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## Data Sheet

# SunOyster 16 model 2.0

Note: Indicative data only. SunOyster Systems reserves the right to change specifications.



### Introduction:

The **SunOyster 16** (SO 16) is a patented concentrating solar collector with roughly 16 m<sup>2</sup> gross mirror surface. It tracks the sun bi-axially to generate heat and potentially electricity. The SO 16 comes in **4 versions**:

- The purely thermal **SO 16 heat** generates up to 10 kW at CSTC of thermal power.
- The **SO 16 hybrid** generates in its receiver both electricity and heat, at present up to 2.4 kW of electricity and 6.0 kW of heat.
- **SO 16 heat** as well as **hybrid** can in the version **pvplus** be combined with 12 photovoltaic (PV) modules with an additional output of up to 4.8 kW of electric power for optimum utilization of the installation area.

### Installation:

The SO 16 requires a horizontal surface or platform for installation. It can be installed on roofs, carports or on the ground. The sub-structure of the SO 16 can be e.g. a concrete or asphalt surface, concrete plates, ground anchors or steel beams. On this, twelve base profiles support the ring profile of the SO 16. Each support point for the base profiles has to carry a static weight load of 100 to 150 kg, plus varying dynamic loads.

### Mechanics:

- The SO 16 has – including pvplus – a swept diameter of 8.30 m, corresponding to a circular surface of approx. 54 m<sup>2</sup>.
- Ring profile:  
Rail profile S7 in corten steel, 5.24 m in diameter.
- Main frame:  
Rolled steel profiles with zinc-aluminum-magnesium (ZAM) coating. Main frame rolling on steel or polymer wheels on the ring profile.
- Other profiles:  
Hot-dip-galvanized steel profiles.
- Torque tube: 2 torque tubes at a horizontal distance of 3 m from each other, with the back torque tube elevated to minimize shading.
- Mirrors:  
On the torque tubes, the two semi-parabolic mirror troughs have a width of 3,870 mm and a height of approx. 1,900 mm and consist of three mirror segments each. 4 mm of toughened glass, reaching approx. 95 % reflectivity, with ceramic pads on the back side for installation. Concentration factor  $\geq 30$ .

Warning – avoid concentrated radiation in eyes, on the skin or clothes!

- pvplus: In the front and on both sides of the SO 16 each 4 PV modules, fixed at approx. 17° to the ground and tracking the sun together with the SO 16 from East to West.

## Tracking: Two-axis in Azimuth and Elevation:

Azimuth tracking from East to West  $\geq 350^\circ$  rotation angle; gear motor. Elevation tracking working angle  $160^\circ$ ; two individual drive systems with worm gears.

Warning – beware of moving parts!

## Expected power output of model 2.0:

Type	Max. heat output CSTC	Max. electricity output <sup>1</sup>	pvplus* 4.0 - 4.8 kW <sub>p</sub>
SO 16 heat	10 kW <sub>th</sub>	-	+ 4.8 kW <sub>p</sub>
SO 16 hybrid	6.0 kW <sub>th</sub>	2.4 kW <sub>p</sub>	+ 4.8 kW <sub>p</sub>

\*Additional electricity output depends on the used type of PV modules.

## SO 16 heat - thermal receiver:

Insulated and protected by a 3 mm borosilicate glass tube with anti-reflective coating. The thermal receiver features inside a steel tube with selective coating.

## SO 16 hybrid - hybrid receiver:

Insulated and protected by a 3 mm borosilicate glass tube with anti-reflective coating, the hybrid receiver features inside an extruded aluminum profile. On this, glass lenses – the so-called “SunOyster Crystals” – concentrate the light a second time onto the multi-junction concentrator PV (CPV) cells which have up to 44 % cell efficiency. Temperature co-efficient for power: -0.1 %/K.

## SO 16 pvplus – PV modules:

The SO 16 can carry 12 modules with a size of approx. 1 m x 1.7 m each. See separate data sheet of the PV modules.

Warning – both the hybrid receiver and the PV modules create electric hazards!

