Operations Manual
MODO-1000
Optical Dissolved Oxygen Digital Electrode

leadtec
Water Treatment Solution

Table of Content

1.0 Specifications

Specifications are subjected to change without notice.

SPECIFICATIONS	DETAILS	
	% sat	**mg/l**
Measuring Range	0 ~ 200.0	0.00 ~ 20.00
Resolution	0.1	0.01
Accuracy	±0.2	±0.2
Temperature Probe	NTC	
Temperature Range	0.0℃ to +60.0℃	
Temperature Resolution	0.1℃	
Temperature Accuracy	±0.2℃	
Ambient Temperature	0℃ to +60℃	
Storage Temperature	-20.0℃ to +70.0℃	
Pressure Range	500~2100mBar	
Salinity Range	0-40.00 ppt	
Fieldbus Connection	RS-485 Modbus RTU Protocol	
Baud Rate	9600	
Protection Class	IP65	
Electrical Connection	12 to 24 VDC	
Weight	0.8 kg	
Material	POM & 316L stainless steel	
Cable Length	7 meters (Optional)	

2.0 Introduction

2.1. General Information

Notice

Indicates essential information regarding operation, calibration or anything which is considered as good practice or handling of the products.

The manufacturer will not be liable and responsible for any direct, indirect, incidental, or consequential damages due to any defect or omission in the operations manual. The manufacturer reserves the right to alter the content in the operations manual as well as the products without any notification. Please contact the manufacturer to request the latest and revised editions of the operations manual.

Unpacking, setting, installing, and operating of the product require comprehensive knowledge and understanding of the entire operations manual. Please take note to all danger, warning and notice signs and details. Negligence of the danger, warning and notice signs could increase the risk of serious injury to the product's operator or even inflicting damage to the products. Do not install, calibrate, or operate this product in any manner other than that specified in the operations manual.

2.2. Safety Information

DANGER!	
[Signage]	Neglecting the signs may result in death or at least serious injury to the operator.

WARNING!	
[Signage]	Neglecting the signs may result in mild or at least minor injury to the operator.

2.3. Safety Precautions

It is vitally important to take safety precautions during the installation, operation, and calibration of the electrode. Safety must not be compromised; some ground rules need to be followed first. The basic guidelines regarding the safe handling of electrical components are documented below will help users while working with electricity.

2.3.1. Handling by Authorized Personnel

The instrument must be operated by trained personnel and technical personnel.

2.3.2. Component Isolation

The signal cables in the instrument should be separated from the power lines and machines that produces high noise interference which affects the performance of the controller significantly.

Limitations

The warranty does not cover damage or malfunction caused by misuse, abuse or improper maintenance, failure to follow operating instructions, or use with equipment which it is not intended to be used. It does not cover cosmetic or incidental damages. Also, the warranty will not apply to damage caused by unauthorized alteration, modification, or repair of the product.

3.0 Product Overview

3.1. Product Content

Leadtec optical dissolved oxygen digital electrode (MODO-1000) packaging contains 1 x digital optical dissolved oxygen electrode, and 1 instruction manual.

3.2. Product Introduction

Leadtec optical dissolved oxygen digital electrode comes equipped with RS-485 Modbus RTU output for communication between the electrode and computer such as PLC, PC etc. The electrode consists of the sensing element and integrated RS485 circuit embedded on the same body.

