

# 2M DOME



# Manual



## 1. The main advantages of 2M dome

- simple and fast installation, the dome will be delivered to you assembled, after the shipment installation of the dome doesn't require more work than a typical installation of the telescope,
- the dome is ready to work once it is unpacked, thanks to the full-assembly and testing in our factory, you avoid the complicated, expensive and time-consuming process of re-assembling the dome from the parts,
- safe 12V DC power supply,
- the ability to automatically open the shutter on any azimuth by using the built-in rotary power ring mechanism (e.q. slip ring),
- the dome with automation and control computer can be powered directly from a car battery,
- all rollers are hidden inside the dome to protect them from the weather conditions,
- very good tightness of the dome, design and execution the dome models entirely in 3D and CNC technology allowed us to minimize the space between its rotating parts.

## 2. Dimensions:

- a) Basic dimensions
  - width: 2000 mm
  - height: 1300 mm
  - base diameter: 1940 mm
  - width of the shutter: 615 mm
  - free zenith circle radius: 95 mm
  - width of the door: 700 mm
  - height of the door: 765 mm (900 mm for the tower H120)
  - weight of the dome: 120 kg
  - radius of the telescope free movement: 890 mm
- b) height of the dome and tower:
  - H80: 2,340 mm
  - H120: 2,615 mm

## 3. Additional equipment:

- small tower H80
- high tower H120
- built-in shelf for accessories
- leveled aluminum base with a hole for the pier.

The basic version of the dome is designed to be mounted on the observatory's crown (e.g. on the roof). Base ring has internal and external collar, which must be attached to the crown of the observatory building. For fixing, it is suggested to use Hilti anchors drilling the holes through the laminate. Before attaching the base to the observatory's crown there is a need to seal all the base ring contact surfaces (joints) with silicone.

If you would like to install the dome in the garden on a concrete slab, you should think about ordering it with an additional tower with entrance door. There are two types of different heights: 80 and 120 cm. Each of the towers is standard equipped with front door and one shelf for equipment. You can also order the tower with two or three shelves for equipment.

If you do not want to make a concrete slab under the dome, we recommend a dedicated aluminum base with the floor and special hole for the pier. With big possibilities of height adjustment, it will allow you to setup and level the dome directly on the ground.

## 4. Standard equipment and automation options

The dome is light enough that you can open, close, and rotate it by hand.

We normally does not equip the dome with drive motors for rotation and the shutter. We only install all the necessary components to allow a very simple upgrade to fully automated version in the future.

Because of the automation systems, 2M dome can be ordered in several versions:

- a) manual
- b) with the rotary drive
- c) with the shutter drive
- d) with motors without full automation - Semi PlugAndPlay (with built-in heating system for electronics)
- e) fully automatic - PlugAndPlay (motor control using a computer)
- f) heating system of the box with electronic for PlugAndPlay version
- g) dedicated power supply

## 5. Preparing a place for the dome

Depending on the type of ordered dome, there is a need to:

- adjust the roof structure so that it is possible to screw the dome (e.g. add special reinforced crown of at least 10 cm height)
- make a concrete slab on the ground with a diameter at least the same as the diameter of the dome, it is worth considering the separation between the concrete slab and the telescope pier
- make small concrete pillars (like for the fence around the house) for the dedicated aluminum base with floor to provide its better stability.

## 6. Installation of the dome, unpacking after transportation and attachment to the ground

After setting the dome it must be precisely leveled. Any deviation from the level could be a reason of improper work of the dome.

## 7. Sealing dome (base ring)

The combination of the dome with the observatory's crown or concrete slab should be sealed with two strips of silicone around the entire perimeter of the dome (from the bottom). It is worth to also add silicone on the outside joints between dome and the crown or concrete slab.

## 8. Installation of the dome's automatics system

If you ordered the dome with PlugAndPlay automatics system, all necessary devices will be preinstalled and testes during assembling the dome at ScopeDome manufacture. All you have to do is plugging the dome power cord into 230VAC socket.

### **Attention!**

**Please check connection correctness of L, N, PE 230VAC lines.**

## 9. Dome automatics

Dome automatics in PlugAndPlay version consists of following components:

### Rotation control:

- a) ScopeDome USB Card Main Unit
- b) Remote controller
- c) 12V PWM Dome Motor Control Module
- d) ScopeDome USB Card Main Unit has 230V AC sockets on its left side to control the telescope, CCD camera and FAN socket.

The sockets can be used to connect any device powered with 230 VAC.

### Shutter control:

- e) ScopeDome USB Card Rotary Unit
- f) 12V PWM Dome Motor Control Module
- g) Hygrometer
- h) Thermometer for the motor temperature measurement
- i) Thermometer for the internal electronics temperature measurement

Ordering SemiPlugAndPlay version you will receive only devices marked as a), e), g). Upgrade from SemiPlugAndPlay to PlugAndPlay version is possible. In this case there is a need to send back to us complete plates with installed automatics. Wiring system for 2M dome is designed to support such operations.

## 10. Adjustment of the motors and electronics temperature

2M dome rotation and shutter motors gears are equipped with heaters and thermostates. They allow to warm these devices up +10C in relation to surrounding temperature.

All the boxes for electronics in PlugAndPlay and SemiPlugAndPlay version have built-in heating system that allows to warm the electronics up +10C in relation to surrounding temperature.

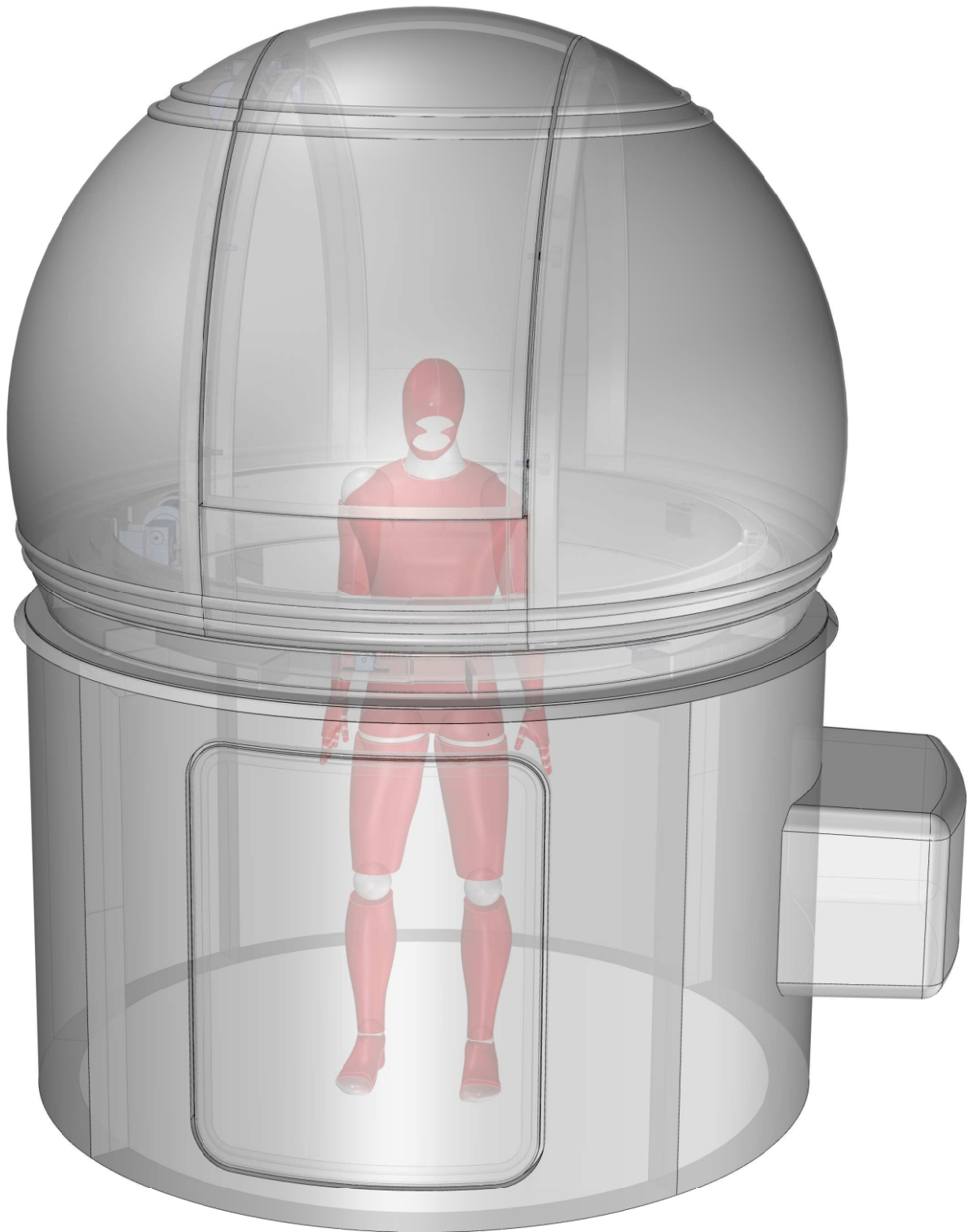
When the air temperature is over 10C, the heating system is automatically turned off.

There is a possibility to reprogram the heating system working thermal range of  $\pm 30C$ .

