Installation manual

Simrad EK500
Fishery research echo sounder

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SIMRAD
A KONGSBERG Company

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Fishery research echo sounder

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About this document

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Sections

This book is the Installation manual manual for the Simrad EK500 Fishery research echo sounder. It describes how to install the various units used by the EK500 system.

1 General information

2 Installation procedures

3 Test and alignment procedures

4 Drawings

Remarks

References

Further information about the EK500 system may be found in the following manuals:

- EK500 Maintenance manual
- EK500 Operator manual

The reader

This Installation manual is intended for the design and installation engineers at the shipyard performing the installation. The information is supplied as the basis for the shipyard's own installation drawings applicable to the vessel. On completion of the installation, this manual must be kept on the vessel for reference purposes during system maintenance.

1. GENERAL INFORMATION

1. SUPPLY CONDITIONS

1.1. Introduction

The SIMRAD EA 500 hydrographic echo sounder, the SIMRAD EK 500 scientific echo sounder and the ES 500 fishery echo sounder systems may consist of the following units:

✓ Sounder Unit
Up to three transceivers may be used, a wide selection of operating frequencies is available.

✓ 14" colour monitor (SIMRAD CF 140)

✓ LCD monitor (SIMRAD RD 110)

✓ Colour recorder (Hewlett Packard "Paintjet")

✓ Transducer(s) to match the requested operating frequencies

1.2. Installation procedure

Installation of the EA/EK/ES 500 systems includes:

✓ Installation of the transducer(s)
✓ Mounting of the Sounder Unit
✓ Mounting of the CF 140 colour display
✓ Mounting of the LCD display
✓ Mounting of the colour recorder(s)

In addition, the cabling between the units and the connection of the supply voltage must be wired. A final check must be made in order to verify correct operation of the system. Refer to the cable plan and main interconnection diagrams, and the drawings showing outline dimensions and weights of the units included in Part 4.

1.3. Equipment responsibility

Upon receipt of the equipment, the installation shipyard automatically becomes fully responsible for the equipment unless otherwise stated in the contract. This responsibility covers the storage period before installation, the actual installation itself, commissioning, and the period between the completion of the commissioning and the acceptance of the equipment by the end user (normally the owner of the vessel into which the equipment is to be installed).

1.4. Transportation, receipt, unpacking and storage

On receiving the equipment, the shipyard should ensure that the delivery is complete and should inspect each container for physical damage. If the inspection at receipt reveals indications of crushing, dropping, immersion in water or any other form of damage, the receiving shipyard should request a representative from the carrier to be present at the shipyard during unpacking.

During unpacking, the equipment should be inspected for physical damage, i.e. broken controls and indicators, dents, scratches etc.

If damage to the equipment is discovered, the shipyard should notify the carrier and Simrad so that Simrad can arrange for replacement or repair of the damaged equipment.

The equipment, once unpacked, must be stored indoors at normal room temperature and less than 55% humidity in an atmosphere free from corrosive agents. In addition, the equipment must be covered to protect it from dust and other forms of contamination.

1. The units must be humidity-protected with a sealed plastic bag, 0.15 mm thick.

2. Humidity absorbing material should be used inside this sealed bag.

3. In order to protect displays, joysticks, etc. polyethylen foam or styrenfoam shall be used.

4. A second sealed plastic bag shall be used.

5. The sealed units shall be placed in wooden boxes lined inside with oil-paper.

6. The units shall be kept in a fixed position inside the box by wooden crossbars and polyethylen or styren foam.

1.4.1. Repacking mechanical units

All unprotected parts made of material likely to corrode shall be cleaned for dust and stains and coated with TECTYL 506 or equivalent.

1.4.2. Temperature protection

All units requiring temperature protection shall be packed as electronic units, but the wooden box shall be lined with 5 cm thick polyethylen foam or styrenfoam, walls, bottom and top.

The box shall be marked:

"MUST NOT BE TRANSPORTED OR STORED IN TEMPERATURES BELOW -5°C"

1.5. Installation, supervision and commissioning

1.5.1. Electrical and mechanical installation

Unless otherwise stated, the installation shipyard is responsible for the installation of the total system. In addition, it is also responsible for providing and connecting all cables, other than special cables supplied with the equipment, and, where applicable, base-frames which must be manufactured in accordance with the drawings provided in the following sections of this manual. The actual installation and cable laying must comply with the vessel's classification rules and the recommendations given in this manual.

During the installation period the shipyard will be held responsible for all damage to the equipment. Therefore, the equipment should be covered in such a way that it is protected from dust, paint spray/splashes and welding/cutting sparks. Precautions should be taken to ensure that no part of the equipment is used as a work platform or other unintended use.

Any damage incurred during the installation period, even with a Simrad representative present, is the installation shipyard's responsibility unless it can be proven that the damage was due to defective equipment delivered by Simrad, or irresponsibility by Simrad personnel.

1.5.2. Pre-commissioning and customer acceptance test

If the sales contract includes system pre-commissioning and/or customer acceptance test, the Simrad personnel must have access to "non-specialist"

equipment and tools, and necessary power for the whole period of installation, commissioning and testing. If required during the installation period, the shipyard must provide, free of charge, assistance necessary for the rapid and efficient completion of the work even when the work is done outside normal working hours. This requirement includes assistance from sub-contractors when applicable. Excessive waiting time resulting from delays caused by the shipyard will be charged to the shipyard.

2. PROJECT MANAGEMENT

2.1. Installation schedule diagram

The Simrad installation period (after shipyard-installation) is divided into three consecutive phases:

✓ Initial Start-UP, Dockside Testing and Pre-commissioning.
✓ Commissioning (Sea Trials) in operational condition.
✓ Sea Acceptance Test (SAT) in operational condition.

The sales contract will state whether these services are included.

If the services are included, please note that before commencement of installation work by Simrad all cables (at least those which are in any way connected with the system) must be run and connected to their respective terminations. These cables will be checked out by the Simrad engineers.

Depending upon the availability of electrical power either from the generators on board or from ashore the various parts of the system will be tested out during the "Initial Start-UP" and "Dockside" testing period. This requires that interfaces to equipment delivered by other sub-contractors are ready for integration testing.

During this period delays may occur if any of the equipment related to the system is not available for testing as and when it is required by Simrad.

During sea trials, the vessel must be entirely at Simrad's disposal even though Simrad cannot be held responsible for expenses relating to the running costs of the vessel.

After completion of the commissioning, the equipment should be officially handed over to the end user and the appropriate documents signed in accordance with the contract. All defects or deviations from the contract must be specified in detail in these documents. It should be noted that if such defects or deviations are not specified they cannot be used by any of the parties concerned as valid reason for not signing the documents.

The guarantee period for the system (as specified in the contract) begins as soon as acceptance documents have been signed.

3. GENERAL REQUIREMENTS

3.1. Power requirements

3.1.1. Voltage variations

The voltage to the Simrad equipment is to be kept within 90% and 110% of the installation's nominal voltage. (DnV: 97.5-102.5%) The transient voltage variations on the main switchboard's bus-bars by the maximum power and current variation which can occur (except under faulty conditions) are not to exceed -15% +20% of nominal voltage.

Larger voltage variations than specified above, may be accepted after consideration in each case.

3.2. Environmental requirements

3.2.1. Vibrations

If the vibration velocity amplitude at the base of the installed equipment is to exceed 10 mm/s in the range 5-50 Hz, constantly during operational life, special precautions are to be taken.

3.2.2. Temperature, humidity and corrosion

All the equipment, unless otherwise specified, should be kept in an operational environment with room temperature (within the limits +5°C to +55°C) with room humidity less than 80% in a dust-free atmosphere.

3.3. Cabling

3.3.1. Cable runs

Wherever possible, cable runs should be:

✓ Straight, accessible and placed so as to avoid possible contamination by condensation or dripping moisture.

- ✓ Remote from sources of heat and should be protected against physical damage. Suitable shields must be provided where cables are installed in the vicinity of heat sources.

- ✓ Unless absolutely unavoidable, cables should not be installed across the vessel's expansion joints. If this is unavoidable, a loop of cable having a length proportional to the expansion of the joint should be provided. The minimum internal radius of the loop should be at least twelve times the external diameter of the cable.

- ✓ Where a service requires duplicate supply lines, the cables should follow separate paths, whenever possible.

- ✓ Cables having insulation materials with different maximum-rated conductor temperatures should not be bunched together (i.e. in a common clip, gland, conduct or duct). When this is impractical the cables should be carefully bunched so that the maximum rating is that of the lowest-rated cable.

- ✓ Cables with protective covering which may damage vulnerable cables should not be bunched together.

- ✓ Cables having a copper sheath or braiding should be installed in such a way that galvanic corrosion by contact with other metals is prevented.

- ✓ Cables should not be installed in the same cable run as high-power cables.

- ✓ In order to allow for future expansion of the sonar system all cables should be allocated spare conductor pairs. Also space within the vessel should be set aside for the installation of extra cables.

3.3.2. Radio frequency interference (RFI) protection

All cables that will be permanently installed within 9 m (30 ft) of any source of Radio Frequency Interference (RFI) such as a transmitter aerial system or radio cabin should, unless shielded by a metal deck or bulkhead, be adequately screened by sheathing, braiding or other suitable material. In such a situation flexible cables should be screened wherever practicable.

It is important that cables, other than those supplying services to the equipment installed in a radio room, are not installed in a radio room. Cables which must pass through a radio room should be screened by a continuous metal conduct or trunking which must be bonded to the screening of the radio room at its points of entry and exit.

3.3.3. Physical protection

Cables exposed to a risk of physical damage should be enclosed in a steel conduct or protected by a metal casing unless the cable's covering (e.g. armor or sheath) is sufficient to protect it from the damage risk.

Cables exposed to an exceptional risk of mechanical damage (for example in holds, storage-spaces and cargo-spaces) should be protected by a suitable casing or conduct, even when armored, if the cable covering does not afford sufficient protection for the cables.

Metallic materials used for the physical protection of cables should be adequately protected against corrosion.

3.3.4. Grounding of protective metallic coverings

All metallic cable coverings (armor, lead sheath etc.) should be electrically connected to the vessel's hull at both ends except in the case of final sub-circuits where they should be connected at the supply end only.

Earthing connections should be made with a conductor which has a cross-sectional area related to the current rating of the cable or with a metal clamp which grips the metallic covering of the cable and is earthed to the hull of the vessel. These cable coverings may also be earthed by means of glands specially intended for this purpose and designed to ensure a good earth connection.

The glands used must be firmly attached to, and in good electrical contact with, a metal structure earthed in accordance with these recommendations.

Electrical continuity must be ensured along the entire length of all cable coverings particularly at joints and tappings.

In no case should lead-sheathed cables be used as the only means of earthing non-current-carrying conductors.

Metallic casings, pipes and conducts should be earthed, and when fitted with joints should be mechanically and electrically earthed.

3.3.5. Cable connections

All cables shall be earthed at both ends unless otherwise stated in the cable plan. All connections are shown in the cable plan.

Where the cable plan shows cable connections outside an equipment box outline, the connections are to be made to a plug or socket which suits the plug or socket on that particular item of equipment.

Where two cables are connected in series via a junction box or terminal block the screens of both cables should be connected but not earthed.

3.3.6. Cable terminations

Care should be taken to ensure that correct termination is used for all cable conductors especially for those connected to terminal blocks. Here crimped sleeve-terminations must be fitted in order to prevent the conductor core from fraying and making a bad connection with the terminal block. It is also of the utmost importance that where crimped terminations are used the correct size of crimp and crimping tool are used. In addition each cable conductor must have a minimum of 15 cm slack (service loop) left before its termination is fitted.

3.3.7. Cable identification

Cable identification codes corresponding to the cable number shown in the cable plan should be attached to each of the external cables. These identification codes should be positioned on the cable in such a way that where possible they are readily visible after all panels have been fitted. In addition each cable conductor should be marked with the terminal board number to which it is connected.

3.3.8. Cable installation guidelines

All cable connections should be made in accordance with the guidelines laid down by the vessel's Classification Society. If no such guidelines exist, Simrad recommends that the DnV Report No. 80 - P008 "Guidelines for Installation and Proposal for Test of Equipment" be used as a guide.

4. TECHNICAL SPECIFICATIONS

Note that only technical specifications valuable for the installation are included. For detailed specifications, refer to the EA/EK/ES 500 Operator Manual.

