User's Manual

SC92 Portable Conductivity Meter Start-up and Safety Precautions

IM 12D03E02-01EN

YOKOGAWA
Yokogawa Electric Corporation

IM 12D03E02-01EN
1st Edition

Introduction

Thank you for purchasing the SC92 Portable Conductivity Meter.

This Instructor's Manual contains all essential information for the user to make full use of the SC92.

Please read the following respective documents before using the SC92.

The related documents are listed as follows.

User's Manual

Contents	Document number	Note
SC92 Portable Conductivity Meter Start-up and Safety Precautions	IM 12D03E02-01EN	Printed manual (This manual)
SC92 Portable Conductivity Meter User's manual	IM 12D03E02-02EN	Online manual

"EN" in the document number is the language code.

An exclusive User's Manual might be attached to the products whose suffix codes or option codes contain the code "Z" (made to customers' specifications). Please read it along with this manual.

You can download the latest documents from our website.

https://www.yokogawa.com/an/sc92/

Product safety tips

WARNING

- Do NOT use this instrument where there is a possibility of electrical shock.
- Do NOT touch any part of the electrode immediately after using in very hot liquids. Otherwise, you may get burned.
- The product contains devices that can be damaged by electrostatic discharge. When inserting batteries and connecting a sensor, take care to prevent such a damage.

- The Instrument is packed carefully with shock absorbing materials, nevertheless, the instrument may be damaged or broken if subjected to strong shock, such as if the instrument is dropped. Handle with care.
- Do not use abrasives or organic solvents.

CAUTION

- Do not apply physical shock or excessive force to the glass sensor, or it may break.
- If the meter will not be used for an extended period of time, be sure to remove the batteries. Otherwise battery leakage may occur, causing damage to or malfunction of the meter.
- Use both meters and sensors made by YOKOGAWA. Otherwise, it will result not only voiding of our warranty, but also may impair the safety and performance of the instrument.

Notes on Handling User's Manuals

- Please hand over the user's manuals to your end users so that they can keep the user's manuals on hand for convenient reference.
- Please read the information thoroughly before using the product.
- The purpose of these user's manuals is not to warrant that the product is well suited to any particular purpose but rather to describe the functional details of the product.
- No part of the user's manuals may be transferred or reproduced without prior written consent from YOKOGAWA.
- YOKOGAWA reserves the right to make improvements in the user's manuals and product at any time, without notice or obligation.
- If you have any questions, or you find mistakes or omissions in the user's manuals, please contact our sales representative or your local distributor.

Drawing Conventions

Some drawings may be partially emphasized, simplified, or omitted, for the convenience of description.

Some screen images depicted in the user's manual may have different display positions or character types (e.g., the upper / lower case). Also note that some of the images contained in this user's manual are display examples.
Flashing indication is represented by a pale color.

Trademark Notices

All other company and product names mentioned in this user's manual are trademarks or registered trademarks of their respective companies.

We do not use TM or ® mark to indicate those trademarks or registered trademarks in this user's manual.

Product disposal

Disposal of the product must be carried out in accordance with local and national laws/ regulations.

Battery disposal

Batteries must be disposed of in accordance with local and national laws/regulations.

Warranty and service

YOKOGAWA products and parts are guaranteed free from defects in workmanship and material under normal use and service for a period of (typically) 12 months from the date of shipment from the manufacturer.

Individual sales organizations can deviate from the typical warranty period, and the conditions of sale relating to the original purchase order should be consulted. Damage caused by wear and tear, inadequate maintenance, corrosion, or by the effects of chemical processes are excluded from this warranty coverage.

For warranty claims for replacement or repair (at our discretion), please contact our sales representative. We will replace or repair at our discretion. The following information must be included in the letter accompanying the returned goods:

- Part number, model code and serial number
- Original purchase order and date
- Length of time in service and a description of the process
- Description of the fault, and the circumstances of failure
- Process/environmental conditions that may be related to the failure of the device.
- Warranty coverage statement: In-warranty or out-of-warranty repairs

Returned goods that have been in contact with process fluids must be decontaminated/ disinfected before shipment. Goods should carry a certificate to this effect, for the health and safety of our employees.

