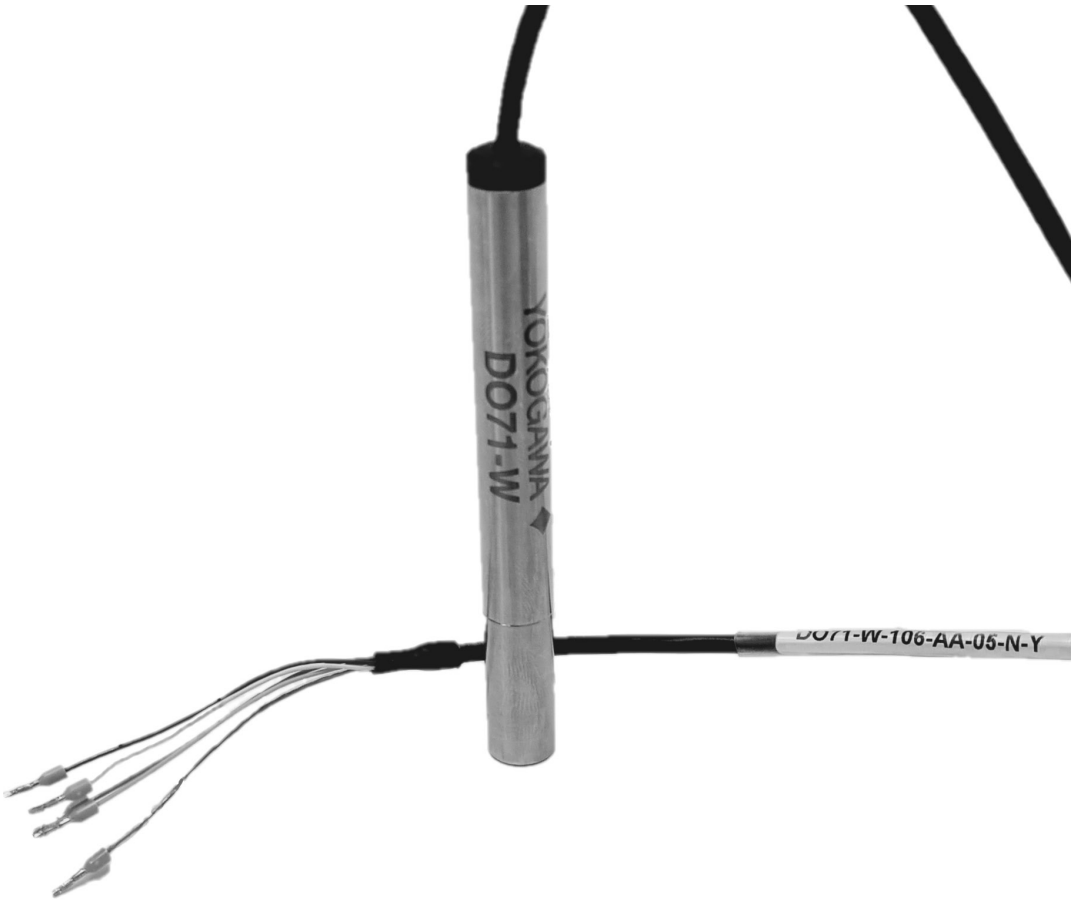
Instruction Manual

Model DO71
Optical Dissolved Oxygen Sensor



YOKOGAWA

IM12J06J01-00EN-P
3rd edition

Safety and Modification Precautions

- 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 Instruction 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 Process Analyzers Europe B.V. (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.

Notes on Handling Instruction manuals

- Please hand over the Instruction manuals to your end users so that they can keep the Instruction manuals on hand for convenient reference.
- Please read the information thoroughly before using the product.
- The purpose of these Instruction 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 Instruction manuals may be transferred or reproduced with out prior written consent from YOKOGAWA.
- YOKOGAWA reserves the right to make improvements in the Instruction manuals and product at any time, without notice or obligation.
- If you have any questions, or you find mistakes or omissions in the Instruction manuals, please contact our sales representative or your local distributor.

Product Disposal:

The instrument should be disposed of in accordance with local and national legislation/regulations.

Contents

1. PREFACE

1.1 Introduction

The DO71 optical dissolved oxygen sensor uses the optical measurement method to continuously measure oxygen dissolved in water in various industries and applications where accurate measurement and control is required.

The optical sensor is integrated in a exchangeable stainless-steel cap that is screwed to the probe housing.
These extremely robust probes can be installed in various applications. The optical sensors have a fast response time & good long-term stability with low maintenance and low costs of ownership.
The DO71 sensor is available for ppm range oxygen measurements. The interface used is Bi-directional digital communication RS485 and can be connected directly to the new FLXA402 4-Wire converter. Converter is designed to combine the superior functionality and ease of use from the Yokogawa FLXA series with the digitization of the future.
The DO71 sensor is ideally suited for applications in W&WW where it must stand harsh measurement conditions. The DO71 sensors has a permanent cable which is offered in various cable lengths. The crimp-on terminals are pin type.

1.2 Unpacking and Checking

Upon arrival of the purchased product, carefully unpack it and make sure the product has not been damaged during transportation.
Verify the model code on a name label adhered on the packaging box. For details of the model code, see subsection 7.

1.3 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. In the event of warranty claim, the defective goods should be sent (freight paid) to the Service Department of the relevant sales Organization for repair or replacement (at Yokogawa's discretion)

The following information must be included in the letter accompanying the returned goods:

- Model Code and Serial Number.
- Original Purchase Order and Date.
- Length of time in service and description of the process.
- Description of the fault and circumstances of the failure.
- Process/environmental conditions that may be related to the failure of the sensor
- Statement as to whether warranty or non-warranty service is requested.
- Complete shipping and billing instructions for return of material, plus the name and phone number of a contact person that can be reached for further information.
- Clean Statement
  Returned goods that have been in contact with process fluids must be decontaminated and disinfected prior to shipment. Goods should carry a certificate to this effect, for the health and safety of our employees. Material Safety Data sheets must be included for all components of the process to which the sensor(options) have been exposed.