## PV Inverter System:

- **SO 16 hybrid:** 1x ABB UNO-DM- 3.3-TL-PLUS
- **SO 16 hybrid pvplus:** 2x ABB UNO-DM- 3.3-TL-PLUS
  - Integrated DC disconnect switch.
  - Max. efficiency: 97,0 %.
  - Grid connection type: AC Single Phase (L / N / PE).
  - Rated AC voltage: 230 V.
  - Rated output frequency: 50 Hz or 60 Hz.
  - Recommended external AC overcurrent protection: 16 A.
  - Anti-islanding protection: According to local standards.
  - Grid connection of the two inverters is recommended on separate phases.

## Electric Interconnection:

Junction box with clamp terminals for the cable (max. wire size 2.5 mm<sup>2</sup>). The cable shall be positioned at the center of the SO plus 1 m cable length.

## Control System:

- Customized and highly integrated control system with 3 independent motor controllers.
- Redundant safety system with integrated temperature switches in each receiver.
- Integrated UPS system for closing the SunOyster during main grid failure.
- Local or central weather station equipped with the following sensors:
  - Anemometer and
  - Radiation sensor.
- Power consumption: 10-20 W average (max. 180 W).

## Data Interconnection:

Junction box with RJ45 ethernet port. The ethernet cable shall be positioned at the center of the SO plus 1 m cable length.

## Thermal Properties:

- Heat transfer medium in areas without freezing temperatures: De-mineralized water. In other areas: solar fluid, i.e. water glycole with corrosion protection additives. Standard version max. temperature of working fluid: 105°C. High temperature version up to 170°C, with thermal oil more.
- System pressure: min. 3 bar and max. 5 bar for standard version, for high temperature version up to 16 bar.
- Flow Rate: Minimum flow of 250 l/h, at full radiation 750 l/h, maximum flow 1,500 l/h.
- Pressure loss:  $\leq 0.5$  bar at 1,500 l/h.

Warning – the high fluid temperature can cause burning hazards!

## Thermal Interconnection:

Pipes for the hot fluid should be installed to within a distance of 1 m from the center of the SunOyster. Stainless steel pipes are preferred. The pipes should have a minimum inner diameter of 25 mm (1 inch) – preferably larger for long runs. The two ends have a 1 inch external pipe thread.

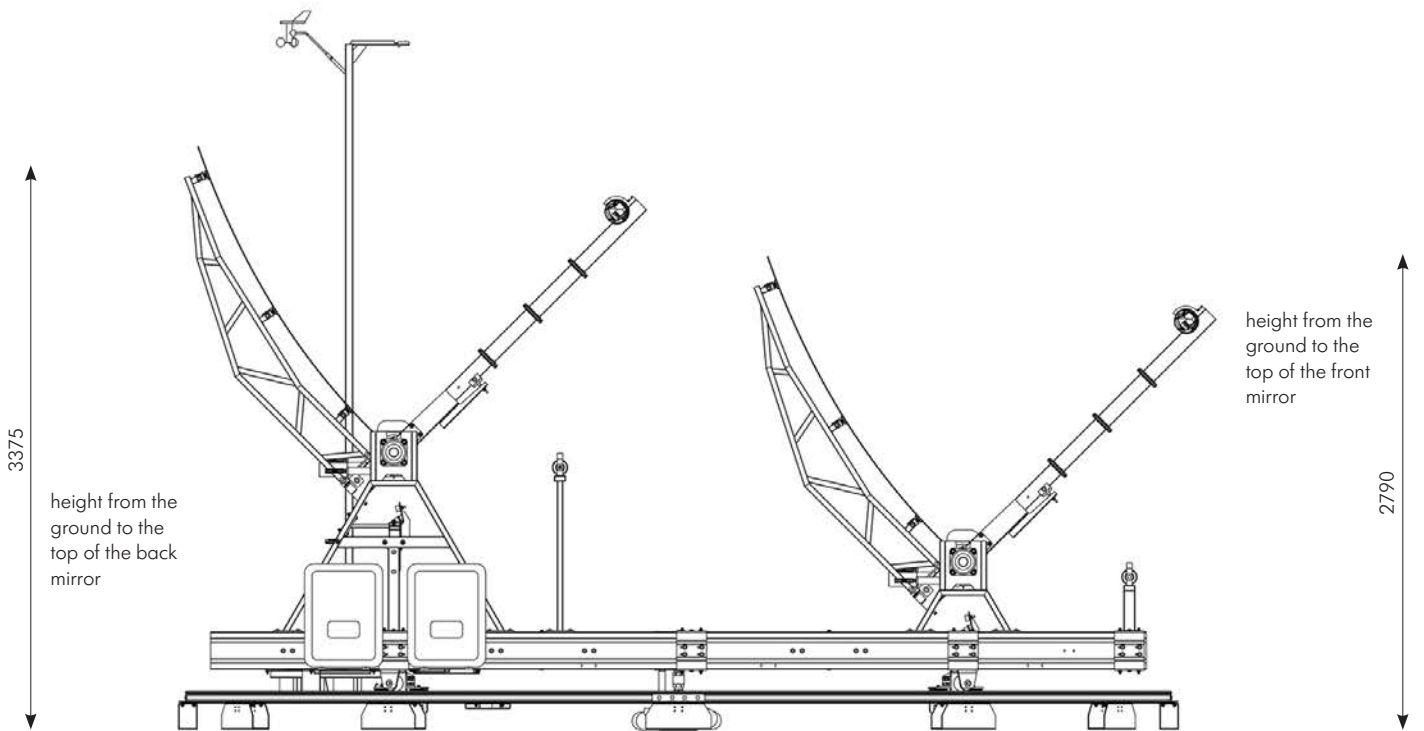
## Environmental limits:

- Operational temperatures: - 30°C to + 45°C.
- Survival temperatures: -40°C to +50°C.
- Air humidity: 0-100 %, condensing.
- Wind: normal operation up to 50 km/h. Survival in safety position with normal turbulence up to 150 km/h.
- Remove snow on SunOyster.

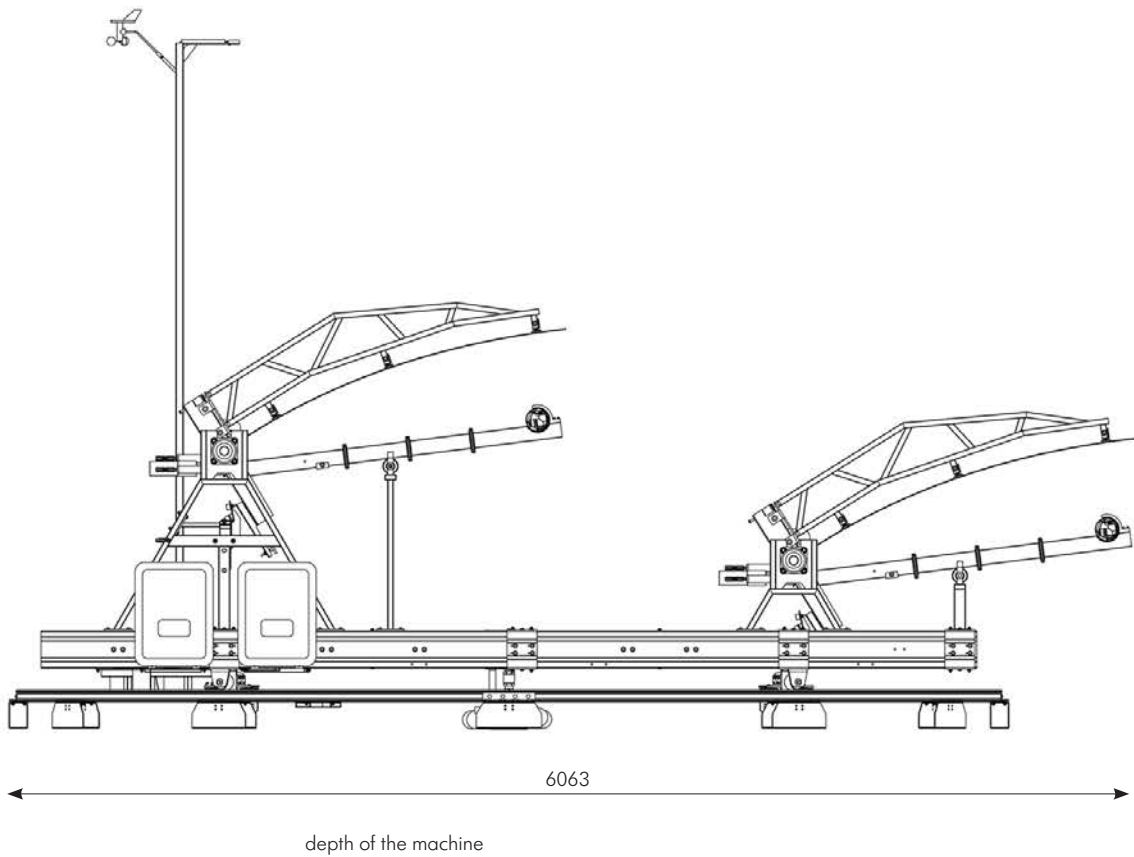


<sup>1</sup> Nominal power of generator under Concentrator Standard Test Conditions CSTC acc. IEC 62670-1:2013:1.000W/m<sup>2</sup>, (25±2)°C, AM 1.5 acc. EN 60904-3

