

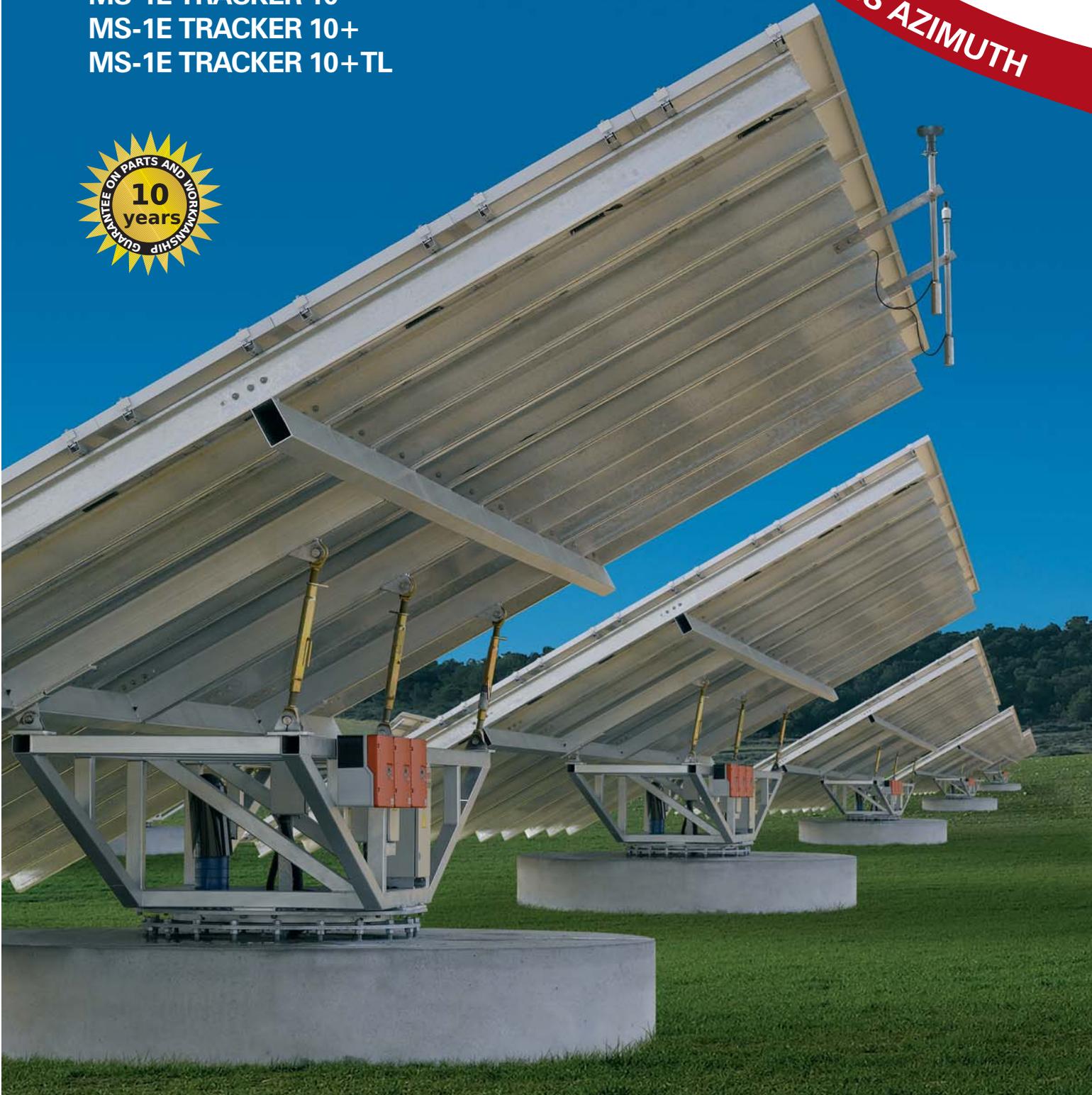


SEASONAL 1-AXIS AZIMUTH



High-Tech Solar Trackers

MS-1E TRACKER 10
MS-1E TRACKER 10+
MS-1E TRACKER 10+TL





Products and Services

mecasolar is a company dedicated to the **design, manufacture and distribution of state-of-the-art dual-axis solar tracking systems**, seasonal single-axis azimuth trackers and fixed structures, making it possible to increase photovoltaic solar energy production, offering a **10 year GUARANTEE on parts and workmanship**. World-leading **mecasolar** trackers and fixed structures are the securest, sturdiest, most efficient and profitable on the market.



MS-1E TRACKER 10

- Metal structure and grill for 12 kWp panels.
- Automatic tracking with PLC in a fully wired independent panel, including motor guards, PLC power supply, varistors, etc..
- Three-phase gear motor for azimuth axis.
- Hook-up connection cabinet for storing protectors.

MS-1E TRACKER 10+

- Metal structure and grill for 12 kWp panels.
- Automatic tracking with PLC in a fully wired independent panel, including motor guards, PLC power supply, varistors, etc..
- Three-phase gear motor for azimuth axis.
- Hook-up/connection cabinet for storing protectors (magnetothermic, differential, power surge protection), installed and fully wired.
- **Three 3.3 kWn single-phase SMA Sunny Boy SB3300 inverters for outdoor use, IP65.**

MS-1E TRACKER 10+TL

- Metal structure and grill for panels up to 12 kWp.
- Automatic tracking with PLC in a fully wired independent panel, including motor guards, PLC power supply, varistors, etc.
- Three-phase gear motor for azimuth axis.
- Hook-up/connection cabinet for storing protectors (magnetothermic, differential, power surge protection), installed and fully wired.
- **1 SMA Sunny Mini Central inverter SMC10000TL up to 10 kWn single-phase, no transformer, for outdoor use, IP65.**

