



## Data Sheet: Pilot Production Series of SunOyster 16 thermal receiver *pvplus*

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

### Introduction

The **SunOyster 16 thermal receiver *pvplus*** is a concentrating solar collector that produces heat from the receiver. This is combined with PV modules. Its 16 square meters of parabolic mirror track the sun, and concentrate the sun's energy on a receiver tube, achieving a total energy efficiency of up to 75%; in addition, it carries 12 standard photovoltaic (PV) modules to use the space most efficiently.

### Installation:

The base is installed on a horizontal surface using twelve steel feet to support the ring profile. The sub-structure can be ground anchors, concrete plates or steel beams (for more details see installation information sheet).

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 778106.

### Mechanics:

- Ring profile: Rail profile S7 in corten steel, 5.24 m diameter of the ring. Maximum swept diameter with mirrors folded: 8 m, corresponding to 50 m<sup>2</sup>.
- Main frame and other profiles: steel, hot-dip-galvanized or with highly corrosion resistant zinc-aluminum-magnesium (ZAM) coating.
- 2 semi-parabolic mirror troughs at a horizontal distance of 3 m from each other. Each with a width of 3970 mm and a height of 2000 mm. Concentration factor  $\geq 30$  x. Reflectors are mirrors using 4 mm toughened glass (approx. 95% reflectivity), with ceramic pads bonded on the reverse side for installation. Weight: Approx. 115 kg for the ring profile and 1100 kg for the SunOyster incl. solar fluid.
- In the front and on both sides of the SunOyster each 4 standard PV modules, fixed at approx. 18° to the ground and tracking the sun together with the SunOyster from East to West, combined with an inverter. Weight: Approx. 1300 kg.

## Tracking: Two-axis in Azimuth and Elevation

Azimuth tracking  $\geq 350^\circ$  rotation angle; gear motor.

Elevation tracking working angle  $0^\circ$  to  $160^\circ$ ; individual drive system with worm gear for each mirror.

## Electric Properties of PV modules:

- 12 standard modules with size of approx. 1 m x 1.6 m each. See separate data sheet of the PV module. Minimum Power output at STC (1000 W/m<sup>2</sup> solar radiation /air mass 1.5 /temperature 25°C): 3 kWp.

## PV Inverter System

- PV-inverter ABB PVI-3.6-TL\_OUTD
- Efficiency (Euro): 96,0%
  - Grid connection type: AC Single Phase (L / N / PE);
  - Rated AC voltage: 230 V;
  - Rated output frequency: 50 Hz / 60 Hz;
  - Maximum external AC overcurrent protection: 25 A;
- Anti-islanding protection: According to local standards.

**Electric Interconnection:** Junction box with clamp terminals for the cable (wire size 2.5 mm<sup>2</sup>, 3 wires).

**The cables shall be guided to the center of the SunOyster and then shall have an additional length of 2 m.**

## 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 avg. (300 W peak).

**Data Interconnection:** Junction box with RJ45 ethernet port. **The data cables shall be positioned at the center of each SunOyster and have an additional cable length of 2 m.**

