## Installation instruction for the following units:
CA34/44/54, CE34/44/54, CP34/44/54 and CR34/44/54.

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List of Simrad distributors.................................................................. end of manual
# I. Installation instruction

## I.1 Installation notes

For a number of reasons, all user-related decisions, setups, etc. should be noted in these two pages as they occur. This information may be helpful if your unit has been updated with new software, reset or in for service.

<table>
<thead>
<tr>
<th>Radar setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scanner type</td>
</tr>
<tr>
<td>Antenna height</td>
</tr>
<tr>
<td>Heading adjust</td>
</tr>
<tr>
<td>Tuning reference</td>
</tr>
<tr>
<td>Zero range/timing</td>
</tr>
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<td>Sensitivity</td>
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</table>

<table>
<thead>
<tr>
<th>Echo setup</th>
</tr>
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<tbody>
<tr>
<td>Transducer</td>
</tr>
<tr>
<td>Depth</td>
</tr>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>Keel depth</td>
</tr>
<tr>
<td>Other important settings:</td>
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<td>--------------------------</td>
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<td></td>
</tr>
</tbody>
</table>
1.2 Installation of CA/CE/CP/CR34

The unit can be flat or bracket mounted - overhead, bulkhead or console.

Console mounting.

Overhead mounting.

Bulkhead mounting.
Flush mounting of XX34

Removable corner for flush mounting.

Minimum clearance incl. cables: 15 cm.

Refer to included template for instructions on flush mounting.
(measurements in mm)
1.3 Installation of CA/CE/CP/CR44
The unit can be flat or bracket mounted - overhead, bulkhead or console.

Overhead mounting.

Bulkhead mounting.

Console mounting.
Flush mounting of XX44

Removable corner for flush mounting.

Minimum clearance incl. cables: 11 cm.

Refer to included template for instructions on flush mounting.
1.4 Installation of CA/CE/CP/CR54
The unit can be flat or bracket mounted - bulkhead or console.
Overhead and bulkhead mounting is only possible if using a distance piece.

Console mounting.

Bulkhead mounting.
Flush mounting of XX54

Removable corner for flush mounting.

Minimum clearance for cables: 13 cm.

Refer to included template for instructions on flush mounting.
1.5 Location for display unit
Determine which place is the most suitable and convenient for navigation and general operation after considering the following conditions:
- you can see the ship’s bow when you raise or lower your eyes from the display.
- there is limited exposure to direct sunlight to avoid overheating - see environment temperature limits in 1.14 Specifications.
- there is good ventilation and minimum vibration.
- the minimum distance to a magnetic compass is 650mm (25.6”).
- provide sufficient space behind the unit to allow for proper cable connections to the rear panel connectors.

1.6 Connection between main unit and Dual Station
The DS models are remote control units for all the main units in the 34/44/54 series i.e. model numbers starting with the letters CA, CE, CP and CR. The units with the same model numbers are identical in size e.g. DS44 and CE44, so the same installation guides can be applied when performing the installation. When choosing a dual station, the unit does not have to match the main unit in size, as all the mentioned units are compatible. The dual station can be ordered with a specific keypad to match the keypad of the main unit. There are two types to choose from, one for the CE and CP units, and one for the CA and CR units. Example:

A special connection cable (153-3002-023) of 15 meters with two male plugs is supplied with the Dual Station. Push one of the male plugs into the receptacle marked NMEA1 on the back of the XX44/54 or REMOTE on the XX34 main unit and the second into the DS34/44/54.

An extension cable (153-6080-004) of 10 meters is available for installations requiring a total cable length of up to 25 meters.
The NMEA1 interface from the main unit XX44/54 is transferred to the dual station via the connection cable and is available on the dual station’s NMEA2 receptacle.

Refer to section 1.8 for details on pin numbers.

The connection cable between the dual station and the main unit is a special pair-twisted cable of 15 meters, which consists of the following wires:

1.6.1 Operation of Dual Station

The main unit and the dual station operate in parallel. All key commands are relayed to the main unit and the display picture is instantly transferred back via a high speed data bus (HSDb).

Adjust light/contrast in screen and background light in keypad via the [PWR] key. The eject keys and cartridge drawers are blinded and can not be opened on the dual station.
1.7 Connection of Radar supply box RS4050 or RS4052

To run the radar function, an external power supply must be connected to the CA34/44/54 and CR34/44/54.

Be careful to choose the correct supply box for the connected scanner.

The RS4050 is for the 2kW and 4kW scanners.
Ship’s mains 12 or 24 volt. Instructions and template for mounting, see Addendum no. 183-0700-003.

The RS4052 is for the 6kW and 12kW scanners.
Ship’s mains 24 volt. Instructions and template for mounting, see Addendum no. 183-0700-004.
1.8 Electrical connections
Page 1-12 and 1-13 are for XX34. (Page 1-14 and 1-15 are for XX44/54)
Electrical connections continued
Page 1-14 and 1-15 are for XX44/54. (Page 1-12 and 1-13 are for XX34)
**ECHO 1 Transducer**
1: Speed Log
2: Speed Log 5V +
3: Depth I + *
4: GND
5: Depth I - *
6: GND
7: Temperature
*CR/CP Model n.c.

**Scanner RB715a/6/7/8**
1: Purple thick +250V
2: Blue +24V
3: Orange thick +12V
4: Yellow GND
5: Green DAT GND
6: Red DAT
7: N.c.
8: Brown BP/HG
9: White BP/HG GND
10: Coax center V/TRG
11: N.c.
12: Red thick Ship’s +
13: N.c.
14: Coax shld V/TRG GND
15: Green thick Ship’s –
16: Yellow thick Ship’s +
17: N.c.
18: Blue thick Ship’s –
Main shield of RB716a cbl. is cnel. to GND ring.

