Operations Manual

MEC4-1000

Digital Conductivity Electrode

leadtec
Water Treatment Solution

Table of Content

1.0 Specifications

Specifications are subjected to change without notice.

SPECIFICATIONS	DETAILS			
	Conductivity	**Resistivity**	**Salinity**	**TDS**
Measuring Range	0.00 ~ 2000 mS	0.00 ~ 20.00 MΩ CM	0.00 ~ 78.00 g/kg	0 ~ 133000 ppm
Resolution	0.01	0.01	0.01	1
Accuracy	±2% F.S.	±2% F.S.	±2% F.S.	±2% F.S.
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℃			
Electrode constant	0.0001~20.0000			
Fieldbus Connection	RS-485 Modbus RTU Protocol			
Baud Rate	9600			
Protection Class	IP65			
Electrical Connection	12 to 24 VDC			
Weight	0.8 kg			
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 digital conductivity electrode (MEC4-1000) packaging contains 1 x digital conductivity electrode, and 1 instruction manual.

3.2. Product Introduction

Leadtec digital conductivity 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.

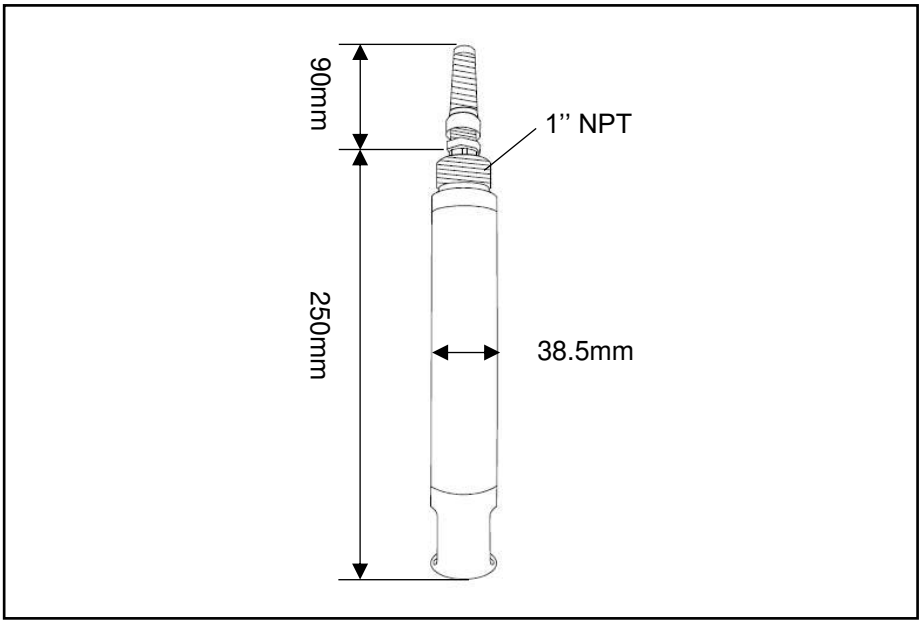

Figure 1 Electrode dimensions MEC4-1000

3.3. Electrode Connection

Leadtec conductivity digital 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.

