CHAPTER 9
INSTALLATION

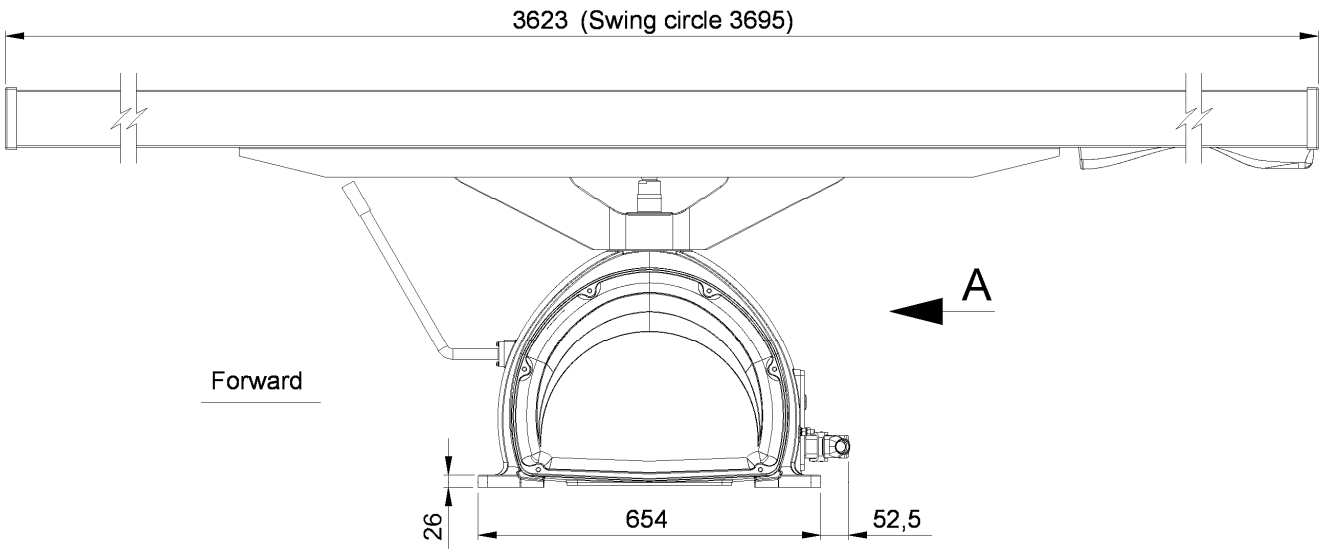
9.1 INTRODUCTION

This chapter of the Technical manual can be used as a self-contained Installation Manual for the SRT Up Mast S-Band Radar System and 12 feet Antenna to. It contains necessary information, pictures and drawings to handle, assemble and install this unit as a part of the complete Radar Equipment. Actions how to prepare this unit for the Radar Equipment Setup Procedure are also described.