Material safety data sheets should also be included for all components of the processes to which the equipment has been exposed.

◆ Safety Precautions

■ Safety, Protection, and Modification of the Product

- In order to protect the system controlled by the product and the product itself and ensure safe operation, observe the safety precautions described in this user's manual. We assume no liability for safety if users fail to observe these instructions when operating the product.
- If this instrument is used in a manner not specified in this user's manual, the protection provided by this instrument may be impaired.
- If any protection or safety circuit is required for the system controlled by the product or for the product itself, prepare it separately.
- Be sure to use the spare parts approved by Yokogawa Electric Corporation (hereafter simply referred to as YOKOGAWA) when replacing parts or consumables.
- Modification of the product is strictly prohibited.
- The following safety symbols are used on the product as well as in this manual.

WARNING

This symbol indicates that an operator must follow the instructions laid out in this manual in order to avoid the risks, for the human body, of injury, electric shock, or fatalities. The manual describes what special care the operator must take to avoid such risks.

CAUTION

This symbol indicates that the operator must refer to the instructions in this manual in order to prevent the instrument (hardware) or software from being damaged, or a system failure from occurring.

CAUTION

This symbol gives information essential for understanding the operations and functions.

NOTE

This symbol indicates information that complements the present topic.

■ Warning and Disclaimer

The product is provided on an "as is" basis. YOKOGAWA shall have neither liability nor responsibility to any person or entity with respect to any direct or indirect loss or damage arising from using the product or any defect of the product that YOKOGAWA can not predict in advance.

◆ Compliant Standards

EMC:

CE: EN 61326-1 Class B Table 1 (For use in a basic electromagnetic environment)

EN IEC 61326-1 Class B Table 1 (For use in a basic electromagnetic environment)

Influence of immunity environment (Criteria A): change of reading value is specified within ± 10 uS/cm

RCM: EN 61326-1 Class B, Table 1

Environmental regulation:

RoHS Directive: EN IEC 63000

WEEE Directive: DIRECTIVE 2012/19/EU

REACH : Regulation(EC) 1907/2006

◆ CE marking products

■ Authorized Representative in EEA

The Authorized Representative for this product in EEA is Yokogawa Europe B.V. (Euroweg 2, 3825 HD Amersfoort, The Netherlands).

■ Identification Tag

This manual and the identification tag attached on packing box are essential parts of the product. Keep them together in a safe place for future reference.

■ Users

This product is designed to be used by a person with specialized knowledge.

■ Batteries

Prepare 2 batteries that type is AA (LR6) 1.5V by yourself since batteries are not included in this product. If required, please select batteries with the authorized certification mark for each country. The batteries should be disposed of in accordance with local and national legislation/regulations.

■ How to dispose the batteries (This directive is valid only in the EU.)

This product complies with the WEEE Directive marking requirement.

This marking indicates that you must not discard this electrical/electronic product in domestic household waste.

Product Category

With reference to the equipment types in the WEEE directive Annex I, this product is classified as a “Monitoring and Control instruments” product.

Do not dispose in domestic household waste. When disposing products in the EU, contact your local Yokogawa office.

◆ Control of Pollution Caused by the Product

This is an explanation for the product based on “Control of Pollution caused by Electronic Information Products” in the People’s Republic of China.

产品中有害物质的名称及含量

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
本体	×	○	○	○	○	○
传感器 (PH92SN,OR92SN,SC92SN)	×	×	×	×	○	○
电缆	×	○	○	○	○	○

○： 表示该有害物质在该部件中所有均质材料中的含有量都在GB/T26572所规定的限量要求以下。
×： 表示该有害物质至少在该部件的某一均质材料中的含有量超出GB/T26572所规定的限量要求。

环保使用期限：这个标志是基于SJ/T11364，在中国（不包括台湾，香港，澳门）贩售的电子电器产品所适用的环保使用期限。

只要遵守产品上关于安全及使用上的注意事项，从制造之日起计算在该年限内，不会发生制品内的有害物质外泄，突然变异，对环境或人体以及财产产生重大影响的情况。

（注） 该年限是《环境保护使用期限》，不是产品的保质期限。
另外，关于替换部件的推荐替换周期，请阅读使用说明书。

1. Instrument Check

Upon delivery, unpack the instrument carefully and inspect it to ensure that it was not damaged during shipment. If damage is found, retain the original packing materials (including the outer box) and then immediately notify YOKOGAWA sales office.

