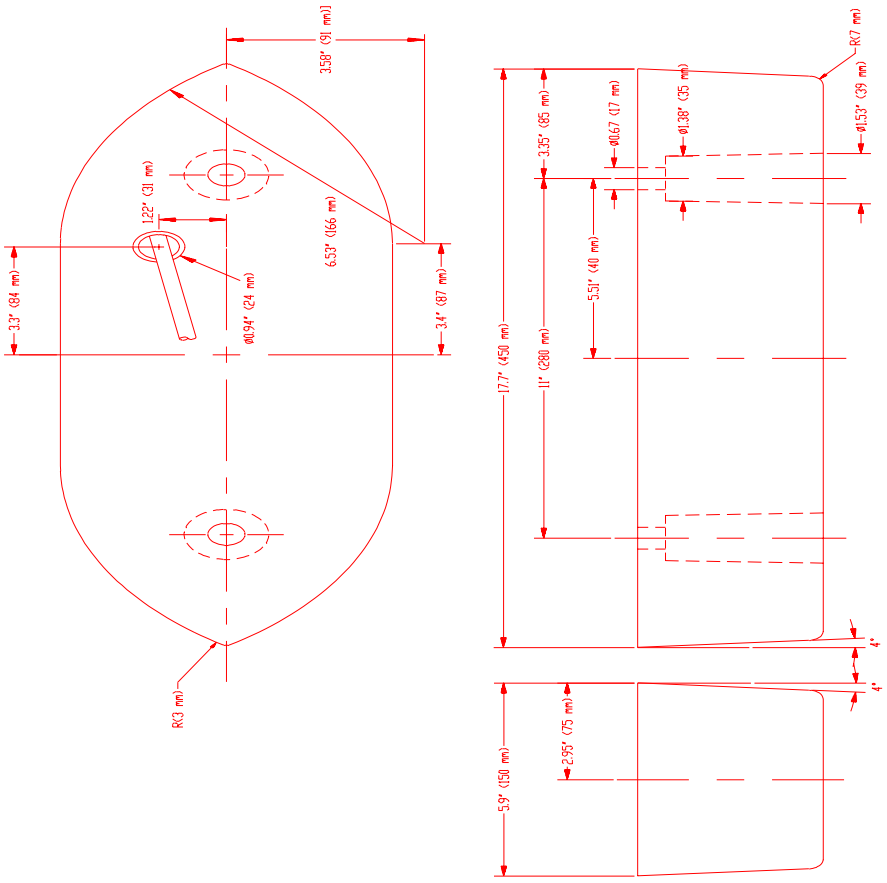


EQ 55 Standard Performance 200 kHz Transducer Wire Color Code

Transducer:	Black
Transducer:	Blue
Shield:	Bare
Temperature:	Brown
Temperature:	White

4.2.5 EQ 55 High Performance Transducers, 50 and 38 kHz

Reference Numbers: 193600
191600



EQ 55 High Performance 38 kHz Transducer Wire Color Code

Transducer: Black
Transducer: Blue
Shield: Bare

EQ 55 High Performance 50 kHz Transducer Wire Color Code

Transducer: Black
Transducer: Blue
Shield: Bare

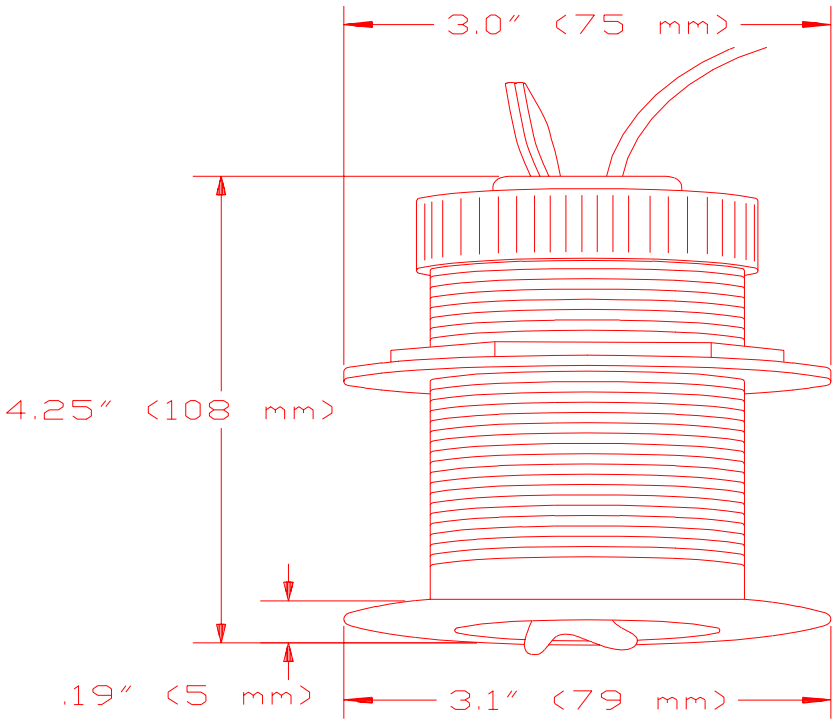
4.2.6 Speed/Temperature Sensor

Reference Number: 303-105606

EQ-55 Speed/Temperature Sensor

Housing and Nut Material	:Bronze, alloy CDA836
Plug Assembly	:Black polycarbonate
Hull Thickness	:1/4" to 2 1/8" (6.35 to 54 mm)
Required removal headroom	:4" (102 mm) minimum

Note: Use only mineral spirits based anti-fouling paints.



EQ 55 Speed/Temperature Sensor Wiring Color Codes

Positive Supply Voltage:	Red
Sensor Output Signal:	Yellow
Ground (Shield):	Bare
Temperature:	Brown
Temperature:	White

4.3 DETERMINING THE POSITION FOR THE TRANSDUCER

4.3.1 General

A single answer to the question where to locate the transducer cannot be given. It depends very much on the vessel's construction. However, there are some important guide lines.

4.3.2 Go Deep

The upper water layers of the sea contain myriads of small air bubbles created by the breaking waves. In heavy seas the uppermost 5-10 metres may be air-filled, with the highest concentrations near the surface. Air bubbles absorb and reflect the sound energy, and may in the worst cases block the sound transmission totally. Therefore, mount the transducer at a deep position on the hull.

Consider the situation when the vessel is unloaded, and when it is pitching in heavy seas. The transducer must never be lifted free of the water surface. Not only will the sound transmission be blocked, but the transducer may be damaged by slamming against the sea surface.

Another reason to go deep is cavitation in front of high power transducers. Cavitation is the formation of small bubbles in the water due to the resulting local pressure becoming negative during parts of the acoustic pressure cycles. The cavitation threshold increases with the hydrostatic pressure.

4.3.3 The Boundary Water Layer

When the vessel forces its way through the sea, the friction between the hull and the water creates a boundary layer. The thickness of the boundary layer depends upon vessel speed and the roughness of the hull. Objects protruding from the hull, and dents in the hull, disturb the flow and increase the thickness of the boundary layer. The flow in this boundary layer may be laminar or turbulent. A laminar flow is a nicely ordered, parallel movement of the water. A turbulent flow has a disorderly pattern, full of eddies. The boundary layer increases in thickness when the flow goes from laminar to turbulent. Figure 4.1 sketches the boundary layer of a vessel moving through the water.

Furthermore, air bubbles in the sea water are pressed down below the hull and

mixed into the boundary layer. The Boundary layer is thin underneath the forward part of the vessel, and increases in thickness as it moves aftwards. If the sides of the hull are steep, some of the air bubbles in the boundary layer may escape to the sea surface along the vessel sides. It is our experience that a wide and flat bottom, with a rising angle less than around 13 degrees, is prone to giving air problems for the transducer. In any case a transducer location in the forward part of the hull is preferred in order to minimize the influence of the boundary layer.

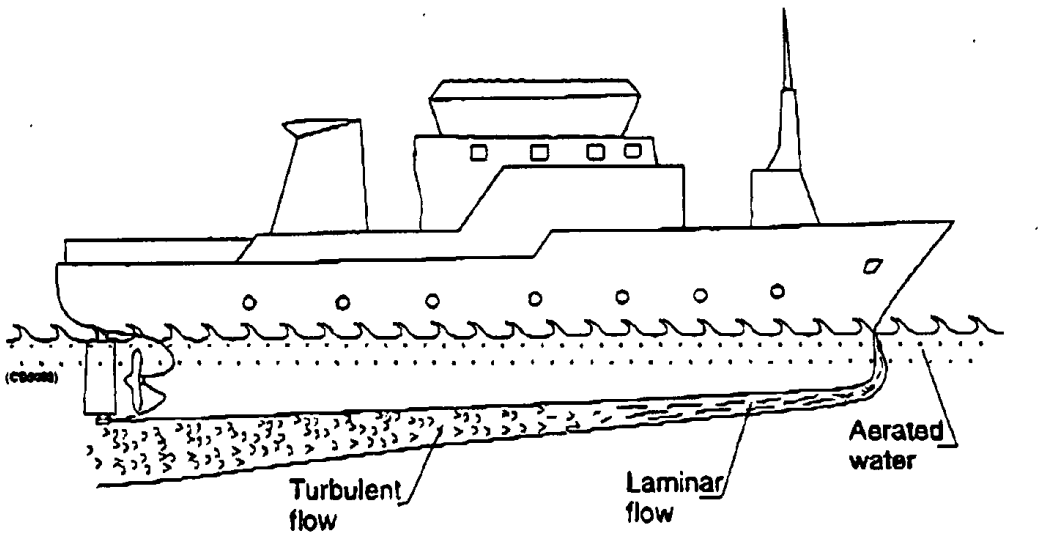


Figure 4.1 Sketch of the boundary layer underneath the vessel.

4.3.4 Propeller Noise

The propulsion propeller is the dominant noise source on most fishing vessels, research vessels, merchant vessels and pleasure crafts. The noise is transmitted through the sea water. Therefore, the transducer should be placed far away from the propeller, which means on the fore part of the hull. Positions outside the direct line of sight from the propeller are favourable. On small vessels with short distances it is advised to mount the transducer on that side of the keel where the propeller blades move upwards, because the propeller cavitation is strongest on the other side. The cavitation starts most easily when the water flows in the same direction as the propeller blade, and that is to some degree the case at that side of the keel where the propeller blades move downwards.

Bow thrusters are awful machines. When they are in operation, the noise and cavitation bubbles make the echo sounder useless, almost no matter where the transducer is installed. And when not in operation, the tunnel creates turbulence, and if the vessel is pitching, the tunnel may be filled with air or aerated water in the upper position and release this in the lower position. Therefore, an echo sounder transducer should be placed well away from the bow thruster.

4.3.5 Vessel Heave

Heave is the up and down movement of the vessel. It disturbs the echo traces in the echogram, so that a flat bottom is displayed as a wave. A transducer location in the middle of the vessel minimizes the influence of vessel roll and pitch.

4.3.6 Noise From Protruding Objects on the Hull

Objects protruding from the hull, such as zinc anodes, sonar transducers or even the vessel's keel, generate turbulence and flow noise. Also holes and pipe outlets are noise sources. They may act as resonant cavities amplifying the flow noise at certain frequencies. Do not place an echo sounder transducer in the vicinity of such objects, and especially not close behind them.

4.3.7 Summing up on Transducer Location

Some of the above guide lines are conflicting, and each case has to be treated individually in order to find the best compromise. Generally the propeller noise is the dominant factor, and a recommended transducer location is in the fore part of the hull, with maximum distance from the bow equal to one third of the total length of the hull at the water line, see Figure 4.2. If the vessel hull has a bulbous bow, this may well be a good transducer location, but also here must be taken into consideration the flow pattern of the aerated water. Often the foremost part of the bulb is preferable as shown in Figure 4.3.