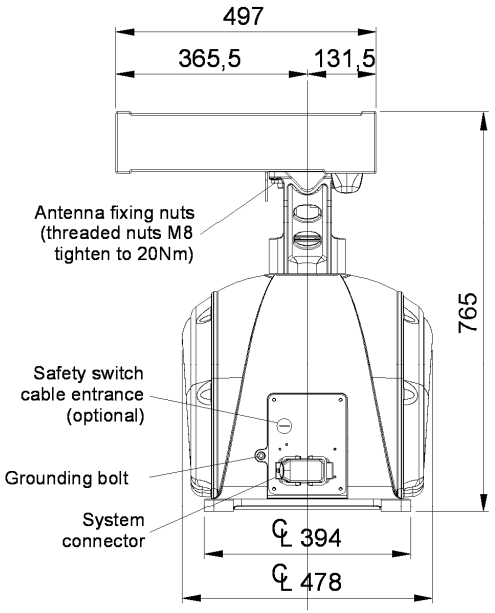
9.2 LAYOUT AND CONNECTION DIAGRAMS

9.2.1 **Layout SRT S-Band Up Mast**

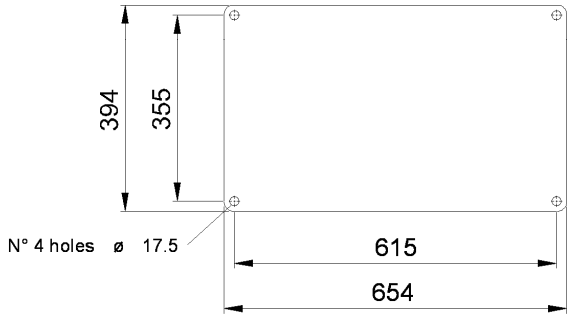
SIDE VIEW



VIEW A

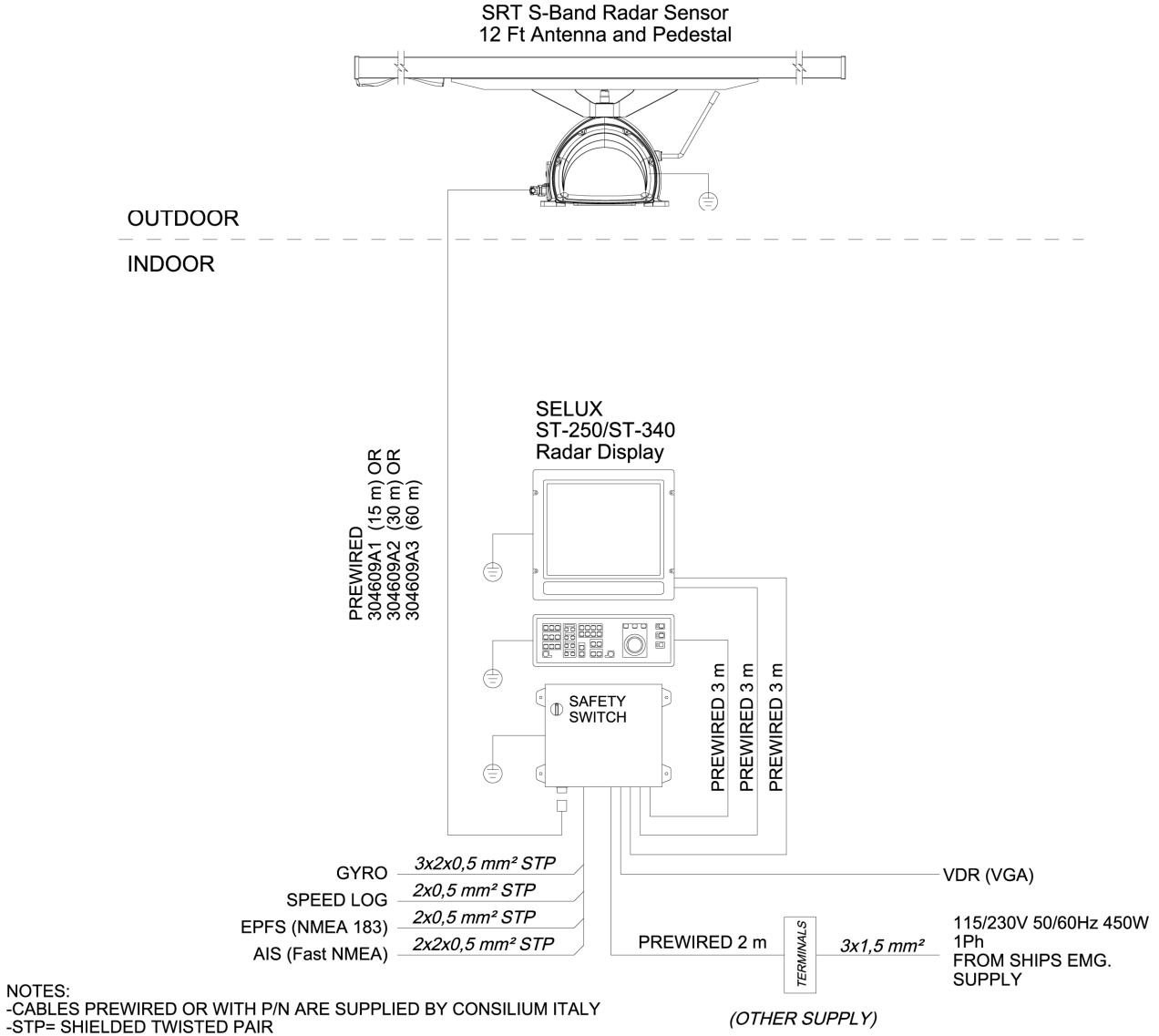


MOUNTING PLANE VIEW

