



MANUAL

# SatCom Line SC59 & SC58

English



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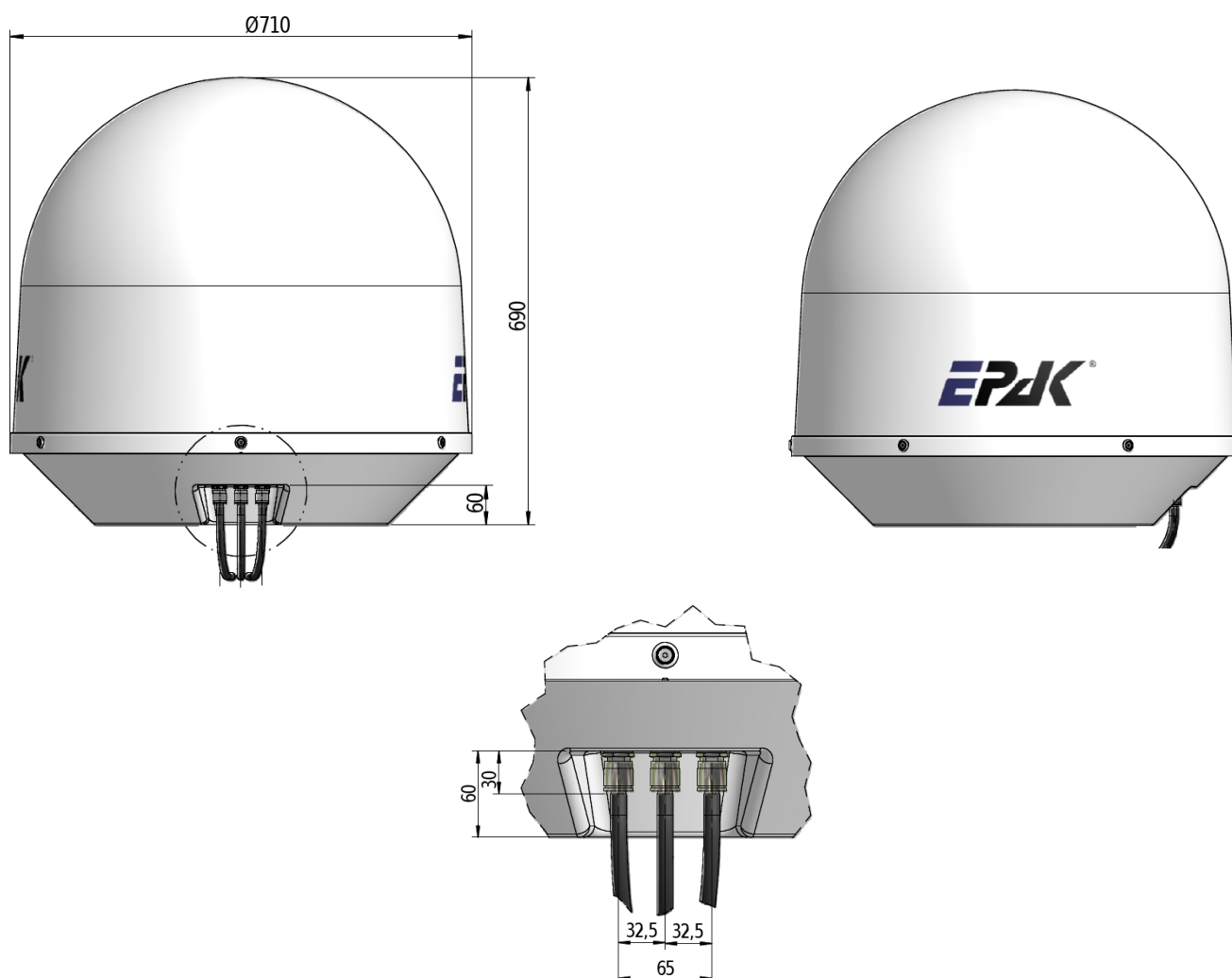
