

SYL Series Laser Ceilometer



The laser-ceilometer is mainly composed of transmitting module, receiving module, measurement and signal processing module and software inversion module. Under the control of the drive circuit, the laser emits high-frequency laser pulses, which are collimated by the transmitting system and then spread upward to the clouds. The backscattered signals generated by the interaction with the clouds are focused by the receiving system and converge on the photosensitive surface of the photodetector to convert the optical signals into electrical signals, and then ADC chip is used to complete the digital-analog conversion and acquisition of the signals. And the FPGA chip completes the average cumulative signal pre-processing, and finally sends the data to the supreme computer for cloud information inversion and display. The main performance indicators of this product include.

Part number	SLY-905-12k
Detection range	30m ~ 12000m
Ranging resolution	<5m
Sampling frequency	≥40MHz
Laser wavelength	905nm
Rep frequency	500Hz Adjustable
Pulse energy	<20uJ
Beam divergence Angle	3mrad
Pulse width	50ns
Detector responsiveness	>3000KV/W
Working temperature	-40℃ ~ 70℃
Working humidity	98%RH (30℃)
Working pressure	80-105Kpa
Weight	<35kg
Dimension	573x300x733mm

a) Detection range: 30m ~ 12000m

The detection range of 30m is mainly determined by the laser collimation divergence angle and the overlap factor of optical axis. The detection range of 12000m is mainly determined by the laser power and the detection capability of APD. The simulation results meet the requirements, and the specific analysis needs to be based on the experimental results.

b) Ranging resolution: <5m

It is determined by the sampling accuracy of the receiving system and can meet the requirements.

c) Sampling frequency: $\geq 40\text{MHz}$

Analysis: Determined by the APD amplifier circuit.

d) Wavelength: 905nm

Determined by the laser, which can meet the demand

e) Rep frequency: 500Hz Adjustable

Determined by the drive and laser, which can meet the demand.

f) Pulse energy: $< 20\mu\text{J}$

Determined by ranging distance, which can meet the demand.

g) Beam divergence Angle: 3mrad

The optical simulation results meet the requirements, Meet the demand after actual measurement.

h) Pulse width: 50ns

According to the experimental verification, meet the demand.

i) Detector responsiveness: $> 3000\text{KV/W}$

Select appropriate APD and the corresponding amplifier circuit design

j) Working temperature: -40°C - 70°C

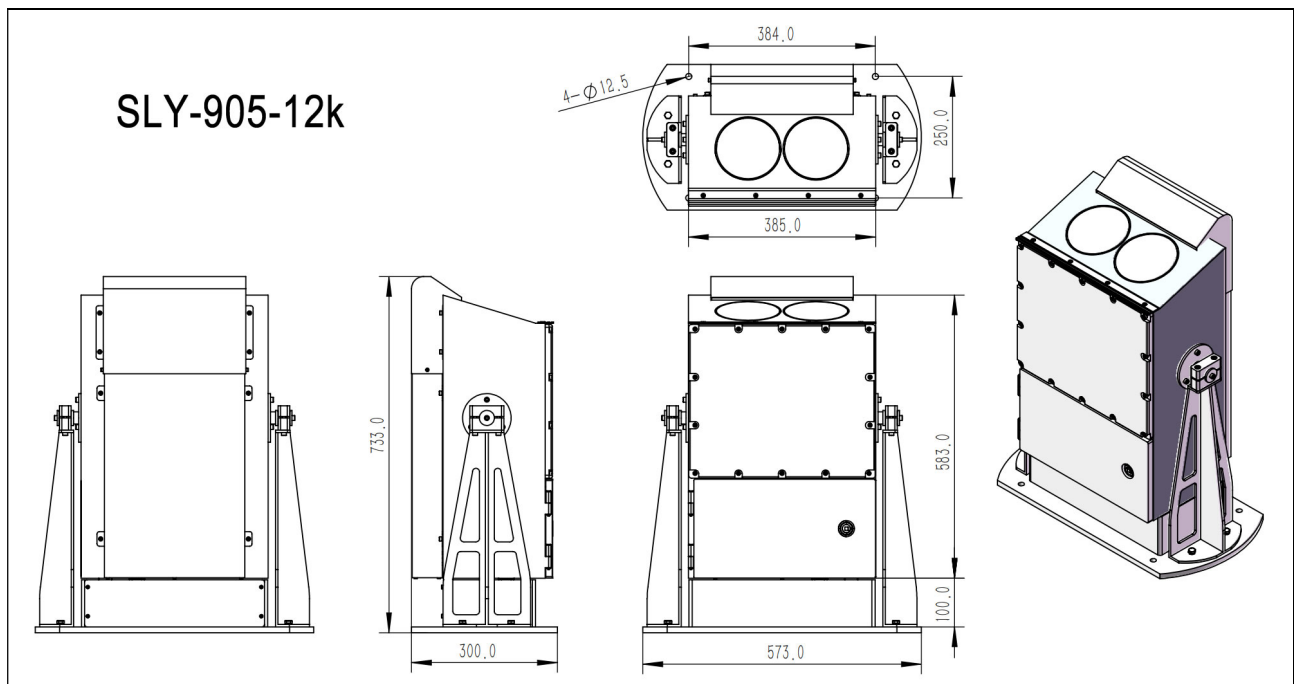
Select devices that meet the requirements of high and low temperatures, and determine them according to experimental verification.