4.1. The Sounder Unit

GENERAL SPECIFICATIONS	
Supply voltage	187 - 264 VAC 50/60 Hz 90 - 132 VAC 50/60 Hz (with transformer) 21 - 31 VDC (EA 500) 22.5 - 31 VDC (with DC/AC converter)
Power consumption	100 W (one channel) 125 W (two channels) 150 W (three channels)
Operating temperature	0 - 55°C
Dimensions	W480 x H310x D440 (mm) (standard 19" rack dimensions)
Weight	25 kg (one channel) 30 kg (two channels) 35 kg (three channels)

INTERFACES	
Serial interfaces (9-pin Delta, RS232)	port 1: Remote computer command input and data output (EA/EK/ES) port 2: Annotation input from standard terminal (EA/EK). Depth output (ES) port 3: Navigation data input (EA/EK/ES) port 4: Sound velocity (EA), Trawl instrumentation (ES) port 5: Simrad RD Remote display (EA/EK)

Parallel interfaces (25-pin Delta, Centronics)	Port 1: Colour printer 1 Port 2: Colour printer 2 Port 3: Colour printer 3 Port 4: Colour printer 4
Auxiliary port (25-pin Delta)	Differential analogue input from heave sensor Transmit synchronization input/output Log pulse input (from vessel's log) Event marker input Alarm output
Remote control signals (25-pin Delta)	Separate lines: digits 0-9 cursor control
LAN port (15-pin Delta)	Ethernet type IEEE 802.3 UDP/IP communication protocol Command input and data output
RGB video (15-pin Delta)	Impedance 75 ohms 640 x 480 pixels resolution Line frequency 30 Hz Frame frequency 60 Hz noninterlaced Composite sync on green
Transducer signals (12-pin MIL type)	Single-beam signals Split-beam signals Cable screen
FIFO sample data signals (15-pin Delta) (EK only)	Output sample data (Super layer)

4.2. The Display Unit

CF 140 14" COLOUR DISPLAY WITH BUILT-IN JOYSTICK	
Supply voltage	198 -264 VAC 50/60 Hz 90 - 132 VAC 50/60 Hz
Power consumption	90 W
Operating temperature	0 - 40°C
Dimensions	W410 x H360 x D460 (mm)
Weight	25 kg

CF 190 20" COLOUR DISPLAY WITH BUILT-IN JOYSTICK	
Supply voltage	198 -264 VAC 50/60 Hz 90 - 132 VAC 50/60 Hz
Power consumption	105 W
Operating temperature	10 - 40°C
Dimensions	W498 x H449 x D534 (mm)
Weight	29 kg

RD 110 11" LCD MONOCHROME DISPLAY WITH KEY FUNCTION	
Resolution	640 x 480 pixels
Supply voltage	+5V, ±15V DC (supplied from Sounder Unit)
Operating temperature	10 - 40°C
Dimensions	W380 x H250 x D75 (mm)
Weight	6 kg

4.3. The printer

Colour printer	
Supply voltage	187 - 264 VAC 50/60 Hz 90 - 132 VAC 50/60 Hz 21 - 31 VDC
Power consumption	20 W max.
Operating temperature	0 - 55°C
Dimensions	W442 x H98 x D302 (mm)
Weight	5 kg

2. INSTALLATION PROCEDURES

1. GENERAL INFORMATION - UNITS AND PART NUMBERS

1.1. General

A standard EA/EK/ES 500 echo sounder system delivery consists of a Sounder Unit, one to three transducers, a Display Unit (CDU) (14" colour display and/or LCD), one to four printers, and optionally a Keypad. The EA/EK/ES 500 utilizes a modular design, and a unique identification of a Sounder Unit requires a base unit plus 1, 2 or 3 transceiver kits to be specified.

1.2. Sounder Unit

The base unit type is determined by the required supply voltage and the transceiver kit type, which comprises transceiver, digitizer and signal processor. These are determined by operating frequency and transducer type.

Note that the Sounder Unit is delivered as one complete unit. It is important that the transducer characteristics match the impedance and output power capability of the transceiver. The impedance should be 60 ohm, and the transmit power capability should be 4 kW (or 2 kW) at the lower frequencies and 1 kW at the higher frequencies.

1.3. Display Unit

There are three display units available:

14" colour CRT unit with a built-in joystick
20" colour CRT unit (external keypad/joystick required)
LCD unit

1.4. Printers

The printers are manufactured by Hewlett Packard, paint-jet colour graphics type.

1.5. Order numbers

Refer to the tables on the following pages.

SOUNDER UNITS

EK 500 Sounder Units	**Simrad reg. no.**
230 VAC 115 VAC as for 230 VAC via transformer 24 VDC as for 230 VAC via DC/AC converter	125-082819 EK5-082818
Sounder Unit number with corresponding packing list number is shown.	

EA 500 Sounder Units	**Simrad reg. no.**
230 VAC 115 VAC as for 230 VAC via transformer *24 VDC	125-082799 EA5-082798 125-082792 EA5-082791
Sounder Unit number with corresponding packing list number is shown.	

* Can be delivered as 24 VDC or as 230 VAC + DC/AC converter.

ES 500 Sounder Units	**Simrad reg. no.**
230 VAC	125-108215 ES5-108214
Sounder Unit number with corresponding packing list number is shown.	

TRANSCEIVER KITS

EK 500/ES 500 Transceiver kits	Simrad reg. no.
12 kHz single beam	299-082802
18 kHz single beam	299-082803
27 kHz single beam, 2 kW	299-082938
27 kHz single beam, 4 kW	299-082940
38 kHz single beam, 1 kW	299-083515
38 kHz single beam, 2 kW	299-082901
38 kHz single beam, 4 kW	299-082804
49 KHz single beam, 1 kW	299-083517
49 KHz single beam, 2 kW	299-082939
49 KHz single beam, 4 kW	299-082944
120 kHz single beam	299-082806
200 KHz single beam	299082808
38 kHz split beam	299-082805
120 kHz split beam	299-082807

EA 500 Transceiver kits	Simrad reg. no.
12 kHz single beam	299-082802
18 kHz single beam	299-082803
27 kHz single beam, 2 kW	299-082938
27 kHz single beam, 4 kW	299-082940
38 kHz single beam, 1 kW	299-083515
38 kHz single beam, 2 kW	299-082901
38 kHz single beam, 4 kW	299-082804
49 KHz single beam, 1 kW	299-083517
49 KHz single beam, 2 kW	299-082939
49 KHz single beam, 4 kW	299-082944
120 kHz single beam	299-082806
200 KHz single beam	299082808
38 kHz split beam	299-082805
120 kHz split beam	299-082902

NOTE !

Only the most common kits are included here. Other kits with different power strapping are available on request. Kit installation procedure and transducer cable connector (Military Standard type, cable mount, male) are included in each kit delivery.

TRANSDUCERS

Suitable transducers	Simrad type
12 kHz single beam (nickel)	67CA
18 kHz single beam (nickel)	63BA
27 kHz single beam	27-26
38 kHz single beam	38-7
49 kHz single beam	49-26
120 kHz single beam	120-25
200 kHz single beam	200-28
38 kHz split beam	ES38B
120 kHz split beam	ES120
Other transducers are available on request.	

DISPLAY UNITS

Display units	Simrad reg. no.
CF140, 14" CRT	125-107516 (CF2-108591)
CF190, 20" CRT	299-083534
RD110, LCD	109-082897

PRINTERS AND ACCESSORIES

Printer/Items	Simrad reg. no.
Colour printer 230 VAC	129-085148
Colour printer 110 VAC	129-082942
Colour printer 24 VDC	129-082943
Black print cartridge	719-085162
Colour print cartridge	719-085163
Z-fold paper 250 sheets	719-085164

2. LIST OF INSTALLATION PROCEDURES

General procedures (Group 1):

N/A

Installation of cabinets (Group 2):

INS 21 INSTALLATION OF THE SOUNDER UNIT
INS 22 INSTALLATION OF THE CF 140 DISPLAY UNIT
INS 23 INSTALLATION OF THE PRINTER
INS 24 INSTALLATION OF THE RD 110 LCD DISPLAY UNIT

Installation of the Hull Unit (Group 3):

INS 31 TRANSDUCER INSTALLATION

Installation of cabling (Group 4):

INS 41 CABLE INSTALLATION

Special installation procedures (Group 9):

N/A

3. GENERAL SAFETY RULES

1) The EA/EK/ES 500 system is powered by 230 VAC. This voltage is lethal. Always switch all power off prior to work on the system. It is not enough to switch off local power in the Sounder Unit. Use the main circuit breaker, and label it with a warning sign which informs that maintenance is carried out on the system.

2) Do not open the cabinet drawer in rough sea. The drawer might open suddenly and cause damage and injury.

3) Read and understand the applicable first aid instructions for electric shock.

4) During troubleshooting on the equipment with power ON, two persons should always be present for safety reasons.

5) The various parts of the system are heavy. Make sure that the appropriate tools are available, and that the installation personnel are trained in installation work.

INSTALLATION PROCEDURE INS 21

EA/EK/ES 500

INSTALLATION OF THE SOUNDER UNIT

1. Introduction

The EA/EK/ES 500 Sounder Unit may be mounted in a 19" rack, on a table or on a similar base.

The following drawings are applicable:

830-083732 . . . . . Outline dimensions of the Sounder Unit's outer cabinet
830-083731 . . . . . Outline dimensions of the Sounder Unit's base cabinet
830-083839 . . . . . Outline dimensions of rack
851-056419 . . . . . Installation drawing

2. Installation

Refer to installation drawing 851-056419.

Remember to connect the ground screw on the back panel to ship's ground. Make the cabling as short as possible.

INSTALLATION PROCEDURE INS 22

EA/EK/ES 500

INSTALLATION OF THE CF 140 DISPLAY UNIT

1. Introduction

The connection to the Sounder Unit is shown in the following drawing in part 4:

824-083682 . . . . . EA/EK/ES 500 Cable plan

The joystick cable from the EA/EK/ES 500 Sounder Unit must be connected to the Remote Control - IN socket. If a second display is used, the joystick on this display may be connected to the Remote Control - OUT socket.

The CF 140 Display Unit may be mounted in a 19" rack, in a panel, on the bulkhead, on a table or on a similar base (bracket mount).

Bracket mount parts are included in the standard delivery. For panel mount no extra parts are required.

The various installation methods are illustrated in SIMRAD CF 140 Instruction Manual, P2252E.

Slave displays

A number of additional displays may be connected in parallel to the Sounder Unit. The connection must be made on the rear side of each display.

NOTE !

"Slave" displays can only be added if RGB output is used from the Sounder Unit.

Additional displays are connected to the spare coax sockets marked OUT.

The signal termination switch (OPEN/75) must be set to OPEN on all the displays except for the LAST one. On the last display this switch must be set to 75 in order to terminate the RGB signals correctly.

INSTALLATION PROCEDURE INS 23

EA/EK/ES 500

INSTALLATION OF THE PRINTER

1. Introduction

The printer must be mounted in a near horizontal position (±30° relative horizontal) for proper long term operation of the jet ink head.

The following drawings in part 4 are applicable:

824-083682 . . . . . EA/EK/ES 500 Cable plan
830-083733 . . . Outline dimensions, colour graphic printer and power module

2. Installation

When not in use, the printer should be turned off by means off the power switch. This will make sure that the jet ink head is located in the rest position.

All seven bits of the DIP switch at the rear of the printer should be set to zero.

The printer uses the power module HP 17222B for 230 VAC operation.

INSTALLATION PROCEDURE INS 24

EA/EK/ES 500

INSTALLATION OF THE RD 110 LCD DISPLAY

The connection to the Sounder Unit is shown in the following drawing in part 4:

824-083682 . . . . . EA/EK/ES 500 Cable plan

The RD 110 LCD Display Unit may be mounted on almost any vertical or angled structure where there is enough space.

The various installation methods are illustrated in SIMRAD RD 110 Instruction Manual, P2359E.

INSTALLATION PROCEDURE INS 31

EA/EK/ES 500

THE TRANSDUCER INSTALLATION

1. Introduction

The performance of the echo sounder depends to a large extent of the transducer location with respect to propeller noise and hydrodynamic flow noise. The interference of electrical noise by the transducer cable is also important.

Refer to the following diagrams in part 4:

824-083682 . . . . . Cable plan
824-065243 . . . . . Transducer/Transmitter connection

Applicable installation drawings are included with each transducer delivery.

2. Guidelines

The following guidelines should be observed.

- The transducer cable must be run in a steel pipe in order to minimize electrical noise interference.

- The cable screen must only be connected to the appropriate connector pin on the rear of the Sounder Unit.

- Propeller noise is reduced by selecting a transducer position where the ship's hull acts as a screen between the propeller and the transducer.
  The transducer should therefore be mounted not more than one third of the vessel's length from the bow and on the side of the hull where the propeller blades move upwards. Also, the transducer should be slightly inclined in such a way that the protraction of the transducer face passes below the keel at the propeller location.

- In order to minimize cavitation noise the propeller must be free from damages and have a smooth surface. Ample spacing between the propeller blades and the hull also reduces noise.

- On vessels shorter than 20 meters the transducer should be mounted at least 0.6 meter from the keel and at least 1 meter from the keel on larger vessels. This in order to reduce hydro dynamic flow noise close to the keel.

- For a sounder with two or three channels the transducers should be installed at the same location. This will reduce the blanking interval subsequent to transmission due to the travel time of the direct transmit signal from one transducer to the other.

- Protruding parts, like pipe outlets and sharp edges near the transducer should be avoided.

- Flow noise may be reduced by sharpening the bow frame of the vessel.