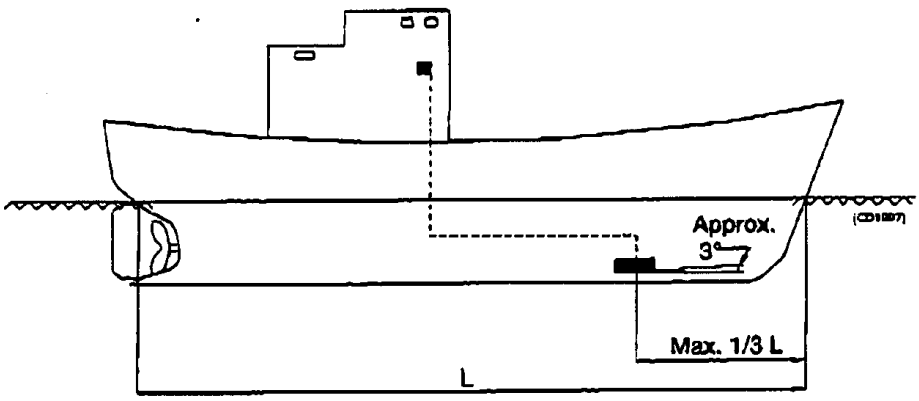


Figure 4.2 Recommended location of the transducer on the hull

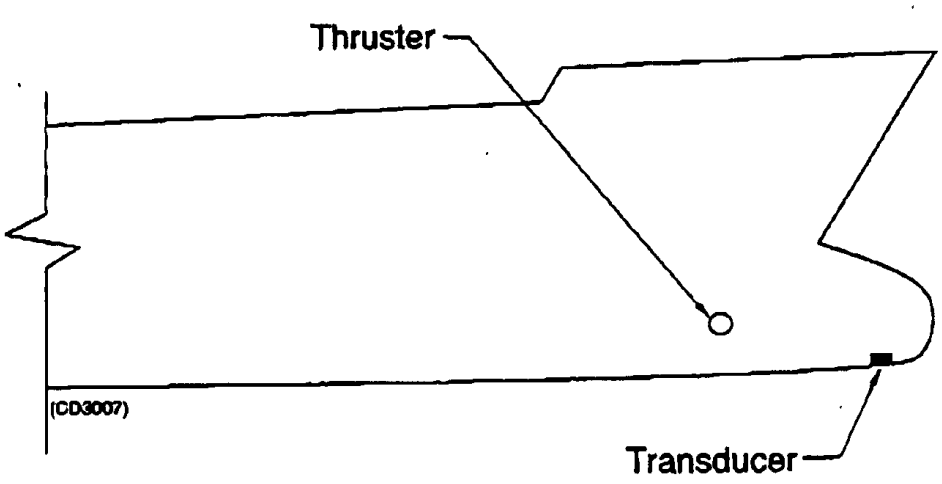


Figure 4.3 Transducer location on a bulbous bow

4.3.8 Thru-hull Installation

Typical thru-hull installations are illustrated for transducers on the following pages. The leveling blocks shown are to be supplied by the installer. Any gaps between the block and the transducer should be filled up with mastic and the entire surface should be made as smooth as possible to provide an undisturbed flow of water over the transducer face.

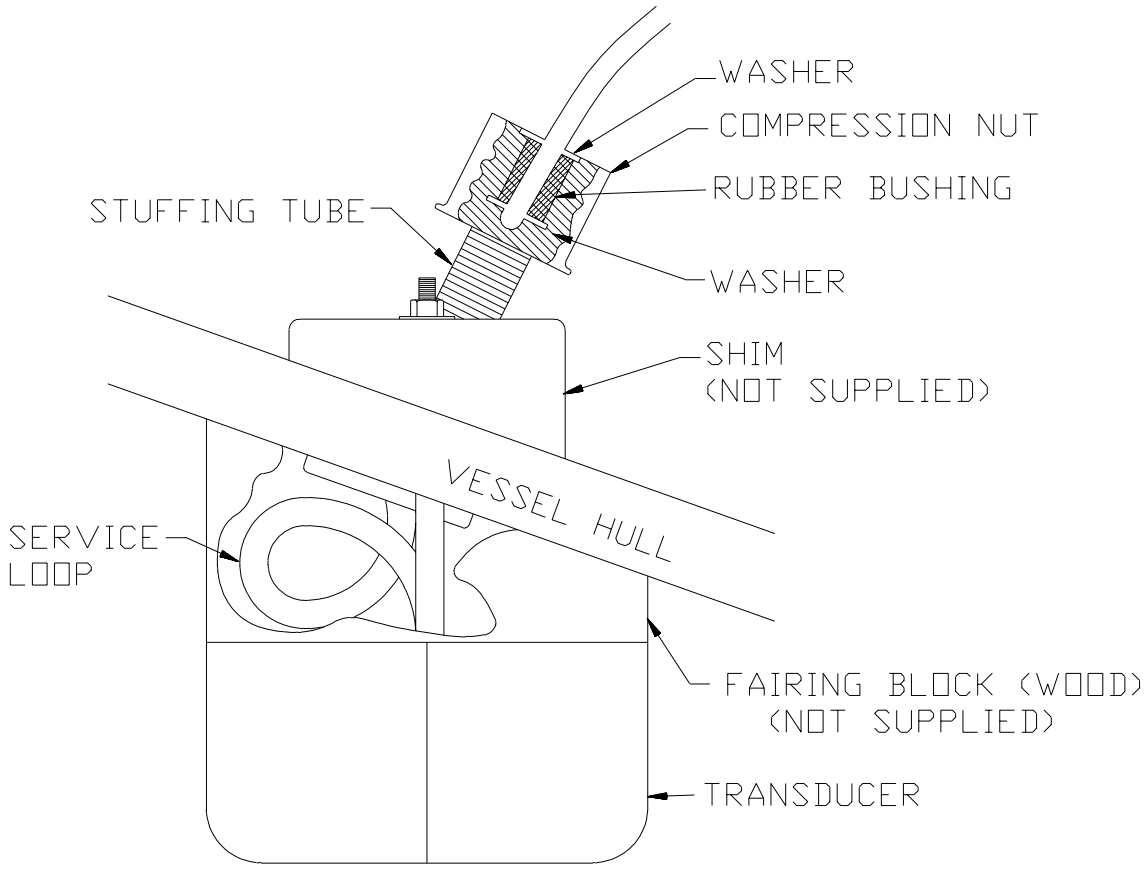
To ensure a watertight installation, apply a liberal amount of high quality sealing compound inside the mounting holes and around any hardware that penetrates the hull.

The stuffing tube and the transducer housings may be painted with anti-fouling paint.

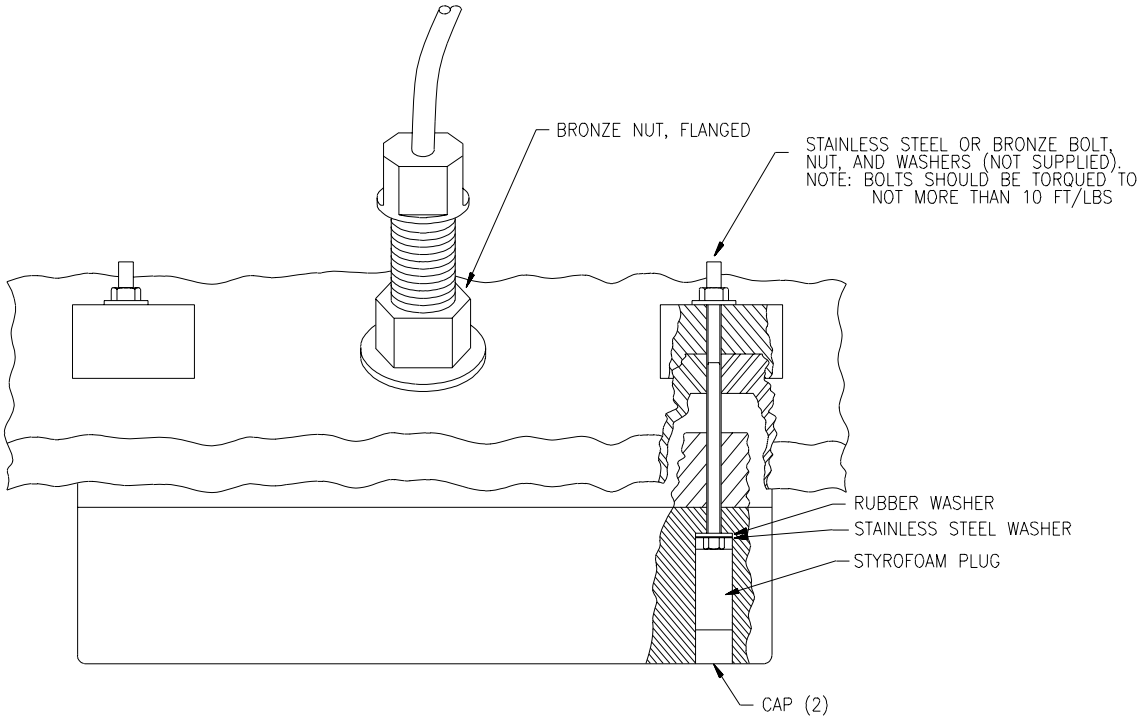
CAUTION: The face of the transducer should be left unpainted or decreased performance will result Do not allow solvents to come into contact with the transducer face.

Steel stuffing tubes are available for use on steel vessels. Note that bronze stuffing tubes should not be used on aluminum hulls.

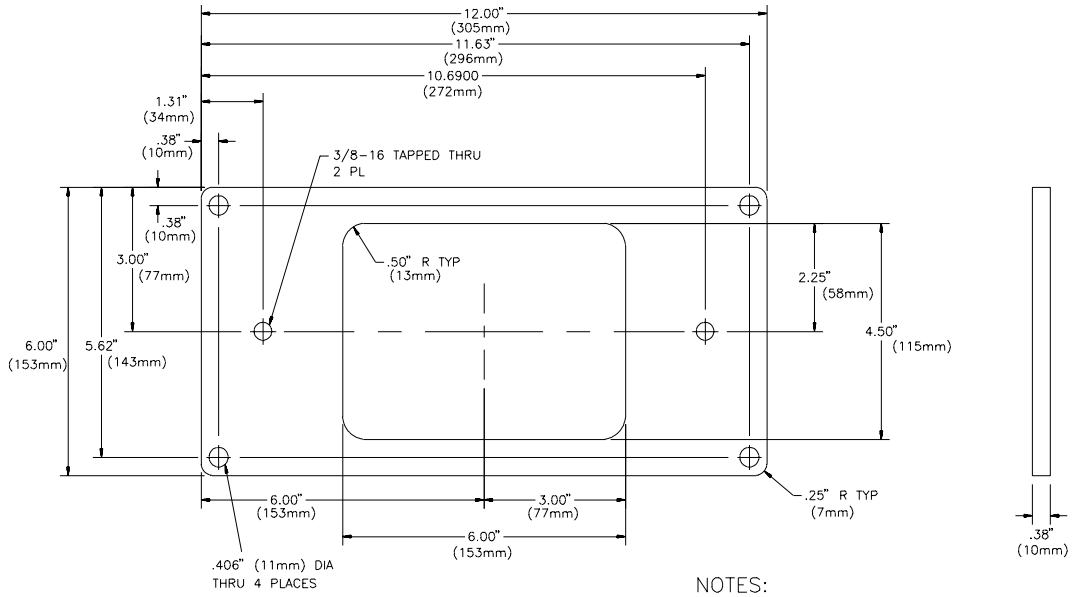
4.3.9 EQ 55 Standard Transducer Mounted to Wood or Fiberglass Hull


WASHER
COMPRESSION NUT
RUBBER BUSHING
STUFFING TUBE
WASHER
SHIM
(NOT SUPPLIED)
VESSEL HULL
SERVICE
LOOP
FAIRING BLOCK (WOOD)
(NOT SUPPLIED)
TRANSDUCER

