HYTOP

HYTOP SOLAR ENERGY SOLUTIONS

HYTOP

Comprehensive Meteorological & Environmental Monitoring Product Guide



Web:
www.bjsayr.com

Email:
office@bjsayr.com

Phone:
18611489358

Address:
Rm 906, Bldg B, Huayuan,
Tongzhou, BJ

HYTOP

BRAND VISION & INTRODUCTION

HOW HYTOP SOLAR ENERGY SOLUTIONS ARE ADVANCING RENEWABLE ENERGY

AN UNRIVALED RESOURCE

Humans have used the sun's energy for thousands of years, but we have only recently developed solar technologies efficient enough to replace fossil fuels. This energy evolution is one of humankind's most important priorities, and it is ongoing today.

Solar energy is becoming increasingly competitive and efficient. However, for it to reach its full potential and create significant societal change, solar stakeholders require powerful insights from fully integrated, highly accurate meteorological and environmental monitoring solutions. Those insights and solutions come from **HYTOP.**



MONITORING EQUIPMENT

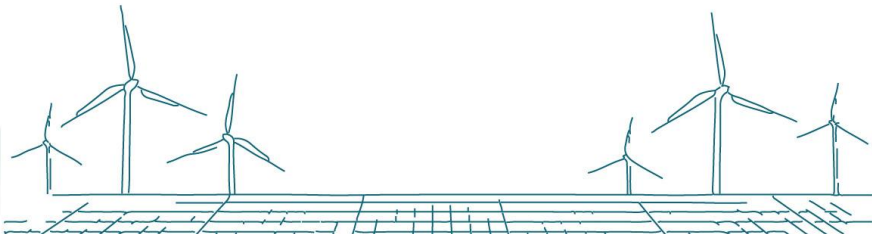
RELIABLE DATA

METEOROLOGICAL DATA

EMPOWERING YOUR SOLAR VISION

HYTOP is dedicated to providing high-precision, all-weather meteorological and environmental monitoring equipment. Our solutions not only ensure data security, stability, and efficiency but also empower users to obtain reliable solar radiation and meteorological data even under extreme environmental conditions. From resource assessment to operational forecasting, our technology serves as the foundation for bankable solar investments.

Our comprehensive suite of measurement technologies is designed to meet the most stringent international standards, including ISO 9060:2018 Class A and IEC 61724-1:2021, ensuring that your data is traceable, verifiable, and highly accurate.



HIGH-END PV WEATHER STATION (AWS810-SE)

COMPLETE METEOROLOGICAL MEASUREMENT SUITE

Measurement of GHl, GTI, Albedo, PV panel temperature, PV soiling ratio, Wind speed &direction, Air temperature, Air humidity, Air pressure, and rainfall.

OVERVIEW

The **AWS810-SE** high-end PV weather stations integrate weather sensing, data collection,and transmission. Featuring both local data storage and cloud data storage, the system guarantees data security, stability, and efficiency. Users can access real-time data and tailored analytical services through dedicated software. This station is an Internet ofThings (loT) weather station specifically engineered for photovoltaic power stations.



The system accommodates comprehensive measurement parameters essential for solar energy production. The stations effectively serve critical operational and analytical requirements of solar power plants, including:

- **Resource evaluation and investment estimation**
- **Power forecasting and performance modeling**
- **Operation and maintenance (O&M) monitoring**
- **Power trading and grid compliance reporting**

CORE ADVANTAGES

- **High Precision & Reliability:** Delivers stable, research-grade performance under varying field conditions.
- **Integrated System Design:** Built-in data acquisition with versatile wired or wireless data transmission options.
- **Flexible Storage Solutions:** Dual-mode optional local and cloud data storage for redundancy.
- **Streamlined O&M:** Engineered for intuitive operation and simple routine maintenance.



OVERVIEW

The **ZT Solar Monitoring** Station adopts an integrated design to achieve highly cost-effective, simultaneous monitoring of key solar radiation parameters:

- Global Horizontal Irradiance (GHI)
- Diffuse Horizontal Irradiance (DHI)
- Direct Normal Irradiance (DNI)
- Sunshine Duration

It is widely utilized in solar energy resource assessment, PV plant operation and maintenance, power generation forecasting, meteorology, and environmental monitoring applications.

ZT SOLAR MONITORING STATION

INTEGRATED QUAD-PARAMETER RADIATION MONITORING

All-in-one GHI, DNI, DHI, and Sunshine Duration Measurements

Depending on specific project requirements, the system can be expanded with dust sensors and atmospheric environment monitors to achieve synchronous tracking of soiling ratio, ambient temperature, pressure, wind speed, wind direction, and precipitation.

CORE ADVANTAGES



- **Cost-Effective Efficiency**: Comprehensive observation of GHI, DNI, DHI, and sunshine duration in a unified platform.
- **High Accuracy & Fast Response:** Delivers swift response times and accurate data capture across varying conditions.
- **Long-Term Stability:** Optimized for low power consumption and sustained operational life.
- **Compact Deployment:** Small footprint, light weight, and straightforward installation

HIGH-END SOLAR MONITO-RING STATION (ZTR-8)



RESEARCH-GRADE PRECISION SOLAR STATION

High-accuracy measurement of GHI, DNI, DHI, Sunshine Duration, and environmental parameters.

