

High-Tech Solar Trackers

MS-1E TRACKER 15
MS-1E TRACKER 15+
MS-1E TRACKER 15+HE



meca
solar

Exclusive distributor
PROINSO



1-AXIS



NEW PRODUCT
OCTOBER 2010



Products and Services

mecasolar is a company dedicated to the **design, manufacture and distribution by PROINSO of state-of-the-art 2-axis solar tracking systems**, seasonal 1-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 15

- Metal structure and grill for 15.36 kWp (Fifty-six 240 Wp modules) 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 15+

- Metal structure and grill for 15.36 kWp (Fifty-six 240 Wp modules) 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.
- **Two 6.0 kWn single-phase SMA Sunny Boy SB6000 inverters for outdoor use, IP65.**

MS-1E TRACKER 15+HE

- Metal structure and grill for panels up to 15.36 kWp (Fifty-six 240 Wp modules).
- 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 high efficiency reduced cost/Wp ratio SMA SC 500HE for 50 trackers. IP 65 Outdoor.**

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

mecasolar holds at present the CE, ISO 9001:2008 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.



ISO 9001:2008

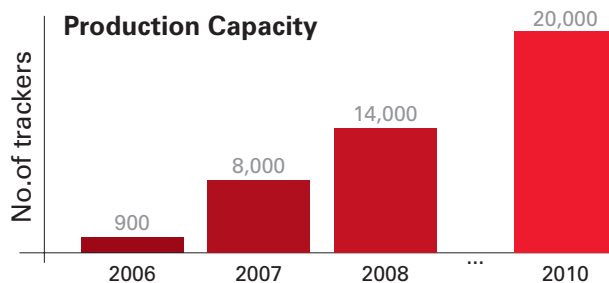


ISO 14001:2004

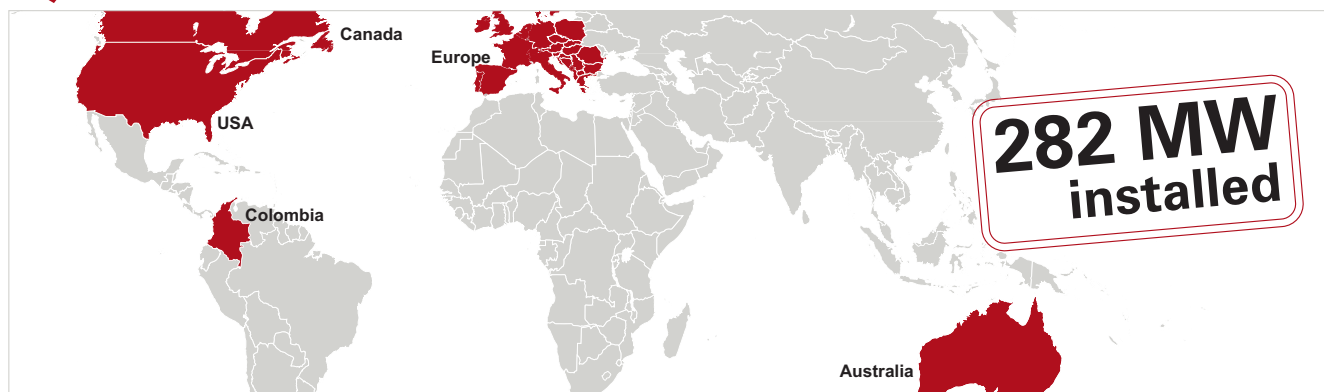


At present we have factories at the following sites:

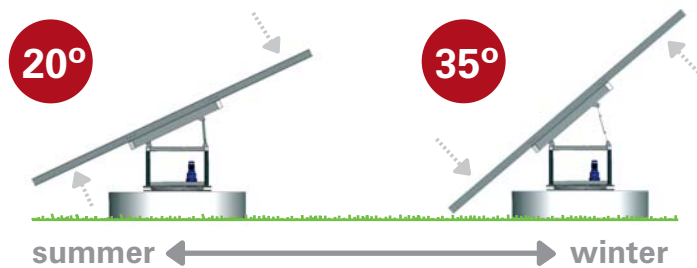
- Fustiñana - Sede Central - Navarra - SPAIN
- Tesalonica - GREECE
- Milan - ITALY
- West Sacramento - USA



Experience



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 35°, 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 35° 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° - 45° 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 counter-nuts**
Tighten the counter-nuts of the three tensors, the central unit and the two sides.

Minimum Surface Area Occupied

6 Acre/MW (2,45 Ha/MW)

For a 1 MW facility with a 4% shaded area the traditional 1-axis tracker occupies a surface area of 5.88 Acre (2.38 Ha). **The Seasonal 1-Axis Azimuth MS-1E TRACKER breaks all records in this aspect by occupying 6Acre (2,45 Hectares) for the same job.**

Notably, the design of its grill at $26 \times 43.5 = 1140.5$ square feet ($8 \times 13.3 = 106 \text{ m}^2$) -modular surface reduces the effect of shadows.