## 11. Maintenance and technical inspection of the dome

- a) After the transportation and installation of the dome, check that all screws are tightened.
- b) Secure all the bearings with technical vaseline.
- c) After the first 50 rotations of dome (reaching all the mechanisms), take the inner cover off and remove the aluminum filings accumulating at rolls and the cog wheel.
- d) Once every six months grease all the rollers to protect their bearings against humidity.
- e) Once a year, check whether any screws are not loosen and clean the dome ring aluminum filings.
- f) afilings. filings. filings. aluminum filings.fi

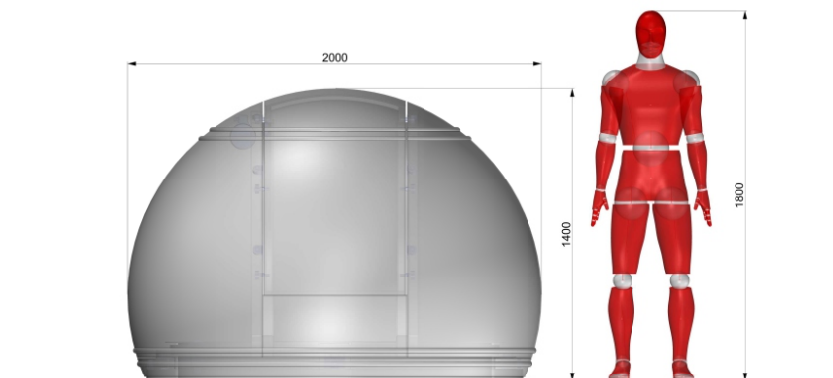
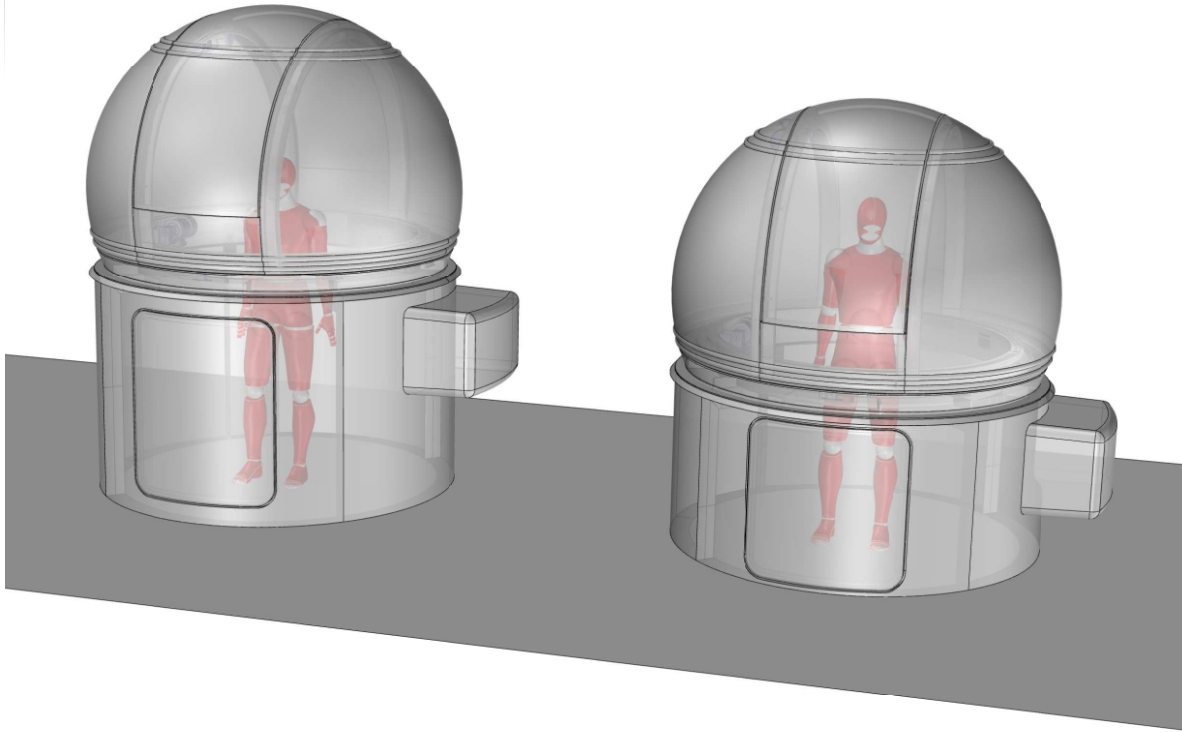
# Dome 3D model



