SIMRAD

10 kW and 25 kW Low Emission Radar

Installation Manual

ENGLISH

simrad-yachting.com

Preface

As Navico is continuously improving this product, we retain the right to make changes to the product at any time which may not be reflected in this version of the manual. Please contact your nearest distributor if you require any further assistance.

It is the owner's sole responsibility to install and use the instrument and transducers in a manner that will not cause accidents, personal injury or property damage. The user of this product is solely responsible for observing safe boating practices.

NAVICO HOLDING AS AND ITS SUBSIDIARIES, BRANCHES AND AFFILIATES DISCLAIM ALL LIABILITY FOR ANY USE OF THIS PRODUCT IN A WAY THAT MAY CAUSE ACCIDENTS, DAMAGE OR THAT MAY VIOLATE THE LAW.

Governing Language: This statement, any instruction manuals, user guides and other information relating to the product (Documentation) may be translated to, or has been translated from, another language (Translation). In the event of any conflict between any Translation of the Documentation, the English language version of the Documentation will be the official version of the Documentation.

This manual represents the product as at the time of printing. Navico Holding AS and its subsidiaries, branches and affiliates reserve the right to make changes to specifications without notice.

Copyright

Warranty

The warranty card is supplied as a separate document.

In case of any queries, refer to the brand web site of your display or system:

www.simrad-yachting.com

Declarations and conformance

This equipment is intended for use in international waters as well as coastal sea areas administered by countries of the E.U. and E.E.A.

Compliance Statements

The Simrad TXL-10S-4, TXL-10S-6, and TXL-25S-7:

* Comply with CE under R&TTE directive 1999/5/EC.

* Comply with the requirements of level 3 in Australia and level of conformity 3 in New Zealand.

* The relevant Declaration of Conformity is available in the following website under model documentation section:

//http://www.simrad-yachting.com

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada

IC RSS-GEN, Sec 7.1.3 Warning Statement- (Required for license-exempt devices)

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC RSS-GEN, Sec 7.1.2 Warning Statement- (Required for Transmitters)

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée quivalente (p.i.r.e.) ne dépassepas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

IC RSS-GEN, Sec 7.1.2 Warning Statement- (Required for Transmitters w/ detachable antennas)

The radio transmitters 768C-NKE2103, and 768C-NKE2254 have been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

System Model	Transmitter	Antenna part number/ description	antenna gain (dBi)	impedence (nominal)
TXL-10S-4	768C-NKE2103	151-10359-001 - 4 foot antenna	27.9 dBi	50 ohm
TXL-10S-6	768C-NKE2103	151-10360-001 - 6 foot antenna	29.9 dBi	50 ohm
TXL-25S-7	768C-NKE2254	151-10361-001 - 7 foot antenna	30.7 dBi	50 ohm

→ ***note:*** only the antenna and transmitter pairing shown in table above may be used.

IC RSS-102, Sec 2.6 Warning Statement

The user manual of devices intended for controlled use shall also include information relating to the operating characteristics of the device; the operating instructions to ensure compliance with SAR and/or RF field strength limits; information on the installation and operation of accessories to ensure compliance with SAR and/or RF field strength limits; and contact information where the user can obtain Canadian information on RF exposure and compliance. Other related information may also be included.

Le mode d'emploi des appareils destinés à l'utilisation contrôlée doit aussi inclure des informations sur les caractéristiques de fonctionnement de l'appareil; les instructions de fonctionnement pour assurer la conformité avec SAR et / ou les limites d'intensité de champ RF; informations sur l'installation et l'exploitation d'accessoires pour assurer le respect des SAR et / ou les limites d'intensité de champ RF; et les coordonnées où l'utilisateur peut obtenir des informations sur l'exposition canadienne de radiofréquences et la conformité. Autres renseignements connexes peuvent également être inclus.

Harmful Interference

The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna

• Increase the separation between the equipment and receiver

• Connect the equipment into an outlet on a circuit different from that of the receiver

• Consult the dealer or an experienced technician for help

Trademarks

- NMEA 2000 is a registered trademark of the National Marine Electronics Association
- Navionics is a registered trademark of Navionics SpA
- Simrad is a trademark of Kongsberg Maritime AS Company registered in the US and other countries and is being used under license
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About this manual

This manual is a reference guide for installing the Simrad TXL-10S-4, TXL-10S-6, and TXL-25S-7.

The manual does not cover basic background information about how equipment such as radars, echosounders and AIS work. Such information is available from our web site:

http://support.simrad-yachting.com

Important text that requires special attention from the reader is emphasized as follows:

➔ ***Note:*** Used to draw the reader's attention to a comment or some important information.

⚠ **Warning:** Used when it is necessary to warn personnel that they should proceed carefully to prevent risk of injury and/or damage to equipment/personnel.

Contents

1 Introduction

This manual explains how to install the radar scanner (antenna + pedestal) and the Navico radar processor. There are also details how to connect the radar to the various brands of displays produced by Navico.

This manual should be used in conjunction with the installation manual provided with the display.

This manual is written for professional marine technicians, installation technicians, and service technicians. Dealers may use information contained in this document.

The radar systems consist of a scanner, radar processor and connection cables. Scanner models are available with power outputs of 10 kW and 25 kW to suit different customer requirements. Each scanner model has a corresponding radar processor module.

The radar system is intended for use in a marine environment. It consists of an open antenna scanner connected to a radar processor module by a prefabricated interconnection cable. The interconnection cable must be installed by a qualified radar technician. An ethernet network cable is used to connect the radar processor to the system display.

> ⚠ **Warning:** The scanner cable should only be installed by a qualified radar technician

> ⚠ **Warning:** Use the radar at your own risk. Your radar is designed as a navigation aid. It should not be used for purposes that require precise measurements of direction, distance, topography or location. Always compare the navigation information received from your radar with data from other navigation aids and sources. When a conflict arises between the navigation data from your radar and data from other navigation aids, make sure you resolve the conflict before proceeding with navigation.
>
> A CAREFUL NAVIGATOR NEVER RELIES ON ONLY ONE METHOD TO OBTAIN NAVIGATION INFORMATION.
>
> International Regulations for Preventing Collisions at Sea mandate that when radar is on a vessel, the radar must be used at all times, regardless of weather conditions or visibility. Numerous court decisions have ruled that the radar must be used, and the radar operator must know all operational aspects of radar performance. Otherwise they will face a greater risk of liability if an accident occurs.

> ⚠ **Warning:** ***High Voltage Hazard***
>
> There are dangerously high voltages present within the radar pedestal unit.
>
> Technicians must exercise extreme care when working inside the unit. ALWAYS remove power before removing the cover. Some capacitors may take several minutes to discharge, even after switching off the radar. Before touching the magnetron or any high voltage components, ground them with a clip lead.

> ⚠ **Warning:** ***Microwave Radiation Hazard***
>
> The microwave energy radiated by a radar antenna is harmful to humans, especially to the eyes. NEVER look directly into an open waveguide or into the path of radiation from an enclosed antenna. Radar and other radio frequency radiation can upset cardiac pacemakers. If someone with a cardiac pacemaker suspects abnormal operation, immediately turn off the radar equipment and move the person away from the antenna. Turn off the radar whenever it is necessary to work on the antenna unit or other equipment in the beam of the radar.

➔ ***Note:*** Most countries accept that RF power density levels below 100 W/m^2 cause no significant RF hazard.

Radio Frequency (RF) Exposure Information

Calculations for radar systems in table below show that the safe distance (for a rotating antenna) is within the antenna's turning circle. Irrespective, users should stay well outside the turning circle of the antenna to avoid injury through impact as it spins.

System	100W/m² **or** power at Antenna face	50W/m² (measurement distance, cm)	10W/m² (measurement distance, cm)	2.5W/m² (measurement distance, cm)
10kW: TXL-10S-4 TXL-10S-6	32.8 W/m²	N/A	26cm (0.86 ft)	123cm (4.04 ft)
25kW: TXL-25S-7	74.7 W/m²	5cm (0.16 ft)	81cm (2.66 ft)	162cm (5.31 ft)

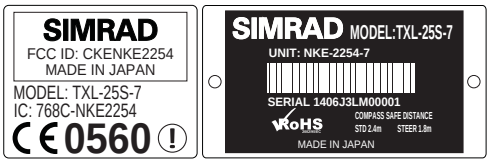
➔ ***Note:*** Limits apply to exposure within the vertical beam angle.

➔ ***Note:*** The safe range for a non-rotating antenna is far greater due to the lack of averaging, however this is not a permitted operational mode and the system includes interlocks to prevent this mode of operation.

FCC labels

10kW (4 foot & 6 foot):

25kW (7 foot, two labels):



Countries of intended use in the EU:

AT - Austria
BE - Belgium
BG - Bulgaria
CY - Cyprus
CZ - Czech Republic
DK - Denmark
EE - Estonia
FI - Finland
FR - France
DE - Germany
GR - Greece
HU - Hungary
IS - Iceland
IE - Ireland
IT - Italy
LI - Liechtenstein
LV - Latvia
LT - Lithuania
LU - Luxembourg
MT - Malta
NL - Netherlands
NO - Norway
PL - Poland
PT - Portugal
RO - Romania
SK - Slovakia
SI - Slovenia
ES - Spain
SE - Sweden
CH - Switzerland
TR - Turkey
UK - United Kingdom

2 Pre installation checks

Warning: A radar unit should only be installed by a qualified marine technician, as potentially lethal high voltage is present along with heavy rotating parts.

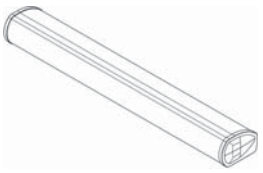
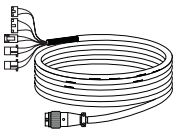
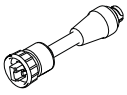
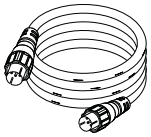
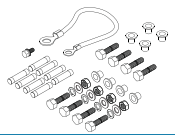
There is a transmit interlock that prevents radar transmissions if the antenna is not rotating. However, a high voltage remains for a period of time after the system is turned off. If you are not familiar with this type of electronics, consult with a trained service or installation technician before attempting to service any part of the equipment.

Installation includes:

- mechanical mounting
- electrical wiring
- configuring the display or network system to work with the radar
- adjusting the radar for proper performance

Don't take any shortcuts, and follow these instructions carefully!