A number of different transducer types can be used with the EA/EK/ES 500. Appropriate procedure and drawings are included in each transducer delivery. The installation procedures recommended by Simrad are generally approved by DNV (Det Norske Veritas). Nevertheless, each installation should be locally inspected and approved.

After installation the transducer should be painted with a high quality fouling paint.

INSTALLATION PROCEDURE INS 41

EA/EK/ES 500

CABLE INSTALLATION

1. Introduction

The EA/EK/ES 500 can be interfaced with a range of external equipment, and all input/output signals are available through connectors at the rear of the Sounder Unit.

Refer to the following diagrams in part 4:

824-083682 sheet 1 of 6 . . . . . Cable plan 230 VAC
824-083682 sheet 4 of 6 . . . . . Cable plan 115 VAC
824-083682 sheet 5 of 6 . . . . . Cable plan 24 VDC
824-083682 sheet 6 of 6 . . . . . Cable plan, optional equipment
824-065246 . . . . . Interconnection diagram
824-065243 . . . . . Transducer/Transmitter connection
824-065240 . . . . . Backplane connection, 230 VAC
824-065239 . . . . . Backplane connection 24 VDC

2. Serial ports

There are five serial ports (RS232, 9-pin Delta connector, female) at the back of the Sounder Unit:

port 1 - EA/EK/ES: Remote control input and data output
port 2 - EA/EK: Annotation input. ES: Depth output
port 3 - EA/EK/ES: Navigation data input
port 4 - EA: Sound velocity. ES: Trawl instrumentation
port 5 - EA/EK: Simrad RD remote display

Electrically and mechanically these ports are identical, and signals connected are listed in the table below:

9-pin Delta	Description
1	
2	Receive data
3	Transmit data
4	
5	Signal ground
6	
7	Request to send
8	Clear to send
9	

Signalling is based on asynchronous ASCII characters with individual programming of the ports from the EA/EK menu system:

* 1 start bit
* 7 or 8 bit characters
* even, odd or no parity
* 1 or 2 stop bits
* 300, 600, 1200, 2400, 4800, 9600 or 19200 baud signalling rate
  (port 1: 9600, port 2: 9600, port 3: 4800, port 4: 9600, port 5: 4800).

NOTE !

The default settings are shown underlined.

In the ES 500 the settings are fixed and may not be programmed from the menu system (Standard NMEA 0183: 4800 baud, 1 start bit, 8-bit characters, no parity, 1 stop bit).

3. Printer ports

Centronics parallel interface is used between the Sounder Unit and up to four printers; 25-pin female Delta connector at the back of the Sounder Unit and 36-pin female Centronics Ribbon connector at the printers.

The connected signals at each side of the interface cable are shown in the table below:

25-pin Delta	Description	36-pin Ribbon
1	Strobe	1
2	Data 0	2
3	Data 1	3
4	Data 2	4
5	Data 3	5
6	Data 4	6
7	Data 5	7
8	Data 6	8
9	Data 7	9
10	Acknowledge	10
11	Busy	11
15	Error	32
18-24	Ground	19-29

4. Auxiliary ports

The table below lists the individual signals of the auxiliary plug (25-pin Delta connector, female).

25-pin Delta	Description
5	+15V (Max 100mA)
6	+5V (Max 200mA)
17	Ground
18	-15V (Max 100mA)
8	Log pulse input
20	Event marker input
9	Ext. sync. input
7	Transmit trig output
1	Alarm output
25	Heave + input
13	Heave - input
12	Roll - input
24	Roll + input
11	Pitch - input
23	Pitch + input

Pin 5,6 and 18 contain supply voltages for small external adapter and conversion modules.

An external push button switch can be connected between the event marker input and ground for manual event registration; a vertical line is drawn on the display and printers. The switch is normally open, and registration occurs by closing the switch.

The vessel's log is connected between the log pulse input and ground (10 or 200 pulses per nautical mile). The log input is connected to +5 V via a 2-kohm resistor. The input signal, which is active low, may come from a relay or an open collector circuit.

The input signal on pin 9 (active low) is used for external triggering of the EA/EK/ES 500 transmit pulse, and the output signal on pin 7 (active low 1 ms) allows external equipment to be triggered by the EA/EK/ES 500.

The Sounder Unit contains a beeper used for depth alarm and error notification, and this signal is available on pin 1 (active low, open collector, max 100 mA).

A differential analogue input for heave is provided. One differential line is connected to the sensor output terminal and the other line is grounded at the sensor in order to prevent ground potential offsets between the sensor and the Sounder Unit from adding to the sensed signal. The differential input range is ±10V.

5. Remote control

The front panel keypad of the Sounder Unit allows manual operation of the sounder. Keys for cursor control and numeric input are provided. The individual key lines are available at the remote control connector for parallel coupling of an external keypad or joystick. The lines are active low, and external keys are connected between the lines and ground.

The table on the next page lists the available signals.

In addition to the cursor control and numeric input signals the connector also includes an alarm signal, reset signals and supply voltages. The numeric inputs are not implemented in the software.

The alarm signal (active low, open collector, max 100 mA), also included in the auxiliary port, is used for depth alarm and error notification.

A soft reset signal causes the equivalent of a power-on reset ("SR" and "E" simultaneously).

A hard reset signal during software initialization causes Simrad default settings to be loaded into battery backup memory (this is done by pressing when power up).

Sufficient supply power for driving small adapter circuits is provided. Both the small external keypad unit and the built-in joystick of the 14" CRT display unit use the remote control signals for manual control of the sounder.

25-pin Delta	Description
2	+15V (Max 100mA)
3,4,16	+5V (Max 200mA)
14,17	Ground
15	-15V (Max 100mA)
5	" 0 "
18	" 1 "
6	" 2 "
19	" 3 "
7	" 4 "
20	" 5 "
8	" 6 "
21	" 7 "
9	" 8 "
22	" 9 "
24	" "
23	" "
11	" "
10	" "
25	Enter
1	Alarm output
13	Soft reset
12	Hard reset

6. The RGB signals

Red-Green-Blue video is available at a 15-pin Delta connector at the rear panel of the Sounder Unit.

15-pin Delta	Description
2	R
4	G
10	B
1	Screen R
3	Screen G
5	Screen B

75 ohms, 0 to 0.7 Volt peak, sync on green.

7. Ethernet (EA/EK only)

The Ethernet port (15-pin Delta connector, female) complies with the IEEE 802.3 standard.

The table below lists the connected signals:

15-pin Delta	Description
1	Screen
2	Collision presence +
3	Transmit +
5	Receive +
6	0 V
9	Collision presence -
10	Transmit -
12	Receive -
13	+15V

8. Transducer ports

Each transducer is connected by a separate rugged connector, and identical connectors are used for all transducer types (Military Standard type, 12-pin female).

The female connectors at the rear of the Sounder Unit are of make Amphenol (shell MS3102A-24, insert 24-19S). Male counterparts for cable installation are available from Amphenol and Cannon.

Document 824-065243 in Part 4 contains the connection diagram for split beam and single beam transducers.

The four elements of the split beam transducers are connected to pins A through J, and single beam transducers are connected to pins C and D. Pins B, D, F, J, L, M and N are grounded internally in the transceiver module.

NOTE !

In order to minimize electrical noise interference along the transducer cable the screens must only be connected to pins M and N on the transducer plug and must not be in contact with ship's ground or sounder chassis at any point.

3. TEST AND ALIGNMENT PROCEDURES

1. LIST OF TEST AND ALIGNMENT PROCEDURES

The following tests should be done in sequence after the installation work has been completed.

TAP 1 Installation check
TAP 2 Supply voltage
TAP 3 Starting up

2. GENERAL SAFETY RULES

1) The EK/EA/ES 500 systems are powered by 230VAC. This voltage is lethal.
Always switch all power off prior to work on the system. Use the main circuit breaker, and label it with a warning sign which informs that maintenance is carried out on the system.

2) Do not open the cabinet drawer while in rough sea. The drawer may open suddenly and cause damage and injury.

3) Read and understand the applicable first aid instructions for electric shock.

4) During troubleshooting on the equipment with power ON, two persons should always be present for safety reasons.

5) The various parts of the system are heavy. Make sure that the appropriate tools are available, and that the installation personnel are trained in installation work.

TEST AND ALIGNMENT PROCEDURE TAP 1

EK/EA/ES 500

INSTALLATION CHECK

1. Introduction

After the installation has been completed, all cabling and settings must be checked. This test must be performed before the system is switched on for the first time.

Refer to the installation drawings and cable diagram in Part 4.

2. Test

1. Make a visual check of the installation, and make sure that all units are mounted properly. Check that cabling have been installed in proper ducting, or fastened in any other way. (Refer to Part 1 for general comments on cable installation).

2. Check the CF 140 connections (if applicable): all cables to and from the Display Unit.

3. Check the CF 140 settings (if applicable): refer to the CF 140 Instruction manual.

4. Check the RD 110 connections (if applicable): all cables to and from the Display Unit.

5. Check the RD 110 settings (if applicable): refer to the RD 110 Instruction manual.

6. Check the transducer connection(s).

7. Check the printer connections(s).

TEST AND ALIGNMENT PROCEDURE TAP 2

EK/EA/ES 500

SUPPLY VOLTAGE

1. Introduction

Prior to initializing the system for the first time, the supply voltage should be checked.

2. Test

Use a voltmeter, and check the supply voltage. Make sure that this voltage is within the specifications for the sounder system.

If required, check the supply frequency with an oscilloscope.

TEST AND ALIGNMENT PROCEDURE TAP 3

EK/EA/ES 500

STARTING UP

1. Introduction

This procedure is used when the EA/EK/ES 500 sounder shall be powered up for the first time.

2. Test

1. Check the system cabling. Refer to TAP 1.

2. Check the supply voltage. Refer to TAP 2.

3. Switch on the display power, and then the Sounder Unit.

4. The display should present a menu on the left side of the screen, and coloured horizontal stripes to the right.

5. For EA/EK: Enter the "Test Menu", and activate the "Counter". For ES: Enter the "Test Menu" via the "Installation Menu" and activate the "Counter".

   CP Counter ≠ 0
   SP1-3 Counter ≠ 0 depending on the number of transceivers
   E.g: One transceiver implemented will result in:
   SP1 Counter ≠ 0
   SP2 Counter = 0
   SP3 Counter = 0
   Activate "Version" and check that correct software version is installed.

6. For EA/EK: Return to the "Operation menu", and select "Normal" mode. The system will commence transmitting after a few seconds. The display should present the transmit pulse at the top of the image, and then an echogram scrolling over the screen.
   For ES: Return to the "Main menu".

7. If a printer is connected:

   Check the cabling between the Sounder Unit and the printer.

   Switch on the printer, check that it is "On-line". Make sure that paper is loaded properly, and that the paper may run freely.

   For EA/EK: Enter the "Printer" menu, and activate "Echogram" to the connected printer. With default settings the printer output will equal the display echogram presentation.
   For ES: Enter the "Printer menu" and set "Printer choice" to "Display".

8. If external connections have been made:

   Check that all cabling have been performed correctly.

   Activate the external equipment, and enable the inputs to the EA/EK/ES 500.

