

# STALWART



## Conductivity Meter Operation Manual

Please read and adhere to all recommendations in this manual to ensure the best experience and to maintain your Meter in good working order. The manual is for the model **SCM-72**.

## 1. Features

- 6.5-inch LCD screen with concise and friendly-use interface.
- Built-in microprocessor chip has Intelligent functions such as automatic calibration, ATC, data storage, clock display, USB output, function settings, wireless printing, and self-diagnosis information, etc.
- Adopt advanced conductivity measurement technology, with conductivity electrode (K=1), it can meet measuring accuracy requirement for range of 0.5 $\mu$ S/cm ~ 200mS/cm.
- Can switch among conductivity, TDS, salinity and resistivity. Multinomial calculation for TDS and salinity to ensure the conversion precision of the full scale.
- Auto recognition of 8 conductivity standard solution with 2 kinds of options: Europe & USA, and China.
- Wireless bluetooth printing and real-time data transfer to mobile phone are optional.
- Smart electrode status display to ensure accurate use.
- Omron long lasting and light touch key can be used more than 100,000 times.
- Can store 1000 sets of test data, which can be saved and transferred to USB memory stick and opened with Excel.

## 2. Technical Parameters

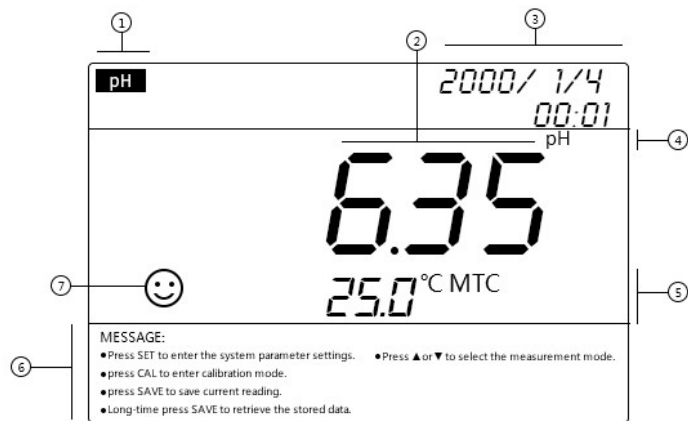
Cond.	Measuring range	Conductivity:
		(0.00~20.00) $\mu$ S/cm, (20.0~200.0) $\mu$ S/cm
		(200~2000) $\mu$ S/cm, (2.00~20.00)mS/cm
		(20.0~200.0)mS/cm,
		(200~2000)mS/cm (K=10)
		TDS: (0 ~ 100)g/L
		Salinity: (0 ~ 100)ppt
		Resistivity: (0 ~ 100)M $\Omega$ -cm
	Resolution	0.01/0.1/1 $\mu$ S/cm, 0.01/0.1/1mS/cm
	Accuracy	Electrode: $\pm$ 0.5% FS, Meter: $\pm$ 0.80% FS
Temp. compensation range	(0 ~ 100) $^{\circ}$ C, auto	
Electrode constant	0.1/1/10 cm <sup>-1</sup>	

	Reference Temp.	25°C, 20°C, 18°C
Temp.	Range	(0 ~ 100)°C
	Resolution	0.1°C
	Accuracy	5 ~ 60°C: ±0.4°C, Others: ±0.8°C
Other	Display	6.5-inch LCD screen
	Data storage	1000 sets
	Power	DC 12V/1A
	Output	USB
	Ambient Temp.	5 ~ 40 °C
	Ambient Humidity	≤85%
	IP grade	IP54

### 3. Instrument Structure

#### 3.1. LCD display

- ①---Parameter mode
- ②---Measuring value
- ③---Time
- ④---Measurement unit
- ⑤---Temp. measuring value
- ⑥---Tips
- ⑦---Stability icon



### 3.2. Operation Keys

**【ON/OFF】** Switch key

**【CAL】** Calibration key, Left direction key

a) Under measuring mode, press the key to enter into calibration mode.

b) Under setting mode, the key is a Left direction key.

**【SAVE】** Records saving, Records query, Right direction key

a) Under measuring mode, short press the key to store measuring data, long press the key to check stored data.

b) Under setting mode, the key is a Right direction key.