Check the parts

System	TXL-10S-4	TXL-10S-6	TXL-25S-7	example
Antenna	4 foot	6 foot	7 foot	
Pedestal	NKE-2103-4	NKE-2103-6	NKE-2254-7	
Processor	10 kW	10 kW	25 kW	
Scanner cable	20 m	20 m	20 m	
Ethernet adaptor	1	1	1	
Ethernet cable, 1.8m (6 ft)	1	1	1	
Accessories note: some hardware is packed with the antenna	brass washers, antenna bolts, mounting bolts, washers, nuts, earthing strop & bolt, fuses, mounting template			

Choose the scanner location

The radar's ability to detect targets depends greatly on the position of its scanner. The ideal location for the scanner is well elevated, centered over the vessel's keel line, and clear of as many obstacles as possible on the same plane as the antenna.

A higher installation position increases the radar ranging distance, but it also increases the minimum range around the vessel where targets cannot be detected.

When you're deciding on the location, please consider:

- To avoid the scanner coming in contact with other installed objects while it is rotating, ensure that there is at least 200 millimeters between the swing circle (turning radius) and the other installed objects. Observe the following swing circle when determining mounting location:

Scanner antenna	diameter of swing circle
4 foot	1,320 mm
6 foot	1,910 mm
7 foot	2270mm

- The length of the interconnection cable supplied with your radar is usually sufficient. If you think you'll need a longer cable, consult your dealer before installation, because a longer cable may reduce the performance of the radar.
- If the roof of the wheelhouse is the highest existing location, consider installing a radar mast or a pedestal on which you can mount the scanner. You may also need to construct a working platform for your own safety during installation and servicing work.
- If you mount the scanner on a pedestal or base, ensure that rain and sea spray can drain away from it rapidly.
- If you locate the scanner on the mast, position it on the forward side so that there is a clear view to the front of the vessel.
- The scanner is usually installed parallel to the line of the keel.
- Ensure that the location site provides the scanner with a clear view of the front of the vessel.

DON'T DO THIS!

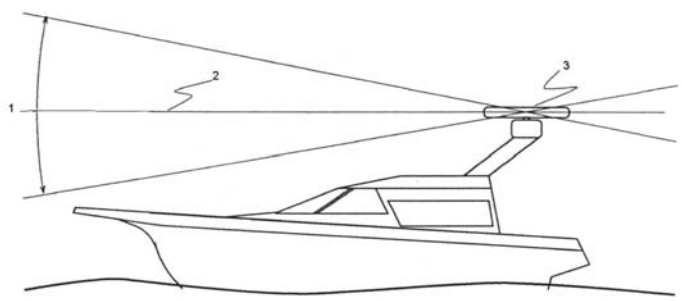
- DON'T install the scanner too high up, where its weight will alter the stability of the vessel and cause degrade the radar picture over short ranges.
- DON'T install the scanner close to lamps or exhaust outlets. The heat emissions may cause the equipment to break down. Soot and smoke will degrade the performance of the radar.
- DON'T install the scanner close to the antennas of other equipment such as direction finders, VHF antennas, GPS equipment etc, as it may cause interference.
- DON'T install the scanner where a large obstruction (such as an exhaust stack) is at the same level as the beam. The obstruction is likely to generate false echoes and/or shadow zones.
- DON'T install the scanner where it will be subjected to strong vibrations (such as a derrick post) because these vibrations will degrade the performance of the radar.
- DON'T install a scanner close to halyards or flags because the wind or boat movement could cause entanglement with the rotating antenna.

Warning: DON'T install the scanner inside of the recommended compass safe distances of any navigation instruments such as the magnetic compass and the chronometer. The compass safe distances are as follows:

10 kW radar	STD 2.4 m (7.9 ft) / STEER 1.8 m (6 ft)
25 kW radar	STD 2.4 m (7.9 ft) / STEER 1.8 m (6 ft)

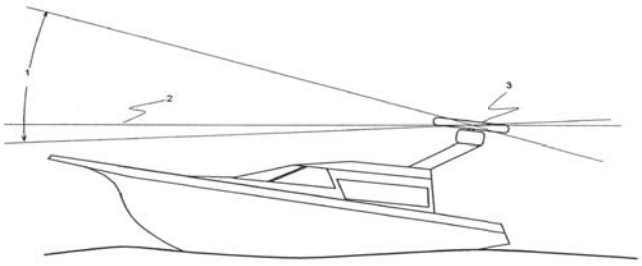
Power boat installations

Normally, you should install the scanner horizontally, to produce an equal sweep around the boat:



However, when a power boat is traveling at high speed, the bow rises up out of the water and if the elevation angle (trim) of the bow is raised up so that it equals, or exceeds, 50% of the vertical beam width of the radar, this can cause two problems:

- Ahead of the power boat, the beam is projected too high to sweep the water surface effectively. Targets can be missed completely or appear at a very poor resolution on the display screen.
- Astern of the power boat, the beam is projected too low and is concentrated over a small area of water so that sea clutter becomes a problem on the display screen.



In this case, you're recommended to install the scanner so that it is tilted down at the front, at an angle that will produce an almost horizontal sweep when the power boat is running at speed.

The optimum height for the scanner is as close as possible to the A-B line for best performance.

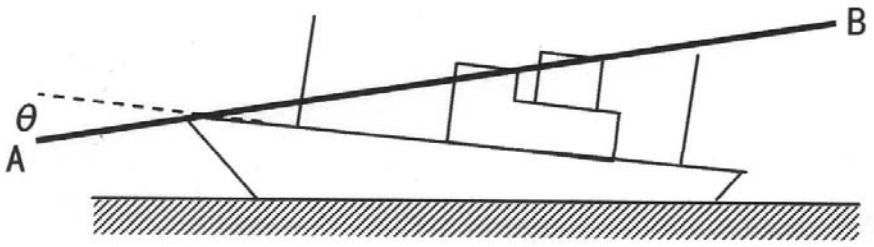
How to find the A-B Line:

The vertical extent of the radar beam is 20°, so most of the radar beam is concentrated within this angle, meaning that outside of this angle, the radar beam will be very weak.

Scanner power	θ° value (half the -3 dB beam width)
10 kW	10
25 kW	10

An example of an A-B Line is shown in the picture. If you install the scanner below the A-B line, the scanner will be too low. It will be difficult to acquire distant targets and the superstructure will be more likely to impede the passage of the beam and generate false echoes.

If the scanner is installed too high above the A-B line, the beam will miss close targets and increase sea clutter return.



You can find the A-B line for any vessel as follows:

• Using a scaled drawing of the vessel, lay a rule along the line of the main deck and continue this forwards as a dashed line extending beyond the bow.

• Using a protractor, measure the θ° value (for your scanner model) below the dashed line at the bow and draw in a new line along this angle.

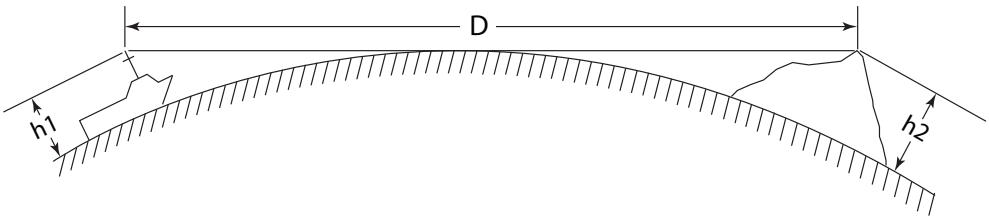
• Extend the new line back beyond the bow of the vessel. This is the A-B line.

How to find the theoretical maximum detection range

Propagation of the radar beam can vary, depending on the properties of the air through which it is traveling. Under normal conditions the maximum distance a target can be detected at is approimately 10% beyond the optical horizon.

You can calculate the maximum theoretical target detection range using the following formula:

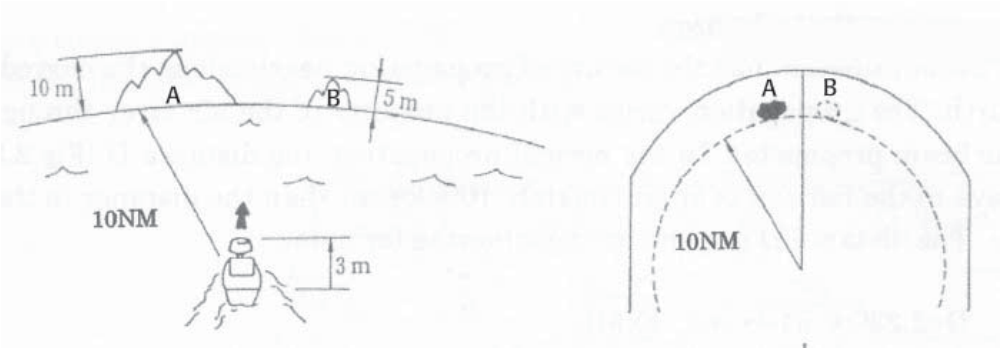
$D = 2.23 (\sqrt{h1} + \sqrt{h2})$



where:

- D is distance traveled by the radar beam
- h1 is the height above sea level of the scanner
- h2 is the height above sea level of a target

An example is shown below:



In this example, the scanner is installed on the vessel at a height of 3 m (10 ft) above sea level (h1). Island A is 10 m (33 ft) high (h2) and for comparison, island B is 5 m (16.4 ft) high (h2). Both islands are at a distance (D) of 10 nautical miles from the vessel.

Calculations using the formula show that, at this distance, the radar can only detect objects that are more than 7.6 m (25 ft) high, which means that island A is shown on the radar but island B is not shown.

Remember that:

- The maximum detection range of the radar is limited by the curvature of the earth's surface under normal conditions of wave propagation.
- Bad weather conditions can reduce the maximum detection range.

Reduce false echoes and shadow zones

False echoes can be produced on the radar display if the scanner is installed too close to an object on the vessel's superstructure. This object can block the radar beam and reflect it back, generating false echoes and shadow zones.

If you are having problems with false echoes and/or shadow zones, re-install the scanner at a higher location where the radar beam will be clear of any obstructions.

If this is not possible, try relocating the scanner away from the central keel line of the vessel to the starboard side. This will move any shadows to the port side, maximize the radar view of your give way sector, and ensure a clear view of the area around the vessel at the bow.

