User's Manual

EXA DO

Model DO70G
Optical Dissolved Oxygen Sensor

IM 12J05D04-01E

vigilantplant.®

YOKOGAWA
Yokogawa Electric Corporation

IM 12J05D04-01E
1st Edition

Introduction

The DO70G optical dissolved oxygen sensor uses the optical (fluorescence) measurement method to continuously measure oxygen dissolved in water

Topics and information that need your special attention in handling the product are given in the text of this manual along with cautionary notes, such as a warning or caution, depending on their importance. Strictly observe these items from the standpoint of safety and prevention of equipment damage. For a notation, such as a warning also indicated on the product, there is an alert mark in the manual.

1. Confirming the Specifications

The DO70G sensor cable should have the specified length. The crimp-on terminals are either pin-type or M4 ring-type.

Upon arrival of the purchased product, carefully unpack it and make sure the product has not been damaged during transportation.

Also check the model code to confirm that the sensor is exactly as ordered. For details of the model code, see subsection 1.2.2 on page 1-2.

2. Information Covered by This Manual

This manual covers all of the information on handling the DO70G optical dissolved oxygen sensor, such as instructions on installation, inspection, and maintenance and service.

Note : When system components other than DO70G have to be mentioned, descriptions of the basic system assumes that the DO402G Dissolved Oxygen Converter is used.

Refer to the instruction manual for information on the converter connecting holders with the DO70G and how to connect sensor cables.

Note that the instruction manuals listed in the following table are for the associated equipment used with the EXA DO Dissolved Oxygen Metering System.

Manuals for Associated Equipment Used with the EXA DO Dissolved Oxygen Metering Syatem

Model	Title of Manual	Manual No.
DO402G	Dissolved Oxygen Converter	IM 12J05D02-01E
DO70G	Optical Dissolved Oxygen Sensor	IM 12J05D04-01E
DOX10	Power Supply Unit	IM 12J05S01-01E
PB350G	Angled Floating Ball Holder	IM 19H1E1-01E
PB360G	Vertical Floating Ball Holder	IM 19H1E2-01E
DOX8HS	Submersion Type Holder (Style B)	IM 19H1D2-01E
PH8PU1	Cleaning Pump/Tank	IM 19C1E1-01E

Note: Only the basic system of basic components are listed on the front panel.
Refer to respective instruction manual for information on recorders, annunciators and other instruments.

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◆ For the safe use of this equipment

(1) About This Manual

- This manual should be passed on 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 for 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 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.

The following safety symbols are used in this manual.

CAUTION

Identifies instructions that must be observed in order to avoid physical injury and electric shock or death of the operator.

WARNING

Identifies instructions that must be observed in order to prevent the software or hardware from being damaged or the system from becoming faulty.

IMPORTANT

Identifies important information required to understand operations or functions.

TIP

Identifies additional information.

SEE ALSO

Identifies a source to be referred to.

◆ After-sales Warranty

- Do not modify the product.
- During the warranty period, for repair under warranty 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, provide us with the model name and serial number and a description of the problem. Any diagrams or data explaining the problem 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 pre-purchase quotation. Yokogawa shall conduct defined warranty service based on its standard. When the customer site is located 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 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 did not supply.
  - Failure due to improper or insufficient maintenance by user.
  - Failure due to abuse, misuse or modification 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 will not bear responsibility when user configures the product into systems or resells the product.
- Maintenance service and supplying repair parts will be covered for five years after the production ends. For repair for this product, please contact the nearest sales office described in this instruction manual.

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Model DO70G
Optical Dissolved Oxygen Sensor

IM 12J05D04-01E 1sth Edition

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1. General

1.1 Features

- **Long stability**

  The sensor will be ready for measurement approximately 10 minutes after turning on the power.

  The sensor can be used continuously and stably for a long time thanks to the stain-resistant sensor cap and the measurement method which is less susceptible to disturbance. It also is hardly influenced by air bubbles in the measurement liquid.

- **Highly reliable measurement system with low maintenance**

  The sensor withstands a pressure of up to 500 kPa. It can be assembled into the submersion type, angled floating ball, or vertical floating ball holders.

  In the submersion type holder, the sensor can be automatically cleaned with jet-sprayed water or air at regular intervals. By selecting a suitable holder and cleaning device for applications, a highly reliable, low-maintenance measurement system can be built with this sensor.

- **Easy maintenance**

  The sensor cap ages with time and eventually comes to the end of its service life. Before this happens, replace it with a new one. The sensor cap is easily replaced

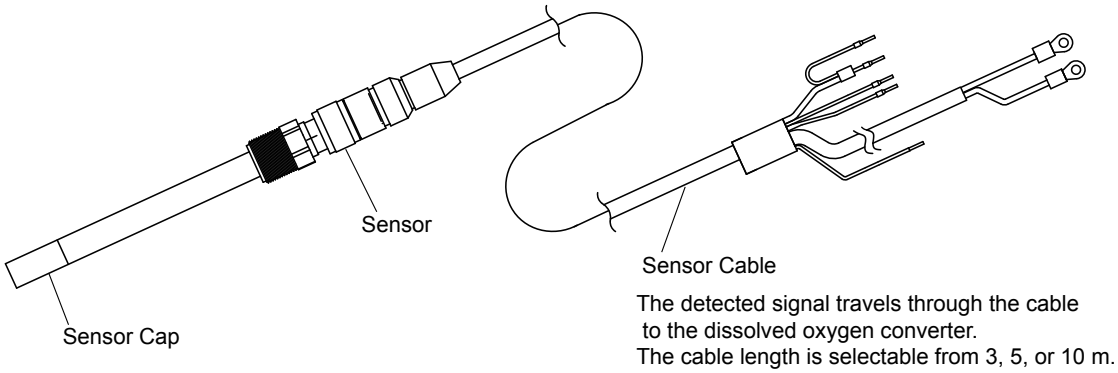

Figure 1.1 External View of the DO70G Optical Dissolved Oxygen Sensor

CAUTION

Do not drop the sensor. Please handle it with care.

1.2 Specifications

1.2.1 Standard Specifications

Object of Measurement: Concentration of oxygen dissolved in sewage and drainage (water)

Principle of Measurement: Optical (fluorescence) measurement method

Measurement Range: 0 to 25 mg/l

Note: The measurement range must be entered through the dissolved oxygen converter.

