Foreward

Thank you for choosing DOF-6310 Dissolved oxygen Data Acquisition Terminal ！

Please read this introduction carefully before installation, correct installation and parameter setting will use the performance and advantage of the product in the best way, bringing you a good using experience.

If you meet some difficulties in the process of the installation and using, please inquire Technical Support Department 400-666-1916 in time.

After unpacking, please be sure to check the complete set of list and the actual product you received, if there is anything missing or damaged, please contact in time.

The manufacturer promises seriously:

1. If quality problems appear within one year from the date of purchase, you will receive free product repair or replacement of a new instrument.

2. No matter in what way you get this product, manufacturer provides eternal technical maintenance as a promise for the sold instruments.

3.Damages to the product caused by the following reasons are not within the scope of the warranty:

a)Misconnection with high voltage power source or damage caused by flooding;

b)Damage caused by privately refitting and improper use;

c)Collateral damage because of the improper selection of model;

d)Damage caused by going beyond the using conditions of the product;

e)All physical damage caused by the improper pressure;

f)Failure appears because storage and transportation are not in accordance with the stipulations of storage or transportation conditions (reference standard SJ/T10463-93);

g)Consumable materials need to purchase separately.

 When this symbol appears in the manual, it means that something about safety, installation, product function and using should be paid special attention!

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1.Overview

DOF-6310 fluorescent dissolved oxygen is a data acquisition terminal with RS485.Based on the quenching principle of active fluorescence by specific substances, the fluorescence film metalporphyrin complex coating is excited by green light to produce fluorescence. The fluorescence quenching time is positively correlated with the oxygen concentration in the environment, and the oxygen content is obtained by quenching speed .

This data collection terminal can directly form a collection system with any communication equipment conforming to Modbus RTU format, such as industrial computer, configuration display, PLC, digital instrument, wireless communication module, and data acquisition controller.

The terminal conforms to the concept of Internet + and is widely used in power, petrochemical, industrial fields, chemical processes, industrial water treatment, environmental monitoring, sewage treatment, aquaculture and other online dissolved oxygen analysis occasions to meet technical applications in various fields.

Diagram **1.1** DOF-6310 fluorescence dissolved oxygen data acquisition terminal appearance

2.Performance and charateristics

- ✧ Fluorescence quenching principle, no need for internal filling, no oxygen consumption, and easy maintenance;
- ✧ The service life of the fluorescent membrane cap is more than one year (under ideal conditions);
- ✧ Original altitude, atmospheric oxygen partial pressure, temperature compensation, to improve the authenticity of the data;
- ✧ There is almost no flow rate requirement, which can meet most usage measurement scenarios;
- ✧ RS485 digital port directly sends Modbus RTU communication data;
- ✧ As the front terminal of any industrial computer, controller, PLC and communication protocol module;
- ✧ 9-28V wide power supply DC power supply, suitable for a wide range of application scenarios;
- ✧ Data acquisition terminal sends data directly, with long transmission distance, anti-interference and no distortion;
- ✧ More solutions for problems,and product ecological support.
- ✧ Good electromagnetic compatibility (EMC) design, calmly deal with the complex electromagnetic environment of the industrial site;

3.Supporting resources

- ✧ Dissolved oxygen data acquisition terminal directly integrated into the industrial site DCS and PLC system;

- ✧ Access to cloud communication and big data platform through GPRS system and DTU;
- ✧ Lora/ZigBee module realizes wireless long-distance data transmission and relay;
- ✧ Optical transceiver and far-infrared terminal realize optical fiber, optical remote and discrete transmission;
- ✧ Support traditional 4-20mA industrial system (RS485—4-20mA module);
- ✧ 485/WiFi/USB IoT tools make on-site operation easily;
- ✧ Address search, baud rate setting, membrane head update, calibration can be realized in APP.
- ✧ Timed jet maintenance device provides automatic maintenance for the fluorescent front end to operate in high suspended solids water;
- ✧ Support hundreds of meters of cable distance (can be extended).