**SunOyster 16 side view open:**

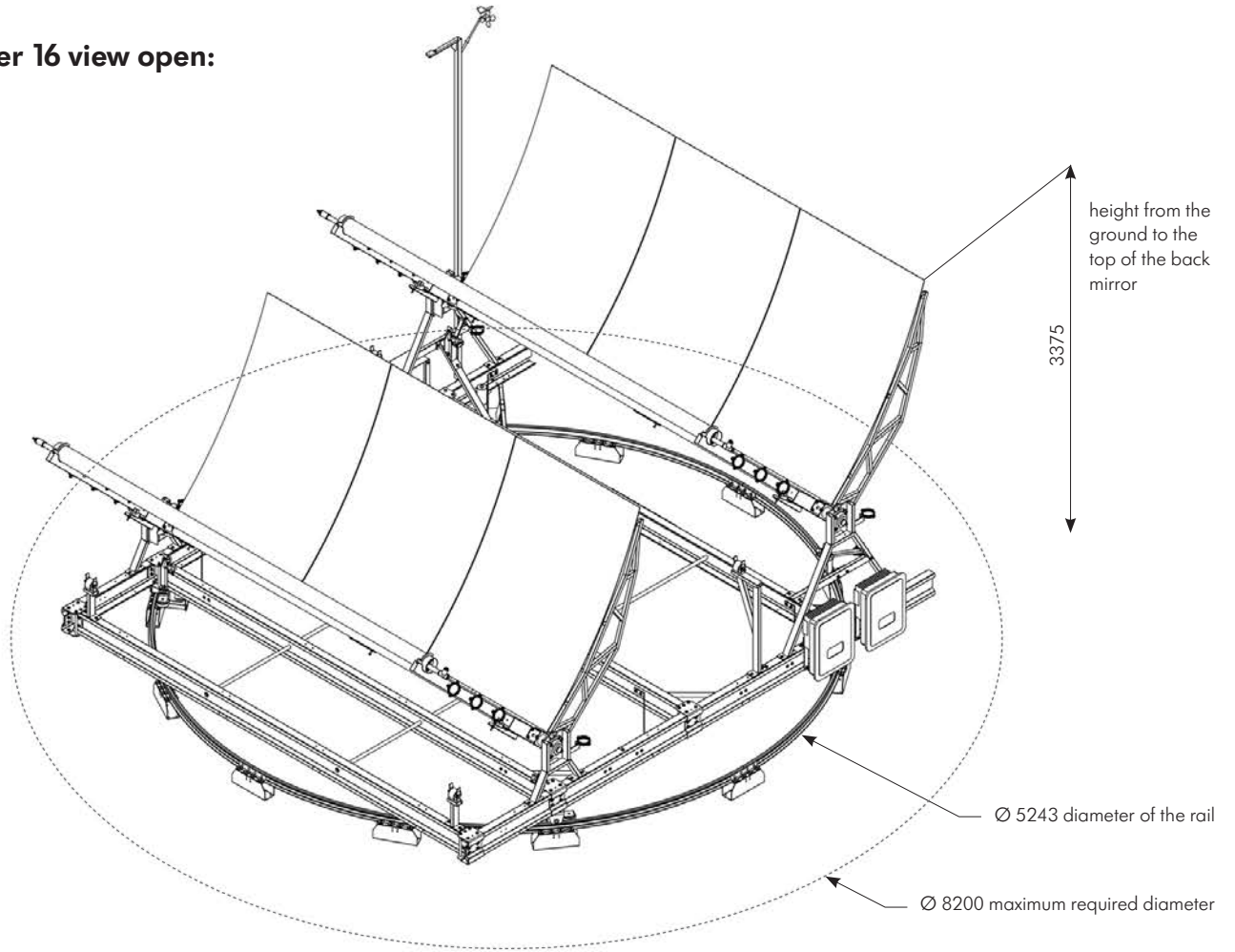