1.4 Serial number

The Serial number is defined by nine (9) alphanumeric characters:

X_1X_2	Production location
X_3X_4	Year/Month code
X_5X_6 X_7X_8 X_9	Tracking number

Example: N3X380005

Table 1: Production Year code

Year	Year code	Year	Year code
2014	P	2026	3
2015	R	2027	4
2016	S	2028	5
2017	T	2029	6
2018	U	2030	7
2019	V	2031	8
2020	W	2032	9
2021	X	2033	A
2022	Y	2034	B
2023	Z	2035	C
2024	1	2036	D
2025	2	2037	E

Table 2: Production Month code

Month	Month code
January	1
February	2
March	3
April	4
May	5
June	6
July	7
August	8
September	9
October	A
November	B
December	C

2. GENERAL SPECIFICATIONS

2.1 Measuring elements:

Optical dissolved oxygen sensor in probe body and an oxygen exchange cap (OEC).

2.2 Electrical specifications

Output signal:	Bi-directional digital communication
Physical layer:	RS485
Protocol:	MODBUS, RTU mode
Data rate:	Default 19200 b/s (8, No Parity, 2 stop bits)
Power supply:	+7 ... +30 VDC Max. 1W in active mode < 150mW in stand-by mode
Cable:	Permanent, shielded, 4 wire (0.14mm^2)

2.3 Mechanical specifications

Case/OEC:	Stainless-steel (SS316L)
OEC sealings / material:	O-ring EPDM
OEC sealing dimensions mm (inch):	ID 9x1 (0.35x0.03)
Housing size (LxDiam.):	106x12 mm (4.17x0.47)
Weight:	Min. 100g (Sensor 43g + cable 19g/m) (0.22 lbs - 0.095 lbs + 0.015 lbs / feet)
Sensor mounting system:	Pressfit with optional adapter
Cable:	Permanent shielded cable, stripped wire end (5 mm) for terminal connection

2.4 Performance

Measuring range:	0 to 22,5 mg/L O_2
Accuracy:	± 0.05 mg/L or 1% of reading whichever greater
Repeatability	± 0.05 mg/L or 1% of reading whichever greater
Temperature accuracy:	≤ 1.0°C (≤ 1.8°F)[1]
Operating temperature:	0 to 50 °C (0 to 122°F)
Pressure:	0 to 3 Barg (0 to 43.5 psi) (overpressure); 0 to 0.990 Barng (0 to 14.36 psi) (under pressure)
Flow rate:	2m/sec or less[2]
Response time t90	≤ 90 sec.[3]

(at 20°C (68°F), 960-980 hPa (13.92 to 14.21 psi), humidified gas mixtures, after performing a calibration)

Note 1: Temperature measurement for process compensation only
Note 2: Hi flow rate can influence sensor performance
Note 3: From air saturated water to 0 g/L O_2 in water (e.g. prepared by 1% sodium sulfite solution)

2.5 Shipping details

Package size (LxWxH)	
for cable length up to 10 meters (32.80 ft)	Approx. 300x100x75 mm (11.8x3.9x3.0 inch)
for cable length 20 meters (65.61 ft)	Approx. 360x220x105 mm (14.2x8.7x4.1 inch)

Package weight (max.)

Sensor cable length	Sensor and cable weight	Total package weight
DO71 3m (9.84 ft)	100.4 (0.22) g (lbs)	260 (0.57) g (lbs)
DO71 5m (16.40 ft)	138 (0.30) g (lbs)	297 (0.65) g (lbs)
DO71 10m (32.80 ft)	232 (0.51) g (lbs)	391 (0.86) g (lbs)
DO71 20m (65.61 ft)	420 (0.92) g (lbs)	615 (1.35) g (lbs)
OEC CA/CB/CC	6 (0.01) g (lbs)	147 (0.32) g (lbs)

2.6 Environmental conditions

Storage temperature	-10 to +70°C (-14 to 158°F)[4]
Ingress protection	IP X8 according EN 60529:1991/ A1:2000/A2:2013 O-ring of OEC must be replaced once a year
Installation	Overvoltage Category I Pollution Degree 2 Altitude 2000 m or less (6561.68 feets)

Note 4: Storage stability of the oxygen exchange cap is 5 years if stored under dark and dry conditions at 20°C (68°F)

2.7 Regulatory compliance

CE

Directive:	768/2008/EC CE-mark has been affixed on the product in 2021 for the First time
UKCA	UKCA-mark has been affixed on the product in 2021 for the first time.
EMC	
Directive:	2014/30/EU
Standards:	EN 61326-1:2013; IEC 61326-1:2012 Table 2 (for use in industrial locations) EN 55011:2016/A1:2017; CISPR11: 2015/A1:2016 Group 1, Class B (for use in domestic estab lishments)
Approvals	ACMA
China	GB30439
LVD	
Directive:	2014/35/EU
Standards:	NEN-EN-IEC 61010-1:2010/A1:2019; NEN-EN-IEC 61010-2-030:2010/C1:2011
RoHS	
Directive:	2015/863/EU Commission Delegated Directive (EU) 2015/863 amending Annex II as regards the list of restricted substances, and by applying Annex IV as regards the application of sensors, detectors, and electrodes, by applying the following standards: EN-IEC 63000: 2018: Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Label information:
All statutory required label information is written on product label.
This includes MS-code, serial number and process operating specifications.
Example of a product label see Fig. 1.

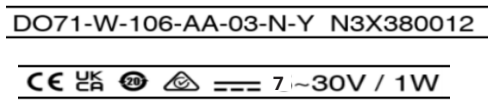


Fig. 1: Sensor product label

3. INSTALLATION OF DO71

Using the sensor adapters the DO71 optical dissolved oxygen sensor can be assembled into the complete Yokogawa flow and immersion fitting program: Flow fitting FF20, FF40, PB350G/PB30 angled floating ball holder, PB360G vertical floating ball holder, or DOX8HS submersion type holder. Flow and immersion fitting program allows sensor to be immersed or submerged to the optimum point to obtain precise measurements.

Section 3.7 of this manual describes adapters for mounting sensor directly in process or existing fitting program.

