澳瑞德
ALLRED

ARD4100

Remote Methane Leak Detector

User Manual

Contents

Warnings

Before using the instrument, you must read the instruction manual carefully and strictly follow the steps to operate and maintain!

The handheld detector has two lasers. When the device is turned on, the detector laser is invisible and continuous. By pressing the switch button on the device, the green spotter laser can be turned off. The green indicating laser level is Class 3R. Protect your eyes from direct exposure!

Laser specifications

Detecting laser：

Maximum output power:≤10mW

Wavelength: 1653nm

Laser Class: Class 1

Indicating laser：

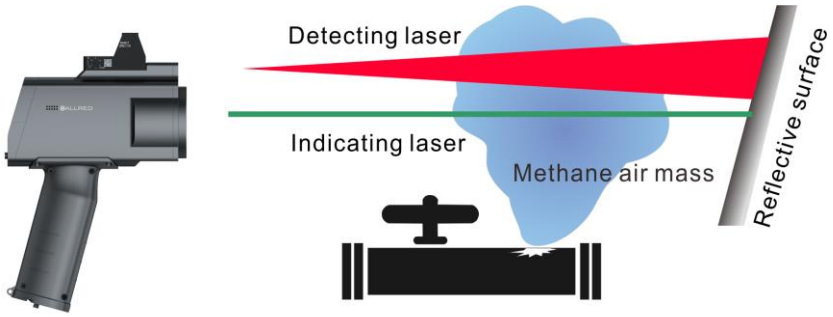
Output power：≤5mW

Wavelength: 530nm

Laser level: Class3R, direct exposure is potentially dangerous, avoid direct exposure to eyes

1. Introduction

ARD4100 Remote Methane Leak Detector uses international advanced tunable diode laser absorption spectroscopy technology (TDLAS), which can detect methane gas within a certain distance. At the same time, through optimization design and inde-pendent research and development, the detection distance and accuracy of the detector are greatly improved, which is the most powerful safety guarantee for gas inspection and leak detection. Unlike traditional portable detectors, this Remote Methane Leak Detector does not need to place the probe in a gas-filled environment. Instead, the device emits a laser beam. The laser passes through the pipe or the space above the facility and hits the object at the other end. Reflected back to the receiver, and then converted into electrical signals, these signals are used to analyze the concentration of methane, the unit is ppm · m. By using WMS technology, the Remote Methane Leak Detector can achieve extremely high detection accuracy. The light at this wavelength is only absorbed by methane, so it only reacts to methane and is not affected by other gases, which greatly improves the accuracy of detection. Using the Remote Methane Leak Detector, the operator does not need to be in a dangerous environment, which not only protects the safety of the inspector, but also can inspect the overhead pipeline from a long distance, which improves the inspection efficiency. The detection reading is the product of the concentration of the laser passing through the methane gas mass and the thickness of the gas mass in ppm · m, as shown below:



2. Composition

The structure and accessories of ARD4100 are as follows:

3. Specifications:

Measurement range:	0 ppm · m - 100000 ppm · m
Sensitivity：	5 ppm · m
Detection distance:	120 meters
Laser grade:	Detecting laser: Class 1 Indicating laser: Class 3R，avoid direct exposure to glasses
Aiming method:	Indicating laser aiming and scope aiming
Response time:	0.05s
Protection class:	Ip54
Ex rating:	Exib IIC T4 Gb
Operating temperature:	-20℃~ 50℃
Display & Alarm:	LCD + sound alarm
Working hours:	12 hours
Device power supply:	Rechargeable lithium battery, 11.1V,3350mAh
Product weight:	0.55kg
Product size:	198mm*131mm*58mm

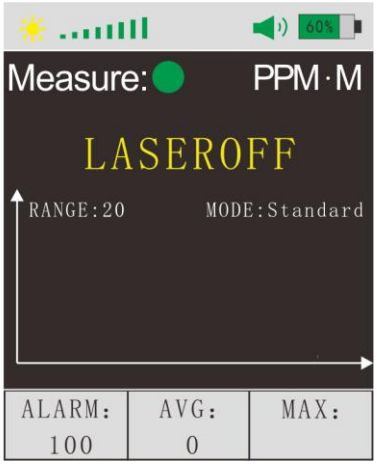
4.Operation Instruction

4.1 Turn on and Turn off

Turn on:

Press and hold the power switch on the front of the device, the display shows the warm-up and start-up interface, and then enter the detection interface.