**SunOyster 16 side view closed:**

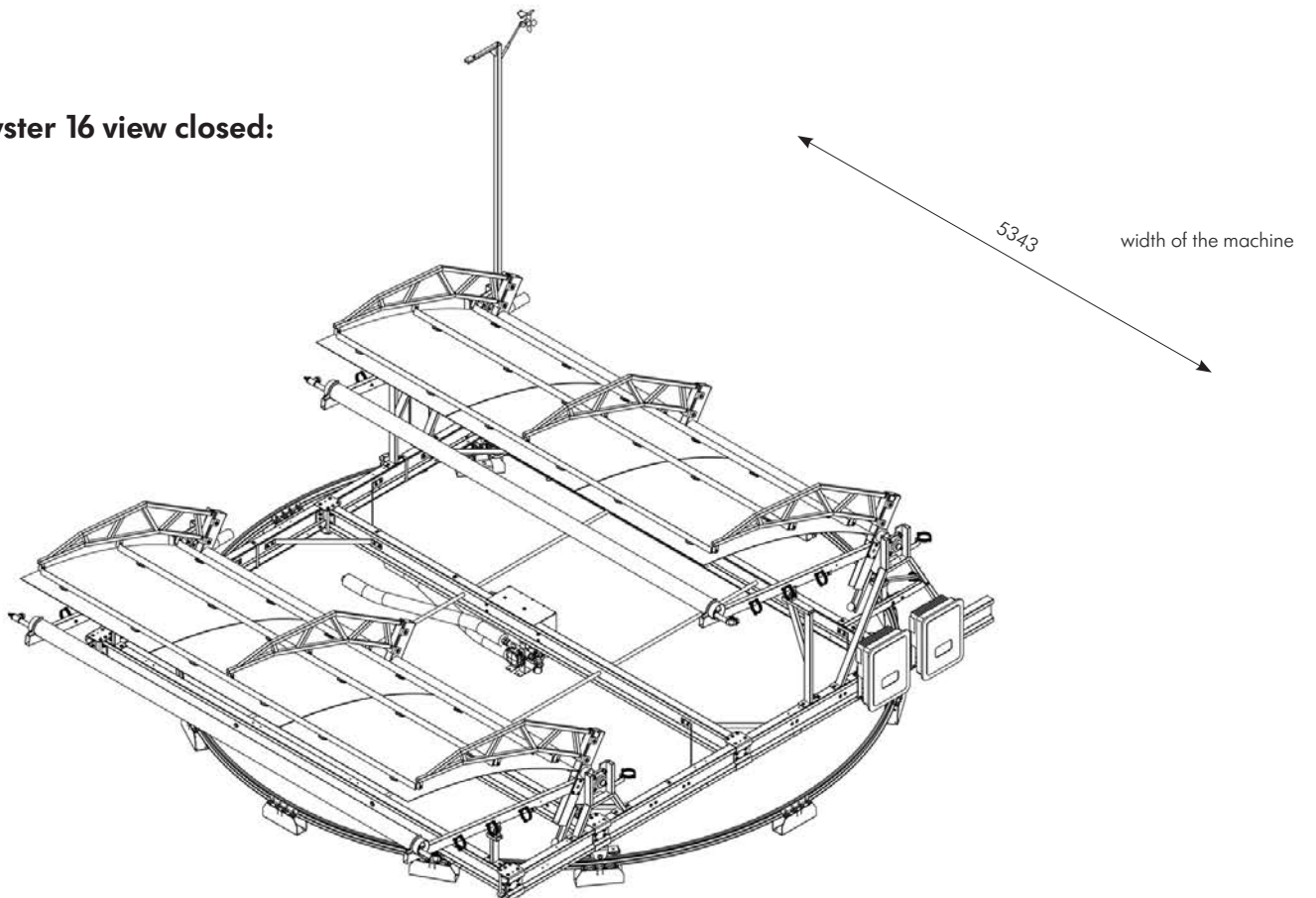




