

MANUAL

# SatCom Line SC60 & SC90

English



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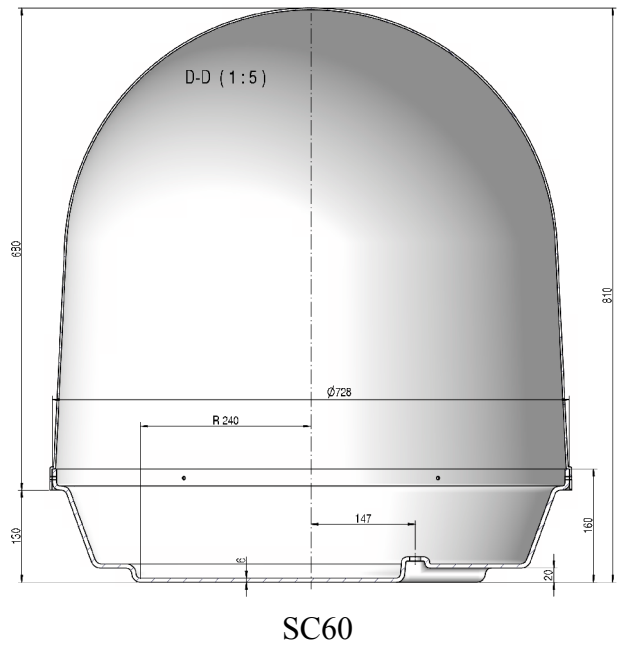
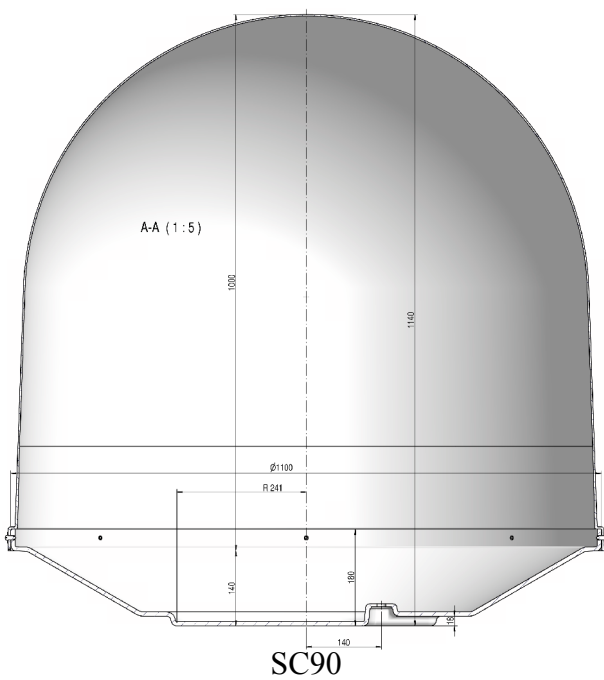
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# 1 The digital satellite tracking system

