سامانه پایش قدرت

Use manual of TDS meter

Contents

Chapter 1: Overview 2

Chapter 2: Technical Specifications..... 2

Chapter 3: Electrode Maintenance 3

Chapter 4: Instrument Installation 4

Chapter 5: Instrument Operation..... 6

Chapter 6: Single-Point Calibration 8

Chapter 7: Resistivity, Salinity, TDS Measurement..... 8

Chapter 8: High/Low Alarms 9

Chapter 9: Precautions & Maintenance 9

Appendix: Modbus RTU Protocol(Optional Function) 10

Chapter 1: Overview

The intelligent color-screen multi-function meter measures conductivity, resistivity, TDS, salinity, and temperature. It features strong environmental adaptability, a clear display, user-friendly operation, and high cost-performance. It is widely used in industries such as thermal power, chemical fertilizer, metallurgy, environmental protection, pharmaceuticals, food, and water supply.

Product Features:

- **High Intelligence:** High-precision AD conversion and microcontroller technology enable conductivity, resistivity, temperature measurement, and automatic temperature compensation.
- **Time Display:** Built-in real-time clock.
- **Bilingual Menu:** Switchable between Chinese and English interfaces.
- **Data Storage:** Stores historical data for up to 1 year. Data can be exported via Bluetooth (optional).
- **Rinse Relay:** Supports timed electrode cleaning via solenoid valves.
- **Audible/Visual Alarms:** Built-in buzzer and alarm lights.
- **4-20mA Output:** Configurable current output (forward or reverse).
- **Multi-Parameter Measurement:** Conductivity, resistivity, TDS, salinity.
- **Range Control:** Relay control for 达标排水 (e.g., compliant drainage).
- **Anti-Interference:** High-impedance op-amp ($10^{12}\Omega$) and optocoupler isolation for stable long-distance transmission.
- **Multi-Parameter Display:** Simultaneously shows time, measurement value, temperature, and current output on a 3.5-inch IPS color screen (480×320 resolution).
- **RS485 Interface:** Supports Modbus RTU protocol for PC connectivity (optional).
- **Watchdog:** Ensures no system crashes.

Chapter 2: Technical Specifications

Parameter	Specification
Compliance Standard	JB/T6855-93 "Industrial Conductivity Meters"
Conductivity Range	0–20 µS/cm (0.1 cell constant) 0–200 µS/cm (0.1 cell constant) 0–2000 µS/cm (1.0 cell constant) 0–20000 µS/cm (10.0 cell constant)
Resistivity Range	0–18.25 MΩ·cm (0.01 cell constant)

Parameter	Specification
Salinity Range	0–5.00% or 0–10.00%
TDS Range	0–10000 mg/L
Basic Error (Unit)	Conductivity: ±0.5% FS; Temperature: ±0.5°C (0–60°C)
Instrument Error	Conductivity: ±1.0% FS; Temperature: ±1.0°C (0–60°C)
Sample Conditions	0–99.9°C, 0.6 MPa
Temperature Compensation	0–99.9°C (25°C reference)
Repeatability	±0.2% FS
Stability	±0.2%/24h
Current Output	4–20mA (Isolated)
Output Error	≤±1% FS
Alarm Relay	AC220V, 3A
Data Storage	Standard
RS485 Interface	Modbus RTU (isolated, optional)
Power Supply	AC220V, 50Hz; Optional DC24V
Protection Rating	IP65
Dimensions	98×98×110 mm (Housing); 92×92 mm (Panel Cutout)
Weight	0.8 kg
Operating Conditions	-20–60°C; <85% RH
Electrode Cable	5 meters (standard)

Chapter 3: Electrode Maintenance

According to the range of conductivity of the measured water sample, choosing an electrode with a suitable constant is the key to accurate measurement. Especially for the measurement of pure water (<3uS/cm) and ultrapure water (<1uS/cm), an electrode with a constant of 0.1 or 0.01 should be used, and a closed measuring tank should be added if necessary to achieve accurate measurement, otherwise a large error will occur.

Basic principles for selecting electrodes: According to the range of conductivity of the measured water sample, refer to the table below to select an electrode with a suitable constant. When selecting electrodes, the most common mistake is "selecting an electrode with a large constant to measure low conductivity." If you select a 1.0 electrode to measure a water sample <3uS/cm, it is impossible to get an accurate value. Because the conductivity of low-conductivity media is very poor, if you use a large constant electrode to measure it, you will only get a weaker and more unstable electrical signal, which will inevitably increase the measurement error significantly.

Measurement Ranges by Cell Constant:

Range	Cell Constant	Notes
0–20 µS/cm	0.01	Requires sealed flow cell
0–200 µS/cm	0.1	—
0–2000 µS/cm	1.0	—
2–20000 µS/cm	10.0	—
30–60.0 mS/cm	30.0	—

When measuring beyond the measurement range listed in the table above, the error will increase.