Diagram 4.1 Data aquicitionterminal multiple application

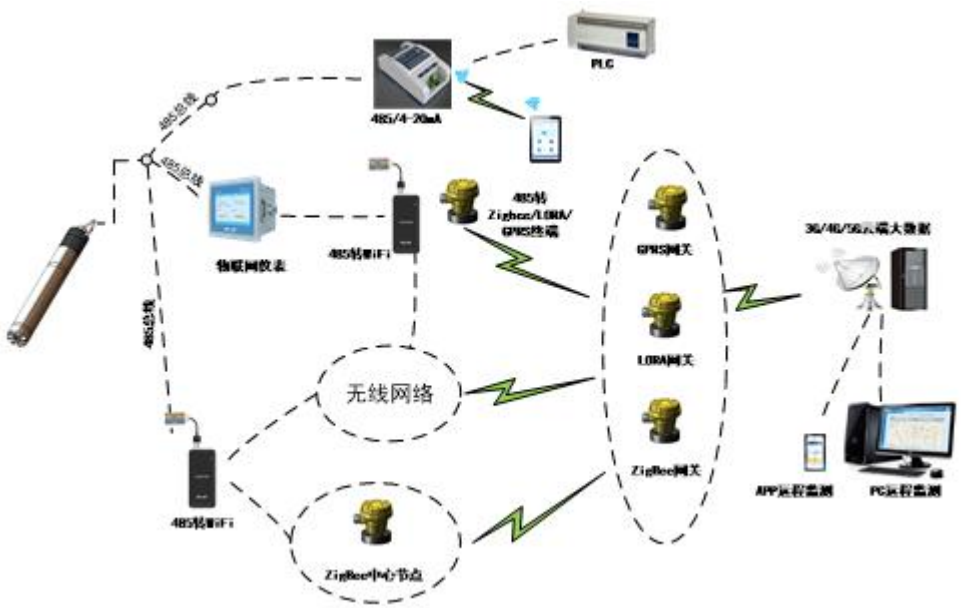


Diagram 4.2 Schematic diagram of data collection terminal connection

4.Main performance index

Product Model	DOF-6310
Product Name	Dissolved oxygen data collection terminal
Measuring Method	Fluorescence Method
Measurement range	0-20mg/L
Accuracy	±0.3mg/L
Resolution	0.01mg/L
Response time	90s
Repeatibility	5%RS

Temperature compensation	0-60.0℃ Accuracy：±0.5℃
Air pressure compensation	300-1100hPa
Stand pressure	0.3Mpa
Communication	RS485 MODBUS-RTU standard protocol
Power	DC（9-28）V
Power comsuption	<2W
Operational envrionment	Temperature：（0-50）℃
Storage Environment	Temperature：（-10-60）℃； Humidity：≤95%RH(None condensation)
Installation	Submerged
Protection Level	IP68
Weight	1.5Kg（with 10m cable）

5.Product size and wiring instructions

（1）Appearance and size

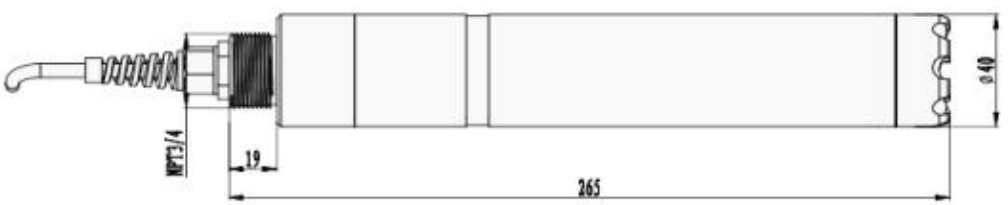


Diagram **6.1** Physical size drawing（Unit：**mm**）

(2) Wiring instructions

1. Wire

In order to obtain longer-distance transmission and environmental endurance, it is recommended to use the original cable for the data collection terminal. It is not recommended to replace the commercially available cables of other specifications at will to avoid affecting the transmission characteristics. It is recommended to make an appointment with the original manufacturer with a relatively rich cable length when purchasing the product.