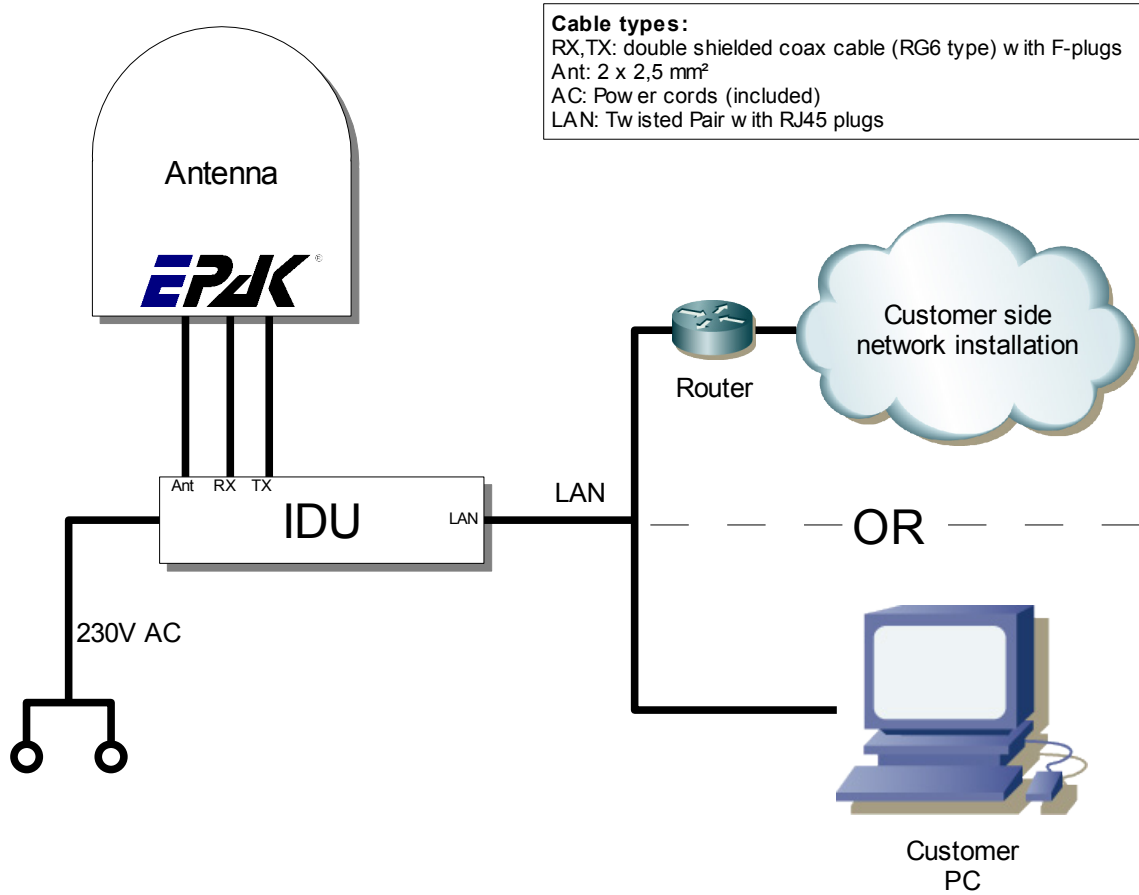
The advanced technology in the satellite tracking system EPAK-SatCom makes it possible to have an excellent internet reception wherever you are. Due to an unlimited 360° high-speed tracking, a non-stop access to your favorite web sites is guaranteed even during your trip on a vessel in open seas. The satellite tracking system is protected by a UV-stabilized and maritime climate proof radome, easy to handle and maintain. (Please note that the given warranty for the radome is limited to the terms of the radome manufacturers. High-speed tracking sensors developed for this system, using high-tech components of the electronic signal processing, provide the topmost and dynamic tracking accuracy of the satellite tracking system. With the help of this technology, EPAK-SatCom guarantees an unmatched tracking rate, dynamic and system performance. EPAK-SatCom is suitable for any size vessel including smaller boats of less than 36ft (11m). The automatic satellite tracking system includes a reflector antenna dish of 24" (60cm) or 35" (90cm) in diameter that is capable of tracking horizontally and vertically to make an amazing choice of web sites available – just like home. Once the connection to a satellite is established, the tracking system will stay connected to the correct satellite even in the roughest sea conditions.



**Notice!** Do not use alcohol or dilution or similar products for cleaning the radome!

**Note!** The reception of satellite signals in different regions depends on the footprints of the satellites. Also, the reception can be affected by rain, snow, dense clouds and extreme movements in areas of weak signals and there is no warranty for reception of certain transponders.

## 1.1 EPAK®-SatCom system overview



## **1.2 Safety recommendations**

- When mounting the antenna, the distance from the antenna unit to other radiation sources e.g. radar equipment or other antennas (mobile communication antennas) should be min. 2.5 m (8 ft).
- Simultaneous operation of radar and satellite antenna may damage the satellite antenna if not installed directly above the radar antenna.
- Do not use the IDU unit outdoors.
- During a thunderstorm, we recommend that the connection cables are disconnected.
- If the negative side of the antenna unit's supply voltage has no connection to ship's ground (earth), then the antenna unit's ground point should be connected directly to ship's ground (earth).
- After the installation is completed, all other electronic systems i.e. GPS, Radar, VHF, FM, AM etc. should be tested for full functionality, while the antenna is turned on.
- Do not test or turn on the antenna before the radome is fitted correctly. If the sun reflects into the dish, the electronics can be damaged.
- Do not touch the rotary joint.
- Do not attempt to open the sealed electronics, as this will void the warranty.
- Do not stay closer than 5m to the antenna during operation

## 2 Installation

### 2.1 Standard delivery

The satellite tracking system EPAK SC60/90 comes complete with electronic assemblies and other necessary installation material.

System components:

- Antenna unit (with serial number)
- Indoor Unit (IDU)
- Manual

Please check the completeness of all components. Make sure that no transport damages exist before you start the installation.

### 2.2 Installation overview

The installation work has to be done in the following order:

- Select location
- Check the mounting surface for stability
- Check cable path
- Position of power distributor
- Drill holes and lay the cable
- Install antenna unit (see also addendum for instructions of how to remove the transportation lock before power-up)
- Make all installation openings watertight
- Connect cables

