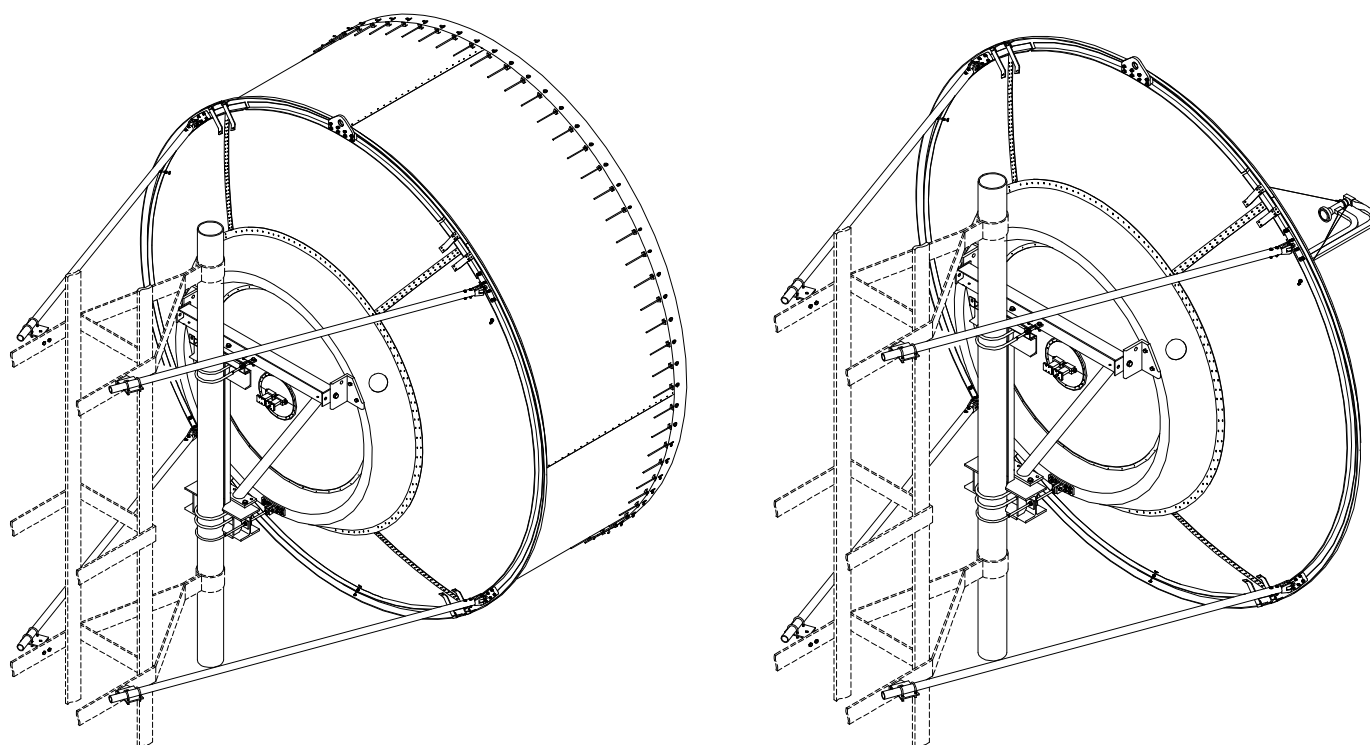


Installation instructions

Microwave Parabolic Antennas \varnothing 4.6m (15 ft)

NMT 211-07 (e)



These installation instructions are valid for antennas in the following versions :

- reflector \varnothing 4.6 m (15 ft), 2 segments of reflector are separated for transportation
- waveguide feed, single or dual polarized.
- steel pipe mount for installation on pipe \varnothing 219 mm.
- antenna center offset to the right, offset to the left is also possible, after rotation of frame
- safety collar to prevent slipping of antenna during alignment
- 2 spindles for fine adjustment of **elevation** and **azimuth** of $\pm 5^\circ$ each
- 4 swaybars, length 3 m.
- reflector (P-type)
- reflector with shroud, shroud aperture covered by a radome (U- and D-types)

It is important to mount the antenna exactly as described in these installation instructions.

The installed antenna shall be inspected once per year by QUALIFIED personnel. RFS disclaims all responsibility for the result of improper or unsafe installation. These installation instructions have been written for qualified, skilled personnel.

We reserve the right to alter details, especially with respect to technical improvement.

1. Tools required for installation

Tools are not included in the delivery except the set of hoisting ropes (see fig.2)

- 1 crane for approximately 10 kN
- ropes
- water level, compass, tape measure
- nail puller
- boxend and socket wrenches for hexagon nuts and bolts :
M6 (10), M8 (13), M10 (17), M12 (19), M14 (22), M16 (24), M20 (30), M24 (36)
(values in brackets = openings of spanners)
- torque wrench from 0,5 to 25 daNm
- nail set or punch for \varnothing 6 mm

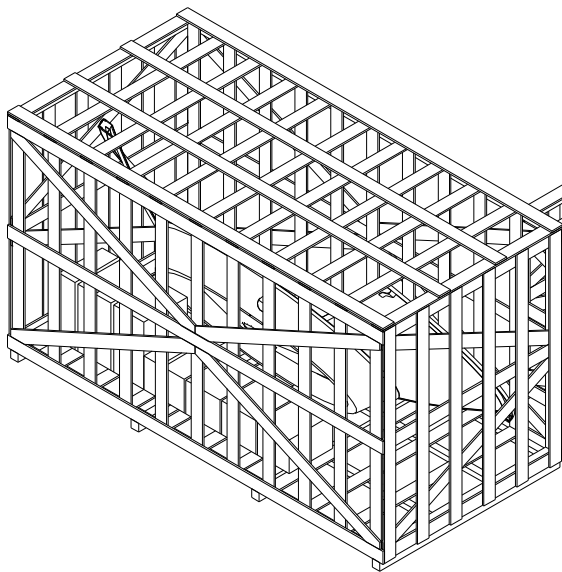


Figure 1 : 15 ft antenna packing, always consisting of 1 crate

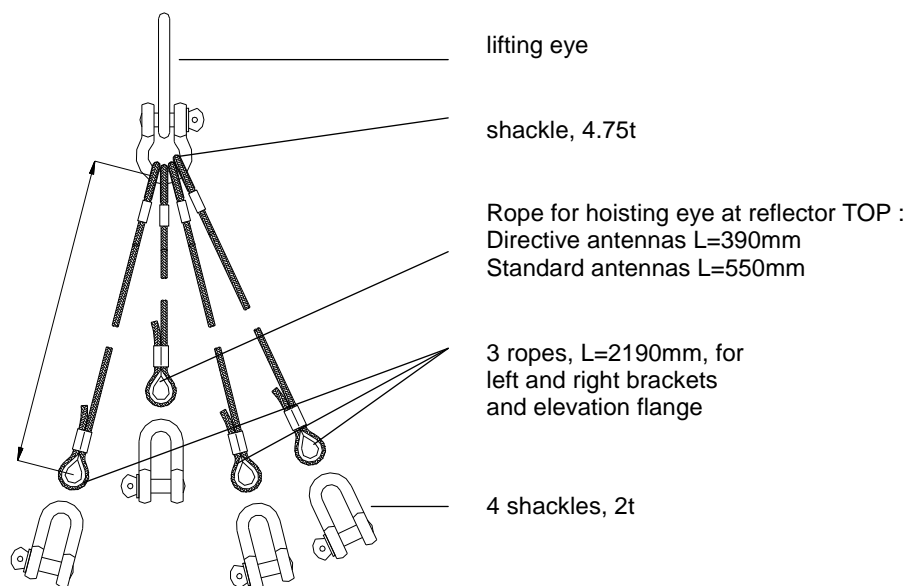


Figure 2 : Set of hoisting ropes, included with each antenna

2. Uncrating

- Remove all nails from the cover and side plates of the crate. These plates will be used later to prepare the assembly platform.
- Attach a crane to the **side hoisting eye** of the reflector, then remove the remaining fastenings and bolts.
- Carefully hoist the reflector free of the crate and let it hang on the hook tackle until the assembly platform has been prepared as in § 4.

