User's Manual

Model SC10XB
Conductivity Sensor for SC100

IM 12D11C01-01E

vigilantplant.™

YOKOGAWA
Yokogawa Electric Corporation

IM 12D11C01-01E
1st Edition

◆ Introduction

This instruction manual covers the SC10XB Conductivity Sensor for the SC100. Other related EXA100 series items are described in the following manuals:

Model name	Manual Name	IM No.
PH100	Panel Mount pH Converter	IM 12 B11A01-01E
OR100	Panel Mount ORP Converter	IM 12 C11A01-01E
SC100	Panel Mount Conductivity Converter	IM 12 D11A01-01E
PH10FP	KCl Refillable pH Sensor	IM 12 B11C01-01E
PH10RP	KCl Replenish-free pH Sensor	IM 12 B11C02-01E
OR10FP	KCl Refillable ORP Sensor	IM 12 C11C01-01E
OR10RP	KCl Replenish-free ORP Sensor	IM 12 C11C02-01E
PH10HLD	Immersion Holder for EXA100	IM 12 B11D01-01E
PH10HG	Guide-pipe Holder for EXA100	IM 12 B11D02-01E
WTB100	Terminal Box for EXA100	IM 12 B11E01-01E
WF100	Extension Cable for EXA100	IM 12 B11F01-01E

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IM 12D11C01-01E
1st Edition: May. 2003 (YK)
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◆ For the safe use of this equipment

(1) About This Manual

- This manual should be passed on to the end user.
- The contents of this manual are subject to change without prior notice.
- The contents of this manual shall not be reproduced or copied, in part or in whole, without permission.
- This manual explains the functions contained in this product, but does not warrant that they are suitable the particular purpose of the user.
- Every effort has been made to ensure accuracy in the preparation of this manual. However, when you realize mistaken expressions or omissions, please contact the nearest Yokogawa Electric representative or sales office.
- This manual does not cover the special specifications. This manual may be left unchanged on any change of specification, construction or parts when the change does not affect the functions or performance of the product.
- If the product is not used in a manner specified in this manual, the safety of this product may be impaired.

(2) Safety and Modification Precautions

- Follow the safety precautions in this manual when using the product to ensure protection and safety of the human body, the product and the system containing the product.

(3) The following safety symbols are used on the product as well as in this manual.

 DANGER

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.

 WARNING

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.

 **Tip**

This symbol gives information that complements the current topic.

 **SEE ALSO**

This symbol identifies a source to be referred to.

 This symbol indicates Protective Ground Terminal

 This symbol indicates Function Ground Terminal (Do not use this terminal as the protective ground terminal.)

 This symbol indicates Alternating current

◆ After-sales Warranty

- For repair during the warranty period, carry or send the product to the local sales representative or service office. Yokogawa will replace or repair any damaged parts and return the product to you.
- Before returning a product for repair under warranty, give us information of the model name and serial number and a description of the problem. Any diagrams or data explaining the problems would also be appreciated.
- If we replace the product with a new one, we won't provide you with a repair report.
- Yokogawa warrants the product for the period stated in the purchase quotation. Yokogawa shall conduct warranty service based on its standard. When the customer site is outside of the service area, a fee for dispatching the maintenance engineer will be charged to the customer.
- In the following cases, customer will be charged for repair fee regardless of warranty period.
  - Failure of components which are out of scope of warranty stated in instruction manual.
  - Failure caused by usage of software, hardware or auxiliary equipment, which Yokogawa Electric did not supply.
  - Failure due to improper or insufficient maintenance by user.
  - Failure due to modification, misuse or outside-of-specifications operation which Yokogawa does not authorize.
  - Failure due to power supply (voltage, frequency) being outside specifications or abnormal.
  - Failure caused by any usage out of scope of recommended usage.
  - Any damage from fire, earthquake, storms and floods, lightning, disturbances, riots, warfare, radiation and other natural changes.
- Yokogawa does not warrant conformance with the specific application at the user site. Yokogawa will not bear direct/indirect responsibility for damage due to a specific application.
- Yokogawa Electric will not bear responsibility when the user configures the product into systems or resells the product.
- Our maintenance service and the supply of repair parts will be covered for five years after the production ends. For product repair, please contact the nearest sales office described in this instruction manual.

Table of Contents

1. Specification

The SC10XB Conductivity Sensor is a lightweight, and easy-to-use sensor dedicated to the EXA100 series. It can be connected to a pipe and used with an optional adapter.