Checking the model and suffix code

Check the model and suffix code on the name plate affixed to the back side of the meter and sensor cable as shown in Figure 1.

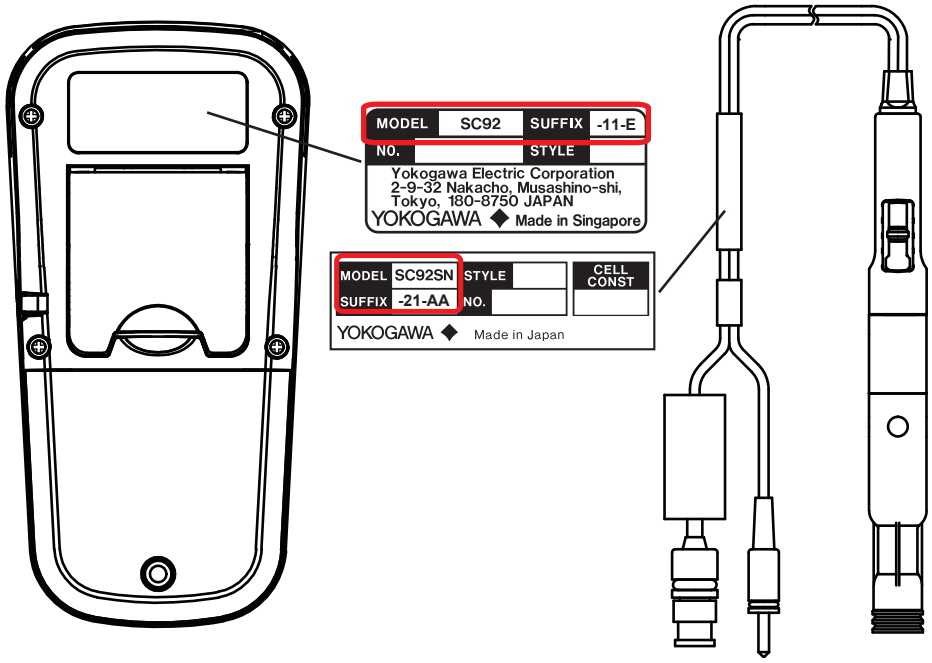


Figure 1 Name plate example

Model and Suffix Codes

SC92 Portable conductivity meter

Model	Suffix code	Option code	Description
SC92	·····	·····	Portable conductivity meter
Connecting sensors	**-00**	·····	Without sensor
	-11	·····	With sensor for high purity water measurement (cable length: 0.75 m)
	-21	·····	With general-purpose type sensor (cable length: 0.75 m)
	-23	·····	With general-purpose type sensor (cable length: 2.75 m)
	-31	·····	With chemical-resistant type sensor (cable length: 0.75 m)
	-41	·····	With sensor for high-conductivity measurement (cable length: 0.75 m)
Country *1	**-J**	·····	Japan (with Japanese manual and batteries, without standard markings)
	-E	·····	Except Japan (with English manual and standard markings, without batteries)

*1: Always specify "-J" for orders to Japan ("-E" is not acceptable).
Always select "-E" for orders destined for outside Japan ("-J" is not acceptable).

SC92SN Conductivity sensor for portable conductivity meter

Model	Suffix code	Option code	Description
SC92SN	·····	·····	Conductivity sensor for portable conductivity meter
Type	**-11**	·····	Sensor for high purity water measurement (cable length: 0.75 m)
	-21	·····	General-purpose type sensor (cable length: 0.75 m)
	-23	·····	General-purpose type sensor (cable length: 2.75 m)
	-31	·····	Chemical-resistant type sensor (cable length: 0.75 m)
	-41	·····	Sensor for high conductivity measurement (cable length: 0.75 m)
—	**-AA**	·····	Always -AA

Checking package contents

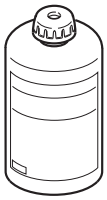
Make sure the following parts as shown in Table 1 are included.

