

Smart safety helmet

OT-AQM

operating instruction



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ISO9001 Quality management system certified enterprise

Catalogue

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1. Product overview

This product is an intelligent hard hat product with an industrial-grade high-definition camera and a 4G / WiFi network, with night lighting, video recording and storage functions. The product with the company's background system management software (Zhihui cloud platform web client, Android small program end) can achieve multiple functions.

On the original basis, the product realizes the interconnection of hand-held objects, intelligent safety helmet, accurate positioning and monitoring of background data, improves the data interconnection, and multi-dimensional monitoring in the security industry, integrates video intercom, positioning, gas (combustible / toxic and harmful / oxygen) monitoring, and provides real-time online monitoring and early warning of the working environment during operation to ensure the safety of employees.

The design, manufacture and verification of the product shall comply with the following national standards:

GB 2811-2019 Head protective safety helmet

GB/T 38305-2019 Head protection Rescue helmet

GB/T 3836.1-2021 Explosive atmospheres - Part 1: Equipment - General requirements

GB/T 3836.4-2021 Explosive atmospheres - Part 4: Equipment protected by intrinsic safety "i"

GB/T 4208-2017 Degrees of protection provided by enclosure (IP code)

GB 12358-2024 General technical requirements for environmental gas detection and alarm instrument in workplaces

Gas units and conversion relationships:

(1) ppm: one part per million of the volume of gas (e.g., ppm means one part per five million).

(2) LEL: Lower explosive limit concentration of flammable gas, 100% LEL indicates the lower explosive limit is reached (e.g., 10% LEL indicates 10% of the lower explosive limit concentration).

(3) %VOL:centage volume of gas (e.g., 5% VOL means the volume occupies 5%).

(4) $\mu\text{mol/mol}$: Micoles per mole, numerically the same as ppm (1 ppm = 1

$\mu\text{mol/mol} = 1 \times 10^{-6}$).

Mutual: $\%VOL > \text{ppm} = \mu\text{mol/mol}$.

For example, the lower explosive limit of methane is 5% VOL, so:

$10\%EL = 0.5\% VOL = 5000 \text{ ppm} = 5000 \mu\text{mol/mol} = 5000 \times 10^{-6}$

2. Product characteristics

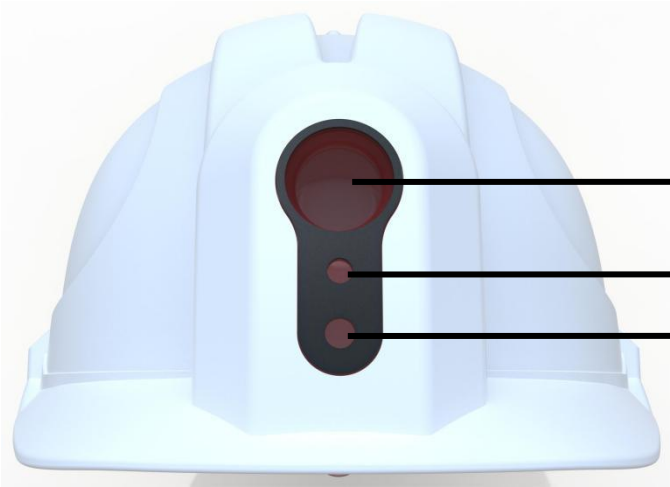
- Reducing vibration lining: effectively disperse the impact force and protect the head
- Hd camera: video data is uploaded in real time, captured with one click and uploaded to the cloud platform
- LED lighting lamp: high-power lighting lamp
- Gas detection: it can detect combustible, toxic, harmful, oxygen and other gases
- Personnel positioning: to support the real-time positioning of the personnel
- Video / voice: remotely view the scene situation, realize the bidirectional video / voice communication, with group call function, one-key intercom, video call
- Electronic fences: Managers can create multiple electronic fences
- Drop alarm: after the personnel is hit hard, the background and surrounding workers will receive the alert
- Take off alarm: If the person does not wear the helmet as required, the product will give a warning and the background will receive the alarm information
- One-button call for help: built-in SOS alarm system
- One-button alarm: Upload the SOS request and request the video call
- GPS positioning: real-time positioning, display the location status
- Bluetooth: search for the BLE signal within 10m of the open range of the connection
- WiFi: search for AP (WiFi) within the minimum connection distance of 100 meters, and the communication rate is not less than 2M
- Full netcom: support mobile, telecom, Unicom, the whole network communication, the Internet of Things card is not subject to geographical restrictions
- Voice prompt: power prompt alarm, power full charge prompt, signal strength change prompt
- Shell interface: data charging interface, can charge, can also communicate with the upper computer
- Equipped with a Bluetooth headset, the device can also be clearly heard in a