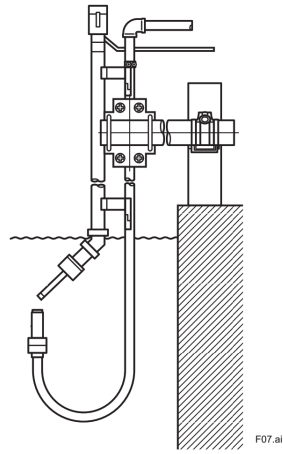


Fig. 2: DOX8HS submersion type holder

3.1 Installation in sensor holder

An adaptor (optional) is necessary to assemble DO71 into the DOX8HS submersion type holder (Fig. 2), PB350G angled floating ball holder (Fig. 3) or PB360G vertical floating ball holder (Fig. 4).

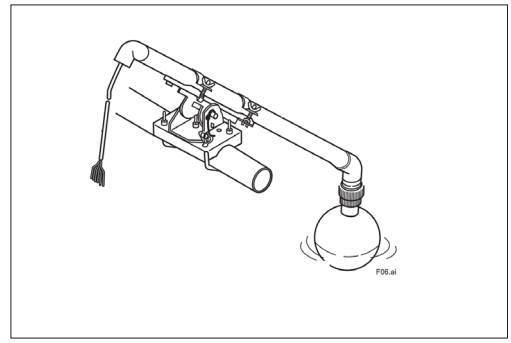


Fig. 3: PB350G/PB30 angled floating ball holder

3.2 Preparing the sensor for use

Make sure that the Oxygen Exchange Cap (OEC) is screwed tightly to the probe body and did not work loose while handling the probe.

3.3 Mounting the sensor

Choose a holder / fitting that suits the liquid to be measured and the measurement location. For detailed sensor installation procedure to sensor holder, please refer to section 3.5 and 3.6.

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

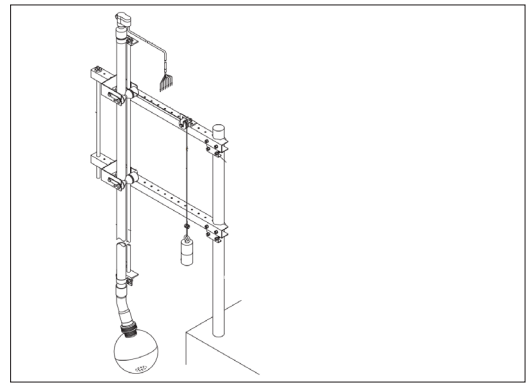


Fig. 4: PB360G vertical floating ball holder

3.5 Installation procedure for the sensor to PB350G/PB360G

1. Pass GLAND from the cable side and place the bottom of the sensor on GLAND as shown in the posture of the Fig. 5.

2. Remove the protective cover put on the head of the sensor (Fig. 6). Pass WASHER, GASKET, WASHER, ADAPTER from the head of the sensor side.

3. Keep the posture and screw ADAPTER to about on the surface of GLAND. The sensor is positioned by screwing as shown in the posture of the Fig. 7

4. Pass O RING through the cable and put O-RING on GLAND to touch the flange of ADAPTER. The installation is correct if the distance between the head of the sensor and the end face of ADAPTER is less than 2mm. By positioning the sensor, the measurement point can be the same even after the reinstallation with maintenance works.

5. In the case of PB350G, continue to Section 3.2 “Sensor Installation” of IM 19H1E1-01E. In the case of PB360G, continue to Section 3.1 “Mounting Sensor Assembly” of IM 19H1E2-01E

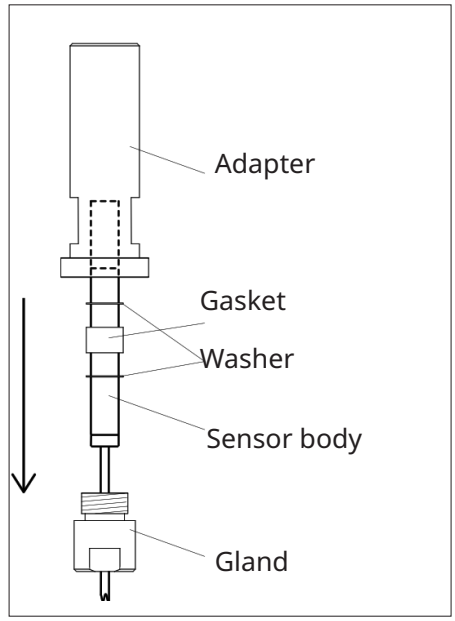


Fig. 5: Cable gland

Fig. 6: Protective cover

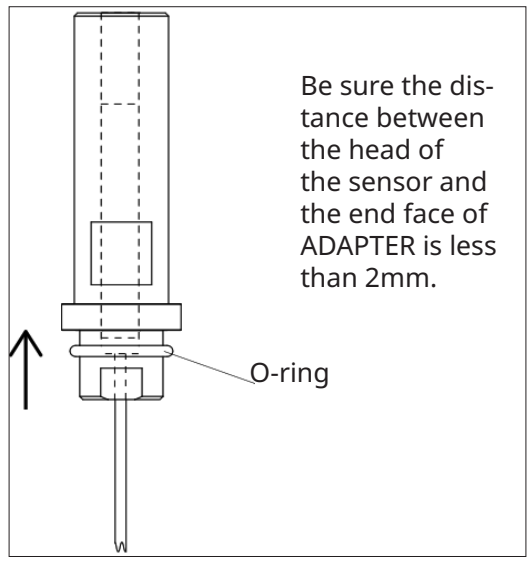


Fig. 7: Sensor adapter

3.6 Installation procedure for the sensor to DOX8HS

1. Pass GLAND from the cable side and place the bottom of the sensor on GLAND as shown in the posture of the Fig. 8.

2. Remove the protective cover put on the head of the sensor (Fig. 9). Pass WASHER, GASKET, WASHER, ADAPTER from the head of the sensor side.

3. Keep the posture and screw ADAPTER to about on the surface of GLAND. The sensor is positioned by screwing as shown in the posture of the Fig. 10. The installation is correct if the distance between the head of the sensor and the end face of ADAPTER is less than 87mm.

By positioning the sensor, the measurement point can be the same even after the reinstallation with maintenance works. Also, the installation position gets effective for cleaning in the case of cleaning system specification.