## Thermal Properties

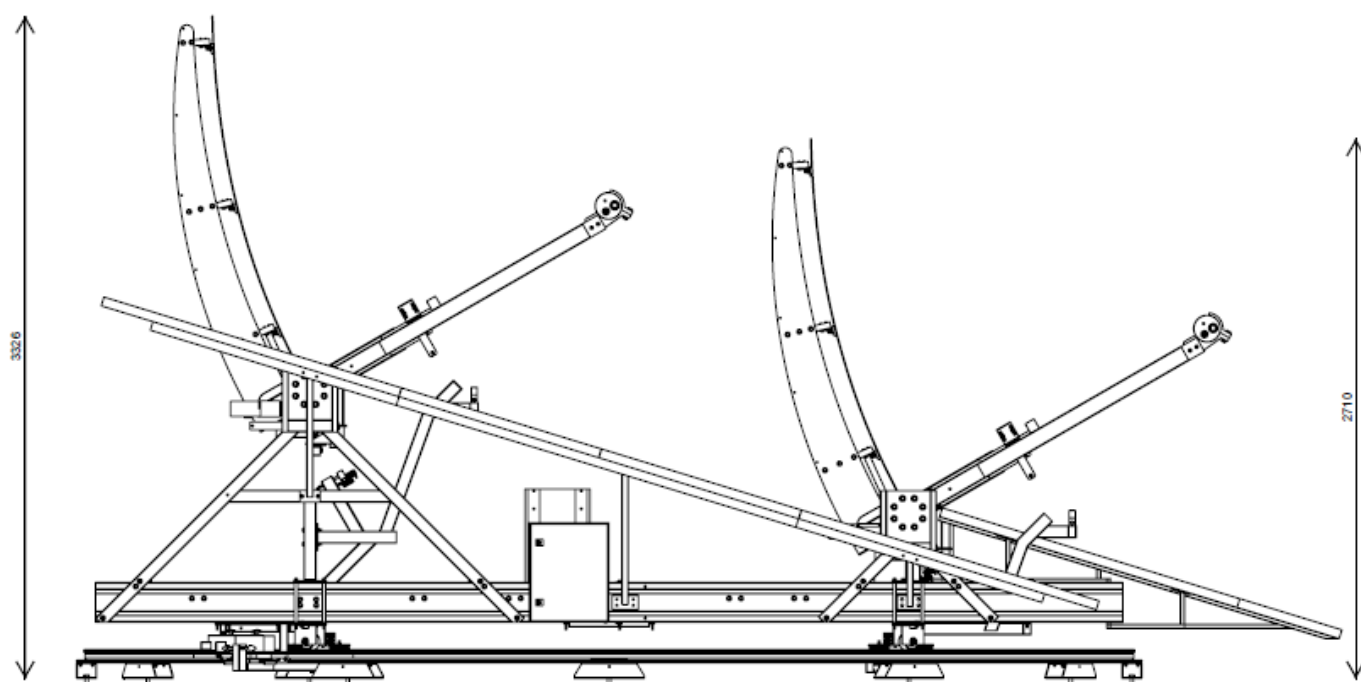
- Minimum power output at STC (1,000 W/m<sup>2</sup> solar radiation/air mass 1.5/ temperature 25°C): 12 kW.
- Heat transfer medium in areas without freezing temperatures: De-mineralized water. In other areas: solar fluid, i.e. water with glycol. Standard version max. temperature of working fluid: 105°C. High temperature version up to 170°C.
- System pressure: min. 3 bar (2 bar gauge pressure) and max. 7 bar (6 bar gauge pressure) 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.

**Thermal Interconnection:** Pipes for the hot fluid should be installed to within a distance of 1 m from the center of the SunOyster. Steel pipes are preferred. The pipes should have a minimum inner diameter of 25mm (1 inch) – preferably larger for long runs. The two ends should be 300 mm apart, and have a 1 inch external pipe thread.

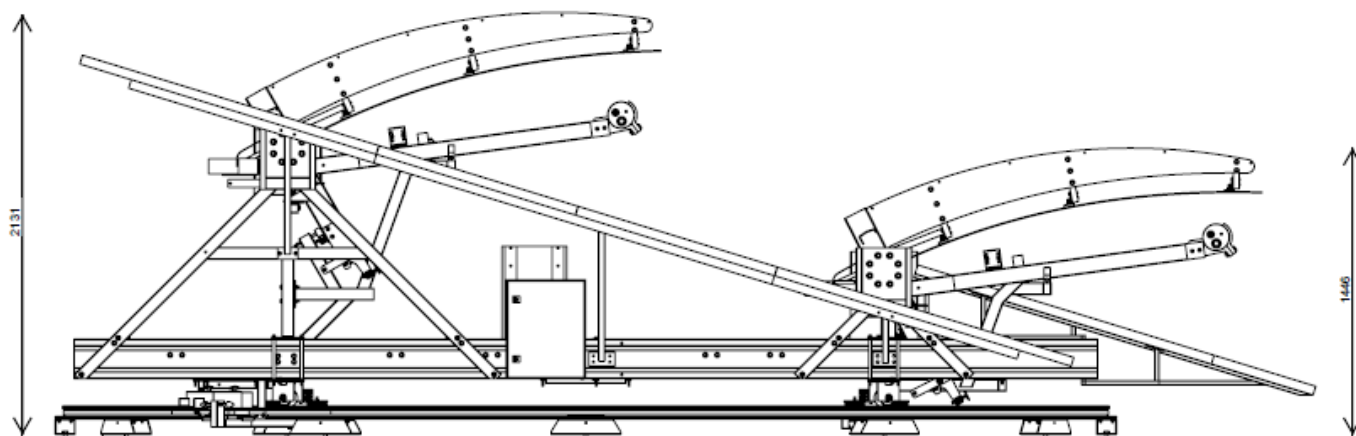
## Operational limits:

- Ambient Temperature range: -40°C to +50°C.
- Air humidity: 0-100%, condensing.
- Wind: normal operation: up to 55 km/h. In safety position :  $\geq 150$ km/h.
- Snow: German load zone 2.

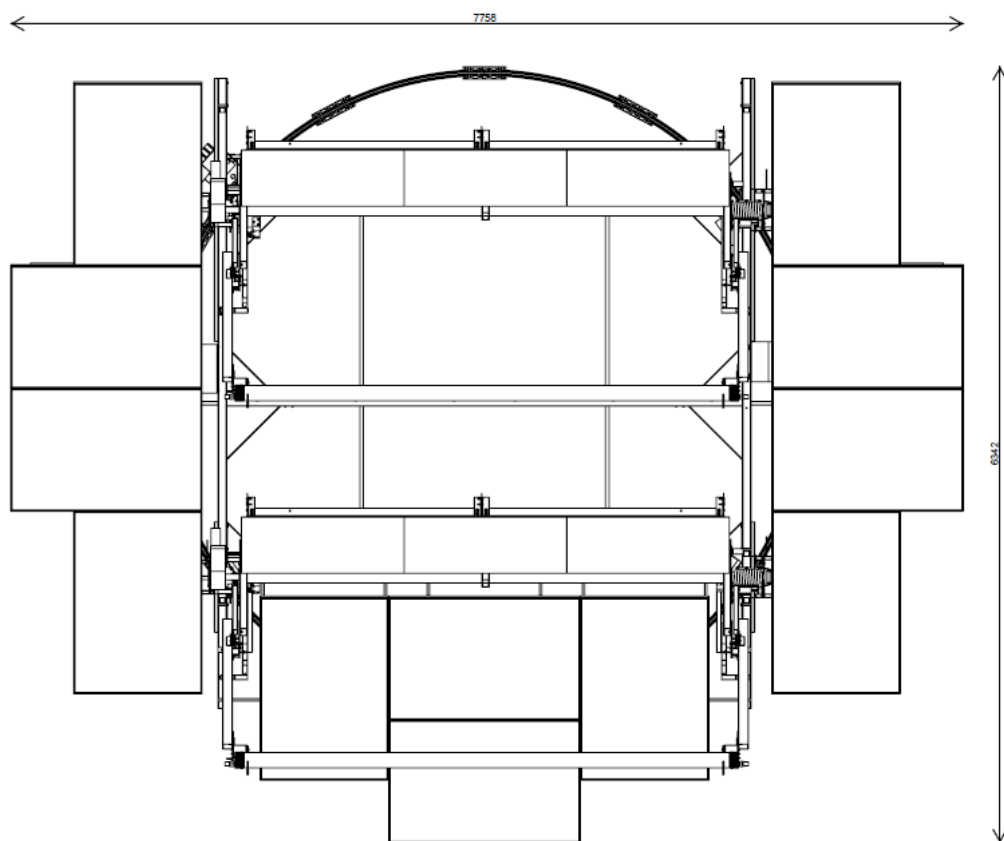
SunOyster 16 *pvplus* side view open:



SunOyster 16 *pvplus* side view closed:



SunOyster 16 pvplus top view open



SunOyster 16 pvplus top view closed