k) Working humidity: 98%RH (30°C)

Improving the air tightness of the system and spraying three anti-paints, etc. can be adopted, to meet the needs according to the experiment.

l) Working pressure: 80-105Kpa

According to the experimental verification, meet the demand.



SYZ Series Laser Ceilometer

Our laser ceilometer is a backscattered LiDAR based on the principle of Mie scattering, and is used to monitor and analyze the flight intensity and time of backscattered light signals using ToF technology, effectively measuring aerosols, cloud height, cloud thickness, cloud cover, and verticality Atmospheric parameters such as visibility are used to accurately obtain the atmospheric backscatter curve.

Product features

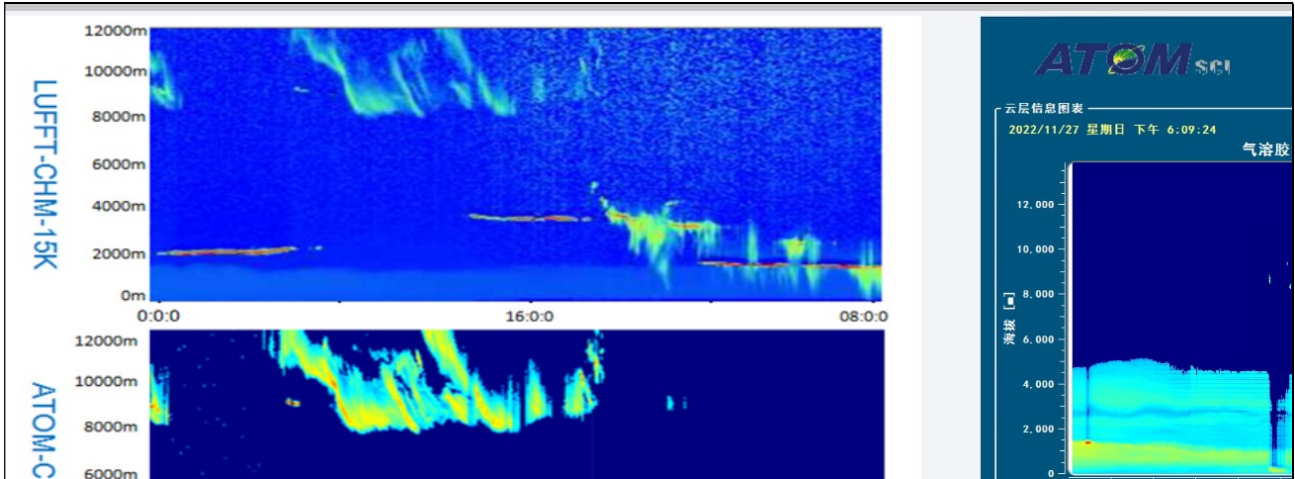
- Strong detection capability, capable of detecting multiple layers of clouds within 15km
- High detection accuracy, ranging accuracy can reach ± 5 meters
- Eye safety, working wavelength 1550nm
- Low maintenance cost, automatic window cleaning, automatic heating and defrosting
- Equipped with self checking function to ensure the reliability of detection data
- Low power consumption, beneficial for installation in outdoor and unmanned areas
- Can be continuously powered by power sources such as photovoltaic cells and fuel cells
- Working 24/7, unaffected by weather conditions such as sun background light, clouds, rain, freezing, etc