When the medium conductivity value is >100µS/cm, it is advisable to use a platinum black electrode with a constant of 1.0 or 10 to increase the effective area and significantly reduce the current density on the electrode surface, so as to effectively weaken the electrode polarization effect that is easily generated when the medium is a concentrated solution.

Chapter 4: Instrument Installation

The instrument can be installed in a monitoring room away from the site, or it can be installed on site together with the electrode. The required wiring is led out from the junction box behind the transmitter.

1. Dimensions

- Housing: 98×98×110 mm; Panel cutout: 92×92 mm.

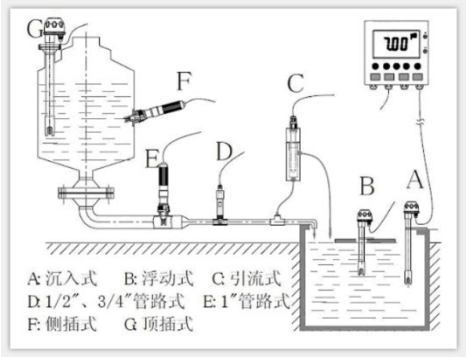
Installation Notes:

1. Mount within 10 meters of the measurement point. Avoid direct water splashes and ensure proper grounding.
2. Keep electrode cables away from power lines to prevent interference.

3. Conventional electrode sizes (pipeline installation)

3. Electrode Mounting

- **Submersible:** Seal threads with PTFE tape to prevent water ingress.
- **Side Wall/Pipeline:** Weld threaded fittings for direct installation.



4. Wiring

Note:

1. The live wire and the neutral wire are power supply wires, so you don’t need to distinguish them.
2. The four wires on the electrode have coils with labels, so you can wire them according to the coil labels. The two temperature terminals do not need to be distinguished. The two measurement terminals do not need to be distinguished. (The signal wire colors of different batches of electrodes may be different. You don’t need to wire them according to the colors.)

Terminals:

- Low open: normally open terminal of low alarm relay
- Low touch: contact of low alarm relay
- Low closed: normally closed terminal of low alarm relay
- High open: normally open terminal of high alarm relay
- High touch: contact of high alarm relay
- High closed: normally closed terminal of high alarm relay
- Live wire: connect to 220V live wire; if 24V power supply is selected, connect to 24V positive pole
- Ground wire: ground wire (optional)
- Zero wire: connect to 220V zero wire; if 24V power supply is selected, connect to 24V negative pole
- Communication B: connect to 485 communication (optional function);

- Communication A: connect to 485 communication (optional function);
- Negative current: negative terminal of 4-20mA output
- Positive current: positive terminal of 4-20mA output
- Temperature: one of the temperature terminals connected to the electrode
- Temperature: one of the temperature terminals connected to the electrode
- **Measurement: measurement terminal connected to the electrode**
- **Measurement: measurement terminal connected to the electrode**

Warning: The electrode signal line must be directly connected to the terminal behind the meter. It cannot be connected through the terminal block in the electric control box for the sake of aesthetics. This is absolutely not allowed!!!

Chapter 5: Instrument Operation

1. **Measurement interface**

Conductivity Resistivity TDS Salinity

- 3.5-inch IPS Screen: Shows time, measurement value, temperature, and current output.

2. **Keys**
   - Function Keys:
     - **ESC:** Return to measurement mode.
     - **◀/▲:** Navigate or adjust values.
     - **MENU:** Enter menu (default password: 0000).
     - **ENT:** Save settings.

3. **Menu Structure**

By pressing the MENU button of the intelligent color screen instrument and entering the correct password, you can enter the menu interface. The menu is a single-level menu. The functions and related parameters are shown in the table.