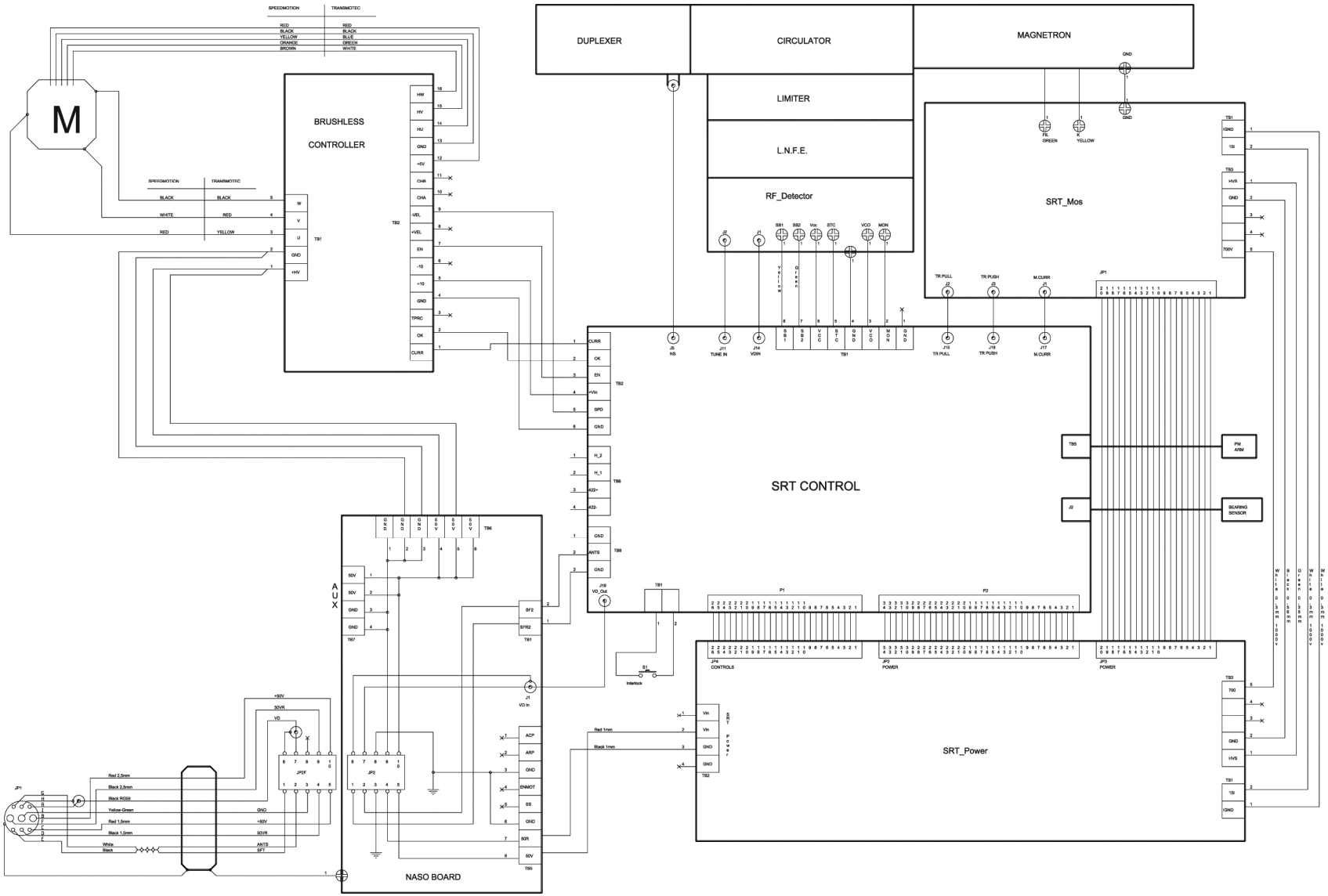


UNIT	IP	WEIGHT
Antenna 12 Ft	65	50Kg
Pedestal	65	75Kg

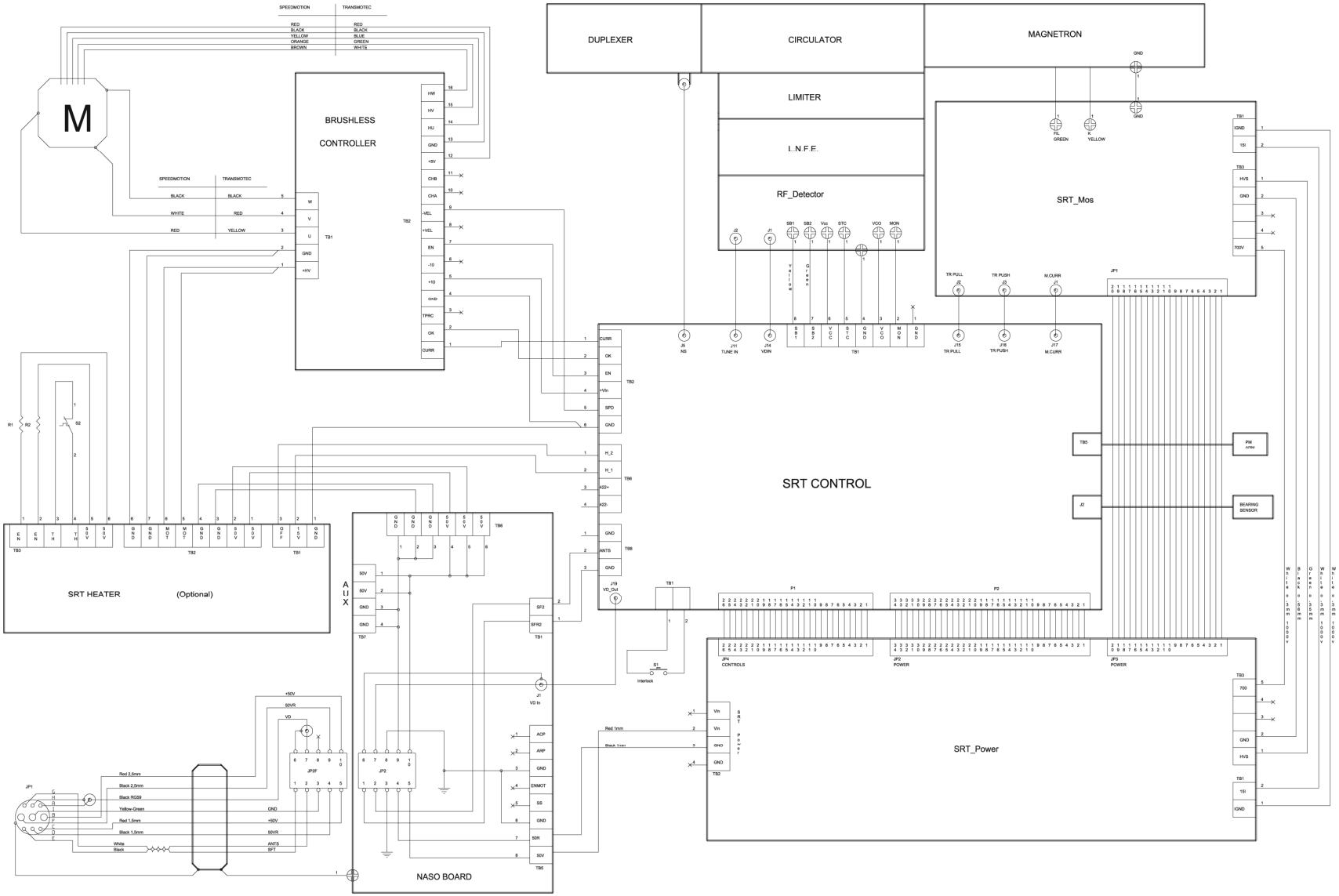
9.2.2 **Block diagram Selux ST radar display with SRT S-Band Up Mast radar sensor**