Use the following formula to calculate the distance that you'll need to move the scanner:

$Ls = 0.4R + D/2$ (when R is less than 49 ft [15 m])

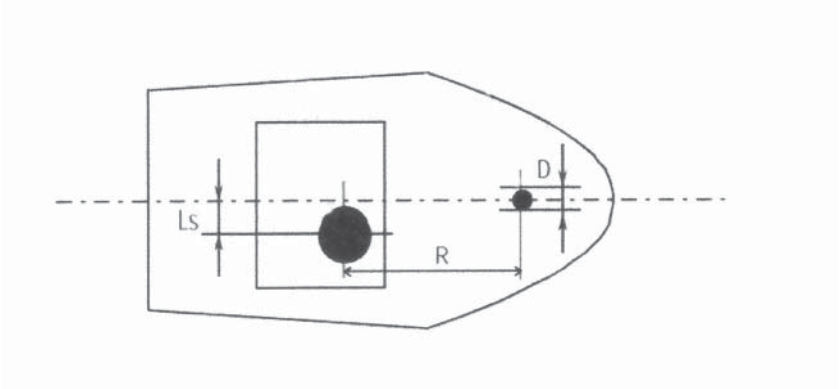
$Ls = 0.025R + D/2$ (When R is greater than or equal to 49 ft [15 m])

where:

Ls = distance to be moved from the keel line

D = diameter of the obstacle

R = distance between the antenna and the obstacle



3 Hardware mounting

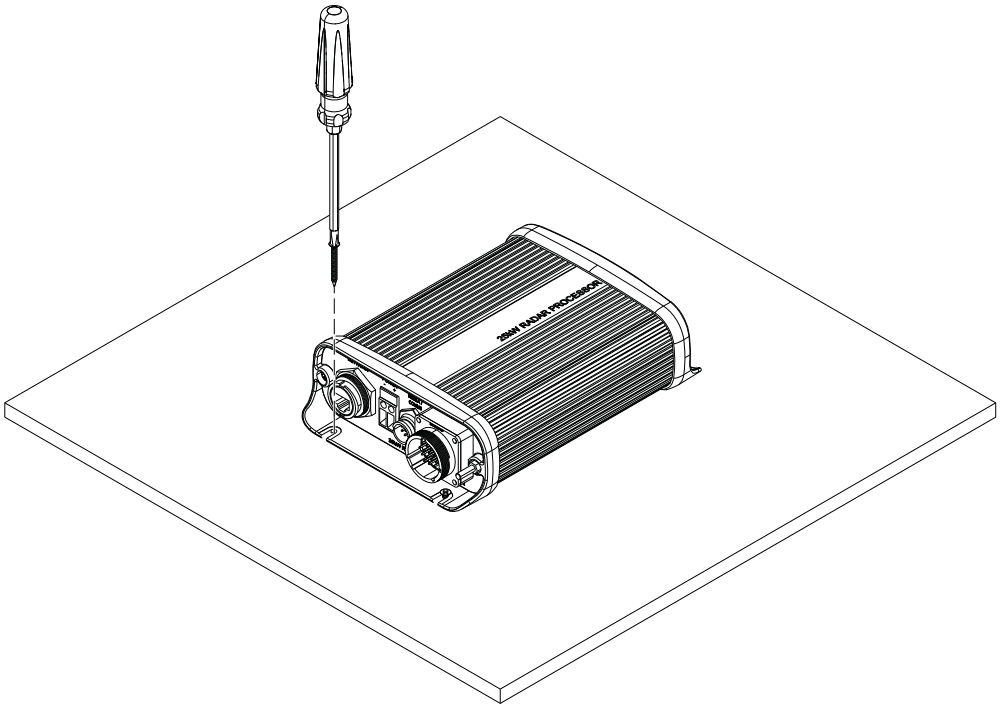
Install the radar processor

Install the radar processor in a dry location away from spray, rain, drips and condensation.

It is preferable that the processor is mounted vertically, with the connectors facing downwards. Avoid installing the processor with the connectors facing upwards, as any water that may ingress the installation area or travels down the connected cables could pool around the connectors. This would result in corroded connectors, or damage to the internal eletronics.

The radar processor must be located where it can be easily connected to the ship's ground, the scanner cable, the power cable and the radar communications cable or the network cable. Check that these cables and the ship's ground can easily reach the radar processor BEFORE you drill.

Use fasteners suited to the mounting surface material. If the material is too thin for self tappers, reinforce it, or mount processor with machine screws and washers. Use only 304 or 316 stainless steel fasteners. Mark the screw locations using processor box as template, and drill pilot holes.



→ ***Note:*** Allow enough space for plugging and unplugging the large scanner cable connector.

→ ***Note:*** Where possible, mount the processor in a way that the LEDs indicators may be viewed if required for diagnostic purposes.

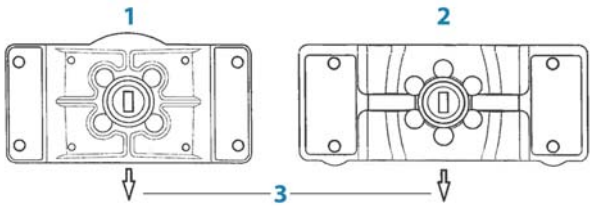
Install the scanner

Ensure all points in "Choose the scanner location" on page 4 have been considered.

Fitting the antenna to the pedestal

Remove the protective caps from the antenna and pedestal, shortly before fitting.

When placing antenna on to pedestal, ensure correct orientation is used - both the antenna and the platform on the pedestal have a front and back edge, even though they may appear nearly symetrical.

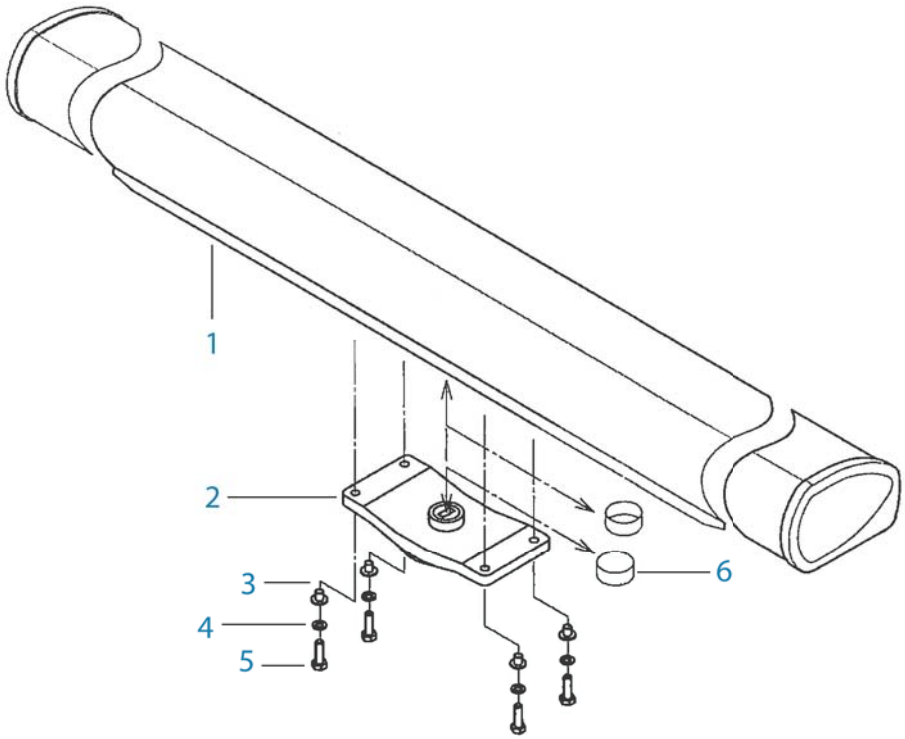


1 10 kW pedestal rotating platform

2 25 kW pedestal rotating platform

3 front edge of platform (antenna front should be on same side)

Tighten the supplied M10 hex bolts to 350 kg-cm (34.3 N·m or 25.3 lb·ft)



1 antenna (front shown)

2 rotating platform (pedestal top)

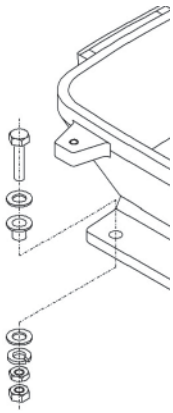
3 brass isolating washer

4 spring washer

5 hex bolt (M10 x 35mm)

6 protective caps

Fixing the scanner in place



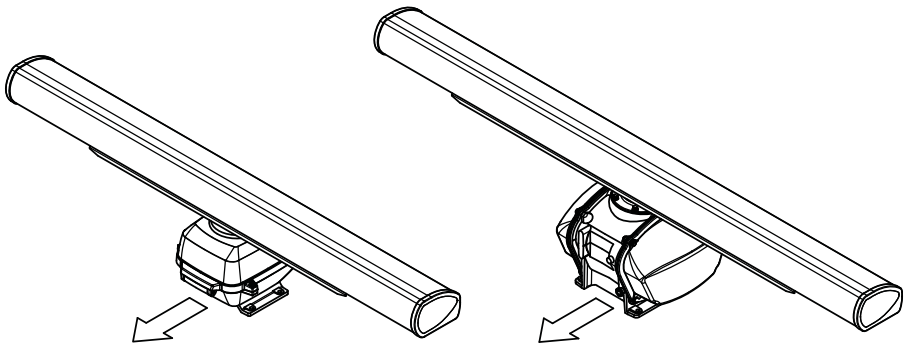
Both the 10 kW and 25 kW pedestals have four mounting points.

Stick down the mounting template in the desired installation location, observing correct orientation. Minor deviation can be compensated for in the radar interface.

Drill pilot holes, followed by the mounting holes to suit mounting fasteners.

When lifting the scanner in place, ensure it is not lifted by the plastic antenna housing. Any lifting sling should be fitted to lift the scanner via each side of the metal mounting platform that the antenna attaches to.

Fit the supplied brass inserts to the pedestal mounting holes., followed by stainless steel bolts, nuts, and spring washers.



→ ***Note:*** In correct orientation, both the 10 kW and 25kW scanners have the scanner cable exiting towards the stern of vessel.