4.3.10 EQ 55 Standard Transducer Mounted to Wood or Fiberglass Hull.

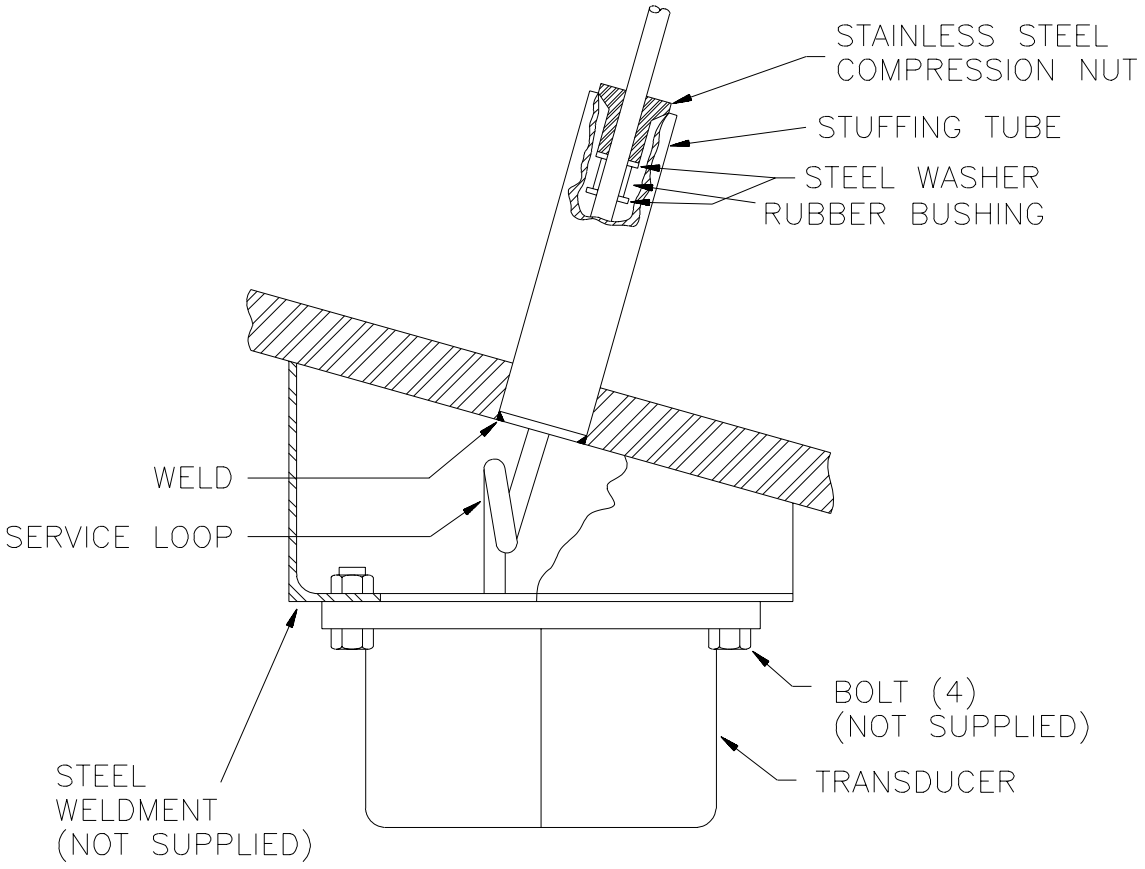


4.3.11 Adapter plate for EQ 55 Standard Transducer Mounted to a Steel Hull.

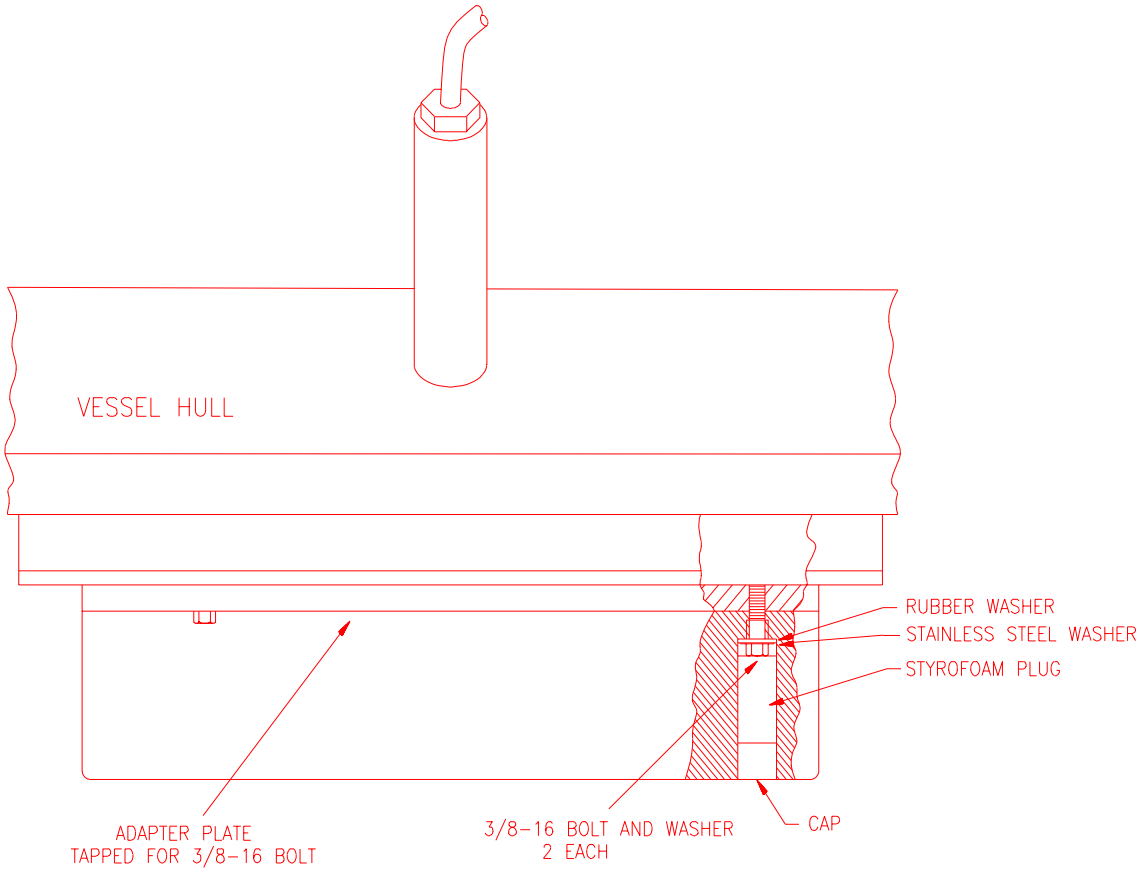


NOTES:
1. MATERIAL : HOT ROLLED STEEL
2. TOLERANCES : 2-PL DEC ± .015
3-PL DEC ± .010
3. FINISH : RED OXIDE PRIMER

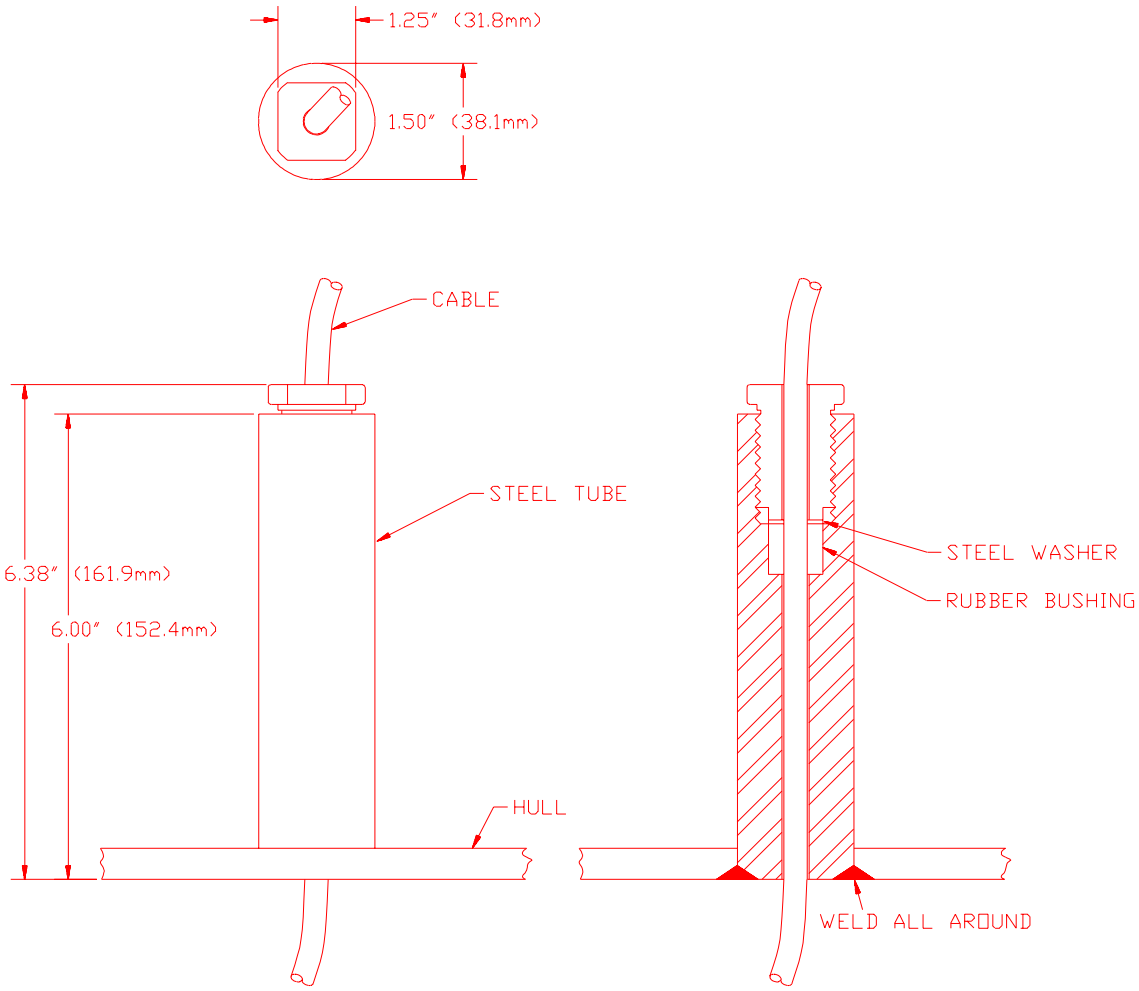
4.3.12 EQ 55 Standard Transducer Mounted to a Steel Hull.



4.3.13 EQ 55 Standard Transducer Mounted to a Steel Hull.



4.3.14 Steel Stuffing Tube for EQ 55 Standard Transducer.



4.4 DISPLAY UNIT INSTALLATION

The display unit is designed to function normally on a continuous basis in the high humidity of a marine environment. However, to ensure the long term performance and reliability of the display unit, it should be installed in a dry, **well ventilated** location. Avoid installation in areas where heavy shocks or vibrations are expected or where the unit will be exposed to high temperatures.

Using the mounting bracket the EQ 55 Display Unit may be "table top" mounted (see Figure 4.14) or the EQ 55 may be mounted to the ceiling

The EQ 55 may also be recess mounted into a control console and rack mounted.

Be sure that there is no tension applied to the cabling when the installation is complete.

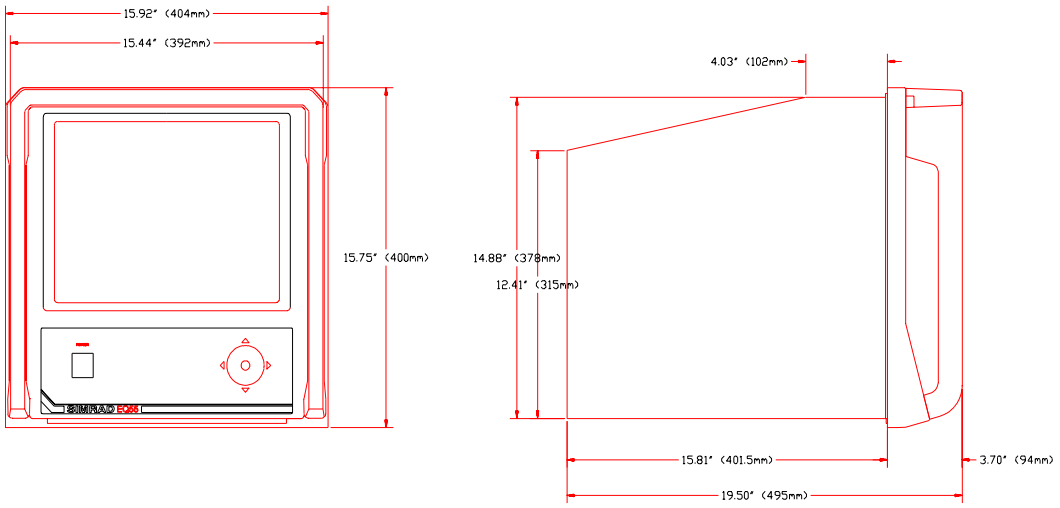
Choose a mounting surface that is strong enough to support the cabinet weight (60 pounds/27 kg) under extreme operating conditions. Reinforce the mounting surface if necessary.

Provide sufficient clearance around the cabinet to allow free circulation of air and to gain access to the connectors and fuse. Do not block the sides, bottom or rear panel of the cabinet or overheating will occur.

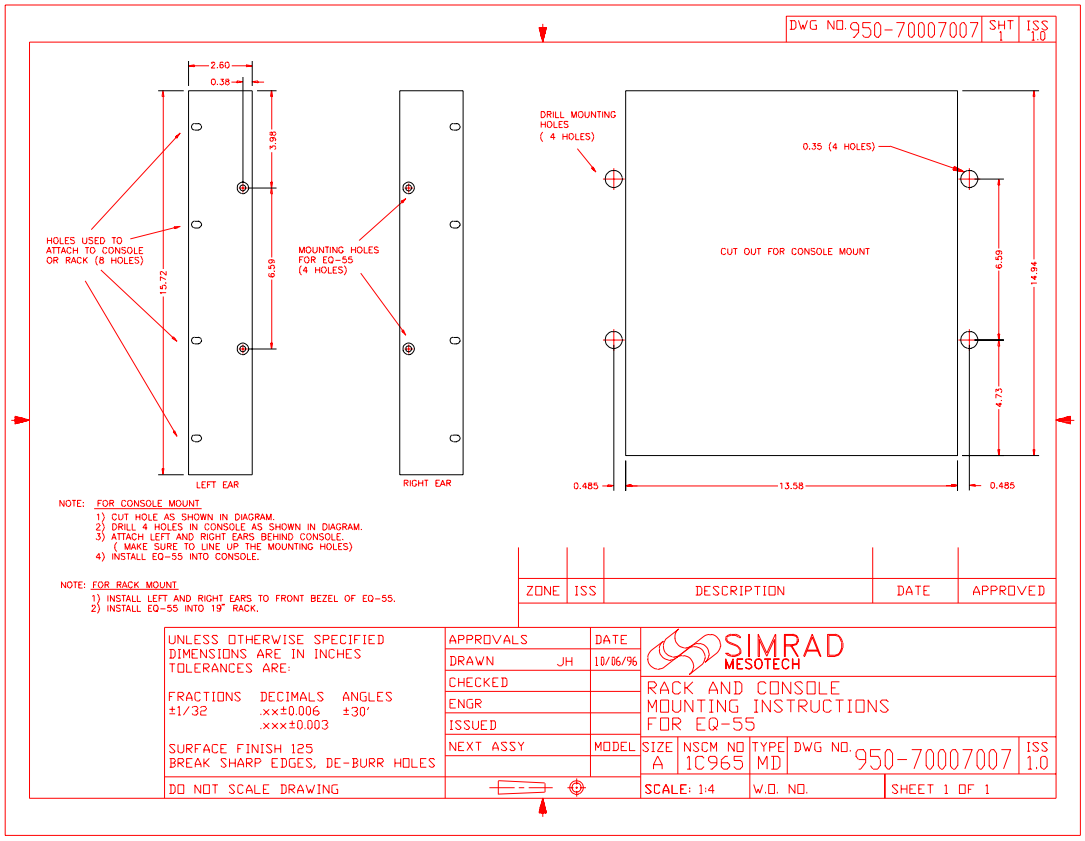
The display unit can be mounted on a table top, bulkhead or over head by using the supplied mounting bracket. See mounting hole pattern drawing, Figure 4.15.