3. General preparations

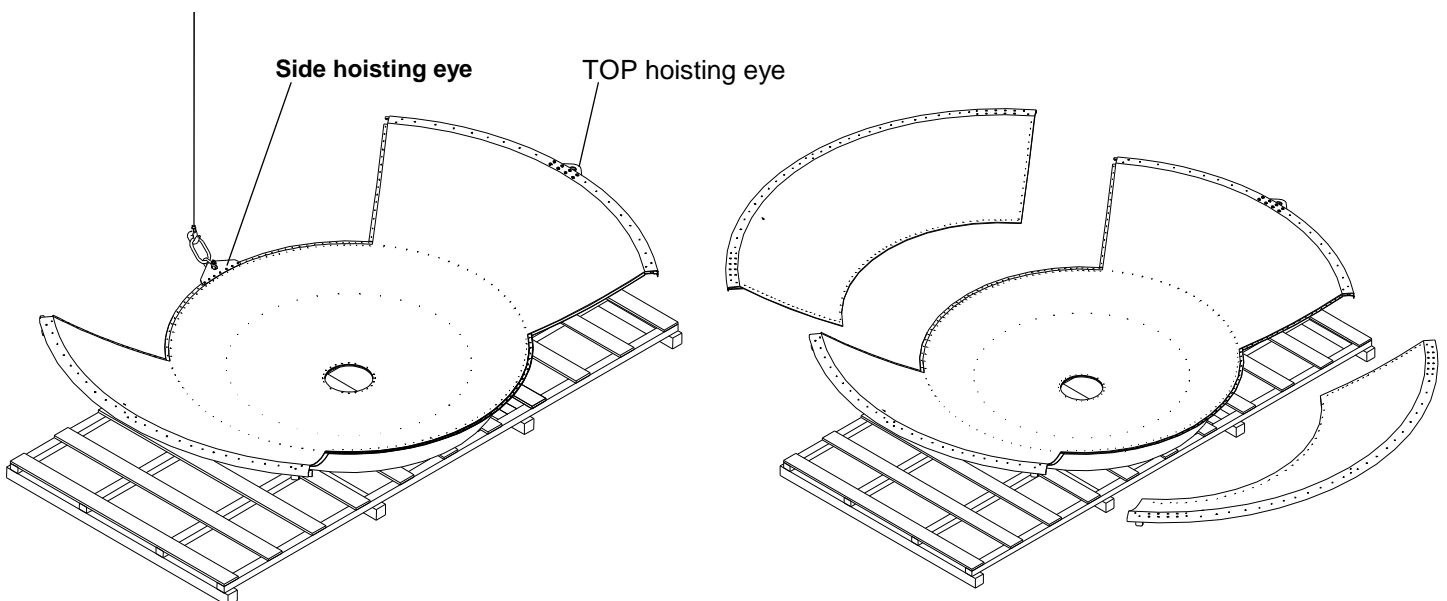
- For easy operation of bolted joints, “Anti Seize” Installation Paste should be applied to all threads of bolts and fine adjustment spindles. After this, keep the lubricated threads free of dust and dirt!
- Please note “handtighten”.

When installing the antenna, some special bolt sets secured with self locking nuts (sl-nuts) may only be tightened by hand, but not locked with a wrench. These bolt sets will be operated when directing the antenna and should be locked only after this has been completed.

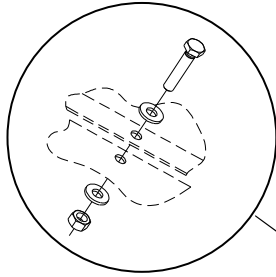
Please watch for the notes “handtighten” in the figures!

4. Reflector assembly

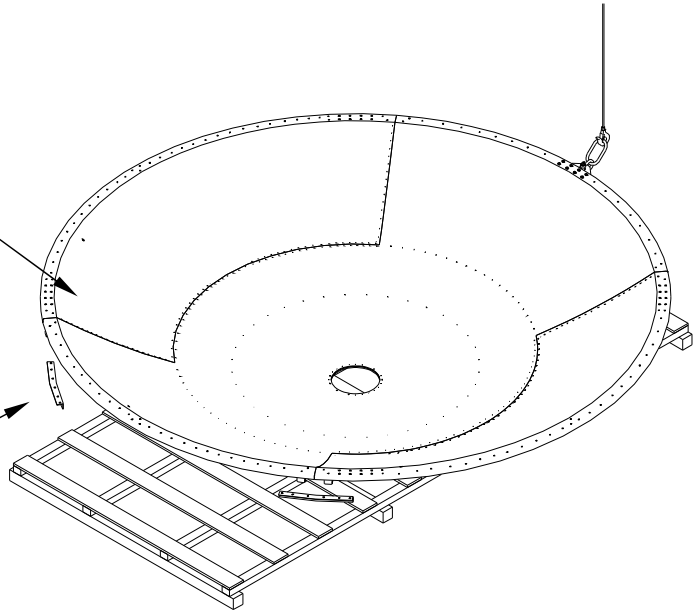
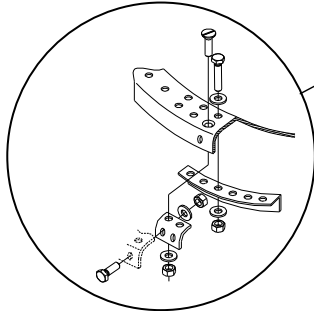
- Choose a flat and even area near the tower to assemble the antenna.
- Position the plates, detached from the crates, on the ground and cover them with some foam.
- Place the reflector onto this base, trapezoidal ring down, remove the **side hoisting eye**, and mount :
 - the 2 **reflector segments**, left and right, using joining plates and bolt sets M6x20
 - the 4 **reflector joint profiles** of the aperture ring with bolt sets M8x30



Reflector segments :
 bolts M6x20
 2 flat washers 6.4
 sl nuts M6

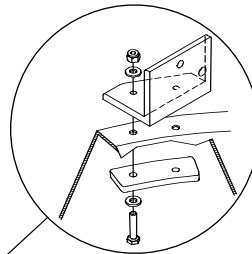


Reflector joint profiles :
 bolts M8x30
 2 flat washers 8.4
 hex. nuts M8

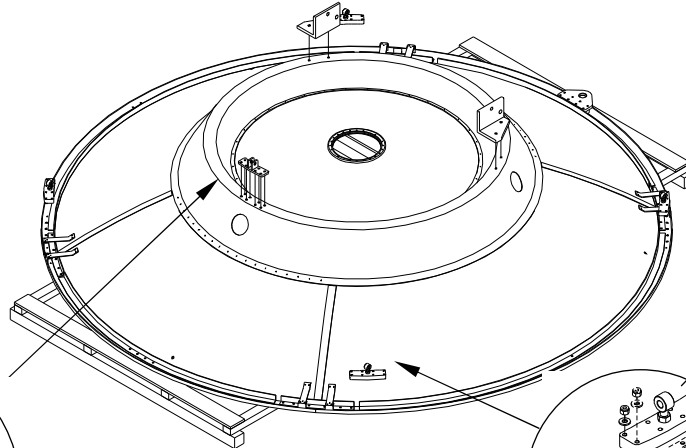
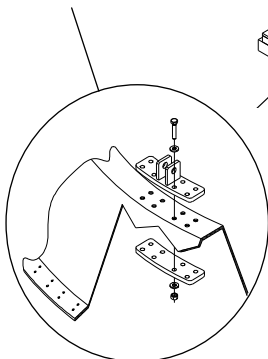


- Turn the reflector upside down, re-arrange the foam padding under the aperture and mount :
 - the 4 **swaybar castings**, each with **eyebolt M20x75** and counter-nut M20
 - the 2 **support brackets** with **support plates** (inside trapezoidal ring) and **handtighten**
 - the **elevation flange** with **stiffening plate** (inside trapezoidal ring) and **handtighten**.

Support brackets left and right :
 2 bolts M16x80
 2x1 flat washers 17
 2x1 spring lock washers 16
support plate (inside trapezoidal ring)
 2 nuts M16
handtighten



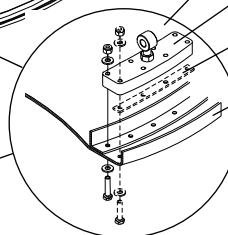
Elevation flange :
 8 bolts M12x60
 8x2 flat washers 13
stiffening plate
 (inside trapezoidal ring)
 8 sl nuts M12