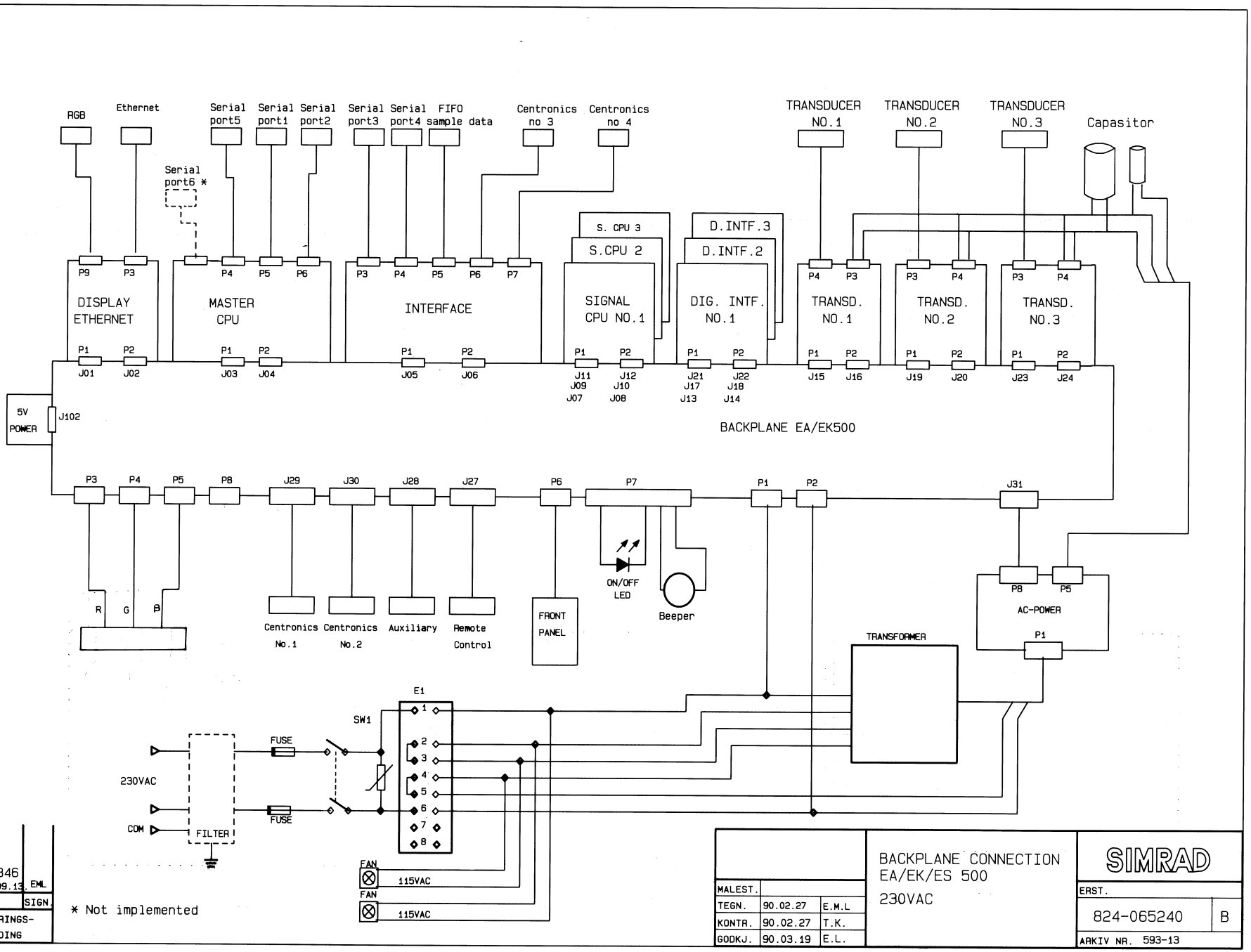
   Check that the communication works properly.

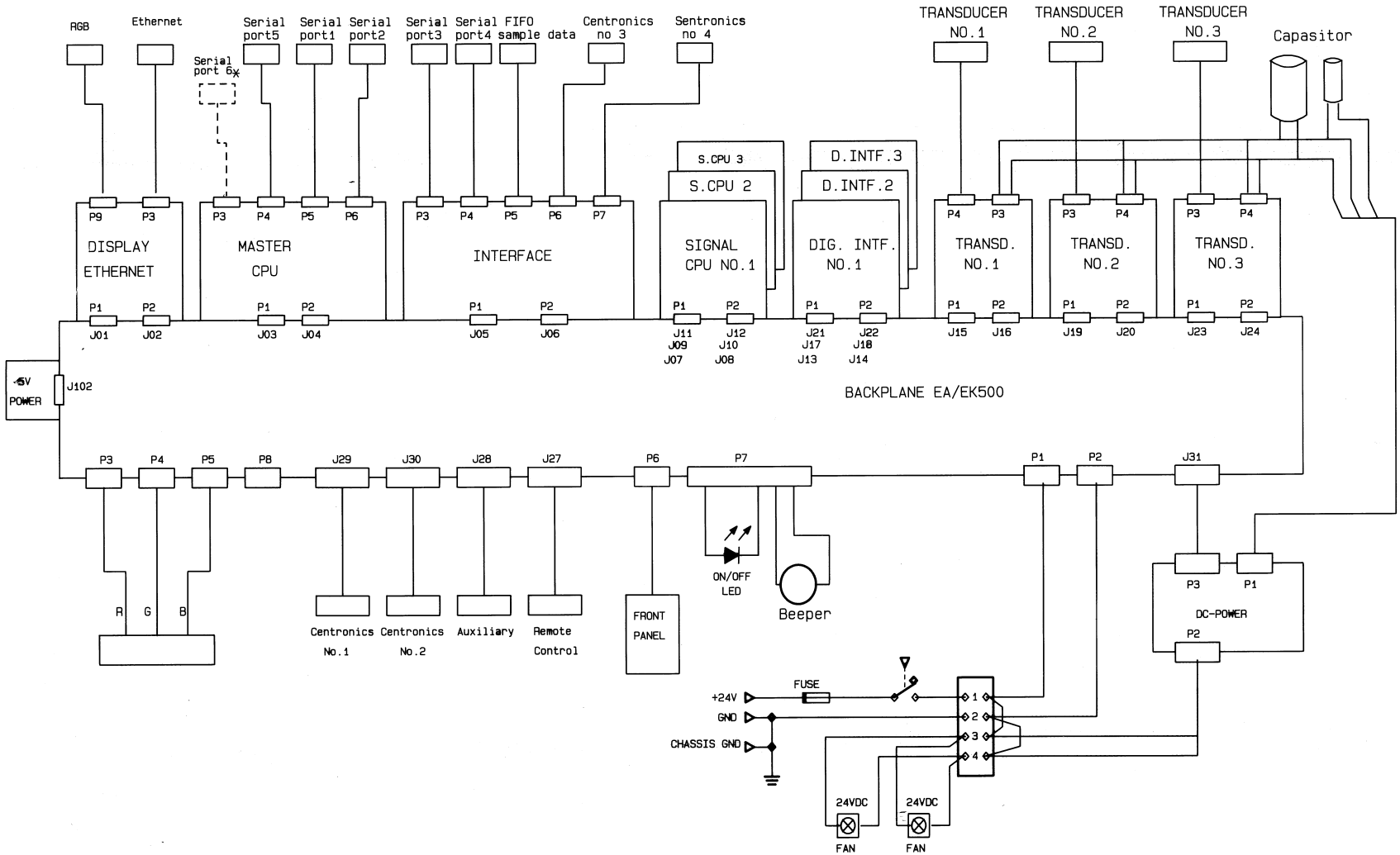
4. DRAWINGS

1. LIST OF DRAWINGS

The following drawings are included:

Backplane connection, 230 VAC	824-065240	539-13
Backplane connection, 24 VDC	824-065239	593-12
Cable plan (6 pages)	824-083682	593-19
Transducer/transmitter connection	824-065243	593-14
Interconnection diagram (3 pages)	824-065246	593-15
Outline dim. Sounder Unit (base)	830-083731	593-69
Outline dim. Sounder Unit (cabinet)	830-083732	593-70
Outline dim. Sounder Unit, rack	830-083839	594-47
Installation drawing	851-056419	528-95
Outline dim. HP Recorder and Power Module.	830-083733	593-71


RGB
Ethernet
Serial port6 *
Serial port5
Serial port1
Serial port2
Serial port3
Serial port4
FIFO sample data
Centronics no 3
Centronics no 4
TRANSDUCER NO.1
TRANSDUCER NO.2
TRANSDUCER NO.3
Capasitor
DISPLAY ETHERNET
MASTER CPU
INTERFACE
S. CPU 3
S.CPU 2
SIGNAL CPU NO.1
D.INTF.3
D.INTF.2
DIG. INTF. NO.1
TRANSD. NO.1
TRANSD. NO.2
TRANSD. NO.3
5V POWER
J102
BACKPLANE EA/EK500
R
G
B
Centronics No.1
Centronics No.2
Auxiliary
Remote Control
FRONT PANEL
ON/OFF LED
Beeper
AC-POWER
TRANSFORMER
E1
SW1
FUSE
FUSE
230VAC
COM
FILTER
FAN
115VAC
FAN
115VAC
* Not implemented
8346
91.09.13. EML
NR. SIGN.
ENDRINGS-MELDING
MALEST.
TEGN. 90.02.27 E.M.L
KONTR. 90.02.27 T.K.
GODKJ. 90.03.19 E.L.
BACKPLANE CONNECTION
EA/EK/ES 500
230VAC
SIMRAD
ERST.
824-065240 B
ARKIV NR. 593-13



8346		
91.09.16	E.M.L.	
NR.	SIGN.	
ENDRINGS-MELDING		

* Not implemented

MALEST.		
TEGN.	90.02.26	E.M.L
KONTR.	90.02.26	T.K.
GODKJ.	90.03.19.	E.L

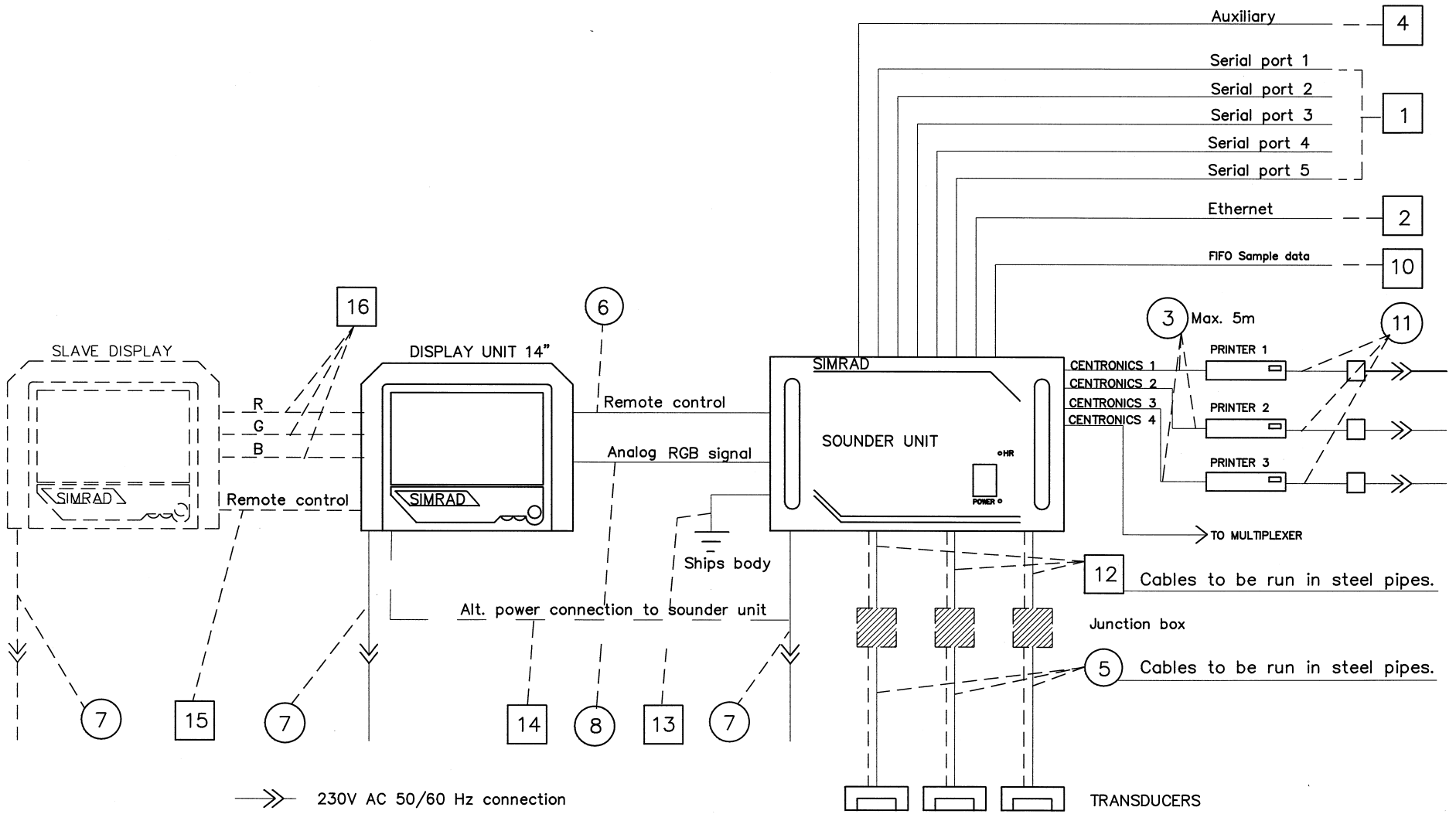
BACKPLANE CONNECTION
EA/EK/ES 500
24VDC
SIMRAD SUBSEA A/S

SIMRAD

EAST.