Table 1 Standard accessories (✓: included)

Products	SUFFIX code for Connecting sensors					
	-00	-11	-21	-23	-31	-41
Portable conductivity meter	✓	✓	✓	✓	✓	✓
User's manual	✓	✓	✓	✓	✓	✓
Sensors	–	✓	✓	✓	✓	✓
Cotton swabs for sensor cleaning (5 pcs)	–	✓	✓	✓	–	–

Optional Accessories

Optional accessories as shown below are sold separately if necessary.

Name	Remark	Part number	Quantity	
NaCl Standard solution	0.1 mol/l NaCl solution for calibration 250 mL	K9221ZA *	1 pcs	

*: You can download the Safety Data Sheet (SDS) from the following website: https://www.yokogawa.com/library/.

2. Preparation

Insert batteries and connect the sensor. Set up according to your preference.
For details, see the User's Manual IM 12D03E02-02EN.

2.1 Inserting the Batteries

Put AA alkaline batteries into the meter.

(1) Unscrew the battery cover on the back of the meter counter-clockwise to unlock the battery cover.
(2) Remove the battery cover and set the batteries inside.
(3) Put the cover back on.
(4) Screw the battery cover on the back of the instrument clockwise to lock the battery cover.

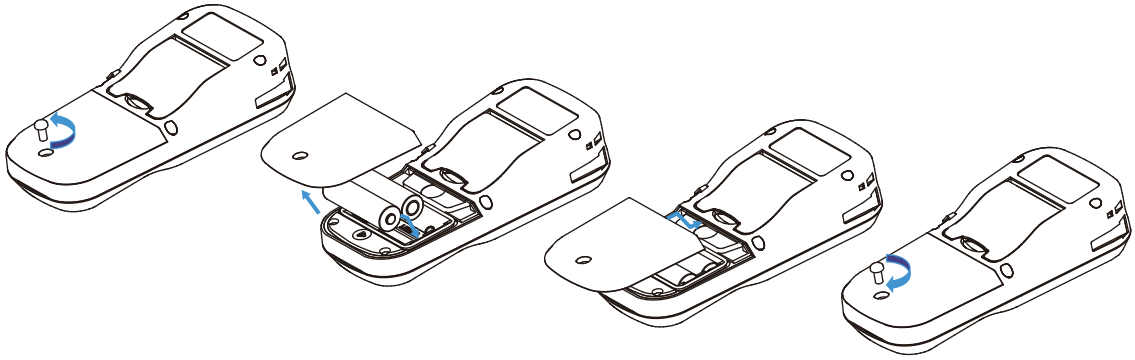


Figure 2 Insert battery into the meter

Power is turned on when batteries are inserted. To turn off the power, press and hold the power ⏻ key. To turn the power on again, press the power ⏻ key.

⚠ CAUTION

- When installing batteries, observe correct polarity: + (plus) - (minus). Failure to do so may damage to the meter.
- Do not use two different types of batteries or use new and old batteries at the same time.
- Do not replace the batteries in a dusty place or with wet hands. Dust or moisture could get inside the instrument and possibly cause an instrument malfunction.
- Prevent electrostatic damage when replacing batteries.
- Take care not to damage the gasket in the battery box to keep waterproof and dustproof.
- When a battery cover is replaced, make sure that the gasket is clean and correctly fitted in order to maintain the waterproof/dustproof.
- The screw for a battery cover shall be tightened with 1.2 N•m
- Loosen only the battery cover screws. Do not unscrew other screws to maintain waterproof and dustproof.

2.2 Connecting Sensor

Connect a conductivity sensor to CH2. Connectable one is SC92SN.
It is no problem to connect the sensor while the power is ON.

Connect the sensor to the meter properly as follows.

(1) Align the slot of the electrode connector with the pin of the electrode connector on the meter and insert it. After firmly pushing it all the way in, turn the electrode connector all the way to the right.

(2) Slide the connector cover over the connector and push the cover straight down until it lightly touches the meter body. Do not turn the cover.

(3) Insert the temperature connector into the temperature connector on the meter. Insert the temperature connector firmly until the O-ring on the temperature connector is no longer visible.