noisy environment

3. Product Parameter

- ◆ Product category: (P) ABS SIZE (52~64) cm
- ◆ Compulsory scrapping period: 30 months
- ◆ Detection gases: combustible / toxic and harmful gases / oxygen, etc
- ◆ Measuring range: (0~100)%LEL(combustible); (0~100) μ mol/mol(toxic) (optional range)
- ◆ Resolution: 1%LEL, 1 μ mol/mol, 0.1 μ mol/mol/%VOL
- ◆ Accuracy level: $\pm 3\%$ FS (combustible/oxygen); $\pm 5\%$ FS (toxic)
- ◆ Low limit alarm setting value: 20% LEL (combustible)
- ◆ Response time: ≤ 30 s(Flammable) (depending on the specific gas)
- ◆ Detection method: natural diffusion type
- ◆ Detection principle: catalytic combustion type; electrochemical formula
- ◆ Ambient temperature: $-25^{\circ}\text{C} \sim +55^{\circ}\text{C}$
- ◆ Relative humidity: (20~93)%
- ◆ Power supply voltage: DC 3.7 V
- ◆ Battery capacity: 3000 mAh lithium-ion rechargeable battery
- ◆ Charging time: ≤ 5 h
- ◆ Working time: ≥ 10 h continuous (non-alarm, standby state)
- ◆ Product weight: approximately 778 g (including accessories)
- ◆ Product size: L 308 W 216 H 153mm
- ◆ Explosion-proof certificate number: CNEx25.3344X
- ◆ Explosion-proof mark: Ex ib II C T4 Gb, Ex ib IIIC T130 $^{\circ}\text{C}$ Db
- ◆ Protection grade: IP66

4. product appearance



headlamp

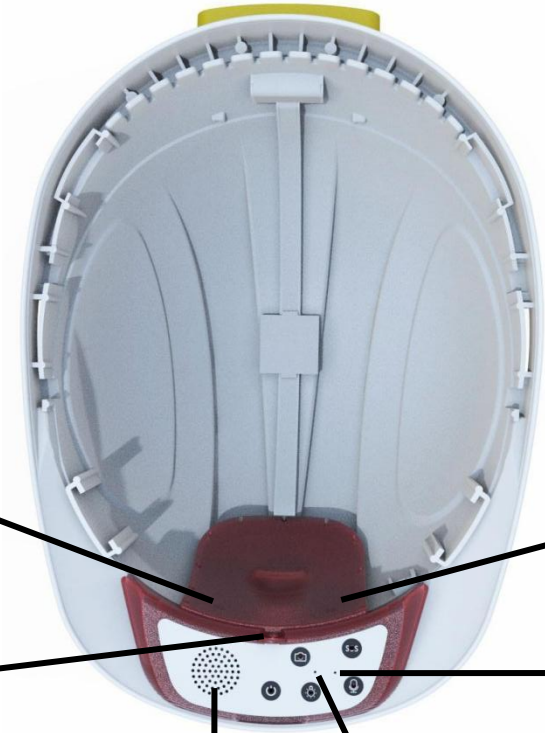
camera

Laser indicator light



gas detector

Gas alarm pilot lamp



microphone

Wearing Detection Port

loudspeaker

charge lamp

microphone

Boot indicator light

5. operation declaration

5.1 Key description

key	operate	realize function	function declaration
	Long press	starting up	In the shutdown state, long press 5s to turn on
		shut down	In the boot state, long press for 5s to shut down
	Short press	talk back	In the boot state, press once short to start recording, and press once once to stop recording and send
	Short press	take a picture	In the boot state, the short press to take pictures
	Long press	shoot a video	Long press 2s to start recording video, and short press 1 time when recording video
	Short press	lighting	On startup, press the light on or off
	Long press	Indicate laser	On startup, long press the indicator laser on or off
	Short press	SOS call for help	In the boot state, short press to open the SOS call for help
	Long press	Device Bluetooth on / off	In the boot state, long press on / off the Bluetooth of the device

5.2 Description of the indicator light

Indicator lamp name	pigment	explain
Boot indicator light	red	Boot often bright
charge lamp	green	During the charging process, the green color is displayed
	not have	Charging is complete, go off
Gas alarm indicator light	green	whack
	red	Alarm status