mecasolar makes a clear **commitment to its customers**. With the aim of satisfying the various and diverse needs of our clients, we offer a series of **complementary services** for all tracking systems:

- **Management and support** for everything related to **construction project execution, low voltage, medium voltage and module and inverter configuration**, with our entire Engineering Department at your disposal.
- Adapting to project management needs as required by the customer. **We schedule tracker system deliveries** to our customers in a timely manner and **fully manage and coordinate the logistics**.
- **Adjusting the tracker system to fit customer power requirements for photovoltaic panels and inverters**. Additionally, we can install **the inverter** at the clients' request
- We provide electromechanical **corrective and preventative maintenance** yearly on the tracker systems based on the schedule and frequency defined by the client.



Production Capacity

mecasolar is a global company with the largest manufacturing capacity for trackers and fixed structures on the market. At present **manufacturing capacity amounts** to the equivalent of a monthly output of 14 MWp per month.

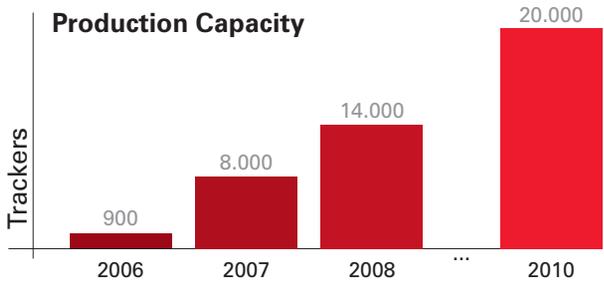
14,000 trackers/year

140 MW/year

At present we have factories at the following sites:

- Fustiñana - Sede Central - Navarra - SPAIN
- Tudela - Navarra - SPAIN
- Talavera la Real - Badajoz - SPAIN
- Tesalonica - GREECE
- ITALY
- USA

mecasolar holds at present the CE, ISO 9001:2000 and ISO 14001:2004 certifications, which makes it possible for it to achieve consistent, excellent fabrication quality with the best guarantees for our clients. Environmentally friendly and consistent with sustainable economic and social development. We also provide fast and flexible service. All components have been tested before being shipped to the client's construction site.