Eyebolt M20x75
 with counter nut M20
handtighten

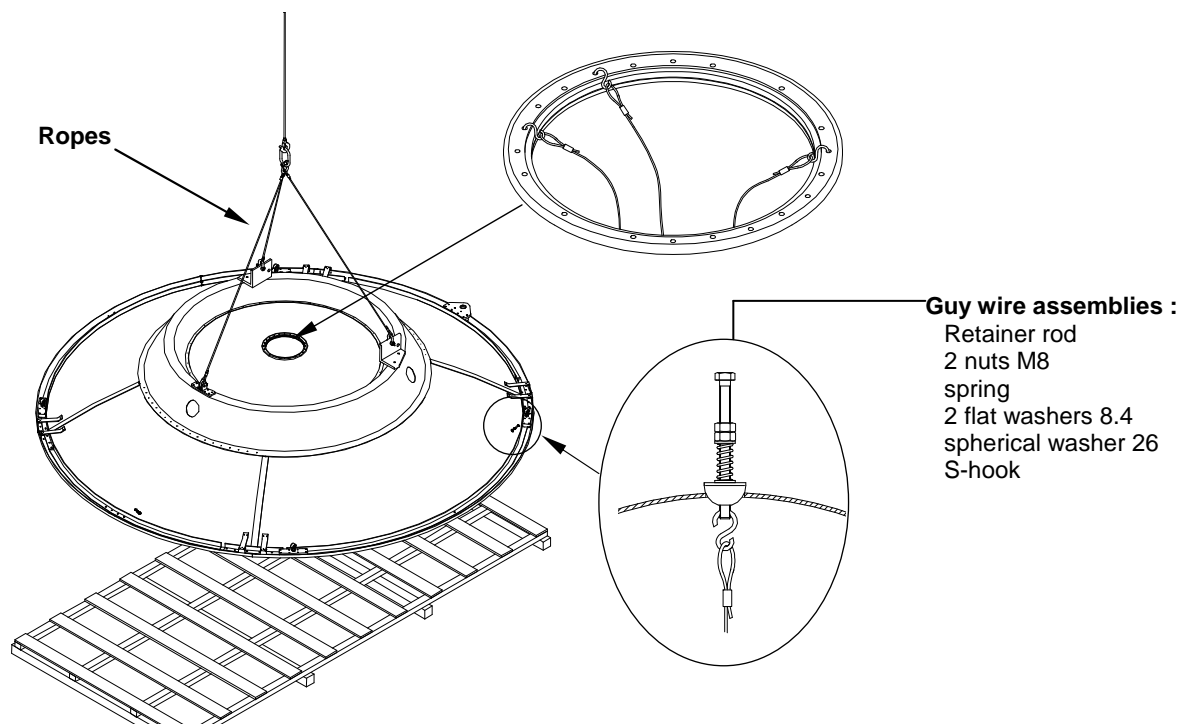
Casting for swaybar
 Spacer
 Reflector

Swaybar castings :
 4 bolts M10x70
 4x2 flat washers 10.5
 4 sl nuts M10

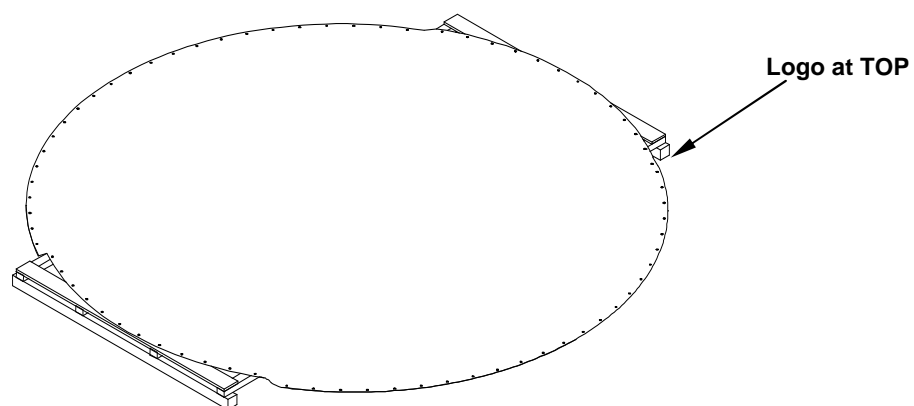


Please note :
 Mount the outer row
 of bolts M10x70,
 when assembling the
 shroud, see Fig.9

- Attach the 3 ropes of equal length from the set of hoisting ropes (supplied with the antenna) to the brackets left and right and to the elevation flange.
- Insert the 3 feed **guy wire assemblies** in the reflector and hook them in the center hole.
- Then hoist the reflector assembly aside.

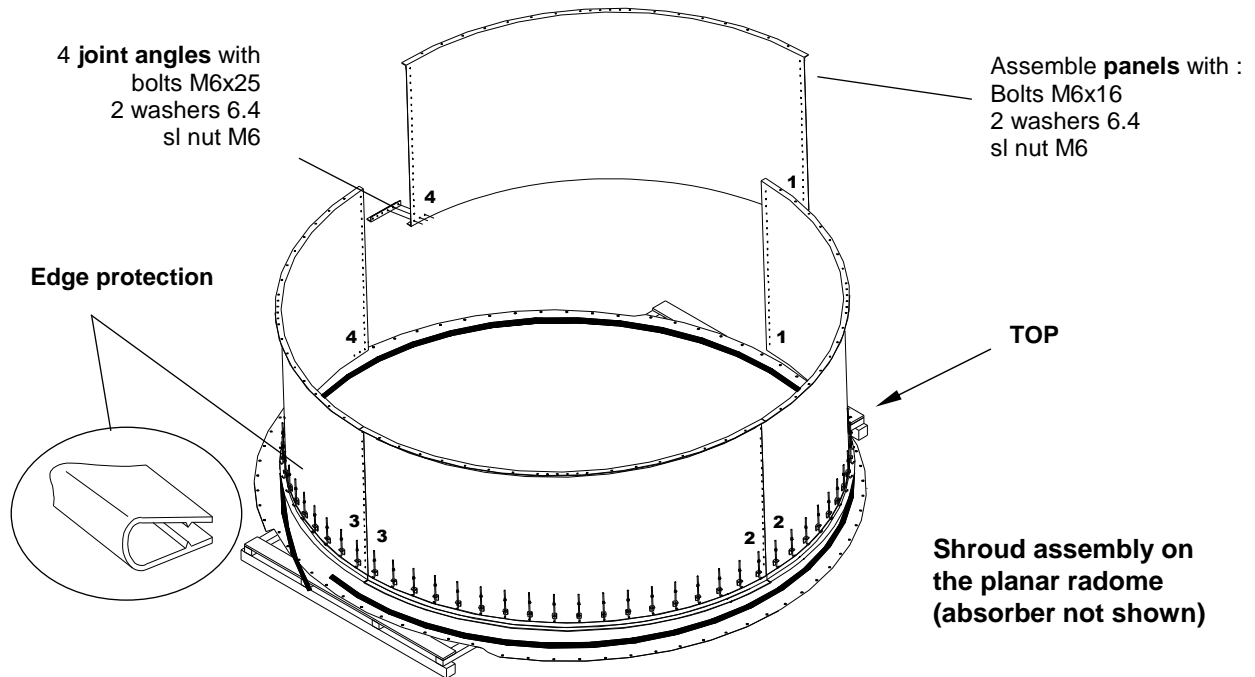


5. Shroud assembly, (only U-and D- types)

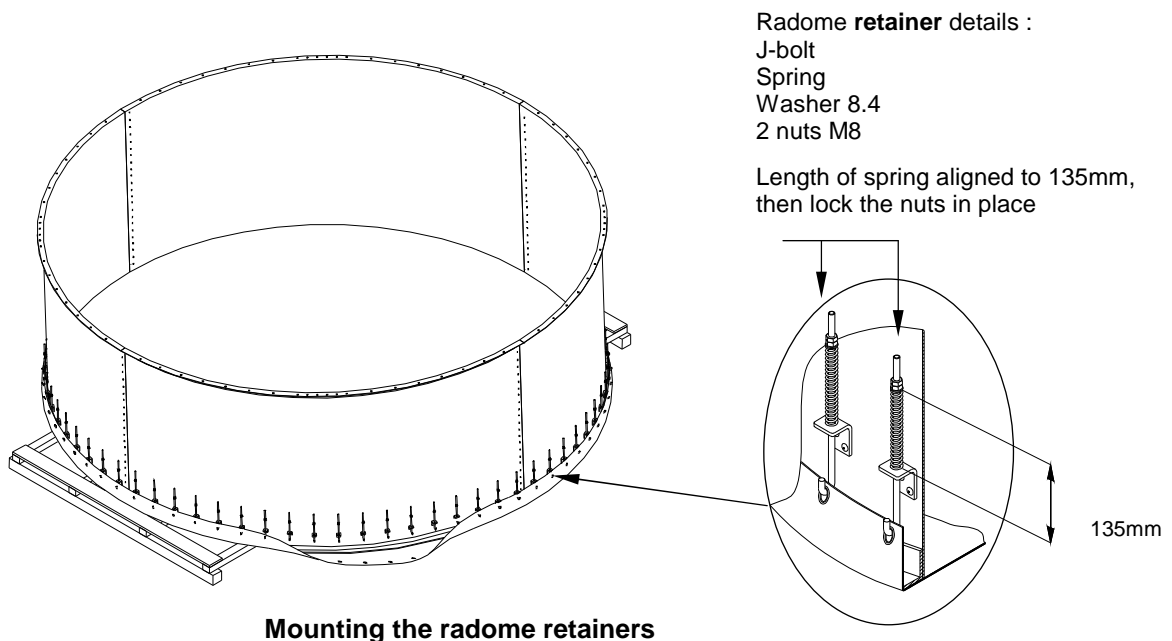


- Spread out the planar radome (logo face down, situated at TOP) onto the plates of the pallets covered with foam.

- Place the shroud panels together in a ring onto the radome, paying attention to the marks **1, 2, 3 (TOP)** and **4**. Assemble the panels with bolt sets M6x16. Fix the 4 joint angles between the panels on the shroud profile near the radome with bolt sets M6x25.
- Slide the **edge protection** for the planar radome onto the upper shroud profile and thus totally cover (360°) the sharp edge of the shroud profile. If necessary cut to the right length.