WARNING: CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY SIMRAD MESOTECH LTD MAY VOID YOUR WARRANTY AND MAY CAUSE INCREASED RADIO FREQUENCY EMISSIONS. THE EQ 55 IS A SOPHISTICATED PIECE OF ELECTRONIC EQUIPMENT, DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH GOOD ENGINEERING PRACTICES. IT SHOULD BE REALIZED, HOWEVER, THAT THE POSSIBILITY OF INTERFERENCE WITH OTHER EQUIPMENT, PARTICULARLY COMMUNICATIONS EQUIPMENT, EXISTS. CAREFUL ATTENTION TO CABLING, ADEQUATE SEPARATION AND SHIELDING IS REQUIRED DURING AND AFTER INSTALLATION TO ENSURE BEST RESULTS.

4.4.1 EQ 55 Dimensions



4.4.2 EQ 55 Mounting Bracket Hole Pattern (option)



4.5 ELECTRICAL CONNECTIONS

4.5.1 Power Supply Connections

Refer to Section 4.5.8 for the location of rear panel receptacles and fuse holder.

4.5.2 Fuse

Refer to Section 4.5.8 for the location of rear panel receptacles and fuse holder.

WARNING: USING A FUSE WHICH IS NOT SPECIFIED FOR YOUR EQUIPMENT CAN CAUSE IT TO BLOW THE INSTANT THE EQ 55 HAS BEEN SWITCHED ON OR IT WILL NOT PROTECT THE EQUIPMENT IN THE EVENT OF TROUBLE.

Transducer Connections
A three prong female plug is supplied for connection between the transducer and the display cabinet. Refer to Figures 4.17 and 4.18 for assembly of the plug. Take care not to lose the small screws.

Reassemble the plug, tightening the screws firmly. Both transducer receptacles are wired for both HI and LOW frequencies, so careful attention should be paid to the correct pin numbers. Push the plug, as far as it goes, into the three pin receptacle marked "TRANSDUCER", and turn the coupling ring on the plug clockwise till it stops. This completes the transducer connections to the display cabinet.

WARNING: THE EQ 55 MUST NOT BE TURNED ON WITH THE TRANSDUCER OUT OF THE WATER OR SERIOUS DAMAGE TO THE TRANSDUCER WILL OCCUR.

4.5.3 Cabinet Grounding

If you wish to ground the display cabinet, run a wire from the terminal on the rear panel to the nearest grounding point. Use a wire as thick and as short as possible to make the grounding effective.

4.5.4 Rear Panel Receptacles

Refer to Section 4.5.8 for the location of rear panel receptacles and fuse holder.

4.5.5 Speed and Temperature Sensor Connections

Refer to Figures 4.6 and 4.19 for information on wiring speed and/or temperature sensors to the EQ-55 connectors.

> ***Note:*** *In the case where a combined speed/temperature sensor is connected, the cabling must be routed to two connectors.*
>
> ***Note:*** *If you are utilizing a speed log with dry closure (relay) output, such as the SIMRAD NL Speed Log, be advised that it is necessary to re-configure one jumper on the EQ 55 CPU circuit board. Please consult your SIMRAD Service Center for details.*

4.5.6 NMEA 0183 Interface Connections

NMEA 0183 connections are made to the NMEA connectors of the EQ 55's rear panel. Connections Connection A is the signal from the "talker" and B is the return to the "talker."

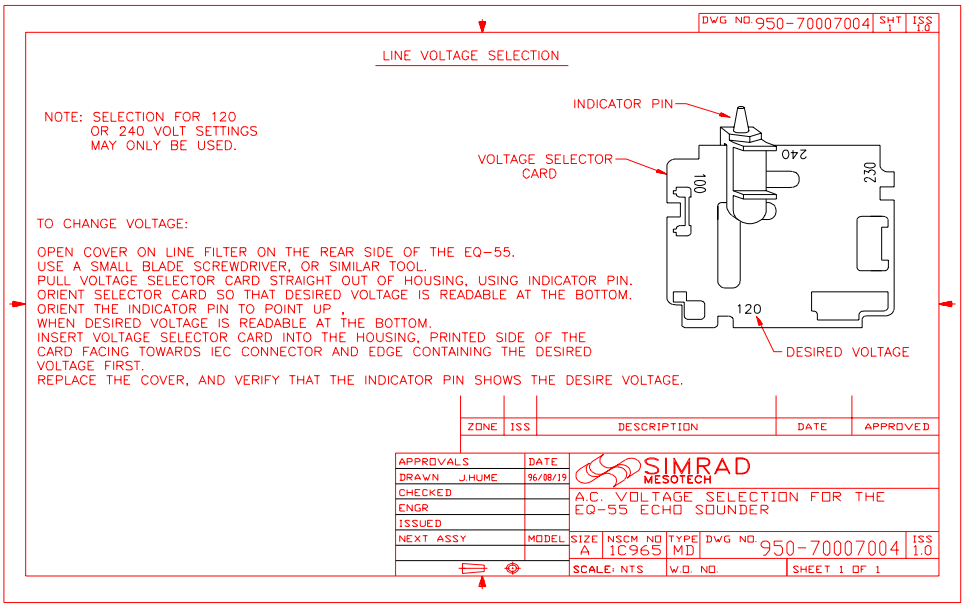
Connections TX and GND are output from the EQ-55. These are used when the EQ-55 is the "talker" and another device is the "listener." (***See section 4.5.12 for wiring information).***

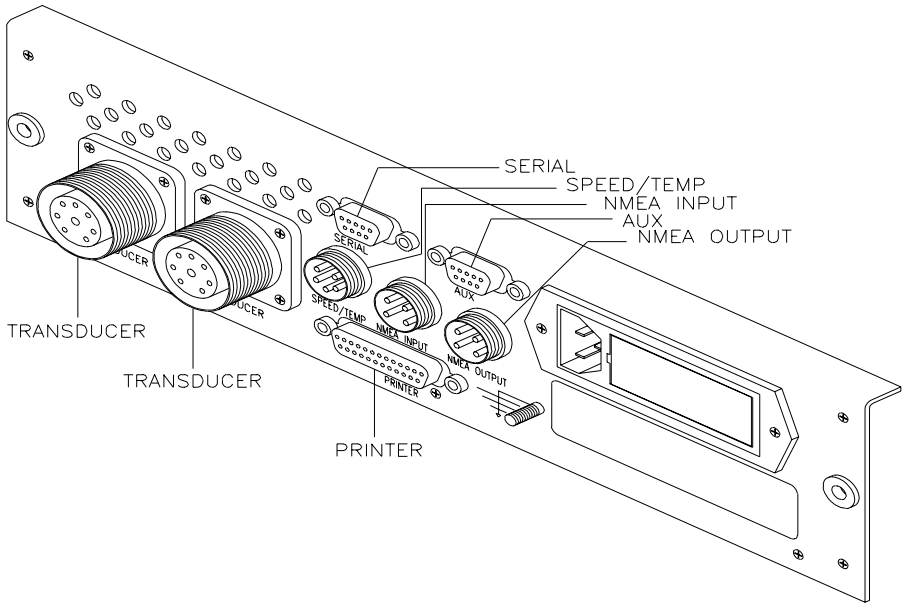
4.5.7 Color Printer Connection

Interface to an H. P. Paintjet printer is through the use of a standard parallel printer interface cable (max. recommended length 4 m (12 feet)). The printer cable is the same type as that used with many personal computers.

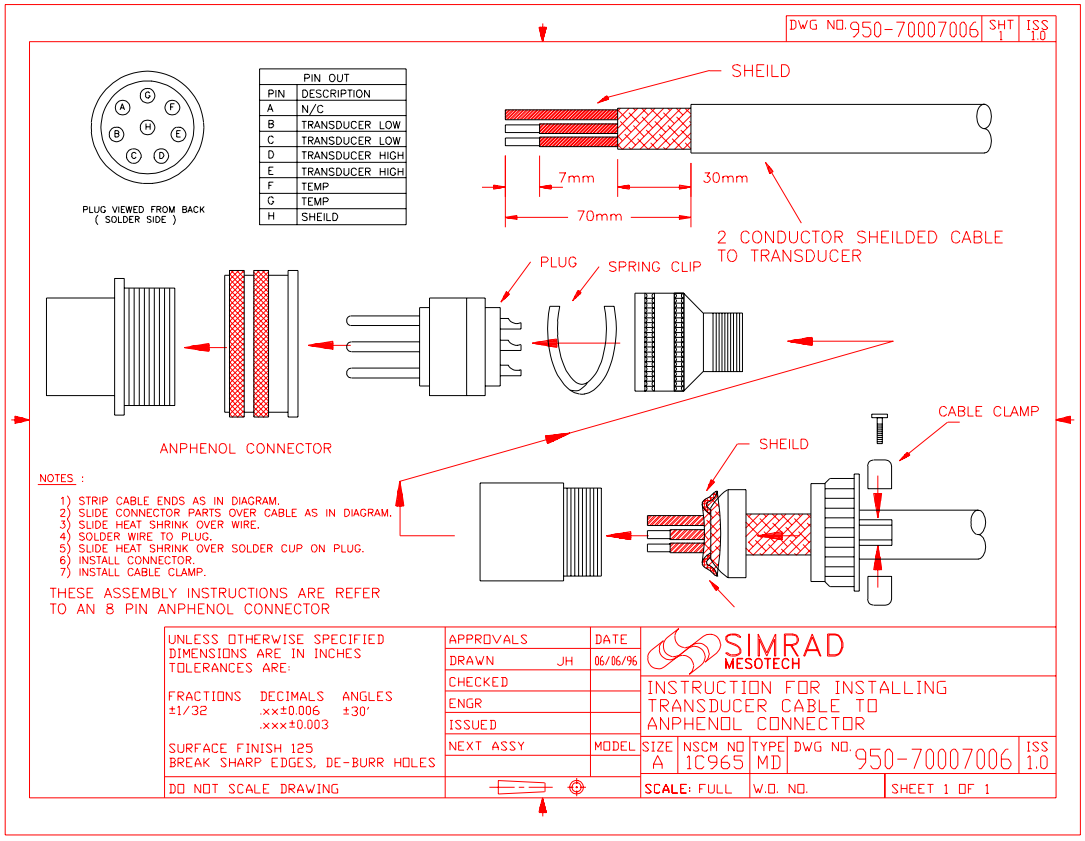
Both the EQ 55 and the printer should be OFF when the cables are connected.