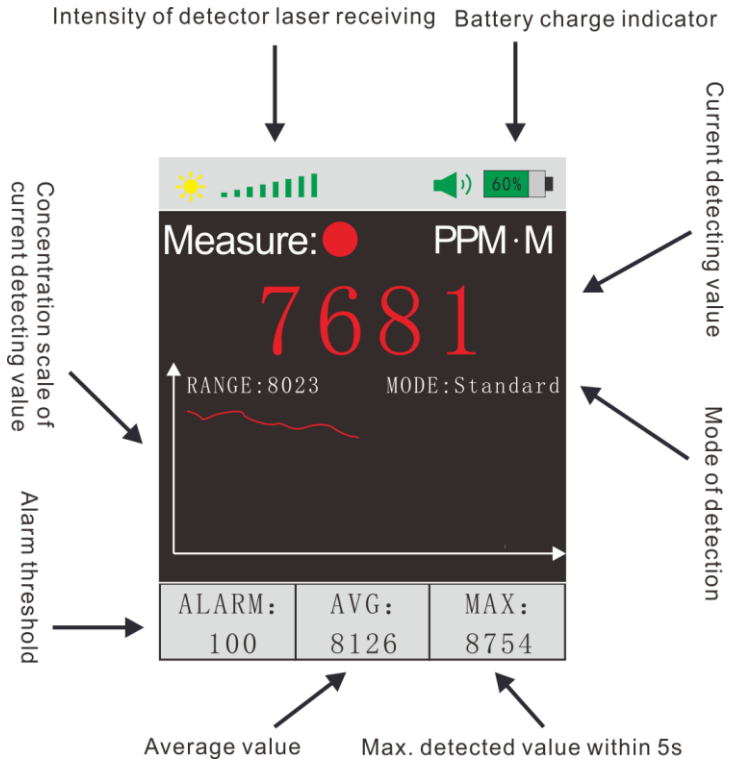
*Note: At this time, only the indicating and detecting laser have been turned on and continue to work.



Turn off:

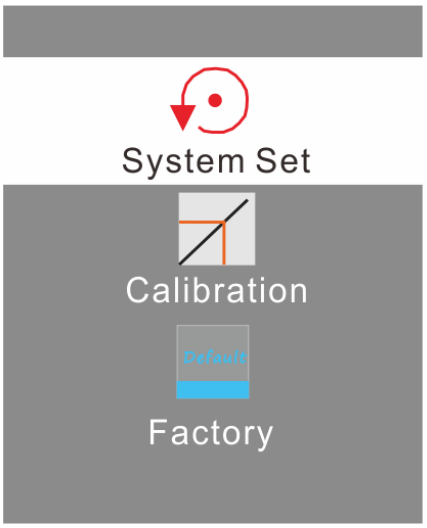
Long press the power switch on the front of the device again, the device and the display will be turned off.