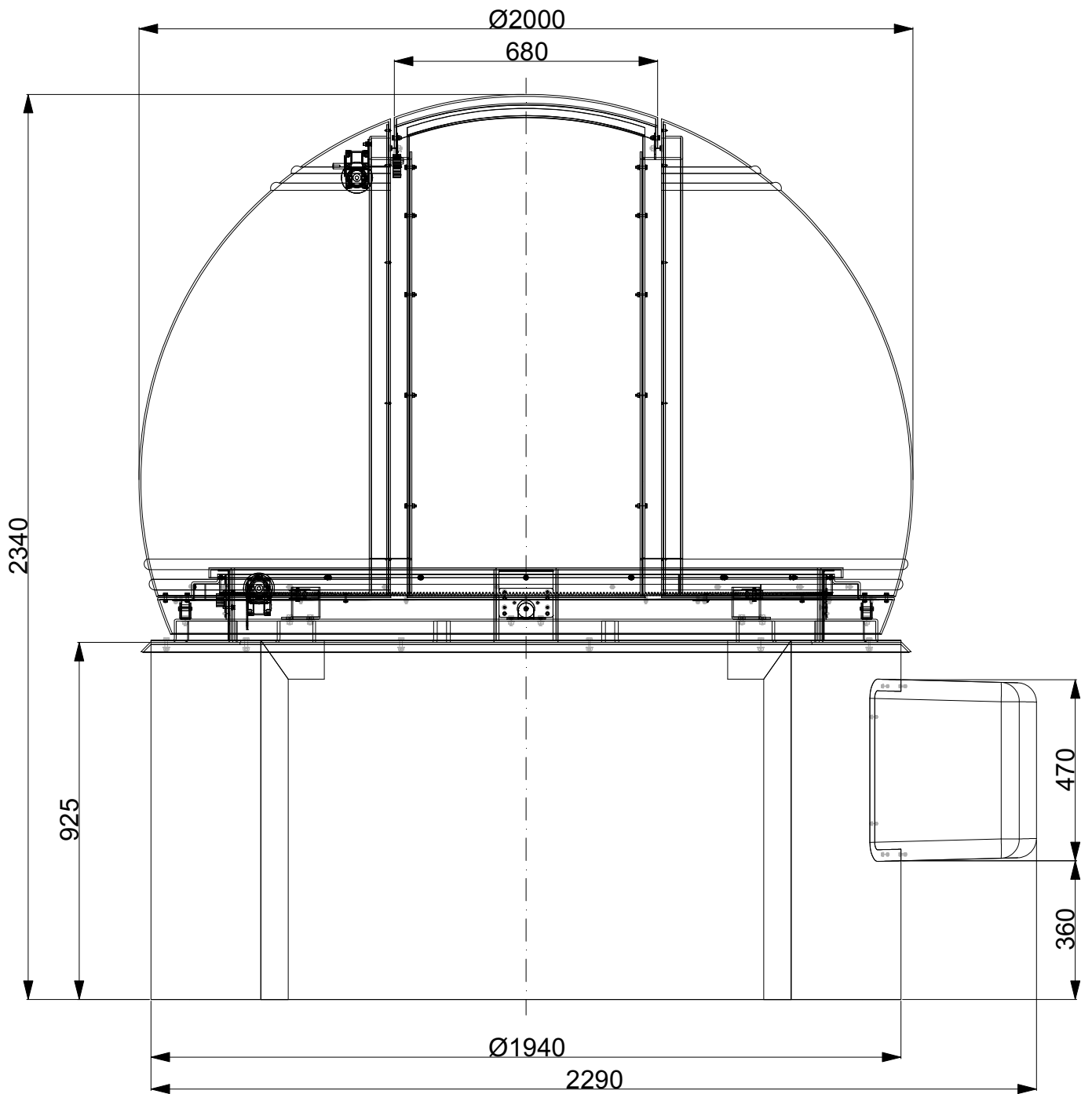
# Dome 3D model - cross-section



### 3D model - H120, H80 and no tower versions comparison

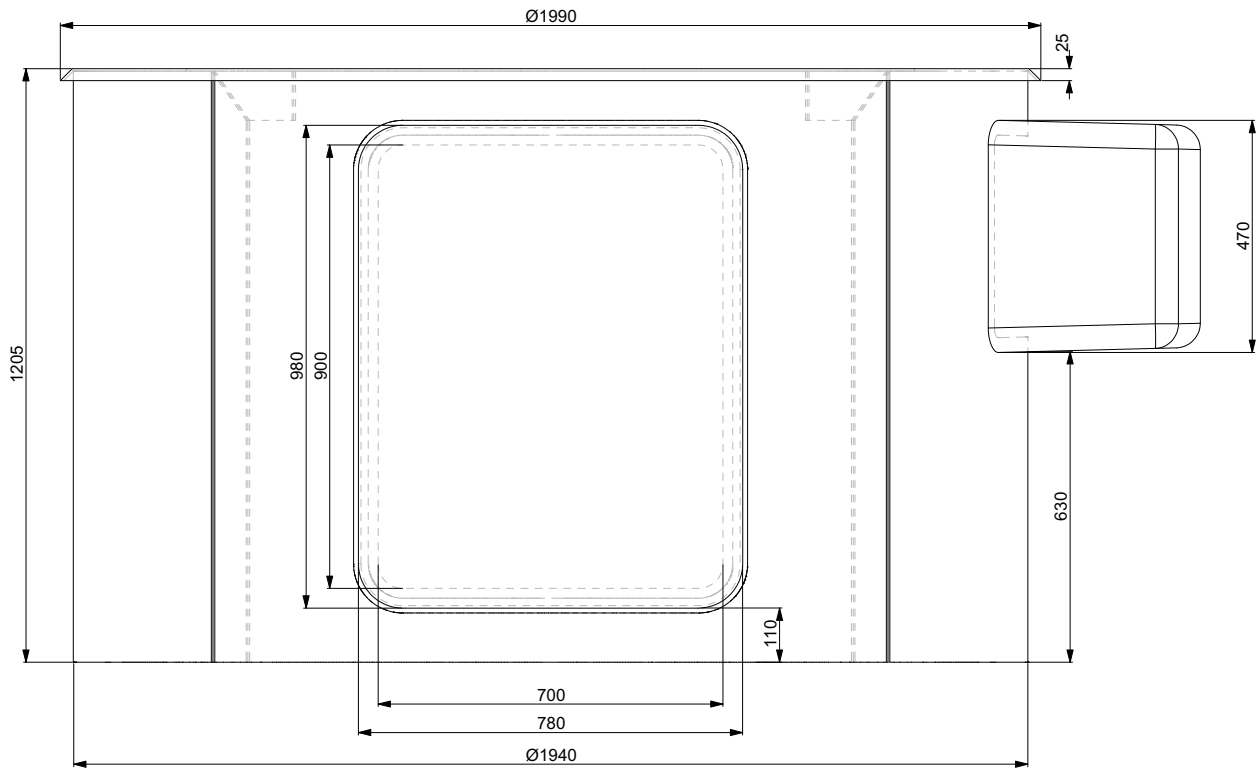