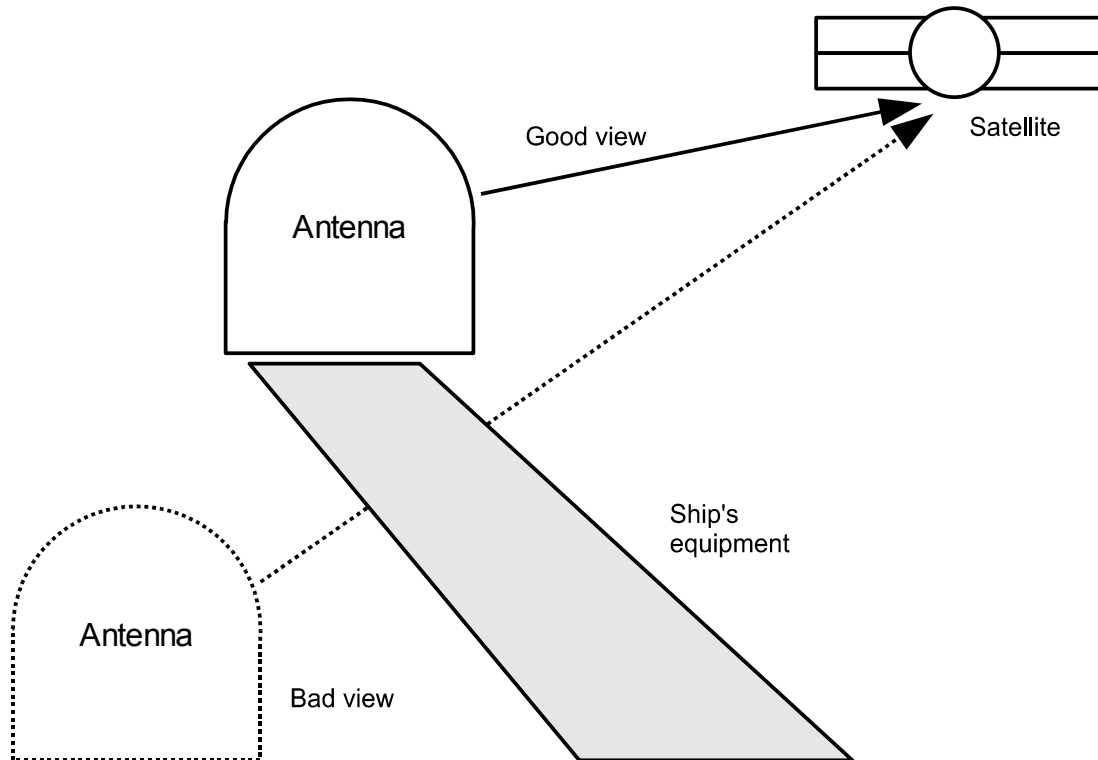
For the installation the following tools are needed:

- Electric drill
- One 4mm and one 8.5-9 mm bits
- Hexagon socket wrench size 6
- Wrench M 8

☛ **Plan the entire installation first! To avoid mistakes or damages to the boat or satellite tracking system, please read the installation instructions carefully before starting the installation.**

## 2.3 Selecting location

This illustration shows the importance of a proper location for the antenna unit.



Note that criteria such as an unobstructed view to the satellite and a strong mounting surface are met. Furthermore, no sources of interference, e.g. radar equipment or other antennas, such as mobile communication antennas, should be installed nearby the antenna unit. A minimum distance of 8-12 ft. (2-3 meters) has to be observed in order not to affect the antenna performance.

Although the radome is sealed, it is recommended to avoid direct waves and bilge water!

The antenna unit has to be installed so that no superstructures will obstruct the sight to the satellite!

Please note, that the elevation angle depends on the geographical location of the boat and on the selected satellite!

• Equally important for a good installation are the conditions of the mounting surface and the lengths of the different cables. See section 2.4, 2.5 and 2.6.

## **2.4 Mounting surface**

A horizontal, solid and steady surface is very important. Make sure that the surface does not have any irregularities! Furthermore, please take into consideration that the weight of the antenna unit is 56 kg or more. Therefore, the surface has to be strong enough to carry the antenna unit, even during the most challenging maritime conditions.

## **2.5 Planning the cable paths**

Before starting the installation, you should check which walls are suitable and if existing openings can be used for the cables.

- **All openings have to be sealed in order to avoid any water penetrating.**

## **2.6 Power supply**

The antenna unit is powered by the IDU using 24 V DC. The IDU is powered by two built in power supplies, which are working on 100-240V AC. Max. power consumption is 200W. The circuit has to be fused properly.

- **The power distributor must be idle while working on the ship's supply net or you may short circuit the system.**