**【ESC/PRN】** Print, Return key

a) Under measuring mode, it is used as a print key.

b) Under non-measuring mode, it is used as a return key.

**【SET】** System setting

Under measuring mode, system setting interface can be entered through the key.

**【UP】** Upward key

Under setting mode, it is used as a upward direction key.

**【DOWN】** Switching key, Downward key

a) Under measuring mode, it is used as a switching key: COND-RES-TDS-SAL-COND.

b) Under setting mode, it is used as a downward direction key.

**【OK】** Confirm key

### 3.3. Interface diagram



① Temperature probe

② pH electrode, not available for conductivity meter

③ Conductivity electrode

④ USB

⑤ Data cable

⑥ Power

## 4. Conductivity measurement

### 4.1 Preparation Work

4.1.1. Press **【ON/OFF】** key to turn on, and warm up for 10 minutes.

4.1.2. Check whether conductivity electrode is intact. If the electrode is damaged or rusty, it can not be used.

4.1.3. Insert conductivity electrode and temperature probe into the corresponding interface.

### 4.2 Instrument calibration (standard solution calibration method)

4.2.1. Press **【CAL】** to enter calibration mode, CAL is displayed to indicate to enter calibration mode.

4.2.2. Wash conductivity electrode and temperature probe in pure water, make them dry, immerse them into 1413  $\mu\text{S}/\text{cm}$  calibration solution, shake the electrodes and place them static, press **【OK】** after stability icon is appeared. when 1413  $\mu\text{S}/\text{cm}$  is displayed, press **【OK】** to complete the calibration, save the data, then press **【OK】** to exit the calibration mode, the icon "L M" will appear on the screen.

Note:

a) The Meter has been calibrated when leaving factory, and can be used directly under normal circumstances.

b) The standard solution method is aimed at the inaccuracy of the conductivity constant caused by the long time use of the conductivity electrode. The new conductivity electrode has been calibrated before leaving factory, and its constant is marked on the electrode, and the input constant before use.

c) The input method of electrode constant. Firstly determine the type of electrode constant, then input the constant coefficient. For example, the constant is 10.5, select 10 electrode types first, and then set the constant to 1.05. That is:  $10.5 = 10 * 1.05$ .

### 4.3. Conductivity solution measurement

4.3.1. Wash conductivity electrode in pure water, keep it dry, and immerse it in the measured solution. shake the electrode and place them static. when the stability icon is displayed, then read the value of the conductivity solution.

4.3.2. Press **【DOWN】** to circularly display resistivity values, TDS values and salinity values corresponding to conductivity values.

### 4.4. Important explanation

4.4.1. The Meter has a unique 1-point calibration function. It can be calibrated according to the principle that the conductivity of the water sample and the calibration solution are as close as possible. when K value is in the range of 0.1, use standard solution  $84\mu\text{S}/\text{cm}$ , when the K value is around 1.0, use standard solution  $1413\mu\text{S}/\text{cm}$ .

Measuring range	0~200 $\mu\text{S}/\text{cm}$	200 $\mu\text{S}/\text{cm}$ ~20ms/cm	20ms/cm~200ms/cm
Electrode constant	K=0.1 $\text{cm}^{-1}$ (Flow test)	K=1.0 $\text{cm}^{-1}$	K=10 $\text{cm}^{-1}$
Calibration solution	84 $\mu\text{S}/\text{cm}$	1413 $\mu\text{S}/\text{cm}$	12.88ms/cm

			111.9 ms/cm
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4.4.2 There are two calibration methods for conductivity electrode: standard solution calibration method and constant setting method:

**Standard solution calibration:** As long as the standard solution is accurate, it can ensure the best accuracy, so the standard solution calibration method is preferred.

**Constant setting:** It can be set according to the constant marked on the conductivity electrode. The new conductivity electrode constant has been calibrated accurately by the manufacturer, and users can use it directly. If it is not used for a long time or has contamination, in order to ensure accuracy, first clean the electrode and then calibrate it with a standard solution.

4.4.3 **The temperature compensation coefficient** set by the factory is 2.00%/C, but the conductivity temperature coefficient of various kinds of solutions or different concentration solutions is different. The user can refer to the below table or use the data obtained in the experiment to set the parameters. In high purity water below 10  $\mu\text{s}/\text{cm}$ , the meter automatically performs nonlinear temperature compensation. when the temperature compensation coefficient is set to 0.00 that is, there is no temperature compensation when the meter is tested. The measured value of the meter is the conductivity value at that time.