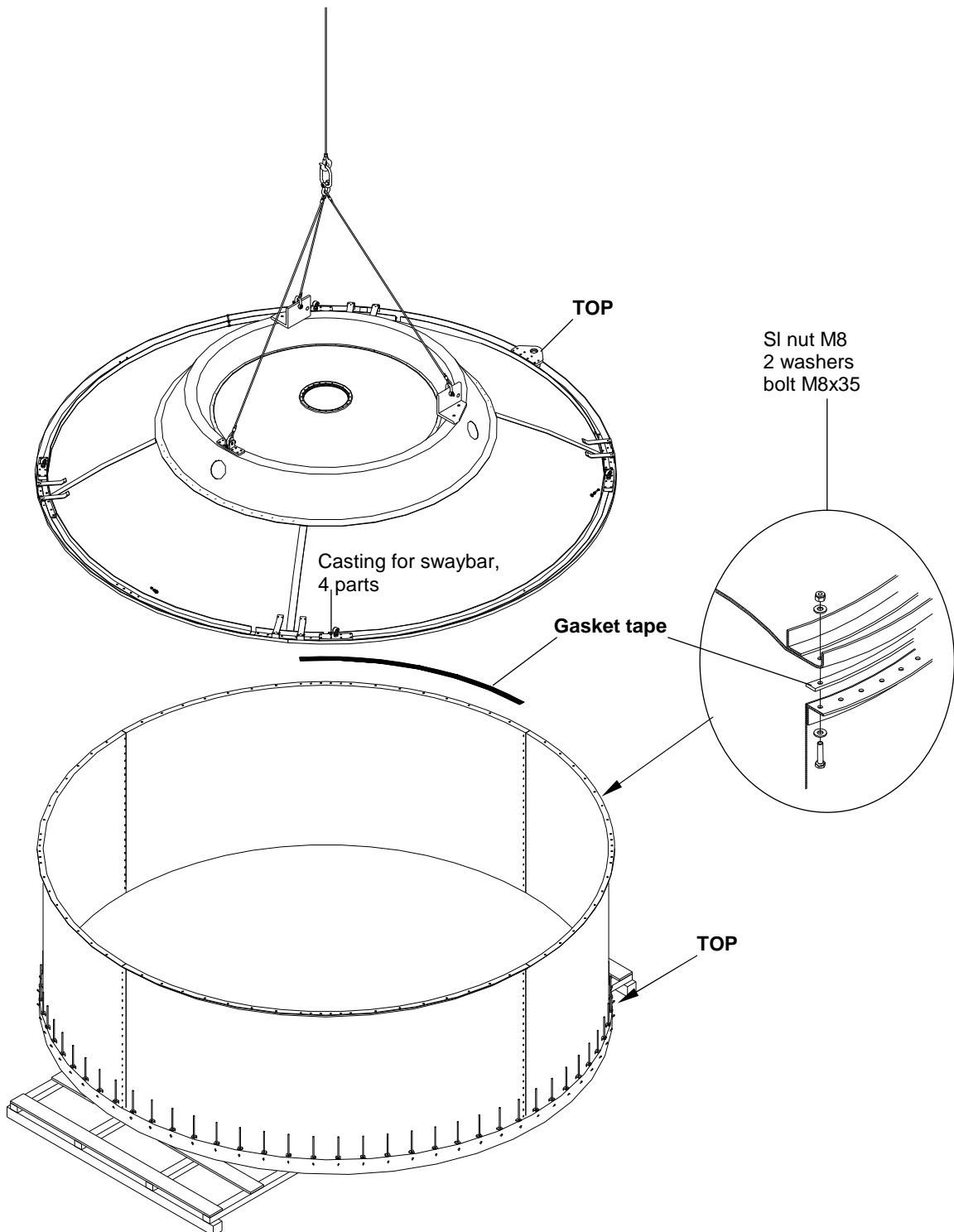


- Mount all **retainers** for radome support:
 - 2 radome retainers at TOP and bottom,
 - 2 radome retainers 90° apart left and right,
 - 2 radome retainers 45° apart,
 - proceed the same way with all remaining retainers
 - align all springs to length of 135 mm
 - counter all nuts in place.



Mounting the radome retainers

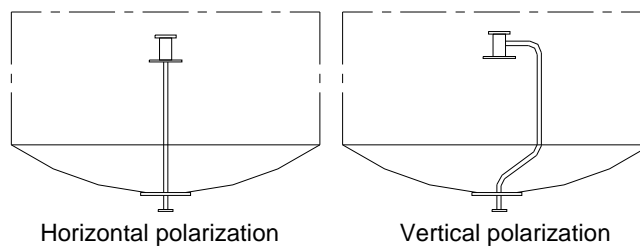
- Apply the RF-gasket tape 360° onto shroud aperture : wire mesh towards the center, flush with shroud edge.
- Using the crane, lift the reflector towards the shroud and slowly lower it down to the shroud edge covered with RF-gasket tape. Minding **TOP**, align the mounting holes of the reflector and shroud.
- Near hoisting eye and swaybar castings : use the outer bolt sets M10x70 for shroud mounting.
- Mount all bolt sets M8x35, each with 2 washers.



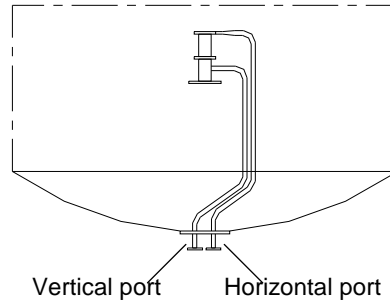
6. Feed installation

The feed is a precision component which should be handled with special care during installation. For instance, always carry the feed, supporting both ends. Any damage may degrade the antenna's performance. Repair of feeds is not possible in the field.

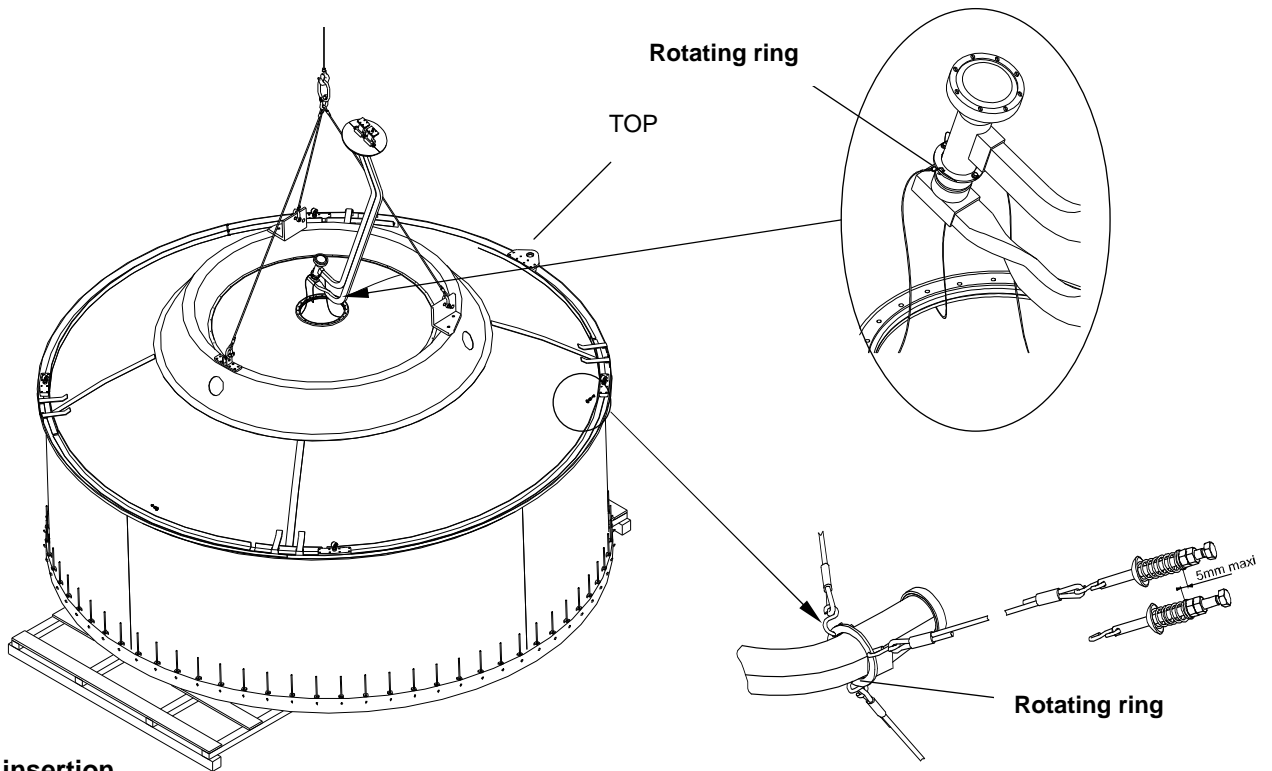
- Unpack the waveguide feed, but do not remove the pressure plate(s) from the feed input flange(s). They will be removed when the transmission lines are connected.
- Determine the feed orientation (polarization), see below.