Temperature of Measurement water :

0 to 50 °C

Flow rate : 2m/sec or less

Pressure : 0 to 500 kPa

Resistance Temperture Detector (RTD) :

22k NTC

Construction: Sensor unit : Stainless steel (316L SS)

O-ring: Ethylene Propylene Rubber (EPDM)

Permeable membrane: Silicone resin

Cable shielding : Heat-resistant flexible PVC

Sensor Cable: Length : 3 m, 5 m or 10 m

Crimping terminal configuration :

Pin-type (for converter)

M4 Ring-type (for power supply unit)

Weight: Sensor: Approx. 0.1 kg

Cable: 3 m Approx. 0.4 kg

5 m Approx. 0.6 kg

10 m Approx. 1.1 kg

[Characteristics]

Repeatability: 0.1 mg/l or 3% FS, whichever is greater

Temperature Compensation Error:

Within ±3% FS

(including sensor) for a ±5 °C change in the range of 0 to 40 °C

Response Time: Within 2 minutes (90% response)

(including sensor)

1.2.2 Model and Suffix Codes

● DO70G Optical Dissolved Oxygen Sensor

Model	Suffix Code	Option Code	Description
DO70G	·····	·····	Optical dissolved oxygen sensor
Insert length	-120	·····	120 mm
Type	-E	·····	Always -E
Cable length	-00N	·····	No cable
	-03E	·····	3m (*1)
	-05E	·····	5m (*1)
	-10E	·····	10m (*1)
—	-N	·····	Always -N
Option	Adaptor	/S3	Submersion type holder (stainless steel)
		/PP	Submersion type holder (polypropylene)
		/FPP	Float holder (polypropylene)
	Tag plate	/SCT	Stainless steel tag plate

*1: The power cable is +1.5m. (Refer to “DIMENSION”)

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● DOX10 Power Supply Unit

Model	Suffix Code	Option Code	Description
DOX10	·····	·····	Power supply unit
Power supply	-U	·····	Always -U
Cable length	-00	·····	No cable
	-15	·····	1.5m (DO402G power supply use)
——	-N	·····	Always -N
Option	Mounting bracket	/P	Pipe mounting bracket
		/W	Wall mounting bracket
	Tag plate	/SCT	Stainless steel tag plate
	Conduit work adaptor	/CB1	G1/2, 1pcs
		/CD1	1/2 NPT, 1pcs
		/CF1	M20 x 1.5, 1pcs

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● DOX8W Calibration Set (optional)

Model	Suffix Code	Option Code	Description
DOX8W	·····	·····	Calibration set
Style	*A	·····	Style *A

This is necessary if the span calibration is to be done using a saturated dissolved oxygen solution. It is not necessary for air calibration.

<Contents>

Air pump, stirrer, stirring element, bubbler, clamp, beaker, and thermometer.

Note: The calibration set can be used in common regardless of the type of holder.

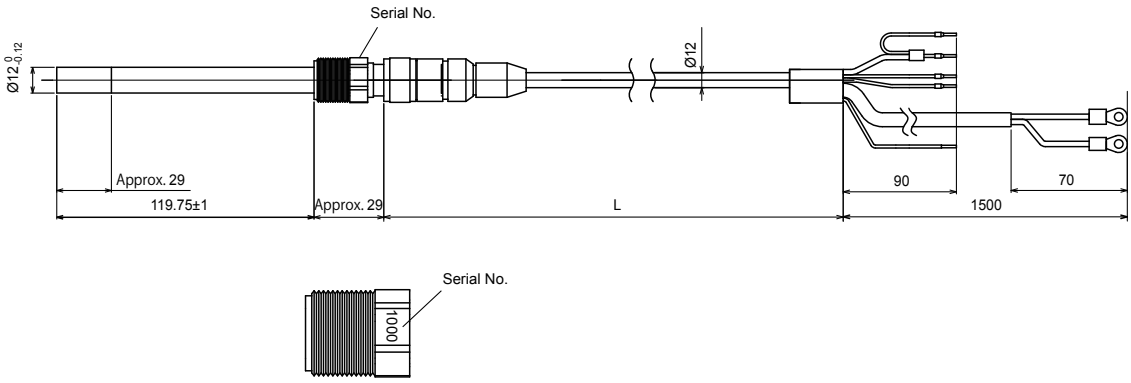
● Spare Parts

Part Name	Part No.	Remarks
Sensor cap *1	K 9679AN	Please shade the light during safe keeping.
Zero adjusting reagent	L 9920BR	Sodium sulfite 500g
Adaptor	K9148NA	For submersion type holder (stainless steel)
	K9148NB	For submersion type holder (polypropylene)
	K9679CA	For float type holder (polypropylene)
Sensor cable	K9679BA	3 m
	K9679BB	5 m
	K9679BC	10 m

*1: O-ring is attached to the sensor cap.

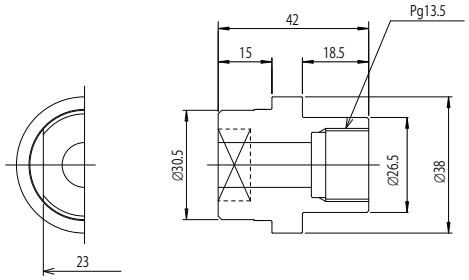
1.2.3 External View and Dimensions

●DO70G Seosor



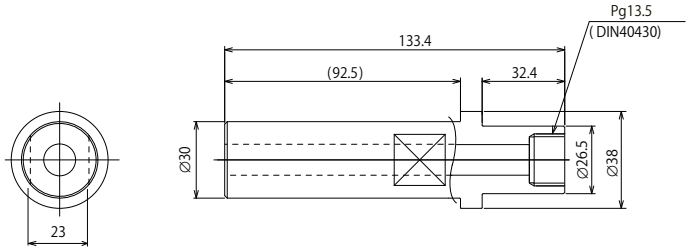
Model-Suffi x code	L	Weight (kg)
DO70G - 120 - E - 00N - N	No cable	Approx. 0.1
DO70G - 120 - E - 03E - N	3,000	Approx. 0.5
DO70G - 120 - E - 05E - N	5,000	Approx. 0.7
DO70G - 120 - E - 10E - N	10.000	Approx. 1.2