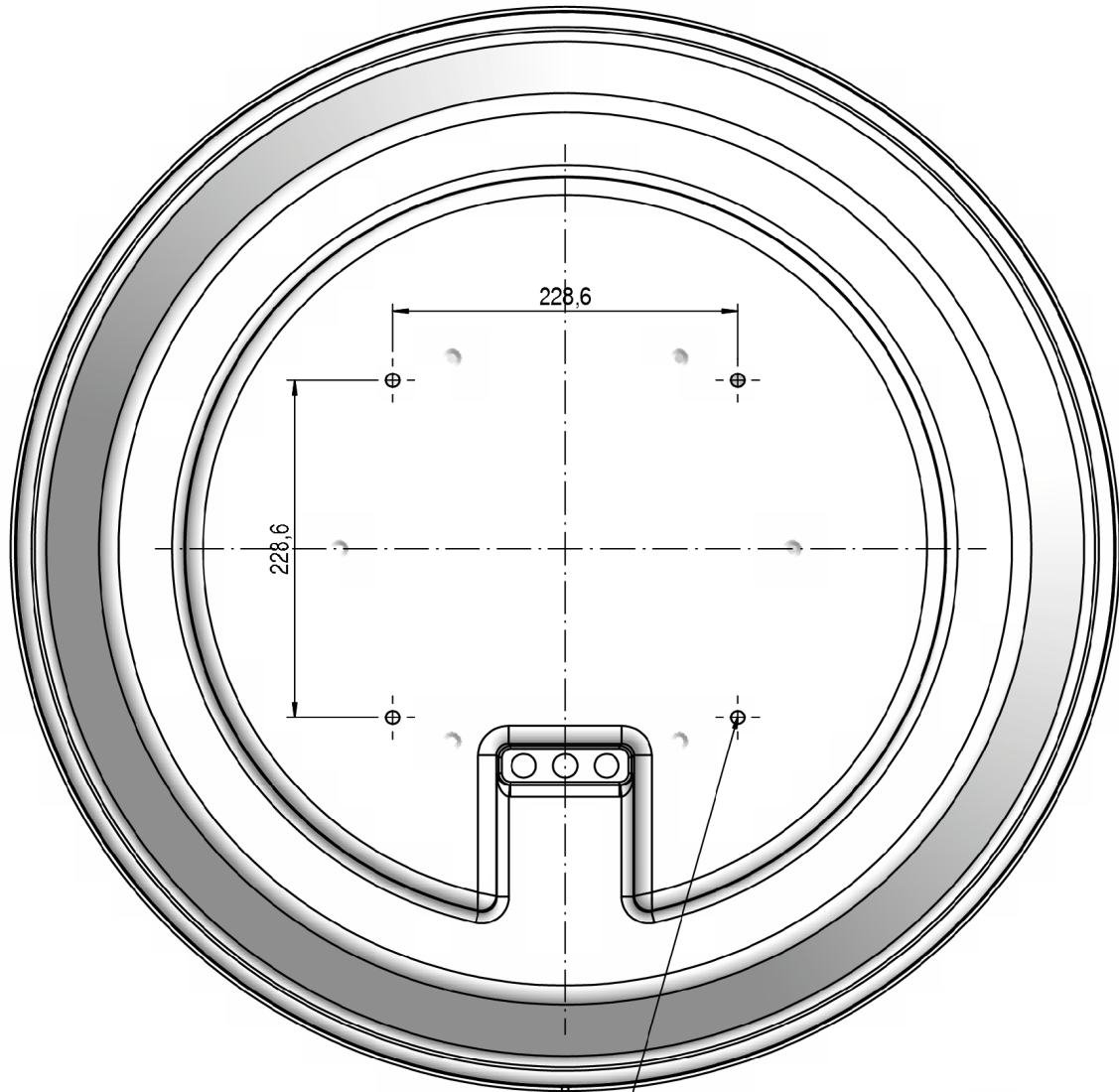
If the chassis of the antenna unit has no connection to the boat's ground, make sure a potential compensation between boat ground and the ground point of the antenna unit is made.

## **2.7 Drillings**

To avoid any damage to the mounting surface it is recommended that you start out with drilling a smaller hole, using a 3.5-4 mm bit before drilling the correct hole size. Use an 8.5-9 mm bit to drill 4 mounting holes for the M8 screws included. To drill the holes in the correct positions, please refer to the included template.