824-065239 B

ARKIV NR. 593-12



NOTES: Signal connector on cabinets are female type

REV./SIGN.	8061E.M.L.	8346 TRS	N995 EF						
DATE	90.09.07.	91.09.11	960305						
PROJ. METHOD			UNLESS OTHERWISE STATED, TOLERANCE: DIM.: ---- THREAD: 6g/6H				SIMRAD		
SCALE			CABLE PLAN				SHEET 1 OF 7		
DRAWN	90.03.01.	E.M.L.	EA/EK/ES 500				824-083682	F	
CHECKED	90.03.05.	T.K.	230 VAC						
APPROVED	90.03.05.	E.L.					FILE NO.: 593-19		

CABLE NO	TYPE	SCREEN	NO of CORES	Cross sect mm2	Diam. mm	length m	Remarks
18	Special				8	5	Simrad no 380-088654
17	Special				5	5	Simrad no 309-088133
16	COAX Rg 59/U				6	Max. 50	Connector: Coax BNC 75 Ω
15	PPOP	YES	6 pair	0.3	9	Max. 50	Connector types: Display unit-25 pin DELTA MALE Metal shield TIN Slave display-25 pins DELTA FEMALE Metal shield TIN
14	PMH	NO	2+gnd	1.0			Connector types: Display unit output- Mains plug Otto Heil 6006 Sounder unit input- Mains plug Otto Heil 430
13	WIRE	NO	1	Min 6.0	5	Short as possible	Color Yellow/green-Yellow
12	RYOC Special RYXC	YES YES YES	2 4x2 4				Or same as for transducer Simrad no 642-075072 see 824-083682 sheet 3 and 4 Or same as for transducer
11	Special					3	Incl. with recorder power module
10	PPOP	YES	6pair	0.3	9	1	
9	Special						Simrad no 380-088677
8	Special				8	5	Simrad no 380-082845
7	Special	NO	2+gnd	1	7	1.5	Simrad no 380-075079
6	Special				9	5	Simrad no 380-082844
5							Cable with transducer see 824-083682 sheet 3 and 4
4	PPOP	YES	15 pair	0.3	13		
3	Special				10	Max 5	Simrad no 380-075382
2	Special						Special Ethernet cable and tranceiver
1	PPOP	YES	2 pair	0.3	6	25	

REV./SIGN.	8061		8346 TRS	8385 I.S.	N995 EF				
DATE	90.09.07.		91.09.11	91.10.28.	960305				
PROJ. METHOD				UNLESS OTHERWISE STATED, TOLERANCE: DIM.: ---- THREAD: -				SIMRAD	
SCALE				CABLE PLAN				SHEET 2 OF 7	
DRAWN	90.03.13.	E.M.L.		CABLE SPECIFICATION				824-083682	F
CHECKED	90.03.19	T.K.		EA/EK/ES 500				FILE NO.: 593-19	
APPROVED	90.03.19.	E.L.							

Freq.	Type	Reg. no.	Beam width deg.	Beam * type	Max Power	STD Cable length m	Diam. mm	Ext. Cable **	Diam. mm	Remarks
12kHz	12–16	KSV–107828	16x16	SI	2kw	20	11	RYOC	11	Screened 2x2,5mm^2 With measured data
12 kHz	12–60	KSV–083742	60x60	SI	0,05kw	20	10	RYOC	11	Screened 2x1,5mm^2
12kHz	12/16–60	KSV–089510	16x16/60x60	SI	2/0,05kw	20	12.5	RYXC	12.5	Screened 4x1,5mm^2 With measured data
18kHz	18–11	KSV–088693	11x11	SI	2kw	20	11	RYOC	11	Screened 2x1,5mm^2 With measured data
27kHz	27–26/21	KSV–067159	10x11/20	DU	3/1,5kw	25	12,5	RYXC	12.5	Screened 4x1,5mm^2
38kHz	38–12	KSV–112814	12x12	SI	1kW	20	11	RYOC	11	Screened 2x1,5mm^2 With measured data
38kHz	38–12–20	KSV–112535	12x20	SI	1kw	15	11	RYOC	11	Sicreened 2x1,5mm^2
38kHz	38–26/22	KSV–031723	9–23x13	DU	2/1kw	15	12.5	RYXC	12.5	Screened 4x1,5mm^2
38kHz	38–26/22	KSV–066903	9–23x13	DU	2/1kw	15	12.5	RYXC	12.5	Screened 4x1,5mm^2 With measured data
38kHz	38–7	KSV–082776	7x7	SI	2kw	20	11	RYOC	11	Screened 2x1,5mm^2 With measured data
38kHz	38–7D	KSV–082778	7x7	SI	4kW	0.5	11			
49kHz	50–18	KSV–082606	18x18	SI	0,5kw	20	11	RYOC	11	Screened 2x1,5mm^2
49kHz	50–10x17	KSV–112026	10x17	SI	1kw	15	11	RYOC	11	Screened 2x1,5mm^2
49kHz	49–26E	KSV–050642	8x11	SI	2kw	15	11	RYOC	11	Screened 2x1,5mm^2
70kHz	70–24–F	KSV–044391	11x11	SI	0.8kW	15	11	RYOC	11	Screened 2x1.5mm^2 With measured data
120kHz	120–25–E	KSV–062615	10x10	SI	1kw	25	11	RYOC	11	Screened 2x1,5mm^2 With measured data
120kHz	120–25–F	KSV–088363	10x10	SI	1kw	20	11	RYOC	11	Screened 2x1,5mm^2
120kHz	120–2/50	KSV–088606	2x50	SI	1kw	20	10 **	RYOC	11	Screened 2x1,5mm^2
120kHz	120–35/25	KSV–069648	3x3/9,5x9,5	DU	2/1kw	25	12,5	RYXC	12.5	Screened 4x1,5mm^2 With measured data

DU= DUAL BEAM
* SI =SINGLE BEAM
SPL=SPLIT BEAM

Junction box for all transducers: Simrad no. BKS–065249

** As ext. cable can same as for transducer be used.

2x1.5 Simrad no: 642–016604 RYOC
4x1.5 Simrad no: 642–022491 RYXC
2x2.5 Simrad no: 642–019643 RXXC
4x2.5 Simrad no: 642–019659 RCOP

REV./SIGN.	8061		8346 TRS	N995 EF						
DATE	90.09.07.		91.09.11	960305						
PROJ. METHOD				UNLESS OTHERWISE STATED, TOLERANCE: DIM.: ---- THREAD:						SIMRAD
SCALE				CABLE PLAN						SHEET 3 OF 7
DRAWN	90.03.15.	E.M.L.		TRANSDUCER						824–083682 F
CHECKED	90.03.19.	T.K.		SPECIFICATION						
APPROVED	90.03.19.	E.L.		EA/EK/ES 500/ES60						FILE NO.: 593–19

Freq.	Type	Reg. no.	Beam width deg.	Beam* type	Max Power	STD Cable length m	Diam. mm	Ext. Cable **	Diam. mm	Remarks
200kHz	200-30-GP	KSV-083744	30x30	SI	0.1kW	15	10****	RYOC	11	Screened 2x1.5mm^2 With measured data
200kHz	200-28-E	KSV-067668	7x7	SI	1,5kw	25	11	RYOC	11	Screened 2x1,5mm^2
200 kHz	200-28-E	KSV-109178	7x7	SI	1.5kw	25	11	RYOC	11	Screened 2x1,5mm^2 With measured data
200 kHz	200-7-F	KSV-065414	7x7	SI	1kw	15	11	RYOC	11	Screened 2x1,5mm^2
200kHz	200-7-F	KSV-109074	7x7	SI	1kw	15	10****	RYOC	11	Screened 2x1,5mm ^{2} With measured data
200kHz	200-7G	KSV-088152	7x7	SI	1kw	15	10****	RYOC	11	Screened 2x1,5mm ^{2}
200kHz	200-7G	312-064646	7x7	SI	1kw	25	11	RYOC	11	Screened 2x1,5mm ^{2}
200kHz	200-35	KSV-068181	3x3	SI	2kw	30	11	RYOC	11	Screened 2x1,5mm ^{2}
710kHz	710-30EP	KSV-062441	5x5	SI	0,1kw	20	11	RYOC	11	Screened 2x1,5mm ^{2}
710kHz	710-36-E	KSV-089292	2,5x2,5	SI	0,1kw	20	11	RCOP	11	Screened 2x1,5mm ^{2}
18kHz	ES-18	KSV-088694	11x11	SPL	2kw	20	19	Special	19	Simrad 642-075072 With measured data
38kHz	ES38-12	KSV-111497	12x12	SPL	1kw	20	9***	Special	19	Simrad 642-075072 With measured data
38kHz	ES38B	KSV-074531	7x7	SPL	2kw	20	19	Special	19	Simrad 642-075072 With measured data
38kHz	ES38D	KSV-082747	7x7	SPL	4kw	15	19	Special	19	Simrad 642-075072 With measured data
70kHz	ES70-11	KSV-110280	11x11	SPL	0.8kW	20	9***	Special	19	Simrad 642-075072 With measured data
120kHz	ES120-7	KSV-088277	7x7	SPL	1kw	20	19	Special	19	Simrad 642-075072 With measured data
120kHz	ES120-7F	KSV-110553	7x7	SPL	1kw	20	9***	Special	19	Simrad 642-075072 With measured data
120kHz	ES120-7G	KSV-112101	7x7	SPL	1kw	20	9***	Special	19	Simrad 642-075072 With measured data
120kHz	ES120-7D	312-111540	7x7	SPL	1kw	0.5				UW plug With measured data
120kHz	ES120	KSV-111646	4x10	SPL	1kW	20	9***	Special	19	Simrad 642-075072 With measured data
120kHz	ES120	KSV-111154	2.5x10	SPL	1kW	20	9***	Special	19	Simrad 642-075072 With measured data
120kHz	ES120-H	KSV-083925	2,5x10	SPL in transv.p	1kw	20	19	Special	19	Simrad 642-075072

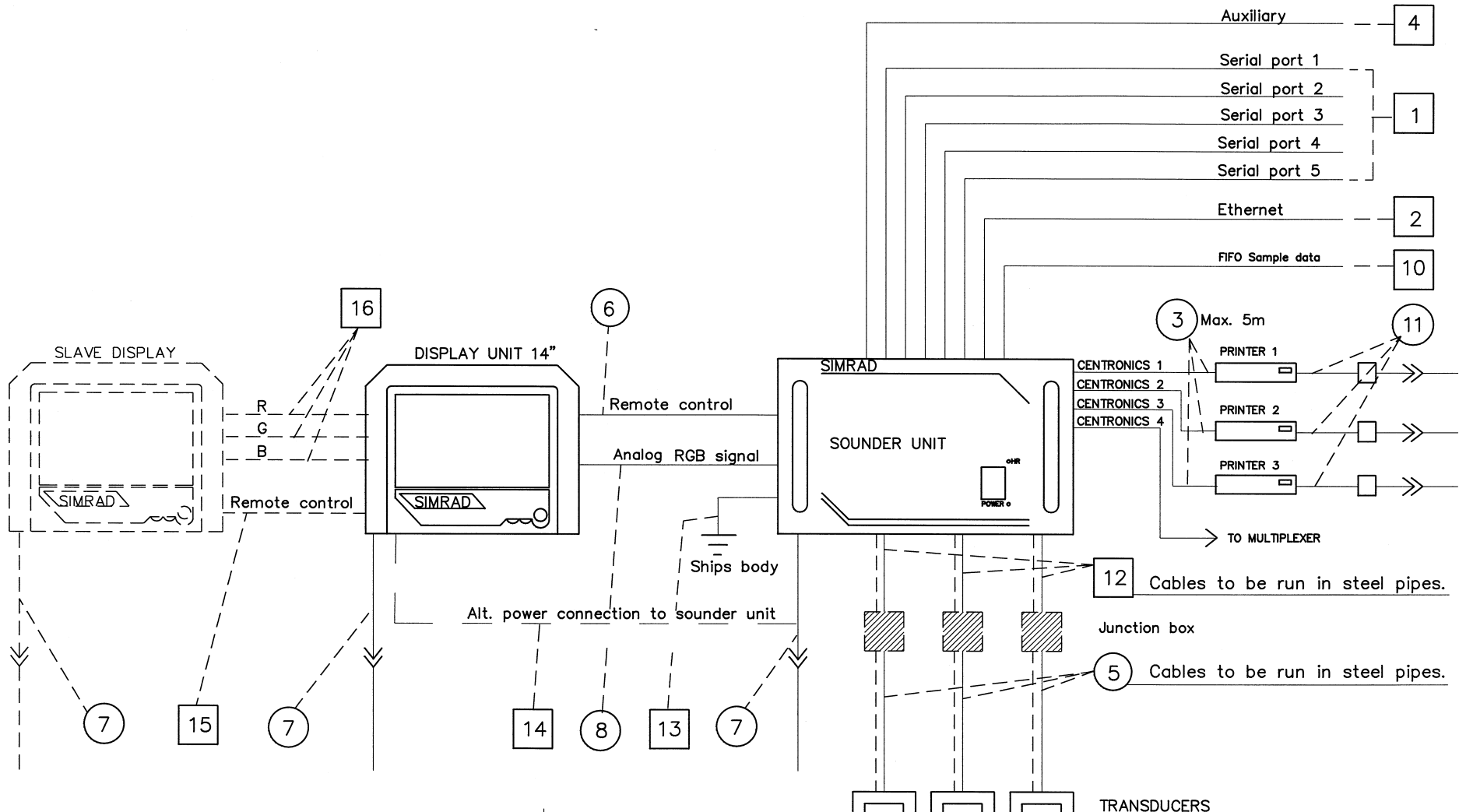
DU= DUAL BEAM
* SI =SINGLE BEAM
SPL=SPLIT BEAM