● Adaptor (/S, /PP) :Option



Weight
/S3 : Approx.173 g
/PP : Approx. 20 g

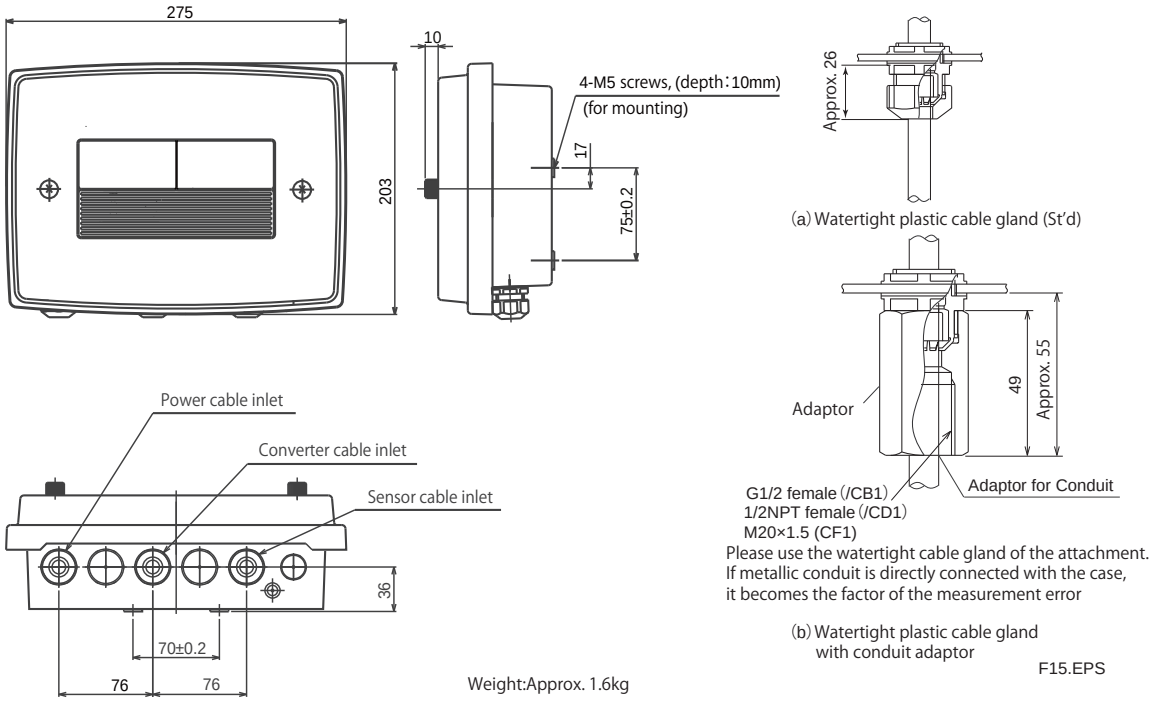
● Adaptor (/FPP) :Option



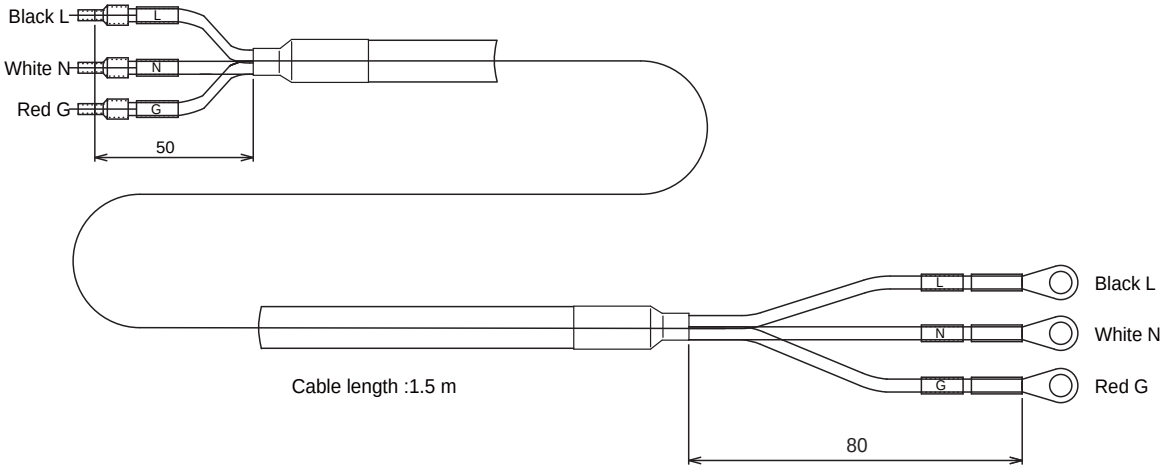
Weight: Approx. 65g

Figure 1.2 External View and Dimensions of DO70G Optical Dissolved Oxygen Sensor

● DOX10 Power Supply Unit



Attached Cable with DOX10 (Not supplied if suffix code "-00-N" is selected)



Model and Suffix Code	L (mm)
DOX10 - U - 00 - N	No cable
DOX10 - U - 15 - N	Approx. 1,500

Weight：Approx. 0.3kg (1,500 mm)

Figure 1.3 External View and Dimensions of DOX10 Power Supply Unit

● Pipe Mounting Bracket for Power Supply Unit (Optional) (Option Code: /P)

Weight: 0.7 kg

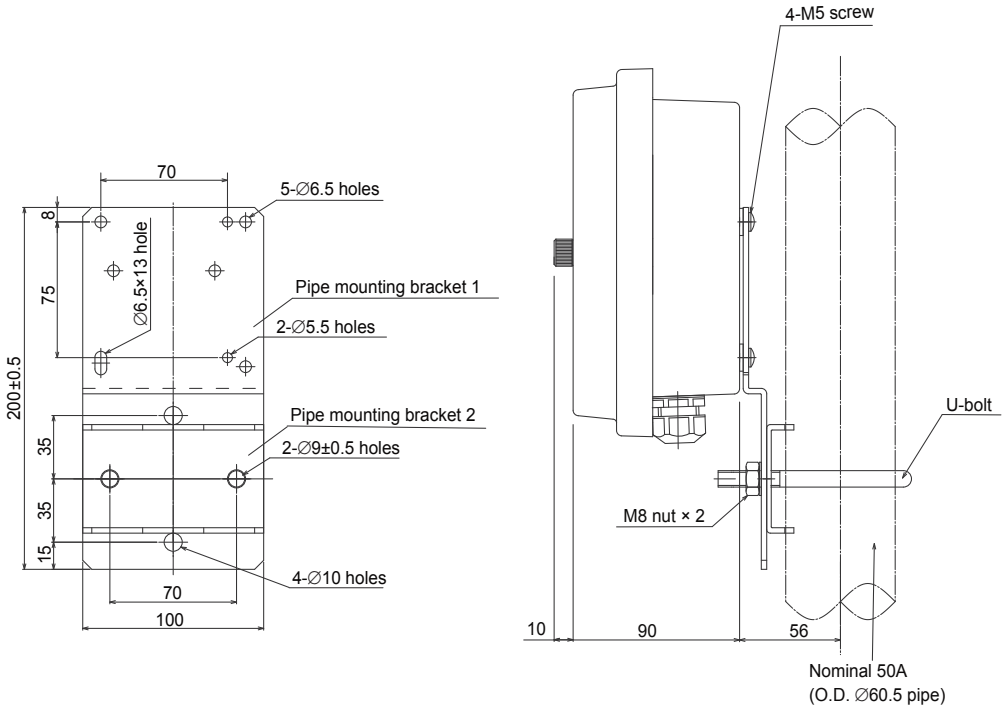


Figure 1.4 External View and Dimensions of Pipe Mounting Bracket

● Wall Mounting Bracket for Power Supply Unit (Optional) (Option Code: /W)