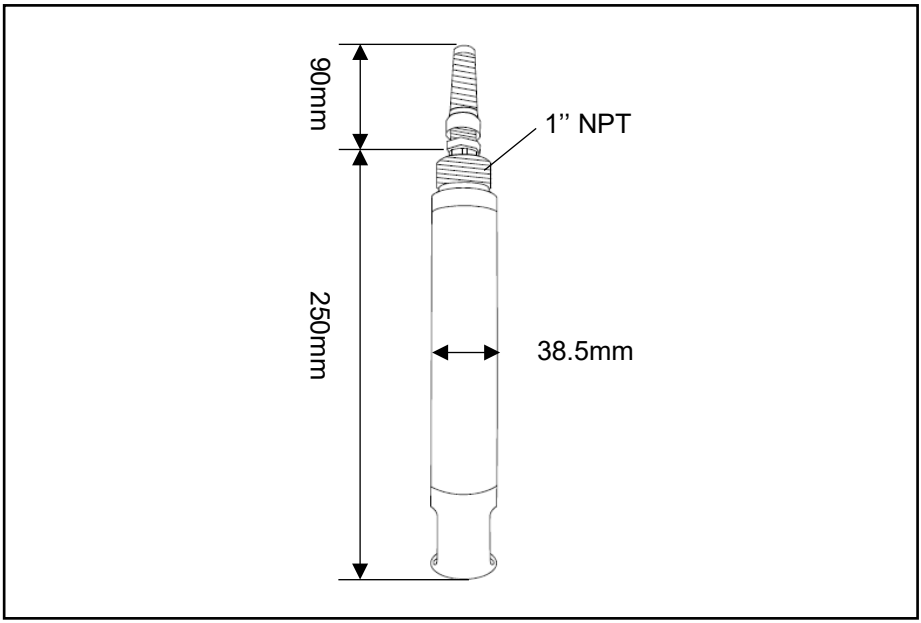

Figure 1 Electrode dimensions MODO-1000

3.3. Electrode Connection

Leadtec digital dissolved oxygen electrode transmits signal with RS485 Modbus RTU communication protocol. The electrode is designed with Half-duplex wiring configuration. Refer figure 2 and 3 for wiring connection between digital dissolved oxygen electrode and your PC by using an RS 485 to USB converter.