# Dome dimensions

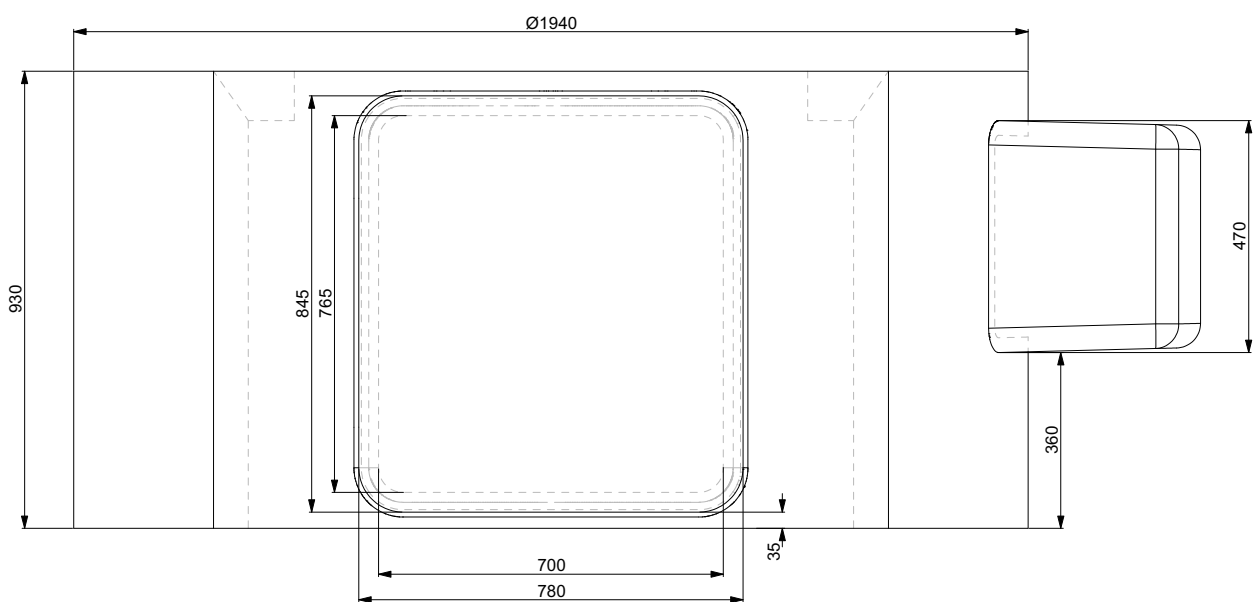




### High tower - H120

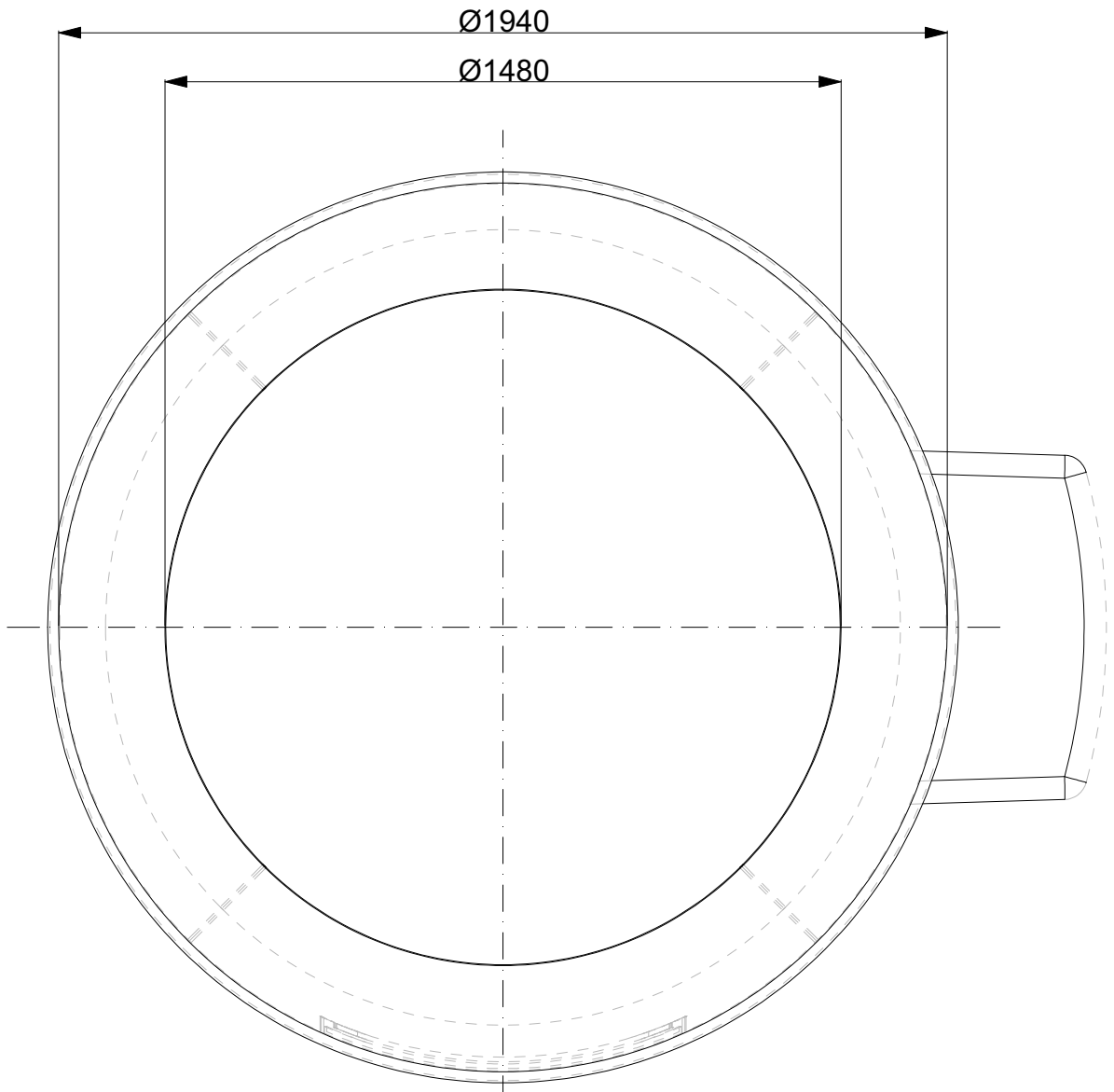


### Low tower - H80



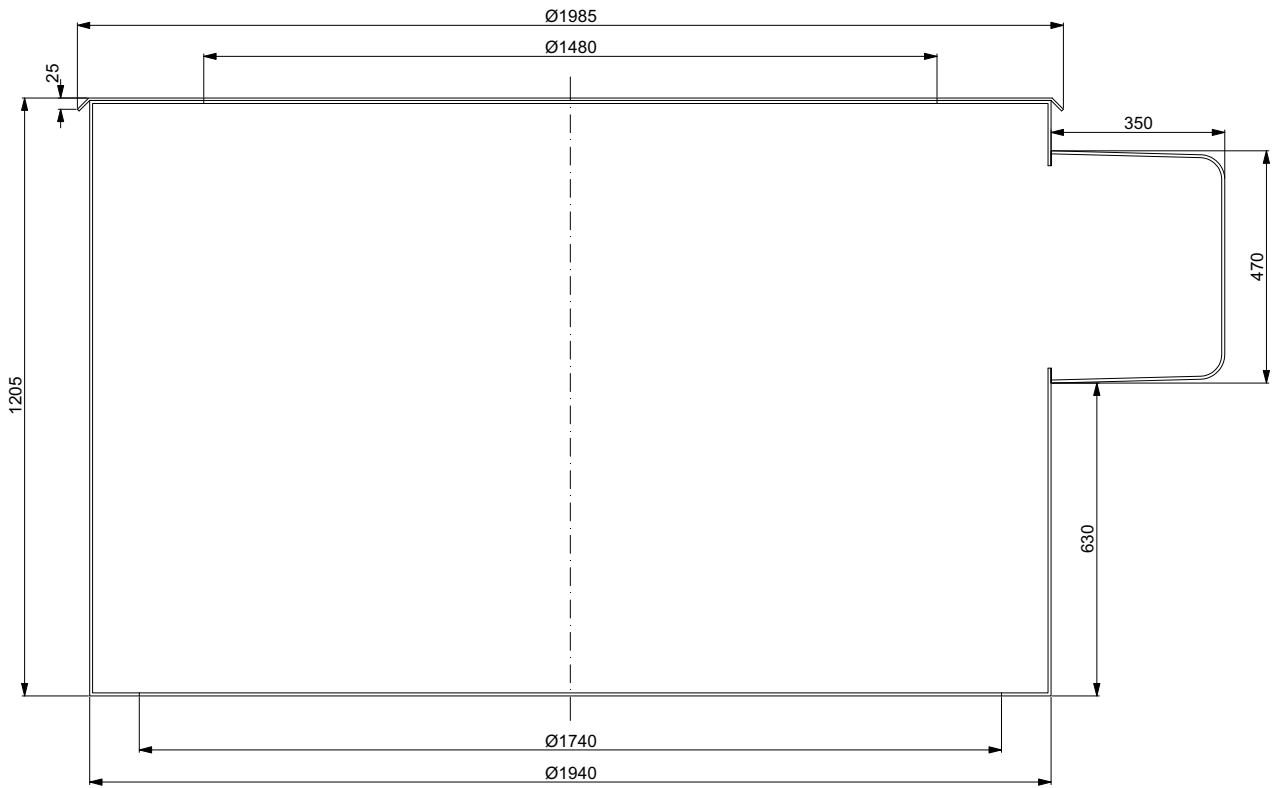
# Tower diameter (top view)