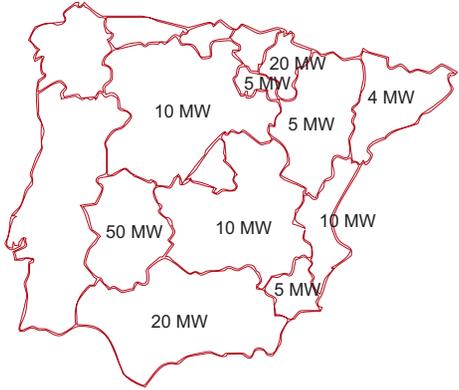


Experience

Some relevant projects:s relevantes:

- Almaraz-CACERES 20 MW
- Talayuela-CACERES 10 MW
- Aliwin-CACERES 20 MW
- Castejón-NAVARRA 5 MW
- Fustiñana-NAVARRA 5 MW
- Las Gabias-GRANADA 13 MW
- Aznalcollar-SEVILLA 2 MW
- La Roda -ALBACETE 2 MW
- La Gineta -ALBACETE 2 MW

180 MW installed



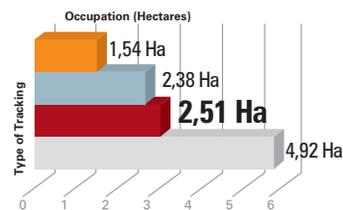
Engineering and/or supply services in the 2004-2008 portfolio

Advantages that make the difference

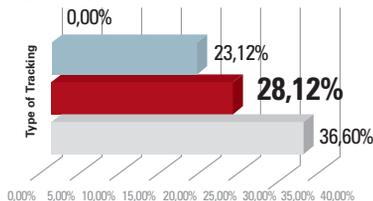


For 1 MW with 4% shading and a grill of 13.3 x 7 = 90m²

LAND OCCUPATION



PRODUCTION INCREASE WITH RESPECT TO FIXED STRUCTURE 30°-SOUTH



10-YEAR GUARANTEE ON PARTS AND WORKMANSHIP

mecasolar has designed a product that has been the subject of **many years of research**, that has been submitted to the **strictest resistance and efficiency tests**, obtaining as a result, the **UNIQUE solar tracker with the best GUARANTEES on the market**.

MULTI-POWER and MULTIPLE MANUFACTURER FLEXIBILITY

The design of the omega panel support structure provides the mecasolar tracker with incredible **FLEXIBILITY when it comes to installing different panels made by various manufacturers**. The system can handle a **maximum power of 12 kWp**.

MANUALLY ADJUSTABLE POLAR TILT

On the MS1E TRACKER the polar axis can be manually adjusted, adapting to the various seasons as established to maximize production. **Adjusted by a manual micrometric screw it enables the angle of the traditional 1-axis solar azimuth tracker to be tilted between 20° and 40° on the horizontal plane, thus increasing production by an additional 5% with regard to the traditional 1-axis azimuth tracker.**

MINIMUM LAND OCCUPATION

The plots occupied by the MS-1E TRACKER are **very similar to the plots occupied by the traditional NON-seasonal 1-axis solar tracker**, which results in a **greater return on investment**.

FOUNDATION

Foundation on surface footing - 6.3 m³ - that does not require any excavation. It is only necessary to clean off the terrain, removing the top layer of vegetation and levelling the ground.

OUTPUT / THREE PHASE CONNECTION

Each of the three phases is connected to each one of the **3 inverters**. This feature **reduces losses due to wiring** and provides a **more balanced power output**. Upon any damage in any of the 3 phases, **2/3 of the installation is still productive**.

ADAPTATION TO THE CLIMATE

The MECASOLAR 1-axis Azimuth seasonal tracker connects to a weather station which with the help of the PLC adapts it to wind speed. It places itself in the horizontal position at wind speeds exceeding 60 km / h through gear motor slipping. In this position it is capable of withstanding winds in excess of 140 km / h.