**Scanner RB714a**
1: Purple thick +250V
2: Blue +24V
3: Orange thick +12V
4: Yellow GND
5: Green DAT GND
6: Red DAT
7: N.c.
8: Brown BP/HG
9: White BP/HG GND
10: Coax center V/TRG
11: N.c.
12: N.c.
13: Coax shld V/TRG GND
14: N.c.
15: N.c.
16: N.c.
17: N.c.
18: N.c.

**Radar Power Supply Box**
1: Blue Scanner 0 Volt
2: White Scanner +40 Volts
3: Black CA/CR PWR 0 Volt (−)
4: Red CA/CR PWR +10–32 Volts

Either

- Red Supply +10–32 Volts
- Black Supply 0V (−)

FUSE 6.3A Slow

- Or
1.8.1 Power supply connections - refer also to section 1.7
The internal voltage regulator will allow the XX34/44/54 to operate normally within the power supply voltage range from 10 to 32 V DC. The XX34/44/54 is connected to external power (battery or radar supply box) by means of the supplied power cable, which is approximately 2 meters long and is not extendable. After connecting the cable to the power source, push the plug as far as it will go into the four pin receptacle marked “PWR” on the rear of the cabinet and turn the plug’s coupling ring clockwise until it makes a click.

1.8.2 Fuse
Warning! A fuse should always be installed to protect the unit. Using a fuse which is not specified for your equipment can cause it to blow the instant the XX34/44/54 is switched on or it will not protect the equipment as intended – see fuse rating in section 1.14 Specifications.

1.8.3 Transducer connection (CA & CE models)
Most transducers are supplied with a 10 meter cable for connection to the echosounder unit – CA34/44/54 & CE34/44/54. Push the female plug, as far as it goes, into the receptacle on XX34 marked “ECHO”, or on XX44/54 marked “ECHO1” or/and “ECHO2” on the rear of the cabinet and turn the plug’s coupling ring clockwise until it clicks into locked position.

The unit must be turned off while connecting/disconnecting the transducer cables.

CA34 and CE34: Recommended transducers
Airmar single element two-frequency 50/200 kHz transducers i.e. B744V, P319, B45, B256, P66 and P52.

CA44/54 and CE44/54: Recommended connection and setup (refer to Operator manual) of Simrad supplied transducers

<table>
<thead>
<tr>
<th>Transducer type</th>
<th>Port</th>
<th>Echosounder setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simrad C50/200</td>
<td>ECHO2</td>
<td>Simrad Combi C50/200</td>
</tr>
<tr>
<td>Simrad C38/200</td>
<td>ECHO2</td>
<td>Simrad Combi C38/200</td>
</tr>
<tr>
<td>Airmar B250</td>
<td>ECHO2</td>
<td>Airmar Combi B250-22</td>
</tr>
<tr>
<td>Airmar B260</td>
<td>ECHO2</td>
<td>Airmar Combi B250-22</td>
</tr>
<tr>
<td>Airmar P319, P52, P66, B117, B45, SS505, B744V, B256</td>
<td>ECHO1</td>
<td>200kHz Airmar Des. A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airmar ST650</td>
<td>ECHO1</td>
<td></td>
</tr>
</tbody>
</table>
CA44/54 and CE44/54 Transducer connections:

⚠️ Warning!
Transducers containing speed log sensor e.g. Airmar B744V must never be connected to the port “ECHO2”. To avoid accidental connection, “ECHO2” is sealed with a small silicone plug, which of course is removable so e.g. a combi transducer can be connected.
1.8.4 Interface connection
The 34, 44 and 54 series feature three possibilities for interconnection and data sharing:

1. SimNet, which is recommended for control and data sharing between Simrad SimNet products.

2. NMEA2000, SimNet products will interface and share data with NMEA2000 based products.

3. NMEA0183, which has been the common standard for marine electronics. Interface connections are made to the receptacle on XX34 marked “NMEA”, or on XX44/54 marked “NMEA1” or “NMEA2” on the rear of the cabinet – turn the plug’s coupling ring clockwise until it stops.

The unit must be turned off while connecting/disconnecting the interface cable.

SimNet is a high-speed control and data network designed to integrate SimNet products into a complete system. Ready-made cables with small plugs makes it easy to run cables. Only 10 mm (3/8”) holes are required through panels and bulkheads. The SimNet accessory program contains the necessary items to make a successful installation, see section 1.14 Specifications.

Plug and Play - once all products are connected and power is switched on, the entire network system will be set up automatically and will ensure optimum performance.

SimNet interface connection for XX34 is made directly to the receptacle marked NET on the rear of the cabinet. Use a Tee Joiner to make a drop connection from the SimNet system to the NET receptacle.

SimNet connection to xx44 and xx54 is made via AT44, which is a special SimNet to NMEA converter with a plug for the NMEA2 receptacle and two sockets for SimNet.
**SimNet power and termination**
The following simple rules should be observed when installing SimNet:

- SimNet must be powered with 12 VDC and connected to the battery via circuit breaker and 5 amp fuse.

- Do not connect the SimNet power cable to the same terminals as the Autopilot Computer, Radar, thruster or other high current products.

- SimNet should normally be terminated in each end, starting with the power cable with termination in one end and termination plug or wind transducer (with termination) in the other end.

---

* The supply cable and wind transducer have a built-in terminator.

---

* The supply cable has a built-in terminator.

---

* The supply cable and wind transducer have a built-in terminator.
1.8.5 PC up/download via NMEA connection
A PC can be connected to XX34 via the NMEA port, or to XX44/54 via the NMEA2 port, to enable exchange of waypoint and route data.