Single polarized waveguide feeds

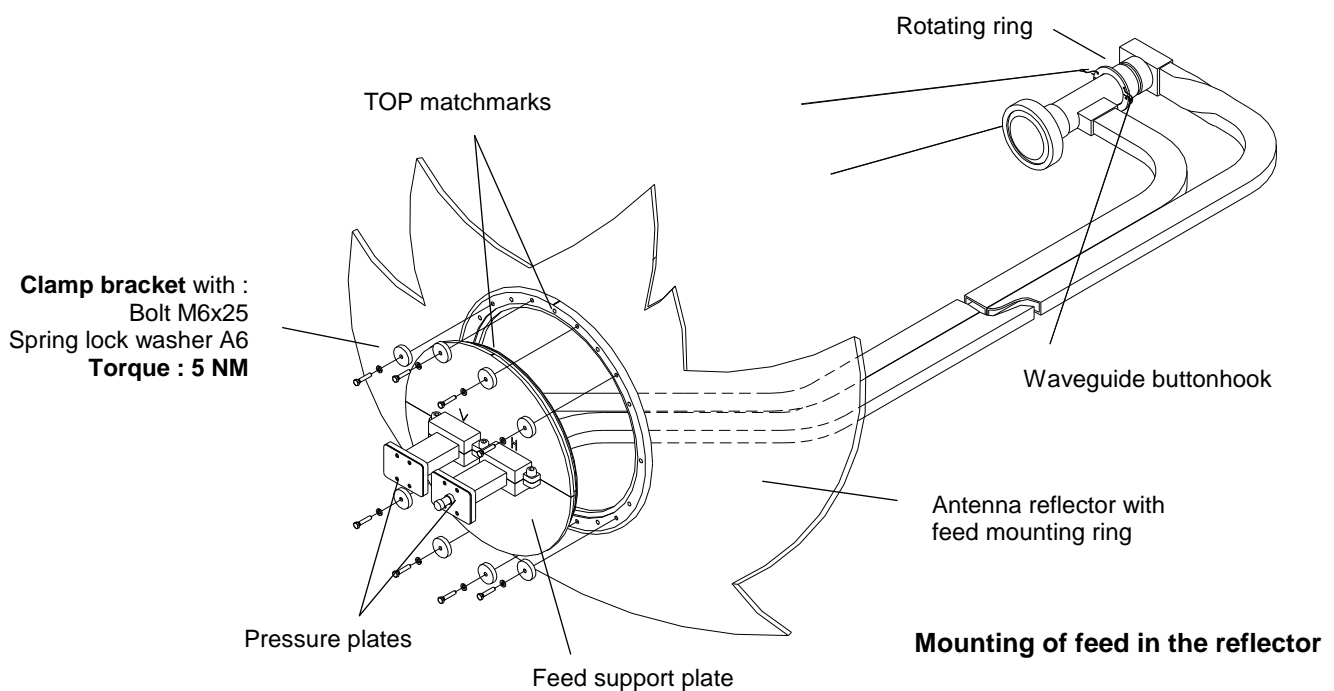


Feed orientation in reflector – top view



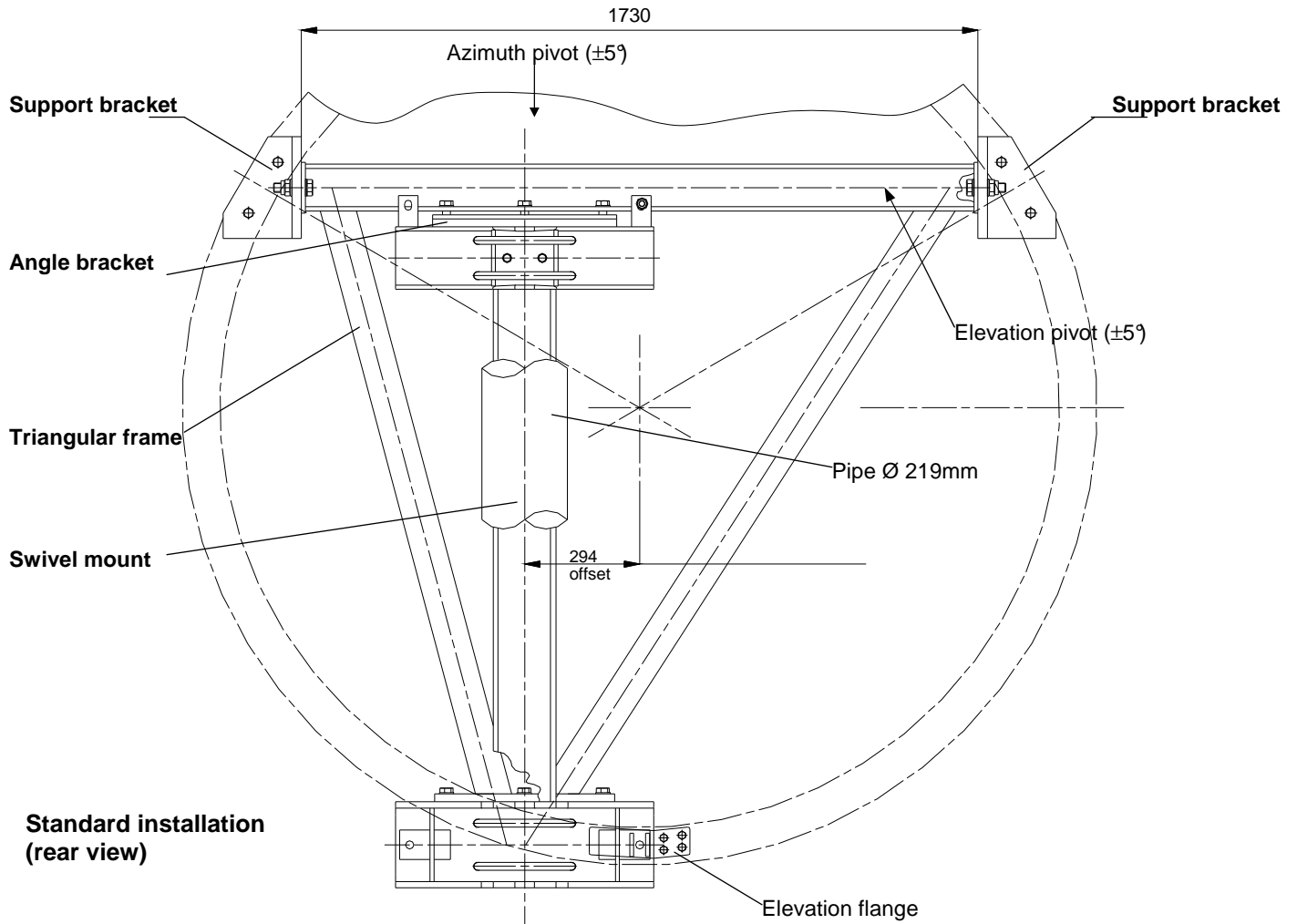
Feed insertion

- Insert the feed partway through the center hole of the reflector.
- Take the 3 guy wires from the center hole and hook them in the **rotating ring** of the feed.
- Guy wire springs must be compressed at **equal values**. The maximum spring contraction during alignment is **5 mm**. Please note : spring length + 2 washers = 30 mm before compression.
- Fully insert the feed and make sure that it fits down in the support ring.
- Align the TOP – matchmarks !
- Assemble the **clamp brackets** provided with bolts and spring washers, while keeping the feed in place, but do not exceed the recommended **torque of 5 Nm**.



7. Standard installation

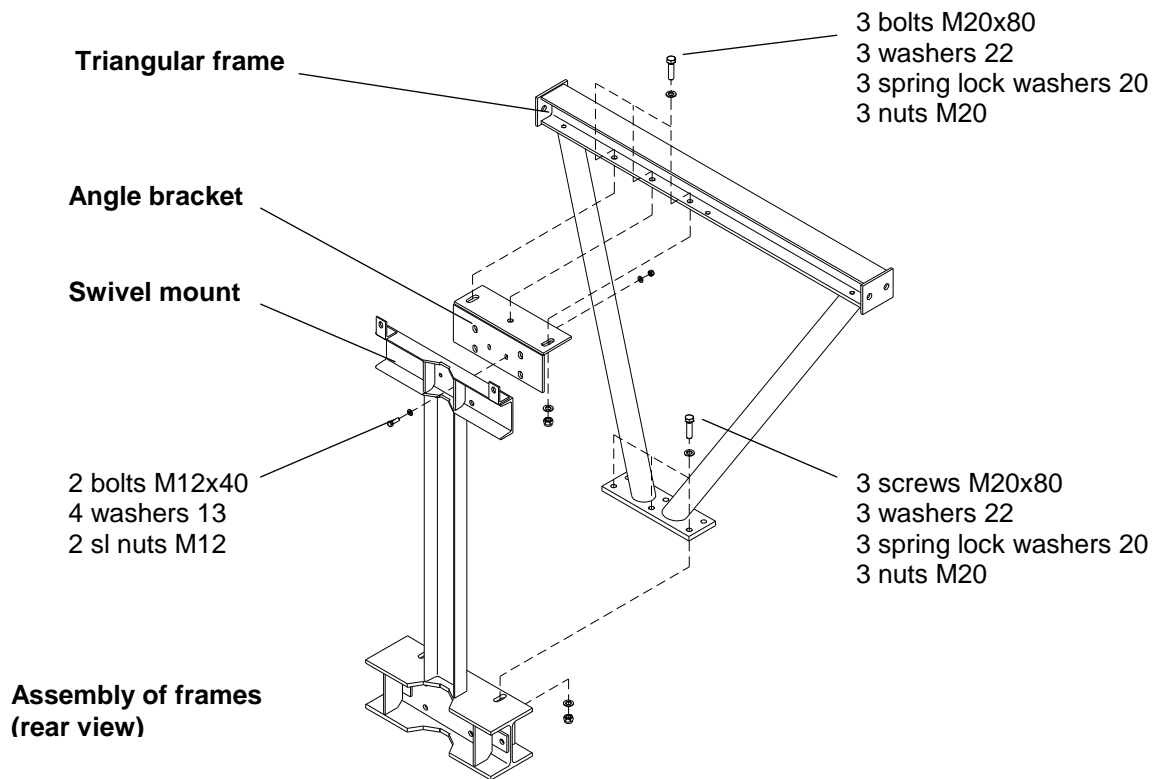
In standard installation, the antenna is mounted with center offset to the right, as described below.