OVERVIEW

The High-end Solar Monitoring Station (ZTR-8) is designed in strict compliance with the **Baseline Surface Radiation Network (BSRN)** standards under the World Climate Research Programme (WCRP) of the World Meteorological Organization (WMO).

It incorporates a high-precision dual-axis solar tracking system **(ZTT-31 series)**, ISO 9060:2018 Class A pyranometers (HYT-SG60 series), and pyrheliometers (ZTZ-7 series). It can be configured with specialized ventilation and heating units (ZTV-2 series) for radiation sensors to ensure uninterrupted high accuracy in extreme operational environments.

This system delivers bankable solar radiation data, making it ideal for meteorological research, high-precision solar energy assessment, and climate monitoring.

KEY FEATURES & SYSTEM CAPABILITIES

- **ISO Class A Instrumentation:** Equipped with **ISO 9060:2018 Class A** highprecision radiation sensors.
- **High-Accuracy Solar Tracking:** Features a 4-quadrant precision sun sensor with dual-axis fully automatic tracking ($<0.01^\circ$ accuracy).
- **Automatic Positioning:** Built-in BeiDou/GPS dual-mode positioning sensor for realtime location coordinate acquisition and microsecond time synchronization.
- **Versatile Modular Design:** Configurable hardware architecture supporting flexible sensor expansion.
- **Low Maintenance:**Engineered for low power consumption and extended maintenance-free operation.
- **High Environmental Adaptability:** All-weather resistant housing for reliable operation from extreme cold to high heat sensor expansion.

ALL-SKY CAMERA SKYCAM4D

09

DAYTIME CLOUD COVER & ATMOSPHERIC IMAGING

Automatically records cloud shape and coverage during daytime for weather and solar power forecasting.

OVERVIEW

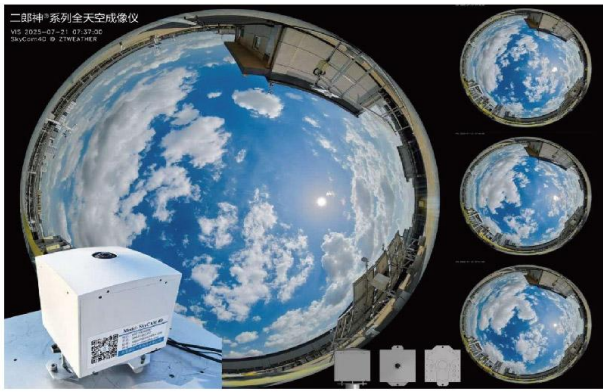
The **ERLANGSHEN® series SkyCam4D** is a cost-effective, visible-spectrum allsky camera designed for daytime cloud cover detection. Featuring a full 180° field of view and an image resolution exceeding 3000x3000 pixels, it provides essential observational data for meteorology, solar energy assessment, photovoltaic power prediction, architectural lighting design, and satellite data validation.

SYSTEM FEATURES

- **All-Solid-State Architecture:**Unobstructed design supporting robust, all-weather continuous operation.
- **Embedded Computing Host:** Built-in processing system eliminates the need for external workstation installations.
- **Automated Cloud Analytics:** Integrated automatic cloud cover observation and analysis software suite.
- **End-to-End Image Processing:**Automated cloud image acquisition, image processing, and cloud fraction analysis.
- **Smart Operations:** Automatic exposure control, remote command/control, and automated cloud data uploading.
- **Interactive UI:** Intuitive visual web-based interactive management interface.
- **High-Capacity Storage:**Integrated host data storage with automated backup capabilities.







HYTOP

PYRANOMETER (HYT-SG60)

ISO 9060:2018 CLASS A FAST RESPONSE PYRANOMETER

Measurement of GHI, GTI, DHI, and Albedo.

OVERVIEW

The **HYT-SG60 pyranometer** is a high-precision thermopile radiometer designed for measuring hemispheric short-wave irradiance on the earth's surface (Radiant flux, W/m^2). It fully complies with the **ISO 9060:2018 "Fast response and spectrally flat pyranometer with Class A"** standard and maintains direct traceability to the World Radiometric Reference (WRR) at the World Radiation Center (WRC) in Davos.

The HYT-SG60 is ideal for scientific research, meteorological monitoring networks, and performance monitoring/power prediction in utility-scale photovoltaic plants.



PERFORMANCE HIGHLIGHTS

- **Ultra-Fast Response:** Response time under **0.5 seconds** ($<0.5s @ 95%$).
- **Exceptional Long-Term Stability:**Non-stability rating of **$< 0.5%$ over 5 years.**
- **High Cost-Effectiveness:** High-end Class A performance with optimized total cost of ownership.