1.1 Standard Specifications

Measurement: Conductivity of aqueous solution
Measurement principle: Electrode method (2-electrode type)
Measuring range: 0-2.0μS/cm to 0-2.0 mS/cm
Cell constant: 0.05 cm^{-1}
Installation: Piping adapter connection (option specified)
Drop-in type
Sample temperature range: 0 to 70°C
Sample pressure: 0 to 500 kPa
Temperature detector: Pt1000
Wetted part materials:
In using the adapter (option code: /ADP):
SUS316, polypropylene, rigid PVC, Viton® fluoroelastomer (O-ring for pipe adapter)
In direct immersion of the sensor or the sensor with the guide pipe holder:
SUS316, polypropylene, rigid PVC, silicon rubber, PPS resin, chlorinated polyethylene (cable sheath)
Adapter material: Rigid PVC resin
Cable type: 4-conductor complex cable
Cable length: 3, 5, 10 m (up to 50 m with sensor cable included when using terminal box)
Note: When using the WTB100 terminal box and a extension cable, the total cable length including sensor cable must not exceed 50 m.
Weight approx: 280g (3m), 400g (5m), 770g (10m)

1.2 Model and Suffix code

Model	Suffix code	Option code	Description
SC10XB			Conductivity sensor for SC100
Cable length	-03		3 m
	-05		5 m
	-10		10 m
– – – – –	-AA		Always -AA
Combination adapter	-AAA		with no adapter
	-ADP		with adapter *1
Cell constant	-005		Cell constant 0.05 cm^{-1}
– – – – –	-NN		Always -NN
Option	Piping adapter	/ADP	Direct insertion screw connection R3/4

Notes *1: O-ring for piping adapter (/ADP) is included. Use this ring when the optional piping adapter is used.

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1.3 External Dimensions

Unit : mm

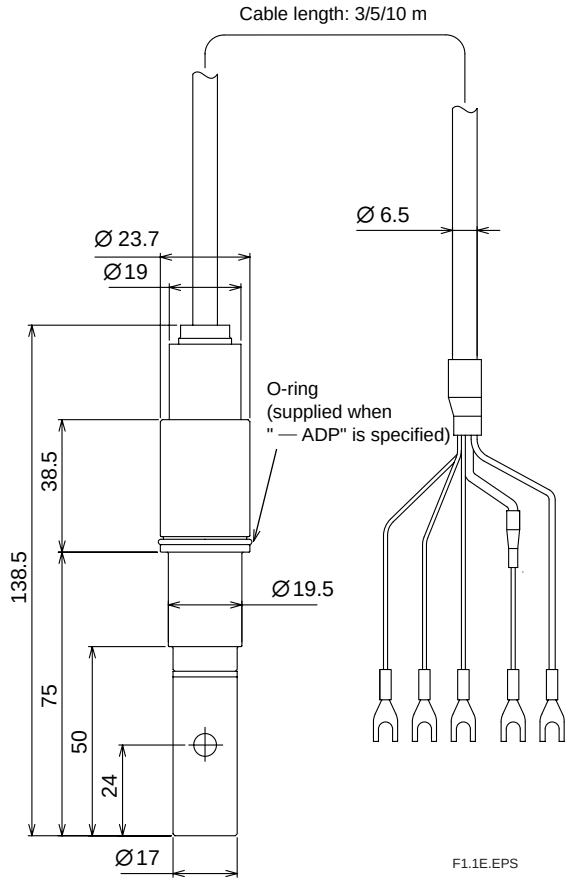


Fig. 1.1

Optional piping adapter: /ADP

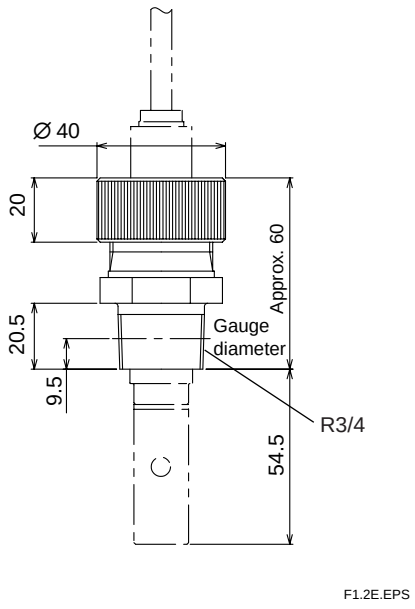


Fig. 1.2

2. Installation

2.1 Preparation for Installation

2.1.1 Checking for Damage

The SC10XB Conductivity Sensor is carefully packed to avoid damage during transportation. However, when you receive it, carefully unpack it and check no visible damage of it.