H120 and H80

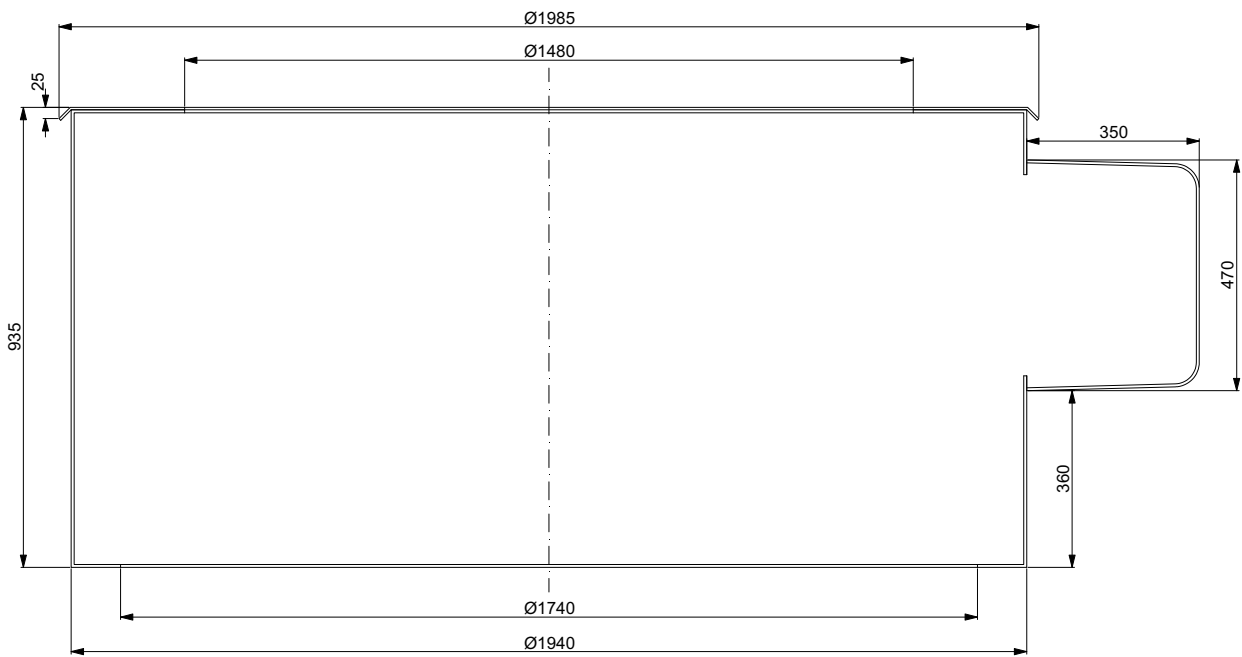


# Tower (side view)

H120

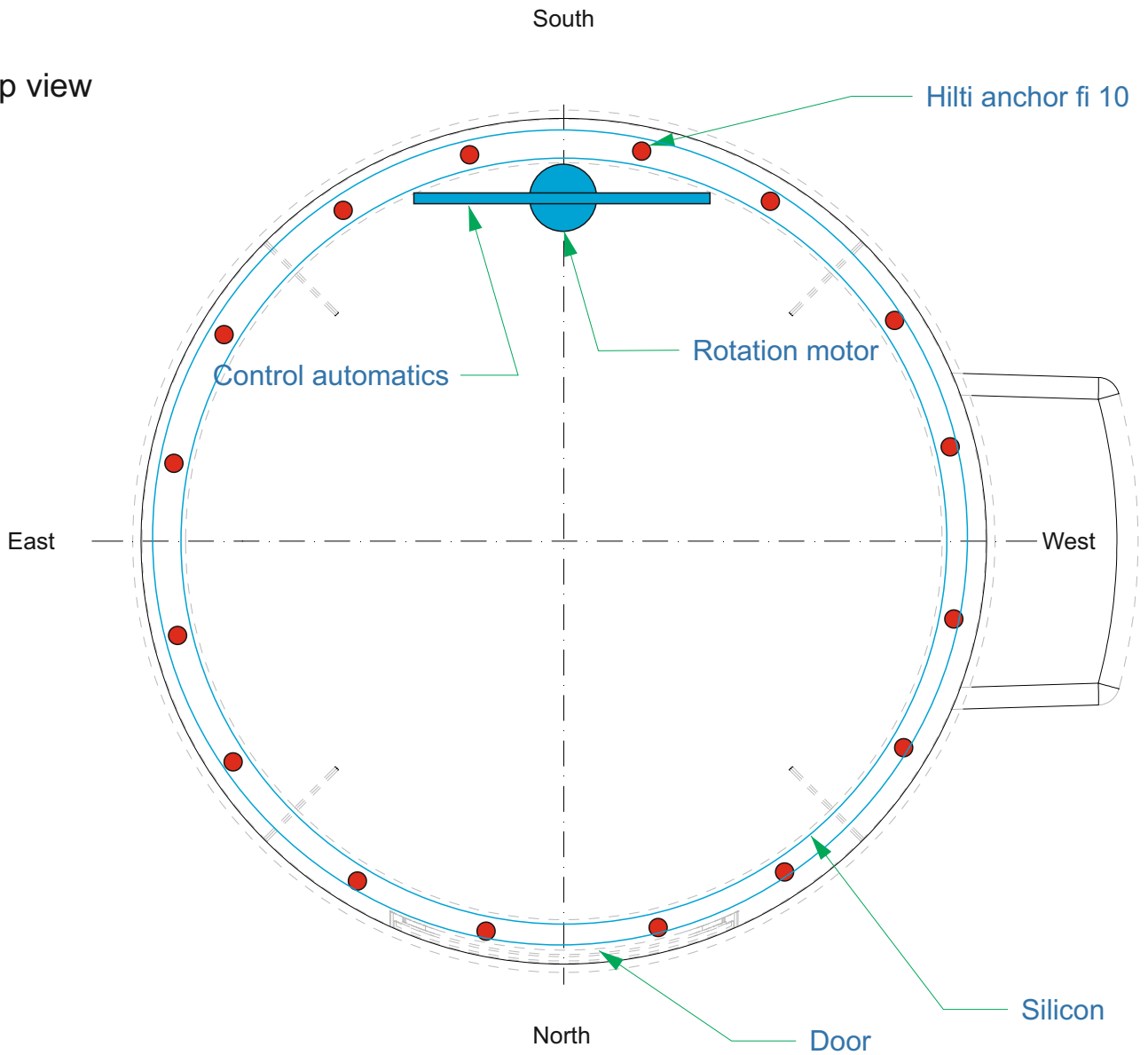


H80

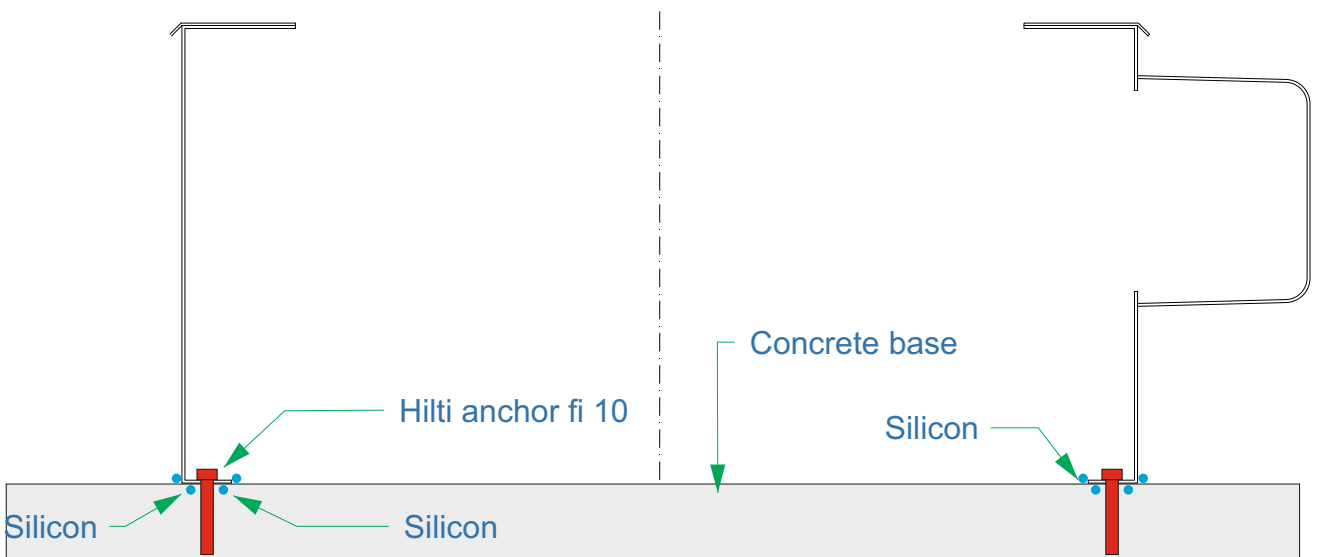


### Tower - fixing to the ground

top view

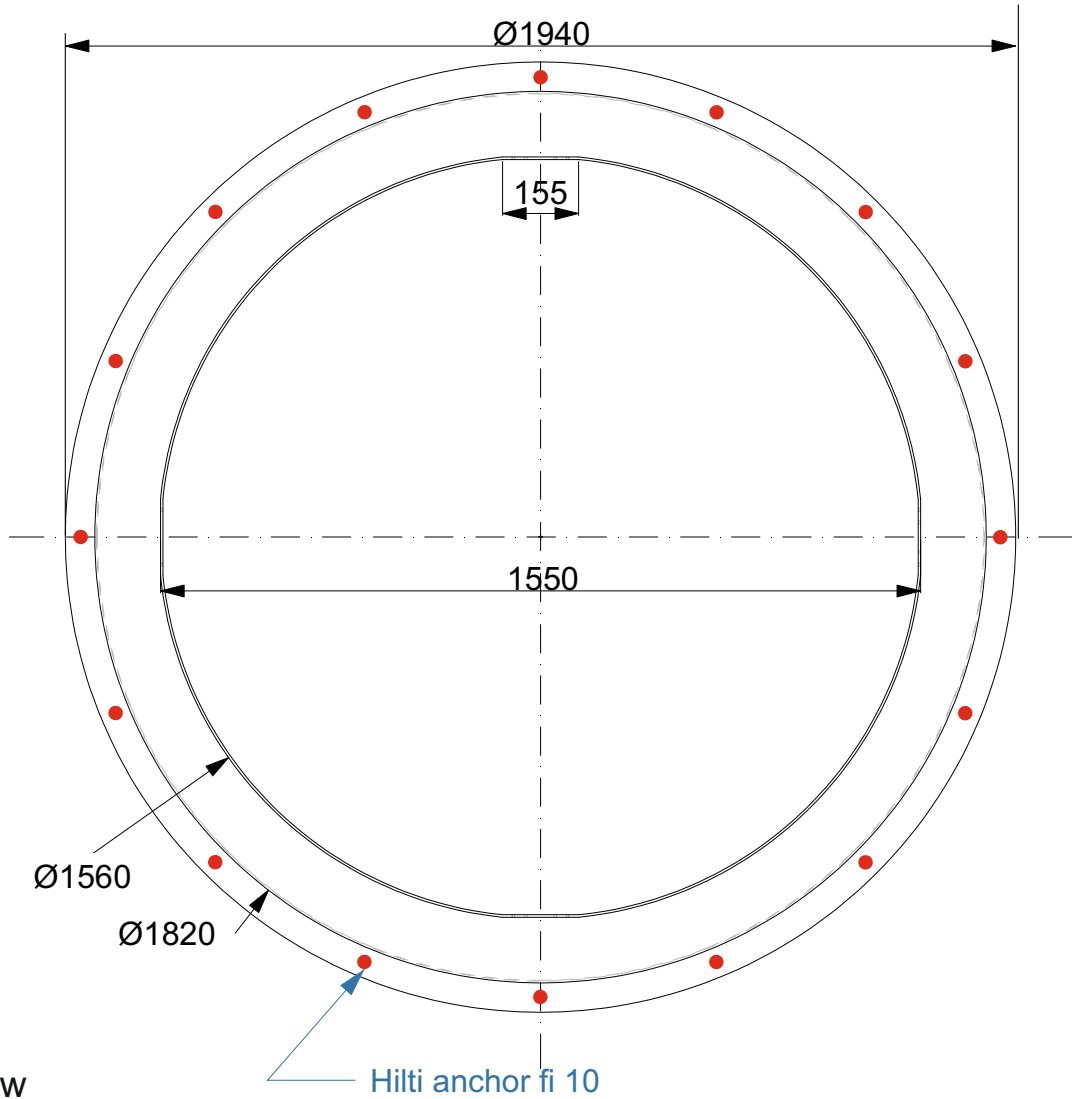