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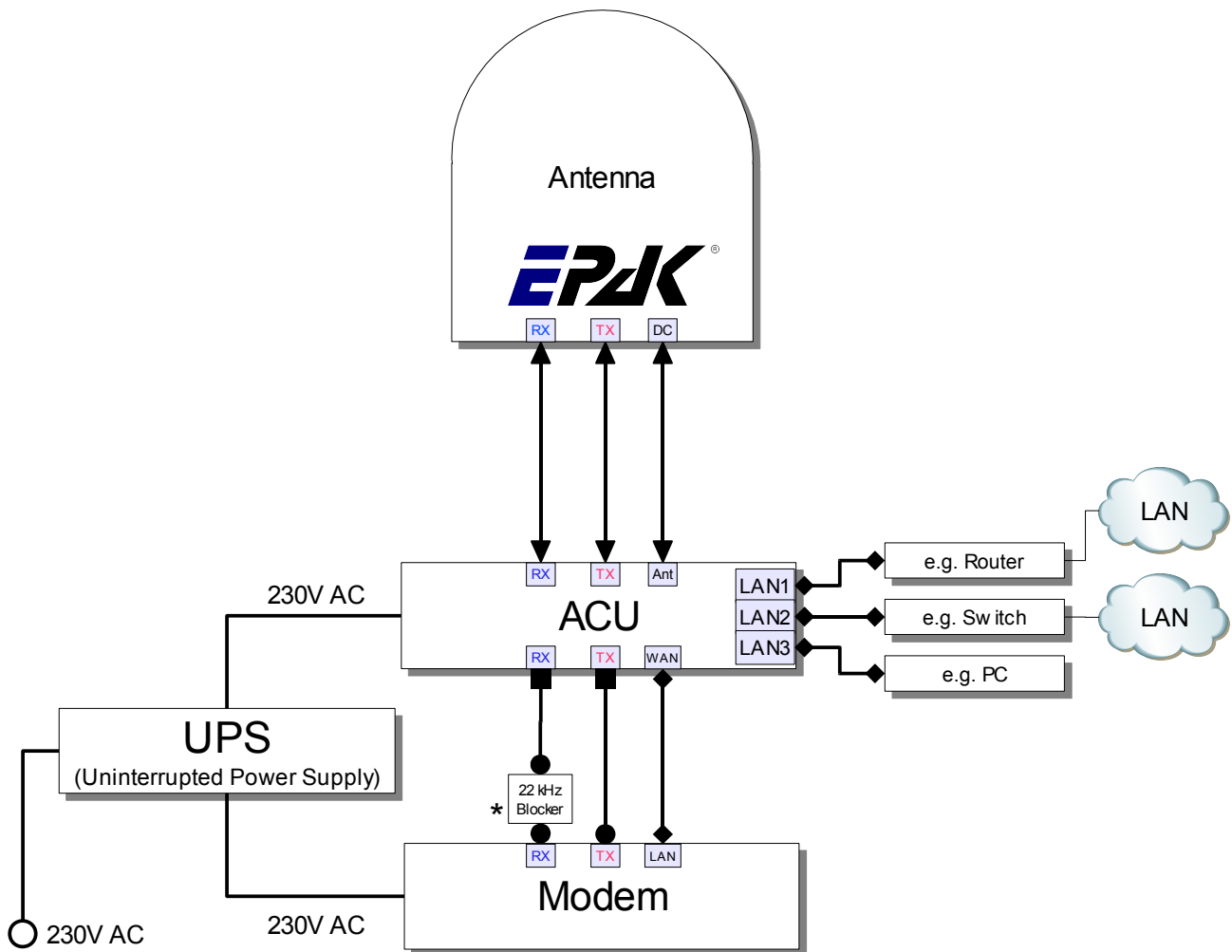
## 1. The digital satellite tracking system