Weight: 0.7 kg

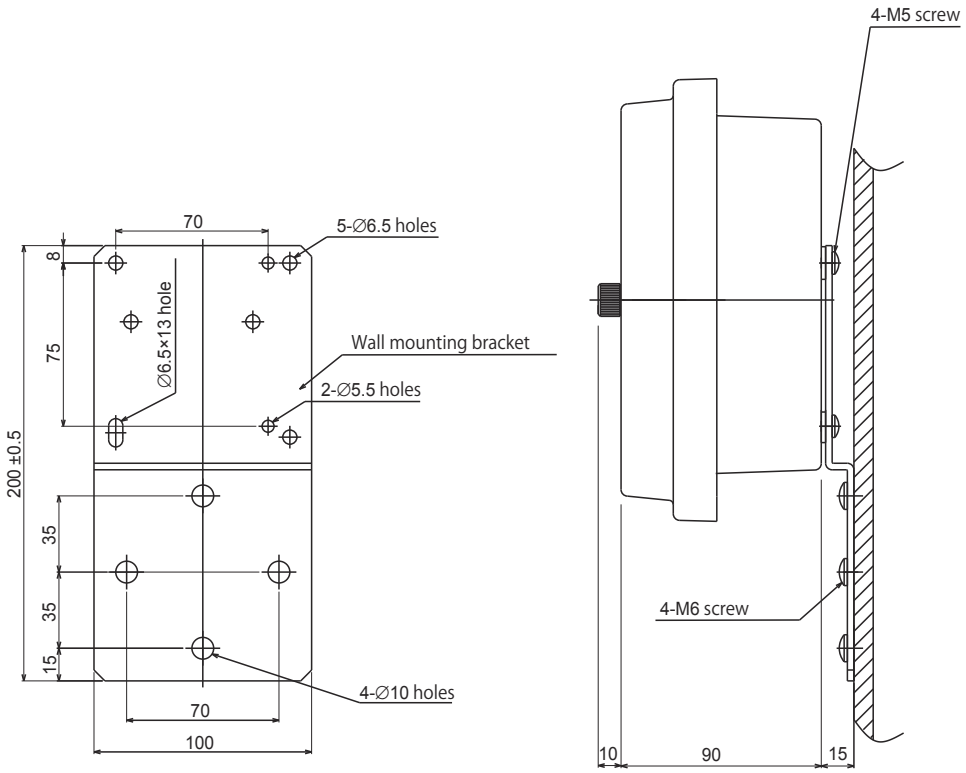


Figure 1.5 External View and Dimensions of Wall Mounting Bracket

2. Components

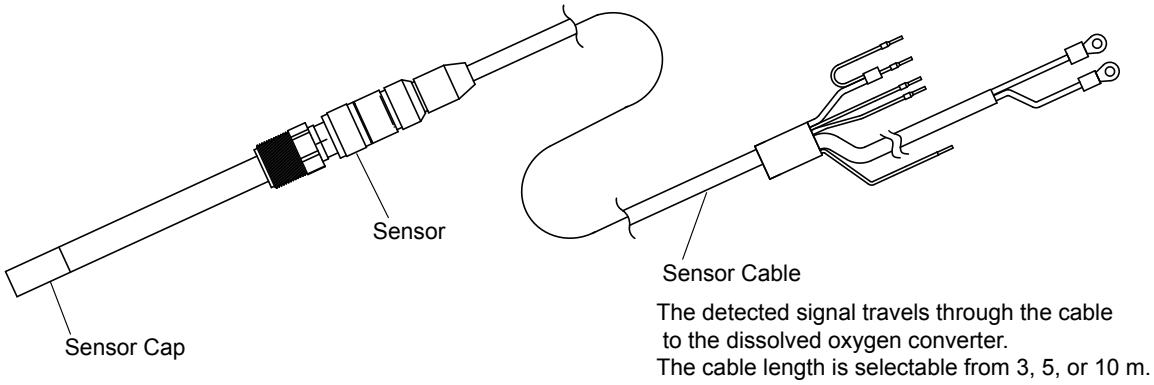


Figure 2.1 Components of DO70G Optical Dissolved Oxygen Sensor

CAUTION

Do not loosen the sensor cap except for replacement.

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3. Installing the Sensor and Connecting the Cable

3.1 Preparing for Installation

3.1.1 Removal of Parts for Transportation and Storage

A cap to prevent the sensor cap from being damaged when transporting the sensor is mounted at the tip of the DO70G Optical Dissolved Oxygen Sensor. When installing the sensor, remove this protective cap.

3.1.2 Method of attaching/detaching the sensor cable

(1) Attachment Method

- Rotating the sensor connector so that its recessed portions will agree with the salient portions inside the cable connector, insert the sensor connector into the cable connector.

  Note: A weak pressure is sufficient for inserting it. If a strong pressure is needed to insert it, the connection position will be incorrect. Check the position and re-try.

- After inserting the sensor connector completely, grip the portion “A”, and rotate the cap nut (“B” portion) clockwise until the nut cannot rotate.

(2) Detachment Method

- Gripping the portion “A”, and rotate the cap nut (“B” portion) un-clockwise.
- After loosing the nut completely, grip and pull the plastic portion of the sensor from the cable connector.

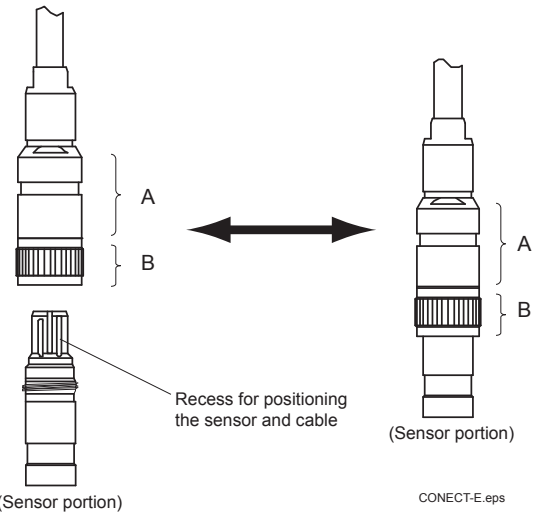


Figure 3.1 Attaching/ Detaching the sensor cable

3.1.3 Assembling the Adaptor

An adaptor (optional) is necessary to assemble DO70G into the DOX8HS submersion type holder, PB350G angled floating ball holder, or PB360G vertical floating ball holder.

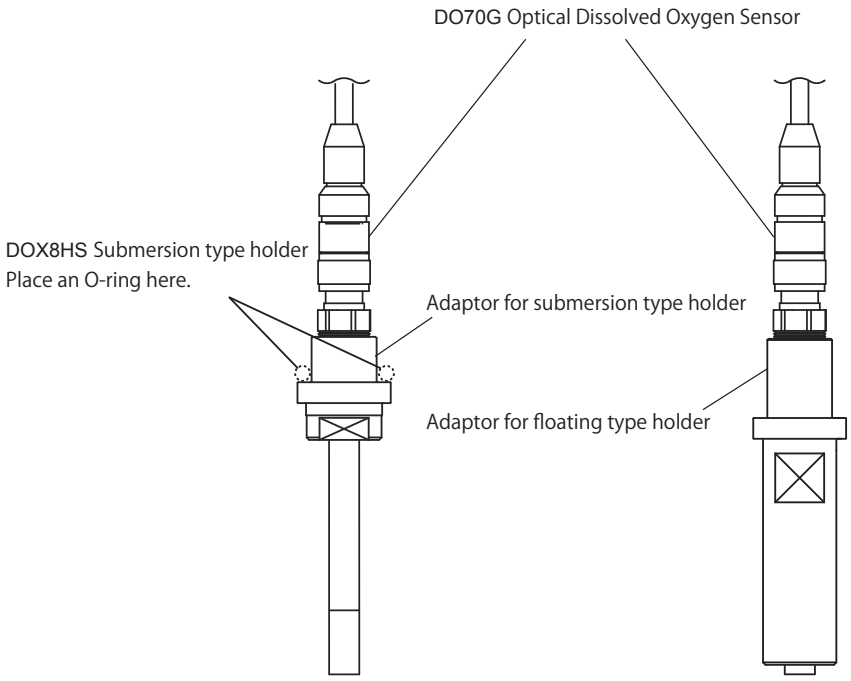


Figure3.2 Assembling the Adaptor

3.2 Installation

The DO70G optical dissolved oxygen sensor, powered by the DOX10 power supply unit, can be assembled into the PB350G angled floating ball holder, PB360G vertical floating ball holder, or DOX8HS submersion type holder. The assembly is submerged to the optimum point to obtain precise measurements.