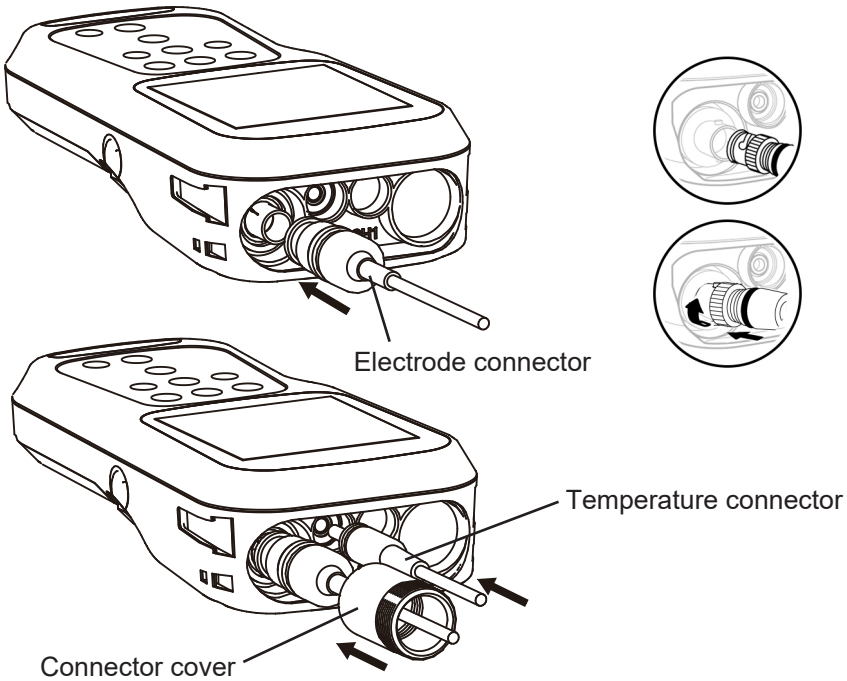


Figure 3 Connection with sensors

CAUTION

- Connect the sensor in a place free from moisture and dust.
- Take care not wet or contaminate the connector.
- When connecting sensors, be careful not to damage the equipment due to static electricity.
- To maintain waterproof and dustproof performance (IP67), use the cover and plug the connector properly.

Leave the sensor connected unless there is a particular need to disconnect it. When disconnecting the sensor, follow the reverse procedure of the connection. Never forcefully pull on the electrode connector. It is no problem to disconnect the sensor while the power is ON.

2.3 Setup

You can setup the followings if you like. Refer to the IM 12D03E02-02EN for details.

P1 COND (Conductivity setup):	Set cell constant, Select conductivity unit, Calibration mode setting, Temperature compensation factor setting, Reference temperature setting, Clear Calibration Data
P2 DATA (Data setup):	Data log interval setup, All data clear
P3 GEN (General setup):	Stability check, Auto power-off time setup, Reset the meter

Set cell constant

Set the cell constant. The setting range is 0.010 to 20.00 cm^{-1}.

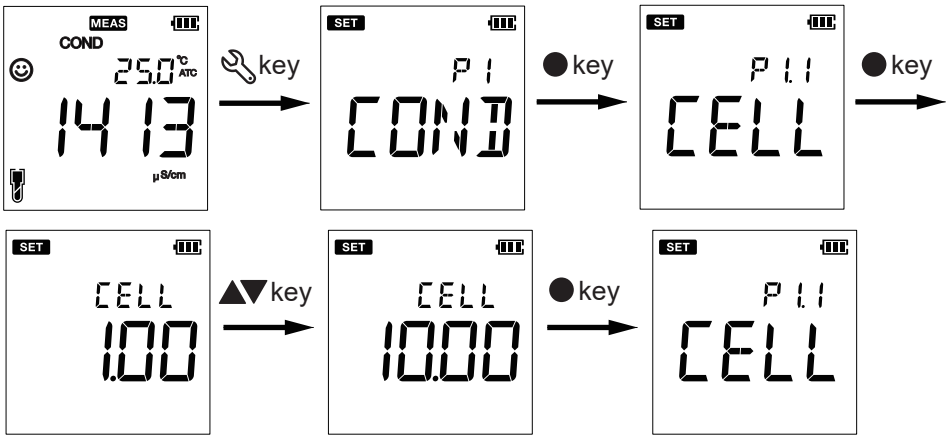
The cell constant varies from sensor to sensor even if they are of the same type (standard cell constant is the same). So the unique cell constants of the sensor to be used must be set. Set the cell constant indicated in the model name and cell constant shown on the sensor cable.
Also, be sure to set the cell constants when replacing the sensor with a new one.