2.1.2 Holder Installation

The conductivity sensor can be used with a dedicated pipe adapter. Before installing the sensor, make sure the adapter is connectable to a pipe.

2.1.3 Installing Associated Instruments

Make sure that the SC100 Panel Mount Conductivity Converter (and the WTB100 Terminal Box) which will be connected to the SC10XB Conductivity Sensor has already been installed.

2.2 Conductivity Sensor Installation Procedures

2.2.1 When installing the conductivity sensor on a dedicated adapter (option code:/ADP)

(1) Install a pipe adapter socket (option code:/ADP) on the pipe as in Figure 2.1.
* If the socket has been installed on the pipe beforehand, you need not to install the socket.

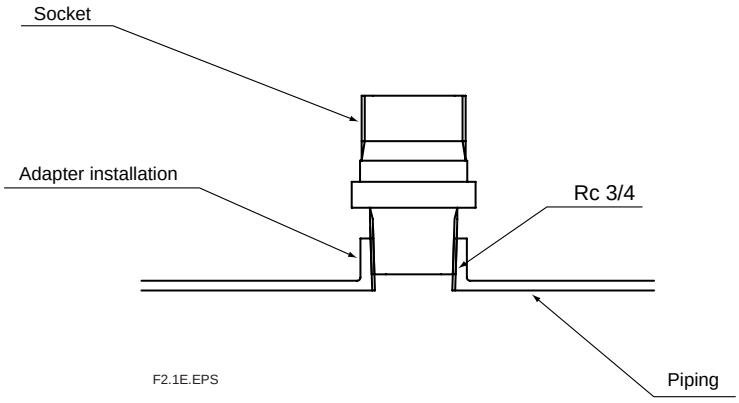


Fig. 2.1

(2) Insert the adapter nut from the cable terminal side of the sensor.

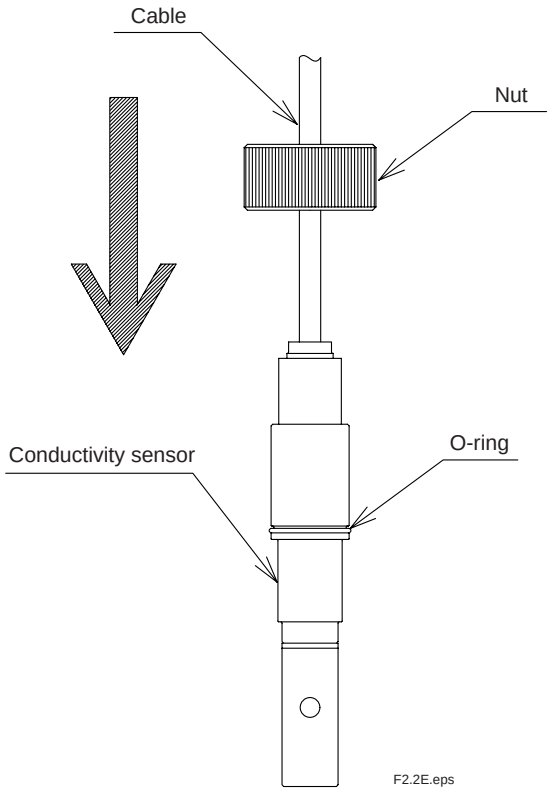
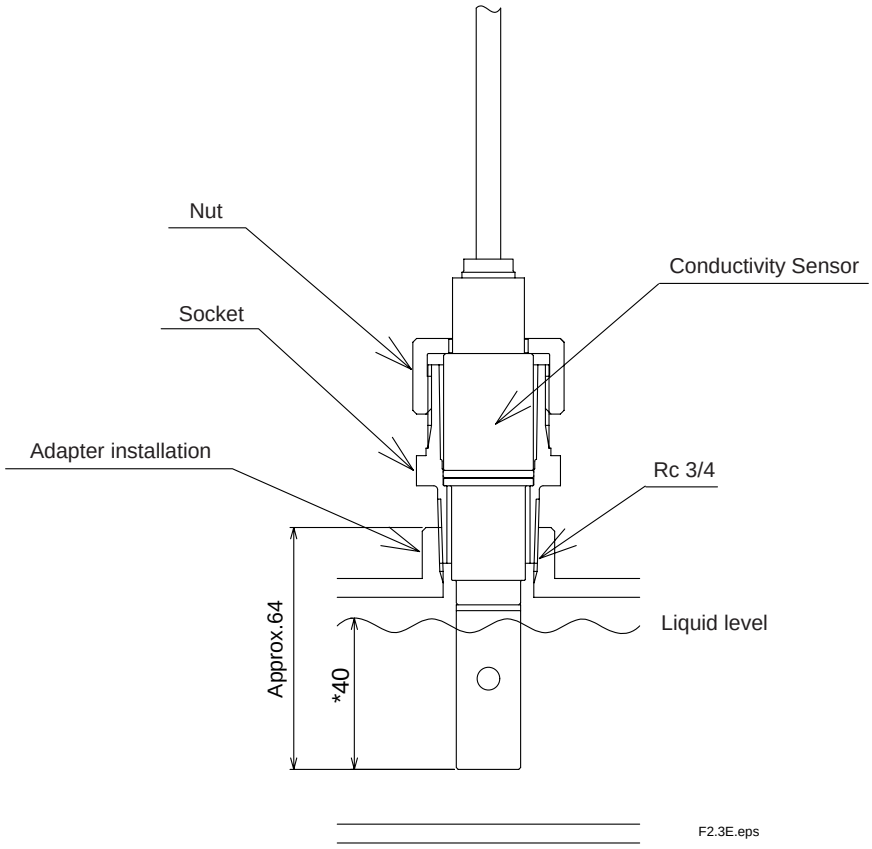