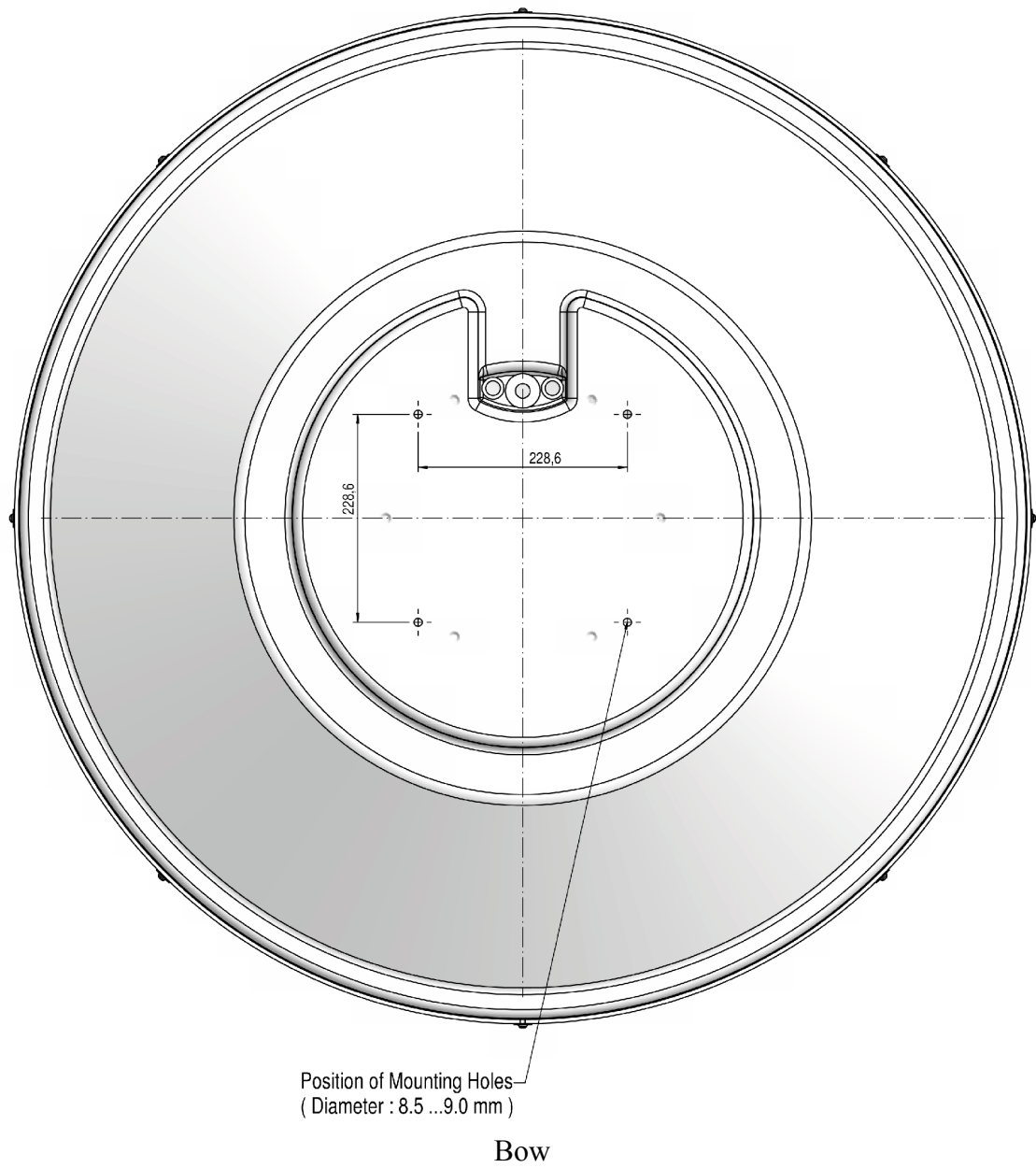
Example of template:

Bow



Position of Mounting Holes  
( Diameter : 8.5 ... 9 mm )

View from below SC60



View from below SC90

☛ **If the antenna unit is mounted on the cabin roof (not device carrier or separate mounting plates) close all drillings with waterproof sealing material to avoid any water penetrating!**

## 2.8 Mounting the antenna unit

The antenna unit has to be mounted on a solid and steady base parallel to the water surface. Take care that the cable lengths are sufficient, the antenna unit must have an unobstructed view to the satellite and there must be no interference fields (especially mobile communication antennas) nearby. Place the antenna unit on the pre-drilled holes and fasten it with the included screws and washers. The screws have to be screwed in from below through the mounting surface into the radome.

☛ **Close all drillings with waterproof sealing material to avoid any water penetrating!**

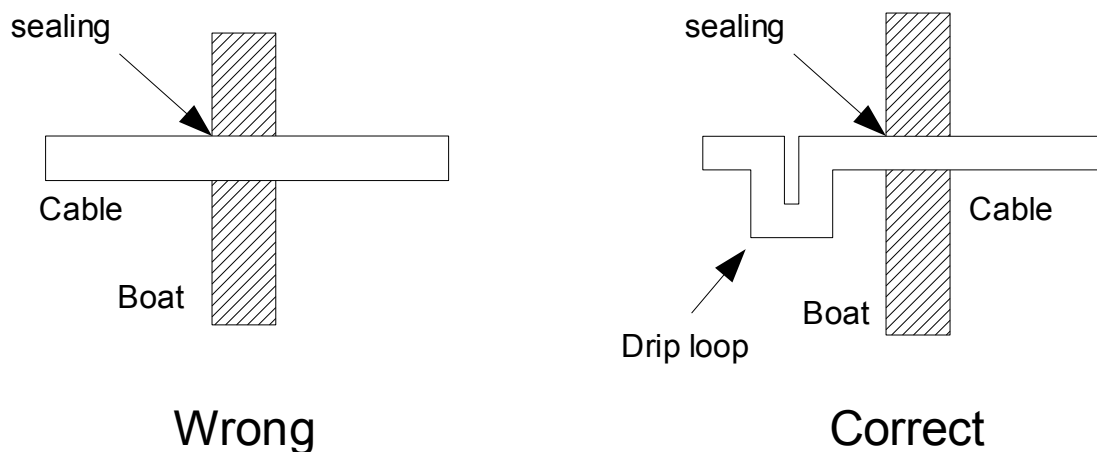
## 2.9 System cable connections

☛ **Break the contact of the circuit on which you are working to avoid short circuit the system.**

- The antenna cables (Power, RX and TX) must be connected to the IDU and the antenna unit.
- The IDU has to be connected to 100-240VAC 50/60Hz (two times)
- The users network is connected (using a router) to the frontside LAN connector of the IDU (backside connector available upon request)