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) 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 rough sea conditions.







**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 strong movements in areas of weak signals and there is no warranty for reception of certain transponders.**

## 1.1. EPAK®-SatCom system overview



### Cable types:

-  double shielded coax cable (RG11 type) with N-plugs
-  double shielded coax cable (RG6 type) with TNC- and F-plugs
-  Power cords (included)
-  Twisted Pair with RJ45 plugs

\* Only used with STM modems

## 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 minimum 3 m (11 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 ACU 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 8m (SC59/58) to the antenna during operation.
- It is not allowed to use modem configurations with less than 153,6 kHz Tx Bandwidth (@ - 3 dB)

## 2. Installation

### 2.1. Standard delivery

The satellite tracking system EPAK SC59/58 comes complete with electronic assemblies and other necessary installation material.

System components:

- Antenna unit (with serial number)
- Antenna Control Unit (ACU)
- Modem
- Installation material
- 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 (keep in mind, that the maximum length of the coaxial cables has to be 25 meters)
- 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

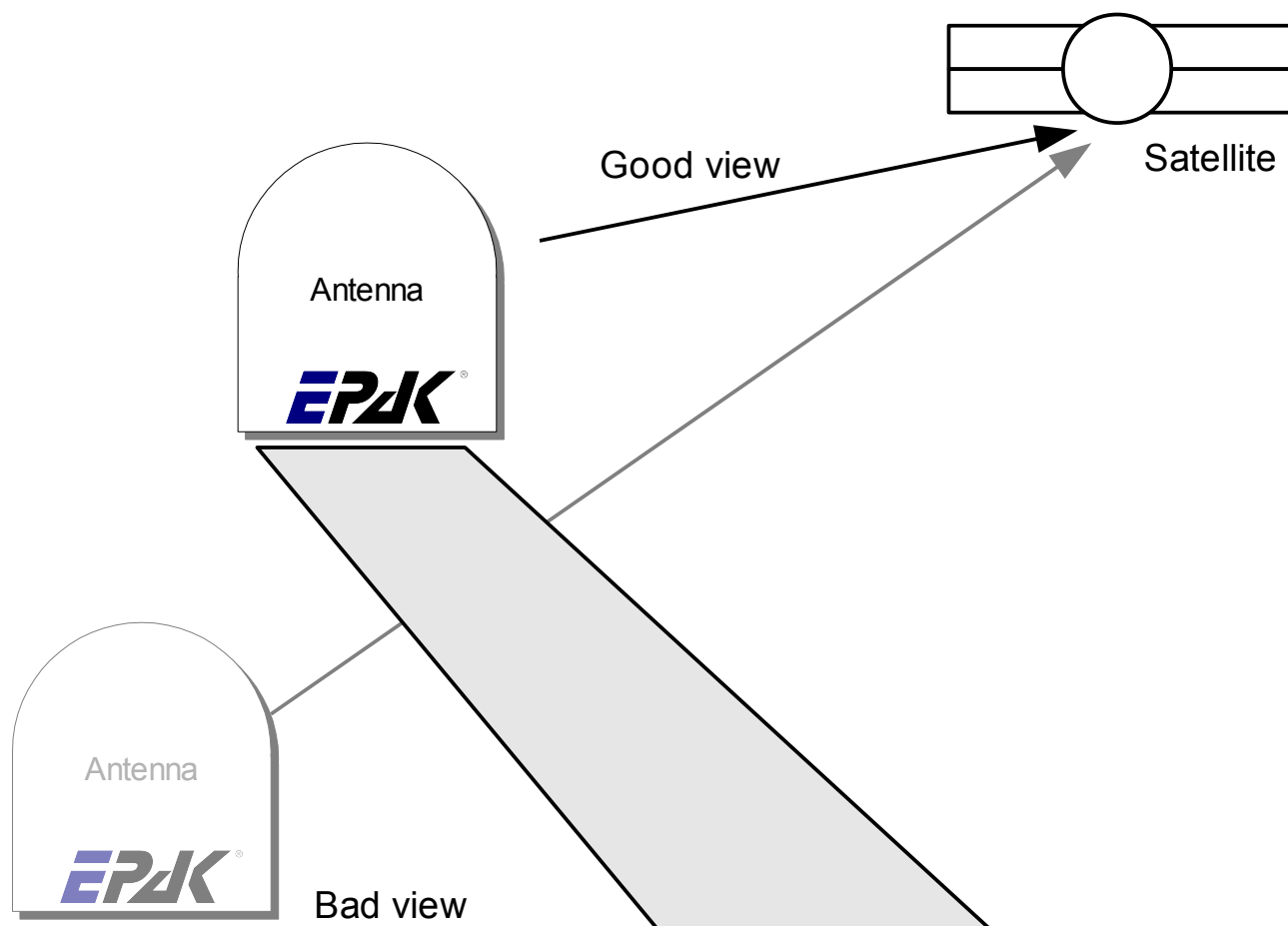
For the installation the following tools are needed:

- 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.