5.3 Functional description

function	explain
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Video voice	Support (real-time video and voice calls over WiFi or 4G networks)
real time protection	Support (real-time 1080P HD monitoring)
voice broadcast	Support (buttons with voice prompt)
Temperature and humidity broadcast	Support (voice prompt function of temperature and humidity broadcast after startup)
Electricity broadcast	Support (voice prompt function after startup)
Low power alarm	Support (voice broadcast when the device is low)
emergency call	Support (when the staff is in personal danger, he can press the SOS button on the helmet, when the helmet will send an alarm sound signal, and the signal will be fed back to the background administrator and group members)
Silent alarm	Support (alarm signal when the employee helmet is still for more than 5 minutes)
Take off the hat to the police	Support (alarm signal when the helmet is removed from the head for 2 seconds)
Real-time positioning	Support (the helmet reports the current location information to the background once every 10 seconds)
local-storage	Support (the customer performs file saving days parameter configuration according to different requirements)
Video export	Support (network real-time upload and USB interface export, can quickly upload or export the recorded video to the computer end)
Portable charging	Support (USB interface charging, signal light indicates charging status)
Gas detection	Support (combustible, oxygen, carbon monoxide, hydrogen sulfide gas detection, alarm status broadcast, gas alarm indicator prompt)
Bluetooth headset	Support (after the startup device is started, the device can automatically connect the Bluetooth headset; if the connection fails, long press the SOS button to restart the Bluetooth headset; when the connection is completed, the device reports and enters the voice through the Bluetooth headset)

5.4 Operation instructions of Zhihui Cloud Iot Platform

(1) Access the address <https://www.zhihuiyun-iot.com> on the computer side and

enter the login interface.

(2) When the first login to the system needs to register the account information, click (Account Registration) to immediately jump to the registration interface, as shown in Figure 5-1.



graph 5-1

(3) After entering the platform, select "Environmental monitoring" — — "Smart Hat" and enter the smart helmet data monitoring screen.

(4) Click "Equipment Management" — — "Add Equipment", fill in the equipment information as required, enter "Equipment Model", "Equipment Serial Number (attached code)", "Note", "Installation Location"; click "Next", fill in the notification information and click "Finish".

(5) If successful, click "Data Monitoring" to view the real-time monitoring data and historical data of the device.

(6) Click "Alarm Information" to view the alarm information within a certain period of time.

(7) Click "Notification Management" to reconfigure or delete the previously added notification information.

(8) Click "Electronic fence" to create a fence, set up the fence behavior "no leave" or "no enter", alarm frequency, alarm time and other information.

(9) Can also be "group call" "photo management" "video management" "video playback" and other Settings.

6. Precautions

- When using the helmet, the cap hoop or chin strap should be adjusted according to the size of the head circumference to ensure that the helmet is worn firmly without accidental deviation or slide.
- The safety helmet must be replaced after experiencing a severe impact, even if

there is no obvious damage.

- Any modification and replacement of helmet accessories can be hazardous to the user unless recommended by the manufacturer!
- Can not be applied on the external surface of the paint, solvent, dry adhesive paste, can not be used in the environment of strong acid, strong alkali.
- The size of the applicable head circumference is (52~64) cm.
- Wash with neutral soap or warm water (be careful not to touch the circuit area).
- Only use our accessories.
- This safety helmet is suitable for head protection in production safety, road traffic, natural disaster accident rescue and other workplaces, but it cannot be used for fire rescue.
- The service life of infrared sensor and semiconductor sensor is 5 years, and the service life of catalytic combustion sensor and electrochemical sensor is 2 years.
- In order to ensure the detection accuracy, the machine shall be calibrated regularly, and the verification period shall not exceed one year.
- The battery pack cannot be removed or replaced in explosive gas environments. In the explosive gas environment can not use without explosion-proof certification of peripheral plug equipment, also can not replace the sensor.
- Products that have obtained the explosion-proof certificate are not allowed to randomly replace or change the components or structures that affect the explosion-proof performance.
- In the corresponding national standards, there are clear provisions on the electrical design selection, installation or use of the explosion dangerous places, and the installation or use units shall strictly abide by these provisions to ensure the explosion-proof safety of the electrical equipment in the explosion dangerous places.
- Charging must be carried out in a safe place and charged with a professional charger equipped by the machine.
- **Note: The front interior of the safety helmet is equipped with a "Wearing Detection Port," which operates on a laser detection principle. When the safety helmet is worn on a person's head and detects the presence of the head, it will issue a voice prompt stating "Safety helmet is worn." If the safety helmet is not worn and is placed in another state, or if the detection port is obstructed by other objects, the detection window may still detect an object and trigger the voice prompt "Safety helmet is worn." This is considered a normal phenomenon.**

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