9.2.3 **General interconnection diagram of PCBs (standard version)**



9.2.4 **General interconnection diagram of PCBs (version with SRT HEATER)**



9.3 SPECIFICATIONS

9.3.1 Dimensions and weights (also see outline drawings)

Width	**654 mm**
Depth	**478 mm**
Height	**765 mm**
Weight with 12 ft antenna	**75 + 50 kg**
Swing circle with 12 ft antenna	**3620 mm**

9.3.2 Required power

Standard configuration	**115÷220 VAC - 56÷60 Hz or 48VDC**
Transceiver only	**80 W**
With 100 KN	**350 W**
With 100 KN (HSC)	**850 W**
Medium power cunsumption 30 kW / 12 SLP	**170 W**
Medium power cunsumption 30 kW / 12 SLP (HSC)	**280 W**

9.3.3 Environmental data

Operating temperature	**-25°C / +55°C As in IEC 60945**
Storage temperature	**-25°C / +70°C As in IEC 60945**
Relative humidity	**Up to 95% at + 40° As for IEC 60945**
Vibrations	**As for IEC 60945**
International Protection (IP)	**IP 66**

9.4 INSTALLATION

9.4.1 Installation principles

In order to obtain the best radar performance and accessibility, the following precautions should be used:

- Space for the antenna to swing freely. See par.9.2 (Specifications; Antenna type)
- Safety and easy access for maintenance purposes. It is preferable to use a platform on the ship mast.
- The antenna to be accessible in all directions
- Avoid exposure to exhaust fumes from the funnel
- Avoid strong vibrations
- Avoid interference between two antennas
- Avoid obstacles in the radar beam, especially ahead of athwart ships directions

If two radar sets are installed, their antennas should be installed on different levels.

The antennas can be mounted, either on a single mast construction, so they are on top of each-other or the antennas can be mounted on a platform, one on portside and one on starboard side.

The following formula and drawing, will help you to determine the correct distance and height between the two radar antennas. The 45° angle on the drawing is the actual vertical beam-width with a safety margin included.

Example:

“H = L”,

H = height between the two antennas

L = the distance between the two antennas

If the distance L is 6m, then the height should be = 6m.

Blind sectors towards the bow and within a few degrees on port and/or starboard side caused by the structure of the ship must be avoided with great care. In case of a blind sector at the bow in mid-ships’ position, it is advisable to mount the antennas on the starboard side of the ships’ keel-line.

When obstacles are sufficiently far from the antenna, they will result in a blind sector on the radar display with approximately the same amplitude as observed by the human eye, but these obstacles can produce false echoes. An echo produced by an obstacle close to the antenna, can be suppressed by reflecting the antenna-beam skywards by mounting a reflector made of metal. This solution however does not eliminate the blind sector, but will reduce false echoes produced by the obstacle. The best position for the reflector can be found by testing out different positions.

It is highly recommended that the shipyard submit the drawings of the radar antenna position(s) to the manufacturer for approval.

The Installation consists of following basic steps:

- Mount the Unit without the Antenna on the mast
- Make relevant connector
- Install and connect the Performance Monitor (optional) arm
- Install the Safety Switch
- Mount the Antenna on the Unit

NOTE

The transceiver should be installed in such way that the performance monitor arm is not facing funnels or other big ships obstruction. Sector blanking is enabled to prevent false echoes caused by funnels and/or big ships construction (see above). If performance monitor arm is positioned, within this blanking area, the pedestal must be turned because the radar performance monitor is not working where there is no transmission in the sector of its sensor

Installation of Safety Switch CHANGE: IT IS ON THE DC CORE OR ADAPTER BOX OR OPTIONAL FOR THE ADAPTER BOX EXTERNAL is compulsory. It is recommended to be installed at the bottom of the stairs giving access to the Antenna Pedestal. The waterproof switch is supplied by manufacturer, but a connection cable (2x2,5mm2) should be provided by the shipyard.