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 26 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 ACU using 24 V DC. The ACU is powered by a built in power supply, which is working on 230V AC. Max. power consumption is 150W. The circuit has to be fused properly.

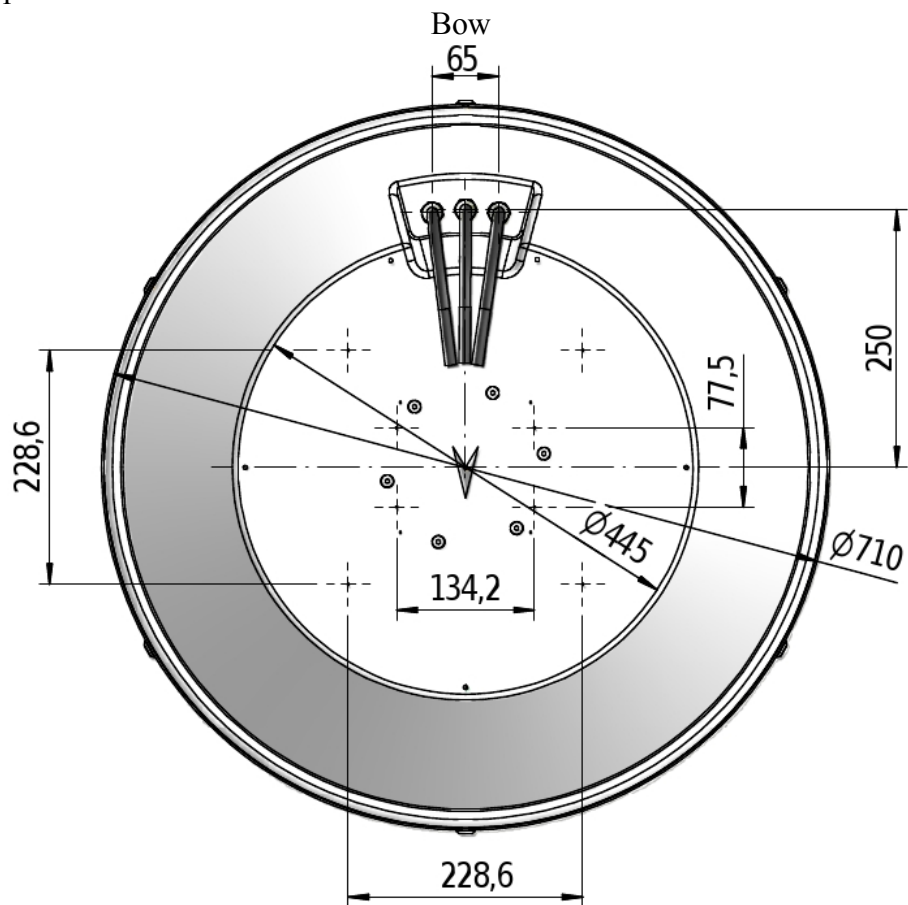
► **The power distributor must be idle while working on the ship's supply net or you may short circuit the system.**

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:



View from below SC59.  
SC58 is similar to the SC59.

► 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.