NMEA 	 SUB-D 9 pin
Pin 6 White TX A (DATA OUT) 	 Pin 2
Pin 7 Brown TX B (RETURN) 	 Pin 5
Pin 8 Yellow RX A (DATA IN) 	 Pin 3
Pin 9 Green RX B (RETURN) 	 Pin 5
1.9 Installation of GPS / DGPS antenna

The antenna must be placed in a position where tall constructions, steel wires, masts, etc. do not obstruct the view to the satellites. Do not, however, mount the antenna in the top of a mast or tower, as this may degrade the COG and SOG readings, especially if DGPS is used. Do not place the antenna close to sources of electrical interference, such as radar, satcom, etc. If installing the GPS antenna close to other antennas it must be placed either above or below the radiation beams. There is full coverage down to 20° below the horizon.

Avoid installing the GPS antenna inside the beam areas.

Mounting of DGPS antenna MGL-3
Mount the antenna on a standard US 1” 14 thread pipe, or optional standard antenna mount. Tighten firmly, but only by hand - no use of tools. Attach the antenna cable to the TNC socket.

Mounting of GPS antenna RS5640
Loosen the screw (1) of the antenna adapter. Guide the antenna cable (2) through the adapter and connect it to the antenna. Screw the US 1” 14 mount adapter (3) firmly onto the optional antenna mount (4). Press (5) the antenna into the adapter and turn it (6) approx. 1/2 to 1 turn counter clockwise to “catch” the thread. Turn (7) clockwise 1 to 2 turns and firmly secure the antenna with the lock screw (1).

Do not close the small ventilation hole at the bottom, and do not attempt to open the antenna.
1.10 Optional connections

- Compass
- Dual Station DS34/44/54
- Performance Instruments
- Differential Beacon Receiver
- Water speed and temperature sensor
- Autopilot
- Yeoman digitizer
- PC - WPs & routes up/download
- Other equipment via SimNet, NMEA0183, or NMEA2000.

1.11 Universal connection cable for echo transducers (option)

The universal connection cable should be applied when connecting one or two transducers to either ECHO1 or ECHO2 port on XX44/54, or single transducer to the ECHO port on XX34. Transducers for CA44/54 and CE44/54 are recommended to be 60 to 80 ohms and minimum 1kW.

Connection cable (153-3004-002) Cable type AMW STYLE 2464

<table>
<thead>
<tr>
<th>Pin</th>
<th>ECHO1 50/200kHz</th>
<th>ECHO2 50&amp;200kHz</th>
<th>ECHO2 38&amp;200kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Red</td>
<td>Speed log</td>
<td>50kHz+</td>
<td>200kHz+</td>
</tr>
<tr>
<td>2 Black (brown)</td>
<td>VCC speed</td>
<td>50kHz-</td>
<td>200kHz-</td>
</tr>
<tr>
<td>3 Blue</td>
<td>Depth 1+</td>
<td>200kHz+</td>
<td>38kHz+</td>
</tr>
<tr>
<td>4 Shield</td>
<td>Shield</td>
<td>Shield</td>
<td>Shield</td>
</tr>
<tr>
<td>5 White (orange)</td>
<td>Depth 1-</td>
<td>200kHz-</td>
<td>38kHz-</td>
</tr>
<tr>
<td>6 Green</td>
<td>GND*</td>
<td>GND (Temp.)</td>
<td>GND (Temp.)</td>
</tr>
</tbody>
</table>

*) Temp./Speed log
1.12 Basic transducer and cable information (CA & CE models)

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

The CA & CE34/44/54 must be turned off while connecting/disconnecting the transducer cable.

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 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.

Only applicable for CA & CE44/54 models:
The CA & CE44/54’s transmitter is designed to match Simrad 1kW 75 ohms high performance transducers described in section 1.12.1 Transducers. However, when using a 600 W single element transducer e.g. B744V, the 1kW output signal from the echosounder is automatically reduced due to the difference of impedance in the transmitter, which is 75 ohms, and the transducer, which is 185 to 425 ohms. See section 8.2 Echosounder setup in the CE44/54 operator manual, or section 9.3 Echosounder setup in the CA44/54 operator manual, for correct setting for the transducer selected.

⚠️ Warning!
Transducers containing speed log sensor e.g. Airmar B744V must never be connected to the port “ECHO2”. To avoid accidental connection, “ECHO2” is sealed with a small silicone plug, which of course is removable so e.g. a combi transducer can be connected.
1.12.1 Transducers (option)

Simrad Combi-transducers C50/200 or C38/200
For optimum performance of the XX44/54 Echosounder, the Simrad combi transducers C38/200 and C50/200 are recommended. These transducers also include a water temperature sensor. A variety of alternative medium-range transducers is available for vessels mainly operating in shallow waters and/or where the size of the transducer is critical.

Combi C50/200 or C38/200 combines two transducers and a temperature sensor in one housing. It has a streamlined shape, designed for mounting onto the hull.

**Frequency:**

<table>
<thead>
<tr>
<th></th>
<th>50 and 200 kHz</th>
<th>38 and 200 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beamwidth:</td>
<td>longitudinal 10° / 7°</td>
<td>longitudinal 13°/ 7°</td>
</tr>
<tr>
<td></td>
<td>transverse 16° / 7°</td>
<td>transverse 21° / 7°</td>
</tr>
</tbody>
</table>

**Maximum pulse power input:**

|                      | 1000 W          | 1000 W          |

**Maximum continuous power input:**

|                      | 10 W            | 10 W            |

**Storage temperature:**

|                      | max.70°C, min. –20°C | max.70°C, min. –20°C |

**Cable length:**

|                      | 10m (32’)        | 10m (32’)        |

**Maximum transducer depth:**

|                      | 20 meters        | 20 meters        |

**Reference No.**

|                      | 700-3000         | 700-3001         |
Airmar P319

Thru-hull mount

Frequency: 50/200 kHz
Beamwidth: 45° / 15°
Cable length: 10m (32’)
Depth information.