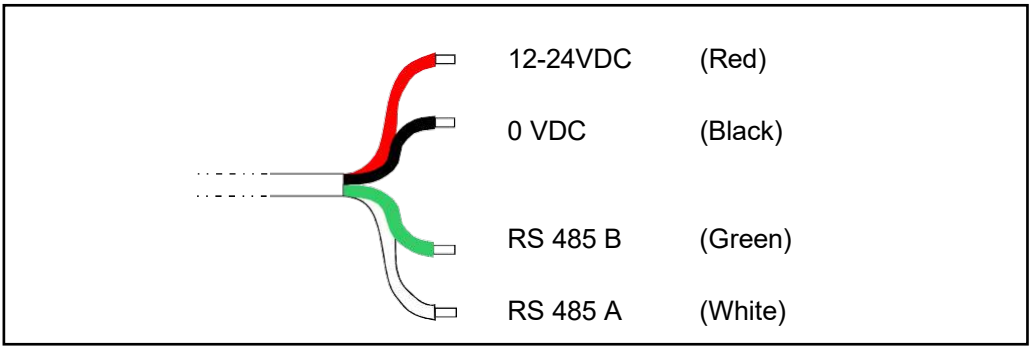

Figure 2 Electrode connection

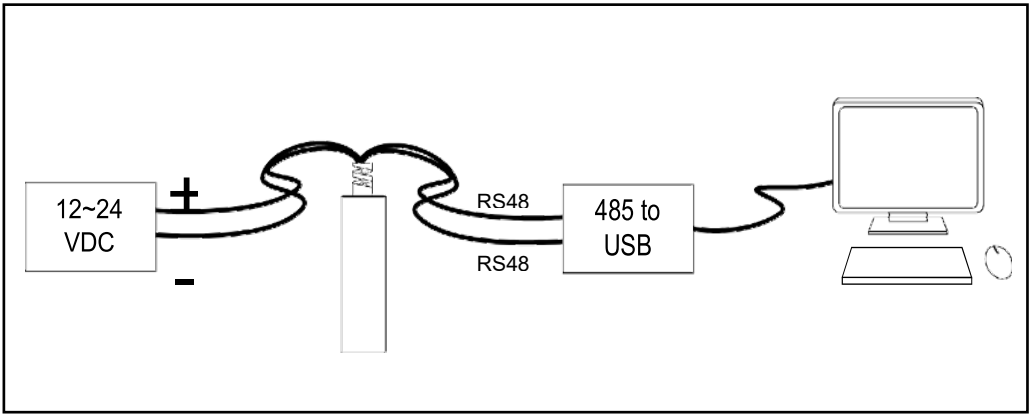

Figure 3 Electrode termination

4.0 Calibration

The electrode is pre-calibrated at factory to ensure upmost accuracy and user comfort. Calibration is not needed unless user requires accuracy adjustment. The electrode is ready for calibration once the RS 485 connection is completed.

4.1. Calibration Procedure

Two points calibration:

1. Immerse the electrode to anhydrous sodium sulfite.
2. Write 0xFF address 0x46 to begin with the 0% calibration.
3. Wait for the reading is stabilize.
4. Write 0x00 to address 0x46 again to accept and save the 0% calibration.
5. Place the electrode to a closed,100% saturated humidity space.
6. Wait for the reading is stabilize.
7. Write 0x00 to address 0x48 to accept and save the 100% saturated calibration for completion.

One points calibration:

1. Place the electrode to a closed,100% saturated humidity space.
2. Write 0xFF to address 0x48 to begin with the slope calibration.
3. Wait for the reading is stabilize.
4. Write 0x00 to address 0x48 to accept and save the 100% saturated calibration for completion.

5.0 Troubleshooting

5.1. Troubleshooting

Problem	Troubleshooting Measures
No reading	- Verify the power supply rating
	- Verify the specification of the communication
	- Contact your supplier
Communication fail	- Ensure both power and RS 485 cables are connecter correctly and secure
	- Ensure the power supply is rating is correct
	- Ensure that the connection from the RS 485 to the USB device is installed properly
	- Contact your supplier

6.0 Index 1 (RS 485 address list)

Leadtec digital pH/ORP electrode is a Modbus slave device that uses serial communication for data transmission with a Modbus master device.

6.1. Configuration:

Protocol : Modbus RTU
Baud rate : 9600 (Fixed)
Data bits : 8
Stop bit : 1
Parity : None

ID: 0x11(Default)

Address	Function	Data type	R/W	Range	Description
02H	Temperature reading	Float	R	0-60℃	Temperature readings
04H	DO reading	Float	R	0.0 -200.0	DO readings
06H	mg/l reading	Float	R	0.00 -20.00	mg/L readings
0CH	Status	Word	R	0-2	0 = measuring state
					1 = zero calibration state
					2 = slope calibration state
10H	Restore Factory data	Word	R/W	0xFF	Restore factory data
12H	Measurement unit	Word	R/W	1-2	0=%, 1=mg/l
14H	ID address	Word	R/W	1-255	ID address setting
18H	Filter	Word	R/W	0-50	
1EH	Temperature offset	Float	R/W	+/-5.0	Temperature offset
20H	DO offset	Float	R/W	+/- 10.0	DO offset
22H	mg/l offset	Float	R/W	+/- 1.00	mg/l offset
32H	Pressure compensation	Float	R/W	500-2100	For calibration only
32H	Salinity	Float		0.00-40.00	For calibration only

Address	Function	Data type	R/W	Range	Description
46H	Zero calibration	Word	R/W	0 0xF0 0xFF	0 = Complete zero calibration
					0xF0 = Cancel calibration
					0xFF = Starting zero calibration
48H	Slope calibration	Word	R/W	0 0xF0 0xFF	0 = Complete slope calibration
					0xF0 = Cancel calibration
					0xFF = Starting slope calibration
4AH	Calibration parameters	Word	R/W	0-1	0 = Use factory parameters
					1 = Use user parameters
50H	Part number	u32	R	ASCII	MODO-1000
58H	Serial number	u32	R	ASCII	AXXXXXXX