OPTOSKY
Spectroscopy Solutions

DataSheet

Multispectral Water Quality Online Monitoring Instrument

ATE5800

Features:

· Operates online, enabling real-time transmission of water quality data and supporting 24/7 continuous monitoring.
· 360° rotation for wide-area coverage, meeting the requirements of full-area water monitoring.
· Delivers accurate multi-parameter retrieval, covering core water quality indicators.
· Can be integrated with a water quality data aggregation platform to support data traceability and analysis.
· Fixed unattended operation; weatherproof, high and low temperature resistant, and unaffected by complex weather conditions.
· 33x optical zoom for precise positioning of key areas such as sewage outlets and cyanobacteria accumulation zones.
· Simple operation with convenient installation and maintenance.
· Data transmission via 4G communication, supporting remote control and early warning.
· Equipped with wiper, defogging and defrosting functions, suitable for field water monitoring environments.
· Waterproof and dustproof design to meet the protection requirements for shore installation.

Application Scenarios:

· Surface water quality monitoring (rivers, lakes, reservoirs)
· Safety protection for drinking water sources
· High-frequency monitoring of black and odorous water bodies
· Real-time monitoring of industrial wastewater discharge
· Early warning and prevention of cyanobacterial blooms
· Monitoring of illegal discharge and excessive discharge from sewage outlets
· Water quality monitoring of wetland ecosystems
· Coastal water quality monitoring and red tide early warning
· Rapid response to emergency water pollution incidents
· Cross-regional watershed water quality collaborative monitoring

Product Overview

The ATE5800 Multispectral Water Quality Online Monitor is equipped with core spectral bands of 450nm (blue), 555nm (green), 670nm (red), 730nm (red edge), 800nm (near-infrared), and 850nm (short-wave infrared), with each band having an operating bandwidth of approximately 15nm and supporting customized spectral channel configuration. Based on the spectral characteristics of water bodies, the equipment can accurately obtain key water quality parameters such as turbidity, chlorophyll a, cyanobacteria density, total phosphorus (TP), total nitrogen (TN), chemical oxygen demand (COD), chromophoric dissolved organic matter (CDOM), and suspended solids (SS) through multi-band signal fusion calculation and algorithm inversion.

The equipment has strong water quality anomaly identification capabilities, which can real-time monitor abnormal situations such as cyanobacterial bloom aggregation, illegal discharge from sewage outlets, and sudden changes in water turbidity, and trigger an early warning mechanism in a timely manner, providing data support for water quality management and pollution prevention and control. Its flexible installation methods (shore pole installation, buoy mounting, hull mounting, etc.) and stable outdoor working performance are suitable for long-term online monitoring and dynamic management and control of various water environments, helping to build an integrated water quality management system of "monitoring - early warning - disposal"

Figure 1 Device and Ambient Light Sensor

1.Equipment usage scenario diagram

2. Working Principle of Multispectral Technology

The principle of a filter array-based multispectral camera is to achieve spectral separation and multispectral imaging by placing a filter array above the optical sensor array. When light enters the camera system through the camera lens, it passes through the filter array. The filter array consists of multiple filter units, each corresponding to a spectral response in a specific wavelength range. Each filter unit is designed to selectively transmit or block light of specific wavelengths. This means that when light passes through the filter array, each filter unit only allows light within a specific wavelength range to pass through, while blocking light in other wavelength ranges. After passing through the filter array, the light enters the corresponding optical sensor array. Each optical sensor is aligned with a filter unit and is responsible for receiving and converting the optical signal transmitted through the filter unit. The optical sensor converts the optical signal into an electrical signal, which is then amplified and processed. The output of each optical sensor represents the light intensity within the wavelength range selected by the corresponding filter unit. By collecting and processing the outputs of multiple sensors in the optical sensor array, the filter array-based multispectral camera can simultaneously acquire image data of multiple spectral bands. This multi-channel image data can be used in applications such as spectral analysis, ground object identification, and vegetation monitoring.