Reference no. 179-0401-002 (P319)
Housing: Reinforced plastic
Recommended for fiberglass and metal hulls. Do not use in wooden hulls!

Reference no. 179-0401-003 (B117)
Housing: Bronze
Recommended for fiberglass and wooden hulls.

Airmar P66

Transom mount

Frequency: 50/200 kHz
Beamwidth: 45° / 15°
Cable length: 10m (32’)
Speed, temperature + depth information

Reference no. 179-0401-001
Housing: Chemical resistant, high impact plastic alloy.
Recommended for all type hulls.

Do not connect to XX44/54’s ECHO2 port.
**Airmar SS505**

**Thru-hull stem mount**

Accomodates hull thickness:
- Min. no fairing 6 mm (1/4"),
- Max. with fairing 83 mm (3 1/4"

Frequency: 50/200 kHz  
Beamwidth: 45° / 15°  
Cable length: 10m (32')  
Depth information.

Ref.no. 179-0401-004 (B45)  
Housing: Bronze  
Recommended for fiberglass or wooden hulls only.

Ref.no. 179-0401-008 (SS505)  
Housing: Stainless steel  
Recommended for any hull material.
1.12.2 Determining the position for the transducer

The CA & CE34/44/54 is a sophisticated piece of electronic equipment, but how well it will perform under actual operating conditions will be largely dependent upon the location of the transducer and how it has been installed. Careful consideration, therefore, must be given to selecting the mounting location and on deciding the method of installation that best suits the vessel.

Air bubbles and turbulence caused by the vessel’s movement through the water will seriously degrade the transducer’s performance. Therefore the transducer should be located well clear of any water intake or discharge line and also clear of any projection along the hull line which might disturb the smooth flow of water. It is of profound importance for good performance of the CA & CE34/44/54 that the water flowing over the transducer be free of bubbles and aeration. If the transducer face is clean but the performance degrades with increasing vessel speed, then aeration of the water flowing under the transducer may be the cause of the poor performance. Due to the varying design of ship’s hulls and different operating speeds, there
can be great variation in the amount of air bubbles which are carried beneath the hull. These bubbles tend to be carried close to the hull as they pass aft. For this reason, it is desirable for the transducer to be mounted on a fairing block which holds the transducer away from the hull and which directs the flow of aerated water around the sides of the transducer rather than over the face of the transducer.

On deep keeled vessels, care must be taken to ensure that the transducer beam will not be blocked by any part of the keel. Although the appropriate mounting location that meets all requirements depends on the type of vessel and its normal operating speeds, a practical choice is usually somewhere between one third and one half of the vessel’s water line length from the bow. Leveling blocks may be designed accordingly to meet this requirement.

The more the transducer protrudes from the hull, the better the results will be.

Particularly at lower frequency operation (38 and 50kHz), interference from propeller noise can be a significant problem. This can be seen as an increase in the “noise” on the echosounder display when the propeller speed is increased. To help reduce this, the transducer’s mounting face may be angled slightly forward on the order of 3-5°. The goal is to incline the transducer so that a line of sight along the transducer’s radiating surface passes below the propeller.

Keeping the propeller clean and free of any nicks or roughness will assist in minimizing interference from propeller noise due to cavitation.

Sources of noise to consider:

<table>
<thead>
<tr>
<th>Water/air noise</th>
<th>Acoustic noise</th>
<th>Electrical noise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air bubbles</td>
<td>Main engine</td>
<td>Noise from electrical cables</td>
</tr>
<tr>
<td>Turbulence</td>
<td>Reduction gear propeller shaft</td>
<td>Noise from generators</td>
</tr>
<tr>
<td>Propeller</td>
<td>Generators auxiliary engines</td>
<td>Poor grounding of instrument</td>
</tr>
<tr>
<td></td>
<td>Power plant for freezers</td>
<td>Radiated noise from other instruments</td>
</tr>
<tr>
<td></td>
<td>Hydraulic pumps</td>
<td>Dc – Dc converters</td>
</tr>
<tr>
<td></td>
<td>Rudder engine</td>
<td>Electrical winches</td>
</tr>
<tr>
<td></td>
<td>Bow thruster</td>
<td>Neon lights</td>
</tr>
<tr>
<td></td>
<td>Stern thruster</td>
<td>etc.</td>
</tr>
</tbody>
</table>
1.13 Installation of scanner unit (CA & CR models)

A radar’s target detection capacity varies greatly depending on the fitted position of the scanner. An ideal fitting position is a location high above the ship’s keel line where there is no obstacle all around the scanner. In an actual ship, such an ideal location is limited by various factors. Therefore, consider the following suggestions when you determine the place to install the scanner:

A. **Install scanner at a position as high as possible**
The higher the installation position, the longer the radio ranging distance. Install the scanner at a position as high as possible after considering the ship’s hull structure and radar maintainability.

B. **Install scanner away from smoke-stack and mast**
If the scanner is installed at the same height as the smoke-stack or mast, radar waves may be blocked, creating shadow zones or generating false echoes. Therefore, do not install the scanner at such a position.

C. **Install scanner forward away from obstacle**
To avoid creating shadow zones or generating false echoes, install the scanner at a position nearer to the ship’s bow away from obstacles. When installing the scanner on a mast, position it in front of the mast. If obstacles cannot be avoided for the ship’s structural reasons, refer to “Shifting away from obstacles” described in section 1.13.1.