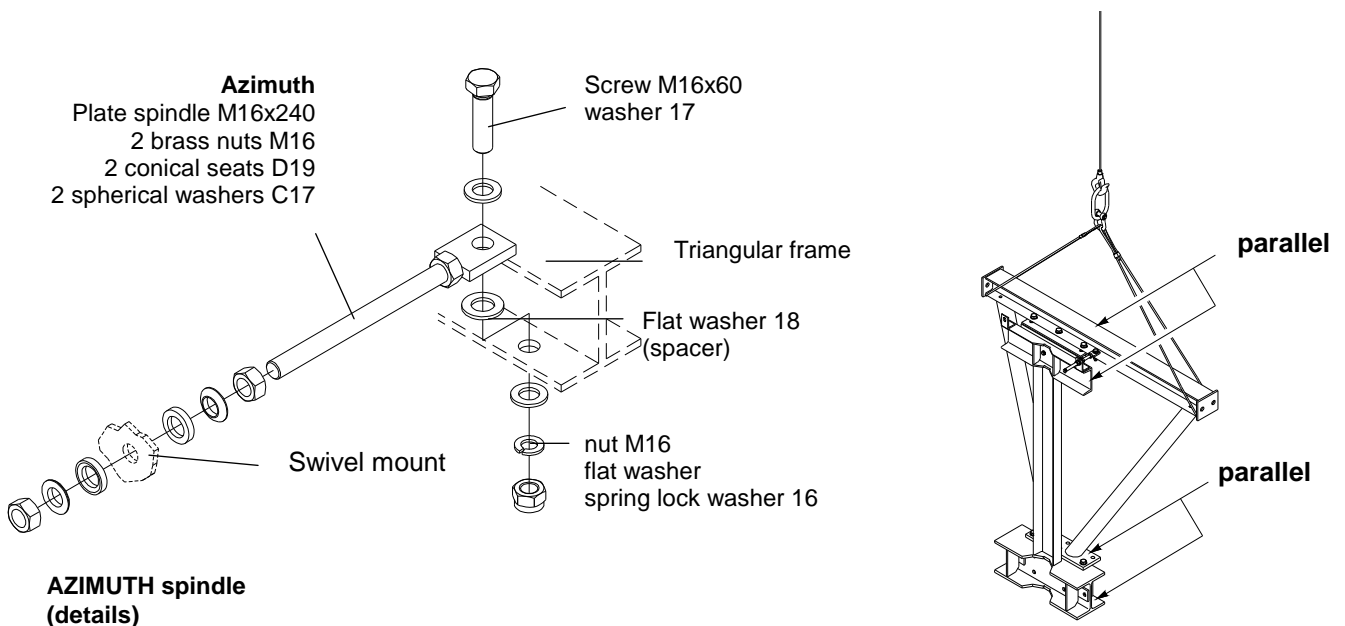
The inverse installation with offset to the left is also possible. The triangular frame should be rotated 180° (horizontally) and installed as usual.

8. Frame mounting,

- Choose the antenna center offset now, offset to the right is described here.
- Mount the **angle bracket** very loosely to the **swivel mount** using 2 bolts sets M12x40, so that movement of the bracket in the long slots is retained.
- Align the **swivel mount** with **angle bracket** to the **triangular frame**, mount the 3 upper and 3 lower bolt sets M20x80 and **handtighten**.
- Tighten the bolt sets M12x40.

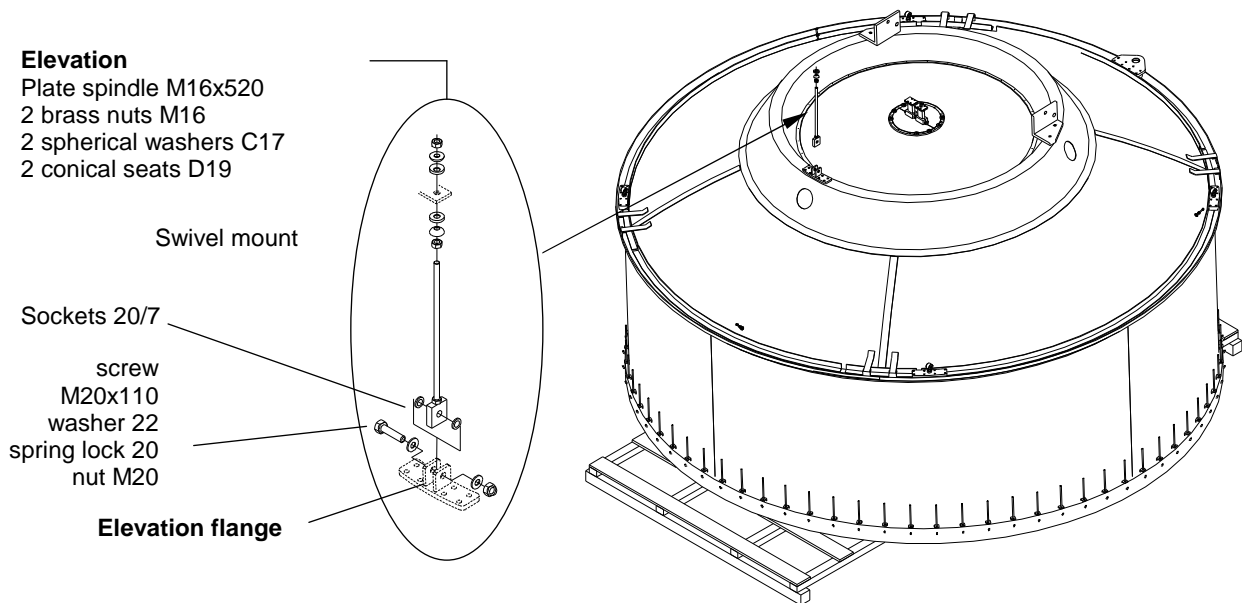


- Loosen the bolt sets M20x80 again and center with precision the outer upper and lower bolts in the oblong slots, to ensure **parallel** mounting. **Note** : Carefully re-check that the **swivel mount** and the **triangular frame** are mounted parallel. The parallel mounting of the 2 parts is important to achieve the total azimuth range of $\pm 5^\circ$ later.
- **Handtighten** the upper and lower bolt sets M20x80. These bolts should not be operated again, until the installation of the antenna has been completed and fine adjustment of **elevation** and **azimuth** have been performed.
- Mount the **azimuth spindle**, as below.