4.5.8 Location of Fuse and Rear Panel Receptacles

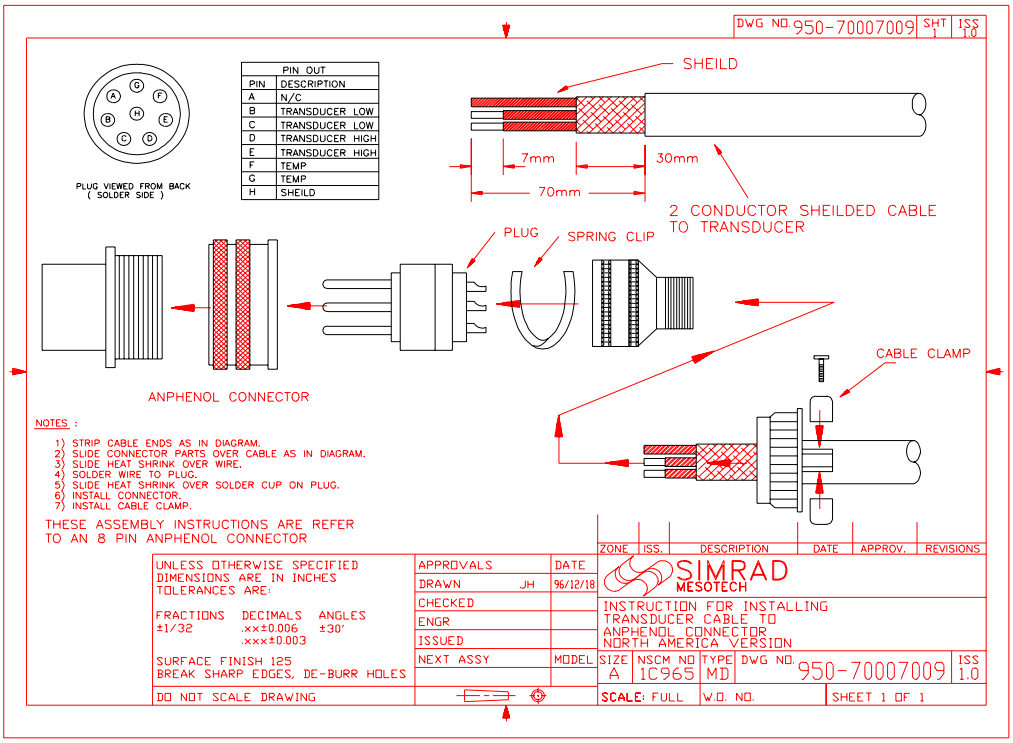




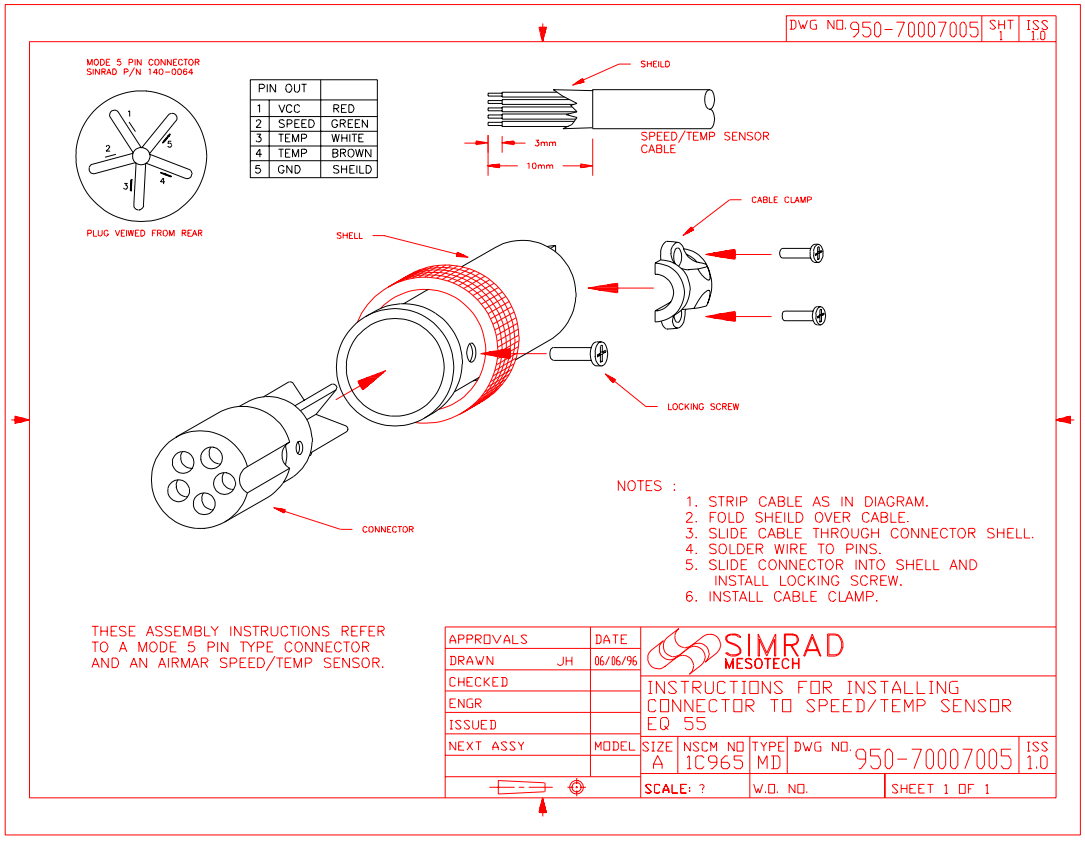
4.5.9 Transducer Connectors (European)



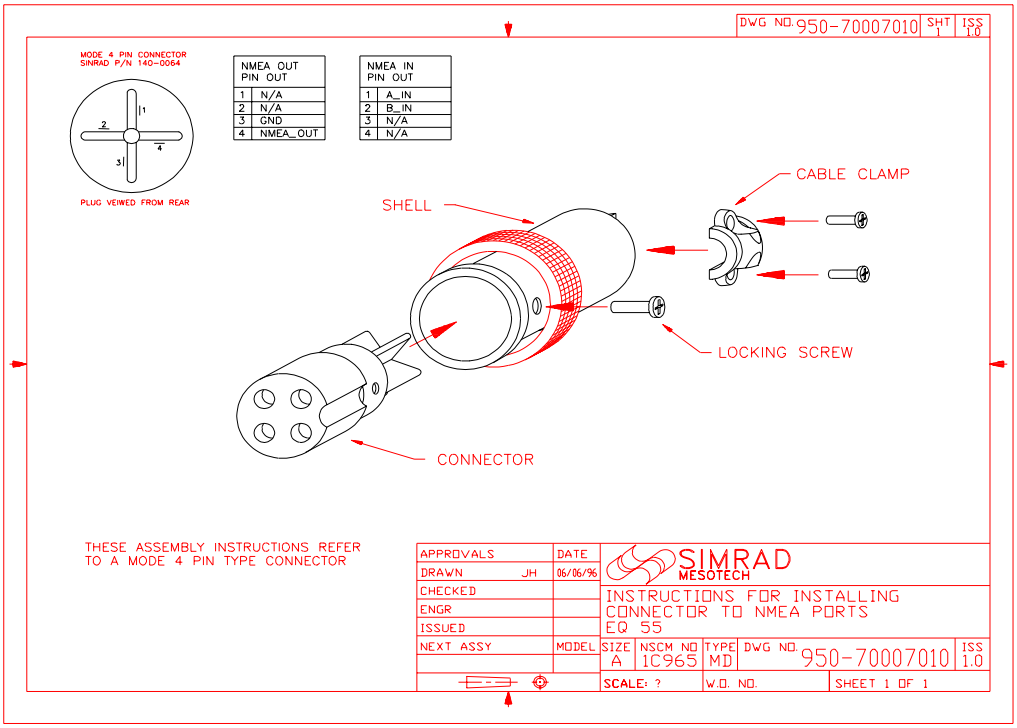
4.5.10 Transducer Connectors (North American)