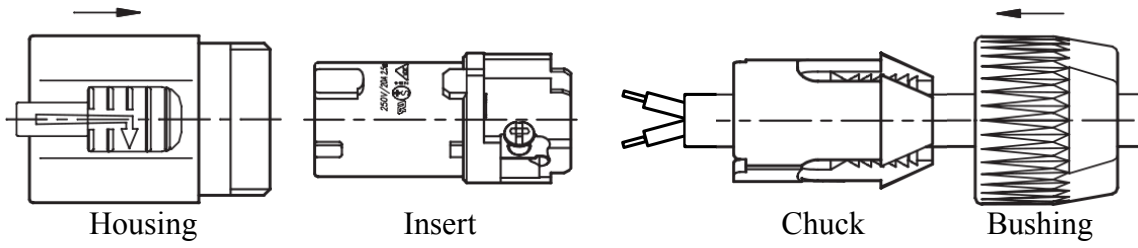
See system overview and illustration details.

Lead the cable through the drilled holes and seal it with waterproof sealing material. Furthermore, drip loops should precede the entry point from the exterior to avoid any water penetrating, see below illustration:

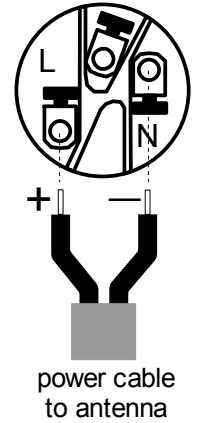


Find a suitable location for all units within cable lengths. Take care that the display of the IDU can be easily read and the push-buttons are accessible. And also, allow room for the cables behind the IDU! The antenna unit is separated from the power supply net by the IDU. Therefore, the antenna unit has electric power when the IDU is turned on!

### Preparing the Power connector:

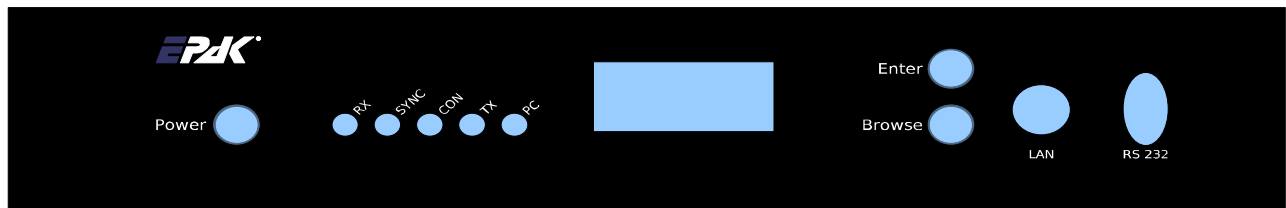


1. Put bushing and chuck onto the cable.
2. Prepare cable as shown above.
3. Insert the wire into the terminals and fasten the clamping device by a flat screw driver.
4. Push insert and chuck into housing (pay attention to the guiding keyway!).
5. Fasten bushing by means of a fork wrench 3/4", min. Torque 2.5 Nm (1.8 lb-ft).



## 3 Control elements

### 3.1 IDU



The operation of the EPAK-SatCom system is controlled from the IDU (19“, 2HU). It is a good idea if you make yourself familiar with the key functions and the indicators:

Keys:

Power : Short press will turn on or off power.

Browse : Short press will browse through all available menus, step by step or cancel an operation.

Enter : Short press will select/confirm what is written in the display.

Indicators:

RX : System has locked on the correct satellite

SYNC: System is synchronised to the data stream

CON : IDU is online

TX : IDU transmits data to the satellite

PC : a PC or router is connected to the IDU

Connectors:

LAN : Connects a PC or router to the IDU

RS232: Access for firmware upgrades and diagnostics

### 3.2 Preparing the network behind the IDU

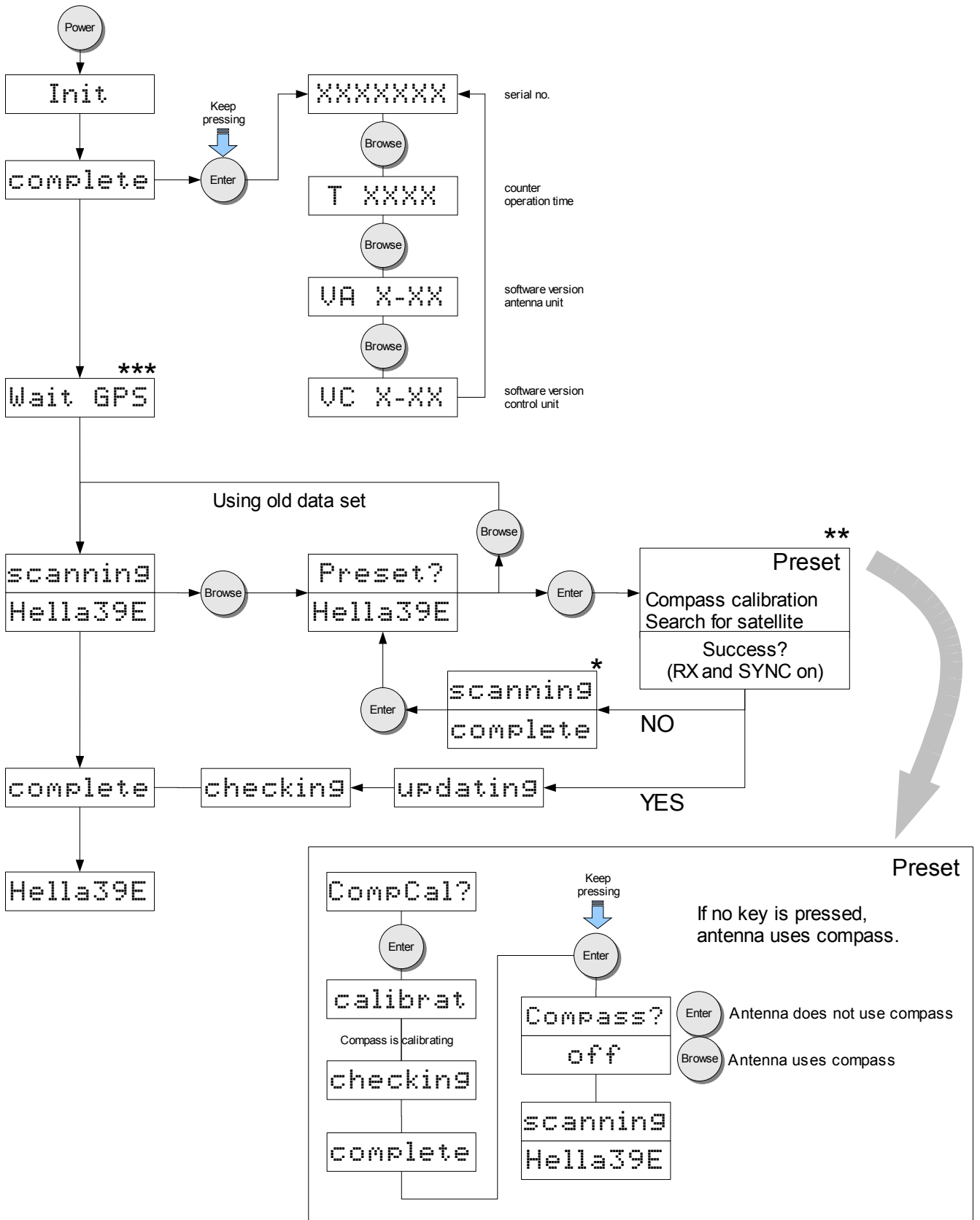
It is possible to connect either a single PC or a complete network. In this case a router has to be used. The IDU provides network configuration using DHCP<sup>1</sup> protocol. The router behind the IDU has to be configured to use DHCP on the WAN interface.

- ▶ The DHCP is only working, if the IDU is online!
- ▶ If a single PC is connected to the IDU, a crosslink cable has to be used. When using a router, a normal patch cable can be used
- ▶ A „proxy server“ has to be configured on each client PC, or special prepared router (not included in delivery, can be ordered separately) can be used. The proxy address is <IP-address of IDU> and port 9877.

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<sup>1</sup> DHCP: Dynamic Host Configuration Protocol

# 4 Operation



**States:**

|                      |   |
|----------------------|---|
| Init                 | The antenna is in initialization phase and checks the limit switches and motors   |
| Wait GPS             | The antenna waits for valid GPS data from the built in GPS receiver. If no GPS is received or the GPS module is defective, the antenna will hang in this state forever! |
| scanning<br>HELLA39E | Antenna searches for satellite.   |
| HELLA39E             | Antenna has found the satellite and tracks it.  |

When the satellite has been found and identified correctly, the indicators RX, SYNC and CON will be lit. The indicator PC is on, when a PC or router is connected on the LAN port of the IDU. The indicator TX flashes, if data is transmitted from the IDU to the satellite.

In the first time installation a preset has to be done. This means, after power on and after the message `complete`, press BROWSE (display `HELLA39E/Preset?`) and then ENTER. A full preset including a compass calibration and new search for the satellite will be done. This step can take a few minutes.

# APPENDICES

## A Maintenance

The satellite tracking system EPAK-SatCom does not require a lot of maintenance. The following instructions are sufficient to sustain the optimal capacity of the antenna unit:

- Clean the radome once a month, using fresh water and a mild detergent to remove dirt and salt deposits.
- Do not detach the radome!
- Do not spray directly on the radome with high pressure water from a hose!
- Check cable connections to be tight and free of corrosion. Clean the cables regularly.

The radome has a protective layer of UV-stabilized and maritime climate-proof lacquer. Do not apply any additional paint, wax, preservative, solvent, chemicals or adhesive labels. Any kind of coating will void warranty claims!

In case any solvent comes in contact with the radome by accident, rinse the area immediately with water and, if necessary, with a mild detergent!