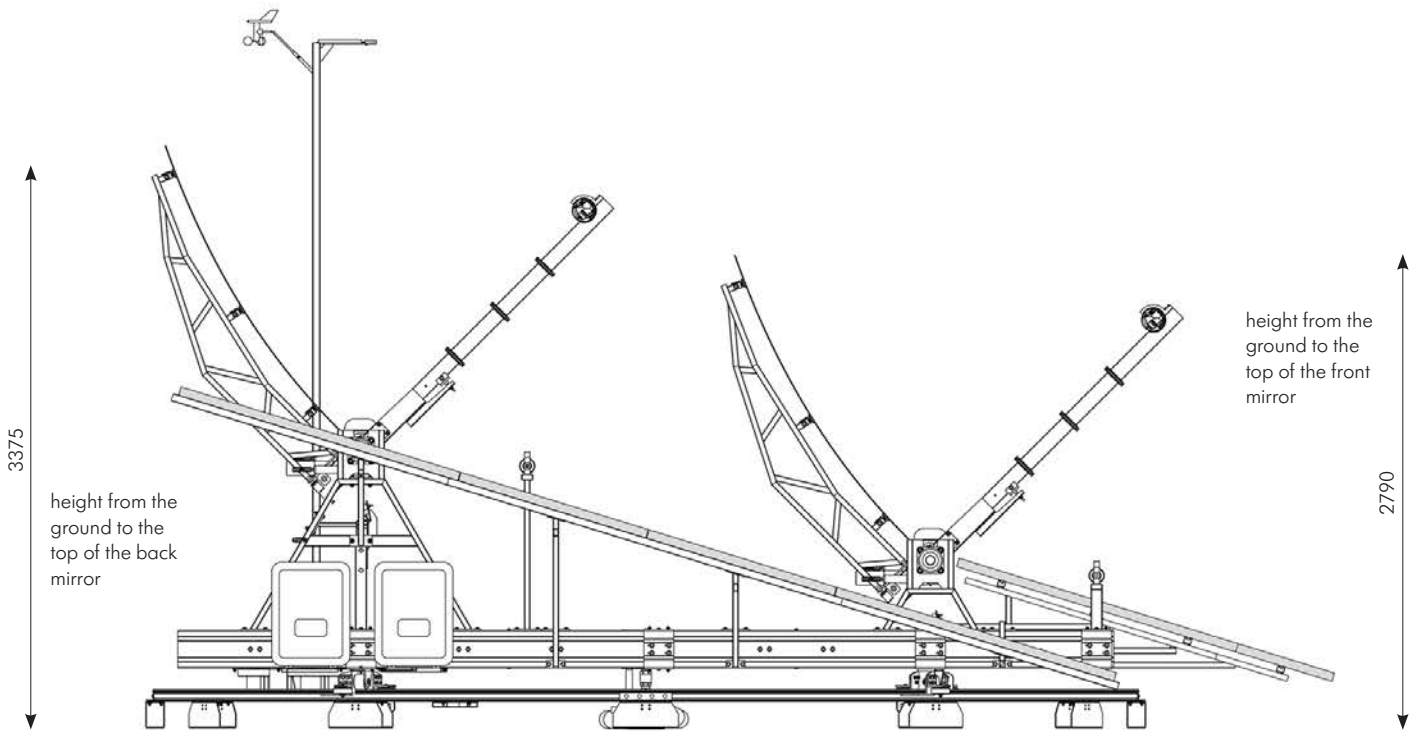
**SunOyster 16 view open:**



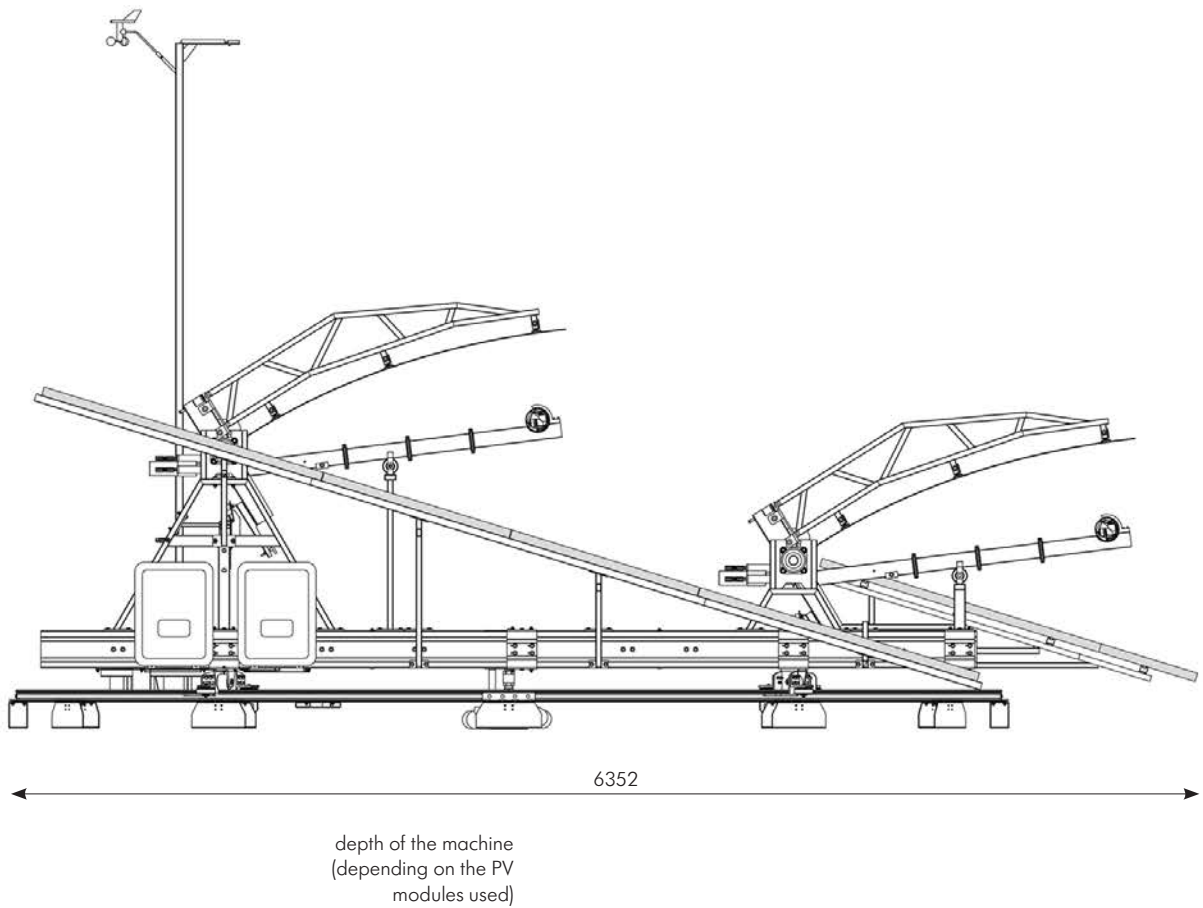