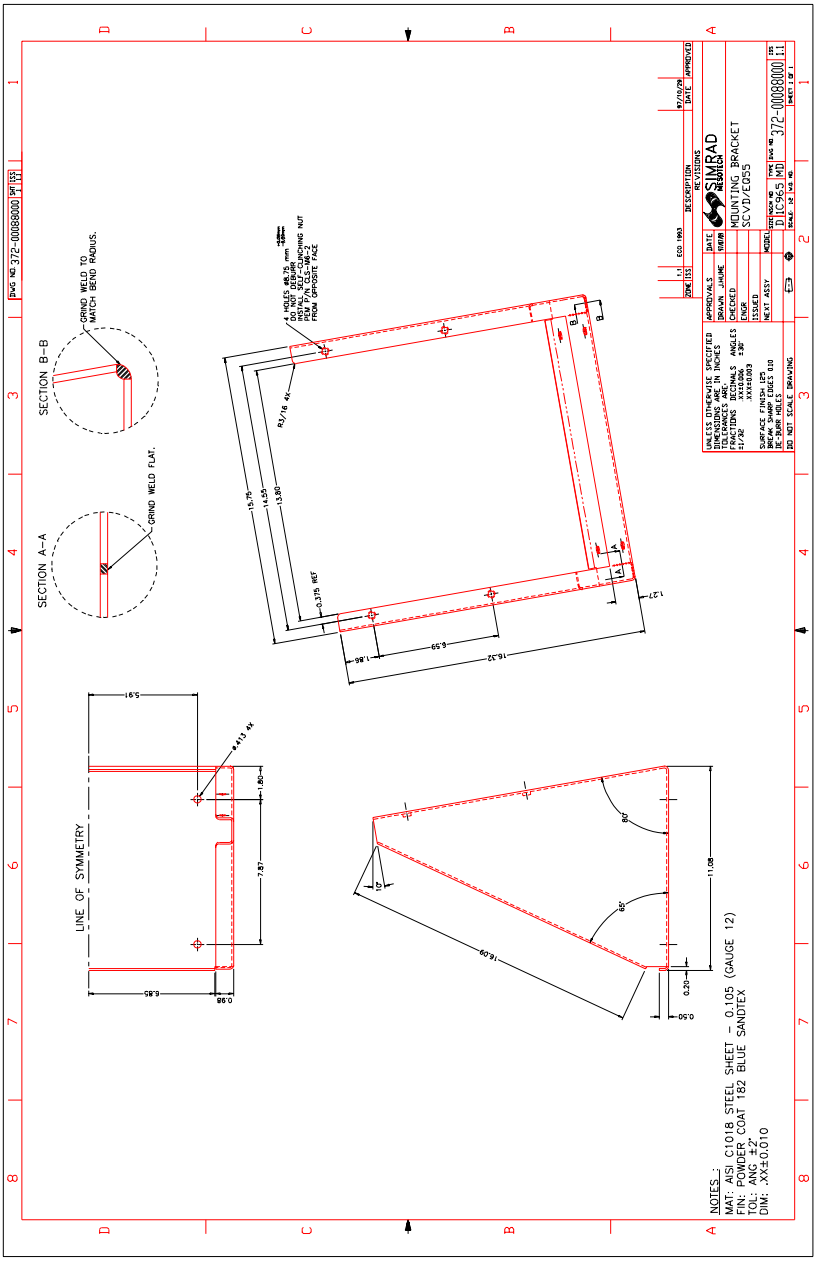
4.5.11 Speed Temperature Connectors



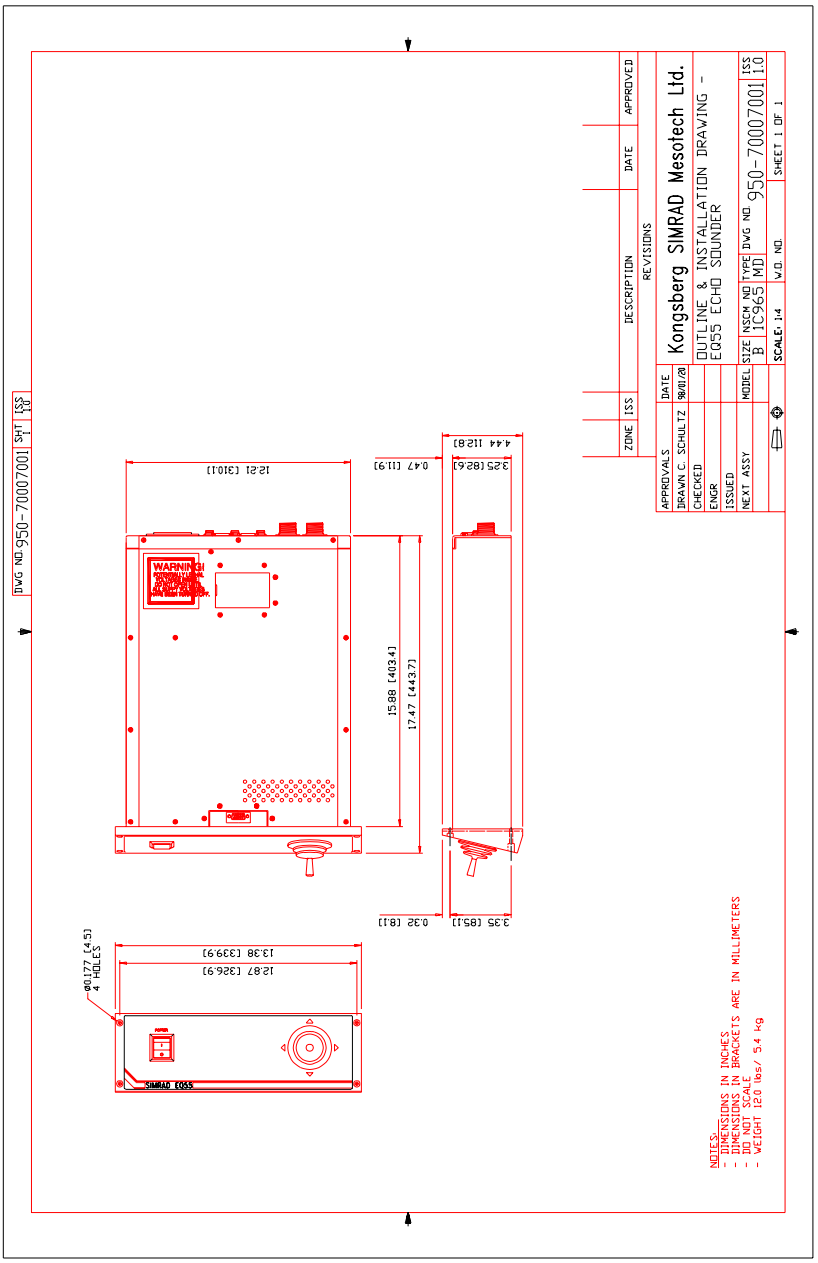
4.5.12 NMEA Connectors



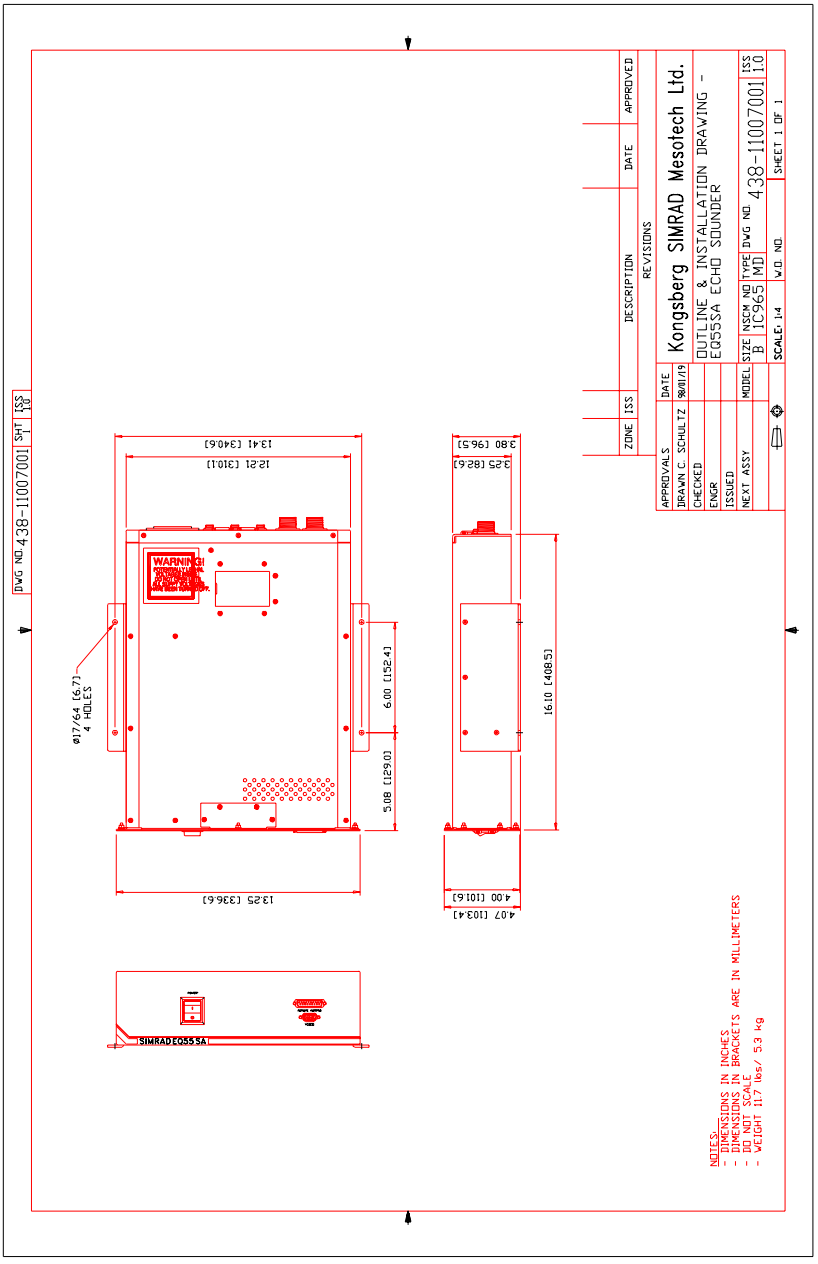
4.6 MOUNTING BRACKET ASSEMBLY DRAWING



4.7 OUTLINE & INSTALLATION DRAWING - EQ55 ECHO SOUNDER



4.8 OUTLINE & INSTALLATION DRAWING - EQ55SA ECHO SOUNDER



PART 5

MAINTENANCE, TROUBLESHOOTING, REPAIR AND SPARE PARTS

5. MAINTENANCE, TROUBLESHOOTING, REPAIR AND SPARE PARTS5.3

5.1 PREVENTIVE MAINTENANCE 5.3
5.1.1 Surface Cleaning 5.3
5.1.2 Electrical Connections 5.3
5.1.3 Mounting Bracket 5.3
5.1.4 Transducer 5.3

5.2 TROUBLESHOOTING THE EQ 55 .....5.4
5.2.1 Power Requirements 5.4
5.2.2 Normal Start-up Responses 5.4
5.2.3 Troubleshooting Guide 5.5
5.2.4 Troubleshooting Procedure 5.8

5.3 REPAIR AND SERVICE 5.8

5.4 SPARE PARTS 5.8

5. MAINTENANCE, TROUBLESHOOTING, REPAIR AND SPARE PARTS

The EQ 55 is a sturdy, well-built piece of electronic equipment. In this chapter you will find information on how to keep it in good working condition and what to do if a problem should arise.

5.1 PREVENTIVE MAINTENANCE

5.1.1 Surface Cleaning

To keep the EQ 55 cabinet and display screen clean, wipe the surfaces with a clean damp cloth. For heavier cleaning, using a clean, damp cloth which has been dipped in a solution of a mild dish detergent (like Joy) and water. Wring out firmly to avoid dripping water into the cabinet and electrical components.

5.1.2 Electrical Connections

Periodically check the electrical connections. Make sure that connections are tight and that no cables are frayed or worn. In the event of frayed or worn cables, have them repaired or replaced by a qualified electrician.

5.1.3 Mounting Bracket

Periodically check the mounting of the EQ 55 to its mounting surface to insure that it is secure, especially in the event of high seas.

5.1.4 Transducer

Periodically clean the face of the transducer with a plastic utensil using a scrubbing action. Do not use a harsh abrasive or a solvent to clean the transducer.

5.2 TROUBLESHOOTING THE EQ 55

Warnings!

Warning: The EQ 55 contains static sensitive devices Do not attempt any servicing unless adequate anti-static and static suppressive procedures are followed.

Danger: The EQ 55 contains high voltage circuitry. There are no user serviceable components inside the case. Refer servicing to qualified personnel.

Warning: The EQ 55 transducers are designed to operate in water. Operation out of water can permanently damage the transducer elements. Perform all testing with the transducers submerged in a volume of water.

5.2.1 Power Requirements

Ensure that the EQ 55 is supplied with adequate power of the proper voltage. The system isspecified to operate from 110 to 220 Vac.

Power consumption is approximately 135 watts.

5.2.2 Normal Start-up Responses

When the EQ 55 is turned on, the normal power up response is for the unit to default to the Group 1 control settings.

As the unit is warming up, it is often possible to hear the high voltage "crackling" as the CRT anode is energized.

The EQ 55 fan should begin operating.

The transmitter may be heard "ticking".

Once the picture is visible (less than 10 seconds after power up) the Main Menu and Status window should be visible, and data should be scrolling across the display screen.

5.2.3 Troubleshooting Guide.

SYMPTOM	INSPECT	ACTION
Unit does not turn on.	Is fuse intact?	Replace fuse.
	Check the supply voltage	Provide proper voltage.
Unit draws excessive current.	Has the Power Supply printed circuit board (PCB) module failed?	Measure output voltages. If necessary, isolate by disconnecting other PCB's from Power Supply PCB.
Unit seems to be operating, but has no picture.	Check Display Monitor connections and voltages.	Correct bad connections, if necessary replace Display Monitor..
	Are video signals going from CPU to Display Monitor?	Check voltages on CPU connector J9, pins 1,3,5 (Red, Green, Blue).
Display isn't bright enough.	Check for correct adjustment of brightness and contrast potentiometer on front panel.	Adjust both brightness and contrast potentiometer on front panel. Background (outside of video frame) should be black, colors bright.
		Adjust Screen control on side of sweep transformer, Display Monitor PCB.
Display background black is too bright.	Check the adjustment of contrast potentiometer on front panel.	Adjust potentiometer just to the point where background becomes black (rasters disappear).
		Adjust Screen control on side of sweep transformer, Display Monitor PCB.
Display is out of focus.	Check adjustment of screen and focus settings on Display Monitor sweep transformer (on Display Monitor PCB assembly).	Adjust screen and focus settings for maximum clarity.
Display colors seem to be incorrect.	Color bar along left side of menu; Top to bottom should be black, dark blue, light blue, cyan, light cyan, green, dark green, yellow, dark yellow, orange, red, dark red.	Operate Degauss button on front panel. Display should "wiggle" momentarily.
		Check settings of Color Threshold.
		Check connections from CPU to Display Monitor PCB's. CPU PCB J9, pins 1,3,5 (Red, Green, Blue)
Picture, but no bottom or fish targets.	Check transducer connections.	Ensure connections are clean and tight and that pinouts are correct. Ensure that correct transducers are being used.

SYMPTOM	INSPECT	ACTION
	Check transmit power setting.	Raise transmit power to FULL.
	Check Gain Setting.	Raise Gain settings (both channels). Maximum setting is 15
	Check TVG Setting.	Set TVG (both channels) to 40logR ("Fish")
	Transmit output from transceiver PCB.	Measure transmit power (see Transducer section).
One channel operates normally, but second channel does not operate.	Transducer connections.	Ensure connections are clean and tight, and that pinouts are correct. Ensure that correct transducers are being used.
	Check Gain Setting.	Raise Gain Setting. Maximum setting is 15.
	Check TVG Setting.	Set TVG to 40log ("Fish").
Unit comes on, but then shuts off.	Check incoming power to EQ 55.	Provide proper voltage.
	Is fuse intact?	Replace with proper fuse.
	Are Power Supply components overheating?	Isolate Power Supply from loads. Replace Power Supply module if necessary.
Unit comes on, operates normally, then operates erratically.	Are Power Supply components overheating?	Isolate Power Supply from loads. Replace Power Supply if necessary.
	Check incoming power to EQ 55.	Ensure that incoming power is not falling below limits.
	Check connections on CPU and joystick.	Repair connections. Isolate Power Supply from loads. Replace Power Supply or CPU if necessary.
No response to joystick operation.	Check connections between joystick and CPU.	Repair connections as necessary.
	Check contacts on joystick switches.	Replace joystick contact(s).
		Replace CPU PCB assembly.
Fan does not operate.	Check connections to +12 Vdc on monitor PCB.	Repair connections. Replace fan if necessary.
Speed Sensor does not work.	Is the Speed input is turned to ON in the Configuration Menu?	Turn Speed input ON in the Configuration Menu?

SYMPTOM	INSPECT	ACTION
	Check connections to Speed input.	Ensure connections are clean and tight and pinouts are correctly followed.
	Check if Speed sensor is fouled or damaged.	Remove sensor (placing supplied dummy plug in hole). Check paddlewheel operation. Measure output voltage as paddlewheel turns.
	Check connections between CPU PCB and Speed input.	Repair connections as necessary.
	Check jumper configuration on CPU PCB.	Configure jumper JP2 for type of sensor used.
Temperature Sensor does not work.	Is the Temperature input turned ON in the Configuration Menu?	Turn Temperature input ON in the Configuration Menu.
	Check connections to Temperature input.	Ensure connections are clean and tight and pinouts are correctly followed.
	Check connections between CPU PCB (J8) and Temperature input.	Repair connections as necessary.
	Check resistance of Temperature sensor (see Technical Specifications).	Replace sensor if necessary.
Operates OK at slow boat speeds, loses targets at higher speeds	Is aerated water passing under transducer and blocking signals?	Consider different mounting for transducer to avoid aeration. See Transducer section.
NMEA interface does not work.	Is the NMEA interface turned ON in the Configuration Menu?	Turn NMEA interface ON in the Configuration Menu.
	Is the correct data being sent?	The EQ 55 receives "GLL" (latitude & longitude). The EQ 55 sends "DBT" (depth below transducer) and "DBS" (depth below surface).
	Check the wiring from external device to EQ 55 terminal strip.	Correct wiring: EQ 55 input is labeled "A" & "B". A is signal, B is return (input is floating and optically isolated) EQ 55 output (labeled "Tx" & "Gnd") is ±12 Vdc.

SYMPTOM	INSPECT	ACTION
Noise on display at high boat speeds, or when engine is put into gear.	Is acoustical noise coming from propeller?	Ensure that propeller is clean, undamaged (has no "nicks").
	Is acoustical noise coming from shafting or machinery?	Isolate sources of interference. Operate one shaft/ propeller at a time, etc.
		Consider different mounting for transducer to minimize interference. See Transducer section.
	Is electrical noise coming from alternator, generator, dirty shaft grounding contact?	Isolate sources of interference by selectively disabling them. Install filters if/as necessary.

5.2.4 Troubleshooting Procedure

For all fault finding, first check the line voltage to insure that it is providing the necessary levels to insure operation.

5.3 REPAIR AND SERVICE

The EQ 55 is sealed and does not contain any user serviceable parts. Opening of this unit will void its warranty. Touching electrical parts inside may cause bodily harm or death. If the EQ 55 requires servicing or repair call your authorized SIMRAD dealer.

5.4 SPARE PARTS

Fuses may be bought from a handler or a marine supply store. If you require a SIMRAD part, please contact your authorized SIMRAD dealer.

PART 6

TECHNICAL INFORMATION

6. TECHNICAL INFORMATION 6.3

6.1 TECHNICAL INFORMATION 6.3
6.1.1 Technical Specifications (General) 6.3
6.1.2 Display.....6.4
6.1.3 Accessory Output 6.4
6.1.4 Accessory Input 6.4
6.1.5 Voltages 6.5
6.1.6 Console 6.5
6.1.7 Environmental Requirements 6.5
6.1.8 Options 6.5
6.1.9 Transducers.....6.6
6.1.10 Sensors 6.6

6. TECHNICAL INFORMATION

6.1 TECHNICAL INFORMATION

For technical drawings, see Chapter 4 - Installation.