The Antenna Group must be covered by plastic sheet during any painting performed after the installation.

NOTE

In no case, the Antenna shall be used to hoist the Pedestal up the mast

9.4.2 **Mechanical installation**

The SRT consists of following units and type designations:

Pedestal with 30 kW transceiver **UP MAST/S-001**

12 feet antenna **ANT12LP/S-001**

Safety switch

(optional, always included in DC-CORE or SRT ADAPTER BOX)

9.4.2.1 Unit (Pedestal + Transceiver)

The pedestal should be mounted with its lid hinges pointed forward and cable glands pointed astern. However the antenna swinging plane must be horizontal in all directions when ship is upright on even keel. Consider giving ample space for service, especially astern of the antenna group. If such space can not be achieved, contact manufacturer for installation alternatives.

NOTE

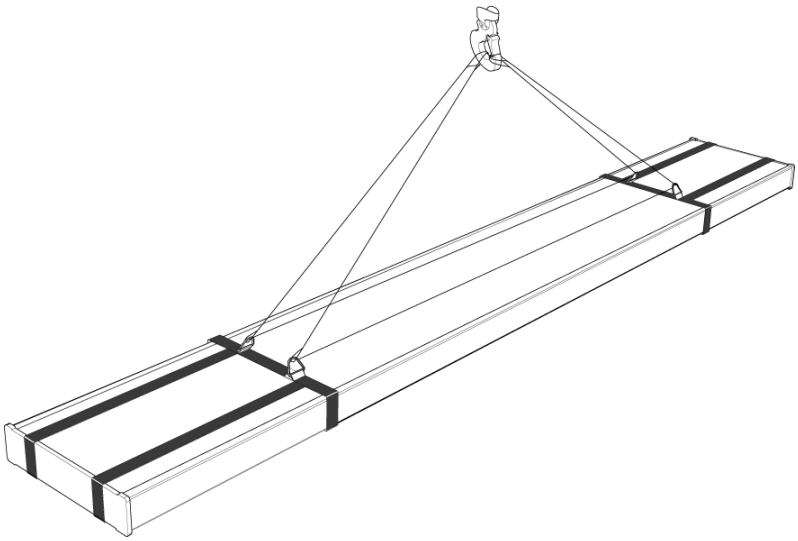
The fixing materials to fasten the antenna pedestal to the ship's platform are not provided by the manufacturer. Assuming a platform plate thickness of 20 mm, four M10 stainless steel bolts of 65 mm length, with relative nuts grooves and washers, must be used. The tightening couple is 44 Nm.

9.4.2.2 Antenna

The antenna and the unit must be run up the mast separately and then assembled. The TXRX should not be lifted with the antenna already mounted.

WARNING

It is recommended to use the slings for lifting the antenna as shown in figure



1.1.27 *Antenna Positions*

The mounting procedure of the antenna to the pedestal consists of following steps:

- Remove the waveguide protections on the antenna and pedestal.
- Mount the antenna over its support, check that the waveguide connections are on the same side. The antenna assumes the right position following two reference covers.
- Rest the antenna on the pedestal and tighten the 16 bolts holding the antenna. The tightening couple is 22 Nm

9.4.2.3 Safety switch (external is optional)

Usually the safety switch is located on the Radar Display DCORE or the optional SRT adapter Box.

Installation of safety switch is compulsory. The optional safety switch can be supplied by the manufacturer.

It is recommended to place the safety switch at the bottom of the stairs that are giving access to the radar mast. The switch must be mounted with the cable glands pointing down. Connect the cable as described in 9.4.3 Electrical installation.

9.4.2.4 Performance Monitor arm

To install the P.M. Arm proceed as follows:

- Connect the P.M. Arm for the radiation monitor on the SRT. The arm shall be angled upwards.

9.4.3 **Electrical installation**

The electrical installation of the SRT consists of cabling and connection to terminals as described below:

9.4.3.1 Multicore cable

Also see Multicore Cabling and Termination Principles

NOTE
Use the installation materials for the Multicore cable which are delivered by the manufacturer to ensure proper connection

Normally the cable (4 twisted pair + 2 Coax + 8 wire), P/N 55X456P001, is delivered to a length of 30m. The Multicore cable includes wires for Power, Video, Trigger and Antenna data. It is therefore required to handle these cables with particular care.

9.4.3.2 Safety switch

The safety switch is supplied by the manufacturer. Cable from the safety switch to the Core is not included.

Check the Safety Switch is placed as described in par. 9.4.2 Mechanical Installation

Connect the two poles of the safety switch, on TB1 of SELUX display Core

The cable gland not used must be properly sealed

Carefully make sure that the switch is closed in “1” (On) position and open in “0” (Off) position

9.4.3.3 Grounding

Connect a tinned braided copper wire (>25mm^2) between the GROUND TERMINAL on the SRT and the radar mast.

9.4.4 **Pre setup procedures**

This paragraph provides information concerning the preliminary controls and procedures to be done as a completion of the electrical installation and before supplying the unit with power and before performing the System Setup

Procedure:

NOTE
This manual is for study purposes only. Schematics with radar set may be different from those enclosed.