Fig. 2.2

(3) Connect the Conductivity Sensor cable terminals to the SC100 Converter.
Refer to the wiring procedure in Section 2.3. Connect the cable correctly.
(4) Insert the SC10XB Conductivity Sensor into the installed socket and fix the sensor by the nut.



* : Immerse the electrode tip at least 40 mm under the water level

Fig. 2.3

2.2.2 Notice for guide-pipe installation

The SC10XB Conductivity Sensor is usually installed with the dedicated adapter.

But if it is used with a guide-pipe type, make sure that:

(1) The sensor wetted part is resistant to the measured liquids,
(2) The temperature and pressure of the measured liquid meet the specifications of the sensor,
(3) The sensor is immersed at least 40 mm into the measured liquid, and should be installed so that the measured liquid can be exchanged completely, and
(4) Avoid lifting the sensor by using its cable alone. Protect the sensor along with a guide pipe. The pipe plays roles in not only protecting the sensor and its cable but also keeping its mesurement point constants.

2.3 Conductivity Sensor Cable Wiring Procedure

CAUTION

Place conductivity sensor cable wiring as far as possible from power supply and ground wiring.

2.3.1 Connecting to the WTB100 terminal box

(1) Open wiring hole in the terminal box.
On the bottom of the terminal box you can see a circular hole for wiring (covered by a blind plate). Place the tip of a screwdriver or the like on the center of the blind hole, and hit it with a hammer or the like to punch out the blind plate.
(2) Loosen two screws in the front of the terminal box, and remove the cover.

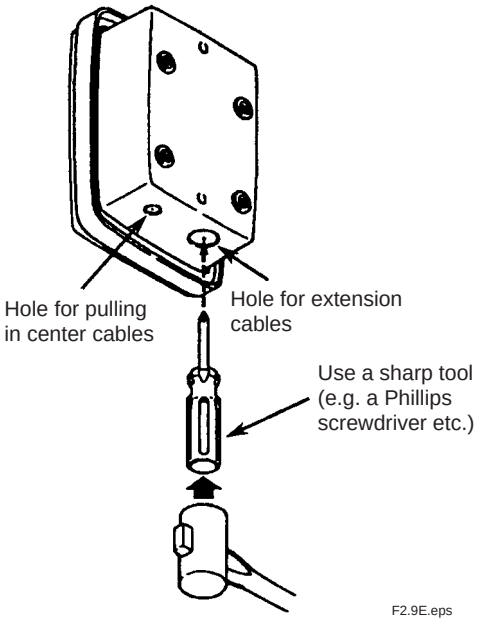


Fig 2.4

(3) Remove the nut from the dedicated cable gland (see Fig. 2.5), which is used for locking the sensor cable.