4. Continue to Section 3.1 “Preparations for Installation” of IM 19H1D2-01E.

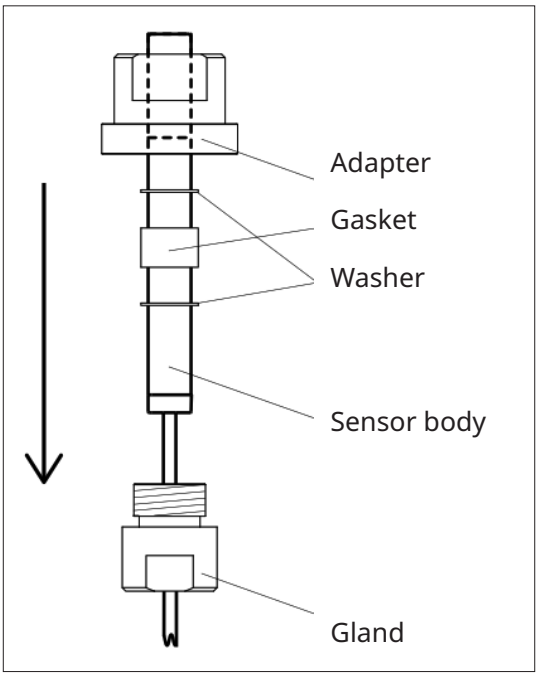


Fig. 8: Cable gland

Fig. 9: Protective cover

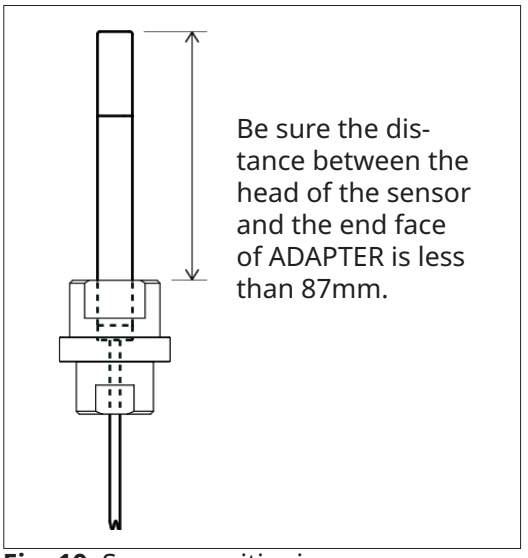


Fig. 10: Sensor positioning

3.7 Mounting sensor using adapters

To mount the DO71 into various process connection use adapters set K1531JA as described in figure 11 and figure 12.

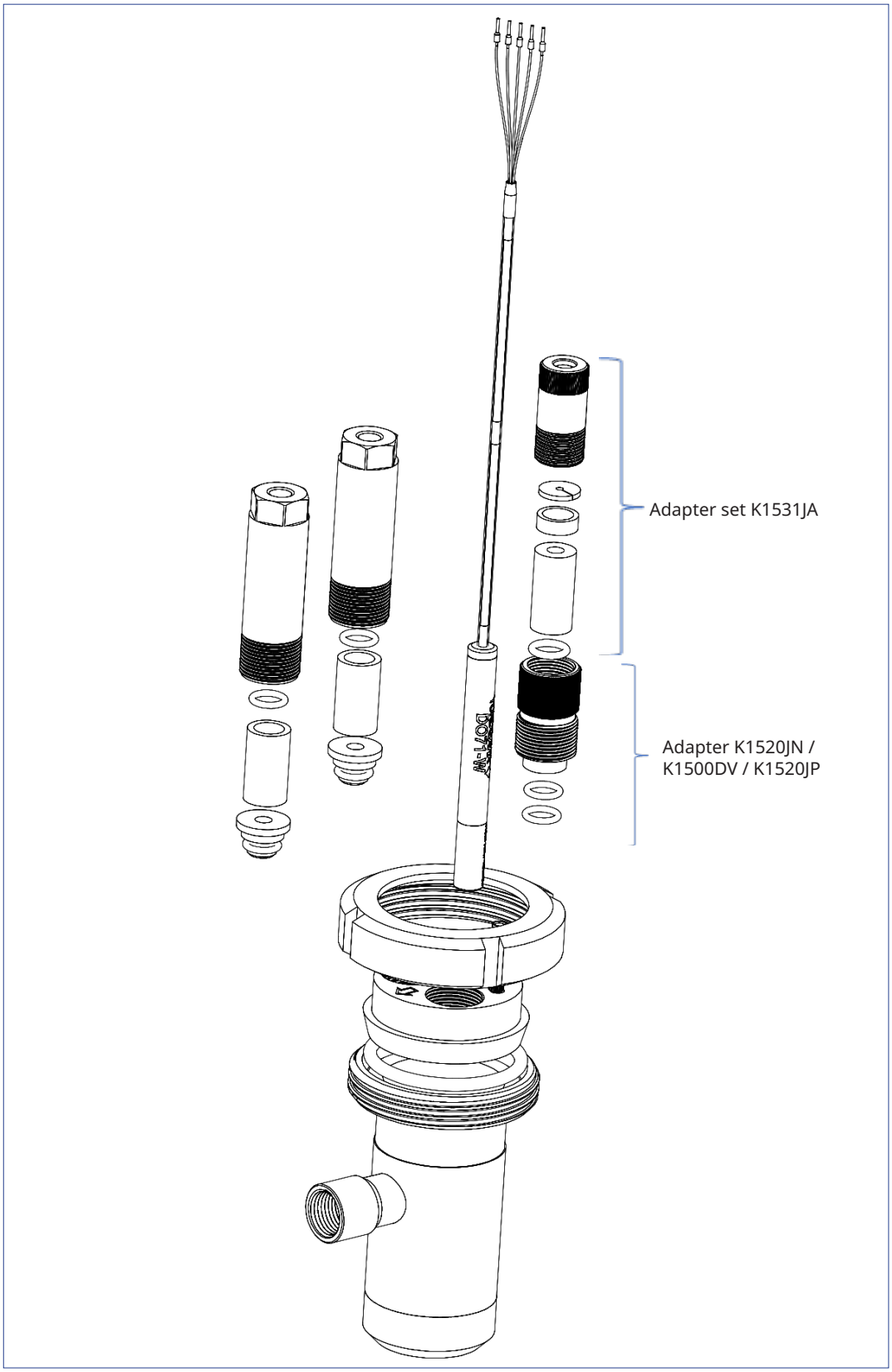


Figure 11. DO71 installation in Yokogawa FF20 fitting[6] using the adapter K1531JA sensor adapter set and adapter to fitting K1520JN, K1500DV or K1520JP