4 Wiring

Guidelines

When wiring the radar:

- DON'T make sharp bends in the cables
- DON'T run cables in a way that allows water to flow down on to the connectors
- DON'T allow the scanner cable to place pressure on the radar processor connector

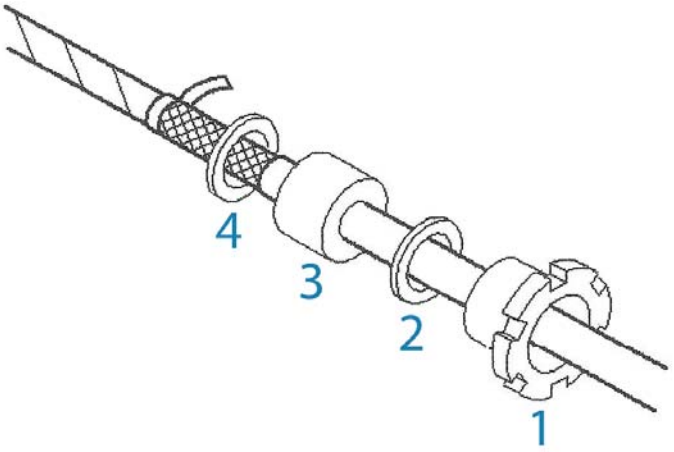
But:

- DO make drip and service loops
- DO use cable ties to keep the cables tidy and secure
- DO seal and protect all wiring connections if cables are shortened, lengthened, or re-terminated
- DO leave room to easily access, install and remove cables
- DO make sure cables connecting to the radar processor are not under stress from bending or twisting that could place pressure on the processors connectors

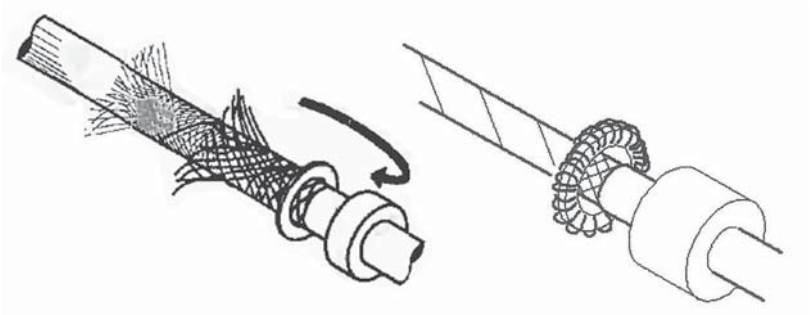
Radar scanner: 10 kW

Fitting the scanner cable

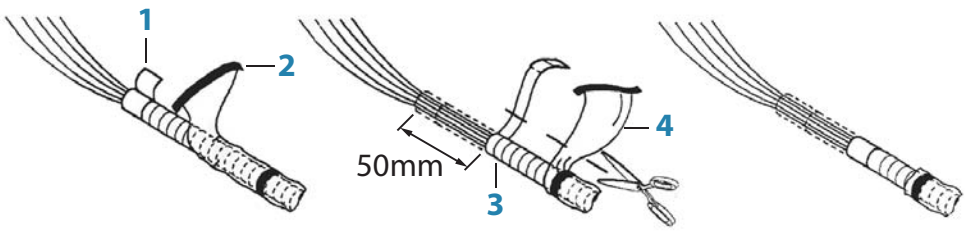
1. Unscrew the four cover bolts and lift up the hinged cover of the pedestal.
2. Remove the cable gland assembly from the lower half of the pedestal cover.
3. Pass the scanner end of the scanner cable through the cable gland (**1**), plain washer (**2**), rubber gasket (**3**) and another plain washer (**4**), in the order shown.



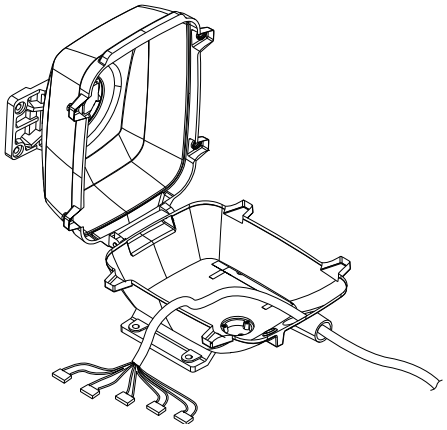
4. Unravel the braided shield and wrap it around the washer (**4**).



5. Carefully unwrap the copper tape (**1**) and black PVC tape (**2**). Shorten both the foil shield (**3**) and the clear insulation material (**4**) so that an extra 50mm of cable is exposed. Re-use the copper tape on the end of the foil, ensuring it is stuck to the same side as before, to ensure good conductivity.

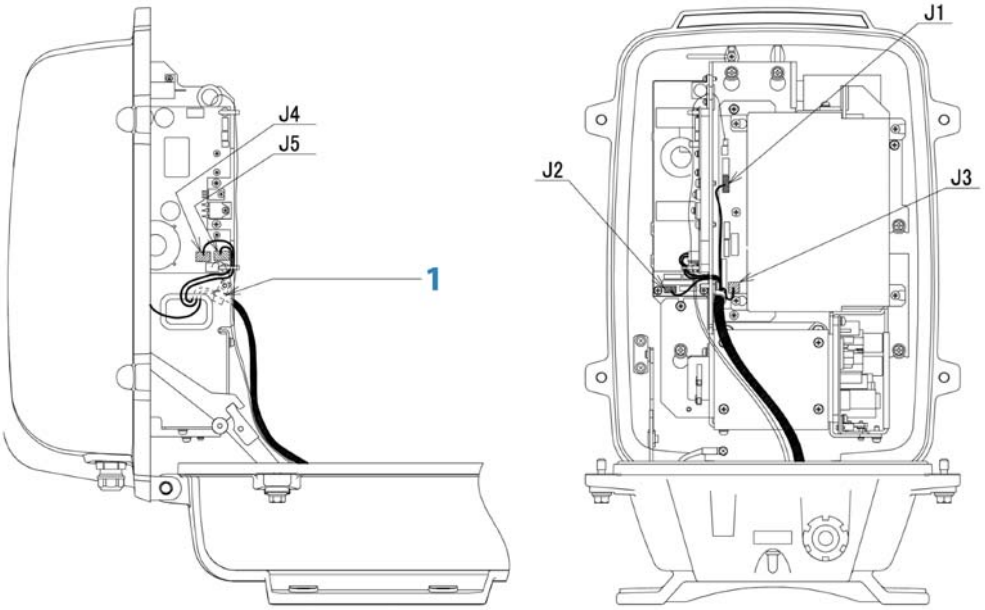


6. Pass the scanner cable through the cable gland opening, into the pedestal.



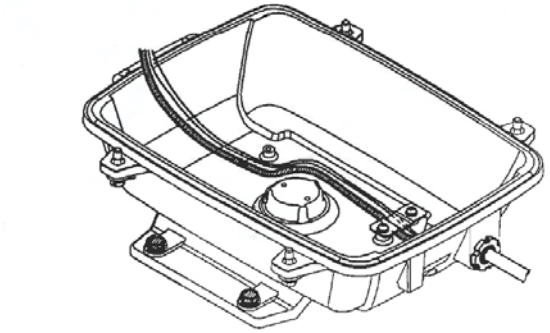
7. Connect the five scanner cable connectors to the 'J' connectors as follows:

Cable Connector	Pedestal Connector (on PCB)
P1	J1
P2	J2
P3	J3
P4	J4
P5	J5

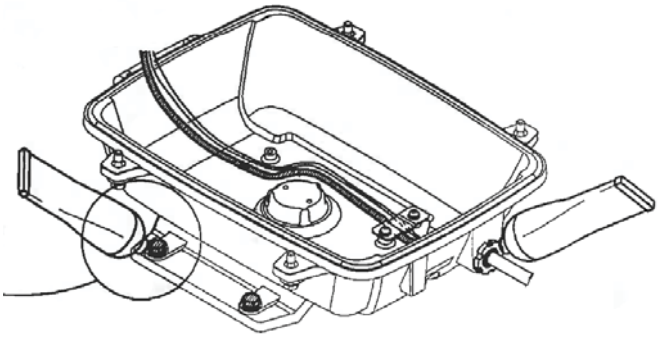


8. Use the cable clamp (**1**) to secure the cable to the upper housing. The clamp should hold the cable at the point where it is wrapped in copper tape.

9. In the lower half of the housing, secure the cable under the cable clamp. The cable should have enough slack to not interfere with opening or closing of the case.



10. Fit the cable gland assembly. Use silicon sealant around the cable entry point.



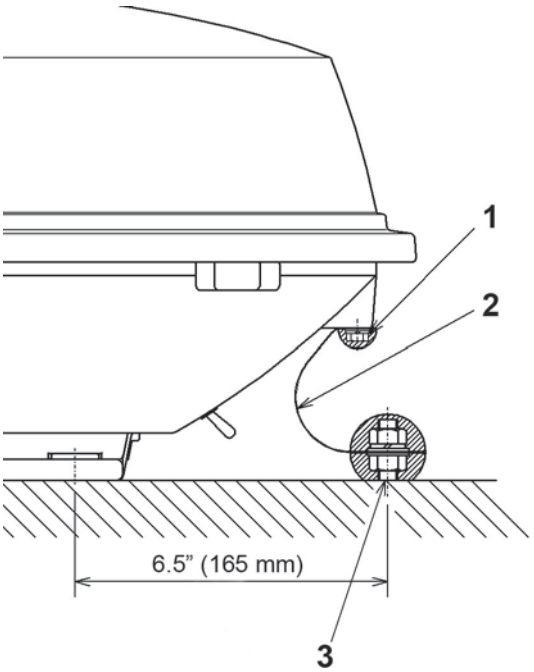
11. Use silicon sealant around the mounting bolts
12. Close the pedestal and firmly secure it with the screws.

Earth the 10 kW scanner

The earth point must be connected to the vessel's ground system.

1. Connect one end of the copper Earth strop (2) to the bolt (1) on the pedestal.
2. Connect the other end of the Earth strop to the mounting location using the Earth bolt (3).
3. Apply silicon sealant around both of the bolts.