4.2 Menu Illustration

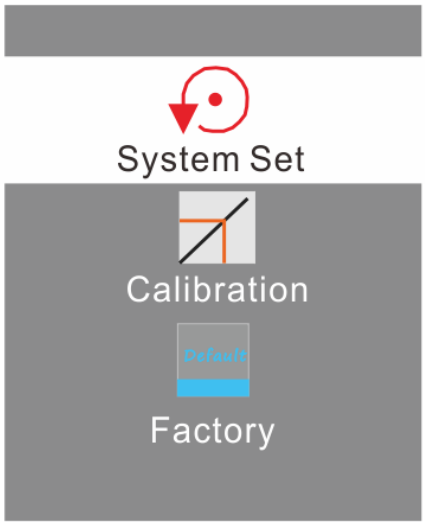


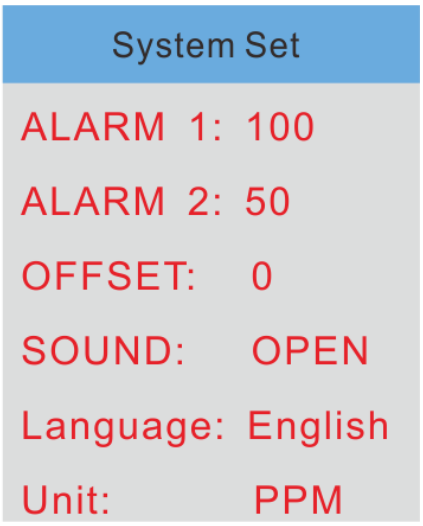
4.3 Change menu setting

Press the MENU key to enter the menu interface. The menu interface is as follows:



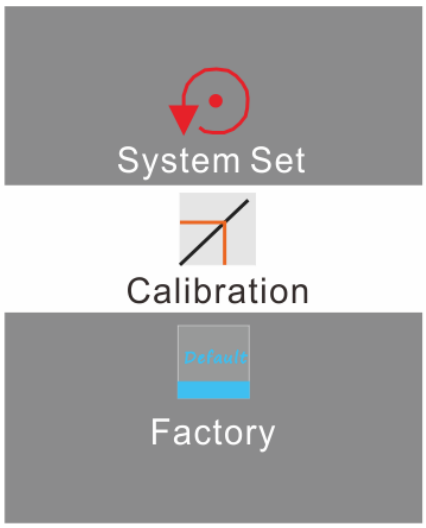
4.3.1 System Setting

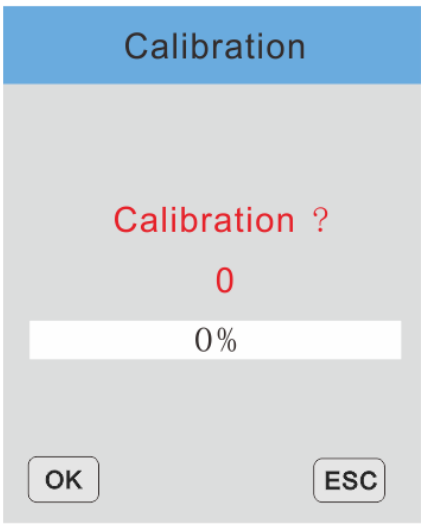




On the main menu interface, move the cursor with the MENU and MOVE keys to select the system set icon, and press the POWER key to enter the system set. Move the cursor with the MENU and MOVE keys to select the item you want to change, and press the POWER key to enter. Use the MENU and MOVE keys to change its size of. Press MENU to confirm the changes.

4.3.2 Calibration

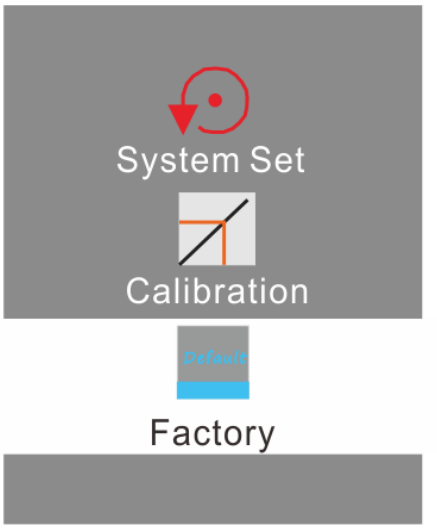




On the main menu interface, move the cursor with the MENU and MOVE buttons to select the calibration icon, and press the POWER key to enter the calibration. Press the MENU key to confirm the system. Within 10 seconds of the countdown, place the device directly in the calibration gas cell in the safety protection box. After

three minutes, the calibration is successful, the device alarms, remove the device, and the calibration is complete.