No.	Menu Item	Setting Parameter	Description	Default Value
1	Alarm Settings	High Alarm Value	Trigger value when exceeding upper limit	200000 μS/cm
		High Alarm Hysteresis	Reset differential for upper limit control	0 μS/cm
		Low Alarm Value	Trigger value when falling below lower limit	0 μS/cm
		Low Alarm Hysteresis	Reset differential for lower limit control	0 μS/cm
2	Current Settings	4mA Setting	Measurement value corresponding to 4mA output	0 μS/cm
		20mA Setting	Measurement value corresponding to 20mA output	200000 μS/cm
		4mA Setting	Temperature value for 4mA output (Optional)	0℃
		20mA Setting	Temperature value for 20mA output (Optional)	100℃
3	Time Settings			Current Time
4	Factory Settings	If configurations are corrupted, restore factory defaults		Universal password:0001
5	System Settings	Change Password		Universal password:0001
		Filter/Salinity/TDS Coefficient	Coefficient varies by measurement mode	
		Potentiometric Coefficient		1.000
		Potentiometric Offset		Calibrated
6	Communication	Device Address	0-255	0001
7	One-point Calibration	Data Correction	Refer to Chapter 6	0
8	Electrode Constant			-
9	Temp Coefficient	Temp Compensation Coefficient		2.20%
10	Manual Temp Comp	Electrode Temp Compensation	0.0~+99.9 ℃	25.0℃
11	Current Calibration	Current 1 Coefficient	Conductivity output scaling	1.000
		Current 1 Offset	Conductivity output offset	+0.00 mA
		Current 2 Coefficient	Temperature output scaling (Optional)	1.000
		Current 2 Offset	Temperature output offset (Optional)	+0.00 mA
12	Temp Calibration	Temp Coefficient		0.950%
		Temp Offset		+0.0℃
13	Measurement	Conductivity		-

No.	Menu Item	Setting Parameter	Description	Default Value
	Mode	Mode		
		Resistivity Mode		-
		Salinity Mode		-
		TDS Mode		-
14	System Language	Chinese Mode		-
		English Mode		-
15	Historical Data	Data View	View stored data	-
		Storage Interval	1min/10min/1hour	1min
		Clear Data	Delete all data	password:0001
		Data Export	Export via Bluetooth APP (Optional)	Optional
16	Auxiliary Functions (Password:0001)	Timed Rinse	Auto-rinse hourly using high alarm relay	Off
		Interval Control	Control via low alarm relay (references alarm values)	Off
		Buzzer Alarm	Audible alarm for limit alerts	Off
		Random Value	Enable measured value fluctuation (Optional)	Off

Default settings are optimized. It is recommended to use the default settings. Users are advised not to modify them by themselves. Please make corresponding settings according to the actual situation under the guidance of professionals.

Chapter 6: Single-Point Calibration

During the instrument measurement process, if the measured value is found to have a slight deviation, it can be corrected through the known point calibration in item 7. This method can correct the conductivity value, resistivity value, salinity value, and TDS value.

If the instrument measured value is smaller than the actual value, press the ▲ key to increase the corresponding offset; if the instrument measured value is larger than the actual value, press the ▼ key to reduce the corresponding offset.

Chapter 7: Resistivity, Salinity, TDS Measurement

The meter can also measure the resistivity, salinity and TDS value of the solution. The function can be switched by pressing the 13th item in the menu: "Measurement Mode"

Chapter 8: High/Low Alarms

1. High and low alarm settings

The intelligent color screen instrument comes standard with two sets of high and low alarm relays, each with two sets of normally open and normally closed contacts, for users to set various combination controls.

2. Hysteresis setting

The contacts of the instrument alarm relay are used by users to connect corresponding control appliances (such as solenoid valves, etc.) to form a control system. In order to avoid the jitter of the relay contacts near the alarm point, the secondary meter adopts a hysteresis cancellation method.

When the preset alarm upper (lower) limit is reached, the relay closes immediately. However, when the conductivity value falls back (rises) to the alarm upper (lower) limit, the alarm will not be cancelled immediately. It will not be cancelled until it continues to fall (rise) by a hysteresis value.

Chapter 9: Precautions & Maintenance

- The instrument generally does not require daily maintenance. When an obvious fault occurs, please do not open it and repair it yourself, and contact us as soon as possible!
- After starting the power, the instrument should have a display. If there is no display or the display is abnormal, the power should be turned off immediately to check whether the power supply is normal and whether the fuse is intact.
- The cable connector must be kept clean and cannot be damp or water-logged, otherwise the measurement will be inaccurate.
- The electrode should be cleaned frequently to ensure that it is not contaminated.
- The electrode should be calibrated at regular intervals.

Appendix: Modbus RTU Protocol(Optional Function)

Master Request Command Format

Definition	Address	Function Code	Start Register Address		Data Count		CRC Checksum	
Data	ADDRESS	0x03	0x0000		0x0002		CRC-16/MODBUS	
	0-255		Hi	Lo	Hi	Lo	Lo	Hi
Bytes	1 byte	1 byte	2 bytes		2 bytes		2 bytes	

Example:

01 03 00 00 00 02 C4 0B

- Address: Corresponds to the device address set in Menu 6 (Communication Settings).