## B Troubleshooting

| Display                              | Problem   | Remedy  |
|--------------------------------------|---|---|
| no dish                              | No connection to the antenna unit   | - Check cable connection to antenna unit (power and antenna cable)<br>- Check antenna unit's power supply   |
| ErrorCom                             | Communication error with antenna unit                                     | Turn unit off and on again  |
| Low Usup                             | Power supply for antenna too low  | - Check power supply connection for antenna unit (loose cables/connectors or wrong cable type)  |
| Err HR                               | Read error of horizontal unit   | Turn the unit off and on again. In case the error reoccurs, call for technical assistance.<br><br>In case of errors regarding limit switches:<br>Check all moving parts for nonblocking functionality                               |
| Err HW                               | Write error of horizontal unit  |   |
| Err VR                               | Read error of vertical unit   |   |
| Err VW                               | Write error of vertical unit  |   |
| Err SR                               | Read error of signal processing unit                                      |   |
| Err SW                               | write error of signal processing unit                                     |   |
| Err PR                               | read error of polarisation unit   |   |
| Err PW                               | write error of polarisation unit  |   |
| Err VCO                              | Error during satellite inspection   |   |
| Err EEP                              | Error during storage  |   |
| Err IIC                              | Error in internal communication   |   |
| Err Trck                             | Error in tracking module  |   |
| Err ULS                              | Error in upper limit switch   |   |
| Err LLS                              | Error in lower limit switch   |   |
| Err ELS                              | Error in eastern limit switch   |   |
| Err WLS                              | Error in western limit switch   |   |
| Err Comp                             | Compass error   | Compass will automatically reset and recalibrate. After that, please do a preset. In case the error reoccurs several times, call for technical assistance.  |
| Err Save                             | Error while saving satellite  | Repeat search and storing procedure. Make sure the boat is not moving and no superstructures obstruct the sight to the satellite  |
| complete                             | The search for a stored satellite was successful, but no picture is shown | - Delete satellite storage positions and memorize again   |
| Wait GPS                             | Antenne is waiting for valid GPS data.                                    | - GPS signal is jammed by another signal source<br>- GPS receiver is defective  |
| Sat X interchanging with no Sig      | No reception of the stored satellite                                      | - Check if superstructures (e.g. steeple cab or masts of proximate boats) obstruct the sight to the satellite – if so, move the boat<br>- Reception can be briefly interrupted by passing boats                                     |
| scanning interchanging with complete | No receptable satellite in the entire search range                        | - Check, if any superstructures are obstructing the sight to the satellite<br>- Check, by using footprint cards (e.g. <a href="http://www.satcodx.com">www.satcodx.com</a> ), that the boat is inside the coverage area (footprint) |
| >Short!<                             | There is a short in the connection between IDU and antenna                | Check cable connection to antenna and rotary joint inside of antenna  |

|                       |  |  |
|-----------------------|--|--|
|                       | Cannot find a satellite  | - Check, if superstructures obstruct the view to the satellite   |
|                       | Search for stored satellite takes longer, even though there are no obstructions in the view to the satellite   | If the location of the vessel changes, the angles of the satellite may have changed. Modify angles of the satellite at the new location with the function <code>Preset</code> , see section 4. |
| <code>Preset?</code>  | Antenna asks for confirmation to update the satellite data   |  |
| <code>Standby</code>  | <ul style="list-style-type: none"> <li>- Antenna could not find a satellite for one hour.</li> <li>- There was the error message <code>no dish</code> before.</li> </ul> | Press <code>POWER</code> , wait ca. 1 minute and press <code>POWER</code> again. If you have free sight to the satellite, the antenna should find it again.                                    |
| <code>upd reco</code> | saved satellite data is not completely similar to the real data measured by the antenna  | Do a preset, like described on page 15.  |

## C Technical specifications

| Antenna unit  | SC60                          | SC90        |
|---|-------------------------------|-------------|
| Type  | Cassegrain reflector          |             |
| Diameter  | 60 cm (18")                   | 90 cm (34") |
| Gain  | 36 dB                         | 41 dB       |
| Minimum E.I.R.P.* (for reception of geostationary satellites) | 48 dBW                        | 46 dBW      |
| Radome diameter   | 735 mm                        | 1114 mm     |
| Radome height   | 810 mm                        | 1140 mm     |
| Weight (incl. radome)   | 42 kg                         | 60 kg       |
| Azimuth range   | unlimited                     |             |
| Elevation range   | 5..85°                        | 0..90°      |
| Skew Range  | ±70 °                         |             |
| Drive system  | 3 axes with belts             |             |
| Tracking Sensor   | Electronic Beam Forming (EBF) |             |
| Tracking speed  | >30 °/s                       |             |
| Power supply  | 24 VDC, 50 W provided by IDU  |             |
| Power on satellite lock time                                  | typical 30s                   |             |
| <b>IDU</b>  |                               |             |
| Power supply  | 100-240 VAC, 50/60Hz          |             |
| Satellite acquisition   | fully automatically           |             |
| <b>System</b>   |                               |             |
| Operation temperature   | -20 to +55 °C                 |             |
| Storing temperatur  | -30 to +85 °C                 |             |