INDEPENDENT CONTROL

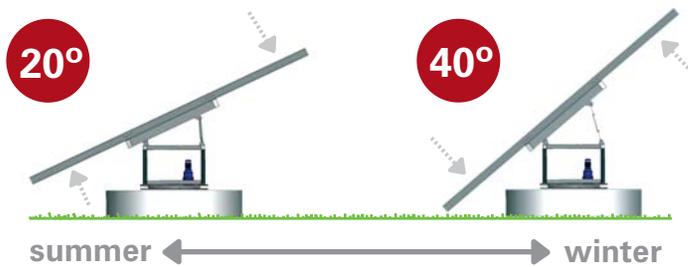
Each mecasolar solar tracker comes equipped with an **independent PLC controller**, which works to monitor solar movements, to handle the prevailing weather conditions and to perform remote operations.

STURDY, EASY TO INSTALL, REDUCED MAINTENANCE, AND LOW POWER USAGE

The mecasolar tracker motors **consume less energy per year (40 kWh/year)**, resulting in reduced **maintenance**. Likewise, the **robustness of their design and fabrication** guarantees the investment over the long term. Furthermore, the **easy installation reduces labour costs** and time spent on the construction project.



Seasonal Polar Axis



mecasolar Seasonal 1-Axis Azimuth trackers from MECASOLAR have a Polar Axis that can vary the tilting angle manually. **This variation in the tilt degree can range from 40°, ideal for the winter season to 20° for the summer season.** The required degree of tilt at any given moment can be made by the customer at any time of the year, **depending on the season of the year and latitude in which the facility is located.** The operation to change the angle of the Polar Axis takes 10 minutes.

Polar Angle Change from 20° to 40° in 10 min.



1. Disconnect central adjustment unit

Then disconnect central tensor

2. Fit jack

Mount the tilt angle change mechanical tool where the central tensor was, leaning it on the foundation base.

3. Disconnect the side adjustment unit

Remove the two side tensors by removing a bolt from each side tensor. The mechanical changing tool will support the entire weight of the structure.

4. Tilt Adjustment

Use the mechanical tool to modify the Polar Axis tilt angle between 20° -40° depending on the season of the year.

5. Readjust the side adjustment units

Adjust the side tensors again to the newly modified tilt angle and fit the bolts.

6. Disconnect jack

Disconnect the central mechanical support device, the structure is supported by the two side tensors with the lateral tilt angle changed.

7. Fitting the central adjustment unit

Disconnect the mechanical tool and proceed to replace the central tensor.

8. Tighten the counternuts

Tighten the counternuts of the three tensors, the central unit and the two sides.

Minimum Surface Area Occupied



For a 1 MW facility with a 4% shaded area the traditional 1-axis tracker occupies a surface area of 2.38 hectares. **The Seasonal 1-Axis Azimuth MS-1E TRACKER breaks all records in this aspect by occupying 2.51 Hectares for the same job.** Notably, the design of its grill at 7x13. 3 =93 m²-modular surface reduces the effect of shadows.

Maximum Production +28,12%

Seasonal 1-Axis Azimuth Trackers increase production by 5% in addition to what has already been increased by 1-Axis Traditional Trackers on the market. So if a Traditional 1-Axis tracker increases production compared to a fixed facility at 30° south-by 23,12%, the MECASOLAR MS-1E TRACKER gives at least 5% more, **increasing production by 28,12 % with respect to a facility under the same conditions at 30° South**, just by subjecting the plant to two tilting changes (summer-winter).