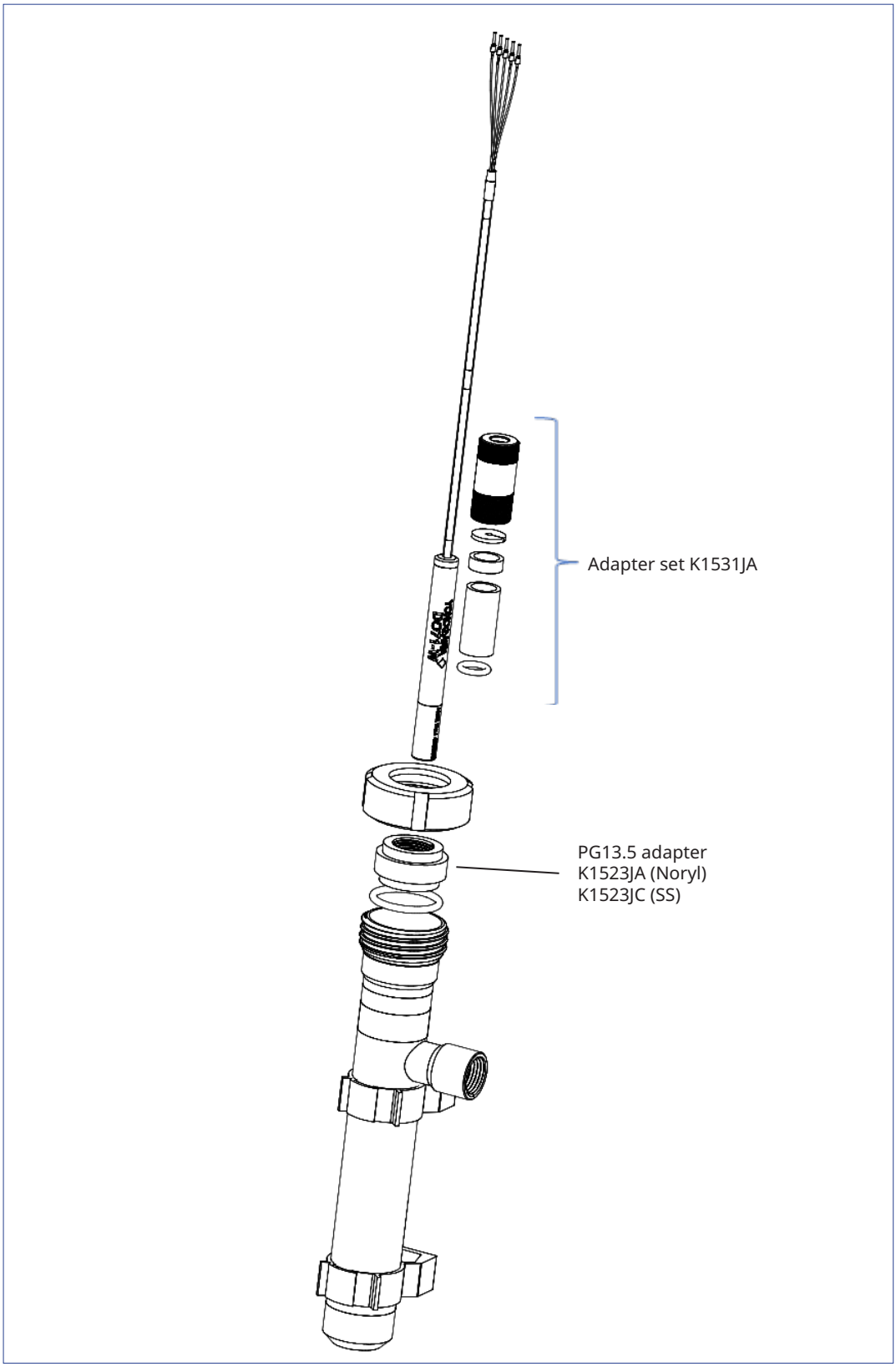


Figure 12. DO71 installation in Yokogawa FF40 fitting[6] using the adapter K1531JA sensor adapter set to fit in PG13.5 fitting adapter K1523JA (Noryl) K1523JC (SS)

4. DIMENSIONS

The DO71 sensor is provided with in four cable lengths as described in table 3. Sensor and O-ring dimensions are described in Fig. 13.

Table 3: Sensor model code and cable length

Model code	L (mm)	L (ft)
DO71-W-106-AA-03-N-Y	3000	10
DO71-W-106-AA-05-N-Y	5000	16,5
DO71-W-106-AA-10-N-Y	10000	33
DO71-W-106-AA-20-N-Y	20000	66