4.3.3 Reset

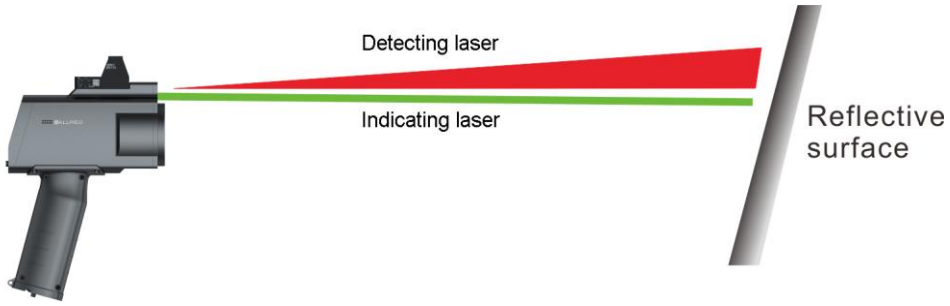


On the main menu interface, move the cursor with the MENU and MOVE keys to select the factory reset icon, and press the POWER key to enter the factory. Press MENU to restore the factory and return to the main menu.

4.4 Detecting Methods

4.4.1 Aiming instructions

The ARD4100 Remote Methane Leak Detector has two aiming methods to assist Detection. The first is a green indicating laser. The green indicating laser is suitable for short-range aiming and aiming in weak sunlight. The second is a sight lens, which is suitable for long-distance sighting and sighting in strong sunlight.



☆ **Indicating laser aiming**

After the device is turned on, the indicating laser and detecting laser are turned off. Short press the power switch on the front of the device to turn on the indicating laser and detecting laser at the same time.

☆ **Sight lens use effect**

When the device is turned on, the sight lens is also open, and when the device is turned off, the sight lens is off at the same time. The specific aiming effect is as follows:

☆ **Sight lens deviation adjustment**

When deviation of the sight lens is found, the accuracy can be corrected by adjusting the crews in up dan down direction or left and right direction.

Up and down adjustment

Left and right adjustment

4.4.2 Measuring

When the laser emitted by the device passes through the natural gas leaking air mass, the methane gas will absorb the laser. The absorbed laser light is received by the detector through diffuse reflection, and the concentration information of the methane gas leakage is obtained through data collection and processing. Methane density of methane (ppm · m) =methane concentration (ppm) × air mass thickness (m).

☆ **In order to ensure that the ARD4100 Remote Methane Leak Detector can properly detect methane gas, the following conditions must be met:**

There is methane gas accumulation in the laser path;

The laser can pass through the gas;

The laser can be reflected back to the receiver through the reflective surface;

☆ **During the detection operation, the moving speed of the handheld detector will also affect the detection result. Please observe the following points during operation:**

You should try to maintain a uniform moving scan;

Focus on the detection of leaking valve ports, exhaust ports, cracks, etc .;

When the position of the pipeline is known, detect according to the S-shaped scanning path;

☆ **Common misuses**

The detector laser is facing the sky, and the light signal cannot be returned;

The detector laser is directed at the glass at a vertical angle, and the optical signal

interferes, causing a false alarm. Therefore, there must be a certain angle with the glass when testing through the glass;