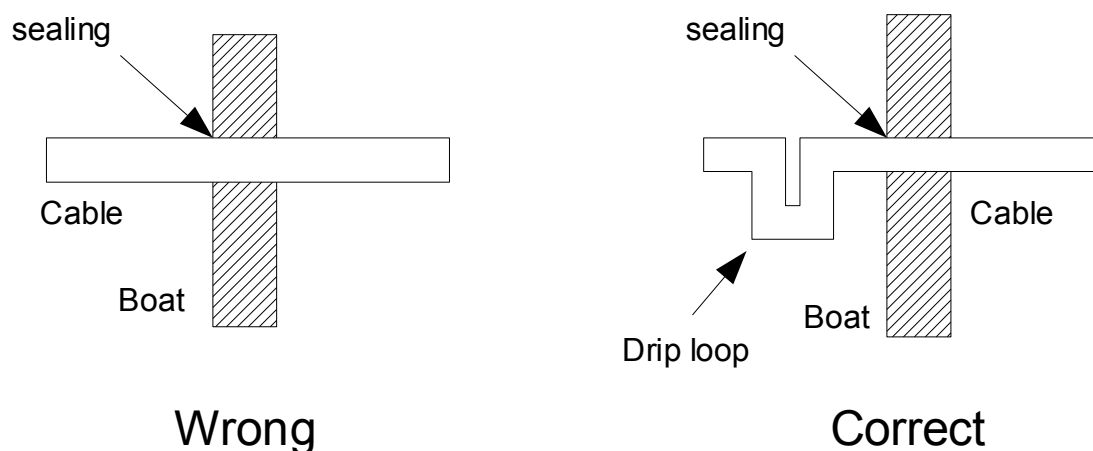
► **Close all drillings with waterproof sealing material to avoid any water penetrating!**

## 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 ACU and the antenna unit.
- The modem cables (RX, TX and WAN) must be connected to the ACU and the modem
- The ACU has to be connected to 230VAC 50Hz from the UPS
- Power supply of modem has to be connected to the UPS
- The users network is connected to the front side or backside LAN connector of the ACU

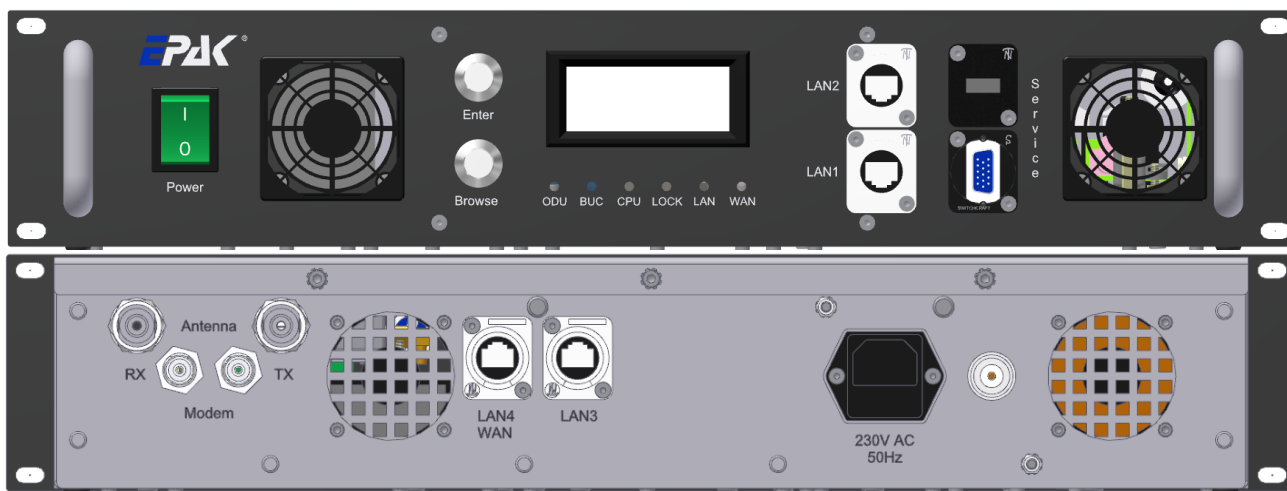
Lead the cable through the drilled holes and seal it with waterproof sealing material. Furthermore, drip loops should precede the entry point from the exterior to avoid any water penetrating, see below illustration:



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

### 3. Control elements

#### 3.1. ACU



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

#### ACU Keys:

- POWER** : Switches on and off the power for the whole unit
- 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.