D. **Do not install the scanner near hot or heat-generating items**
Do not install the scanner at a position where it may be subjected to smoke or hot air from smoke-stacks or heat from lamps.

E. **Install the scanner away from antennas or other equipment**
Install the scanner as far away as possible from the antennas of a direction finder, radio transceiver, etc..
1.13.1 Shifting away from obstacles

**Shifting from keel line:** By shifting the scanner position from the keel line to the starboard side of the ship, it is possible to move shadow zones to the port side which makes it possible to keep a clear vision in the bow direction. The distance to be shifted can be obtained by calculation depending on the distance from the scanner to obstacles using the following equation:

\[
L_s = \begin{cases} 
0.4R + D/2 \text{ [m]} & \text{(when } R < 15\text{m)} \\
0.025R + D/2 \text{ [m]} & \text{(when } R > 15\text{m)} 
\end{cases}
\]

where \( L_s \) = distance to be shifted from keel line
\( D \) = diameter of obstacle on keel line
\( R \) = distance from scanner to obstacle

**Obtaining sufficient dip angle:** Raise the scanner position so that there is a sufficient dip angle available between the line of sight from the scanner to the obstacle and the horizontal line. By raising the dip angle above 5° it is possible to prevent mid and long distance shadow zones. The radar cannot detect objects below the line of sight.
1.13.2 Mounting of scanner

Deciding the place of installation, a minimum distance must be considered to the master compass (2 meters) and steering compass (1.4 meters). If a mount base like the one shown below is available, it may be easier to install the scanner. If not available, you may install the scanner directly to the roof, etc. In this case, pay attention to the water drain tube located at the bottom of the scanner unit during installation.

 realpath When the radar mast or mounting bracket has a curvature of more than 2mm, repair it or use spacers.

Mount base

Do not use an edge that might trap water

Which size bolts to use for mounting of scanner unit:

<table>
<thead>
<tr>
<th>Thickness of mount base</th>
<th>Bolt requirement</th>
<th>Material</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4mm (0.04-0.16 in.)</td>
<td>M10 × 15 (1.5mm pitch)</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>4-9mm (0.16-0.35 in.)</td>
<td>M10 × 20 (1.5mm pitch)</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>9-14mm (0.35-0.55 in.)</td>
<td>M10 × 25 (1.5mm pitch)</td>
<td>Steel</td>
<td>Incl. with radar</td>
</tr>
<tr>
<td>14-19mm (0.55-0.75 in.)</td>
<td>M10 × 30 (1.5mm pitch)</td>
<td>Steel</td>
<td></td>
</tr>
</tbody>
</table>
RB714A Radome scanner

- 45cm radome
- 2kW
- Range up to 24nm
- Rotation speed 24rpm
- Beamwidth:  Horizontal 5.9°
  Vertical 25°

The bolts included with your radar equipment will suffice for mount base thickness of 9 to 14mm (0.35 to 0.55 in.). If the mount base is thicker or thinner than this, prepare bolts as listed on page 1-31.

Silicone should be applied to secure the bolts. Do not use locking putty, as it may damage the radome.

Drilling template for RB714A
RB715A Radome scanner

- 65cm radome
- 4kW
- Range up to 36nm
- Rotation speed 24 or 48rpm
- Beamwidth:  Horizontal 3.9°
  Vertical 25°

The bolts included with your radar equipment will suffice for mount base thickness of 9 to 14mm (0.35 to 0.55 in.). If the mount base is thicker or thinner than this, prepare bolts as listed on page 1-31.

Silicone should be applied to secure the bolts. Do not use locking putty, as it may damage the radome.
RB716A Open scanner

- 3 or 4ft Open array
- 4kW
- Range up to 48nm
- Rotation speed 24 or 48 (24V) rpm
- Beamwidth:
  - Horizontal 2.5°, 1.8°
  - Vertical 22°

RB717A Open scanner

- 4 or 6ft Open array
- 6kW
- Range up to 72nm
- Rotation speed (24V) 24 or 48 rpm
- Beamwidth:
  - Horizontal 1.8°, 1.2°
  - Vertical 22°

RB718A Open scanner

- 4 or 6ft Open array
- 12kW
- Range up to 96nm
- Rotation speed (24V) 24 or 48 rpm
- Beamwidth:
  - Horizontal 1.8°, 1.2°
  - Vertical 22°
The bolts included with your radar equipment will suffice for mount base thickness of 9 to 14mm (0.35 to 0.55 in.). If the mount base is thicker or thinner than this, prepare bolts as listed on page 1-31.

Silicone should be applied to secure the bolts. Do not use locking putty, as it may damage the radome.

Drilling template for RB716A, RB717A, RB718A.

Remove the protective cap covering the rotary coupler on the top of the scanner. Match the antenna radiation direction to direction of the arrow on the rotation base and fix the antenna in position using the four M8 accessory bolts.

### 1.13.3 Connecting cables

*length of cables – see 1.14 Specifications*

Run the cables by following the instructions below:

- Do not bind the cable for the radar collectively with cables of other equipment (especially the power supply cable).

- The cable has a connector fitted on the display and scanner side. If it is necessary to pass the cable through a narrow path, then fix the scanner side connector vertically by using vinyl tape before guiding the cable through the path.

- Run the cable along the ship’s hull or wall surface, and fasten it at intervals of about 40 cm.
Interconnecting cable (RB714A + RB715A)

Remove the upper part of the radome from the scanner unit. Avoid bumping it against the antenna by lifting vertically (there are four fixing screws). Remove the tape securing the antenna. Remove the shield cover located on the astern side (four fixing screws). Remove the cable clamping plate and rubber ring, pass the cable through the cable inlet, place the rubber ring around the cable, and clamp the cable to the scanner unit with screws via the fixing plate. See ‘Fitting interconnecting cable’ for RB714A and RB715A further on in this section.