NOTE
Powering the Radar System is not included in the Pre Setup Procedure.

- Carry out a careful visual inspection of the installed components referring to the layouts of the unit and to the interconnection drawings
- Carefully check the integrity of the fuses

NOTE
Powering the Radar System is not included in the Pre Setup Procedure.

9.4.4.1 Ship power voltage

The unit must is connected to ship main voltage trough the Radar display console DC-CORE or trough the SRT adapter box.

Cable section shall be ≥ 4mm to support a 15A current.

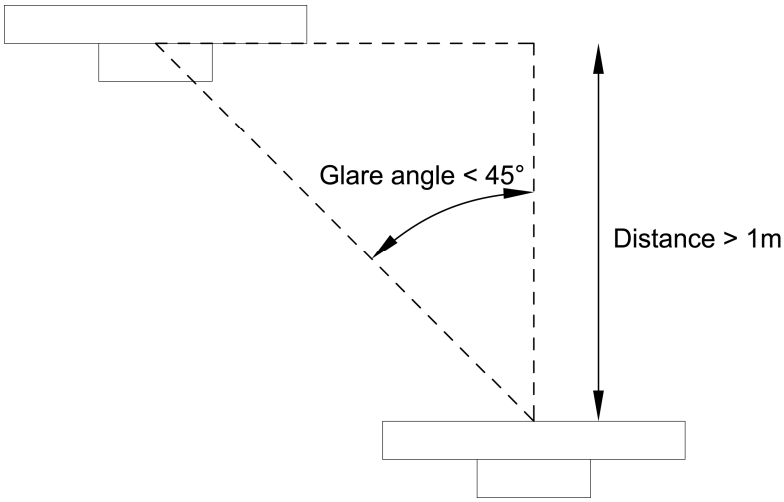
9.4.4.2 Compass safe distance

Every unit should be located outside the minimum magnetic compass safe distance according to the following table:

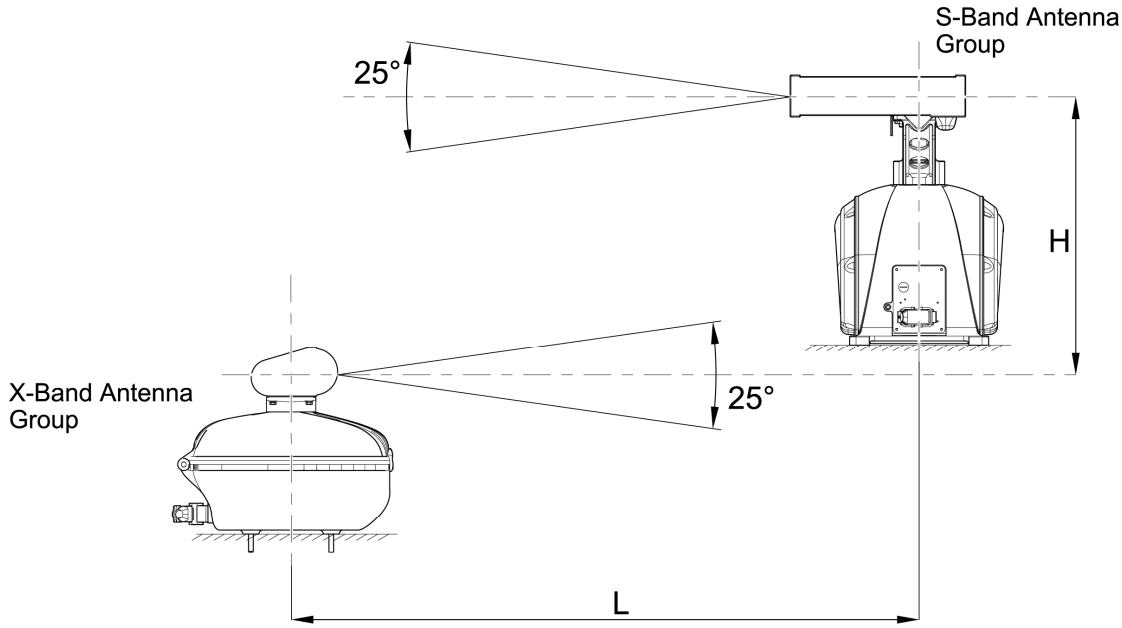
Table 9.4.1 Compass Safe Distance

SAFE DISTANCE TO THE STANDARD MAGNETIC COMPASS	**4,20 m**
SAFE DISTANCE TO THE STEERING MAGNETIC COMPASS	**2,75 m**
REDUCED SAFE DISTANCE TO THE STANDARD MAGNETIC COMPASS	**2,55 m**
REDUCED SAFE DISTANCE TO THE STEERING MAGNETIC COMPASS	**1,65 m**