#### ACU Indicators:

- ODU** : Status of power connection to antenna
  - Green : ODU is powered,
  - Red : Short or other error,
  - White : ODU is not connected
- BUC** : Status of transmit unit (Block Up Converter)
  - Green : BUC is working
  - Red : Short or other error,
  - Blue : Transmit is switched off, BUC or Modem Error
  - White : Tx is not connected to the antenna
- CPU** : CPU is running
- LOCK** : Antenna has locked on correct satellite
- LAN** : a PC or router is connected to the ACU
- WAN** : Modem is online

#### ACU Interfaces:

- WAN** : Connection to the modem
- LAN** : Connects a PC or router to the ACU
- Service** : VGA connection for a monitor and USB connection for a keyboard

### 3.2. Preparing the network behind the ACU

In the following table you can see the standard configurations of the LAN interfaces:

	LAN1	LAN2	LAN3
IP Address	192.168.1.254	192.168.2.254	192.168.3.254
Subnet mask	255.255.255.0	255.255.255.0	255.255.255.0
*DHCP active	x	x	x

*\*DHCP, the Dynamic Host Configuration Protocol, describes the means by which a system can connect to a network and obtain the necessary information for communication upon that network.*

If you connect your PC or other network device on a LAN interface without DHCP, set the IP address to an address different to the shown addresses and set the “Default Gateway” and “Primary DNS-Server” to the shown IP address of the respective LAN interface.

#### Example:

##### Connection of a PC to a LAN interface with DHCP, settings on your router / PC:

Clear the IP in your network preferences and set it to “Obtain IP address automatically” and set the DNS to “Obtain DNS server address automatically”.

Please see in your manual of your operating system.

After this setting the PC will get the IP dynamically.

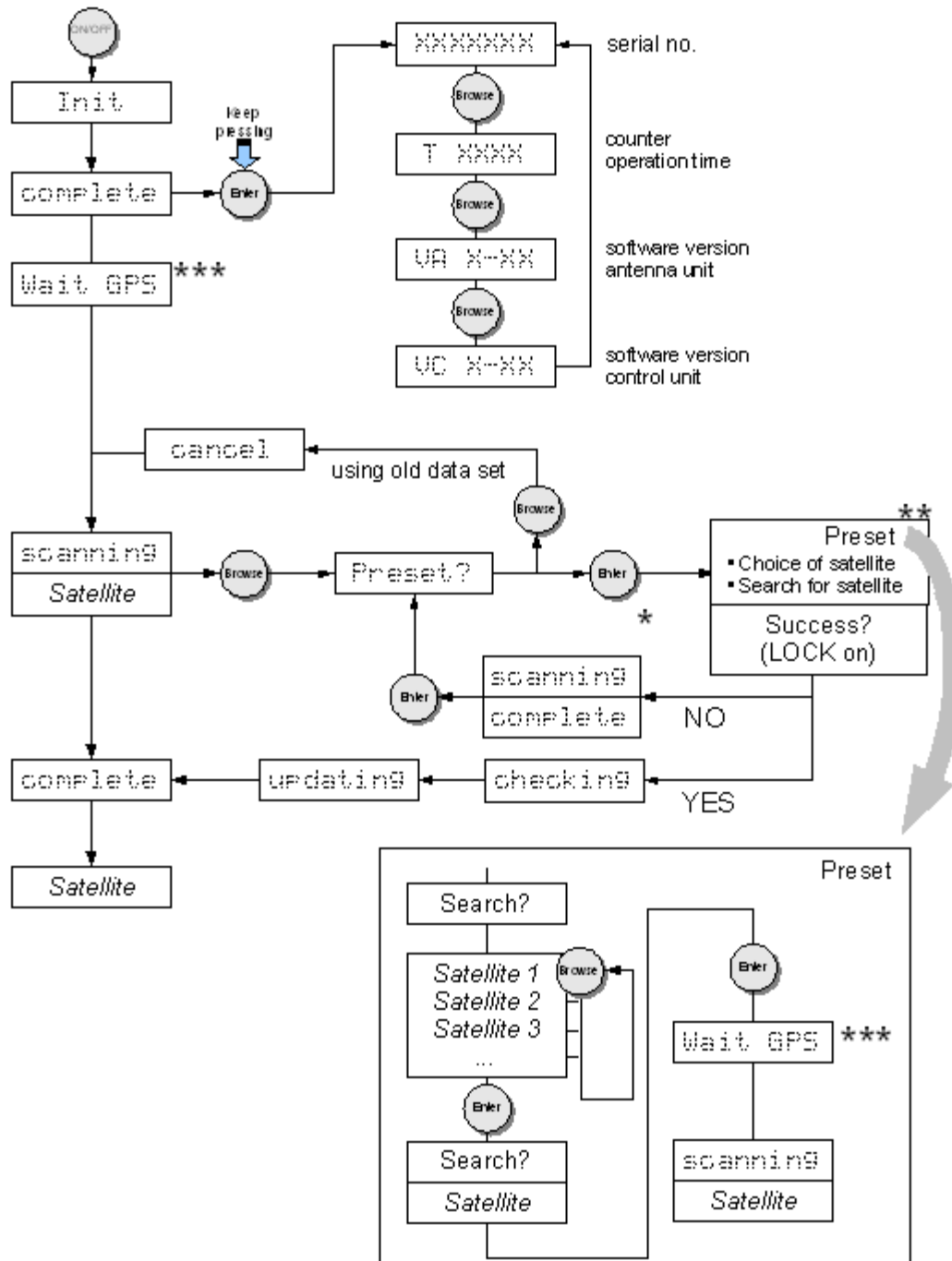
##### Connection of a router / PC to LAN2 with static IP configuration, settings on your router / PC:

IP address: 192.168.2.1  
 Subnet mask: 255.255.255.0  
 Default Gateway: 192.168.2.254  
 Primary DNS-Server: 192.168.2.254

Other configurations are possible upon request.

## 4. Operation

### 4.1. Menu tree



- \* Check for any obstacles in the free line of sight to the satellite.
- \*\* needed for adaption on local circumstances
- \*\*\* Can be skipped by long pressing ENTER, last saved GPS position will be used.

**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 Satellite	Antenna searches for satellite.
Satellite	Antenna has found the satellite and tracks it.
TX off interchanging with Satellite	No reception of the stored satellite or the antenna is blocked by an obstacle.

When the satellite has been found and identified correctly, the indicator LOCK will be lit. The indicator LAN is on, when a PC or router is connected on any LAN port of the ACU. When the modem is online, the WAN indicator is on.

**4.2. Preset**

In the first time installation a preset has to be done. This means, after power on and after the message complete, press BROWSE (display Preset?) and then ENTER. Then a list of preprogrammed satellites is shown, which can be browsed by pressing the BROWSE button. By pressing ENTER the actual shown satellite will be selected.

Service	Satellite
EPAK service	Thor1W A / Thor1W B (recommended)

The satellite will be searched (scanning / Satellite in the display) and stored if found. Now the modem will initialize the internet connection.

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 dome 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) - Check antenna unit's power supply
ErrorCom	Communication error with antenna unit	Turn unit off and on again
Low Vsup	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.  In case of errors regarding limit switches: 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 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
Wait GPS	Antenne is waiting for valid GPS data.	- GPS signal is jammed by another signal source - GPS receiver is defective
TX off interchanging with <i>Satellite</i>	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 - 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 - 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 ACU 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 - Check cables
	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 15 minutes.</li> <li>- There was the error message <code>no dish</code> before.</li> </ul>	Restart the system, if you have free line of sight to the satellite, the antenna should find it again.

## C Technical specifications

Antenna unit	SC59	SC58
Type	Cassegrain reflector	
Diameter	60 cm (24")	60 cm (24")
Max. output-power BUC	3W	3W
Minimum E.I.R.P. (for reception of geostationary satellites)	47 dBW	47 dBW
Radome diameter	700 mm	700 mm
Radome height	690 mm	690 mm
Weight (incl. radome)	26 kg	26 kg
Azimuth range	unlimited	
Elevation range	-2° .. 60°	-2° .. 60°
Skew Range	Range is +/- 120 degree from zero position	
Drive system	belt driven 3 axes servo system	
Tracking Sensor	Electronic Beamforming (EBF-Gyro)	
Tracking speed	> 25 °/s	> 12 °/s
Power supply	24 VDC, 50 W provided by ACU	
Power supply	230 VAC, 50 /60Hz, UPS stabilized (ACU) 100-240 VAC, 50/60 Hz (Modem)	
Satellite acquisition	completely automated	
<b>System</b>		
Operation temperature	-20 to +40 °C	
Storing temperature	-30 to +85 °C	