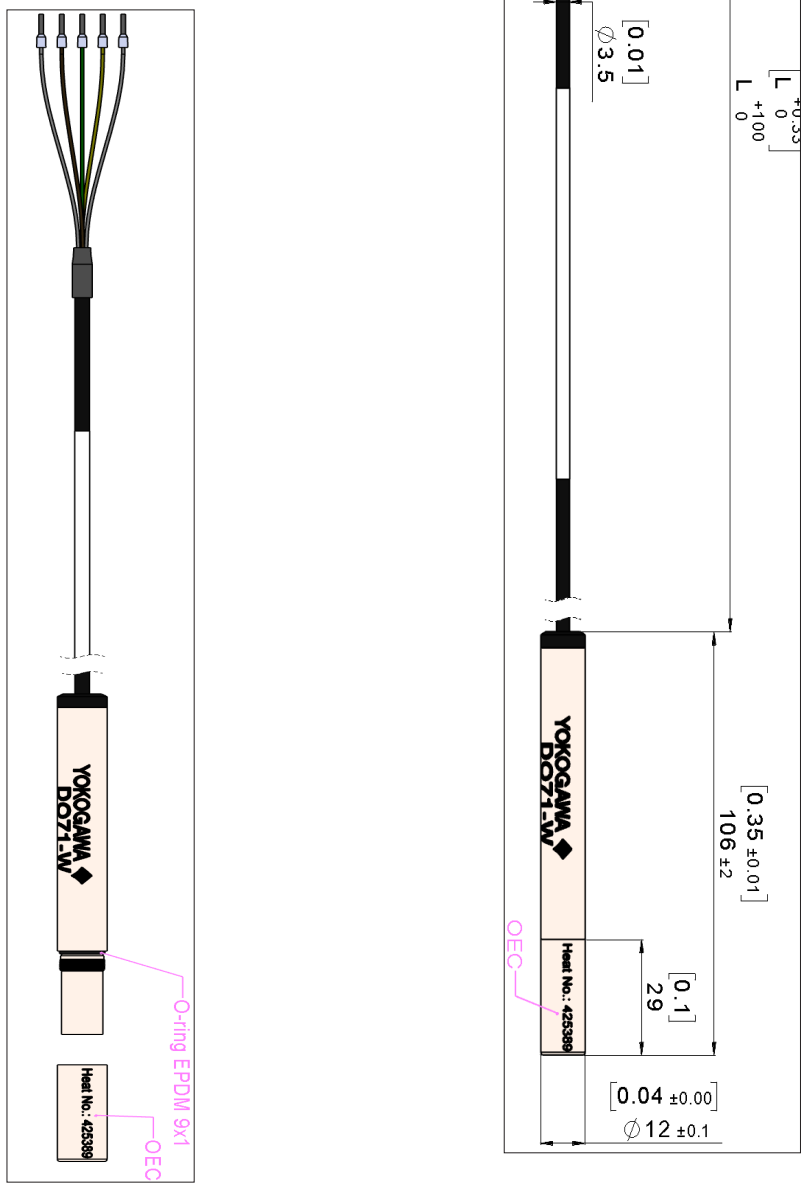


Fig. 13. Dimensions DO71 in mm [inches]

5. WIRING

DO71 Sensor cable connection to converter is delivered with permanent, shielded, 4 wire (0.14mm2) cable, stripped wire end (5 mm) for terminal connection (Fig. 14) as described in table 4.
For information on DO71 sensor cable connection to FLXA402, refer to the Instruction manual for FLXA402 4-Wire Converter (IM12A01F01-02EN).

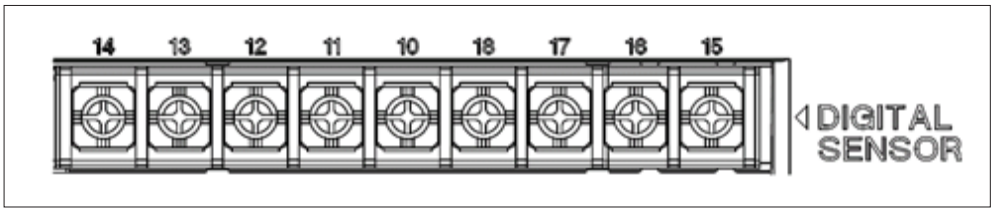


Fig. 14. D6 module terminal assignment for DO71 dissolved oxygen sensor

Table 4: Pin terminal wiring numbering

Wire Pin no.	Wire color	Description
12	yellow	RS485 Data + (B)
11	green	RS485 Data - (A)
13	white	GND
10	brown 5 – 30 VDC	5 – 30 VDC
14	transparent	cable shield / probe body

5.1 DO71 optical DO sensor grounding

The DO71 dissolved oxygen optical sensor housing is made of stainless steel with high corrosion resistance (SUS 316 L). However, electric potential differences between the DO71 and a tank or other peripherals in the tank can cause immediate corrosion through electrolysis. Therefore, please ensure to avoid electric potential differences between DO71 and the surrounding environment.

We recommend always to connect the DO71 to the protective ground at the installation site. Assign the device housing and cable shield to protective ground.

Especially the length of the cable can influence the ground connection quality.

If the DO71 is installed in a fitting, which is NOT connected to the protective ground (e.g. fitting made of plastic or glass), a ground connection should be attached to the DO71 housing (Fig.s 15 and 16)

Remark:
Connection between shields / cases should be as short as possible to provide best potential equalization!

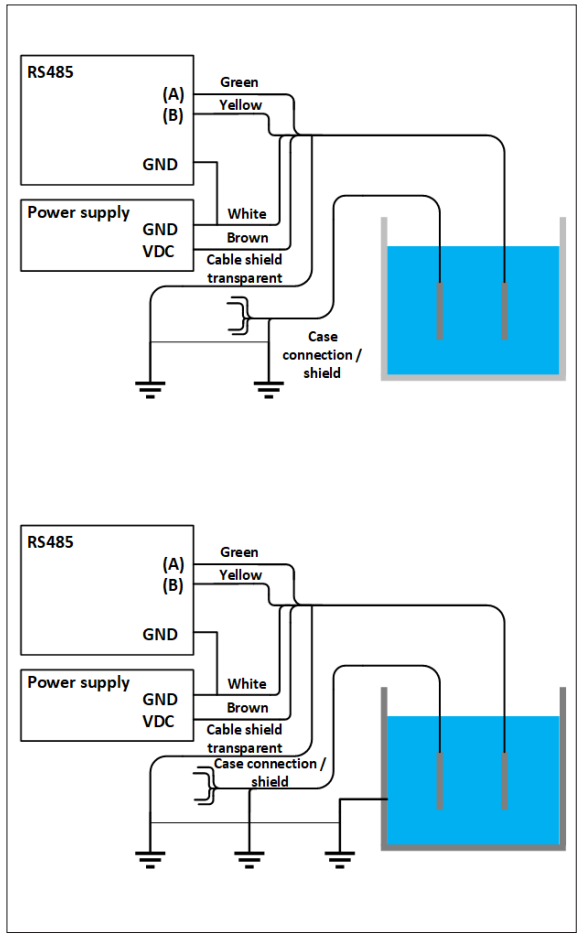


Fig. 15 Example grounding DO71 when installed in a GLASS/PLASTIC (top) and METAL TANK (bottom)

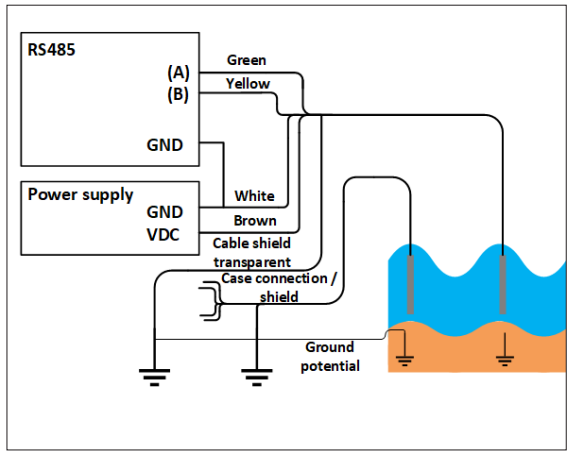


Fig. 16: Example grounding DO71 when installed in OPEN WATER

6. GENERAL CALIBRATION & MAINTENANCE PROCEDURE

6.1 Pre-Calibration Input

In case the Oxygen Exchange Cap is replaced it is neccessary to set the sensor constants (grey highlighted boxes) which can be found on the Final Inspection Sheet delivered with OEC (FIS, see Fig. 17). For the detailed setup instruction please refer to the FLXA402 4-Wire Converter (IM12A01F01-02EN).