### Sealing of the dome base - side view

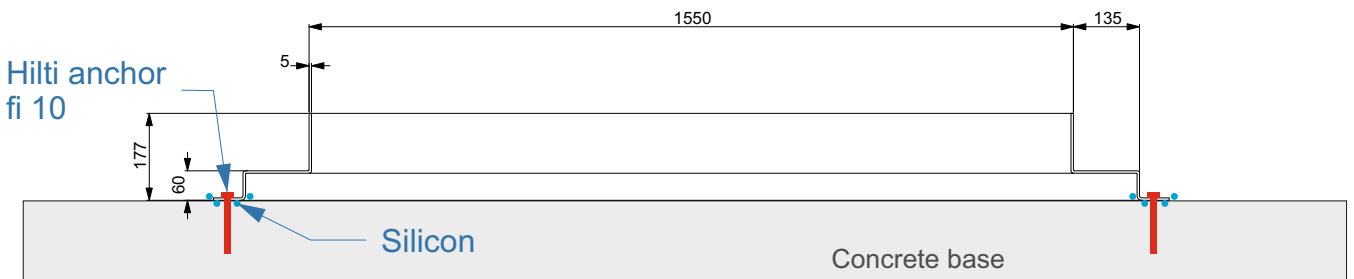


# Base ring - fixing to the observatory's crown

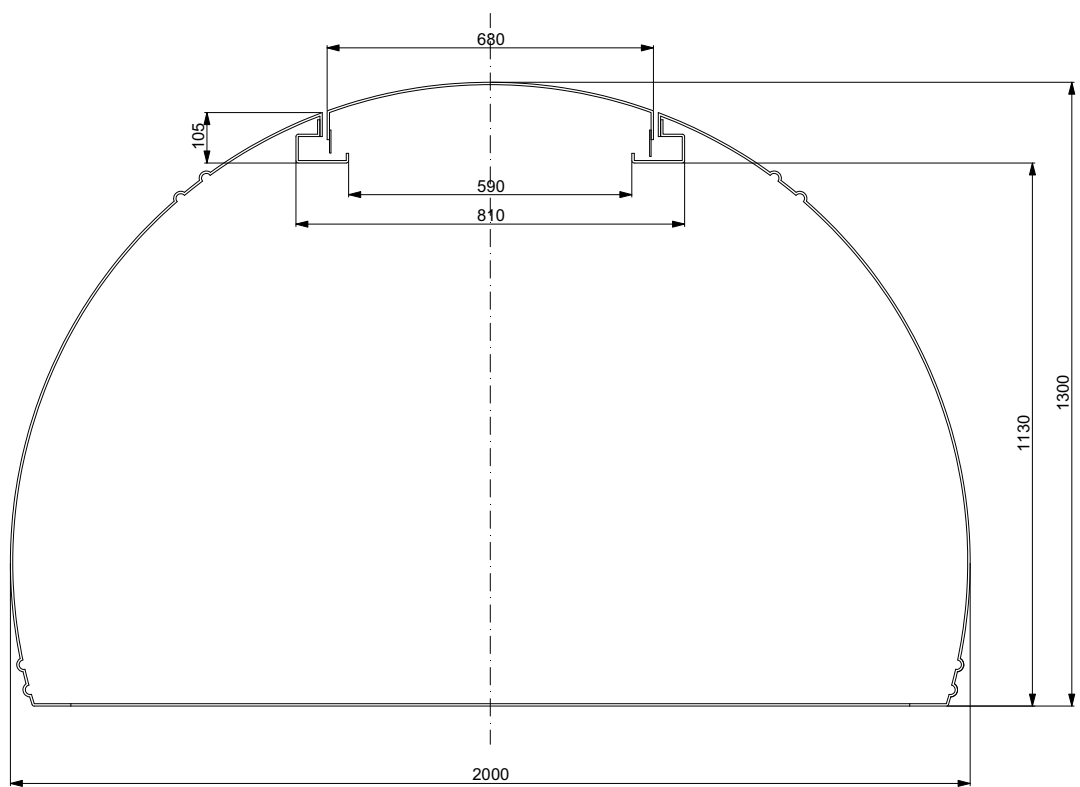
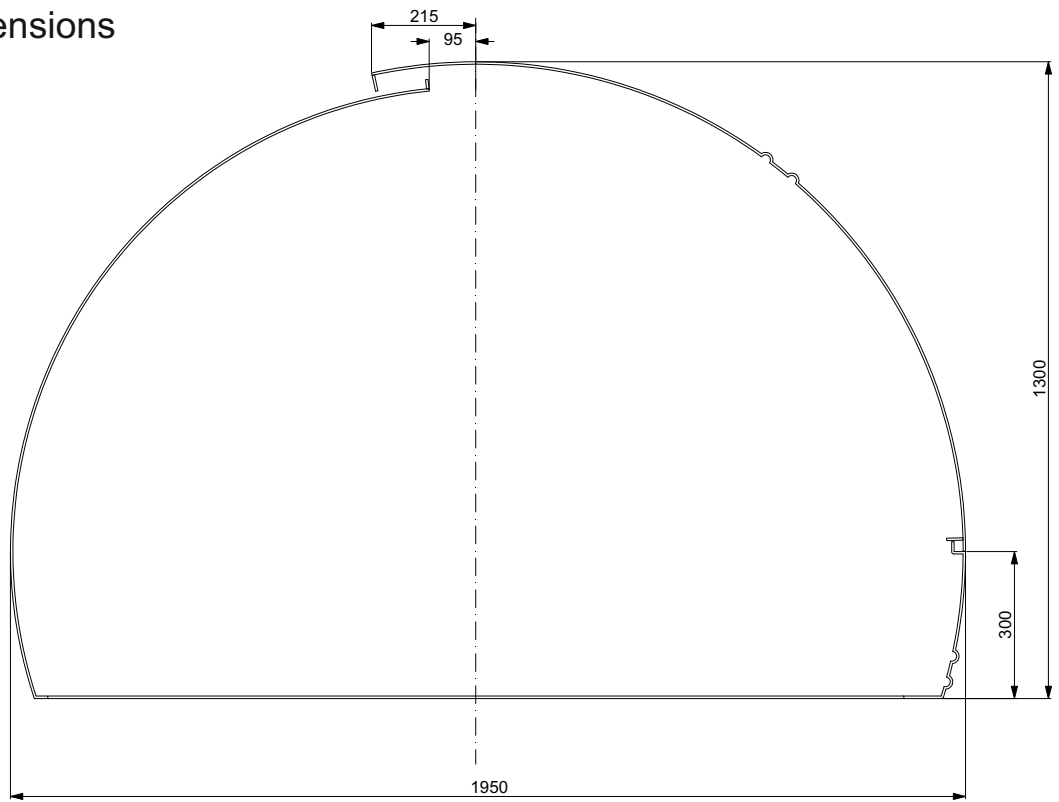
top view