**SunOyster 16 view closed:**



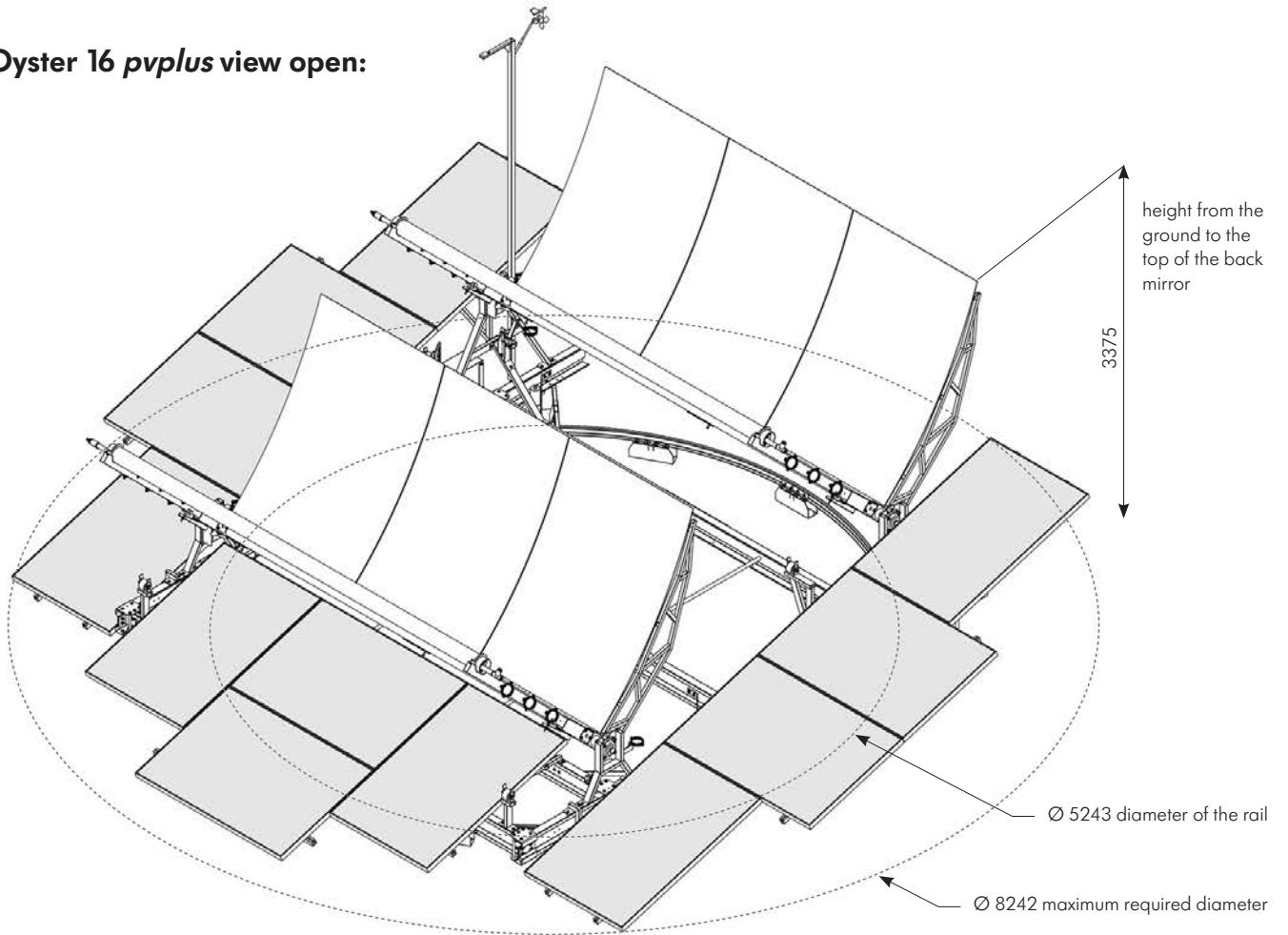
**SunOyster 16 *pvplus* side view open:**



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