Once a cell constant is set, it is stored in memory even after the battery is replaced.

NOTE

If calibration is performed without entering the correct cell constants, the calibration coefficients will not be correct.

(1) Press the SET key.
(2) When P1 COND screen appears, press the ENT ● key.
(3) When P1.1 CELL screen appears, presss the ENT ● key.
(4) Use ▲▼ to change the cell constants, press the ENT ● key to confirm. P1.1 CELL screen appears.



3. Operation

The ways of measurement and calibration are shown. See the IM 12D03E02-02EN for detailed procedures and others.

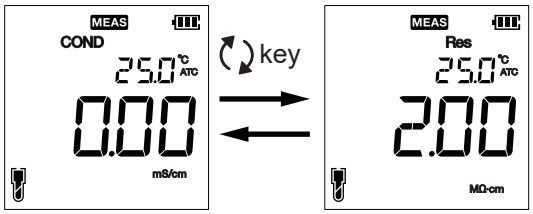
NOTE

Operate the keys with your fingers.

● How to change the measurement parameter

SC92 can measure both conductivity and resistivity.

When in measurement mode, press the MODE key to switch measurement parameters.



■ How to measure

(1) Remove the cap of sensor when the sensor has one.

(2) To avoid measurement errors, fully immerse the sensor in the sample until the liquid level reaches the air vent (bubble outlet).
Air bubbles on the electrode element may also cause measurement errors. Shake the sensor up and down a few times after immersing to remove bubbles.

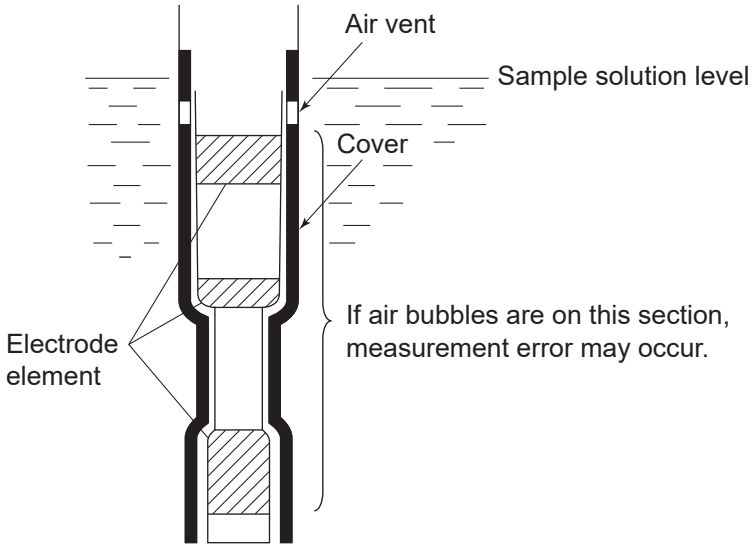


Figure 4 How to immerse sensor (general-purpose type)

(3) In the default auto stable mode, an automatic stability check starts and ☺ flashes. When the measured value has stabilized, the ☺ switches from blinking to lit to indicate the stabilized measured value.

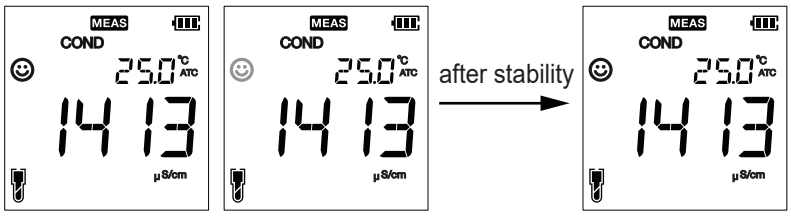
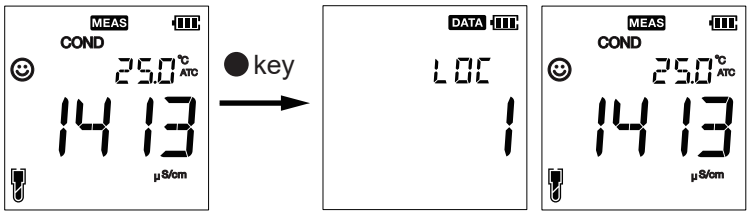