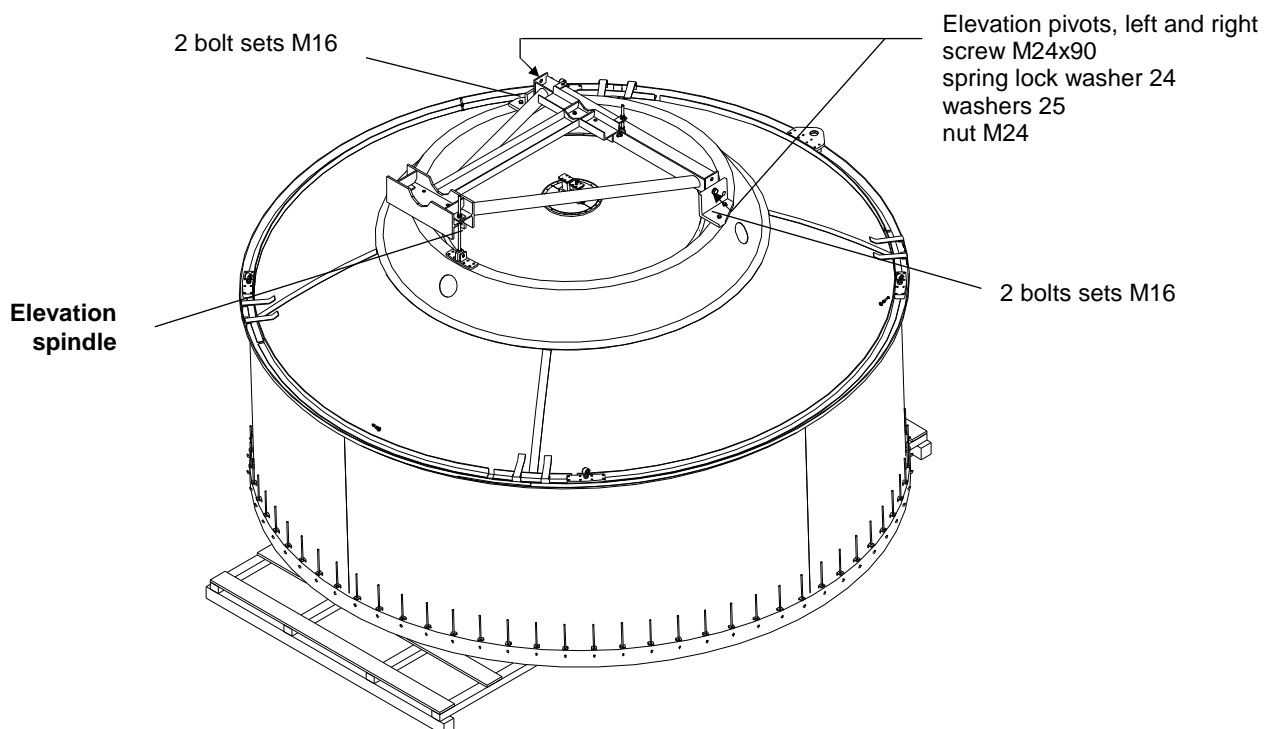


9. Final assembly of antenna

- Mount the eye of the **elevation spindle** in the **elevation flange**, using the bolt set M20x110, and do not forget the 2 sockets !
- Seize the frame assembly with the 3 hoisting ropes of equal length, Fig. 2, and hoist the assembly to the reflector.
- Assemble the ELEVATION spindle to the swivel mount while lowering the frame assembly.

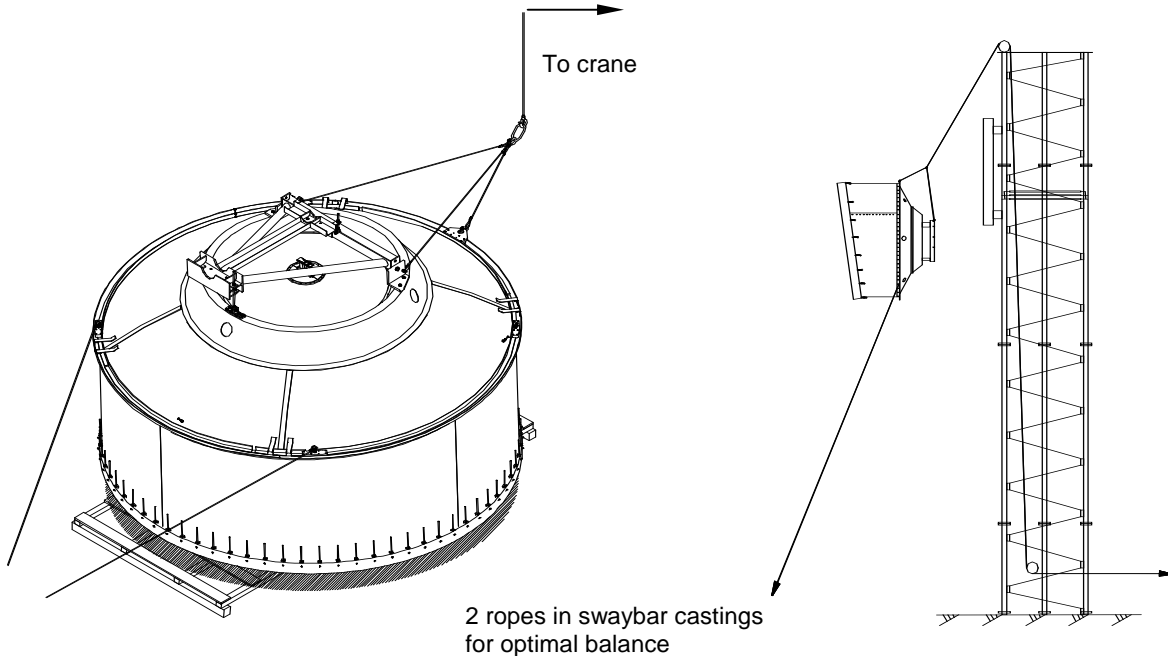


- Line up the support brackets left and right with the frame, install the bolt sets M24x90 in both brackets and **handtighten**.
- If all parts fit correctly, tighten the 2 bolt sets M16x24 in the support brackets.



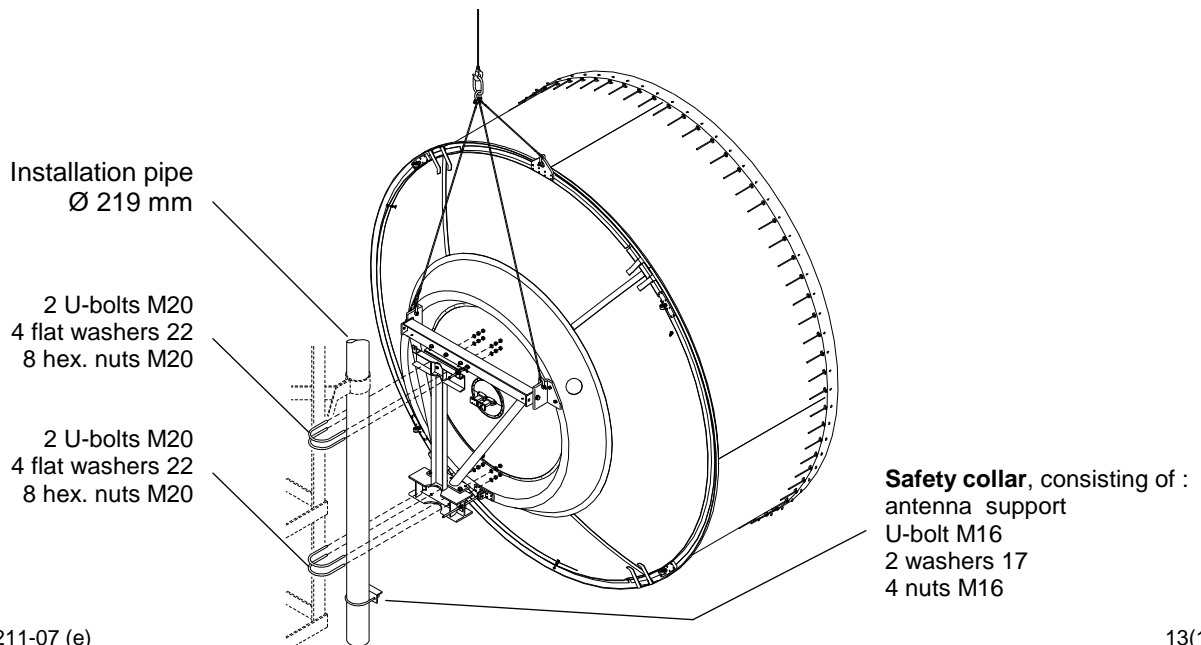
10. Hoisting on tower

- Attach the short rope of the hoisting set to the hoisting eye at TOP, 2 of the 3 ropes of equal length remain in the left and right support brackets.
- Fasten ropes in the 2 lower swaybar castings, and, using these 2 ropes for optimal balance, slowly lift up the antenna with the crane into upright position. Avoid dragging the shroud edge with radome on the ground !