Notably, **this increase of 28.12 % comes close to the 36.6% increase that the same 2-axis MECASOLAR tracker facility would have.**

Technical Specifications

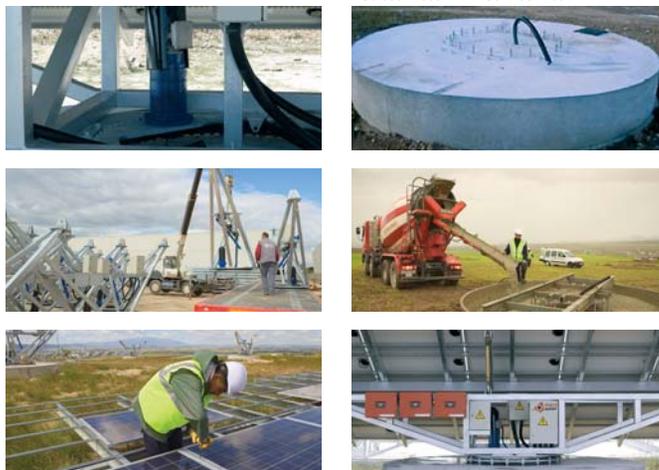
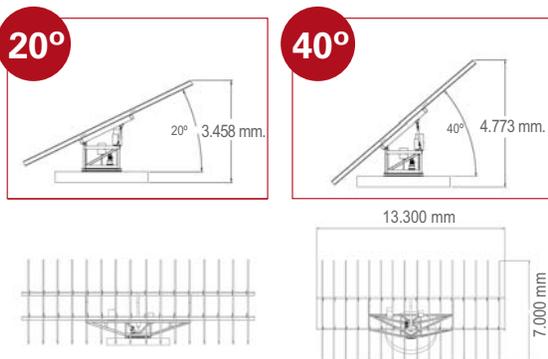


MS-1E TRACKER 10 MS-1E TRACKER 10+ MS-1E TRACKER 10+TL

Tracker axis	1-AXIS: Azimuth (vertical)
Module maximum surface	93 m ²
Grill sizes	13300mm. x 7000mm.
Maximum Photovoltaic Power	12 kWp (depending on the efficiency of the modules)
Azimuth drive	By gear motor and cogged crown wheel
Azimuth rotation angle	Vertical axis: -120 ° to +120 °
Tilt Actuator	Manual micrometric screw
Polar axis tilt	Adjustable from 20 ° to 40 °
Motor consumption	40 kWh / year
Motor operating voltage	400 V Three-phase
Structure	Hot dipped galvanized steel structure
Structure design	Base structure on cogged crown wheel
Weight without modules, and without foundation	2000 kg
Electrical cabinets and PLC Protection	Metal, weathertight, fully wired IP66. Includes PLC, wired to motor and protection
Electrical supply cabinet	Metal, weathertight, fully wired IP66. Includes AC overvoltage protection, PIAs and differential (only for MS-1E TRACKER 10)

Tracking technology	Independent Astronomical programming of PLC
Monitoring	On-site, Ethernet, Internet (OPTIONAL)
Inverters	3 SMA SB 3300 invertors 3.3 KW nominal, IP65 (only for MS-1E TRACKER 10) Possibility of other inverters
Modules to be installed	Any type of PV modules Module holder profile not required
Maximum weight of modules	1250 Kg
Wind protection system	Horizontal positioning at speeds above 60 km / h (by gear motor sliding)
Foundation	Circular surface footing, 6.3 m ³ concrete with mesh. Optional anchor bolts, direct bolt anchoring
Complies with	UNE-ENV 1991 Eurocode DIN 1055-4 (8.86), DIN 1056 (10.84)
Maximum winds	140 Km / h
Maintenance	Annual revision of electrical and mechanical parts to maintain the lifetime warranty
Guarantee	Up to 10 years on Parts and labour.
Height of the tracker at 25 °	3735 mm. (from ground to end of purlin)
Height of the tracker at 30 °	4052 mm. (from ground to end of purlin)
Height of the tracker at 35 °	4350 mm. (from ground to end of purlin)
Height of the tracker at 40 °	4626 mm. (from ground to end of purlin)

Structure diagram



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