Figure 5 Conductivity measurement example (auto stable mode)

Saving data

In a measurement mode, press the ENT ● key. DATA appears and the displayed data are saved. The measurement item, temperature, and measured value data are saved.
The data number (LOC: location number) is displayed, then automatically the screen returns to the previous display.



NOTE

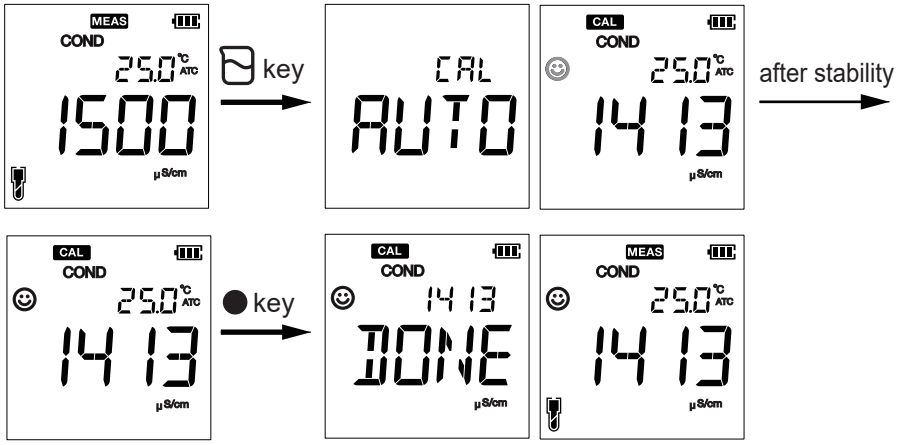
When the data storage limit (500 data) is reached, you cannot store data, an error occurs, MEM FULL :memory is full, is displayed. If you want to save new data, delete the stored data.

Standard Solution Calibration

The default setting for calibration method is automatic calibration.

Auto calibration

1. After immersing the conductivity sensor in the solution, press the CAL key.
2. The calibration method (AUTO) being set is displayed. ☺ blinks, and the stability check of the measured value begins.
3. Wait until the value stabilizes: ☺ goes from blinking to lit.
4. Press the ENT ● key to confirm and save calibration data.
5. Meter displays DONE indicating end of the calibration procedure.
6. When calibrating two or more points, repeat steps 1 through 5 above as necessary.



4. Maintenance and Storage

Maintenance

See IM 12D03E02-02EN for details.

- After the measurement is finished, wash off any contaminant or measurement solution adhering to the sensor with water and store it.
- Wipe off any contaminant on the body with a soft cloth. If the contamination is severe, use a neutral detergent.
- If  is displayed on the meter, replace it with a new one as soon as possible.
  When BATT LOW is displayed, the power turns off immediately.

Storage

Storage location

Select a location where the ambient temperature and humidity are within the following equipment specifications.

Temperature: 0 to +45ºC
Humidity: under 80% relative humidity and free from condensation

Avoid the following conditions.

- Dusty area
- Strong vibration
- Direct sunlight
- Corrosive gas environment
- Locations close to an air-conditioner
- Direct wind

How to store

Improper storage may cause malfunction. Store with the following precautions.

- Do not leave the sensor with the sample solution stained on it. Wash off the sample solution before storing it.
- Keep the sensor connected to the meter as much as possible. This will prevent the degradation of insulation resistance at the connector and prevent contamination of the O-ring for water proofing.
- Do not place any objects on the sensor as well as the meter itself.

CAUTION

If the meter will not be used for an extended period of time, be sure to remove the batteries.

Revision Record

Aug. 2024/1st Edition
Newly published

Yokogawa Electric Corporation
2-9-32 Nakacho, Musashino-shi, Tokyo 180-8750, JAPAN
http://www.yokogawa.com/