6.1.1 Technical Specifications (General)

General	
Frequency Pairs (The EQ 55 is ordered with one of these pairs.)	50/200 kHz 38/200 kHz 38/50 kHz
Output Power	1,000 W rms per channel
Transmit Pulsewidth	»0.25% of receive time, up to 4 mS maximum. 0.3 mS minimum 50 & 38 kHz 0.1 mS minimum on 200 kHz
Receiver Type	Two channel hybrid, direct conversion
Receiver Gain	15 levels 20logR TVG ("Bottom") 40logR TVG ("Fish)
Receiver Bandwidth (matched to pulsewidth)	1 kHz 3 kHz 10 kHz
Transducer Impedance (Jumper selectable)	60 ohms resistive (standard) 100 ohms resistive 200 ohms resistive
Units Selectable	Meters, feet, fathoms, passi braza
Ranges (meters)	20, 30, 40, 50, 75, 100, 150, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1250, 1500, 1750, 2000
Ranges (fathoms)	10, 15, 20, 25, 40, 50, 75, 100, 150, 200, 250, 300, 350, 400, 500, 600, 700, 800, 900, 1000
Ranges (feet)	30, 35, 40, 60, 80, 100, 200, 300, 400, 500, 750, 1000, 1500, 2500, 3000, 3500, 4000, 4500, 5500, 6500
Phasing Ranges	0 - 980 fm in steps of 4 0 - 6460 ft in steps of 8 0 - 1980 m in steps of 4

(Con't) Technical Specifications (General)

Expansion Ranges	3, 5, 10, 15, 20 meters 3, 5, 10, 15, 20 passi braza 2,4, 6, 8, 10 fathoms 10, 20, 30, 40, 50 feet
Noise Reduction	Analog and digital filtering, plus ping-to-ping filter
Sound Velocity	Adjustable 1400 to 1550 m/s
Maximum Ping Rate	8 pings per second (5 pings per second when printing)
Transmit Power Adjustment	Full power (1000 watts) -10 dB (100 watts) -20 dB (10 watts)
Depth Alarm Range	1 unit steps over full range

6.1.2 Display

Display	
Number of Colors	16
Pixels Displayed	640 x 480
CRT Dot Pitch	0.29 mm
CRT Size	35.5 cm (14") diagonal

6.1.3 Accessory Output

Accessory Output	
Printer Port	Standard parallel printer interface (H.P. Paintjet only)
NMEA 0183	Output depth data
AUX 9 Pin D-Type Port	LF & HF Buffer Output

6.1.4 Accessory Input

Accessory Input	
Speed	Adjustable, 100 to 25,000 p/n m
Temperature	NTC thermistor (Airmar Std.)
NMEA 0183	Input GLL (latitude and longitude)
AUX 9 Pin D-Type Pore	Ext Trig Input
Ext Sinc Output	RS232 Pin 1,5,6

6.1.5 Voltages

Voltages	
Supply Voltage	110 VAC or 220 VAC

6.1.6 Console

Console	
Dimensions	400 mm high x 404 mm wide x 495mm deep 15.75" high x 15.92" wide x 19.50" deep
With Mounting Bracket	520 mm high x 404 mm wide x 495 mm deep 20.5" high x 15.92" wide x 19.50" deep
Weight	31 kg (68.5 lb)

6.1.7 Environmental Requirements

Environmental Requirements	
Operating Temperature	0° to 50°C (32° to 122° F)
Storage Temperature	-20° to 65° (-5° to 150° F)
Operating Humidity	95% non-condensing

6.1.8 Options

Options	
Color Printer (Hewlett Packard PaintJet only)	8 colors, requires 110 VAC
Rack Mount Bracket Kit	For Console Mounting

6.1.9 Transducers

Transducers (with temperature transducer standard)		
Frequency	**Beamwidth**	**Housing**
38 kHz	11° x 18°	Resin
50 kHz	14°	Resin
200 kHz	6.5°	Resin
50/200 kHz	6.5°/16°	Resin

High Performance Transducers (without a temperature transducer)		
Frequency	**Beamwidth**	**Housing**
38 kHz	11° x 22°	Resin
50 kHz	8°x 18°	Resin
200 kHz	7°	Resin

6.1.10 Sensors

Sensors	
Speed/Temperature Sensor	Combined in a bronze thru-hull.

PART 7

SERVICING THE EQ-55

7. SERVICING THE EQ 55.....7.3

7.1 SERVICE INSTRUCTIONS.....7.3
7.1.1 Removing the EQ 55 from its Installation Site.....7.3
7.1.2 Transporting the EQ 55.....7.3

7.2 EQ 55 DISASSEMBLY 3-D DIAGRAM.....7.4

7.3 SERVICING THE EQ 55 AIR FILTER.....7.5

7.4 EQ 55 DISASSEMBLY INSTRUCTIONS.....7.5
7.4.1 Removing the EQ 55 Electronics Drawer.....7.5
7.4.2 Removing the Lid From the Drawer.....7.5
7.4.3 Removing the Transceiver Printed Circuit Board Assembly.....7.5
7.4.4 Replacing the Transceiver PCB Assembly.....7.6
7.4.5 Removing the CPU Printed Circuit Board Assembly.....7.6

7.5 CHANGING EQ 55 SOFTWARE.....7.6
7.5.1 Identifying the EPROM chip.....7.6
7.5.2 Orientation of the EPROM.....7.6
7.5.3 Removing the EPROM.....7.7
7.5.4 Replacing the EPROM.....7.7

7.6 EQ 55 ASSEMBLY INSTRUCTIONS.....7.7
7.6.1 Replacing the CPU PCB Assembly.....7.7
7.6.2 Removing the DC Power Supply PCB Assembly.....7.7
7.6.3 Replacing the Power Supply PCB Assembly.....7.8
7.6.4 Removing the Display Monitor Assembly.....7.8
7.6.5 Remove the drawer assembly (see section 7.4.1).....7.8
7.6.6 Remove the Rear Housing.....7.8
7.6.7 Removing the Bezel from the Chassis.....7.8
7.6.8 Replacing the Display Monitor Assembly.....7.8

7.7 EQ 55 CPU CIRCUIT BOARD JUMPER CONFIGURATIONS.....7.9

7. SERVICING THE EQ 55

7.1 SERVICE INSTRUCTIONS

7.1.1 Removing the EQ 55 from its Installation Site

Use care in removing the EQ 55 from its installed location. Remember that the cabinet weighs approximately 68 lb. (31 kg). Label and disconnect the cables from the EQ 55.

7.1.2 Transporting the EQ 55

When transporting the EQ 55, protect the unit from impact, dropping and extremes of temperature. Use the original shipping carton to protect the EQ 55 while in transit.

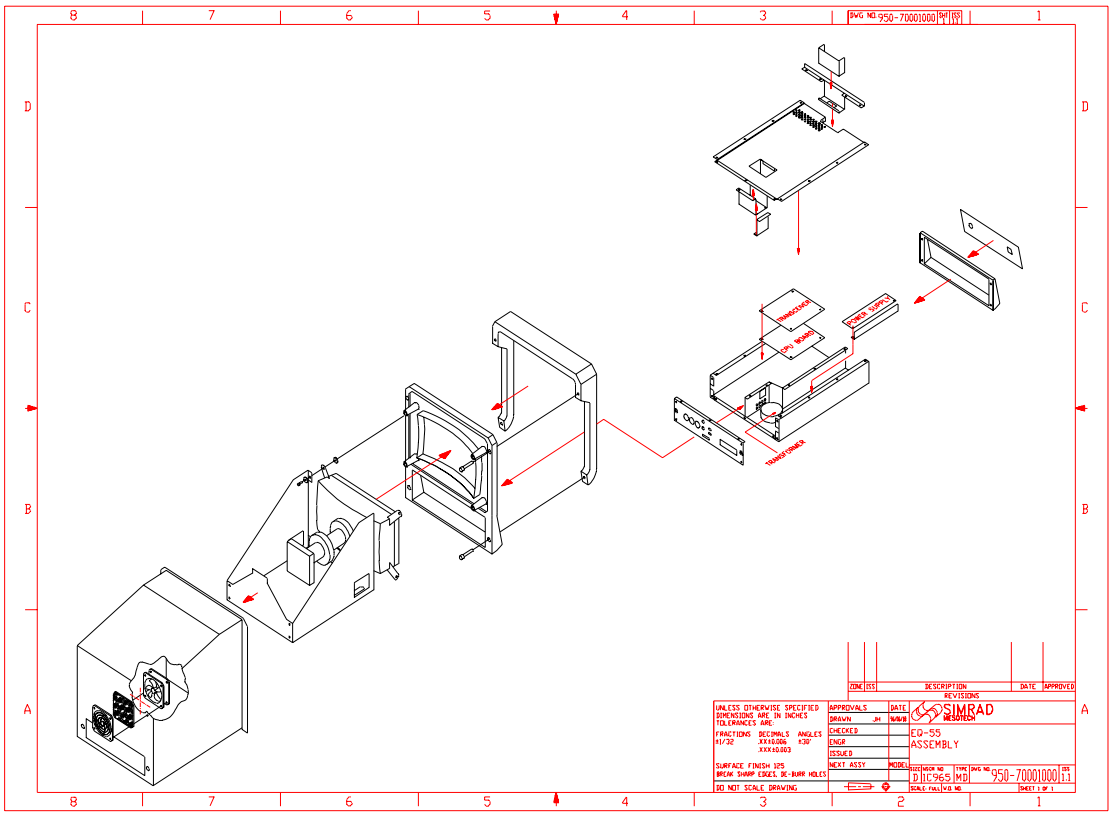
Warnings!

Warning: The EQ 55 contains static sensitive devices. Do not attempt any servicing unless adequate anti-static and static suppressive procedures are followed.

Danger: The EQ 55 contains high voltage circuitry. There are no used serviceable components inside the case. Refer servicing to qualified personnel.

Warning: The EQ 55 transducers are designed to operate in water. Operation out of water can permanently damage the transducer elements. Perform all testing with the transducers submerged in a volume of water.

7.2 EQ 55 DISASSEMBLY 3-D DIAGRAM.



7.3 SERVICING THE EQ 55 AIR FILTER

The EQ 55 air filter should be cleaned once each month under normal operating conditions. If operating in a dusty or dirty environment, cleaning every 24 hours may be necessary to avoid restricting the passage of cooling air through the EQ 55. The EQ 55 fan cooling system is designed to draw air in through the filter, pass it throughout the EQ 55, and exhaust through the vent slots in the bottom of the case.

To clean the EQ 55 air filter, remove power from the unit. With the rear of the EQ 55 facing you, remove the fan shroud. You can now see the filter and the filter frame which holds it in place. The filter can be removed by lifting each side away from the fan housing.

Wash the filter thoroughly in water and wring dry. Allow to air dry **thoroughly**. Reinstall by reversing the removal process. Ensure that the fan shroud is snapped securely in place.

7.4 EQ 55 DISASSEMBLY INSTRUCTIONS

The EQ 55 main electronics can be remove without removing the entire unit from its location.

7.4.1 Removing the EQ 55 Electronics Drawer

Disconnect and mark all cables from the EQ 55. With the front facing you, remove the 4 Hex bolts of the front panel. Slide the drawer out from the main housing of the EQ-55 and disconnect the video cable and the plug that is attached to the drawer.

7.4.2 Removing the Lid From the Drawer

To remove the lid of the drawer remove the 11 Phillips screws located around the outside edge and the 5 Philips screws located on the left side on top of the lid.

7.4.3 Removing the Transceiver Printed Circuit Board Assembly.

The Transceiver printed circuit board assembly is the top board in the EQ 55 drawer.

If it is necessary to remove the transceiver PCB, begin by disconnecting the connectors around the periphery of the PCB. Use care that the connectors and PCB are not damaged in the process of disconnecting. Remove the 9 nuts that are holding down this PCB board. The PCB may be removed from the EQ 55 drawer.

7.4.4 Replacing the Transceiver PCB Assembly.

Replacing the transceiver PCB is the reverse of the removal process. It helps to arrange the connectors before placing the PCB, so that the connectors may be accessed easily after the PCB is in place. Use care to ensure that the connectors are mated correctly with their respective receptacles. Replace the 9 nuts.

7.4.5 Removing the CPU Printed Circuit Board Assembly

The CPU printed circuit board assembly is mounted under the transceiver board in the EQ 55 drawer.

If it is necessary to remove the CPU PCB, begin by disconnecting the connectors around the periphery of the PCB. Use care that the connectors and PCB are not damaged in the process of disconnecting. Once the connectors are free, proceed by removing the 9 standoffs that hold the CPU board in place. The CPU PCB may now be removed from the EQ 55 drawer.

NOTE: The transceiver board must be remove first.

7.5 CHANGING EQ 55 SOFTWARE

The EPROM which needs to be changed is a 40 pin integrated circuit, labeled U10, and is on the CPU circuit board.

7.5.1 Identifying the EPROM chip.

The EPROM chip will have a label stuck to it indicating the revision level of the program inside it. Also, the circuit board is labeled "U10" next to the corner of the chip.

