



Laboratory Equipment Manufacturer
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Level Monitor Operation Manual ZC-100A



PLEASE READ THIS MANUAL CAREFULLY BEFORE OPERATION

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1. Introduction

ZC-100A Level Monitor for Liquid Nitrogen is used for monitoring the liquid level height of biological specimen required in the cryogenic container, and sending an overrun alarm signal, with alarm sound of different tune and different length.

It features in being shockproof, anti-jamming, reliable, precise, durable and convenient. It can measure the temperature in the liquid nitrogen container, displaying temperature through LED nixie tube.

2. Technical Specification

- 1) Power Supply: 220V/50Hz.
- 2) Power consumption: <0.5 W
- 3) Temperature Measure Scope: -200°C ----- +60°C
- 4) Accuracy: Lower Limit Point: $\pm 0.1^{\circ}\text{C}$
- 5) Alarm Conditions: Liquid Level too high; Liquid Level too lower; Problem from temperature sensor; Power supply problem; Parameter set problem.
- 6) LOWER LIMIT alarm error: <15mm
- 7) With adjusting (revising) function
- 8) Communication face port: RS232 (optional).
- 9) Dimension: 142mm×100mm×48 mm

3. Working Principle

When the temperature sensor was fixed in the tank, filling the tank with Liquid nitrogen, the temperature in the tank will change, especially there is a temperature difference between the Liquid Nitrogen and the Gas Nitrogen space (the level position). So the temperature sensor can measure and indicate the temperature difference and alarming if the Liquid Level of Liquid Nitrogen is too lower.

4. Installation Methods

The product is suitable for many liquid nitrogen container of our company, installation procedures are as follows, installation methods (see the diagram):

- 1) Fixing mounting deck on the appointed position according to the diagram (If fixing it on the evacuation nozzle, you must take out plastic cover at first; if fixing it on the handle, you must take off Liquid Nitrogen Level Alarm during transferring liquid nitrogen container).
- 2) Putting the Sensor into the appointed position and fixing it.
- 3) Connecting Sensor Extension Line Tie-in and Alarm interface, and screw the nut tightly;
- 4) Switching on the Power, Level Alarm inspecting automatically and showing “8888” on the display. It begins working normally.

5. Operation Methods

First when the temperature sensor was deep into liquid nitrogen, and get temperature balance, (about 2 minutes), if the temperature indicating is not -196.0°C , then please adjusting the number indicating to be -196.0°C . After adjusting it, the device can work

in normal conditions.

When there is alarming signal, then operate as follows:

1. When the Light of PRE-ALARMING lighting, it means the liquid nitrogen level in the tank is not too much, the user should add LN in near future. The temperature always set to be -195.7 C for the Pre-alarming.
2. When the Light of LOWER LIMIT lighting, it means the liquid nitrogen level in the tank meet the lower limit, the user should add the Liquid Nitrogen into the tank, or the sample storing in the tank maybe damaged. The alarming level error for this point is less than 15 mm. slowly, or the LN maybe comes out from the tank (too much LN add)

6. Adjusting of the device

- 1) To check the set temperature of each point, please press the button of Indicating , then the each point set temperature will indicate:
When there is a point (.) follow the number , then it is means LOWER LIMIT temperature, like “ -196.0°C “, this number can be adjusted, between -197.3°C to 191.0°C .
- 2) Press RESET BUTTON, the alarming noise will stop, but the signal alarming light will still lighting to alarming the condition.
- 3) The Level Alarming device has been adjusting to work before EXW, the Pre-Alarming time is more than 24 hours. For the tank capacity less than 30 Liter, we dot suggest to use this kind of alarming device.
- 4) There are two ways to adjusting the Alarming Level set, one is to adjusting the physical fix position of the temperature sensor, the other way is to adjust the temperature of the LOWER LIMIT Alarming , (if do like this the time of Pre-Alarming will change also, if the user do not want to change the pre-alarming time, he can adjusting the temperature of Pre-alarming accordingly)
- 5) The way to verify the temperature: to verify the temperature by set the Liquid Nitrogen Temperature to be -196.0°C . When the Temperature Sensor deep into the Liquid nitrogen , the LOWER LIMIT temperature is not -196.0°C , then press the ENTER BUTTON (do not release) till the indicating screen flash, then press RESET BUTTON to let the temperature indicated to be lower step by step, or press ENTER BUTTON to let the temperature indicated to be higher step by step. When adjusted the indicating temperature to be -196.0°C , then press the ENTER BUTTON for a while (for several seconds do not release), then the Alarming Device will storing the set parameter , and the indicating screen will indicate in normal way.
- 6) How to adjusting the Alarming Temperature:
 - a. Press RESET BUTTON for several second, the power supply for the Alarming Device will be shut off , Then press ENTER BUTTON to turn the power supply on, and Press RESET BUTTON at once and do not release it until the Pre-Alarming Light flash, then press RESET BUTTONON to let the temperature indicated to be lower step by step, or press ENTER BUTTON to let the temperature indicated to be higher step by step, when the indicating temperature change to be the temperature the user want to adjust, then press