6.2 DO71 two-point (Re)calibration

In case of requirement for recalibration of DO71 use Two-point calibration in oxygen free environment (e. g. nitrogen 5.0, 1 % sodium sulfite solution) and a second calibration medium between 1 and 2 % oxygen. Best accuracy is achieved if the calibration temperature is about the same as the temperature during the following measurements.
For calibrating sensor using FLXA402 analyzer please refer to section 4 of FLXA402 user manual IM 12A01F05-01EN.
Procedures how to prepare oxygen free and medium oxygen environment in HUMID calibration is described below:

• 1st Calibration Point HUMID: Oxygen-free water
To prepare oxygen-free water dissolve 1 g of sodium sulfite (Na2SO3) in 100 mL water.
Use a suitable vessel with a tightly fitting screw top and label it cal 0. Make sure there is only little headspace in your vessel. Due to a chemical reaction of oxygen with the Na2SO3 the water becomes oxygen-free. Additional oxygen, diffusing from air into the water, is removed by surplus Na2SO3.

Close the vessel with the screw top and shake it for approximately one minute to dissolve Na2SO3 and to ensure that the water is oxygen-free. To prepare oxygen-free water you also can use sodium dithionite (Na2S2O4).

Fill the calibration solution cal 0 in the vessel you have mounted the DO71 in. Make sure the probe tip is covered completely with the liquid. To minimize the response time, you can slightly stir the solution. Then follow the instructions in analyzer calibration setting chapter respectively.

After recording the first calibration point remove the calibration solution cal 0, fill the vessel with distilled water and stir it for 1 minute. Repeat this procedure at least 5 times to clean the sensor membrane from sodium sulfite.
For storing the calibration solution cal 0 keep the vessel closed after calibration with a screw top to minimize oxygen contamination. The shelf life of cal 0 is about 24 hours provided that the vessel has been closed with the screw top.

• 2nd Calibration Point HUMID: Air-saturated water

Add 100 mL water to a suitable vessel and label it cal 100. To obtain air-saturated water, blow air into the water using an air-pump with a glass-frit (air stone), creating a multitude of small air bubbles, while stirring the solution. After 20 minutes, switch of the air-pump and stir the solution for another 10 minutes to ensure that the water is not supersaturated.
Fill the calibration solution cal 100 in the vessel you have mounted the sensor in. Make sure the sensor surface is covered completely with the liquid. To minimize the response time, slightly stir the solution. Then follow the instructions in analyzer calibration setting chapter respectively

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最終検査シート
Final Inspection Sheet

センサキャップ(OEC)の種類 Type of OEC	Oxygen Exchange Cap DO71-W
部品番号 Part no.	K1531CA
バッチ番号 Batch number	XXXXXX-XXX_XXXX

お客様各位、
指定されたデータは、横河FLXA402 4線式液分析計に入力する必要があります。
手順については、分析装置のユーザーマニュアルを参照してください。

Dear customer,
Data specified must be entered in the Yokogawa FLXA402 4-wire analyzer.
For the procedure refer to the analyzer User Manual.

データ
Data

大気圧 Atmospheric Pressure	960	hPa
キャリブレーションモード Calibration Mode	Humid	

	位相 Phase signal	基準 Criteria	温度 Temperature	基準 Criteria	振幅 Amplitude	結果 Result
	[°]	[°]	[℃]	[℃]	[µV]	
ゼロ校正 Zero point	56.12	52.00 - 58.00	19.2	18.0 - 22.0	303797	合格 PASS
第2校正点 Calibration 2nd	23.45	18.00 - 26.00	19.2	18.0 - 22.0	128400.7	合格 PASS

応答時間 [t90] Response time [t90]	< 60 s	

センサ定数 Sensor Constants	f1	0.807	dPhi1	-0.06977	dKSV1	0.00032
	m	24.82	dPhi2	-0.00032	dKSV2	0.000001

検査者 Inspected by	XXXX	日付 Date	XXXX
承認者 Approved by	XXXX	日付 Date	XXXX

Fig. 17: Example of Final inspection protocol

6.3 Maintenance of the DO71 sensor

6.3.1 Routine inspection

Cleaning of Oxygen Exchange cap (Fig. 18) - a visual inspection of the oxygen exchange cap must be made whenever the sensor is calibrated. Any dirt on the oxygen end cap adversely affects your measurements.

If the dirt is spread over the oxygen exchange cap, dip the oxygen exchange cap into clean water and gently wipe the dirt off with a soft cloth or lint-free paper. If the dirt does not come off easily, apply a neutral detergent to the oxygen exchange cap so it can be easier to remove the dirt. Wash the oxygen exchange cap with clean water.

Before every calibration, check that the oxygen exchange cap is not loose. If it is loose, retighten it.

Cleaning procedure:

2% H2O2, acidic agents (HCL, H2SO4) max. 4 – 5 % cleaning agents containing CLO2 at room temperature.

Fig. 18.: Oxygen exchange cap

Fig. 19.: O-ring visible - wrong Oxygen exchange cap installation

6.3.2 Exchange of a OEC

When replacing an OEC please make sure to screw the new cap tightly to the probe body, so the black O-ring is no longer visible (Fig. 20). If the OEC is not screwed on tightly (Fig. 19) the probe body might get damaged by entering liquid.

Fig. 20: Oxygen exchange cap installed properly

CAUTION

Do not loosen the sensor cap except in time of replacement.