This section explains how to select the measurement point and sensor holder.

3.2.1 Selecting the Measurement Point

Normally, a location that meets the following requirements may be selected as the measurement point.

- **The measured value is representative among the values available for the solution under measurement (SUM).**

  Avoid choosing a location where the solution is unevenly distributed, since heavy hunting may result in the measured value. Also, avoid locations where bubbles occur frequently.

- **The temperature and flowrate comply with the operating conditions required of the sensor and holder.**

  Note that, if a measured solution running at a high flow rate contains particles of sand, the permeable membrane of the sensor may be damaged.

3.2.2 Selecting the Sensor Holder

Each holder or fitting where the DO70G Optical Dissolved Oxygen Sensor is assembled has the following characteristics.

Choose a holder that suits the liquid to be measured and the measurement location.

[PB350G Angled Floating Ball Holder and PB360G Vertical Floating Ball Holder]

The fitting is designed to contain the sensor in a sphere that floats on a liquid. This fitting is immune to large variations in the liquid level. Since the wet part is smooth and less susceptible to catching flocs, the sensor does not trap rubbish that mixes in with the SUM (Related description: See Subsection 3.2.3). The float is supported by an arm and does not move away from the measurement point even if the SUM is flowing.

When using this holder the membrane damage detector function in the converter can be activated.

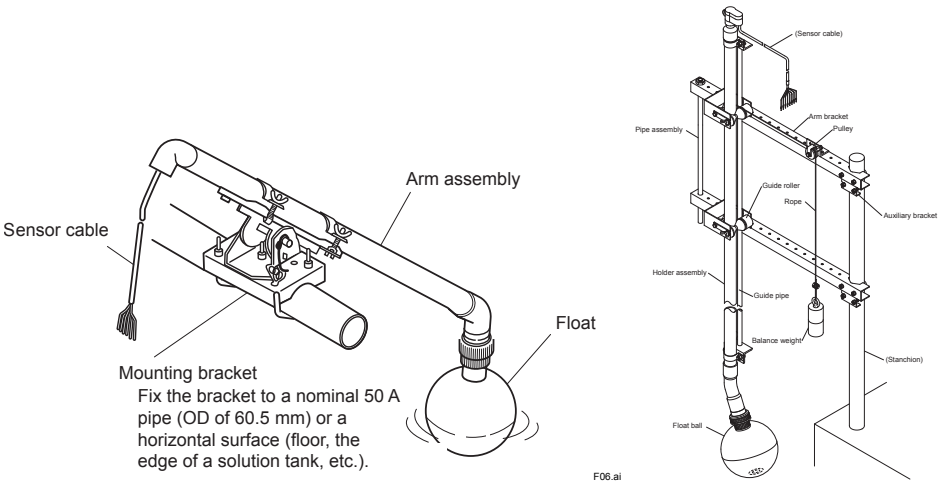


Figure 3.3 Suspension of Dissolved Oxygen Sensor Using PB350G Angled Floating Ball Holder

[DOX8HS (Style B) Submersion Type Holder]

The holder holds the sensor at an angle of 45°. Consequently, bubbles will not stick to the sensor the tip. Any pollutants in the SUM can be automatically cleaned off at regular intervals using a jet-spray water (air) cleaner.

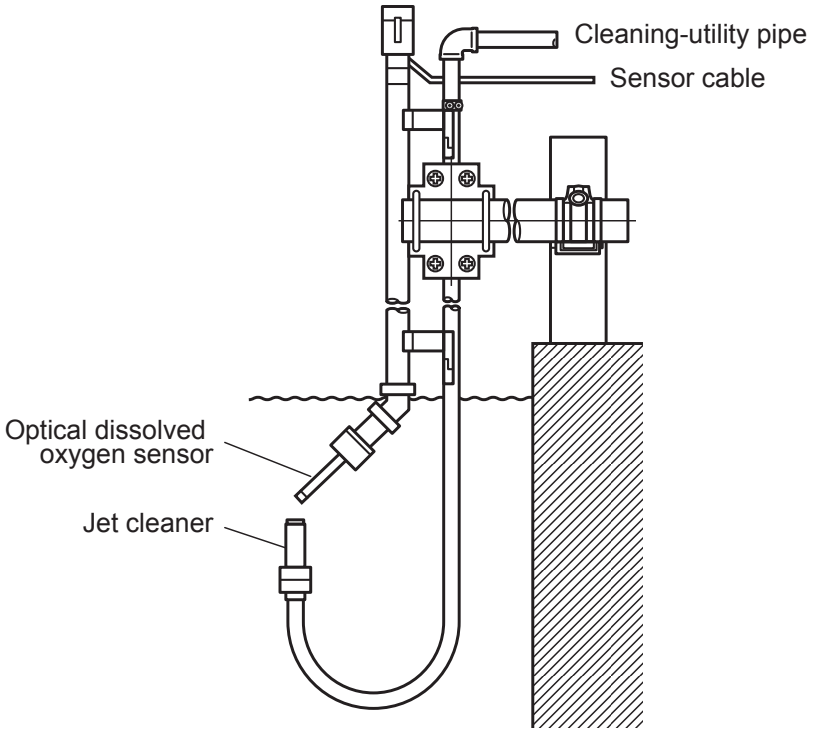


Figure 3.4 **Suspension of Optical Dissolved Oxygen Sensor Using DOX8HS Submersion Type Holder (with Jet Cleaner)**

3.2.3 Assembling the Sensor in the Holder

For details on how to assmble the sensor in the holder or fitting, see the appropriate instruction manual for each holder or fitting.

CAUTION

Exercise care not to contaminate or wet the tip of the sensor cable when assembling the sensor.

If you will not begin wiring the sensor cable immediately, take the protective measures necessary to prevent the assembly from being damaged.

3.3 Connecting the Sensor Cable

The cable of the optical dissolved oxygen sensor must be connected to the terminals of the DO402G Dissolved Oxygen Converter and DOX10 Power Supply Unit.