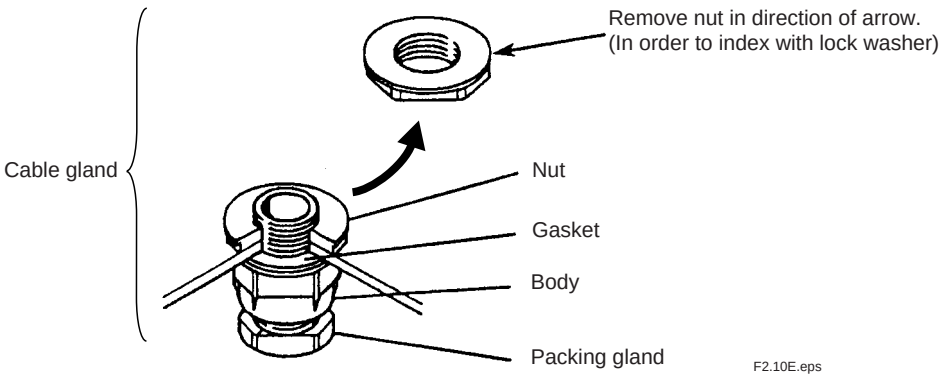


Fig 2.5

(4) Pass the cable through the cable gland except the removed nut.
(5) Pass the cable through the right side of the wiring hole.
(6) Pass the cable through the removed nut.
(7) Check each tag on the terminal of the cable, and connect each cable terminal to the corresponding terminal in the box.
(8) Loosen the packing gland (shown in Fig. 2.5) beforehand.
(9) Attach the cable gland to the wiring hole by screwing up securely the body.
(10) Screw up the packing gland so that humidity can not enter.

CAUTION

Do not too tight when screwing up these nuts.

Very strong tight screwing can damage the cable as well as the cable gland itself.

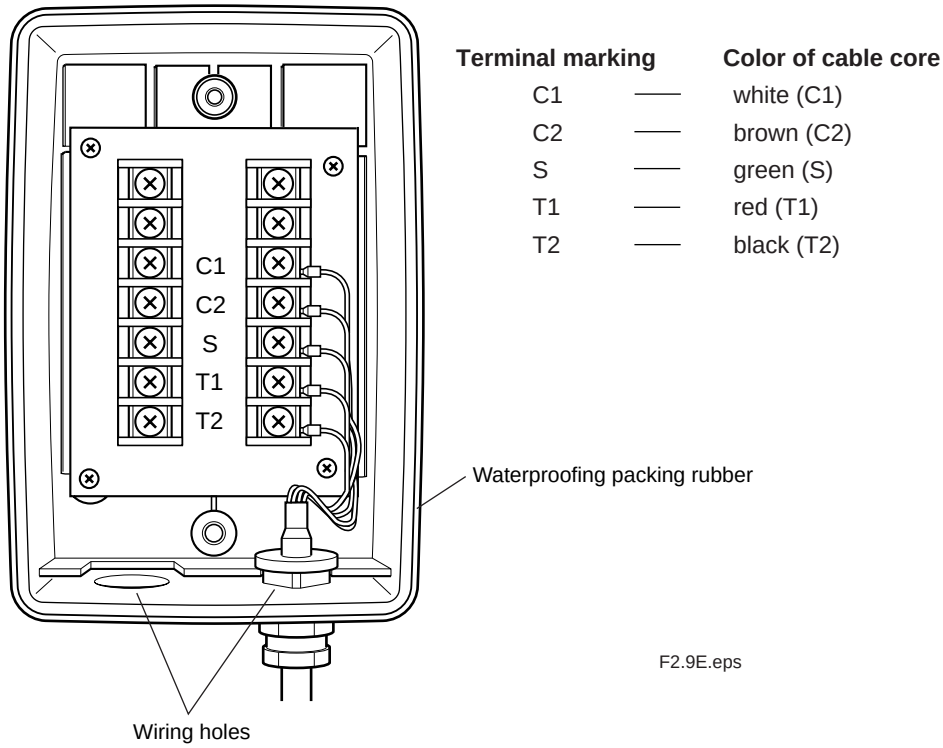


Fig 2.6 Example of wiring to a terminal box

(11) When the wiring work is completed, attach the cover of the terminal box and tighten the removed screws. In addition, check that neither dirt nor water drops are adhering to waterproofing packing rubber of the case part.