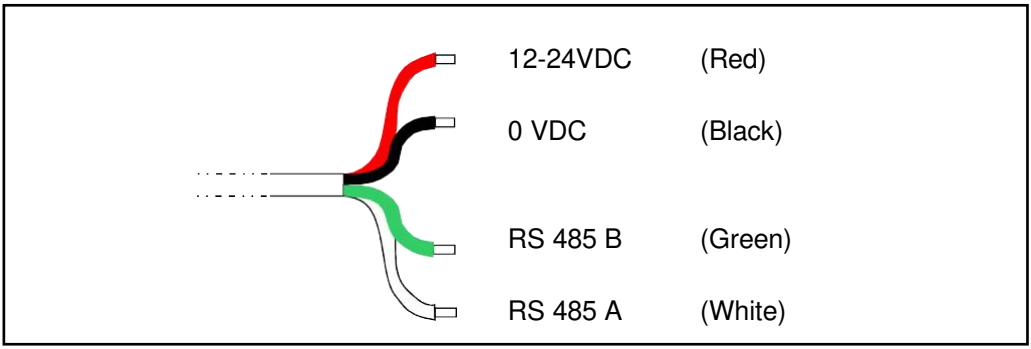

Figure 2 Electrode connection

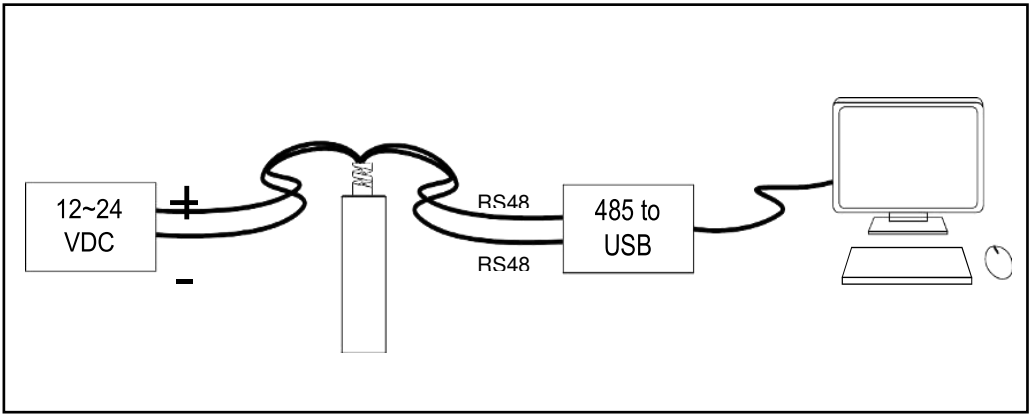

Figure 3 Electrode termination

4.0 Calibration

Calibration of sensors is especially important in maintaining high performance and accurate readings. The sensor is ready for calibration once the RS 485 connection is completed.

4.1. Calibration Procedure

1. Write 0xFF to address 0x10 to restore the factory parameters.
2. Write 0-3 to address 0x4A to select calibration type.
3. Write the standard buffer value to address 0x36-0x3C.
4. Place the electrode to the standard buffer and wait for the reading to stabilize.
5. Write 0xFF to address 0x48 to accept and save the calibration.

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: 0x14(Default)

Address	Function	Data type	R/W	Range	Description
02H	Temperature reading	Float	R	0-60 ℃	Temperature readings
04H	Conductivity reading	Float	R	0uS – 200.0 mS	Conductivity readings
06H	Resistivity reading	Float	R	0 -20.0 MΩ-CM	Resistivity readings
08H	Salinity reading	Float	R	0 78.00 g/Kg	Salinity reading
0AH	TDS reading	Float	R	0 – 133000 ppm	TDS Reading
0CH	Status	Word	R	0-1	0 = Measuring state
					1 = Calibration state
10H	Restore Factory data	Word	R/W	0xFF	Restore factory data
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	Conductivity offset	Float	R/W	+/- 1000 uS	Conductivity offset
22H	Resistivity offset	Float	R/W	+/- 5.00 MΩ-CM	Resistivity offset
24H	Salinity offset	Float	R/W	+/- 5.00 g/Kg	Salinity offset
26H	TDS Offset	Float	R/W	+/- 10000 ppm	TDS offset
28H	Temperature compensation	Word	R/W	0 - 1	0 = Manual temp. comp.
					1 = Automatic temp. comp.
2AH	Manual temperature	Float	R/W	0-60 ℃	
2CH	Pure water compensation	Word	R/W	0-1	0 = General formula
					1 = Pure water formula
32H	Solution coefficient	Float	R/W	0.01-40.00	Unit is %
34H	TDS coefficient	Float	R/W	0.01-3.00	For TDS calculation

Address	Function	Data type	R/W	Range	Description
36H	Conductivity standard buffer	Float	R/W	1413 uS	For conductivity calibration
38H	Resistivity standard buffer	Float	R/W	20 MΩ	For resistivity calibration
3AH	Salinity buffer	Float	R/W	10 g/kg	For salinity calibration
3CH	TDS standard buffer	Float	R/W	1000 ppm	For TDS calibration
48H	Slope calibration	Word	R/W	0 0xFF	0 = Complete slope calibration
					0xFF = Starting slope calibration
4AH	Calibration parameters	Word	R/W	0-3	0 = Conductivity
					1 = Resistivity
					2 = Salinity
					3 = TDS
50H	Part number	u32	R	ASCII	MEC4-1000
58H	Serial number	u32	R	ASCII	DXXXXXXX