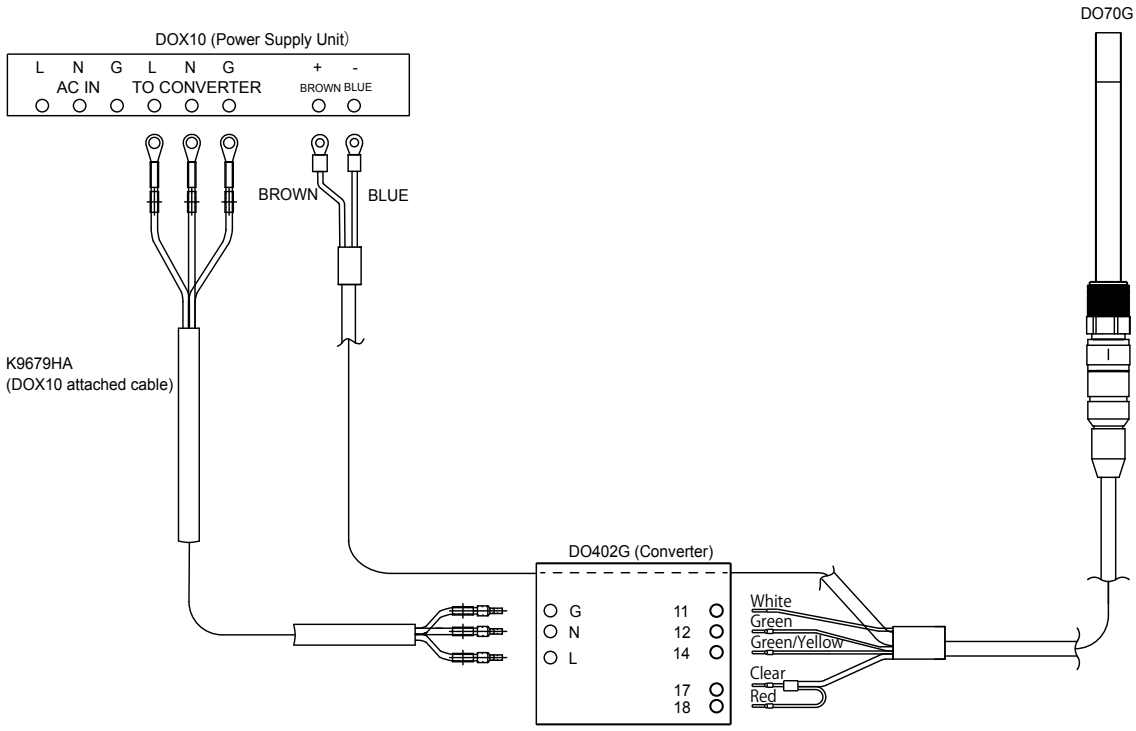
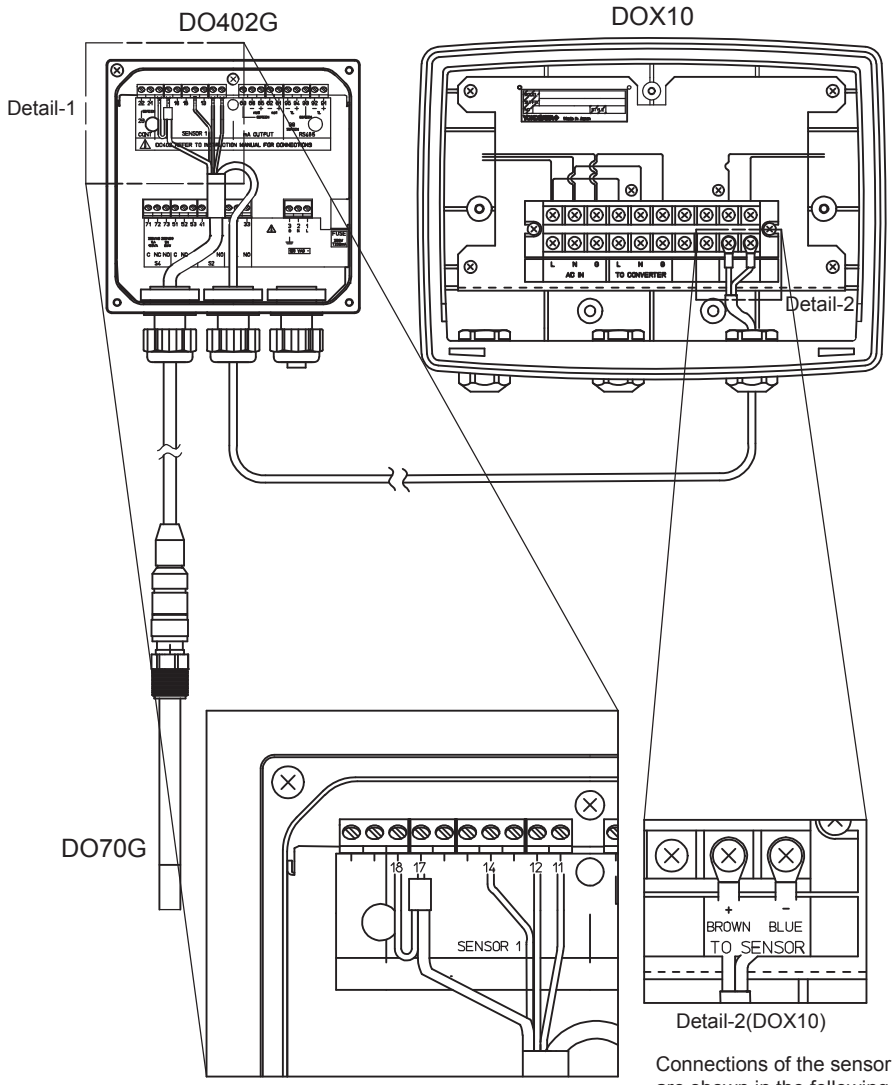


Figure 3.5 Connection of Sensor Cable

DO70G Wiring Diagram Example



Detail-1(DO402G)

Detail-2(DOX10)

Connections of the sensor cable and DO402G terminals are shown in the following table.

DO70G (Wiring color)	DO402G (Terminal No.)
Red	18
Clear	17
Green/Yellow	14
Green	12
White	11

Connections of the sensor cable and DOX10 terminals are shown in the following table.

DO70G (Wiring color)	DOX10 (terminal No.)
BROWN	+ BROWN
BLUE	− BLUE

For details on operation during startup or for regular operation after the entire measuring system is brought into operation, refer to the DO402G Dissolved Oxygen Converter instruction manual (IM 12J05D02-01E). The maintenance and service of the dissolved oxygen sensor is explained in Section 4 that follows.

4. Setting and Calibrating the Converter

4.1 Setting the Converter (the DO402G Converter)

Set the parameters of the DO402G converter to connect to the DO70G optical dissolved oxygen sensor.

4.1.1 Setting Parameters of the Sensor

Code 01	*S.TYPE	Select 1 for optical and polarographic sensors. Press the [ENT] key to display *I.CELL on the section.
	*I.CELL	Select 9 and input a nominal cell current of 60 nA.

4.1.2 Setting Parameters for Temperature

Code 10	*T.SENS	Select 3 for 22k NTC.

4.1.3 Setting Parameters for Calibration

Code 21	*0.CAL	Select 1 for zero calibration.

For other settings, see “DO402G Dissolved Oxygen Converter (IM12J05D02-01E).”

4.2 Calibration

The DO70G optical dissolved oxygen sensor is calibrated at the DO402G converter.

Calibration is performed:

- When the DO70G is installed
- When the sensor cap is replaced
- When the measuring error exceeds the acceptable deviation from the reference method after cleaning
- When the error message appears stating that maintenance is required

4.2.1 Calibration Procedure

Before starting measurements, perform both span and zero calibrations by the water calibration method.

Wash off any dirt on the sensor cap in maintenance mode.

Lightly wipe the sensor cap dry with a soft tissue.

Prepare the necessary equipment and reagents for the span and zero calibrations.

Equipment for calibration includes:

- Beaker or bucket
- Magnetic stirrer or other tools for agitating
- Demineralized water, or salty process water if salinity compensation is activated
- Air supply pump (aquarium pump)
- Glass diffuser to generate small air bubbles (bubbler)

NOTE: Aerate for 15 to 30 minutes so that the water is fully air-saturated.

