

MINITRAK™

SOLAR TRACKER

The MiniTrak™ solar tracker is the most cost effective autonomous two-axis radiometer tracking platform on the market bar none. With mounting accommodation for up to 10 normal incidence pyrheliometers and/or multiple normal incidence mounted pyranometers and one global horizontal diffuse (shaded) pyranometer, the MiniTrak™ is ideally suited to meet virtually any solar monitoring application requirement.

The MiniTrak™ was developed by Precision Solar Technologies Corp. (PST) in cooperation with engineers at Sandia National Laboratories, to provide an accurate, durable and cost effective autonomous solar tracking solution for the solar renewable and climate monitoring research communities. Costing thousands less than competing radiometer tracker models, the MiniTrak™ offers the greatest DNI pyrheliometer mounting capacity in the industry; up to 10 Hukseflux DR01 model pyrheliometers can be mounted 'standard'. In addition to pyrheliometer mounting, the MiniTrak™ can also accommodate the mounting of any Hukseflux model pyranometer in either the global horizontal or POA (plane of array) mode. When properly equipped the MiniTrak™ is suitable for:

- ▶ Normal incidence direct solar irradiance measurement
- ▶ Global solar irradiance measurement (horizontal)
- ▶ Global diffuse irradiance measurement (horizontal)
- ▶ Global solar irradiance measurement (POA)
- ▶ Global diffuse irradiance measurement (POA)

FEATURES

- ▶ Precision reflective optical alignment pointer
- ▶ Integrated 20 Watt PV rechargeable battery system
- ▶ Embedded system controller (no host PC required)
- ▶ Shading options for horizontal and/or POA mounted pyranometers (diffuse)

"Due to its extraordinary value, application flexibility and reliability, the MiniTrak has been sold to universities, government laboratories and industry Worldwide."

APPLICATIONS

- ▶ Solar renewable resource assessment
- ▶ Climate research
- ▶ Material testing /weathering studies

Note: Above applications are inclusive of, but not limited to the MiniTrak's entire application range.



MINITRAK™ SPECIFICATIONS

Tracking mode:	via celestial calculation algorithm
Positioning accuracy:	±0.25° (4 mrad) min.
Velocity:	1.8° / sec
Acceleration:	3.9° / sec ²
Torque:	15 Nm / 11 ft-lbs (azimuth) 136 Nm / 100 ft-lbs (zenith)
Payload (balanced):	32kg (70 lbs)
Altitude:	any altitude
Rotation limit (azimuth):	270° degrees (standard)
Elevation limit (zenith):	90° degrees (standard)
Operating temperature:	-40° to +80° C
Weight (uncrated):	34 kg / 75 lbs (tracking platform) 34 kg / 75 lbs (controller / battery)
Clock accuracy:	± 15 sec / year (after calibration) onboard battery backup GPS clock synch optional available
PC connectivity:	RS232C Fiber optic COMM available
Interface software:	NI LabVIEW
PV charging system:	20 Watt PV panel (standard) 24 VDC / 35 amp hour battery
Mounting:	pole mount, 3" inch diameter
Ground clearance:	18" inches min., or >
Radius clearance:	36" inches min.

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Thermal Sensors

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▲ Figure 1: PST Prospector™ system with MiniTrak™ and fully integrated turnkey weather monitoring station

▲ Figure 2: SolarTrak® electronics controller and battery box enclosures

▲ Figure 3: Precision reflective optical alignment pointer

SCALABILITY

Depending on the application requirement, the MiniTrak™ can be optioned with a single pyrheliometer, or fully equipped to measure all constituent global solar irradiance components in the horizontal and/or POA modes. Such system scalability offers maximum application potential, particularly for the solar renewable resource assessment community, where technology and mounting orientation with respect to the Sun are often quite varied. A 'PV Rack' option is also available for the MiniTrak™, permitting the mounting and real-world efficiency testing of user supplied PV panels (to one square meter) in the standard two-axis tracking mode (normal incidence), single axis mode (azimuth tracking only), or fixed angle stationary mode.

PERFORMANCE

When properly installed and maintained, the MiniTrak™ will accurately point and consistently maintain any DNI mounted radiometer to within $\pm 0.25^\circ$ of the Sun; this represents an order of magnitude 2 times greater than is actually required for a 'First Class' pyrheliometer. The key to the MiniTrak's positioning accuracy is the PST embedded SolarTrak® control electronics, which calculates the bearing of the Sun to within $\pm 0.01^\circ$. The MiniTrak™ system clock maintains an outstanding accuracy to within ± 15 seconds per year, thus greatly reducing the need for regular routine maintenance.



RELIABILITY

Unlike grid connected tracking systems, which are subject to AC line transient effects, brownouts and blackouts, the MiniTrak™ draws power from its own integrated solar PV rechargeable DC battery system. So reliable is the MiniTrak™, PST offers an unprecedented 5-year warranty 'standard' on parts and labor. The MiniTrak's internal system power can also be used to power a data logger, or active sensors requiring DC power.



◀ MiniTrak™ with PV Test Rack option