2. Trasmitting distance

The lengths supported by different power supply voltages are shown in the table below:

Input Voltage	Loop current	Maximum loop resistance	Maximum cable length
24V	40mA	120Ω	600m
12V	100mA	20Ω	100m

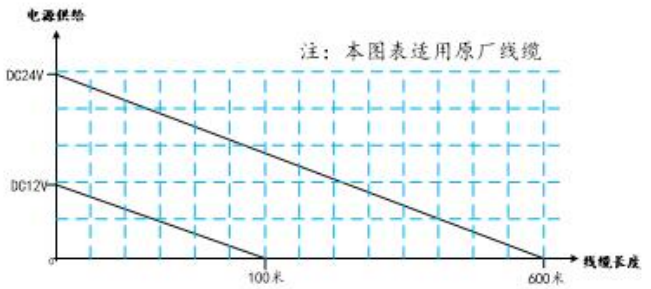


Diagram 6.2 Relationship between power supply and cable length

2. Wire Instruction

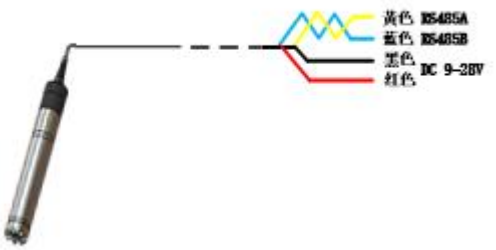


Diagram 6.3 Collection terminal wiring description diagram

Note：DC 9-28V power supply connection is not divided into positive and negative, no polarity connection, automatic default

(3) Communication setting

1. Communication address and rate: the default when the product leaves the factory: baud rate=9600; communication address bit=01
2. In order to calibrate on site, can select to purchase operator,and finish the setting of address and communicatin rate through APP.
3. When you need to change the address and rate of the data mining terminal,you can check the current address on the APP, and the new address and rate can be redefined.
4. To use the handheld operator:connect the four wires at the end of the cable to the IoT handheld operator, scan the QR code on the product with your smartphone, download the applet from the cloud, and turn on the handheld operator to complete the address modification or Product calibration and other work.
5. When setting and calibrating several data aquicition terminals, connect the power bank to get power life.

Diagram 6.4 Schematic diagram of offline setting operation

6.Installation and maintenance guide

(1) Installation Method

Diagram 7.1 Environmental protection bracket installation

1. **Sensor mounting bracket**

It is universally applicable to the support and installation of collection terminals in environmentally friendly sewage treatment plants and other pools or open channels and aquaculture ponds. It is convenient for on-site maintenance. It is an innovative installation method that is safe, convenient, compatible, hygienic and civilized.

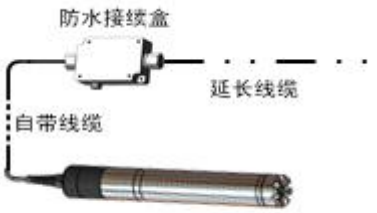
When the collection terminal is installed upright, it can be equipped with a multi-degree-of-freedom sensor bracket or a floating (constant water depth) environmental protection bracket.

Diagram 7.2 upright installation

Diagram 7.3 Floating **installation**

2. Cable extension

The fluorescent dissolved oxygen data acquisition terminal has a built-in pressure compensation cable conduit that communicates with the atmosphere. When the data acquisition terminal cable is extended, it should be connected from the waterproof junction box. We recommed that customers choose the original extension cable.



3. Pollution attachment treatment

The sensing front immersed in the water can easily be blocked by sludge or suspended matter, causing the hypoxic illusion of measurement data. Frequent removal of cleaning and maintenance is difficult to implement routinely. The timing jet desilting device provides a problem solution for field applications.

The timing controller triggers the clean water pump to pressurize, and the clean water flows along the mounting bracket and sensor at the sensing front end of the data aquicition terminal to the injection port. The clean water jet removes the attachments at the sensing front end and maintains the real-time sensing of the changes in dissolved oxygen in the front end of the water.