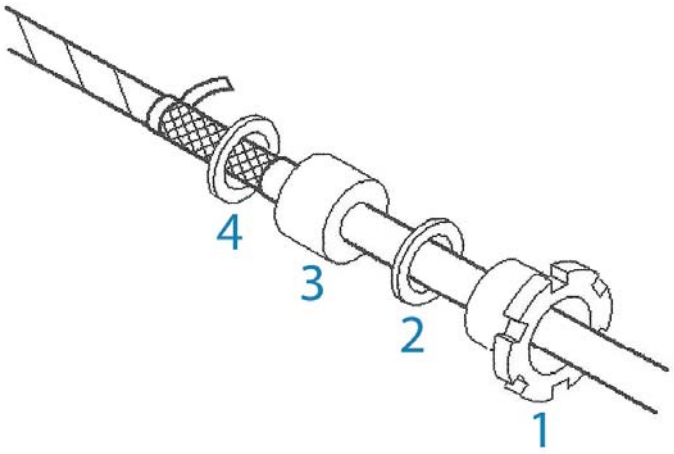
→ ***Note:*** If the radar mounting location is not made of a electrically conductive material, fit a longer earth strap that allows direct connection to the vessel's ground.



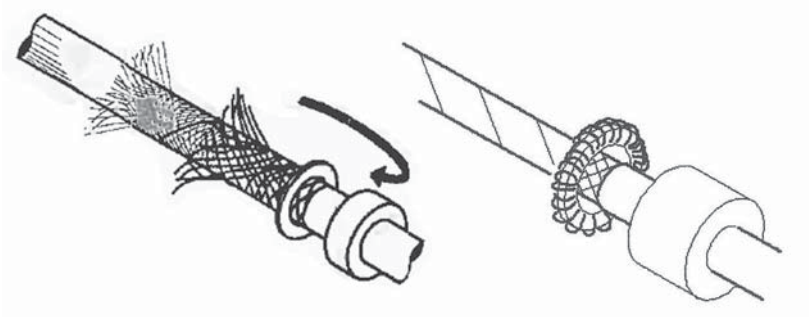
Radar scanner: 25 kW

Fitting the scanner cable

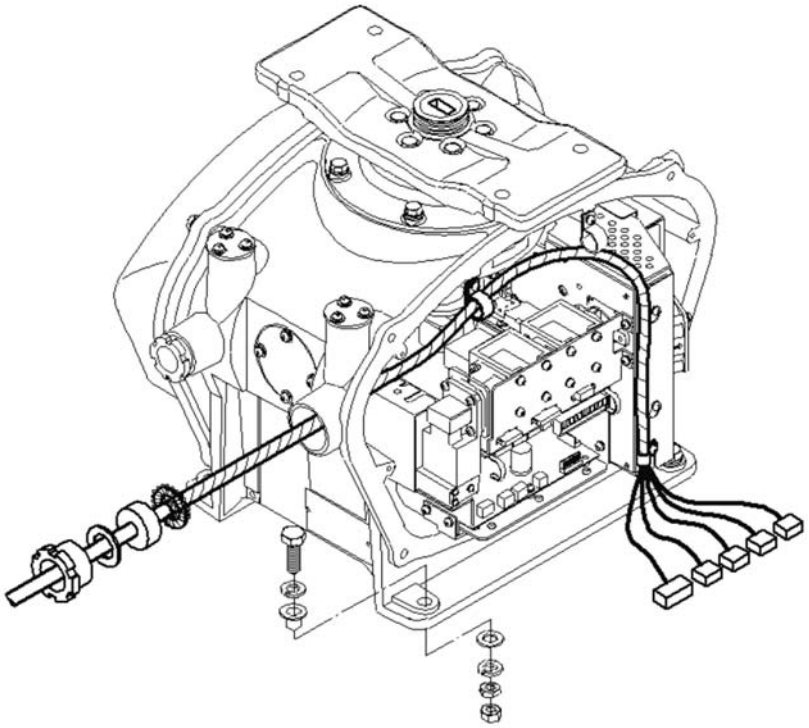
1. Unscrew the four cover bolts and lift up the hinged cover of the pedestal.
2. Remove the cable gland assembly from the lower half of the pedestal.
3. Pass the scanner end of the radar cable through the cable gland (**1**), plain washer (**2**), rubber gasket (**3**) and another plain washer (**4**), in the order shown.



4. Unravel the braided shield and wrap it around the washer (**4**).

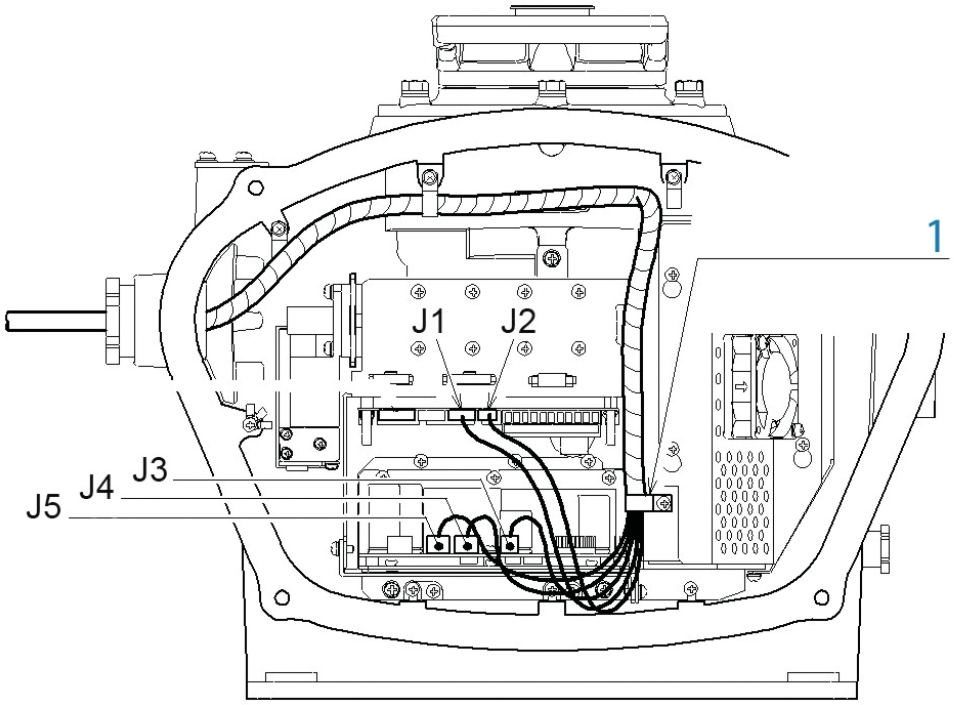


5. Pass the scanner cable through the cable gland opening, into the pedestal.

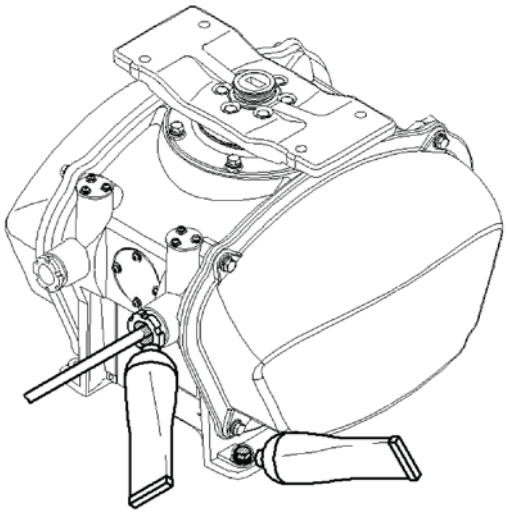


6. Connect the five scanner cable connectors to the 'J' connectors as follows:

Cable Connector	Pedestal Connector (on PCB)
P1	J1
P2	J2
P3	J3
P4	J4
P5	J5



7. Use the cable clamp (**1**) to secure the cable to the upper housing. The clamp should hold the cable at the point where it is wrapped in copper tape.
8. Close the pedestal case sides, securing them with the supplied screws.
9. Fit the cable gland assembly. Use silicon sealant around the cable entry point.



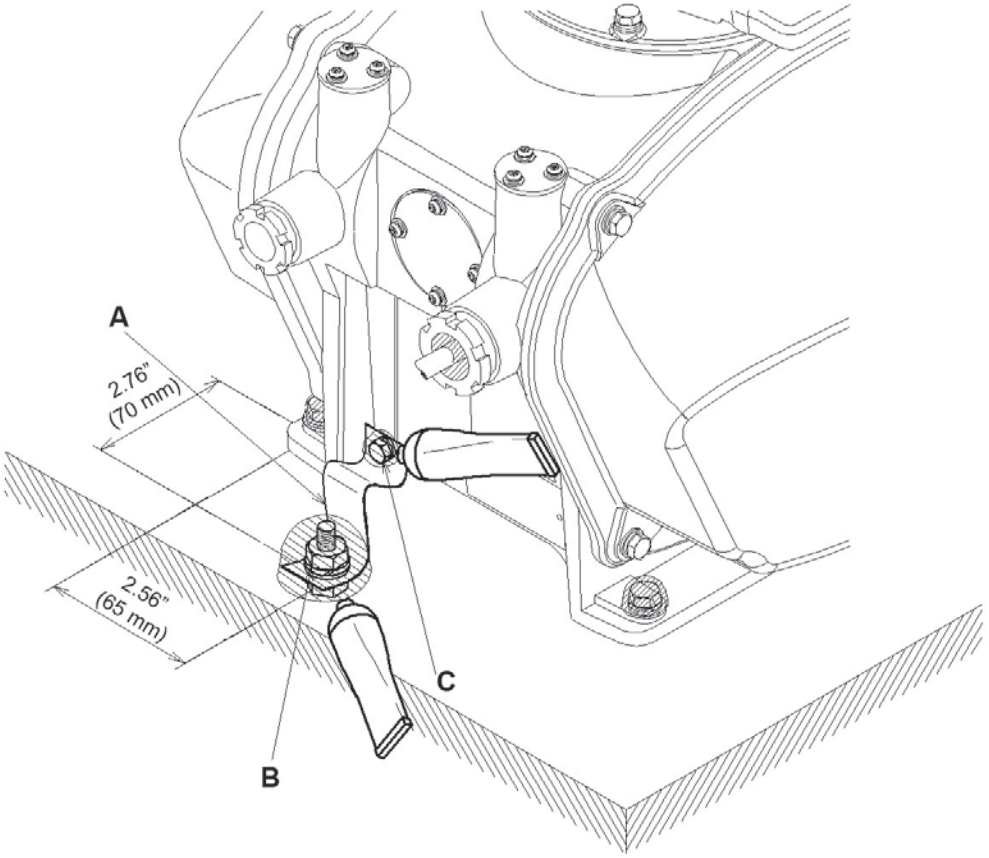
10. Use silicon sealant around the mounting bolts