TECHNICAL DATA

Technical specifications	HYT-SG60	ISO9060-2018: Class A
Measuring principle	thermopile	-
Measurement range	0~4000 W/m²	-
Response time (95%)	< 0.5s	< 10s
Zero offset A (200W/m²)	< 2W/m²	< 7W/m²
Zero offset B (5K/hr)	< 2W/m²	< 2W/m²
Total zero offset	< 2W/m²	< 10W/m²
Non-stability	< 0.5%/3-5year	< 0.8%/year
Nonlinearity (1000W/m²)	< 0.2%	< 0.5%
Directional response (1000W/m²)	< 10W/m²	< 10W/m²
Temperature response (-10 to +40°C)	< 1%	< 1%
Tilt response (1000W/m²)	< 0.2%	< 0.5%
Spectral error	0.5%	0.5%
Sensitivity	7 to 20μV/W/m²	NA
Wavelength range	285~3000nm	-
Operating/storage temperature range	-40 to +80℃	-
Humidity range (non-condensing)	0 to 100 % RH	-
Ingress Protection (IP)	IP67	-
Dimension	Φ 118mm×H82mm	-
Weight	~289g	-

PYRHELIOMETER ZTZ-7

DIRECT NORMAL IRRADIANCE & SUNSHINE DURATION SENSOR

Research-grade measurement of DNI and Sunshine Duration.

OVERVIEW

The **ZTZ-7 pyrheliometer** is a research-grade instrument featuring a broad spectral response range of **200nm to 4000nm** and an ultra-fast response speed ($<0.2s$). Its operational parameters exceed standard ISO 9060 and WMO Class A requirements. It complies with the **ISO 9060:2018 "Fast response and spectrally flat Class A"**classification and is traceable to the **World Radiometric Reference (WRR).**

The device is typically mounted on a dualaxis sun tracker **(ZTT-31 series)** for allweather continuous monitoring of Direct Normal Irradiance (DNI) and Sunshine Duration.

OVERVIEW

- **Ultra-Fast Response:**Rapid response speed of **$<0.2s$**
- **Thermal Compensation:** Built-in active temperature compensation for stable, highaccuracy observations.
- **Window Defrost System:**: Integrated optical window heating prevents frost, dew, and snow accumulation.
- **Superior Stability:** Long-term non-stability within **$\pm0.5%$ over 5 years.**
- **Broad Environmental Adaptability:**Operating temperature range from **-40°C to +80°C** and **0 to 100% relative humidity.**
- **Target Applications:** Stationed in baseline meteorological stations, atmospheric research sites, and utility-scale solar installations mounted on dual-axis trackers.

PANEL TEMPERATURE SENSOR (PVT SERIES)

PHOTOVOLTAIC MODULE SURFACE THERMOMETER

High-accuracy surface temperature measurement for PV panels and outdoor materials

OVERVIEW

The **PVT series high-precision thermometer** is specially designed to measure the surface temperature of photovoltaic modules and structural elements. Utilizing a premium platinum resistance chip (Pt100/Pt1000), the sensor delivers high measurement precision, long-term stability, and strong resistance to high-temperature corrosion.

The PVT series is broadly applied in demanding field environments requiring high-precision surface or medium temperature monitoring, including PV panel backsheet temperature, soil temperature, and surface water/ice temperatures.

KEY FEATURES

- **High Precision:** Precision-matched thermal elements suitable for continuous, allweather monitoring.
- **Long-Term Stability:** Minimal drift over multi-year deployments.
- **Rugged Environmental Rating:** Enclosure rated to **IP67**, operational temperature range of **-40°C to +80°C**, and **0–100% RH** tolerance.

HYTOP

DIGITAL RAIN SENSORS (ZTR-1 & ZTR-2)

PRECISION PRECIPITATION MONITORING INSTRUMENTS

High-accuracy measurement of rainfall volume, intensity, and duration.

OVERVIEW & CAPABILITIES

ZTR-1 TIPPING BUCKET RAIN SENSOR

The ZTR-1 is a high-precision dual-tipping bucket rain gauge designed to record rainfall totals, rain intensity, and duration.

- **Dual-Tipping Bucket Architecture:**Precision-engineered for high accuracy, excellent stability, and a refined measurement resolution of **0.1mm.**
- **Smooth Rain Collector:** Constructed via integral stamping and drawing processes, eliminating water retention errors caused by surface seams.
- **Stainless Steel Construction:** Durable **304 stainless steel** body ensures extended field life in harsh environments.



ZTR-2 OPTICAL RAIN SENSOR INSTRUMENTS

The ZTR-2 utilizes a specialized optical structure to accurately measure individual raindrop size and volume via light induction principles to calculate real-time precipitation.

- **Compact & Lightweight:**Small form factor for rapid deployment and simple installation.
- **No Moving Parts:** Solid-state optical sensing mechanism minimizes routine maintenance requirements.
- **High Humidity Tolerance:** Highly reliable operation in extreme heat and high-humidity environments.