RB714A: Connect 10-pin connector to X1.
RB715A: Connect 7-pin connector to X11 and 9-pin connector to X12 of PCB.

Replace the aluminum cover: Attach a cable shield onto a ditch with the aluminum cover. Be careful that the cable does not get caught between main unit and cover, and that the antenna is free to rotate.

Replace the upper part of the radome: Be careful not to bump it against the antenna. Be sure that the cover is fitted in the correct direction (refer to below illustration). Align the upper and lower parts with the holes for the screws.

Ensure that the radar is off. Connect the cable to the receptacle marked RADAR on the rear panel of the display unit.
Fitting interconnection cable (RB714A):

1. Connect the interconnection cable (RB714A) to X1.
2. Place the Radome (bottom) into its correct position.
3. Install the Fixing plate and ensure it is securely fastened.
4. Place the Rubber ring around the connection point.
5. Attach the Shield cover to the Stern side of the device.
6. Ensure the Cable shield is properly installed.
7. Connect the Inner shield to the PCB.
8. X1 (Connect here) is the designated connection point for the interconnection cable.
Fitting interconnection cable (RB715A):
Interconnecting cable (Open Scanner)

1. Use a T-wrench to remove the back covers of the scanner unit.

2. Remove the two bolts securing the transceiver and pull out the transceiver after removing two connectors (to Motor (X1), to Heading switch (X2)).

3. Remove the four bolts securing the fixing plate at the cable entrance.

4. Remove the metal fixing plate, rubber seal and washer that secures the cable.

5. Pass the cable through as shown in the diagram below.

6. Replace the above items and tighten the bolts.

7. Return the transceiver to its original position and secure it with the removed bolts.

8. Connect 7-pin connector to X11 and 9-pin connector to X12 of PCB.

9. Re-connect the two connectors removed at point 4.

10. Refit the scanner covers.

11. Take care the cable is not pinched when refitting the cover.

12. Ensure that the radar is off.

13. Connect the cable to the receptacle marked RADAR on the rear panel of the display unit.

See ‘Fitting interconnection cable’ on next page.
Fitting interconnection cable (Open scanner):

Remove connector

Fixing bolt

Fixing plate

Clumper

Interconnection cable
**1.13.4 Connector's pin numbers and wire colors**

The connecting cable is supplied with the radar antenna. The 18-pin round connector is connected to the main unit’s receptacle marked RADAR – refer to section 1.8 for details on pin numbers.

The connector at the other end of the connecting cable is for the radar antenna, and consist of the following pin numbers and wire colors:

**Connector for the RB714A Radar antenna**

**Connector for the RB715A Radar antenna**
Connector for the Open Scanners (RB716A, RB717A, and RB718A)

JST no. VHR-9N

1. Blue
2. Not connected
3. Orange thick
4. Green
5. Red
6. White
7. Brown
8. Coax shield
9. Coax center

JST no. VHR-7N

1. Violet thick
2. Not connected
3. Yellow
4. Red thick
5. Yellow thick
6. Green thick
7. Blue thick

80mm (-5 +10) of main shield - twisted and with heat shrinkable tubing

270mm - 5 +15

310mm - 5 +20

35mm - 5 +10

secure with 2 small straps

terminal 6.3mm

100mm

100mm
1.13.5 **Grounding wire**

Connect grounding wire from one of the bolts used for mounting the scanner unit to ship’s hull. The crimp terminal and grounding wire are not included with the radar equipment.

1.13.6 **Initial start-up of radar function**

Having completed the installation of the scanner and display units, and connecting cables, refer to the operator manual for initial start-up of radar function, section 3.2.2.
1.14 Specifications of the CA/CE/CP/CR34, 44 & 54

**General data**

- **Power supply:** 12 and 24 V DC (10-32 V DC max) 20 - 70 watts
  + Radar supply box to run radar antenna - see below.
- **Power cable:** With fuse F6.3A, 4 pin connector, 2 m (153-5000-006)
- **CSD:** Compass Safe Distance: 650 mm (25.6”)
- **Dimensions:**
  - XX34: H:220 mm (8.7”) L:220 mm (8.7”) D:112 mm (4.5”)
  - XX44: H:220 mm (8.7”) L:365 mm (14.6”) D:75 mm (3”)
  - XX54: H:330 mm (13”) L:460 mm (18.1”) D:95 mm (3.7”)
- **Weight:**
  - XX34: 3.2 kg (7 lbs), XX44: 3.7 kg (8.1 lbs),
  - XX54: 6.6 kg (14.5 lbs)
- **Environment:** 0 to +50°C, waterproof USC 46 CFR and IP55
- **Housing:** Casted aluminum back, polycarbonate front
- **Display:** TFT/ATFT color, power backlight, 640x480 pixels,
- **Interfaces:**
  - XX34: 1 port in/out NMEA 0183
  - XX44/54: 2 ports in/out NMEA 0183 (incl.SimNet/NMEA2000 via AT44 Active Tee)
  - PC up/download WPL and RTE
  - alarm:
    - XX34: Signal output 5 Volt 50 mA
    - XX44/54: Alarm relay (contact closure)
  - log out:
    - XX44/54: 200 pulses/nm (5 Volt pulses)
- **Main fuse:** F6.3A