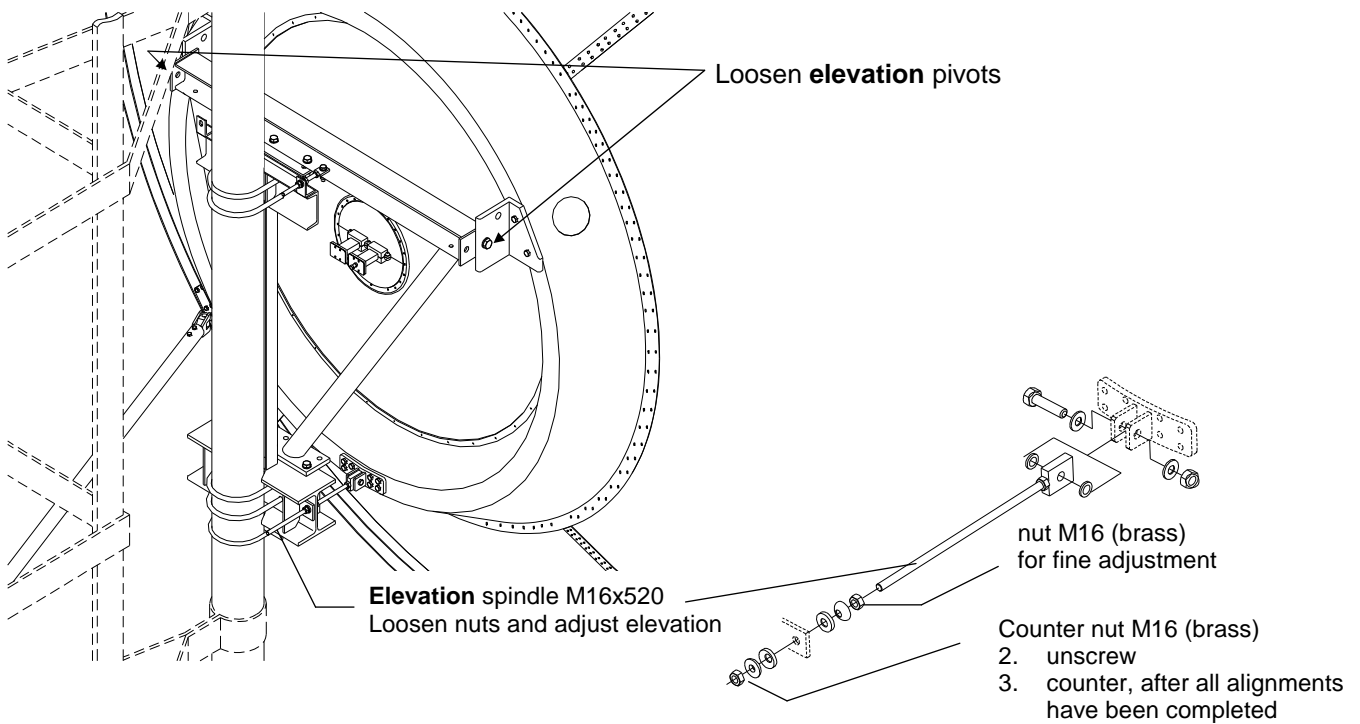


11. Installation on tower

- When the antenna is hanging free in the hoisting ropes as below, mount the **safety collar** on the installation pipe (\varnothing 219 mm), at the required height and direction and carefully tighten the nuts M16 of the U-bolt.
- Position the antenna on the **safety collar** and loosely mount the 2 upper and 2 lower **U-bolts** M20.
- Align the antenna as exactly as possible to the specified direction, using a compass, so that later fine adjustment of ± 5 is possible.



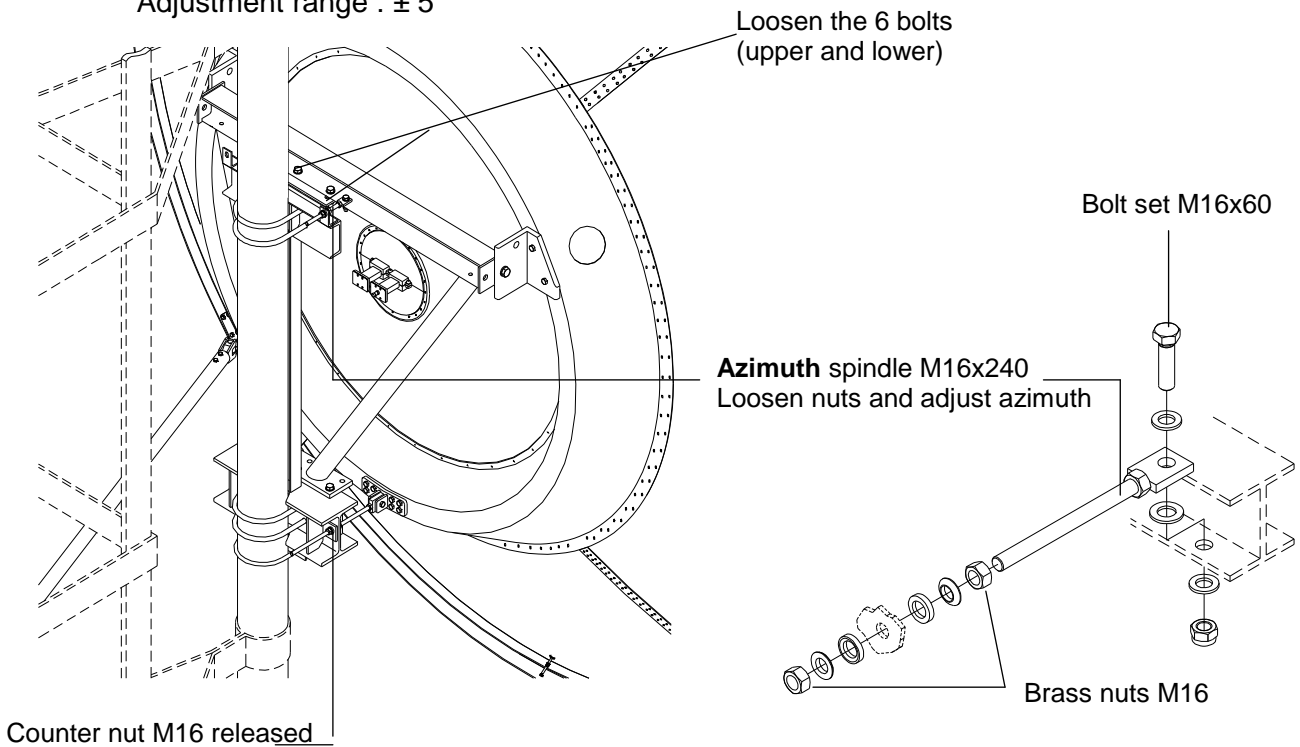
12. Elevation adjustment



The bolts may be tightened only after all alignments of the antenna have been completed.

13. Azimuth adjustment

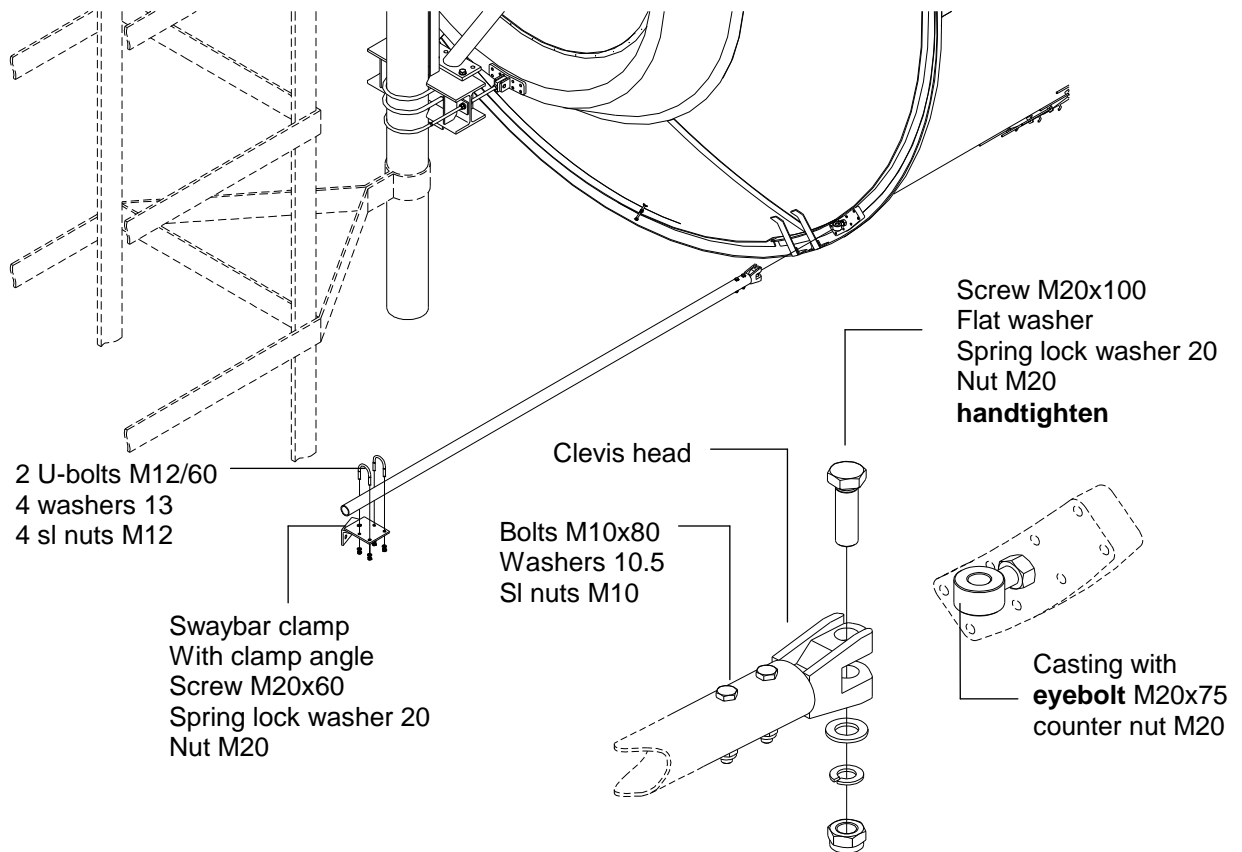
Adjustment range : $\pm 5^\circ$



Please note that fine adjustment of **azimuth** will lead to minor disadjustment of **elevation**.

- Preparations :
- securely lock in place the brass nuts on both spindles
 - tighten all bolted joints loosened before.

14. Swaybar assembly



- After all fine adjustments have been completed, the installation of the swaybars to tower will follow.
- The antennas are equipped with 4 swaybars, each mounted in the **eyebolts** M20x75 with counter nut M20, loosely assembled.
- Install the bolt set M20x100.

15. Final check

When the installation of the antenna has been completed, it is necessary to insure that the installation instructions have been followed in all aspects.

It is especially important to check that all bolted joints are tightly locked.

All ropes may then be removed.