Reagents for zero calibration:

- Sodium sulfite
- Demineralized water

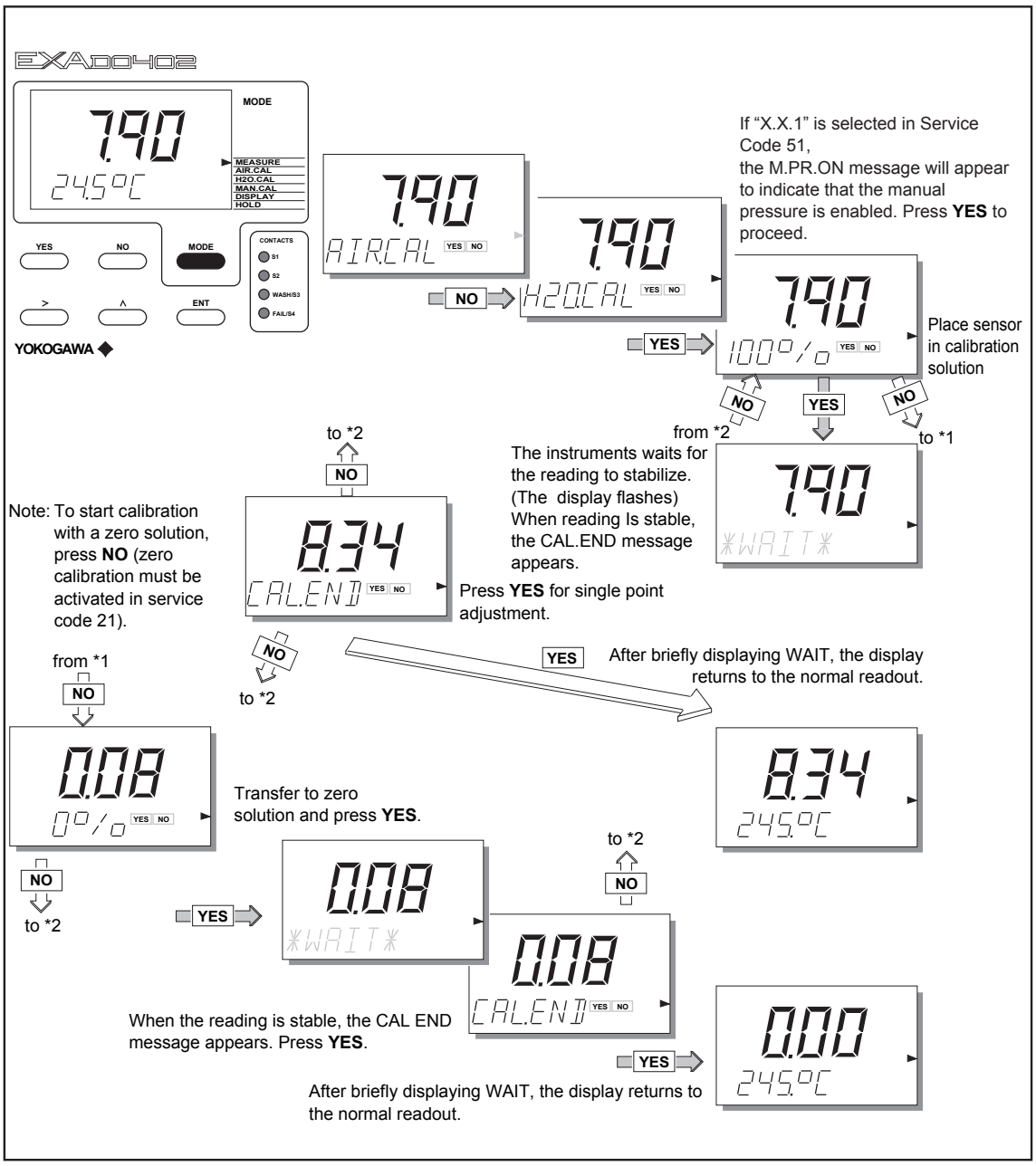
The zero oxygen solution contains approximately 50 grams of sodium sulfite per liter.

CAUTION

Zero calibration of the sodium sulfite solution may take a long time. Even after the CAL.END prompt is displayed, wait for 5 to 10 minutes before pressing the [YES] key. Otherwise, calibration errors may occur during measurement.

The water calibration may take longer than 10 minutes. It is recommended to set the Auto Return (*RET.) in Service Code 50 to “0” before starting the calibration procedure so as not to return to the measurement mode. After the calibration, set the Auto Return in Service Code 50 to the desired setting.

Procedure of the water calibration



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5. Maintenance

This section describes the inspection and maintenance procedure applicable to just the dissolved oxygen sensor alone. For comprehensive inspection and tuning of the measuring system, such as calibration, see the DO402G Dissolved Oxygen Converter user's manual (IM 12J05D02-01E).

5.1 Routine Inspection

5.1.1 Inspecting the Sensor Cap for Cleanness (Degree of Contamination)

An inspection (visual) of the sensor cap must be made whenever the sensor is calibrated. Any dirt on the sensor cap will adversely affect your measurements. If the dirt is spread over the sensor cap, dip the sensor cap into clean water and gently wipe the dirt off with a soft cloth or lint-free paper. If the dirt will not come off easily, apply a neutral detergent to the sensor cap so it will be easier to remove the dirt. Clean the sensor cap with clean water.

5.1.2 Inspecting the Sensor Cap for Tightness

Before every calibration, check that the sensor cap is not loose.

If it is loose, retighten it.

5.2 Inspection If Failure Occurs

If the sensor cap ages and comes to the end of its service life, troubles such as failure to make a span adjustment will occur.

This section deals especially with the inspection and service of the optical dissolved oxygen sensor if any trouble is found in a detected signal.

Either or both of the following measures are necessary to solve the problem.

- Replacing the sensor cap and it's o-ring
- Replacing the sensor unit

5.2.1 Checking of RTD in the Sensor

A 22k NTC resistance temperature detector (RTD) is used in the DO70G sensor.

This RTD indicates a resistance value of about 22 kΩ at 25°C.

Check the RTD by measuring the resistance value between the white wiring and green wiring.

If the resistance value differs greatly from the above value, the sensor must be replaced.

5.2.3 Checking of the Sensor

Any failures in the DO70G can be confirmed at the DO402G converter.

If error number E4, E7, E8, E9, or E12 appears on the display, follow one of the procedures below:

- Cleaning the sensor unit
- Replacing the sensor cap and it's o-ring
- Replacing the sensor unit

5.3 Expendables, Spare Parts and Maintenance Parts

This section presents the general information on spare parts that the manufacturer recommends you to provide and on materials that are used in maintenance and service. When procuring these parts or materials, also refer to the Customer Maintenance Parts List (CMPL) at the end of this manual.

5.3.1 Maintenance Parts (Expendables)

Table 5.1 Items Contained in the Maintenance Parts

Item	Part No.	Qty	Remarks
Sensor cap *1	K9679AN	1	Please shade the light during safe keeping.
Reagent for preparing calibration solution (for zero adjustment) sodium sulfite (Na_2SO_3)	L9920BR	500 g	Calibration must be carried out at a predetermined interval (the frequency of calibration varies depending on the operating conditions). Calibration must also be performed when, for example, the sensor cap is replaced. Approximately 50 grams of the reagent is needed to prepare 1 liter of the calibration solution for zero adjustment.
Adaptor	K9148NA K9148NB K9679CA	1 1 1	For submersion type holder (stainless steel) For submersion type holder (polypropylene) For float type holder (polypropylene)
Sensor cable	K9679BA K9679BB K9679BC	1 1 1	3 m 5 m 10 m

*1: O-ring is attached to the sensor cap.