**SimNet control**

- Maximum number of products connected in a network:..................50 units
- Maximum cable length (excl. 30 m wind transducer cable):......120 m (400’)
- Bit rate of the bus:..................................................................................250 kbit/second
- Maximum DC current through a single SimNet plug:.......................5A
- SimNet power supply:.............................................................................10.8 - 15 VDC
- Maximum drop cable length:.................................................................6 m (20’)
- Maximum total length of all drop cables ........................................90 m (200’)
- Environmental protection: Cable and plug/connector system:........IP66
- Temperature:............................................................................................max. 70°C (158°F)

**Radar supply box RS4050 to run radar antennas RB714/5/6A**

- **Addendum:** 183-0700-003
- **Dimensions:** H:125 mm, L:222 mm, D:81 mm
- **Power supply:** 12 and 24 V DC (10-32 V DC max)
- **Fuses:** Radar supply fuse 4A F
  - Main fuse 6A.3F
  - High voltage fuse 160 mAF
  - Radar motor fuse 6A.3F
**Radar supply box RS4052 to run radar antennas RB717/8A**

**Addendum:** 183-0700-004  
**Dimensions:** H:161.9 mm, L:263 mm, D:91 mm  
**Power supply:** 24 V DC (18-32 V DC max)  
**Fuses:**  
- Radar supply fuse 10 AT  
- Main fuse 6A.3F  
- High voltage fuse 200 mAF  
- Radar motor fuse 3.16AT

**GPS section**

- **Receiver type:** 14 channel parallel, C/A code, 8 state Kalman filter  
- **Accuracy:**  
  - Position (DGPS): 2-5 m RMS  
  - Position (SDGPS): 3-7 m RMS  
  - Position (GPS): 8 m RMS  
  - Speed: 0.1 kn  
  - Course: 1°  
- **Speed filter:** 10 settings  
- **Update rate:** 1 second interval, typical  
- **Dynamics:**  
  - Velocity: 600 km/h  
  - Acceleration: 10 m/s²

**GPS antenna RS5640**  
- **Type:** Quadrifilar Helix  
- **Dimensions:** L:230 mm, D:38 mm  
- **Weight:** 150 g (0.33 lbs)  
- **Environment:** -35°C to +75°C, 95% rel.  
- **Mounting:** 1” 14 thread (standard US)  
- **Cable:** 10 m RG58 (standard), 15 m RG223 (option), max. 30 m RG213

**DGPS antenna MGL-3**  
- **Type:** Patch and H-field  
- **Dimensions:** H:75 mm, D:127 mm  
- **Weight:** 600 g (1.3 lbs)  
- **Environment:** -35°C to +75°C, 95% rel.  
- **Mounting:** 1” 14 thread (standard US)  
- **Cable:** 10 m RG58 (standard), 15 m RG223 (option), max. 30 m RG213

**Chartplotter section**

- **Chart system:** C-MAP NT+  
- **Presentation:** Dual chart - two charts in individual scales and detail levels  
- **Internal memory:** Dynamic storage with combinations of/or totals up to:  
  - 35,000 marks/waypoints  
  - 10,000 waypoints with name (25 characters)  
  - 50,000 trackpoints  
  - 50,000 line sections  
  - 1,000 routes
**Radar section**

Display modes: Head Up, North Up, True Motion, Dual Range.

Range scale: 0.125 – 48nm in 11 steps or multi range.

Min. range: 30 meters

Range resolution: 30 meters

Bearing accuracy: 1° or better

Off-center: Max 66%.

Guard zone: Can be set at any desired distance and angle in any desired width. IN and OUT modes are available.

Stretch: AUTO, PULSE, VIDEO.

Trail (wake): 30 sec., 1, 2, 5, 10, 15, 30 min. or permanent.

---

**Radar radome antennas**

<table>
<thead>
<tr>
<th>Radome:</th>
<th>RB714A</th>
<th>RB715A</th>
</tr>
</thead>
<tbody>
<tr>
<td>45cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>65cm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scanner:</th>
<th>RB714A</th>
<th>RB715A</th>
</tr>
</thead>
<tbody>
<tr>
<td>2kW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4kW</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range:</th>
<th>RB714A</th>
<th>RB715A</th>
</tr>
</thead>
<tbody>
<tr>
<td>to 24nm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>to 36nm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rotation speed:</th>
<th>RB714A</th>
<th>RB715A</th>
</tr>
</thead>
<tbody>
<tr>
<td>24rpm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 or 48rpm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Beamwidth:</th>
<th>RB714A</th>
<th>RB715A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal</td>
<td>5.9°</td>
<td>3.9°</td>
</tr>
<tr>
<td>Vertical</td>
<td>25°</td>
<td>25°</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cables:</th>
<th>RB714A</th>
<th>RB715A</th>
</tr>
</thead>
<tbody>
<tr>
<td>10m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40m</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Radar open antennas**

<table>
<thead>
<tr>
<th>Open array:</th>
<th>RB716A</th>
<th>RB717A</th>
<th>RB718A</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 or 4 ft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 or 6 ft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6kW</td>
<td></td>
<td></td>
<td>12kW</td>
</tr>
<tr>
<td>12kW</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range:</th>
<th>RB716A</th>
<th>RB717A</th>
<th>RB718A</th>
</tr>
</thead>
<tbody>
<tr>
<td>to 48nm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>to 72nm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>to 96nm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rotation speed:</th>
<th>RB716A</th>
<th>RB717A</th>
<th>RB718A</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 or 48 rpm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(24V) rpm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(24V) rpm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Beamwidth:</th>
<th>RB716A</th>
<th>RB717A</th>
<th>RB718A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal</td>
<td>2.5°, 1.8°</td>
<td>1.8°, 1.2°</td>
<td>1.8°, 1.2°</td>
</tr>
<tr>
<td>Vertical</td>
<td>22°</td>
<td>22°</td>
<td>22°</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cables:</th>
<th>RB716A</th>
<th>RB717A</th>
<th>RB718A</th>
</tr>
</thead>
<tbody>
<tr>
<td>10m</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15m</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20m</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30m</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40m</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Echosounder section (CA & CE34)**