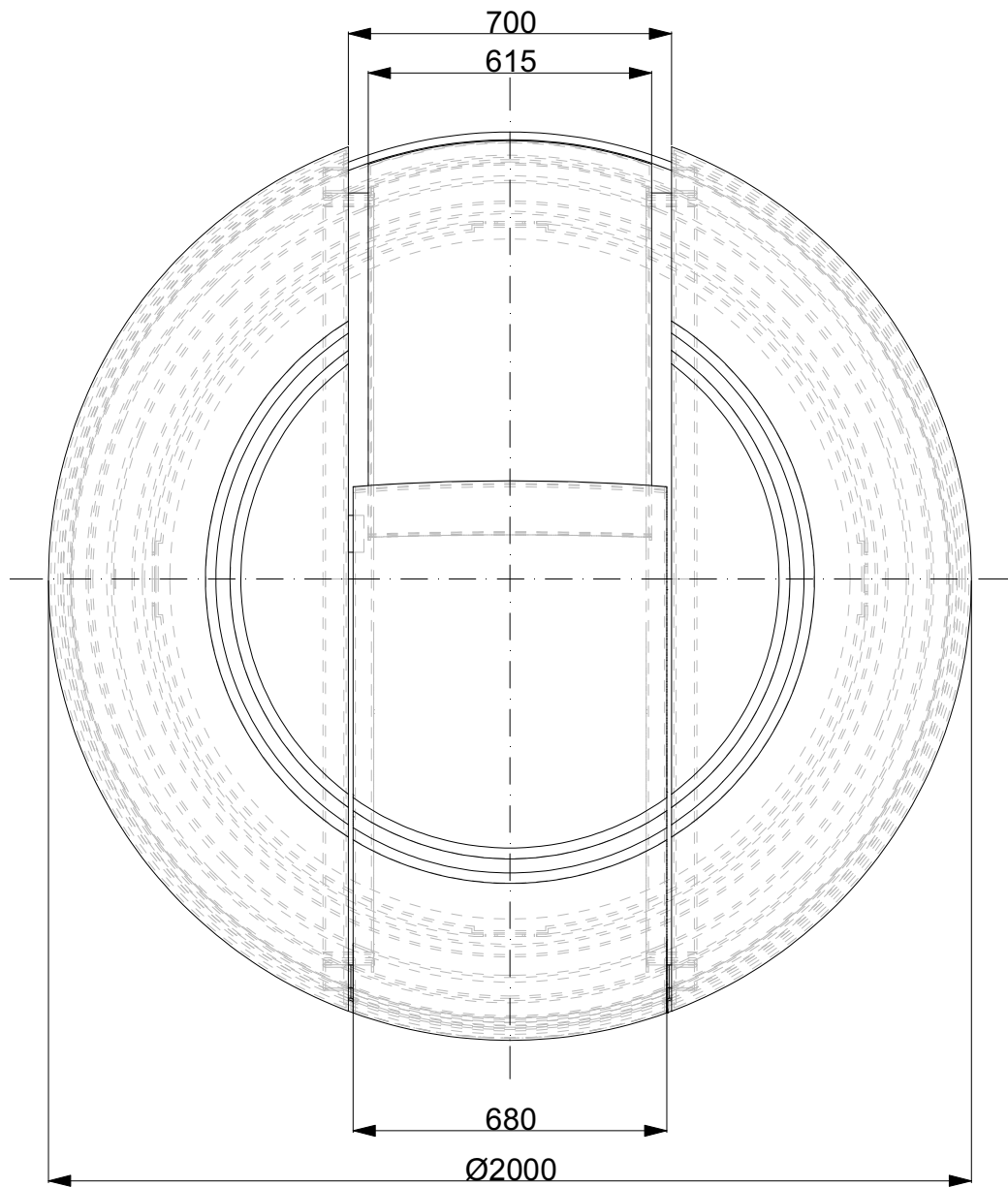
side view



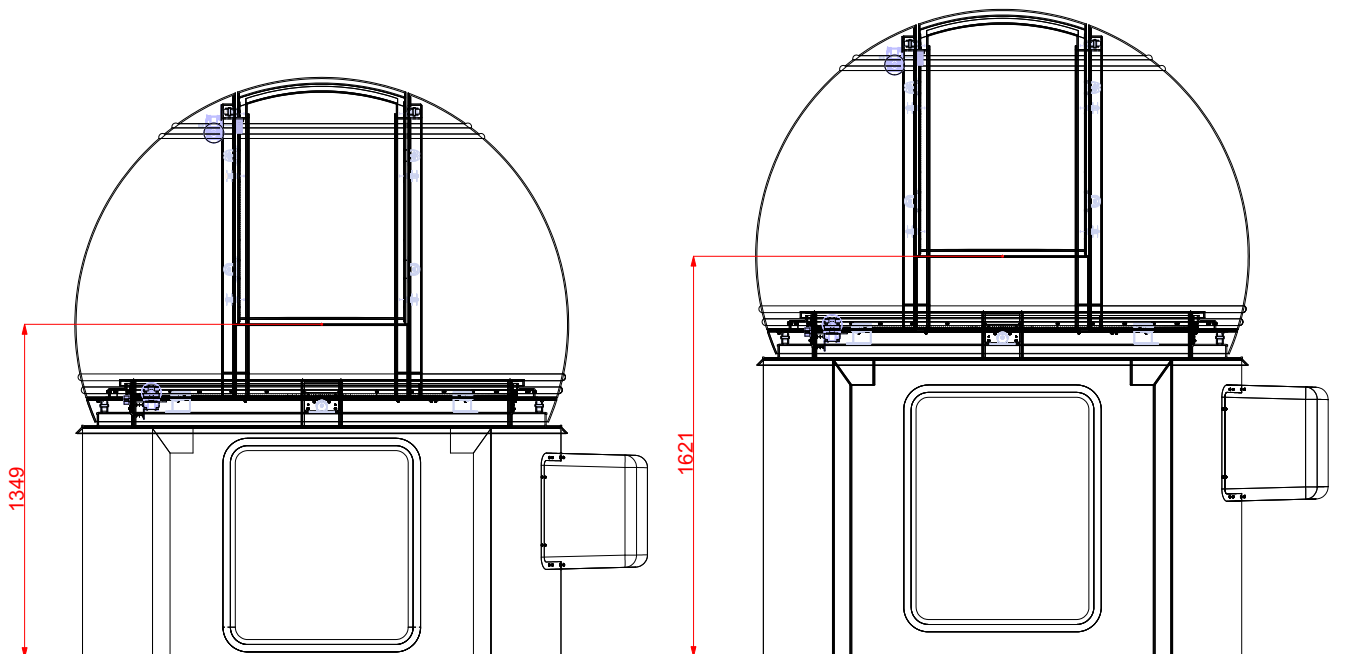
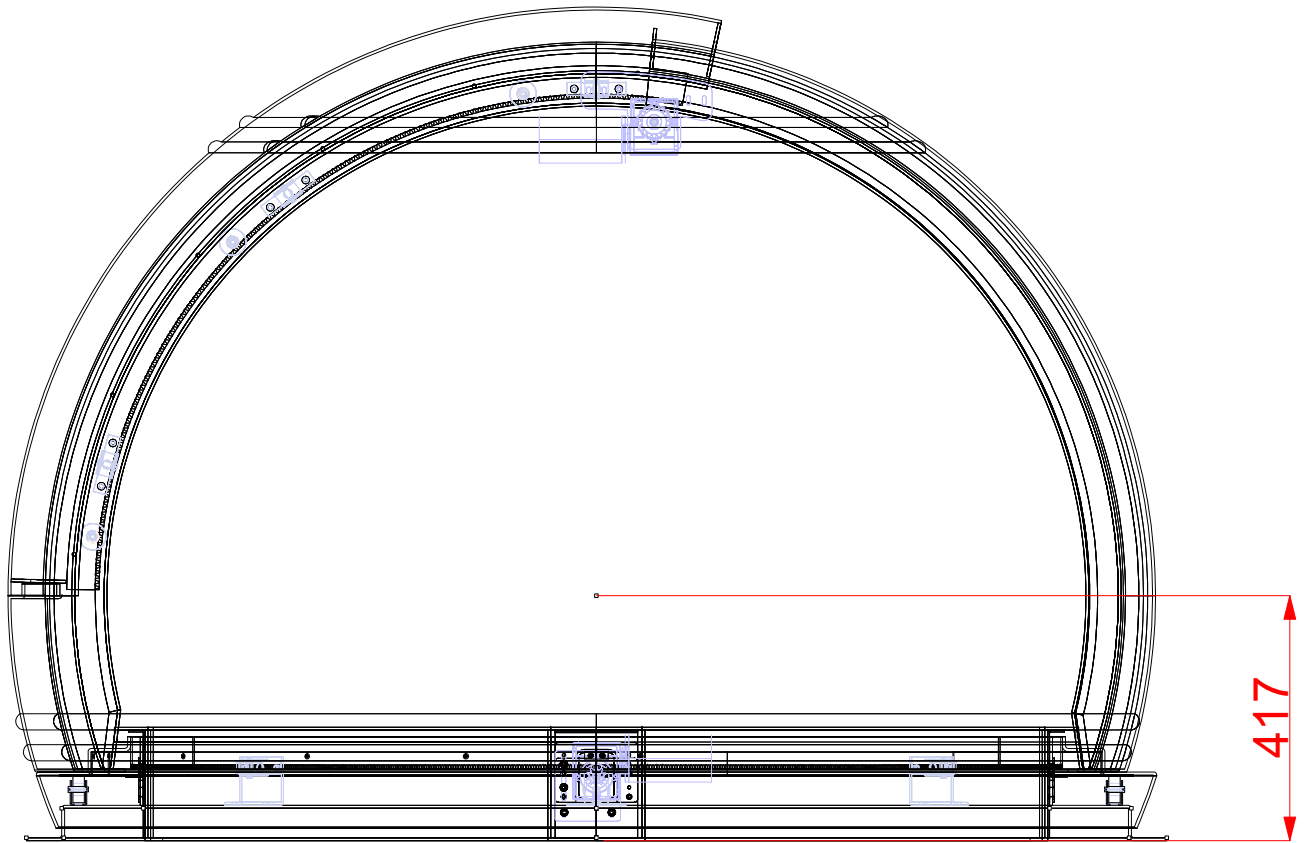
# Dome dimensions



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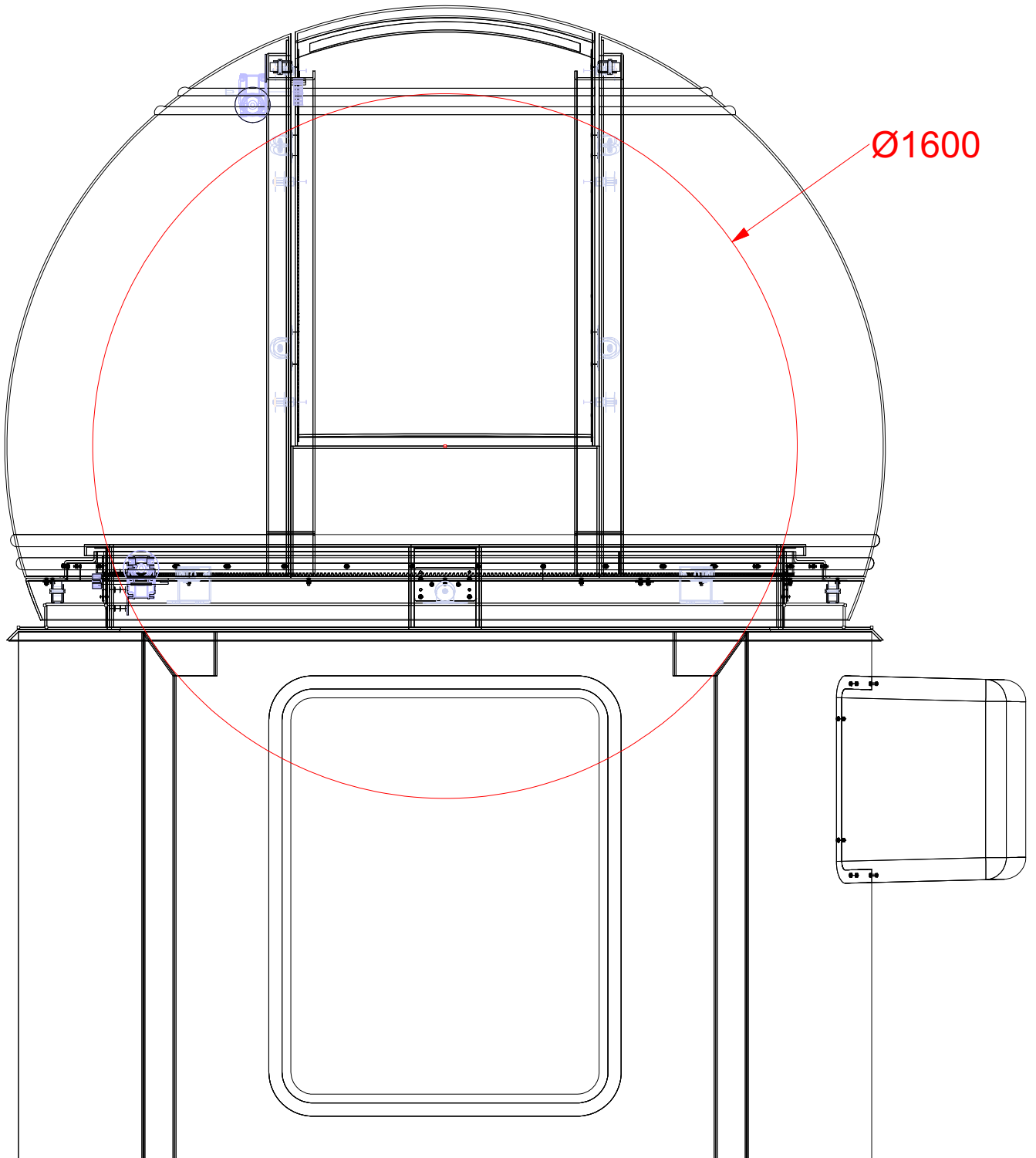


Location of the geometric center of the dome  
(from the base)