Maximum Production +28,12%

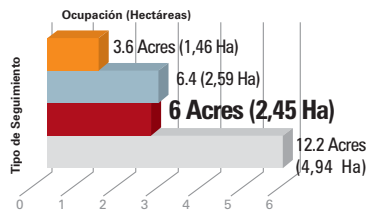
Seasonal 1-Axis Azimuth Trackers increase production by 5% in addition to what has already been increased by 1-Axis Traditional Trackers on the market. So if a Traditional 1-Axis tracker increases production compared to a fixed facility at 30° south-by 23.12%, the **mecasolar MS-1E TRACKER** gives at 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.**

Advantages that make the difference

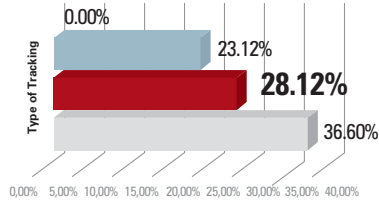


For 1 MW with 3% shading and a grill of 26 feet x 43.5 feet = 1140 square feet (13,3 m x 8m = 106 m²)

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 15,36 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 35° 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 -13 cubic yards- 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 is connected to a weather station so the PLC provided with an own algorithm, helps the tracker to protect itself from the wind. It places itself in the same direction of the wind, when the windspeed exceeds 45 mph (75 km/h) through gear motor slipping. In this position it is capable of withstanding winds in excess of 87 mph (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.



Technical Specifications

MS-1E TRACKER 15 MS-1E TRACKER 15+ MS-1E TRACKER 15+HE

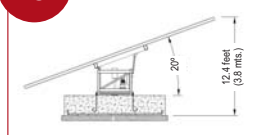


Tracker axis	1-AXIS: Azimuth (vertical)
Module maximum surface	1140 square feet (106m ²)
Grill sizes	43.5 feet x 26 feet (13,3 mts. x 8 mts.)
Maximum Photovoltaic Power	15,36 kWp (depending on the efficiency of the modules)
Azimuth drive	By gear motor and cogged crown wheel
Azimuth rotation angle	Vertical axis: -120 ° to +120 °
Tilt Actuator	Manual micrometric screw
Polar axis tilt	Adjustable from 20 ° to 35 °
Motor consumption	40 kWh / year
Motor operating voltage	380 V Three-phase
Structure	Hot dipped galvanized steel structure
Structure design	Base structure on cogged crown wheel
Weight without modules, and without foundation	4630 lb (2.100kg)
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+)

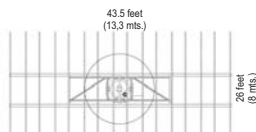
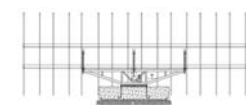
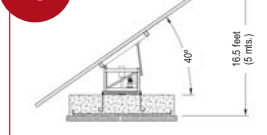
Tracking technology	Independent Astronomical programming of PLC
Monitoring	On-site, Ethernet, Internet (OPTIONAL)
Inverters	2 SMA SB 6000 inverters 6.0 kWn IP65 1 SC 500 HE for 50 trackers and others combination
Modules to be installed	Any type of PV modules Module holder profile not required
Maximum weight of modules	3307 lb (1.500 kg)
Wind protection system	Weather vane position at speeds greater than 60km/h
Foundation	Circular surface footing, 13 cubic yards (10m ³) concrete with mesh. Optional anchor bolts, direct bolt anchoring
Complies with	Actions on the structure: Eurocode 1, state regulations, ASCE-7 05. Steel structure: Eurocode 3 and LRFD (13th). Combination of actions: Eurocode 0 (national annexes), State regulations, ASCE-7 05
Maximum winds	87 mph (140 km/h)
Maintenance	Annual revision of electrical and mechanical parts to maintain the lifetime warranty
Guarantee	5 or 10 year (OPTIONAL)
Height of the tracker at 20 °	12.4 feet (3,8 mts.) (from ground to end of purlin)
Height of the tracker at 25 °	13.5 feet (4,1 mts.) (from ground to end of purlin)
Height of the tracker at 30 °	14.6 feet (4,4 mts.) (from ground to end of purlin)
Height of the tracker at 35 °	15.6 feet (4,7 mts.) (from ground to end of purlin)
Height of the tracker at 40 °	16.5 feet (5,0 mts.) (from ground to end of purlin)

Structure diagram

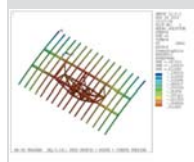
20°



40°



Checking of 1-axis tracker using finite element programme



Exclusive distributor

PROINSO

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