Technical parameters

- Product model: SYZ-1550-8K or SYZ-1550-15K
- Working wavelength: 1550nm
- Measurement range: 0m~7.5km (SYZ-1550-8K); 0m~15km (SYZ-1550-15K)
- Measurement tolerance: ± 5 m
- Resolution: 5m
- Data output: cloud base height, cloud layer thickness, cloud base vertical motion velocity, vertical visibility
- Standard interface: RS232/RS485/Ethernet port (LAN)
- Dimensions: 408mm \times 408mm \times 1200mm
- Weight: 50kg
- Data refresh rate: ≤ 2 Hz
- Weight: ≤ 100 kg
- Power supply requirement: 90-132V AC/180-264V AC optional; Optional DC 24V (can be powered by solar cells, fuel cells, and other power sources)
- Power consumption: Standard 50W, maximum 200W (maximum heating mode)
- Working temperature: -45 $^{\circ}\text{C}$ ~ 60 $^{\circ}\text{C}$
- Environmental protection level: IP66
- Humidity: 0% to 100%



Visual interface



On-site working pictures



Typical applications

- Cloud height data monitoring for aircraft takeoff and landing
- Airport vertical visibility monitoring
- Airport meteorological forecast
- Meteorological data analysis
- Atmospheric visibility detection
- Detection of precipitation potential in cloud systems