Slave Response Format

Definition	Address	Function Code	Data Count	Conductivity/Resistivity /Salinity/TDS Data	Temperature Data	CRC Checksum
Data	ADDRESS	0x03	0x04	0x0000	0x0000	CRC-16/MODBUS
	0-255			Hi Lo	Hi Lo	Lo Hi
Bytes	1 byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes

Example:

01 03 04 00 80 00 FA 7B 98

- Interpretation:
  - Device address: 01
  - Function code: 03
  - Data count: 04 (4 bytes)
  - Conductivity/Resistivity/Salinity/TDS value: 128 (0x0080 in hex → 128 in decimal)
  - Temperature value: 25.0℃ (0x00FA in hex → 250 in decimal, divided by 10)
  - CRC checksum: 7B 98
  - The high 8 bits are 98
- Data Conversion Rules
  - Conductivity Mode: Output data = actual value.
  - Resistivity Mode: Output data ÷ 100.
  - Salinity Mode: Output data ÷ 100.
  - TDS Mode: Output data = actual value.

Serial Port Debugging Example

- Connect the device's Communication A to the A terminal of the 485-to-USB converter.
- Connect the device's Communication B to the B terminal of the 485-to-USB converter.

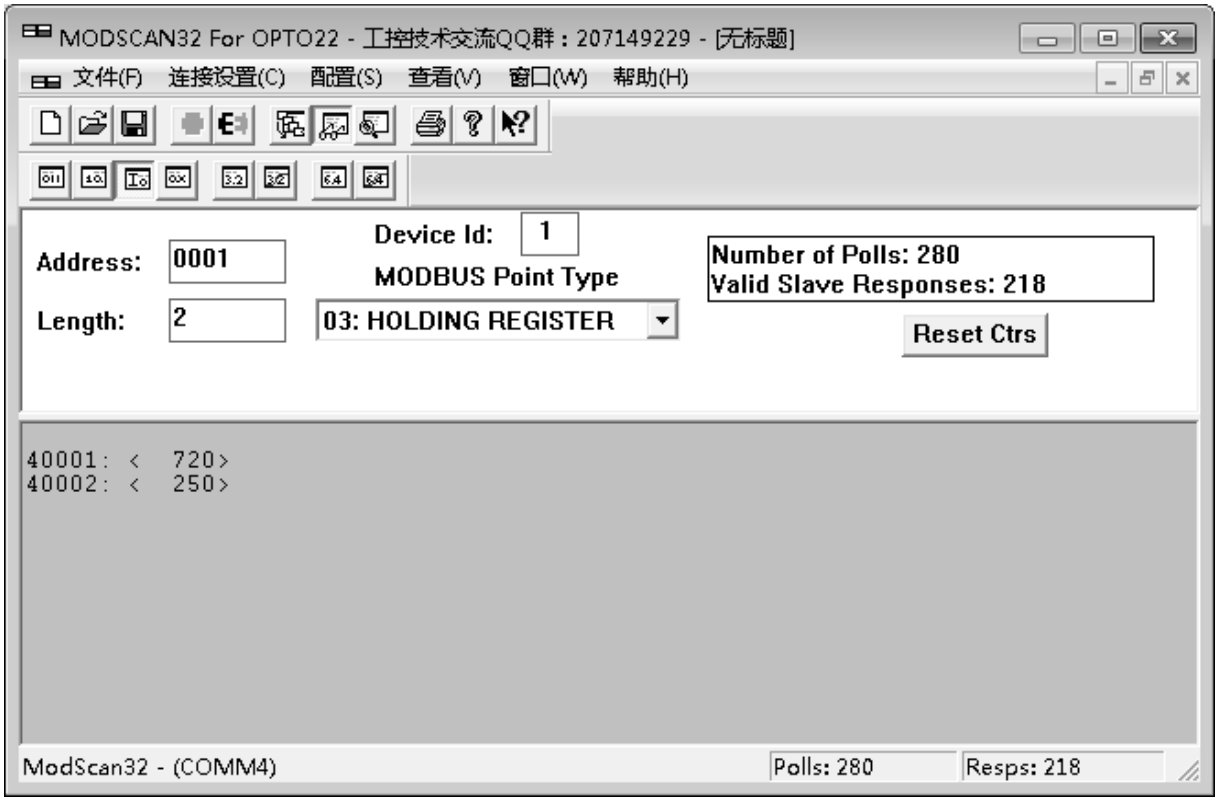
Serial Port Parameters:

- Baud rate: 9600
- Data bits: 8
- Parity: None
- Stop bits: 1

Assume that the address number of the instrument is 01;

Please send data 01 03 00 00 00 02 C4 0B according to the above settings to test whether the communication is normal;

MODSCAN32 Configuration



Test communication wiring method: the instrument's communication A is connected to the A terminal of the 485 to USB; the instrument's communication B is connected to the B terminal of the 485 to USB.

MODSCAN32 communication parameter settings: please set as shown in the figure;

Settings:

- Address: 001 (matches Menu 6 device address)
- Data length: 2
- Device ID: Set according to Menu 6.
- Display format: Integer

Menu settings-----Configuration-----Display options-----Integer.