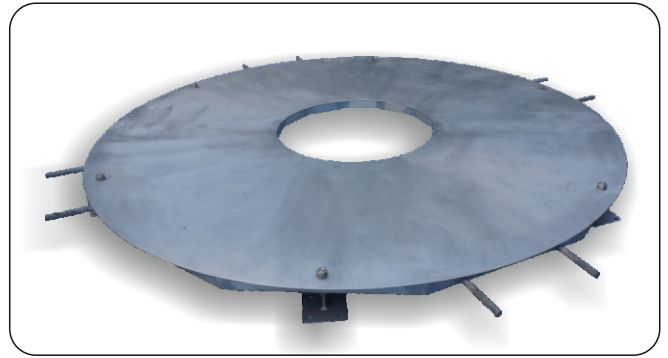




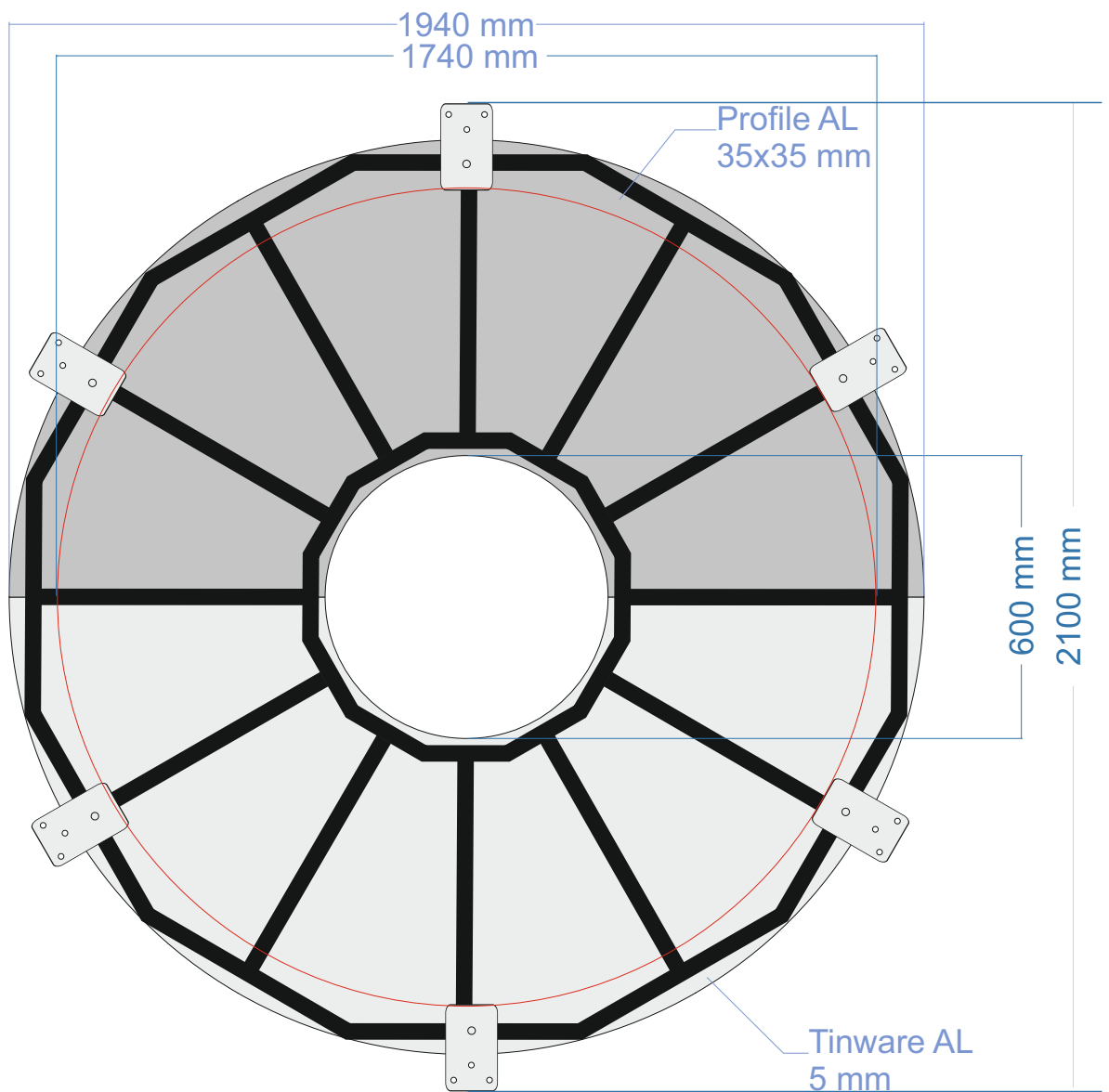
# Free space diameter for telescope



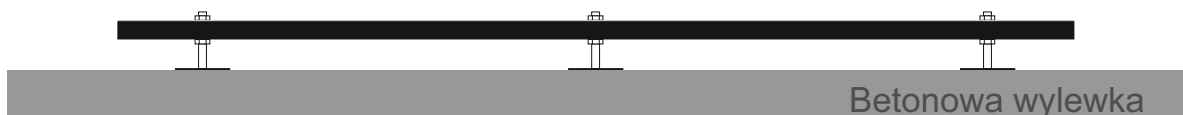
Aluminum base with adjustable pads for leveling the dome  
- adjustment range 8 cm



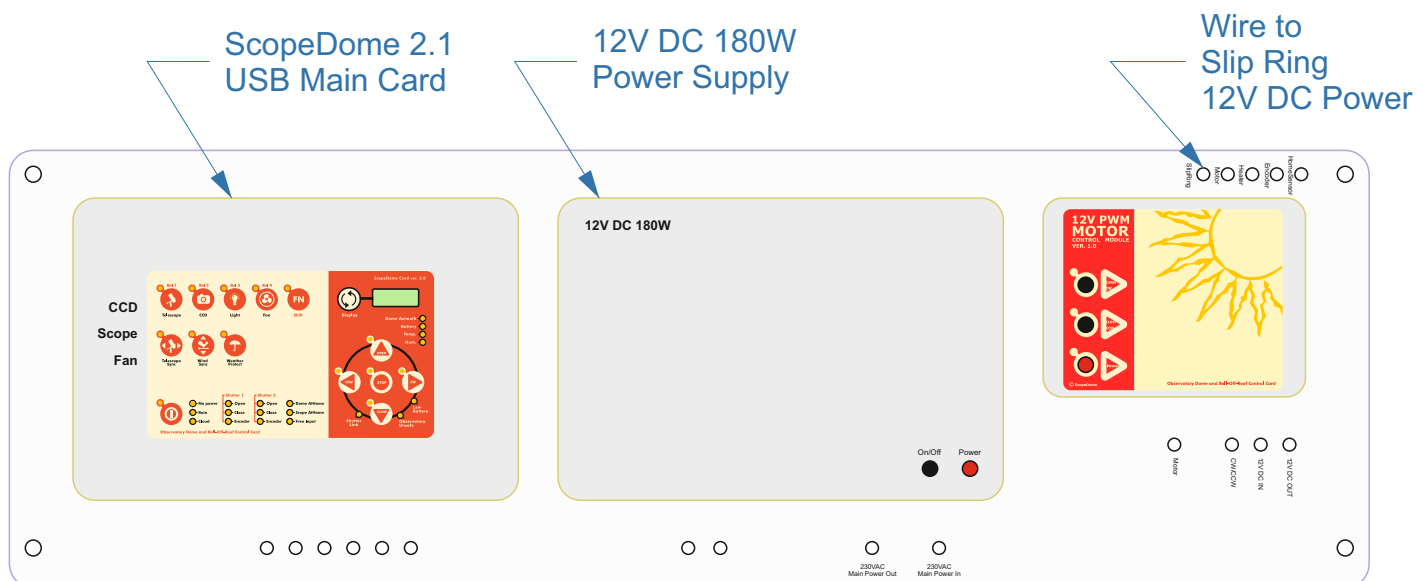
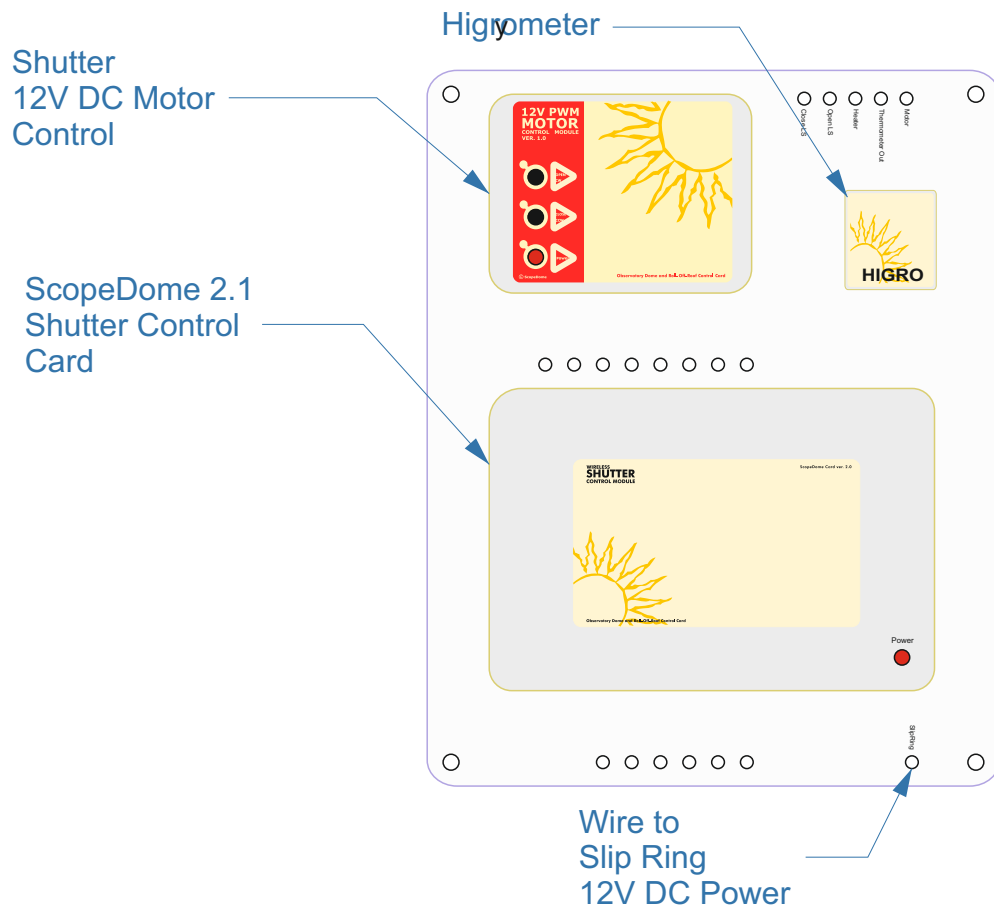
top view



side view



# Dome automatics - Plug And Play version (components arrangement)



# PLUG AND PLAY WIRING DIAGRAM FOR 2M DOME WITH HEATING SYSTEM