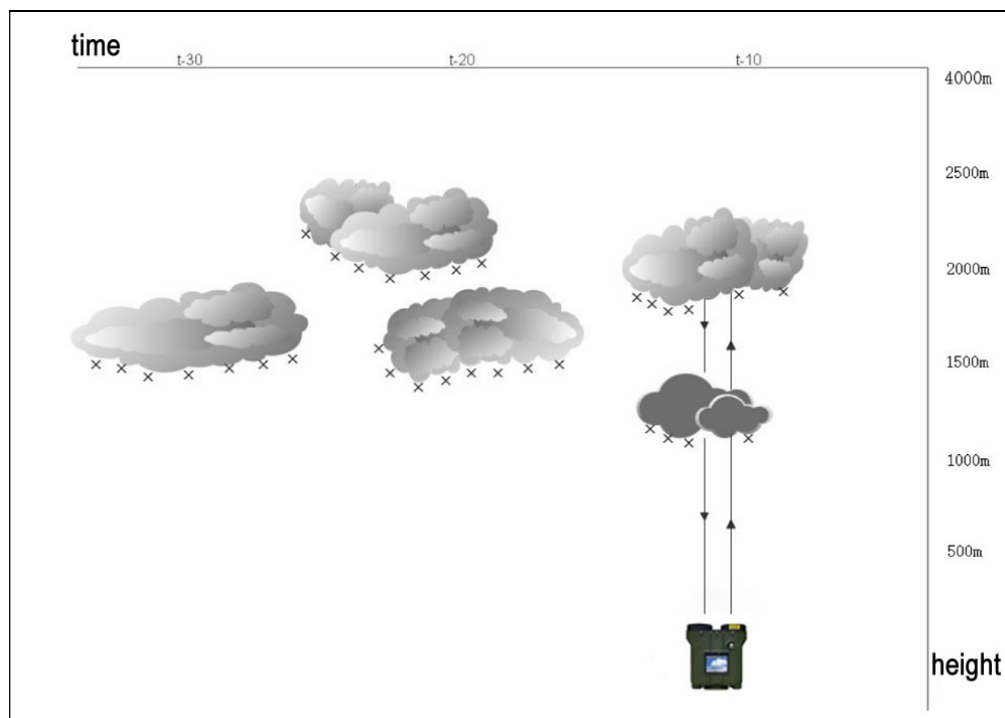
SJH Series Handheld Laser Ceilometer



The handheld laser cloud measuring instrument is a handheld intelligent cloud measuring device that can manually or automatically continuously monitor cloud base height, cloud layer thickness, solid target distance, and display measurement results in real time. This device can measure cloud base height or solid target distance vertically or obliquely. Small size, light weight, not limited by station space conditions, flexible measurement and use. The device is equipped with a lithium battery, and the observation data can be displayed in real-time on the LCD screen, while being stored inside the device for easy reading and data analysis in the later stage. The device adopts an ergonomic design, which can be temporarily handheld for observation or installed on a tripod for long-term continuous observation. This device can be widely used in cloud observation and research, aviation meteorological support, maritime meteorological support, military meteorological support, etc.

Working principle:

The device is based on the principle of Mie scattering. The laser emits periodic laser pulses into the atmosphere, and the laser receiver receives backscatter signals from clouds and the atmosphere. The processor collects and processes the received signals, and through inversion operations, obtains the extinction coefficients of the atmosphere at different heights, thereby determining the cloud layer and calculating the cloud base height value.



Equipment composition:

The equipment consists of laser emitting components, laser receiving components, signal processing components, optical components, camera components, display components, inner core components, outer shell components, etc.

Equipment functions:

- Can measure cloud base height, cloud thickness, and distance to solid targets;
- Measurable elevation, slope, horizontal distance, and height of the target;
- Equipped with real-time display function. It can display the elevation angle, slope distance, horizontal distance, height information, cloud base height, cloud thickness, equipment fault codes, and important operating parameters of the measured target;
- Equipped with self checking function, the device can automatically detect various important internal parameters;
- The device has the function of storing and querying data internally, which can store at least 8640 pieces of data continuously. The computer can query and read the data stored inside the device through the power/data interface;
- Parameter settings and power-off saving function, the device accepts parameter settings and has power-off saving function.

Main technical parameters:

Product model	SJH-C04	SJH-C06	SJH-C08
Laser wavelength	905nm	905nm	905nm
Cloud base height measurement range	50-4000m	50-6000m	50-8000m
Cloud based high measurement accuracy	± 15m (< 500m)	± 15m (< 500m)	± 15m (< 500m)
Cloud based high measurement accuracy	± 10% ≥ 500m	± 10% ≥ 500m	± 10% ≥ 500m
Solid target measurement range	50-4000m	50-6000m	50-8000m
Accuracy of solid target measurement	± 5m	± 5m	± 5m
Elevation measurement range	0~90 °	0~90 °	0~90 °
Accuracy of elevation measurement	± 0.8 °	± 0.8 °	± 0.8 °
Azimuth measurement range	0-360 °	0-360 °	0-360 °
Azimuth measurement accuracy	± 2 ° (laboratory environment)	± 2 ° (laboratory environment)	± 2 ° (laboratory environment)
External dimensions	229x214x106mm	229x214x106mm	229x214x106mm
weight	≤ 2.5kg	≤ 2.5kg	≤ 2.5kg

Electrical performance:

- Power supply: lithium battery power supply (with dedicated adapter)
- Communication interface: RS485
- Baud rate: 115200bps
- Maximum wired transmission distance: ≥ 300m
- Working hours: 25 °C , fully charged, with no less than 500 measurements (manual mode)/continuous operation for no less than 3 hours (automatic mode)
- Charging duration: ≤ 2.5h (using the included power adapter, the charging indicator light will turn off after the battery is fully charged)

Environmental adaptability:

- Protection level: IP65
- Working temperature: -40~50 °C
- Working humidity: 0-95% RH (30 °C)
- Storage temperature: -40~50 °C
- Storage humidity: 0-95% RH (30 °C)