7.5.2 Orientation of the EPROM

Note the small notch in one end of the plastic chip. This notch will be on the end of

the EPROM closest to the rear of the EQ 55. When replacing the chip with the new EPROM, it is very important that the replacement have the notch facing the same direction.

7.5.3 Removing the EPROM.

The EPROM is pressed into a socket on the circuit board. It is not necessary to do any soldering to replace the EPROM.

Using a chip extractor or a small, flat blade screwdriver, pry gently under the ends of the EPROM, between the EPROM and the end of the plastic socket underneath. Working gently from one end and then the other, lift the chip out of the socket.

7.5.4 Replacing the EPROM.

Remove the replacement EPROM from the static protection tube. Noting the placement of the notch at the end of the chip, and placing this end of the EPROM closest to the rear of the EQ 55. Carefully line up the pins with the socket holes. Gently press the EPROM into the socket.

7.6 EQ 55 ASSEMBLY INSTRUCTIONS

7.6.1 Replacing the CPU PCB Assembly

Replacing the CPU PCB is the reverse of the removal process. It helps to arrange the connectors before placing the PCB, so that the connectors may be accessed easily after the PCB is in place. Use care to ensure that the connectors are mated correctly with their respective receptacles.

7.6.2 Removing the DC Power Supply PCB Assembly

The Power Supply printed circuit board assembly is mounted in the EQ 55 drawer. If it is necessary to remove the power supply PCB, begin by disconnecting the connectors around the periphery of the PCB. Use care that the connectors and PCB are not damaged in the process of disconnecting. Once the connectors are free, remove the 5 nuts holding the board in place. Also remove the 2 Phillips screws connecting the metal chassis to the heatsink of the DC power supply.

7.6.3 Replacing the Power Supply PCB Assembly

Replacing the power supply PCB is the reverse of the removal process. It helps to arrange the connectors before placing the PCB, so that the connectors may be accessed easily after the PCB is in place. Use care to ensure that the connectors are mated correctly with their respective receptacles.

7.6.4 Removing the Display Monitor Assembly.

Remove the entire EQ-55 form it's mounting location. Place the EQ 55 on a clean surface which will not mar the finish. A static dissipative surface, properly grounded, and static-dissipative practices for personnel are recommended to minimize damage to the unit from static electricity.

7.6.5 Remove the drawer assembly (see section 7.4.1).

7.6.6 Remove the Rear Housing

Remove the 8 Philips screws that are on the edges behind the front bezel. Lift off the main housing and unplug the fan connector.

7.6.7 Removing the Bezel from the Chassis

Note that it is not necessary to remove the bezel to gain assess to or for removal of the circuit board. In removing the bezel from the monitor chassis, it must be remembered that the CRT is mounted to the bezel, and the bezel must therefore be properly supported when the two are separated.

7.6.8 Replacing the Display Monitor Assembly.

Replacing the display monitor is the reverse of the removal process. (see section 7.6)

7.7 EQ 55 CPU CIRCUIT BOARD JUMPER CONFIGURATIONS

Jumper	Function	Configuration
J1	RESET EQ 55	Open (closing jumper will force /RESET)
JP2	Speed Input (Open Collector)	Jumper across pins 1 to 2
	Speed Input (Switch Closure)	Jumper across pins 3 to 4
JP3	Interrupt	2 x 2 jumper across pins 1 to 2, and pins 3 to 4

EQ 55 Transceiver Circuit Board Jumper Configurations

Jumper	Function	Configuration	Notes
LK1 LK2 LK3	High Frequency channel transmit output impedance select	Jump LK1 = 60W Jump LK2 = 100W Jump LK3 = 200W	Select impedance to match transducer
LK4 LK5 LK6	Low Frequency channel transmit output impedance select	Jump LK4 = 60W Jump LK5 = 100W Jump LK6 = 200W	Select impedance to match transducer
LK11	Operate/Calibrate ADC input	Jumper in position 1 of LK11 to operate.	(Position 2 will ground input of ADC. Do not use in this configuration.)

LK7 LK8 LK9 LK10	Frequency Configuration	38/50 kHz = LK7 open, LK8 jumped, LK9 open, LK10 jumped 38/200 kHz = LK7 open, LK8 jumped, LK9 jumped, LK10 open 50/200 kHz = LK7 jumped, LK8 open, LK9 open, LK10 jumped	Note: other changes are required to change frequency of transceiver.

PART 8

ELECTRICAL DRAWINGS

8. ELECTRICAL DRAWINGS 8.3

8.1 LIST OF DRAWINGS.....8.3

8. ELECTRICAL DRAWINGS

8.1 LIST OF DRAWINGS

The following drawings are included with this manual:

EQ-50 Power Supply Assembly Drawing---------- 403-17011000 (Iss. 1.1)
EQ 55 Power Supply---------- 403-17018800 (Iss. 1.1)
EQ-55 Wiring Diagram ---------- 950-70001003 (Iss. 1.1)
CRT Assembly (6 pages)----------110026-0001 (Iss. A)

PART A

DEFAULT SETTINGS

A. APPENDIX A.....A.3

A.1 DEFAULT SETTINGS.....A.3

A. APPENDIX A

A.1 DEFAULT SETTINGS

The EQ 55 left the factory with the settings below.

EQ 55 Factory Default Settings	
Display Mode	Low frequency
Unit of Measure	Meters
Range	40
Phased Range	0
Auto Range	Off
Expansion	None
Expansion Range	10
Scroll Speed	Full
Color Threshold	None
Background Color	Black
Output Power	High
TVG	40logR (Fish)
Gain	Maximum (15)
Minimum Alarm Depth	40
Maximum Alarm Depth	2,000
Alarms	Off
LF VRM Depth	0
HF VRM Depth	0
Printer Port	Off
NMEA Port	Off
Speed Input	Off
Temperature Input	Off
Depth Adjustment	0

EQ 55 Factory Default Settings	
Sound Velocity	1462 m/s
White Line	On
STC	OFF
Language	English
Test Mode	Off

To LOAD a Group of Settings:

If you wish to load a group of settings:

1. From the Main Menu, select **Configuration**, then

2. From the Configuration Menu, select **Load Settings**, and

3. From the Load Setting Menu, select **the setting group** you wish to load.

To **SAVE** a Customized Group of Settings:

To save a combination of settings which you have selected to suit your needs, do the following:

1. From the Main Menu, select **Configuration**, then

2. From the Configuration Menu, select **Save Settings**, and

3. From the Save Settings Menu, select a **Setting Group**.

The Group Number is simply a name or title for your unique combination of settings. As you can see from the menu, you may save up to four separate groups of settings. Once a group of settings is saved you can recall them at any time through the Load Settings Menu as described above.

PART B

GLOSSARY

B. APPENDIX B.....B.3

B.1 GLOSSARY..... B.3

B. APPENDIX B

B.1 GLOSSARY

A-SCOPE

A method of displaying the echo sounder information. In A-scope mode, the echoes are displayed in a "bar-graph" format, with stronger echoes displayed not only in the color representing their target strength, but also in a width representing their target strength. The same information is being displayed as in other modes, but it is displayed in a different way.

ALARM

Alarms can be set to sound a "beep" if the echo sounder detects a target above (shallower than) a minimum alarm depth or below (deeper than) a maximum alarm depth. The EQ 55 allows you to set the alarm depths and to enable or disable both the minimum and maximum depth alarms.

AUTORANGE

Selecting Autorange will cause the EQ 55 to change the basic range setting(s) to keep the displayed bottom in the lower half of the display. For instance, as your boat moves into deeper water, the EQ 55 will automatically switch to longer ranges, and as you move into shallower waters, the EQ 55 will automatically switch to shorter ranges, always keeping the displayed bottom in the lower half of the display.

BACKGROUND COLOR

Background color is the color shown on the EQ 55 in the event no target is present. The choices of background color are blue or black. Black is especially useful during nighttime operation when the blue background could be too bright.

COLOR THRESHOLD

Color Threshold function allows the "weaker" targets and noise which may be shown on the display screen to be eliminated from the display. These targets are usually shown in the weaker target colors such as blues and greens. The Color Threshold allows you to choose not to display the blues, or the blues and greens, etc. Doing this will leave only the stronger targets on the display screen.

CONFIGURATION

The Configuration functions of the EQ 55 allows you to adapt the system more specifically to your needs. You may set Units of measure (feet, fathoms, meters, etc.), Background Color, Menu Languages, Scroll Speed, etc.

DEFAULT
Default selection in the Load Settings Menu allows you to configure all the settings of the EQ-55 to "typical" values.

DISPLAY MODE

Display Mode means the format which is used to present the targets on the display screen. You can select one of several Display Modes, tailoring the EQ 55 picture to your needs.

EXP

Expand, or expansion. This function allows you to take a closer look at a particular section of the water underneath your boat, and could also be thought of as a "zoom" function. You can Expand the view near the bottom (Bottom Exp) or near the Variable Range Marker (VRM Exp). Using the Expansion Range (Exp Range) allows you to control the amount of expansion.

EXPANSION

See EXP.

EXT I/F

External Interface. This sub-menu allows you to control the printer, NMEA, speed and temperature interfaces.

EXTERNAL INTERFACE

See EXT I/F, above.

GAIN

Gain is another way of saying "sensitivity", or possibly "volume". Increasing the gain setting of the EQ 55 will allow you to see smaller and deeper targets. If the gain is set too high, however, you will begin to see "noise" and unwanted targets. Generally speaking, you want to set the gain control just below the point that you begin to see speckles of "noise" on the screen.

HF

High Frequency. The EQ 55 is provided with a high frequency channel to allow the user to see greater detail of short range targets.

HF SETTINGS

High Frequency Settings. This menu selection allows the user to better configure the high frequency channel to suit their needs.

INTERFACE

The connection between two pieces of equipment.

JOYSTICK

The Joystick is the control lever mounted on the front of the EQ 55. All operator control of the system is performed by manipulating the joystick.

LF

Low Frequency. The EQ 55 is provided with a low frequency channel to allow the user to see deeper targets than would normally be detectable with the high frequency channel.

LF SETTINGS

Low Frequency Settings. This menu selection allows the user to better configure the low frequency channel to suit their needs.

MANUAL RANGE

Manual Range selection allows the operator to set the range displayed on the EQ 55. The alternative would be to use Auto Range.

MARKER

Marker, or "Set Marker", allows the user to place an event marker on the screen and on the printer (optional) output to mark an event.

MENU

The list of available selections shown in the upper left portion of the screen. The user may move though the menu and make selections by using the Joystick.

NMEA

National Marine Electronics Association. The NMEA is an organization of manufacturers of marine electronics equipment. They have adopted the NMEA 0183 as a standard for communications between various types of marine electronic equipment.

PHASED RANGE

Phased Range allows the user to set the displayed depth range to begin at some point below the surface. For example, a 100 meter displayed range can be "phased" downwards, so that the screen shows a 100 meter section beginning at, say, 200 meters and going to 300 meters depth.

RANGE

Range refers to the distance shown from the top to the bottom of the display screen.

SCROLL SPEED

Scroll speed is the rate of movement of the targets on the display screen, moving from right to left. It is adjustable, to allow the user to show a longer "history" on the display screen, if desired.

SERIAL INTERFACE

Serial interface describes the connections used between two or more pieces of computer equipment.

SPEED INTERFACE

The speed interface allows the user to connect the EQ 55 to a paddle wheel type of vessel speed sensor. The vessel speed can then be displayed on the EQ 55 display screen.

STC

Sensitivity Time Control. This decreases the sensitivity of the EQ 55 receivers in the first few meters of depth. This is used to reduce the "clutter" which is often present near the surface, due to bubbles and small sea life present there.

TEMPERATURE INTERFACE

The temperature interface allows the user to connect the EQ 55 to a thermistor (temperature variable resistor) type of sea water temperature sensor. The sea water temperature can then be displayed on the EQ 55 display screen.

TRANSDUCER

The transducers serve as the acoustic "loudspeaker" and "microphone" to send and receive the signals through the water. Transducers are most often made from ceramic elements carefully built into a robust housing. The ceramic elements change shape when a voltage is placed across them (when the EQ 55 transmits a signal), and they also generate a voltage when they encounter sound waves (as when the EQ 55 is receiving an echo).

TVG

Time Varied Gain. This is a method used to compensate for the weakening of an echo as the distance it travels increases. It involves gradually increasing the sensitivity of the receiver circuits, so as to adjust for increased range of targets whose echoes are arriving.

UNITS

"Units" refers to the measurement unit used in the range display. The user may select the displayed units to be one of the following; meters, feet, fathoms or passi braza.

VRM

Variable Range Marker. This refers to a horizontal white line shown on the display screen. There are separate Variable Range Markers for low frequency and high frequency channels. The user can measure the range to targets shown on the display screen by use of these VRMs. The depth to the VRM can be seen in the small display window in the lower left corner of the display window.

WHITE LINE

White Line is a control which places a light colored line slightly below the displayed sea floor. The purpose of this is to help the user detect targets, such as fish, which are very close to the sea floor and whose echoes tend to merge with those of the sea floor itself.

ZOOM

See EXP.