Earth the 25 kW scanner

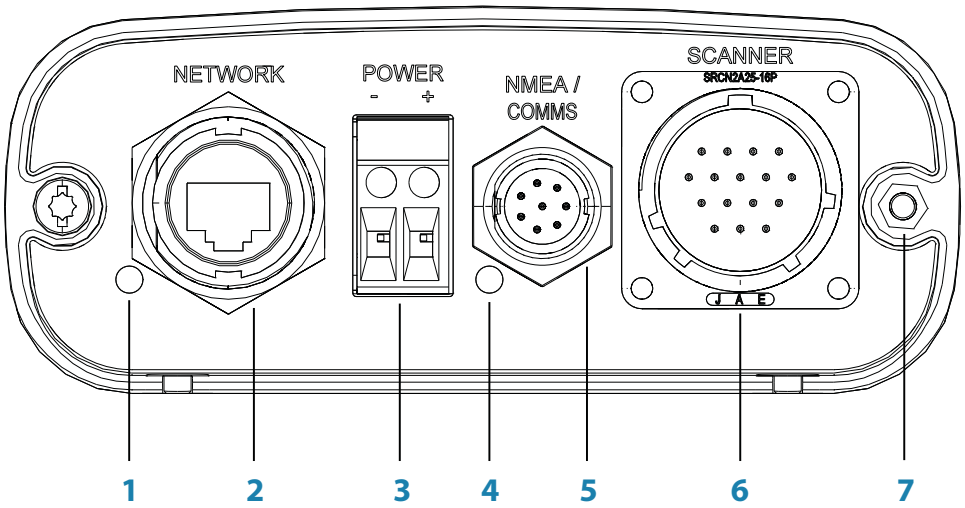
The earth point must be connected to the vessel's ground system.

1. Connect the earth strap (A) to the pedestal with a hexagonal bolt (C).
2. Connect the other end of copper Earth strap to the mounting location, using the special hexagonal Earth bolt (B)
3. apply silicon sealant around both the bolts.

➔ ***Note:*** If the radar mounting location is not made of a electrically conductive material, fit a longer earth strop that allows direct connection to the vessel's ground.



Radar processor connections



Key	Name	Description
1	LED (Ethernet)	Displays status of the Ethernet network connection
2	Network	For Ethernet network connection to Simrad Multifunction displays. RJ45-Yellow Ethernet adapter cable is supplied.
3	Power (+ve and -ve)	Connects to ship's power - must be 24 V DC
4	LED (Power)	Displays power status - illuminated = ON
5	NMEA / Coms	NMEA 0183 input for compass. SimNet or NMEA 2000 Heading via AT10HD
6	Scanner	Connects to scanner, providing power and 2-way communication.
7	Grounding point	Connection point to vessel ground

Connect the scanner cable

Connect the large metal plug on the scanner cable to the scanner socket on the processor. Once inserted, screw on the locking collar by hand. The connector is keyed, preventing incorrect orientation.

Connect the power cable

The radar processor requires a **24 V DC** supply capable of delivering 15 amps continuous.

Scanner	Fuse rating	Cable length 5 m (16.4 ft)	Cable length 10 m (26 ft)	Cable length 20m (20 ft)
10 kW	15 A	2.5mm² (14 AWG)	6mm² (10 AWG)	10mm² (8 AWG)
25 kW	15 A	2.5mm² (14 AWG)	6mm² (10 AWG)	10mm² (8 AWG)

The radar processor must be connected to a dedicated fuse/circuit breaker. The fuse/circuit breaker should be labeled accordingly.

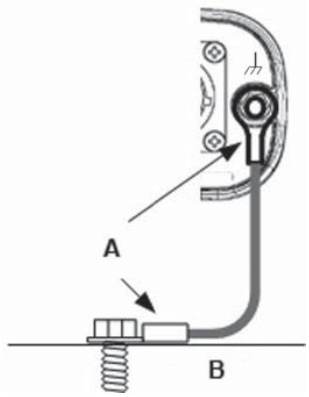
To connect the power cable to the radar processor, you must:

1. Strip away approximately 0.4" (10 mm) of the insulation at the end of each core of the power cable
2. Unscrew the small retention screw from the positive input connector (identified by the + sign) on the radar processor
3. Insert the bare end of the positive wire into the positive power cable input connector to make a connection
4. Tighten the small holding screw to hold the positive wire in place. Gently pull on the positive wire to ensure that it is secured
5. Repeat this process to connect the negative wire to the negative power cable input connector (identified by the – sign)

Connect the ground wire

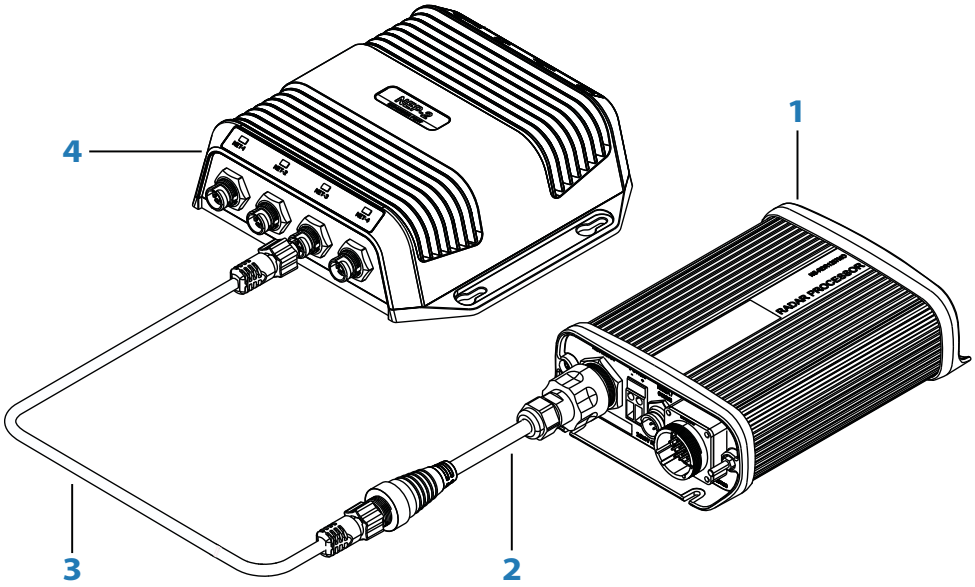
The radar processor has a chassis ground connection stud located on the far right hand side of the unit. The chassis ground is DC isolated from power (–ve) to eliminate the risk of galvanic corrosion.

If you are installing the radar processor on a vessel with a metal hull, connect the radar processor chassis ground to the hull at the closest possible location, using 12 AWG wire (or thicker):



Connect the Ethernet cable

Ethernet is used to share the radar data with compatible displays on the network. Use of a adaptor is required to convert from RJ45 connector to the 5 pin connector used on Simrad network hubs and displays.



1 **Radar processor**

2 **Ethernet adapter cable RJ45 - 5 Pin Yellow (Included)**

3 **5 pin yellow ethernet cable**

4 **NEP-2 or other Navico ethernet device**

Connect the NMEA/Comms cable (Heading)

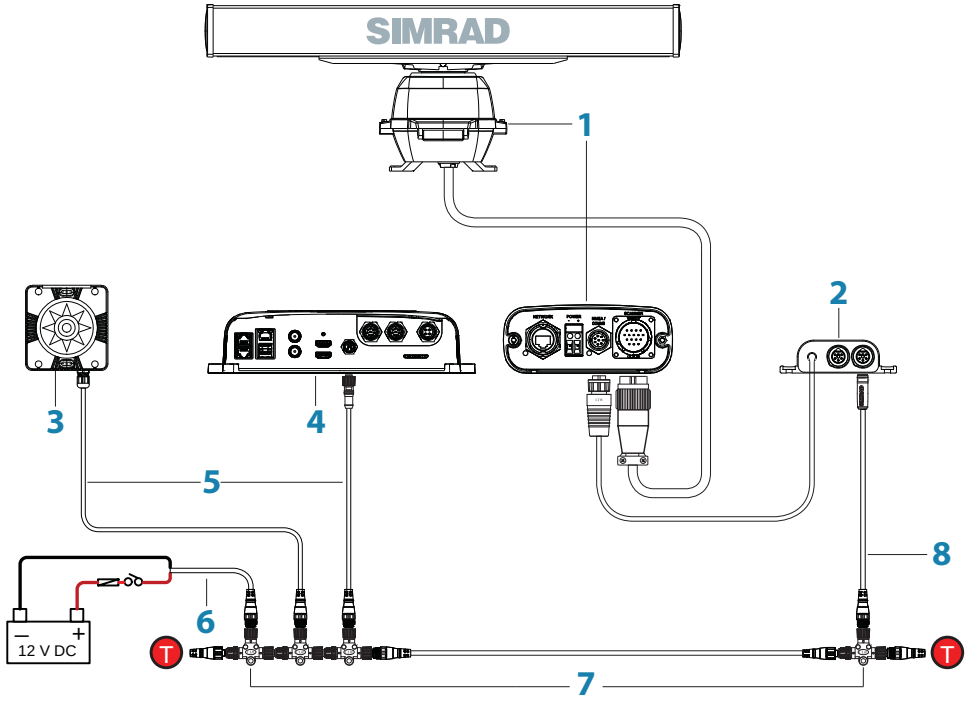
A heading sensor is required for the following functionality;

- MARPA : heading at 10hz or faster is required for the radar processor. Heading must also be connected to the display.
- Radar Chart overlay: heading is required by the display to correctly overlay the radar over a chart.
- North Up: For the display to show the radar page with the top of the PPI as north.

The radar processor input (labeled NMEA / COMMS) is compatible with a NMEA 0183 heading sensor.

For heading sensors that output NMEA 2000 PGNs or SimNet, an AT10HD must be used to convert PGNS to NMEA0183 @ 4800 baud

Heading calibration should be performed during initial setup, annually, and after any major structural changes to the vessel.