9.5 **ANTENNA INSTALLATION**



1.1.28 *Antenna Positions*

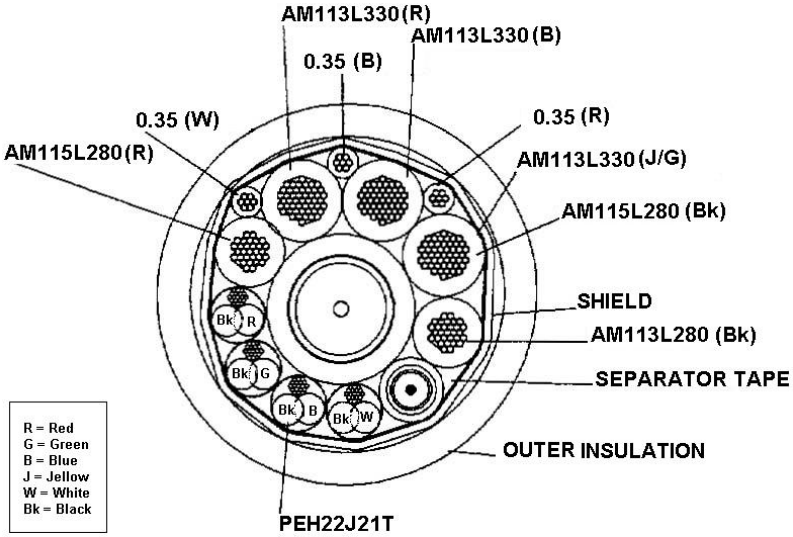


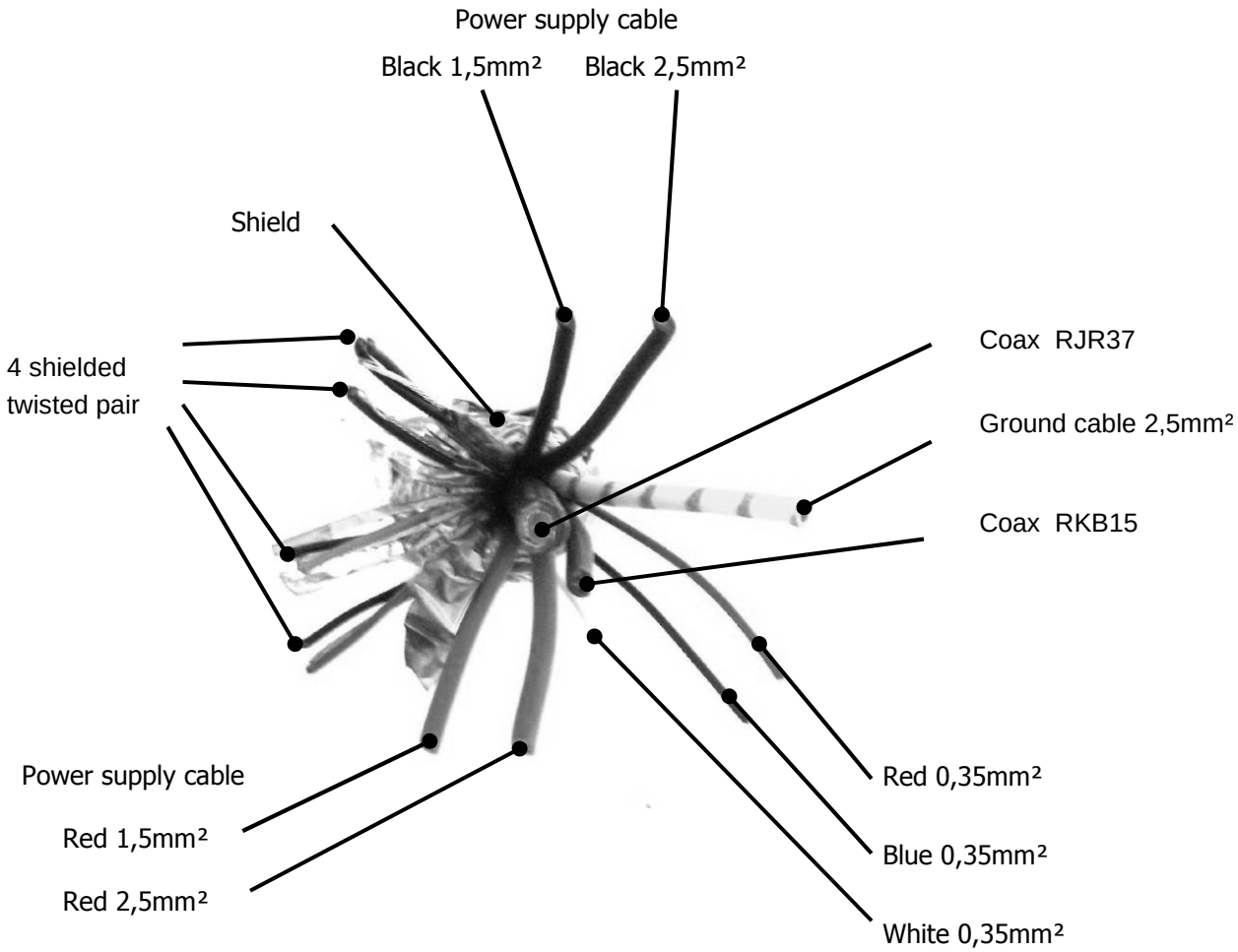
IMPORTANT: **H ≥ L**

1.1.29 *Antenna Positions*

9.6 MULTICORE CABLE TECHNICAL SPECIFICATION

Core overview of Multicore Cable:





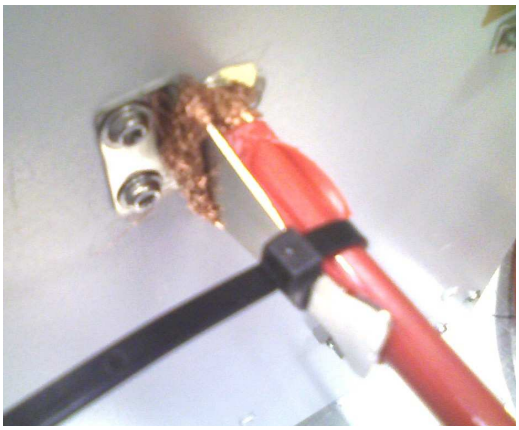
9.6.1 **Cable handling**

- Dismantle the outer insulation of the cable for 60 cm.

- Remove most of the shield, let it be 5 cm with shield perceptive to vision:

- Remove the main protective film and turn, as in the picture, the shield over the cable outer isolation.

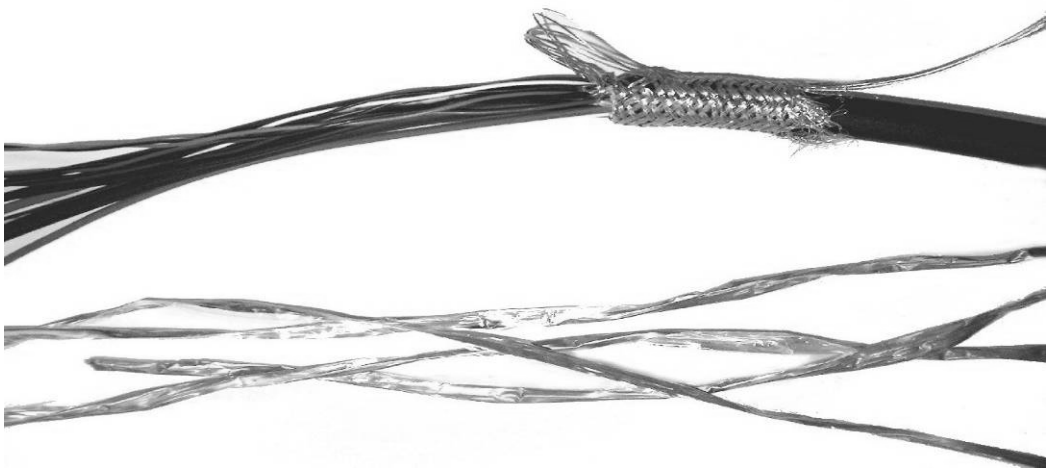
NOTE
When you have the video connection cable combined triaxial BNC,
the first cable shield must be connected to the frame of the Up Mast (Fig.1.1.30).



1.1.30 *Coaxial cable fixing*

9.6.2 **Main shield and inner shields handling**

- Remove the metallic film from each twisted pair cables and pass the 4 ground wires through the turned shield.



0.35 mm² cores

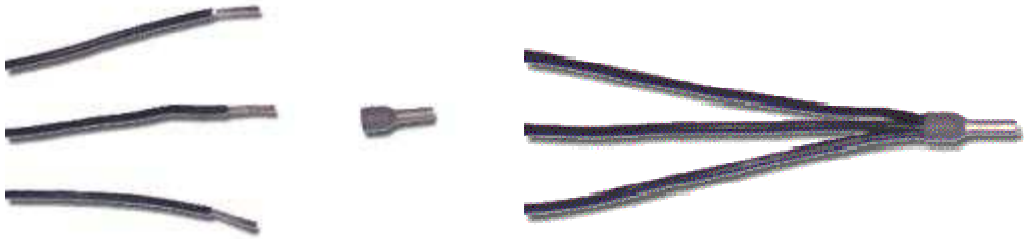
- Cut the core to the wanted length and dismantle the core for 10mm:

- Insert and crimp the blue-end terminal:

NOTE
End terminal should always be used.

- Double connection in one terminal (yellow terminal):

- Triple connection in one terminal (grey terminal):



1,5 and 2,5 mm² cores

- Cut the core to the wanted length and dismantle the core for 10mm:

NOTE
End terminal should always be used.

9.6.3 **RG coaxial cables**

Mechanical details of BNC connector:

Cut the cable to the wanted length.

Dismantle the outer isolation of the RG coaxial cable without damaging the shield, and put the related part of the BNC connector as below:

Details related to the ring of the BNC connector.

Take back the shield on the ring and trim exceeding shield:

Dismantle the outer isolation of the centre core without damaging the centre core and be sure that the

shield is not shorted with the centre core:

Solder the centre core with the BNC pin.

Be careful not damage the isolation (i.e. burned) during the solder process:

Mount the BNC connector as below:

9.7 **SOFTWARE UPGRADE**

The software installed on the processor used by SRT CONTROL can be updated. For this procedure, refer to the use of the console.