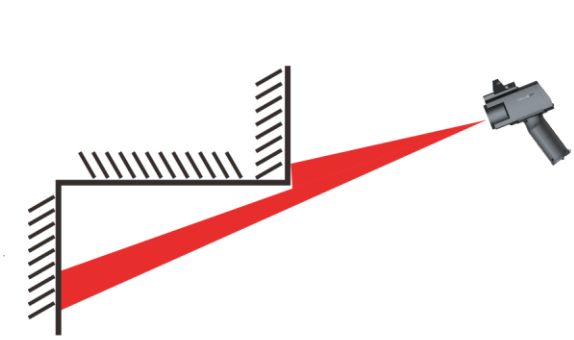
During the detection, the moving speed is too fast, causing a sudden change in the signal and easily causing false alarms;

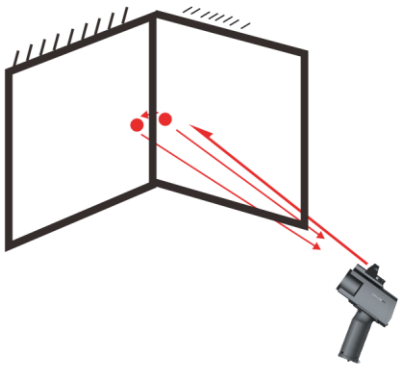
The detection distance is less than 1 meter. At this time, the laser optical system is in a poor state. Try to avoid measuring in this state.

☆ **When there are factors that cause rapid gas diffusion, such as high winds and high temperatures, the gas cannot be concentrated, which affects the detection effect. Operators should consider similar situations in actual operations.**

☆ **ARD4100 Remote Methane Leak Detector can detect methane leakage at a limit distance of 120 meters. The actual detection limit distance will vary depending on the environment. The longer the distance, the weaker the reflected laser energy and the lower the accuracy of the detection result. When abnormal changes in the alarm value are found at a long distance, you should move to a close distance and check carefully.**

☆ **When the detector laser is blocked by some objects, the distance will be abruptly changed, and false alarms may occur.**





☆ **When detecting a corner against a high reflectance background, two reflective spotter laser pointers can be observed. At this time, false alarms may be caused, and other angles should be changed to test again to determine whether it is a leak alarm.**

☆ **When the laser passes through a thin PE pipe, the detector laser may penetrate the PE pipe to detect the methane gas in the pipe, and the pipeline detection should be avoided at this time.**

4.4.3 Alarm Information

Alarm of concentration

When the ARD4100 Remote Methane Leak laser detects a methane gas (ppm · m) that exceeds a set threshold, it will send an audible alarm signal through a buzzer, and the alarm value will be displayed on the LCD.

light intensity is too weak / too strong alarm

When the reflected light signal received by the ARD4100 Remote Methane Leak Detector is too weak or too strong (detection accuracy cannot be guaranteed), the LCD screen displays "light intensity too weak / light intensity too strong".

Temperature control fault alarm

When the ARD4100 Remote Methane Leak Detector detects a problem with the internal laser temperature control (which will cause inaccurate detection and affect its life), it will display a temperature control failure on the LCD screen.

5. Common Problems and Solutions

☆Unable to detect known methane gas

When the device does not display any alarm information, but cannot send an alarm when the known methane gas is detected, you should use the gas chamber provided with the device for calibration. For the calibration method, refer to section 4.3.2.

☆Temperature control failure

When the device shows a temperature control failure, you can try to restart the device and observe whether the device continues to have such failure. If the failure continues to occur, you should contact our after-sales department.

☆Light intensity is too weak for a long time

When the device shows that the light intensity is too weak for a long time, first of all, check whether there are large particles blocking the laser emission port. If there is no blocking of the laser emission port, please contact our after-sales department.

☆For other failures not listed, please contact our after-sales department

6. Routine Maintenance

In order to keep the equipment in good condition, maintenance should be performed

Maintenance project	Frequency
Wipe the exterior surface of the instrument with a damp cleaning cloth	Often
Clean the window of the handheld detector with an alcohol-based glass cleaning cloth	When the window has obvious dust and pollutants
Calibration	Once half a year
Charge	End of each use

7.After-sales Service

Three-year warranty and lifetime upgrade maintenance. If you have problems during use, please contact our company.