Frequencies: 50 or 200 kHz, selectable  
Transmit power: Variable up to 600 watt RMS (4,800 W PP)  
Impedance: 175 / 425 ohms  
Display ranges: 5 to 1000 m in 21 steps, manual and auto mode  
Detection ranges:  

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Beam</th>
<th>Bottom</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 kHz</td>
<td>45°</td>
<td>800 m / 2,400 ft</td>
</tr>
<tr>
<td>200 kHz</td>
<td>15°</td>
<td>350 m / 1,050 ft</td>
</tr>
</tbody>
</table>

Pulse length: Short, medium, long and auto  
Transmission rate: 10 pings per second  
Alarms: Fish, max. and min. depth  
Zoom mode: Bottom and VRM expansion, 6 to 50 meters, feet or fathoms  
Event marker: At current ping and depth memory  
Picture speed: True distance or time, high, medium, low, and freeze  
Noise filter: User selectable on/off  
Echo presentation: A-scope and white line discrimination  
Temperature: Sensor or NMEA  
Speed: Sensor or NMEA

**Echosounder section (CA & CE44/54)**

Frequencies: 38, 50 and 200 kHz, selectable  
Output power: Variable up to 1kW RMS per channel  
Impedance: 75 ohms  
Display ranges: 3 to 3000 m in 21 steps, manual and auto mode  
Max detection ranges:  

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Beam</th>
<th>Fish*</th>
<th>Bottom*</th>
</tr>
</thead>
<tbody>
<tr>
<td>38 kHz</td>
<td>13x21°</td>
<td>410m</td>
<td>1800 m</td>
</tr>
<tr>
<td>50 kHz</td>
<td>10x16°</td>
<td>430m</td>
<td>1500 m</td>
</tr>
<tr>
<td>200 kHz</td>
<td>7°</td>
<td>280m</td>
<td>400 m</td>
</tr>
</tbody>
</table>

*Single Fish Target Strength: -30dB (60cm cod)  
*Bottom Back Scattering Strength: -20dB  
*Simrad transducer C38/200 or C50/200

Pulse length: Short, medium, long and auto  
Transmission rate: 10 pings per second  
Alarms: Fish, max. and min. depth  
Zoom mode: Shift, bottom and VRM expansion, 3 to 50 meters, feet or fathoms
Event marker: At current ping and depth memory
Picture speed: True distance or time, high, medium, low, and freeze
Noise filter: User selectable on/off
Echo presentation: A-scope and white line discrimination
Temperature: Sensor or NMEA
Speed: Sensor or NMEA

50/200kHz medium-range transducers (Airmar Des.A)
B256: 1kW medium range transducer, 16x28° and 4x6° beams.
B45: 600W bronze stem mount transducer, 45° and 15° beam.
B744V: 600W bronze thru hull triducer, depth, speed and temperature, 45° and 15° beam.
P66: 600W plastic transom mount triducer, depth, speed and temperature, 45° and 15° beam.
P319: 600W plastic thru-hull transducer, 45° and 15° beam.
ST650: Speed and temperature only.

Dual frequency transducers (CA & CE44/54)
Simrad C38/200, 1kW high performance combi transducer 38 and 200kHz, 13x21° and 7° beams.
Simrad C50/200, 1kW high performance combi transducer 50 and 200kHz, 10x16° and 7° beams.
Simrad W38/200, 300W wide beam high performance combi transducer 38 and 200kHz, 32° beams.
Airmar B260-22, 1kW combi transducer 50 and 200kHz, 19° and 6° beams.

Cables included
Power cable, 2 m, 4-pin female connector, incl. fuse F6.3A (153-5000-006)
NMEA cable, 1.5 m, 9-pin female connector (153-3002-005)
Antenna cable, 10 m RG58

Accessories included for XX44/54
AT44 Active Tee with connector for SimNet control (153-5555-449)
SimNet cables and accessories (not included)
SimNet cable 0.3 m (1’), (24005829)
SimNet cable 2 m (6.6’), (24005837)
SimNet cable 5 m (16.6’), (24005845)
SimNet cable 10 m (33’), (24005852)
SimNet cable Tee Joiner (24005860)
SimNet cable gland (24005878)
SimNet protection plug (24005886)
SimNet termination plug (24005894)
2 m (6.6’) SimNet power incl. termination (24005902)
2 m (6.6’) SimNet power excl. termination (24005910)
AT10 Universal NMEA0183 converter (24005936)
SimNet cable protection cap (24005928)
SimNet/NMEA2000 adapter cable

Options for XX34/44/54
Simrad DataCards
C-MAP NT+ electronic charts
6-channel NMEA Buffer RS5345
PC data cable, 1.5 m (153-3002-024)
Antenna cable 15 m RG223
Universal connection cable for echo transducer, 2 m (153-3004-002)

DS34 Dual Station*, 7” TFT LCD color screen
DS44 Dual Station*, 10” TFT/ATFT LCD color screen
DS54 Dual Station*, 15” TFT LCD color screen
*) incl. 15 m cable (153-3002-023)
Extension cable for dual station, 10 m (153-6080-004)

Options only for XX34
Alarm/NMEA cable, 2 m (153-6080-001)

Options only for XX44
TiltFrame, 10” (700-5000-042)

Options only for XX44/54
NMEA1 cable, 1.5 m, 9-pin male connector (153-3002-004)
TL50 TurboLoader, external disc drive and NMEA interface
Sunhood, 10” (140-6515) or 15” (140-6752)