Junction box for all transducers: Simrad no. BKS-065249

** As ext. cable can same as for transducer be used.

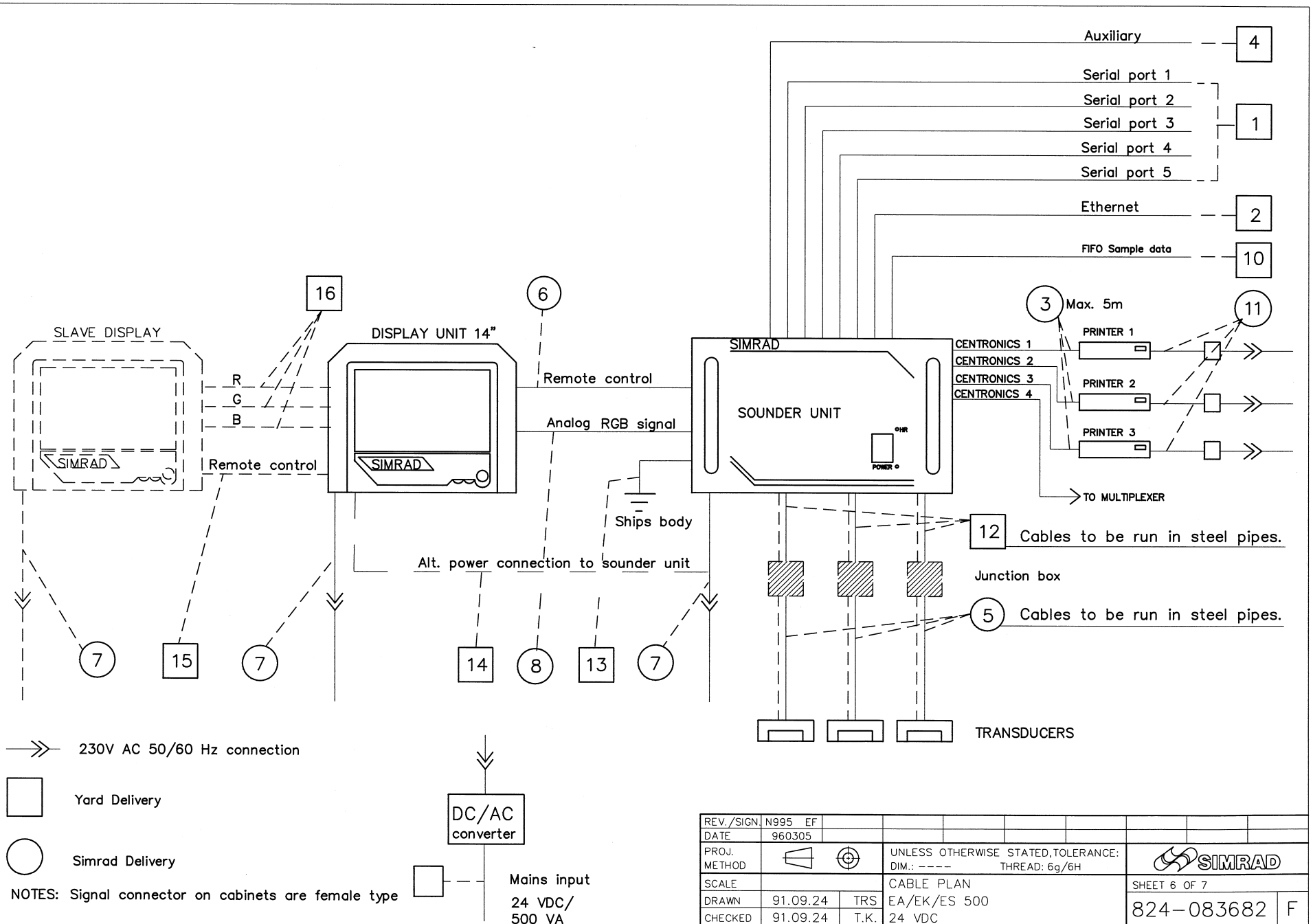
	2x1.5	Simrad no: 642-016604 RYOC
	4x1.5	Simrad no: 642-022491 RYXC
	2x2.5	Simrad no: 642-019643 RXXC
***	4x2xAWG22	Simrad no. 642-076808
****	2xAWG20	Simrad no. 642-076497

REV./SIGN.	8061	8346 TRS	N995 EF							
DATE	90.09.07.	91.09.11	960305							
PROJ. METHOD			UNLESS OTHERWISE STATED, TOLERANCE: DIM.: ---- THREAD:							SIMRAD
SCALE			CABLE PLAN							SHEET 4 OF 7
DRAWN	90.03.15.	E.M.L.	TRANSDUCER							824-083682 F
CHECKED	90.03.19.	T.K.	SPECIFICATION							
APPROVED	90.03.19.	E.L.	EA/EK/ES 500/ES60							FILE NO.: 593-19

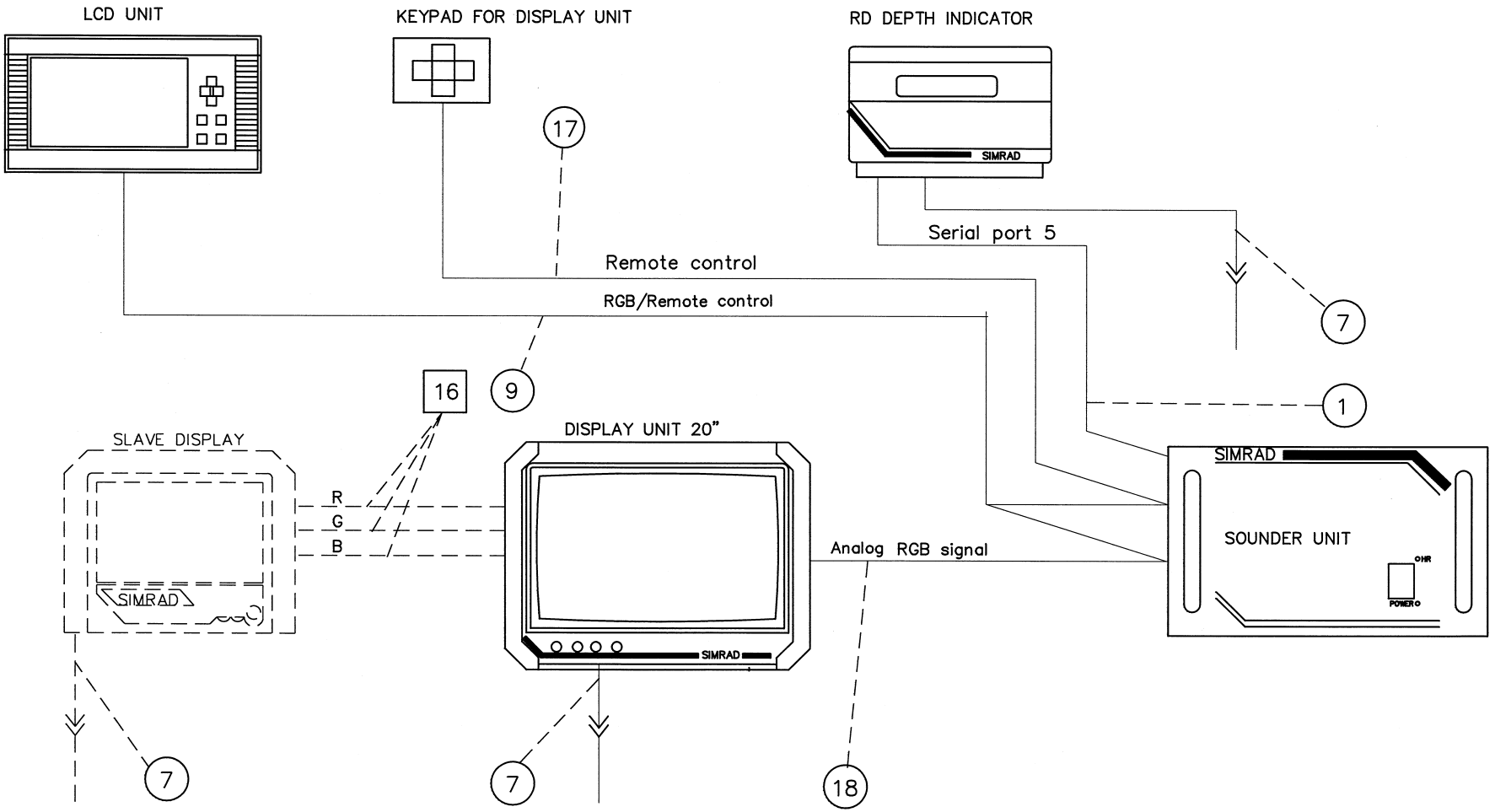


NOTES: Signal connector on cabinets are female type

REV./SIGN.	8061E.M.L.	8346 TRS	N995 EF						
DATE	90.09.07.	91.09.11	960305						
PROJ. METHOD			UNLESS OTHERWISE STATED, TOLERANCE: DIM.: ---- THREAD: 6g/6H				SIMRAD		
SCALE			CABLE PLAN				SHEET 5 OF 7		
DRAWN	90.03.01.	E.M.L.	EA/EK/ES 500				824-083682	F	
CHECKED	90.03.05.	T.K.	115 VAC				FILE NO.: 593-19		
APPROVED	90.03.05.	E.L.							



REV./SIGN.	N995 EF									
DATE	960305									
PROJ. METHOD			UNLESS OTHERWISE STATED, TOLERANCE: DIM.: ---- THREAD: 6g/6H						SIMRAD	
SCALE			CABLE PLAN						SHEET 6 OF 7	
DRAWN	91.09.24	TRS	EA/EK/ES 500						824-083682	F
CHECKED	91.09.24	T.K.	24 VDC							
APPROVED	91.09.24	J.Kv							FILE NO.: 593-19	



NOTE: For mains input 115VAC and 24VDC, see pages 5 and 6 (of 7).
For connections to sounder unit, see pages 1, 5 and 6 (of 7).

230V AC 50/60 Hz connection

Yard Delivery

Simrad Delivery

REV./SIGN.	N995 EF		UNLESS OTHERWISE STATED, TOLERANCE: DIM.: ---- THREAD: 6g/6H	SIMRAD	
DATE	960305				
PROJ. METHOD					
SCALE			CABLE PLAN	SHEET 7 OF 7	
DRAWN	91.09.24	TRS	EA/EK/ES 500	824-083682	F
CHECKED	91.09.24	TK	OPTIONAL EQUIPMENT		
APPROVED	91.09.24	J.Kv		FILE NO.: 593-19	

EA/EK500
REAR
PANEL

TRANSD.
1

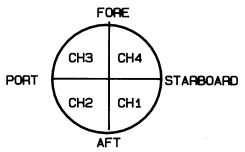
TRANSD.
2

TRANSD.
3

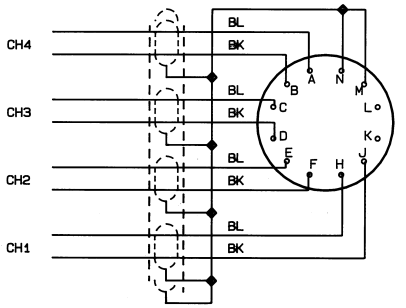
A B C D E F H J K L M N

Note: The transducer cable must be run in a steel pipe.
Ref. INS31

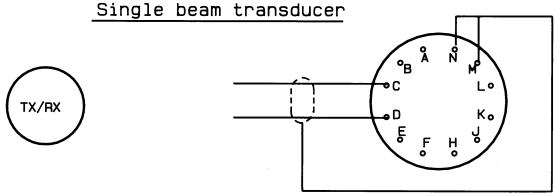
CONNECTION FOR DIFFERENT TYPE OF TRANSDUCERS, SINGLE, SPLIT OR DUAL BEAM.
SEE RIGHT HAND SIDE.



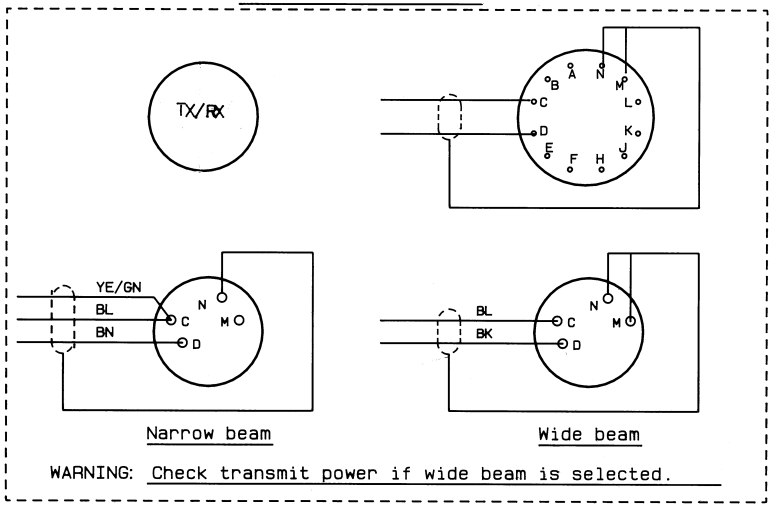
Split beam transducer



Single beam transducer



Dual beam transducer



Narrow beam

Wide beam

WARNING: Check transmit power if wide beam is selected.