5.3.2 Parts That Should Be Kept on Hand

Even parts with a long service life are not completely free from possible failure. It is recommended that users have on hand spare parts for those parts which, if they become defective, will make it impossible to continue measurement.

[Spare Sensor Assembly]

Leaving the sensor unused for a long period may cause some troubles in the sensor cap and other parts, requiring these parts to be replaced with new ones. In spite of this possibility, we recommend that users keep spare sensors in case of failure of a sensor in use.

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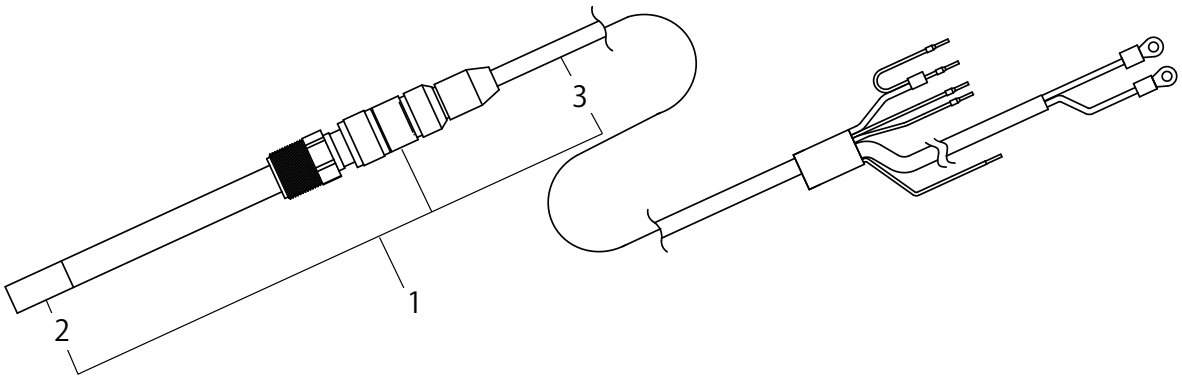
EXA DO

Customer Maintenance Parts List

DO70G
Optical Dissolved Oxygen Sensor



Item	Part No.	Qty	Description
1	—	1	Optical Dissolved oxygen sensor (Refer to table of below "Model & Code")
2	K9679AN	1	Sensor cap
3	K9679BA	1	Sensor cable 3m
	K9679BB	1	Sensor cable 5m
	K9679BC	1	Sensor cable 10m

Model	Suffix Code	Option Code	Description
DO70G	.....	.....	Optical Dissolved oxygen sensor
Insert length	-120	.....	120mm
Type	-E	.....	Always -E
Cable length	-00N	.....	No cable
	-03E	.....	3 m *1
	-05E	.....	5 m *1
	-10E	.....	10 m *1
—	-N	.....	Always -N
Option	Adaptor	/S3	Submersion type holder (Stainless steel)
		/PP	Submersion type holder (Polypropylene)
		/FPP	Froat holder (Polypropylene)
	Tag plate	/SCT	Stainless steel tag plate

*1: The power cable is +1.5m

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CMPL 12J05D04-01E
1st Edition : Jan,2012

Revision Record

- Title : Model DO70G Optical Dissolved Oxygen Sensor
- Manual No. : IM 12J05D04-01E

Edition	Date	Remark(s)
1st	Feb. 2012	Newly published

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User's Manual

Model DO70G
Optical Dissolved Oxygen Sensor

Supplement

Thank you for selecting our Model DO70G Optical Dissolved Oxygen Sensor.
User's Manual, IM 12J05D04-01E, 1st Edition, supplied with the product, some revisions/additions have been made. Please replace the corresponding pages in your copy with the attached, revised pages.

Revisions:

- Page 1-2, Section 1.2.1, "Standard Specifications": Changed of description.
- Page 5-1, Section 5.1.2, "Inspecting the Sensor Cap for Tightness": Added of description and figure.

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IM 12J05D04-01E
1st Edition

1.2 Specifications

1.2.1 Standard Specifications

Object of Measurement: Concentration of oxygen dissolved in sewage and drainage (water); cannot be used with organic solvents.

Principle of Measurement: Optical (fluorescence) measurement method

Measurement Range: 0 to 25 mg/l

Note: The measurement range must be entered through the dissolved oxygen converter.

Temperature of Measurement water :

0 to 50 °C

Flow rate : 2m/sec or less

Pressure : 0 to 500 kPa

Resistance Temperture Detector (RTD) :

22k NTC

Construction: Sensor unit : Stainless steel (316L SS)

O-ring: Ethylene Propylene Rubber (EPDM)

Permeable membrane: Silicone resin

Cable shielding : Heat-resistant flexible PVC

Sensor Cable: Length : 3 m, 5 m or 10 m

Crimping terminal configuration :

Pin-type (for converter)

M4 Ring-type (for power supply unit)

Weight: Sensor: Approx. 0.1 kg

Cable: 3 m Approx. 0.4 kg

5 m Approx. 0.6 kg

10 m Approx. 1.1 kg

[Characteristics]

Repeatability: 0.1 mg/l or 3% FS, whichever is greater

Temperature Compensation Error:

Within ±3% FS

(including sensor) for a ±5 °C change in the range of 0 to 40 °C

Response Time: Within 2 minutes (90% response)

(including sensor)

5. Maintenance

This section describes the inspection and maintenance procedure applicable to just the dissolved oxygen sensor alone. For comprehensive inspection and tuning of the measuring system, such as calibration, see the DO402G Dissolved Oxygen Converter user's manual (IM 12J05D02-01E).

5.1 Routine Inspection

5.1.1 Inspecting the Sensor Cap for Cleanness (Degree of Contamination)

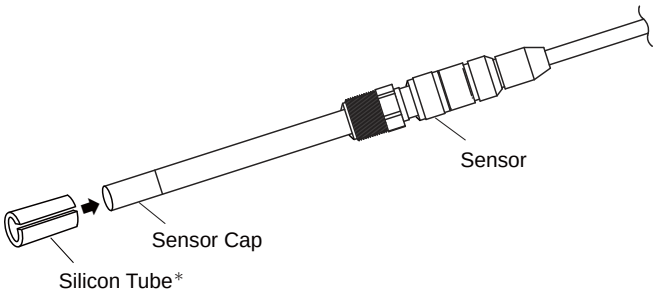
An inspection (visual) of the sensor cap must be made whenever the sensor is calibrated. Any dirt on the sensor cap will adversely affect your measurements. If the dirt is spread over the sensor cap, dip the sensor cap into clean water and gently wipe the dirt off with a soft cloth or lint-free paper. If the dirt will not come off easily, apply a neutral detergent to the sensor cap so it will be easier to remove the dirt. Clean the sensor cap with clean water.

5.1.2 Inspecting the Sensor Cap for Tightness

Before every calibration, check that the sensor cap is not loose.

If it is loose, retighten it.

When you retighten or exchange the sensor cap, use an attached silicon tube and so forth.



*：When you attach or detach the sensor cap, use an attached silicon tube and so forth.