

# CPV & CSP TWO AXES SOLAR TRACKER



# SENER HIGH ACCURACY

## SENER SOLAR TRACKER TECHNOLOGY

SENER is an expert in technological development and, in this sense, is capable of carrying out innovative made to order solutions and products.



**The key point of SENER's tracker is its high performance patented drive and its structure tailor-made design.**

SENER's tracker has been engineered for high pointing accuracy and large panel surface which makes it a reliable, low maintenance and high accuracy product specially developed for the demanding requirements of:

- High Concentration Photovoltaic (CPV)
- Concentrating Solar Power (CSP):  
Central Tower Receiver Heliostat and Stirling Dish.



PSA-CESA | Solar thermal central receiver

## SENER TWO AXES DRIVE

SENER's two axes drive is its own development of a two axes patented design focused on increasing tracking capabilities while reducing both manufacturing and maintenance costs.

Applying its expertise and know-how in high accuracy Actuation and Control Systems, SENER is able to produce a unique high performance drive in the market. Of late,

**SENER has designed a high profile drive that meets the demanding requirements of the CPV and CSP concentrating technologies:**

- High static and dynamic loads enable large panel surface and weight
- High pointing accuracy ( $0.05^\circ$ ), reliability and stiffness (backlash  $0.03^\circ$ )
- Single housing, compact design
- Long life time: 30 years (checked with accelerated life test)
- Low operation and maintenance cost
- Validated and installed technology
- Own manufacture under ISO 9001

**SENER's production ensures that the drive units are built under tight quality controls.**

The manufacture integrates the best in quality management, process control and testing to guarantee that each drive accomplishes the specifications.



# TWO AXES TRACKING SYSTEM

## TRACKER STRUCTURE

SENER's structures are designed to get maximum simplicity and optimum compromise between stiffness (and consequently performance) and cost.

Extensive research by our engineers has resulted in a tracker design capable of carrying **120m<sup>2</sup> CSP heliostat and PV flat panels, and 85m<sup>2</sup> CPV solar tracker**, which is possible thanks to the exceptional characteristics of SENER's drive.

On one hand, this large area covered maximizes the energy production and reduces the need of the number of solar trackers and heliostats, thus decreasing dramatically the plant's civil works, material and maintenance costs. On the other hand, **pointing accuracy is guaranteed even under strong wind conditions**, which is critical to the functionality of CSP and CPV.

SENER's structures are designed to minimize the field works, making easier the levelling of the CPV modules and the adjustment of the heliostat's reflecting surface shape, which is mandatory and has a great impact on installation costs and energy production.



## TRACKER CONTROLLER

The local control unit is based on microprocessor architecture and is designed for high precision, high dimension two axes solar trackers. The controller is based on a closed loop configuration that use ephemeris based algorithms a local solar sensor and central control plant commands, achieving 0.01° pointing accuracy. The control unit can be used for both local and remote control and configuration.

## SENER SOLAR TRACKER SPECIFICATIONS

SENER's solar tracker is an extra large high precision system designed to deliver the highest energy density enabling a total pointing accuracy. The system is the result of the optimization of the high performance drive and structure, stiffness, maintenance, maximum panel area and lowest cost.

### Main data:

Panel area: 85m<sup>2</sup> (CPV) - 120m<sup>2</sup> (heliostat)

Total pointing accuracy: 0.1°

Unloaded weight: 2000/2500 kg

Wind speed to stow condition: 10-12 m/s

Elevation range: 0°-90°; speed: 9°/min.

Azimuth range: 0°-350°; speed: 12°/min.



SENER is an engineering and technology group founded in 1956. With sales of € 311M and a workforce exceeding 2,000 professionals, the company is renown for its innovations, commitment to quality and independence, as well as for its projects in its four major business units.

SENER develops technology, design and construction services for the sectors of Power and Process, Aerospace, Civil and Architecture, and Marine. With offices in Spain, Portugal, Poland, Mexico, Argentina, United States of America, Algeria, Japan and Abu Dhabi, SENER covers a wide range of engineering needs worldwide.

Our facilities include 30,000m<sup>2</sup> of office space, production areas, integration and test departments, clean rooms and electronics laboratory.

## SENER PRODUCTS AND SERVICES

SENER commercializes its products and services regarding to our customers needs offering different product integration and scope of work. In this sense SENER provides for CPV and CSP heliostats and solar trackers:

- SENER two axes drive
- Electromechanical section: drive and local control unit
- Full solar tracker: structure, drive, local control unit and foundation
- Tailor-made structure design data sheets
- As an engineering company specialist in a broad range of disciplines we can also design a tailor made drive by demand, to meet our customers' specifications.



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