1 Radar system

2 AT10HD NMEA 2000 / NMEA 0183 high speed heading converter

3 NMEA 2000 compliant heading sensor

4 Compatible MFD with display

5 Micro-C drop cables

6 Network power 12 V DC

7 Micro-C backbone (NMEA 2000) with terminators

8 Micro-C to SimNet adapter cable

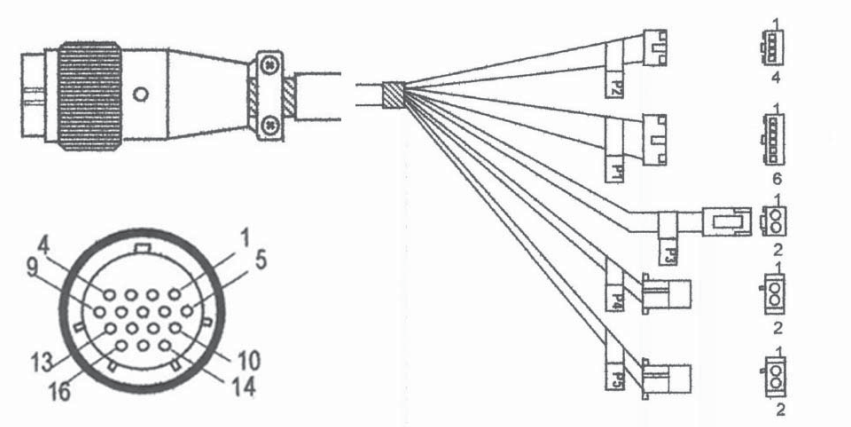
→ ***Note:*** the Micro-C backbone requires 12 V DC, and should therefore not be connected directly to the radar pocessor power supply which is 24 V DC.

Configuration on display

Final setup steps such as bearing alignment, and scanner height need to be done on the display MFD. Refer to the display installation manual for further details.

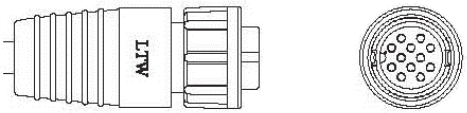
5 Pinouts

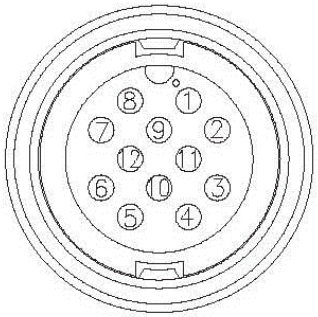
Scanner cable



Pin	Color/Name	AWG Size	P2	P1	P3	P4	P5	Purpose
1	Blue / Gray (thick)	#16				1		Motor Ground
2	Purple / Brown (thick)	#16					1	Motor Ground
3	White / Orange (thick)	#16				2		Motor Power
4	Red / Green (thick)	#16					2	Motor Power
5	Black / Sky (thick)	#16			1			Scanner Ground
6	Black	#22		6				Analog Ground
7	Drain wire (coax line)	#24	2					Video Ground
8	No connection							Not used
9	Yellow / Pink (thick)	#16						Scanner Power
10	Axis line (transparent insulation)	#24	1					Video
11	Yellow (thin)	#24	3		2			RS-485 Comm+
12	Green (thin)	#24		5				Bearing Zero
13	White (thin)	#24	4					RS-485 Comm-
14	Drain wire	#24		2				Trigger Ground
15	Shield line	#24		1				Trigger
16	Orange (medium)	#22		3				Bearing Pulse
Shell	Braid shield							Shield

NMEA / COMMS cable





Pin	Function	Color
1	NMEA RX A	Green
2	NMEA RX B	Red
7	NMEA TX A	Orange
8	NMEA TX B	Blue
12	NMEA TX GROUND	Yellow
9	SHIELD	Drain
10	RADAR REMOTE POWER IN	Brown

➔ ***Note:*** the NMEA/COMMS cable is an optional cable (part number: AA010070) for installations using a NMEA 0183 heading sensor.

6 Specifications

TXL-10S-4/TXL-10S-6

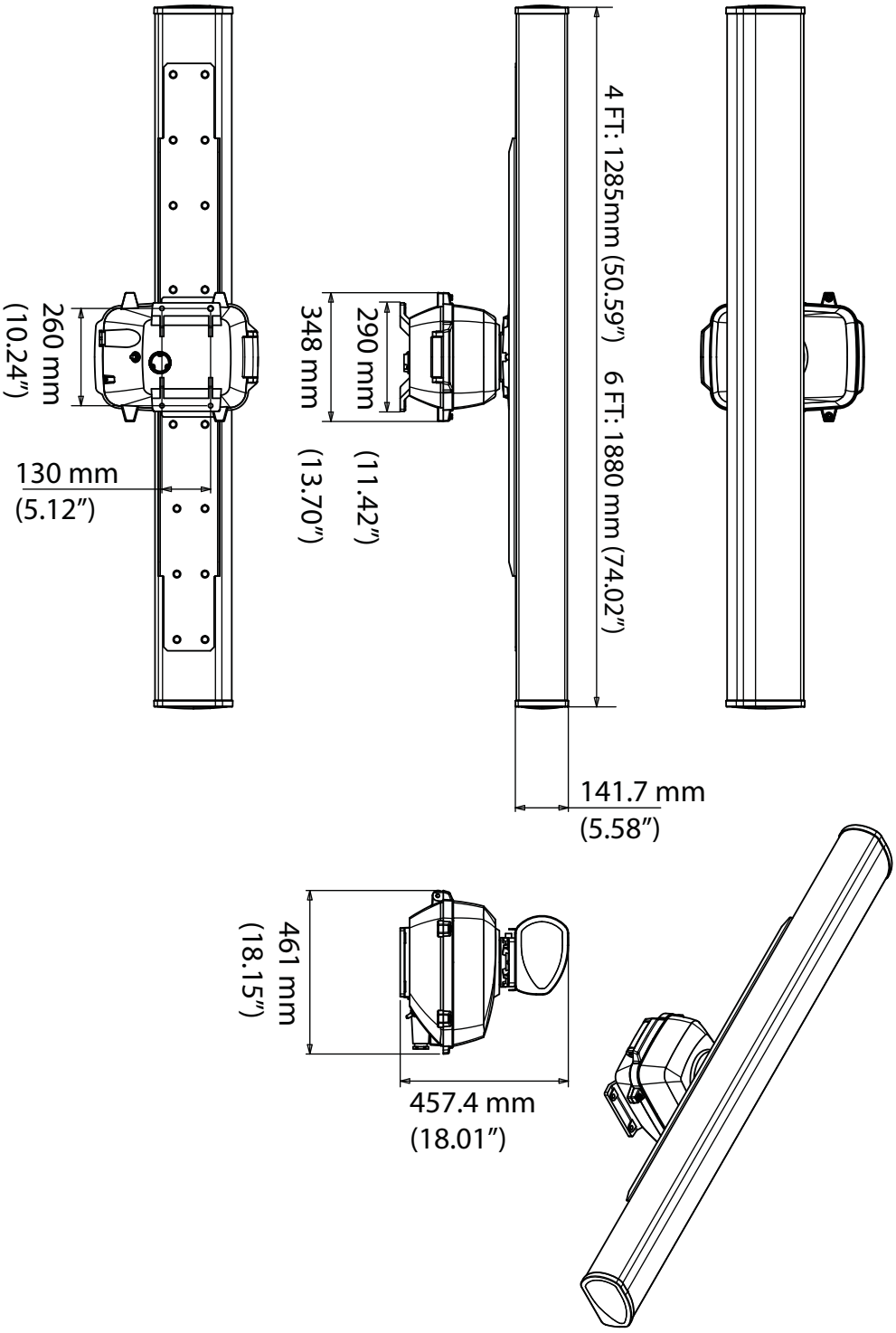
Type of emission	PON - Passed FCC/IC/R&TTE Type Certification: FCC ID: CKENKE2103 IC ID: 768C-NKE2103 R&TTE: Telefication CE0560Ⓘ
Ambient conditions	According to IEC60945-4 Operating Temperature: -25 to +55°C Relative humidity: +40°C, 93% RH Vibration: Amplitude 2 to 13.2Hz, +/-1mm +/- 10% Amplitude 13.2 to 100Hz, Gravity acceleration 7m/sec2 Waterproof:IPX6
Relative wind velocity	51.5 m/sec (100 Knots)
Power consumption	230W (Max.) in maximum wind velocity
DC input	21.6 to 31.2 V (DC24 Volt Systems)
Pre-heating time	Minimum 90 sec
Outside dimensions	Height 458mm x Swing Circle Diameter 1320mm (4 ft) Height 458mm x Swing Circle Diameter 1910mm (6 ft)
Mass	34kg+/-10% (4ft) / 36kg+/-10% (6ft)
Plane of polarization	Horizontal Polarization
Beam width	Horizontal 1.8°+/-10% (4ft, -3dB width) Horizontal 1.2°+/-10% (6ft, -3dB width) Vertical 20° +20% (4/6ft, -3dB width)
Side lobe level	Below -26dB max. (4/6ft, within ±10°) Below -30dB max. (4/6ft, outside ±10°)
Rotation	27 rpm (4/6ft, Min 20rpm at Max 100Knots)
Transmitter frequency	9410±30MHz
Peak power output	10kW±50% under any pulse condition
Transmitter tube	Magnetron NJRC Model MAF1565N
Pulse length/Pulse Repetition Frequency	0.08µS+/-30%/2250Hz +/-5% 0.25µS+/-25%/1700Hz +/-5% 0.50µS+/-25%/1200Hz+/-5% 0.80µS+/-25%/750Hz+/-5% 1.0µS+/-25%/650Hz+/-5
Duplexer	Circulator H-6AJRD00001 FCX-68 and Diode Limiter NJS6930
Mixer	MIC front-end - Model NJT1969
IF amplifier	Center frequency: 60MHz +/-3MHz Bandwidth: 20MHz +/-3MHz (0.08µS) 6MHz +/ -2MHz(0.25µS, 0.5µS) 3MHz +/-1MHz (0.8µS, 1.0µS) Gain: 90dB min. Characteristic: Log Output: -2V for 100dB typical Bandwidth controlled by serial port
Noise figure	NJT1969 @ 6dB (Average) at front-end input.
Com Port	RS485 9600bps Half Duplex Propriety Digital COM Specification
Standard scanner cable length	20m (packed in carton)
Maximum allowable scanner cable length	30m