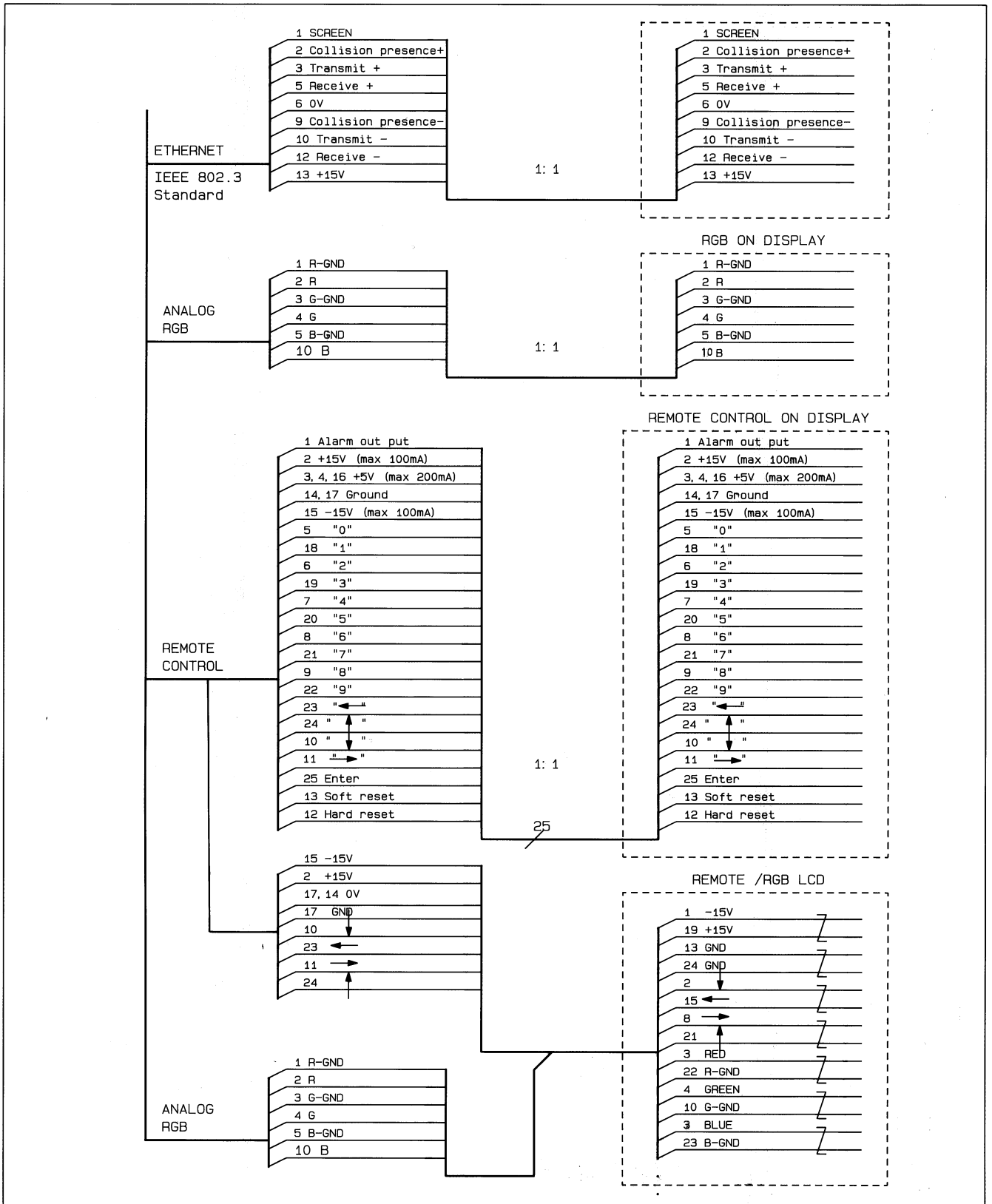
MALEST.			TRANSDUCER- TRANSMITTER- CONNECTION EA/EK500
TEGN.	90.02.27	E.M.L.	
KONTR.	90.02.27	T.K.	
GODKJ.	90.02.27.	E.L.	

SIMRAD

ERST. 824-065243 B

ARKIV NR. 593-14

90.09.07 8061	E.M.L
NR.	SIGN.
ENDRINGS-MELDING	



Sheet 2 of 2

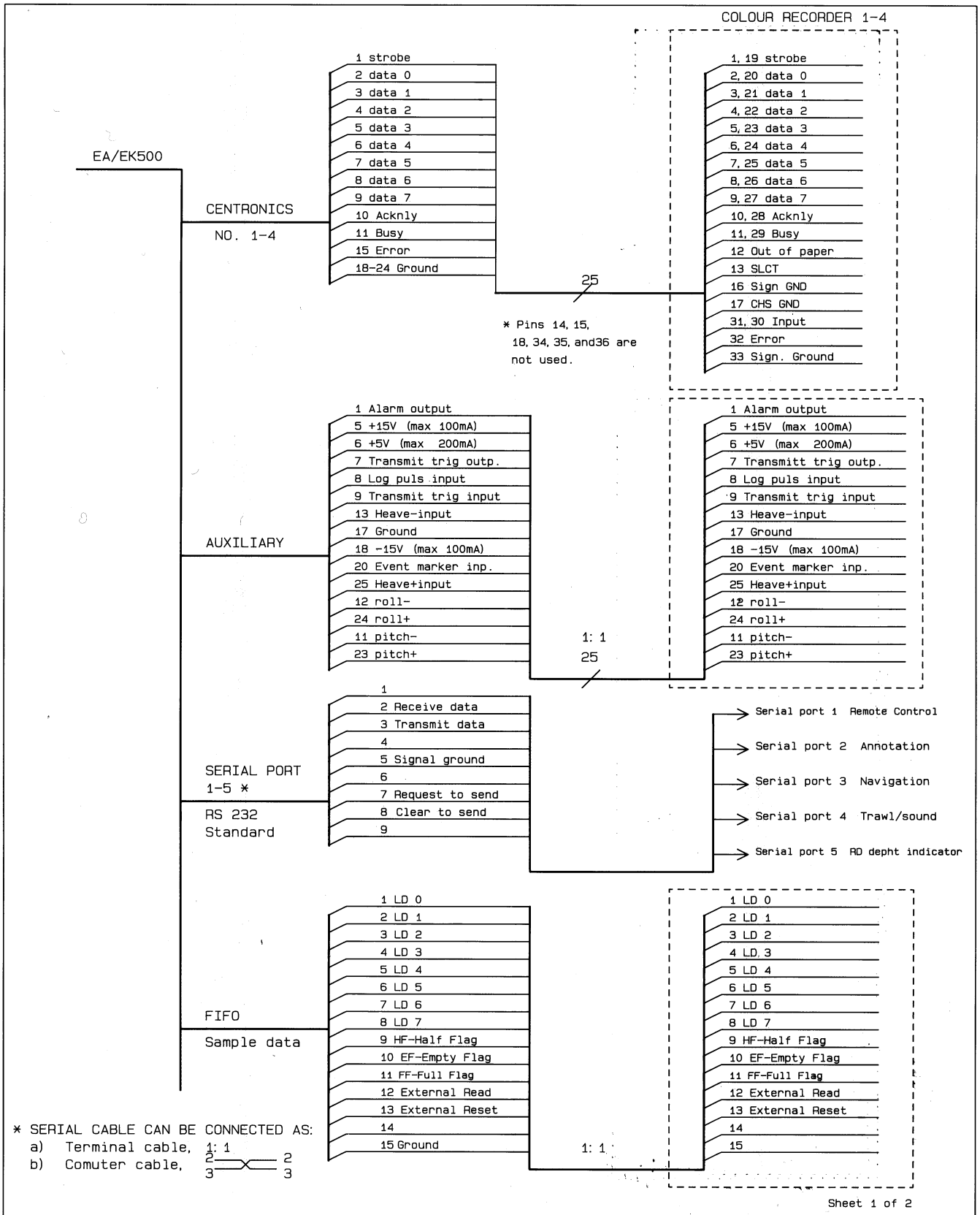
8346	
91.09.16	E.M.L.
8061	
90.09.07	E.M.L.
NR.	SIGN.
ENDRINGS-MELDING	

MALEST.		
TEGN.	90.02.28.	E.M.L.
KONTR.	90.02.28.	T.K.
GODKJ.	90.02.28.	E.L.

INTERCONNECTION
DIAGRAM
EA/EK/ES 500

SIMRAD

ERST.	
824-065246	L
ARKIV NR. 593-15	



Sheet 1 of 2

NR.	SIGN.
8346	
91.09.16	EML
8061	
90.09.07	E.M.L
ENDRINGS-MELDING	

MALEST.		
TEGN.	90.02.27.	E.M.L.
KONTR.	90.02.27.	T.K.
GODKJ.	90.02.27.	E.L

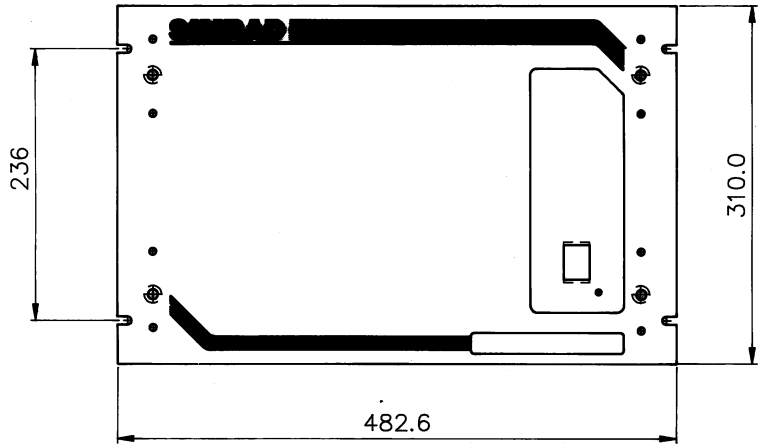
INTERCONNECTION DIAGRAM
EA/EK/ES 500

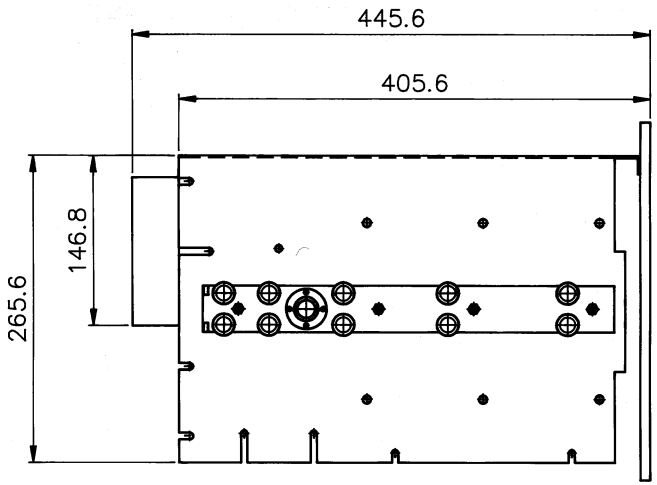
SIMRAD

ERST.