4. Wireless remote connection

When passing through the construction site blocked by rivers, ponds, and buildings, and when it is impossible to erect bridges and pipes and run wires, choose our company's LORA or Zigbee or WIFI wireless modules to achieve remote wireless transmission. This is in environmental monitoring, Sewage treatment plants, aquaculture farms, and subsequent expansion of factories are favored by user engineers because of the convenience of networking.

7.4 Schematic diagram of wireless remote connection

Note：**WiFi——Near-field communication under** no **barriers;**

LORA——Long-distance (approximately 10Km) communication under barrier-free conditions;

Zigbee——When encountering obstacles, it is composed of multiple relay relays to avoid obstacles.

5. Data bus application

Diagram 7.5 Field data bus serial application

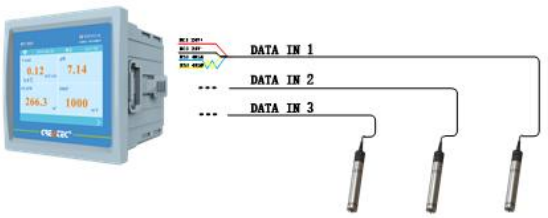


Diagram **7.**6 Field data bus parallel application

In the industrial site, the original cable is used to meet a variety of series and parallel power distributions, and to reduce the cost of on-site construction and maintenance.

7.Calibration of data aquicition terminal

DOF-6310 fluorescent dissolved oxygen data acquisition terminal has been calibrated when it leaves the factory, and it has been put into operation in the near future. For on-site inspection or verification and calibration after a period of time, there are two calibration methods:

The fluorescent dissolved oxygen terminal (without its own display) is directly checked on the display of the industrial computer, data acquisition controller, PLC, and PC upper.

With the help of the company's IOT operator to check under the APP, the APP scans the QR code on the data aquicition terminal, downloads the application applet, and completes the calibration, inspection and corresponding settings according to the operation steps under the APP interface.

8.Maintenance

The maintenance plan shows the frequency of routine maintenance tasks. For applications that will cause membrane cap fouling, the frequency of maintenance operations should be increased and the interval time should be shortened.

Note: Do not disassemble the membrane cap head for maintenance and cleaning.

Maintenance task	Recommended minimum maintenance frequency
Cleaning the data collection terminal	30 days
Check whether the data collection terminal is damaged	30 days

1 Cleaning the data collection terminal

Rinse with clean water first, and then use a soft damp cloth to gently wipe off the dirt.

Note: If it is necessary to disassemble the membrane cap head for maintenance and cleaning, please do not expose the inside of the cap head to direct sunlight for a long time.

2**Check whether the data collection terminal is damaged**

（1）Check whether the membrane surface is damaged, if it is damaged, please contact the manufacturer for replacement;

（2）Check whether the shell is damaged due to corrosion or external force;

（3）Check whether the cable connection is corroded by acidic substances. If it is corroded, please cut off the power, use a wire stripper to cut off the corroded part, and reconnect the cable.

（4）If the black coating of the membrane cap is obviously faded, partly peeled off, or the membrane cap is broken, the membrane cap needs to be replaced. When unscrewing the old cap and replacing it with a new one, check the probe window and the red surface of the new membrane cap for debris, fibers, hair and other debris. If so, please clean it before installing the membrane cap.

3 Membrane cap replacement

（1）It is recommended to replace it every year.

If the membrane cap is found to be damaged or severely corroded during routine inspection, it must be replaced.