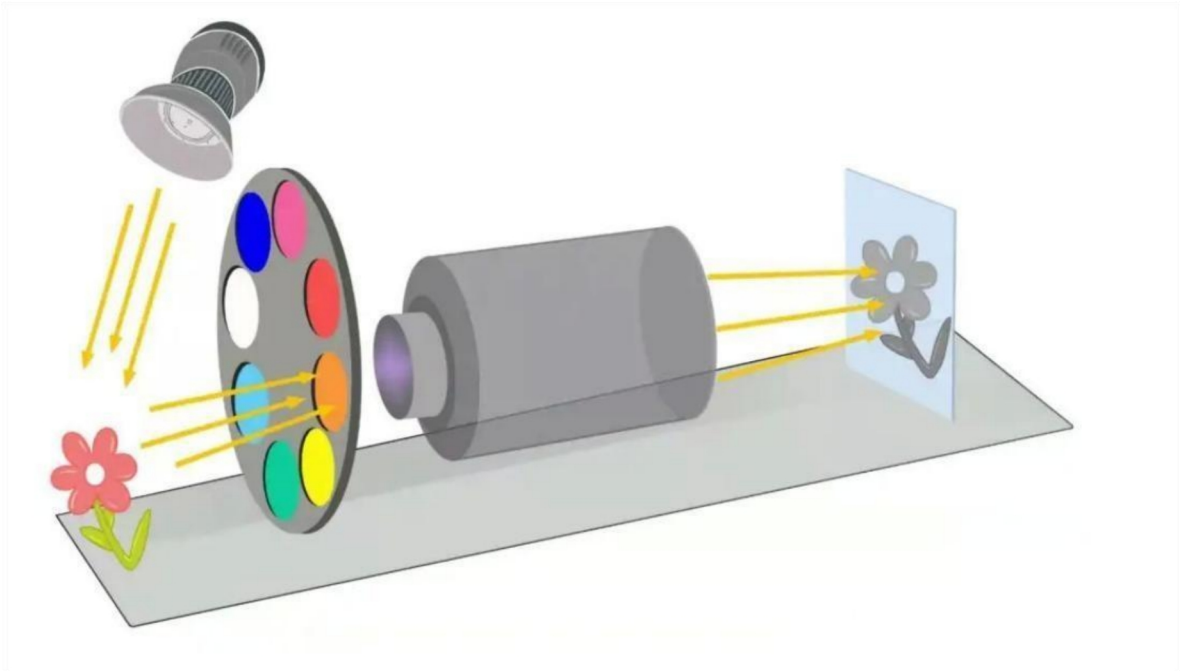

Figure 2. Schematic diagram of a multispectral camera

3.Performance parameters

Category	Parameter	Specification
Spectral Performance	Spectral Channels	450nm (Blue), 555nm (Green), 670nm (Red), 730nm (Red Edge), 800nm (Near Infrared), 850nm (Short-wave Infrared). Working bandwidth per band is approx. 15nm
Spectral Performance	Index Inversion	Online inversion of over 20 water quality parameters including Chlorophyll-a, Blue-green Algae Density, Turbidity, Suspended Solids Concentration, COD, Total Nitrogen, Total Phosphorus, Transparency, Colored Dissolved Organic Matter (CDOM), and other indices
Imaging Lens	Pixels	4 Megapixels
Imaging Lens	Maximum Image Resolution	12 Megapixels
Imaging Lens	Maximum Video Resolution	2688×1520
Imaging Lens	Lens Aperture	F1.2
Imaging Lens	Spectral Resolution	2cm/pixel @ 1KM
Ambient Light Sensor	Ambient Light Sensor	Ambient light calibration device, DC: 36V, 1.4A, supports independent power supply or shared power supply with multi-spectral equipment.RS485 signal output, connected to multi-spectral agricultural detector

Camera Performance Parameters	
Sensor Type	1/1.8-inch CMOS
Pixels	4 million
Maximum Resolution	2560×1440
Electronic Shutter	1s~1/30000s
Minimum Illuminance	Color: 0.001Lux@F1.6, Black and White: 0.0001Lux@F1.6 0Lux (Infrared lamp on)
Maximum Fill Light Distance	250m (Infrared)
Number ofFill Lights	Six (Infrared lamps)
Windshield Wiper Function	Windshield Wiper
Defogging Function	Defogging
Lens	
Lens Focal Length	5.8mm ~ 192mm
Lens Aperture	F1.6~F5.0
Field of View Angle	Horizontal: 61.6°~3.6° Vertical: 35.2°~2° Diagonal: 66.6°~4°
Optical Zoom	33x
Focus Mode	Auto/Semi-Auto/Manual
Macro Focus Distance	0.5~5m
Zoom Speed	Approximately 6s
Pan-tilt head	
Rotation range	Horizontal: 0°~360° continuous rotation; Vertical: -20°~+90° automatic flip and continuous monitoring after 180°
Keystroke speed	Horizontal: 0°/s ~ 180 7/s ; Vertical: 0°/s ~ 75°/s
Preset point speed	Horizontal: 0'/s ~ 180"/s ; Vertical: 0'/s ~ 75°/s。
Preset point	300
Automatic cruise	8 lines, each line can add 32 preset points
Automatic tracking	5 lines
Automatic line scan	5 lines
Power-off Memory	Support
Idle Action	Preset Point; Patrol; Cruise; Line Scan
Scheduled Task	Preset Point; Patrol; Cruise; Line Scan
Preset Point Video Freeze	Support
3D Positioning	Support
Viewing Function	Support