TXL-25S-7

Type of emission	PON - Passed FCC/IC/R&TTE Type Certification: FCC ID: CKENKE2254 IC ID: 768C-NKE2254 R&TTE: Telefication CE0560ⓘ
Ambient conditions	According to IEC60945-4 Operating Temperature: -25 to +55°C Relative humidity: +40°C, 93% RH Vibration: Amplitude 2 to 13.2Hz, +/-1mm +/- 10% Amplitude 13.2 to 100Hz, Gravity acceleration 7m/sec2 Waterproof:IPX6
Relative wind velocity	51.5 m/sec (100 Knots)
Power consumption	240W (Max.) in maximum wind velocity
DC input	21.6 to 31.2 V (DC 24 Volt Systems)
Pre-heating time	Minimum 180 sec
Outside dimensions	Height 536mm x Swing Circle Diameter 2270mm
Mass	58kg+/-10%
Plane of polarization	Horizontal Polarization
Beam width	Horizontal 1.0°+/-10% (-3dB width) Vertical 20° +20% (-3dB width)
Side lobe level	Below -26dB max. (within ±10°) Below -30dB max. (outside ±10°)
Rotation	24 rpm (Min 20rpm at Max 100Knots)
Transmitter frequency	9410±30MHz
Peak power output	25kW±50% under any pulse condition
Transmitter tube	Magnetron NJRC Model M1568BS
Pulse length/Pulse Repetition Frequency	0.07µS+/-30%/2250Hz +/-5% 0.20µS+/-25%/2250Hz +/-5% 0.30µS+/-25%/1900Hz+/-5% 0.40µS+/-25%/1400Hz+/-5% 0.80µS+/-25%/750Hz+/-5% 1.0µS+/-25%/650Hz+/-5% 1.2µS+/-25%/510Hz+/-5%
Duplexer	Circulator NJC3901M and Diode Limiter NJS6930
Mixer	MIC front-end NRG-162
IF amplifier	Center frequency: 60MHz +/-3MHz Bandwidth: 25MHz +/-3MHz (0.07µS) 8MHz +/ -2MHz(0.2µS, 0.3µS, 0.4µS) 3MHz +/-1MHz (0.8µS, 1.0µS, 1.2µS) Gain: 90dB min. Characteristic: Log Output: -2V for 100dB Typical Bandwidth controlled by serial port
Noise figure	7.5dB (Average)
Com Port	RS485 9600bps Half Duplex Propriety Digital COM Specification
Standard scanner cable length	20m (packed in carton)
Maximum allowable scanner cable length	30m

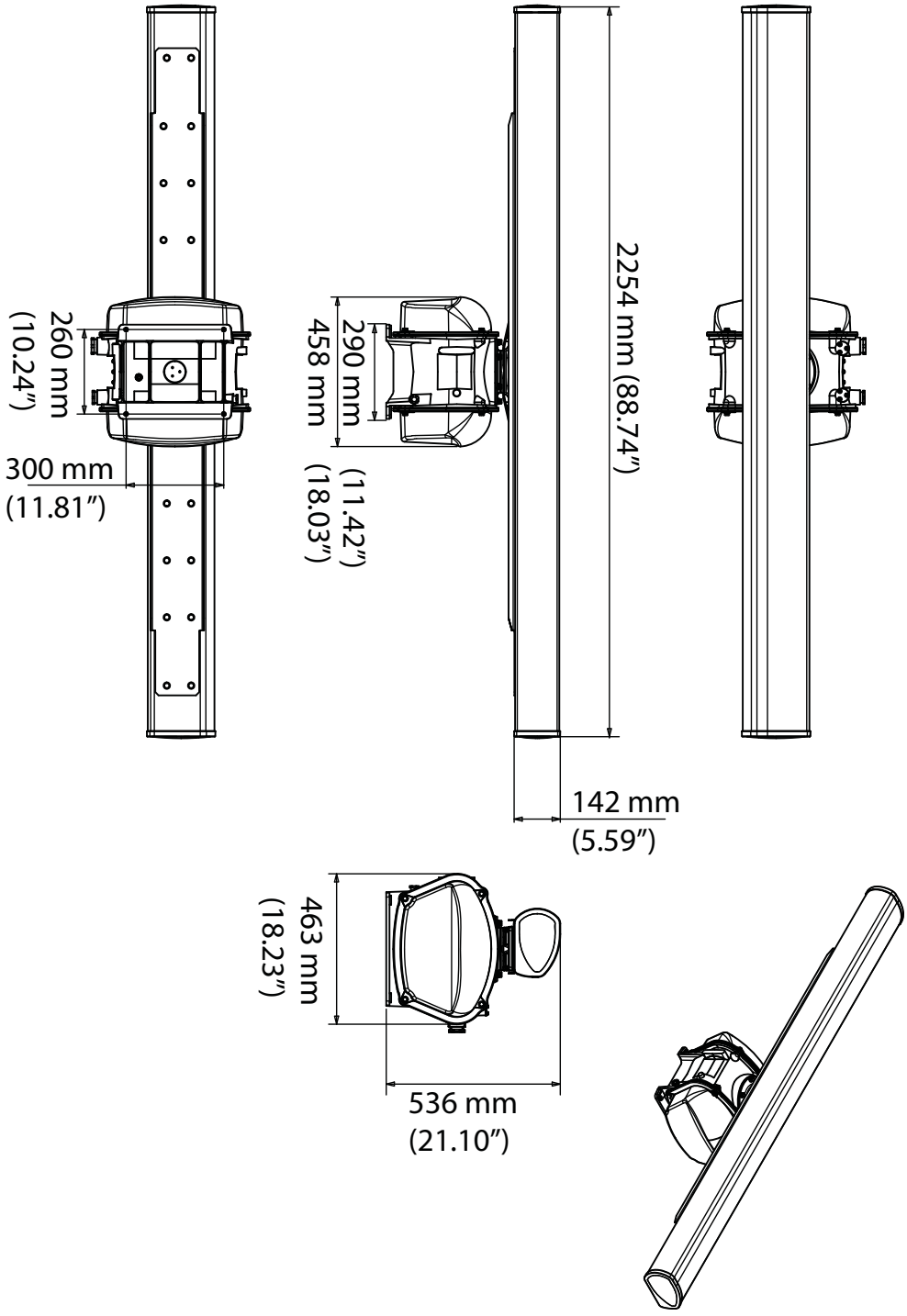
Drawings

10 kW scanner



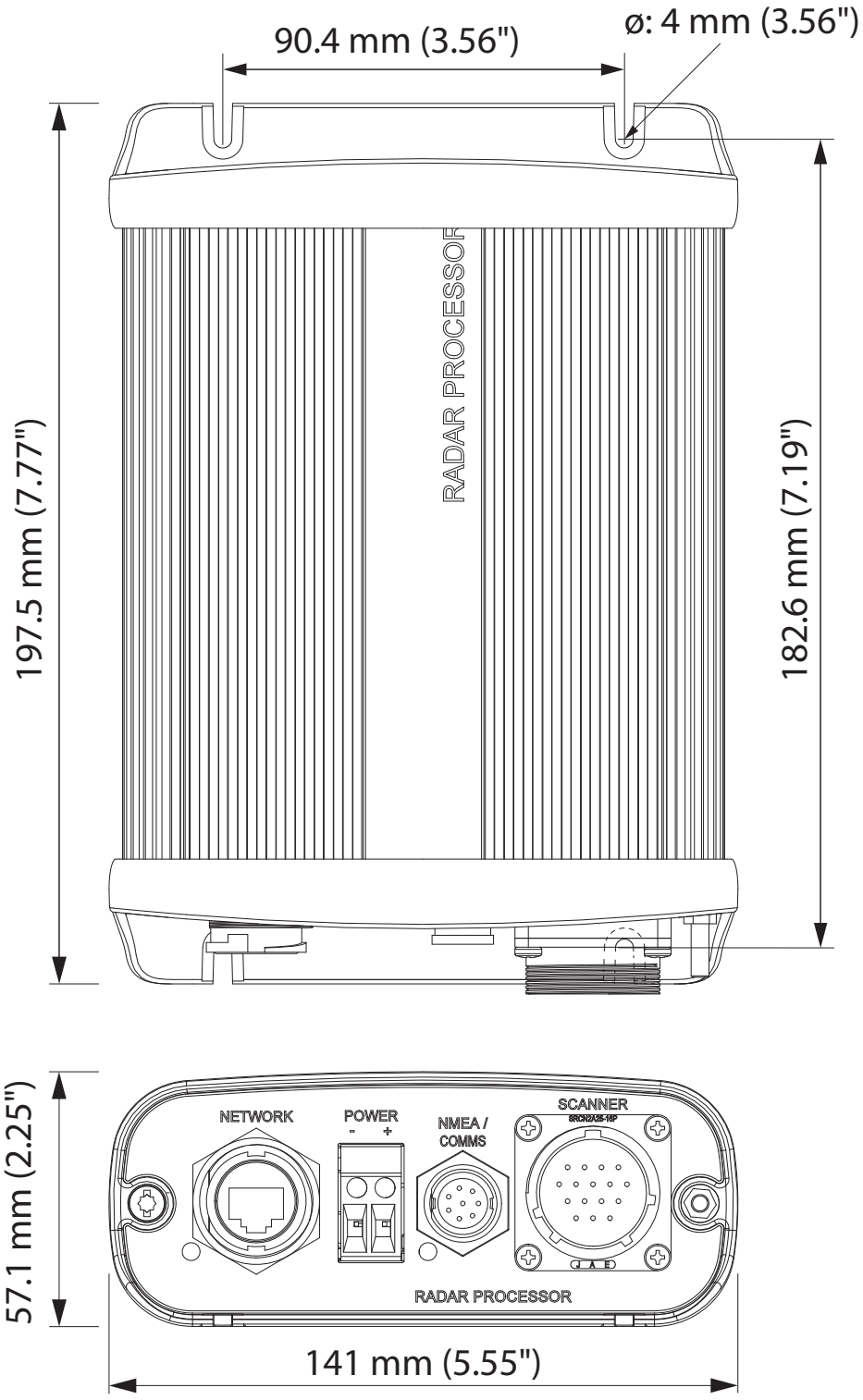
→ ***Note:*** mounting templates are provided.

25 kW scanner



→ ***Note:*** mounting templates are provided.

Radar processor



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