

MODEL SunTracker-3000

VERY PRECISE SOLAR TRACKING

**FOR THE AUTOMATIC MEASUREMENT OF THE DIRECT AND
DIFFUSE SOLAR RADIATION**



- **VERY HIGH ACCURACY**
- **INTEGRATED GPS**
- **POSITIONING CONTROL AND REMOTE COMMUNICATIONS BY ASSOCIATED DATA LOGGER**
- **REMOTELY CONTROLLED**
- **FULLY AUTOMATIC**
- **UNATTENDED OPERATION**
- **OPTIMISED POWER REQUIREMENTS OF LESS THAN 3 WATTS**
- **AUTOMATIC OPERATING DIAGNOSIS**

DESCRIPTION

Model **SunTracker-3000** is a two axis fully automatic solar tracker, to align solar radiation instruments with the normal incidence of the sun, from any position on the earth's surface.

Includes a two axis mechanical device with two stepping motors, controlled by an electronic module combined with our Data Logger Model METEODATA. Tracking control is carried out by an astronomical algorithm calculated by the data logger, having the possibility of integrating an optional GPS receiver for ensuring a very precise clock synchronization.

This new design has a fundamental advantage versus other solar trackers regarding the energy consumption, as it requires less than 3 watts from the battery of the data logger. So a single 75 W solar panel will be enough for powering both, the solar tracker and the data logger, avoiding the need of having 110/220VAC on the site.

The **SunTracker-3000** allows to mount one or two pyrheliometers for the measurement of the direct solar radiation, as well as one or two pyranometers with an optional support and shading assembly, for the measurement of both global and diffuse radiation.

The operation of the **SunTracker-3000** in association with the METEODATA logger allows to profit all the unique advantages offered by our versatile unit, as indicated below.

MAIN FEATURES

- Unattended and automatic operation.
- Remote control of the solar tracker by means of the same communications network used with the data logger (GSM/GPRS, 3G, satellite, Wi-Fi, WiMax, etc.).
- Automatic transmission of SMS alarm messages in case of low battery or vandalism (GSM/GPRS optional modem is required for the logger).
- Real-time calculation of the sun elevation and azimuth with absolute positioning each second.
- Clock synchronization via Internet time base or by an optional GPS receiver integrated with the data logger.
- Continuous recording in the logger of the sun elevation and azimuth. This allows to correlate at any moment the direct solar radiation measurements with the sun position for subsequent data validation.
- Automatic and continuous diagnosis of the correct operation of the two stepping motors, in such a way that, in case of accidental error, a SMS alarm message will be sent.
- Very low power consumption of less than 3 watts. This allows the logger to power also the solar tracker using a little solar panel for recharging its internal battery (mains is not necessary on the site)



SunTracker-3000

TECHNICAL SPECIFICATIONS

Control module	External, with RS485 interface
Data logger communications	RS232/422/485, Ethernet, etc.
Clock synchronization	By Internet time base or GPS receiver, via the data logger
Pointing accuracy	<0.1° passive tracking <0.02° active tracking (with optional sun sensor)
Mechanical transmission	Precision Machined Worm and gear
Torque	35 Nm
Payload	30 kg
Angular velocity	9.4°/second
Supply voltage	12 VDC
Power required	Less than 3 watts
Environmental	Temperature range -20 to +60°C Rel. Humidity range 0-100%
Mounting base	Tripod with two spirit levels
Materials	Rust Proof Cast aluminium housing. AISI 304 Stainless steel worm and bronze gear
Weight	25 Kg
Dimensions	460x490x490 mm (HxWxD)

TYPICAL SOLAR MONITORING CONFIGURATIONS

- Model SunTracker-3000
- METEODATA logger/controller with GPRS optional modem
- One or two Pyrheliometers for direct radiation measurement
- One or two Pyranometers with optional shading assembly and support for global and diffuse radiation measurements.



LOCAL AND REMOTE CONTROL FUNCTIONS

The Control Functions for the SunTracker-3000 made locally or remotely from the GEO-DRC Data Receiving Center are indicated as follows:

1. Automatic Axis Calibration at any time.
2. Change of geographical coordinates.
3. Fine Tune of the azimuth and elevation axis alignment.
4. Activate / Deactivate solar radiation measurements during start-up and maintenance operations.
5. Date and time synchronisation.
6. Diagnostic Alarm Threshold setting

AUTOMATIC DIAGNOSIS AND ALARMS (ADAS-3000)

The marriage of the Data Logger METEODATA-3000 and the SunTracker-3000 working together, is a unique and exclusive symbiosis solution, which allows to profit all the functionalities of the optional Automatic Diagnosis and Alarm Software (ADAS-3000 option).

The ADAS-3000 software installed at the data logger, is monitoring in real-time the measured values of the main three solar irradiance parameters (DNI, GHI and DIFF), supervising also the results of the local running algorithms that are in charge of the SunTracker operation.

The monitored solar radiation sensors and local running algorithms at the data logger are :

1. Global, Diffuse and Direct solar radiation sensors readings.
2. Accurate GPS fixes.
3. Astronomical sun tracking algorithm.
4. Digital Signal Processing Functions.

The ADAS-3000 determines automatically the "coherence" of the three measured parameters : DNI, GHI and Diffuse values, as a function of the Sun position at any moment, obtained by the data logger from the astronomical algorithm used for controlling the automatic tracking. If the ADAS-3000 detects any inconsistency or lack of coherence between the measured values of these three parameters, an alarm condition is automatically generated.

This alarm can be generated by any of the following circumstances :

- Dirt deposition in the domes of the Pyranometers or in the glass filters of the Pyrheliometers.
- Degradation of the solar sensors or incorrect calibration constant.
- Wrong leveling of the sun tracker.
- Misalignment of the Pyrheliometer mounted on the sun tracker
- Incorrect operation of the Astronomical algorithm

These alarms are automatically sent by SMS (up to 5 different users) or by TCP/IP (to a Data Receiving Center) to warn the user about the low data quality being recorded at the site.

The alarm status is also recorded at the alarm channel of the data logger as the rest of historical data.

It is important to mention that minor and even large differences between the actual measurements of any of these three solar irradiance parameters and their real values (correct values), due to any of the reasons indicated before, will not be detected in any manner without our unique automatic diagnosis carried out by the ADAS-3000.

PHOTO GALLERY