7. MODEL AND SUFFIX CODES

Table 5: Model and suffix codes

Model	Suffix code					Description
DO71						Optical Dissolved Oxygen sensor
Range	-W					Wide range (0 – 22,5 mg/L)
Insert length		-106				106 mm
Type			-AA			General purpose
Connection type				-3		Permanent cable, 3 meters
				-5		Permanent cable, 5 meters
				-10		Permanent cable, 10 meters
				-20		Permanent cable, 20 meters
Region					-N	Non-specific
Oxygen Exchange Cap					-Y	DO71 OEC
Option						

8. SPARE PARTS

Table 6: Spare part list

Part No.	Part name	Description
K1531CA	OEC	Oxygen Exchange CAP DO71-W*
K1531BA	Sealings	O-RINGS EPDM 9x1 (6 PCS.) for OEC
K1500BV		O-RINGS EPDM 11X3 (6 PCS.)
K1500BZ		O-RINGS VITON 11X3 (6 PCS.)
K1500GR		O-RINGS SILICON 10.77x2.62 (8PCS)
K1524AA		O-RING SIL. 10.77x2.62&SLIDE RING (1PC)
K9679WJ		Gasket (lifetime parts for K9679WA, WB and WC)
K1531JA	Adapters	Adapter for mounting in Yokogawa fitting
K9679WA		Adapter for submersion type holder DOX8HS (stainless steel) (/S3)
K9679WB		Adapter for submersion type holder DOX8HS (polypropylene) (/PP)
K9679WC		Adapter for float type holder PB350G, PB360G (polypropylene) (/FPP)
L9920BR	Others	Zero adjusting reagent; Sodium sulfite (Na2SO3) 500 g

* The recommendable exchange cycle of a optical exchange cap is 1 time in 12 months.

9. CHEMICAL COMPATIBILITY

o = can be used x = shortens useful life - = cannot be used Blank = no data currently available

		Conc.%	Temp. °C	Material: Viton 20	Viton 60	Viton 100	FFKM 20	FFKM 60	FFKM 100	Silicon 20	Silicon 60	Silicon 100	SS 316(I) 20	SS 316(I) 60	SS 316(I) 100
Inorganic acid	Sulfiric acid	10		o	o	o	o	o	o	o	o	o	x	x	x
		50		o	o	o	o	o	o	-	-	-	x	x	x
		95		o	o	o	o	o	o	-	-	-	x	x	x
		fuming		o	o	o	o	o	o	-	-	-	-	-	-
	Hydrochloric acid	10		o	o	o	o	o	o	x	-	-	-	-	-
		sat.		o	o	o	o	o	o	x	-	-	-	-	-
	Nitric acid	25		o	o	x	o	o	o	o	o	x	x	x	x
		50		-	-	-	o	o	o	x	-	-	x	x	x
		95		-	-	-	o	o	o	-	-	-	o	o	o
		fuming		-	-	-	o	o	o	-	-	-	o	o	o
	Phosphoric acid	25		o	o	o	o	o	o	o	o	x	-	-	-
		50		o	o	o	o	o	o	o	o	x	x	x	x
		95		x	x	-	o	o	o	o	x	x	o	o	o
	Hydrofluoric acid	40		o	o	o	o	o	o	-	-	-	-	-	-
		75		o	o	x	o	o	o	-	-	-	-	-	-
Organic acid	Acetic acid	10		-	-	-	o	o	o	o	o	o	o	o	x
		glacial		-	-	-	o	o	o	o	o	o	o	o	x
	Formic acid	80		-	-	-	o	o	x	o	o	o	x	x	x
	Citric acid	50		o	o	o	o	o	o	o	o	o	o	o	o
Alkali	Calcium hydroxide	sat.		o	o	o	o	o	o	o	o	o	o	o	o
	Potassium hydroxide	50		o	o	o	o	o	o	o	o	o	o	o	o
	Sodium hydroxide	40		x	x	x	o	o	o	o	o	o	o	o	o
	Ammonia in water	30		x	x	x	o	o	o	o	o	o	o	o	o
Acid salt	Ammonium chloride	sat.		o	o	o	o	o	o	o	o	o	x	x	x
	Zinc chloride	50		o	o	o	o	o	o	o	o	o	x	x	x
	Iron(III) chloride	50		o	o	o				o	o	o	-	-	-
	Sodium sulfite	sat.		-	-	-	o	o	o	o	o	o	o	o	o
Basic salt	Sodium carbonate	sat.		o	o	o	o	o	o	o	o	o	o	o	o
	Potassium chloride	sat.		o	o	o	o	o	o	o	o	o	x	x	x
	Sodium sulfate	sat.		o	o	o	o	o	o	o	o	o	o	o	o
	Calcium chloride	sat.		o	o	o	o	o	o	o	o	o	x	x	x
Neutral salt	Sodium chloride	sat.		o	o	o	o	o	o	o	o	o	x	x	x
	Sodium nitrate	50		o	o	o	o	o	o	o	o	o	x	x	x
	Aluminium chloride	sat.		o	o	o	o	o	o	o	o	o	-	-	-
	Hydrogen peroxide	30		o	o	o	o	o	o	x	x	x	o	o	o
Oxidizing agent	Sodium Hypochloride	50		o	o	x	o	o	o	o	o	o	x	x	x
	Potassium dichromate	sat.		o	o	o	o	o	o	o	o	o	o	o	o
	Chlorinated lime									o	o	o	x	x	x
	Ethanol	80		x	-	-	o	o	o	o	o	o	o	o	o
Organic solvent	Cyclohexane			o	o	o	o	o	o	-	-	-	o	o	o
	Toluene			-	-	-	o	o	o	-	-	-	o	o	o
	Trichloroethane			x	x	x	o	o	o	-	-	-	o	o	x
	Water			o	o	o	o	o	o	o	o	o	o	o	o

Note : Information in this list is based on our general experience and literature data and given in good faith.
However Yokogawa is unable to accept responsobility for claims related to this information.

Remark on Oxygen Exchange Cap membrane:

Compatibility	Aqueous solutions, ethanol, methanol
No cross-sensitivity to	pH 1 – 14, CO2, H2S, SO2, ionic species
Cross-sensitivity to	Chlorine gas Organic solvents such as pure acetone, toluene, chloroform or methylene chloride

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