Azimuth Sensor	G-sensor
Professional Intelligence	
Video Structuring	Supports motor vehicle, non-motor vehicle, face, and human body detection; supports optimization; supports capture; supports reporting the optimal captured motor vehicle attributes (license plate, license plate color, vehicle type, body color, vehicle logo, vehicle series/year model, sun visor, seat belt, smoking, making a call, vehicle interior accessories, annual inspection mark), non-motor vehicle attributes (type, body color, number of cyclists, upper clothing type, upper clothing color, hat), human body attributes (upper clothing type, lower clothing type, upper clothing color, lower clothing color, backpack, hat, gender, umbrella), and face attributes (gender, age, expression, wearing glasses, wearing a mask); Upper clothing type, lower clothing type, upper clothing color, lower clothing color, backpack, hat, gender, umbrella); face attributes (gender, age, expression, wearing glasses, wearing a mask);
Perimeter protection	Supports area intrusion; supports fence crossing; supports loitering detection; supports object left behind; supports object removal; supports fast movement; supports parking detection; supports people gathering; supports vehicle and person classification alarm; supports linkage tracking
Face detection	Supports face detection; supports face trajectory box; supports optimization; supports capture; supports reporting the optimal face capture; supports face enhancement, face exposure; supports face attribute extraction, supports 6 attributes, 8 expressions: gender, age, glasses, expression (angry, sad, disgusted, afraid, surprised, calm, happy, confused), mask, beard; supports face cutout area setting: face, passport photo; supports adding 5 face databases; supports single and batch personnel registration; supports face recognition similarity setting; supports face comparison of 10,000 face databases
Video	
Video compression standard	Smart H.265; H.265; Smart H.264; H.264; H.264B; H.264H; MJPEG
Default bitrate at default resolution	61,440,000 bps (2560×1440)
Backlight compensation	Supported
Wide dynamic range	Supported
High light suppression	Support
White Balance	Auto/Indoor/Outdoor/Tracking/Manual/Sodium Lamp/Natural Light/Street Lamp
Gain Control	Auto/Manual/Gain Priority
Noise Reduction	2D Noise Reduction/3D Noise Reduction
Region of Interest ROI	Support
Anti-Shake Function	Gyroscopic Anti-Shake
Fog Penetration Function	Optical Fog Penetration
Digital Zoom	16x
Privacy Masking	Up to 24 polygon regions, with a maximum of 8 regions on the same screen at the same time; multiple colors are supported

Signal-to-noise ratio	≥55dB
Network	

Network interface	1 (RJ-45 female network port, supporting 10M/100M network data)
Network protocol	HTTP; HTTPS; TCP/IP; IPv4; RTSP; UDP; SMTP; NTP; DHCP; DNS; DDNS; IPv6; 802. 1x; SSL; QoS; FTP; UPnP; ICMP; SNMP; IGMP; ARP; RTCP; RTP; PPPoE; RTMP; Bonjour; NFS
Access standard	GB/T28181; ONVIF; CGI; GB/35114A; GA/T1400; SDK;
Storage function	Micro SD card (maximum support 512GB); FTP/SFTP; NAS
Interface	
Audio Input	1 Channel (LINE IN; Bare Wire)
Audio Output	1 Channel (LINE OUT; Bare Wire)
Voice Intercom	Supported
Alarm Input	2 Channels, Digital Input (0~5V DC)
Alarm Output	1 Channel
Alarm Linkage	Snapshot; Preset Point; Cruise; Patrol; Recording; Alarm Digital Output; Audio; Send Email
Alarm Event	Video Motion/Occlusion Detection; Audio Detection; Network Disconnection Detection; IP Conflict Detection; Memory Card Status Detection; Storage Space Detection
Power Supply	
Power Supply Mode	DC36V/2.23A±25% (Standard Configuration)
Power Consumption	Basic Power Consumption: 18.5W Maximum Power Consumption: 26.5W (When the fill light is on and the PTZ moves)
Power Supply	Standard Configuration
Operating Environment	
Operating Temperature	-40°C~+70°C
Operating Humidity	≤95%
Storage Temperature	—40'C ～ +70'C
Storage Humidity	≤95%
Protection Level	TVS 8000V Lightning, Surge and Spike Protection
Structure	
Product Dimensions	232mm×232mm×371mm (Length × Width × Height)
Packing Box Dimensions	340mm×316mm×574mm (Length × Width × Height)
Net Weight	5.3kg
Gross Weight	6.7kg
Installation Method	Wall Mounting; Hoisting; Pole Mounting; Crossbar Mounting; Corner Mounting