the ENTER BUTTON for several second, then the alarming device will storing the set Pre-alarming temperature.

- b. Press ENTER BUTTON for several second, the power supply for the Alarming Device will be shut off , Then press ENTER BUTTON to turn the power supply on, and Press RESET BUTTON at once and do not release it until the LOWER LIMIT Light flash, then press RESET BUTTON to let the temperature indicated to be lower step by step, or press ENTER BUTTON to let the temperature indicated to be higher step by step, when the indicating temperature change to be the temperature the user want to adjust, then press the ENTER BUTTON for several second, then the alarming device will storing the set LOWER LIMIT temperature.
- c. If the user forgets the set temperature of the Pre-alarming or LOWER LIMIT, please repeat the above step of a. and b., the flash indicating temperature the user see on the screen is the set temperature. At last, press the ENTER BUTTON for several second, the device will go back to the normal working condition.

7. Warning and Notice

1) Short Circuit and Open Circuit:

When the device is Short Circuit, the device will alarming and the indicating error code is “E30n” or “E10n”. When the device is Open Circuit, the device will alarming and the indicating error code is “E30f” or “E10f”.

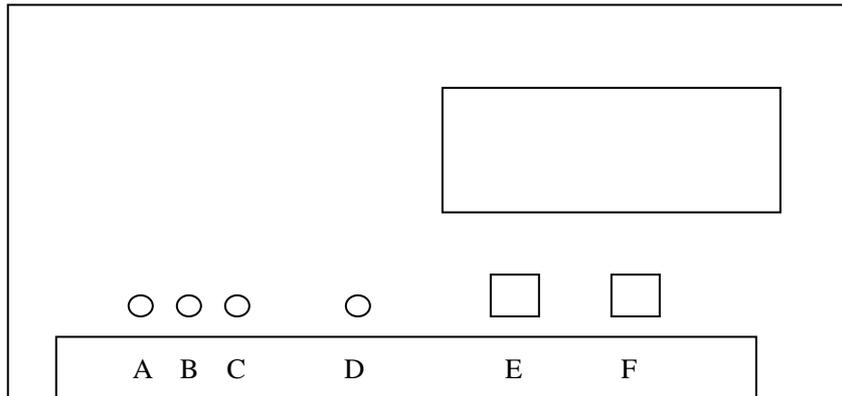
- 2) If the Indicated is “E.EEE”, then it is means that the Alarming Temperature set is wrong, the user need to adjust the set temperature again.
- 3) Please do not change the set temperature of Alarming Temperature and LOWER LIMIT Temperature random, since they are set to be OK before delivery, if the user must want to change the set temperature, please read the operational manual carefully, know how to adjust the set temperature, be sure that the Pre-alarming Temperature is lower than LOWER LIMIT temperature, or the device will not work correctly.
- 4) Protect the Device carefully, do not strike it, keep it clean, keep it dry and away from water.
- 5) Please do not tear the label paper at the side of the alarming device.
- 6) To be sure the device working well, please verify the device once every year.

8. After-Sale Services

The length of warrantee is one year, from the date of the invoice.

9. Main Components

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|-----------------------------|---------|
| 1. ZC-100A Level Monitor | 1 set |
| 2. Temperature sensor: | 1 piece |
| 3. Device Install fix frame | 1 piece |



I. Diagram of the Display

- A. NORMAL WORKING LIGHT (NORMAL)
- B. PRE-ALARMING LIGHT (PRA)
- C. LOWER LIMIT LIGHT (LL)
- D. POWER SUPPLY LIGHT (POWER)
- E. RESET BUTTON (RES)
- F. ENTER BUTTON (ENTER)



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