Solution	Temperature compensation coefficient
NaCl Salt solution	2.12%/°C
5%NaOH solution	1.72%/°C
Dilute ammonia solution	1.88%/°C
10% Hydrochloric acid solution	1.32%/°C
5% Sulfuric acid solution	0.96%/°C

#### 4.5. Parameter settings

Press **【SET】** to enter setting mode, press **【UP】** or **【DOWN】** to choose P1-P14, press **【OK】** to enter the selected setting mode. Press **【ESC/PRN】** to return to measuring mode.

Prompt	Parameter setting item	Remark
P1	Export data to excel	When USB drive is connected, press <b>【OK】</b> to export data. If not, an error will be prompted.
P2	System date setting	

P3	Clear record setting	
P4	Temp. unit setting	°C, °F
P5	Check machine code	
P6	APP Authorization code setting	
P7	Restore to factory setting	When 8888 displayed on screen, press <b>【OK】</b> to restore.
P8	Manual temp. compensation setting	
P9	Bluetooth mode setting	Bluetooth, APP
P10	Electrode coefficient setting	
P11	Electrode constant level setting	0.1, 1.0, 10
P12	Standard solution setting	<u>USA (European and American Series):</u> 84 $\mu$ s/cm, 1413 $\mu$ s/cm, 12.88ms/cm, 111.9 ms/cm <u>CH (Chinese series):</u> 146.6 $\mu$ s/cm, 1408 $\mu$ s/cm, 12.85ms/cm, 111.3 ms/cm
P13	Temp. compensation coefficient setting	
P14	Reference temperature setting	18°C, 20°C, 25°C

#### 4.6. Attentions

4.6.1. When the Meter is out of factory, the conductivity electrode has been calibrated. Its constant value is marked on the electrode. The user can set the constant value directly. It can use directly, does not need to be recalibrated.

4.6.2. Normally recommends that the electrode be calibrated once a month, and that the conductance electrode after using for a period of time also needs to be calibrated once.

4.6.3. Keeps the conductivity electrode clean. Before and after measurement, it needs to be cleaned with pure water and dry it.

4.6.4. Conductivity electrode is plated with a layer of metal platinum black to reduce electrode polarization and expand the range. Therefore, the platinum black electrode can not be wiped out, so it can only be washed in water to avoid damaging the platinum black coating. With the warm water containing detergent, the organic components of the electrode surface can be cleaned and the alcohol can be used to wash.

4.6.5. Conductivity electrode can be immersed in pure water before use, in order to prevent platinum black. If platinum black electrode is found out of failure, immerse into 10% nitric acid solution or 10% hydrochloric acid solution, measure it after rinse with pure water. If the condition is not improved, then platinum black needs to be re-electroplated, or new conductivity electrode should be replaced.

4.6.6. When the Meter is abnormal, please restore it to factory settings, then calibrate and measure again.

#### 5. Packing List

Conductivity Meter

Electrode Holder

Conductivity electrode

Temperature probe

Power Adapter

Manual

**Appendix A** Conductivity standard solution concentration & conductivity value

No	Reference solution KClg/1000g (In vacuum)	Reference solution KClg/1000g (20°C room temp.)	Conductivity/(S.cm <sup>-1</sup> )				
			15°C	18°C	20°C	25°C	35°C
1	71.1352	74.2457	0.09212	0.09780	0.10170	0.11131	0.13110
2	7.41913	7.4365	0.010455	0.011163	0.011644	0.012852	0.015353
3	0.745263	0.7440	0.0011414	0.0012200	0.0012737	0.0014083	0.0016876
4	0.074528	Dilute the solution No. 3 from 100ml to 1000ml	0.0001185	0.0001267	0.0001322	0.0001465	0.0001765

**Note:**

The following conditions must be observed in the application of the above standard solution.

1, The standard values listed in the table deduct the water conductivity of the standard solution.

2, Conductivity solid standard substance can be used to prepare standard solution only after baking 4h under 110 °C.

3, The standard substance are prepared according to the ambient conditions specified in Table 2.

4, It is recommended to use a first class 1L capacity bottle and a balance of 0.1mg.