9.Complete set

1. Product shipping list

Order No.	Name	Specification model	Unit	Picture
248817	Fluorescence Dissolved Oxygen Data Acquisition Terminal	DOF-6310	piece	
109017874	Certificate of conformity	DOF-6310 Fluorescence Dissolved Oxygen Certificate	piece	
1080488	Operational Manual	Chinese or English	piece	

2. Display unit (optional)

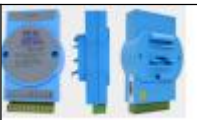
Order No.	Name	Specification model	Unit	Picture
248769	IOT METER	MFC-8800 （100*100）	piece	

248779	Data Acquisition Controller	MFC-2321	piece	
242010	Data Acquisition Controller(panel type)	MFC-1380 （138*138）	piece	
242009	Data Acquisition Controller(Sealed type)	MFC-1200	piece	

3. Communication conversion accessories (optional)

Order number	**Name**	**Specification model**	**Unit**	**Picture**
248764	RS485/4-20mA Conversion module	CEM-6232	set	 For integrated use inside the chassis
	RS485/RS232 converter	CEM-6120	set	
	RS485/CAN converter	CEM-6251	set	
	RS485/Lora converter	CEM-6362	set	

				For outdoor waterproof installation 
	RS485/ZigBee converter	CEM-6372	set	
	RS485/ Optical converter	CEM-6280	set	For integrated use inside the chassis 
	RS485/Ethernet converter	CEM-6290	set	 For integrated use inside the chassis
	RS485/HART converter	CEM-62A0	set	 For integrated use inside the chassis
	RS485/ Infrared communication converter	CEM-62C0	set	 For integrated use inside the chassis

	modbus/profibus converter	CEM-62B0	set	 For integrated use inside the chassis
248778	Hand-held RS485/WIFI Operator	CEM-6100	set	 Portable

Appendix 1 Handling of common problems:

Problem Description	Check and solve
Measured value deviation	Check whether the fluorescent membrane is contaminated, and clean it according to the maintenance method
	Check whether the calibration information is correct and re-calibrate
	Check whether the signal is normal, and get in touch with the manufacturer's after-sales personnel
Communication failure	Check whether the communication terminal is open, whether the wiring is correct, whether the device address is correct, and whether the baud rate is consistent
	Check whether the power supply is normal

APPENDIX 2 Commnunication protocol

Parameter	Register No.	Type	Value range	Remark
Model letter	40001	Read only	16-bit unsigned integer	The default value is 15
Model letter	40002		16-bit unsigned integer	Equal to 2000 constantly
DO measuring value	40004		32-bit unsigned integer	0-2000 Corresponding to 0-20.00mg/L
Saturation measurement	40007		32-bit unsigned integer	0-2000: Corresponding to 0-200.0%
Atmospheric pressure	40009		16-bit unsigned integer	
Temperature measuring value	40015		16-bit unsigned integer	Fixed to 1 decimal point
Communication mark	40017		16-bit unsigned integer	0：not connected 1：Connected
Dissolved oxygen calibration options	40021	Read and wirte	16-bit unsigned integer	1: Zero calibration 2: Initialization calibration 3: Saturated oxygen calibration
Calibration result	40022		16-bit unsigned integer	0：Default 1:Calibrated Successfully 2：Calibration failed
Reset	40030		16-bit unsigned integer	0：Default 1：Reset
Baud rate	40155		16-bit integer	1:1200,2:2400,3:4800，4:9600 Default：4
Address	40156		16-bit integer	1-247 Default：1

Operation time	40199	Read only	16-bit integer	Unit：h
Product ID	40201		32-bit integer	Serial No.：200810001
Manufacturing Date	40203		32-bit integer	For example:20200803 2020.Aug.3th

Unit function code Appendix

Read value	00	01	02	03	04	05	06	07
unit	None	μS/cm	mS/cm	MΩ·㎝	mV	V	mg/L	g/L
Read value	08	09	0A	0B	0C	0D	0E	0F
unit	%	℃	℉	Hz	m/h	m^3/s	m^3	m^3/h
Read value	10	11	12	13	14	15	16	17
unit	ppm	ppt	m/s	L	mA	mbar	NTU	FNU
Read value	18	19	1A	1B	1C	1D	1E	1F
unit	s	GPM	Gal	Pluse/min	mm	‰	pH （Non-unit ）	h
Read value	0x28	29	2A	2B	2C	2D	2E	30
unit	g/L							