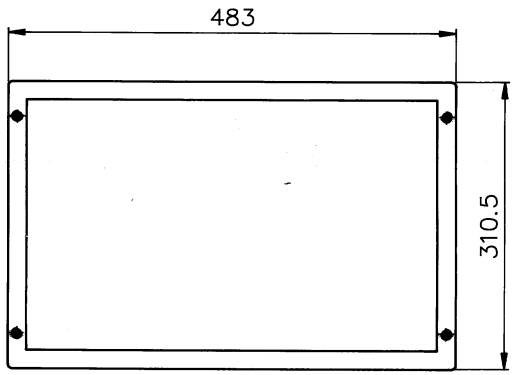
824-065246 C

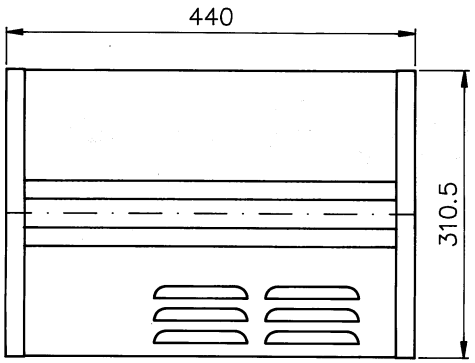
ARKIV NR. 593-15

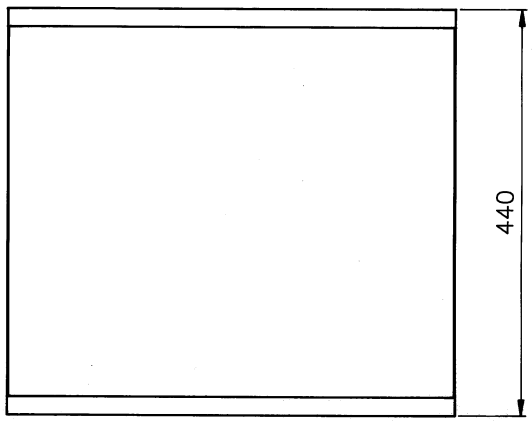




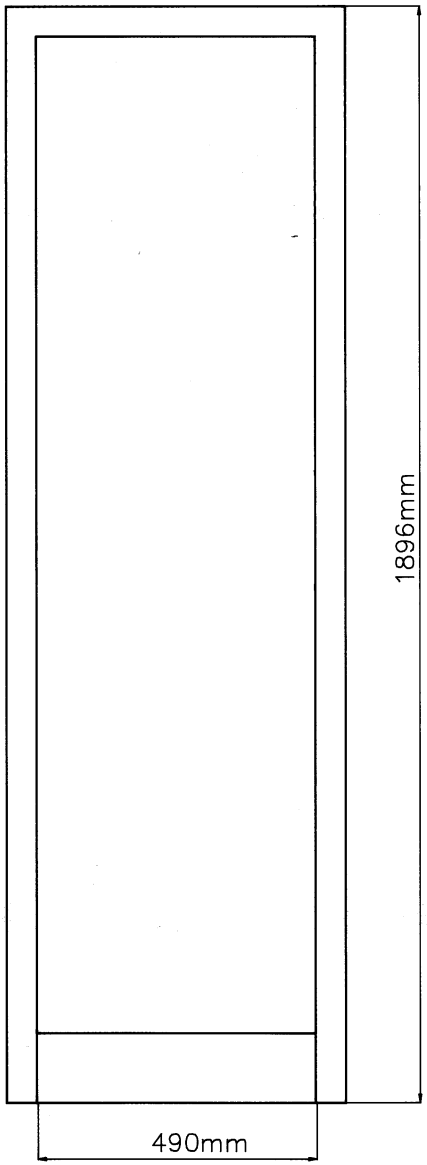
PROJ. METODE			TOLERANSER FOR IKKE SPESIELT TOLERANSESATTE MÅL: MIDDELS NS 1430	SIMRAD
MÅLEST.			BASE UNIT OUTLINE DIMENSIONS	ERST.
TEGN.	90.03.15	M.I.		830-083731 A
KONTR.	90.05.08	T.K.		
GODKJ.	90.05.08	H.B.	EA/EK 500	ARKIV NR. 593-69

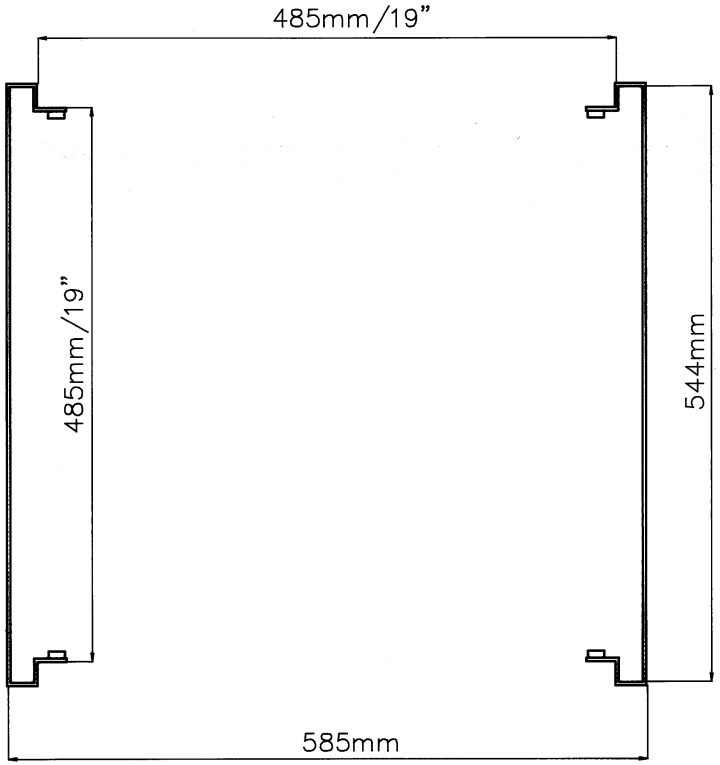






PROJ. METODE			TOLERANSER FOR IKKE SPESIELT TOLERANSESATTE MÅL: MIDDELS NS 1430	SIMRAD
MÅLEST.			CABINET OUTLINE DIMENSIONS	ERST.
TEGN.	90.03.15	M.I.		830-083732 A
KONTR.	90.05.08	T.K.		
GODKJ.	90.05.08	H.B.	EA/EK 500	ARKIV NR. 593-70

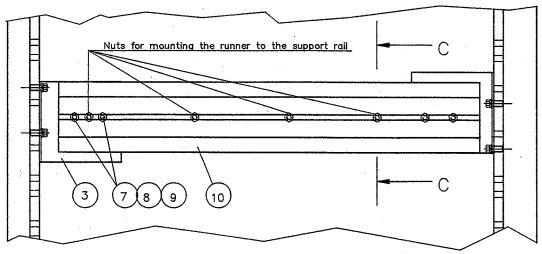




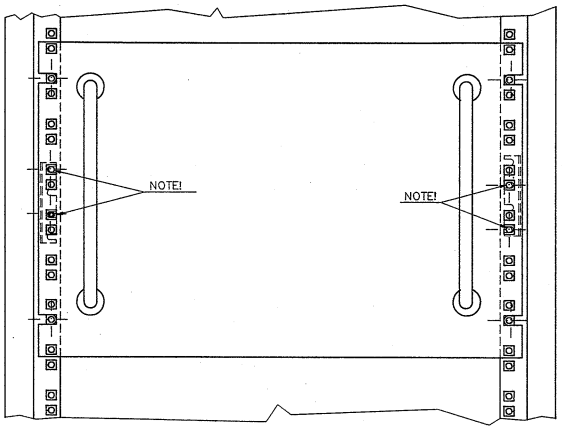
IF DOOR ON AFT SIDE OF RACK–MINIMUM
SPACE TO OPEN DOOR IS 500mm.

RACK INSTALLATION
OUTLINE DIMENSION
EA/EK500

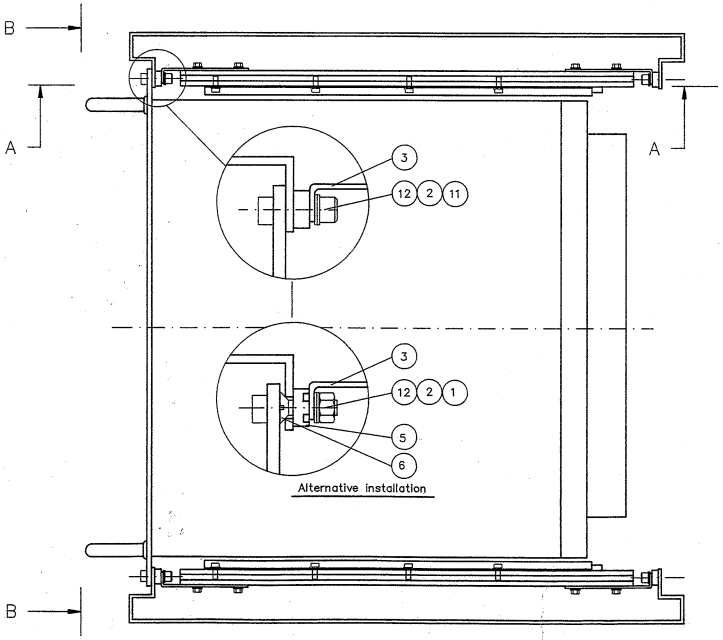
830–083839



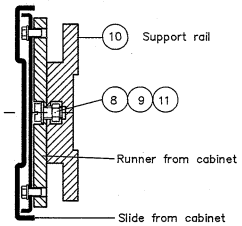
Section A–A Shown without slide and runner.



Section B–B



Alternative installation



Section C–C Scale 1:1

INSTALLATION

The two pair of slide and runners in the cabinet are unscrewed.
Insert 8 ea. 5mm nuts(9) on each suport rail.
Fasten the brackets (3) to both ends, and fasten the support rail, see section A–A for details.
The rail is then screwed to the runner.

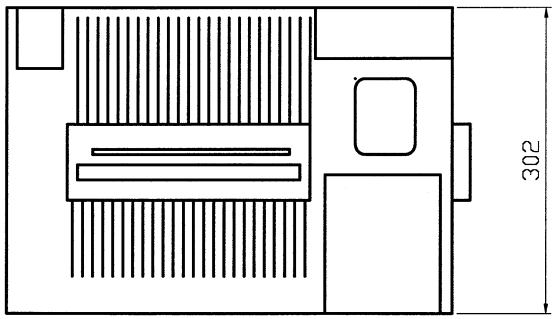
NOTE: When assembling the support rails with brackets in to the rack, be shure to use mounting holes in rack that gives the Tranceiver the right position. See note in section B–B.

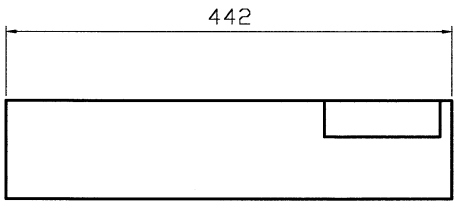
4 Plastic bag, containing:

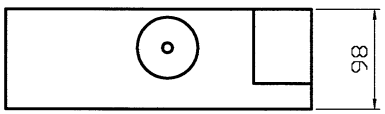
1	8 ea. nut M6
2	8.ea split lock washer ø6.1
3	4 ea. bracket 509–055782
5	12 ea. lock nut M6
6	8 ea. socket head cap screw M6x12 6K
7	8 ea. screw M5x12 6K
8	16 ea. split lock washer ø5.1
9	16 ea. nut M5
10	2 support rail
11	8 ea. socket head cap screw M6x12 6K
12	8 ea. washer ø6.1
13	1 ea. installation drawing 851–056419
14	8 ea. cyl. screw M5x8

REV./SIGN	8354 TRS				
DATE	91.09.25				
PROJ. METHOD			UNLESS OTHERWISE STATED, TOLERANCE: DIM.: ——— THREAD: 6g/6H		SIMRAD
SCALE	1:2.5	1:1	Installation drawing		SHEET 1 OF 1
DRAWN	89.08.18	HAA			851–056419 B
CHECKED	90.02.22	BG	EA/EK/ES 500 RACK		
APPROVED	90.02.22	RLN			FILE NO.: 528–95

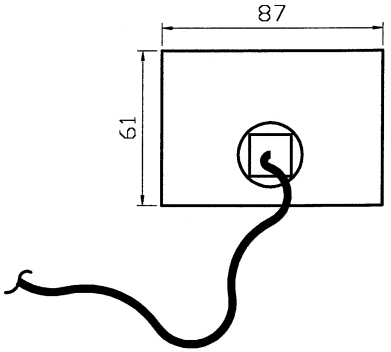
WEIGHT: 5kg

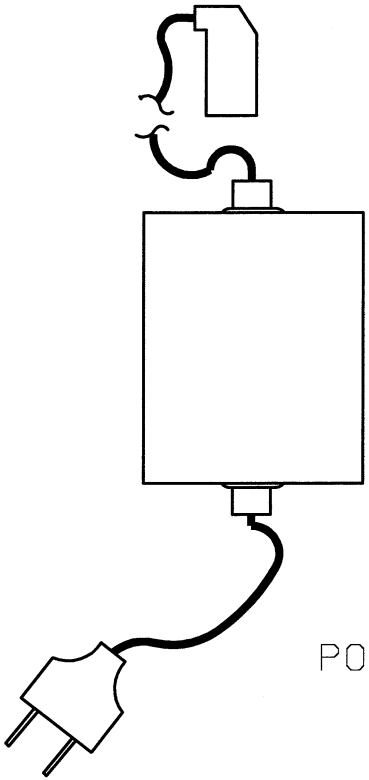


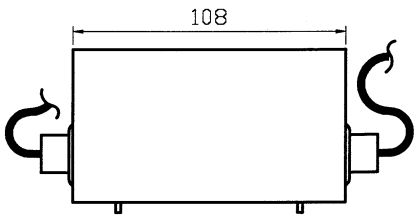




HP COLOUR RECORDER







POWER MODULE

All dimensions in mm.

REV./SIGN.					
DATE					
PROJ. METHOD			UNLESS OTHERWISE STATED, TOLERANCE: DIM.: ---- THREAD: 6g/6H	SIMRAD	
SCALE			Colour graphic	SHEET 1 OF 1	
DRAWN	90.03.15	M.I.	HP Colour Recorder	830-083733	B
CHECKED	90.05.08	T.K.	Power Module		
APPROVED	90.05.08	H.B.	Outline dimension	FILE NO.: 593-71	

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Simrad EK500
Installation manual

Simrad EK500
Installation manual

Simrad EK500
Installation manual

Simrad EK500
Installation manual