(Reference)
A tag is attached to the sensor cable. The tag indicates the colors, markings and numbers corresponting to the converter terminals.

2.3.2 Connecting to the EXA SC100 conductivity converter

Connect the sensor cable to the EXA SC100 conductivity converter as follows:

(1) Loosen two screws, which fix the shield cover on the back of the EXA SC100.
(2) Remove the cover.
(3) Connect the sensor cable terminals to appropriate terminals of the converter. (See Table.2.1)

Table.2.1

Conductivity converter terminal no.	Color of sensor cable core
11 (C1)	white
12 (C2)	brown
13 (S)	green
14	(do not use)
15	(do not use)
16	(do not use)
17 (T1)	red
18 (T2)	black

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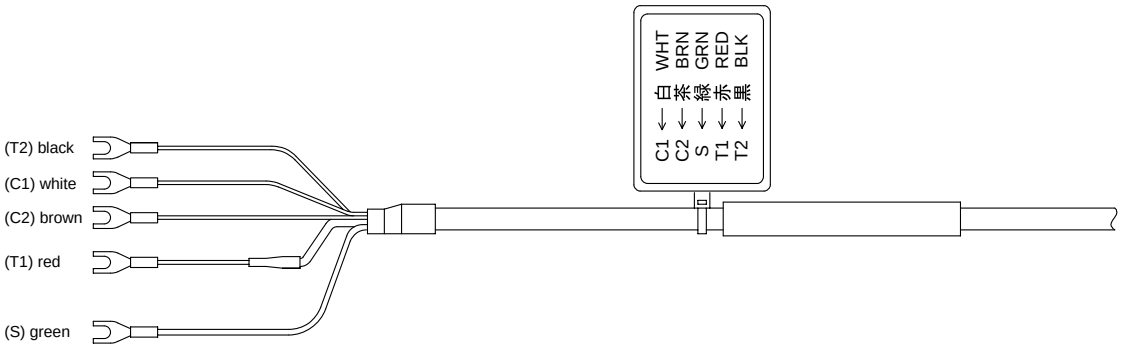

(3) Fix the sensor cable in place by using a wiring clamp.
(4) Replace the shielding cover removed in step (1).

(Reference)
A tag is attached to the sensor cable. The tag indicates the colors, markings and numbers corresponting to the converter terminals.

3. Use

3.1 Operation and Periodic Maintenance

3.1.1 Setting a cell constant

The conductivity sensor's cell constant may vary according to each sensor. Before operating the sensor, be sure to set a cell constant. For cell-constant setting procedures, refer to the Cell Constant Setting section of the separate manual IM 12D11A01-01E, "SC100 Panel Mount Conductivity Converter."

3.1.2 Calibration by Standard Solutions

Cell constants may gradually change with a dirty electrode. So, the sensor needs a periodic calibration within the periods of measurement errors not exceeding the allowable limits. For more details on calibration procedures, refer to the Calibration by Standard Solutions in Section 6.4 of the separate manual IM 12D11A01-01E, "SC100 Panel Mount Conductivity Converter."

3.1.3 Cleaning the Conductivity Sensor

Foulding materials adhered onto the internal or external electrodes of the conductivity sensor may cause measurement errors. If the sensor measures solutions containing dirty components, the sensor needs periodic cleaning as required.

To clean the internal and external electrodes, follow these instructions:

- If dirty electrodes are caused by suspended materials, adhesive materials, or microorganisms:
  Wipe off dirty areas with paper tissue or soft cloth. Then rinse away dirt completely.
- If dirty electrodes are caused by oily substance:
  Pour neutral detergent in a beaker or the like. Dip and clean a dirty electrode in it. After the cleaning, rinse it with cleaning liquids.

3.2 Replacement of Consumables

(1) Replacing O-rings

For SC10XB-□□-AA-ADP-005-NN/ADP, the O-ring for the dedicated adapter is required for preventing water outflow. This O-ring may not be damaged in a short time except some special applications. The O-ring should be inspected every six months for damages (degradation or deformation, or the like).

It is recommended that O-rings be replaced once a year even if they are not degraded or deformed. Use O-rings supplied by YOKOGAWA for replacement.

Replaceable parts:
O-rings for /ADP: part number, K9650XA (two O-rings)

Revision Record

Manual Title : Model SC10XB Conductivity Sensor for SC100
Manual Number : IM 12D11C01-01E

Edition	Date	Remark (s)
1st	May. 2003	Newly published