General Specifications

EXA DO

DO402G
Dissolved Oxygen Converter

GS 12J5D2-E

[Style : S2]

Flexibility, reliability and low maintenance are among the benefits provided by the EXA DO402G dissolved oxygen converter. Designed to meet the exacting requirements of measuring dissolved oxygen in the modern industrial environment, it contains many features to ensure the best precision whatever the application.

This 4-wire converter is housed in a robust IP65 field mountable case. Two mA outputs, four relays, digital communication and a clear LCD make the DO402G a truly comprehensive package.

The DO402G features PI control on the pulse proportional relay outputs, thus avoiding the need for a separate controller.

The DO402G accepts inputs from both galvanic and polarographic sensors. Percent saturation, mg oxygen/l water, and ppm DO can be displayed and transmitted. Compensation for atmospheric pressure altitude, salinity and temperature are included for the best accuracy of measurement.

DO402G Converter

DO30G Sensor

■ FEATURES

Microprocessor-based DO Converter

- Free measuring range of 0 to 50 mg/l. Minimum span of 1 mg/l that can be arbitrarily set.
- Either mg/l, ppm, or % saturation can be selected as the unit for display.
- Built-in barometric pressure and salinity compensation functions for high accuracy measurement
- Small-sized intelligent converter with a built-in wash timer function
- One-touch calibration using air or a solution saturated with air
- Provision of various self-diagnostic functions as in the DO sensor (Temperature measured value, memberane failure etc.)
- Incorporation of abundant contact output functions

DO Sensor with Long-term Stability and Short Electrolyte Stabilization Time

- A DO sensor that uses a special electrolyte, shortening the electrolyte stabilization time and realizing stable measurements over a long period of time.
- Measuring range of 0 to 20 mg/l
- A membrane that is easily replaceable by anyone because of the cartridge type
- A membrane 50 µm thick that is hard to tear and has reduced influence from air bubbles

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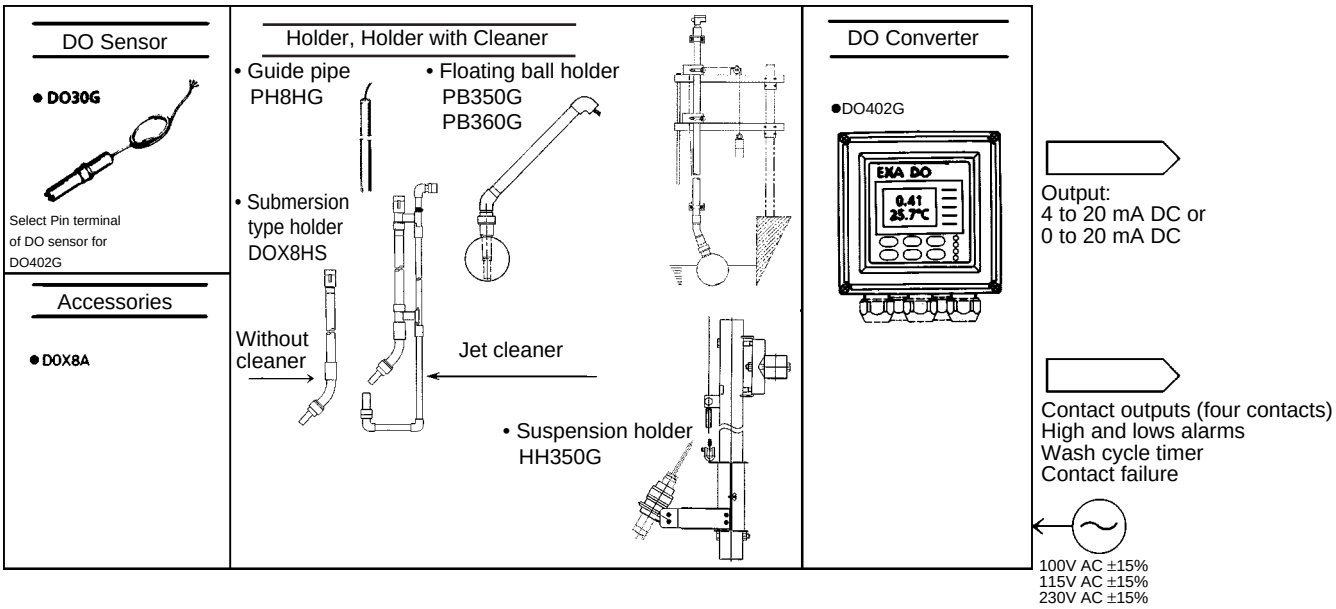
GS 12J5D2-E

3rd Edition: Jan. 2004 (YK)

■ SYSTEM

Please see GS 12J5C2-E about Holders



CAUTION

Installation Location of Holders (Guide Pipe, Submersion Type, etc)
The holder should be used in a place that is as vibration free as possible.
Using the holder in a place where it is affected by vibration, may result in damage to the holder.

■ ACCURATE DISSOLVED OXYGEN

Operating principles

The DO402G uses membrane covered electrochemical sensors for the detection of dissolved oxygen in water.
Dissolved gaseous oxygen diffuses through the membrane, and gives rise to a reaction at the electrodes. The resulting current is proportional to the oxygen concentration in the process solution.
The DO402G can be used with both galvanic and polarographic sensors, giving added flexibility in a wide range of applications.

Display functions and ranges

The display continuously gives you all necessary information at a glance. The process values are shown in easy readable programmable units. Either mg/l, % saturation or ppm can be chosen.
The user-interface is simplified to a basic set of 6 keys accessible through the flexible window cover. It uses a simple step by step, question and answer style to communicate with the operator by giving messages on the second line of the display and indicating which keys are to be pressed in the display.

Automatic air calibration

Calibration for a dissolved oxygen instrument is performed by simple air calibration.
Criteria for automatic calibration (stabilisation time, DO values) can be set to suit the sensor.
In addition to the air calibration three additional calibration procedures can be used:

1. Span calibration using air saturated water
2. Zero calibration using sulfite saturated water
3. Process calibration using laboratory reference method

Automatic wash cleaning

The DO402G can be used to generate a contact closure to control a wash cleaning cycle. The interval, wash and recovery times ar adjustable for optimum operation. Yokogawa immersion assemblies can be supplied with wash cleaning nozzles to provide on line cleaning for the sensor membrane.

Salinity compensation

In order to take the effect of salinity into account for oxygen measurement an average chloride concentration can be programmed. The chloride concentration value is set manually via the service level. The EXA D0402G takes account of the effects of salinity and temperature simultaneously. The advantage of this is the influence of salt concentration temperature have on the solubility of oxygen is automatically compensated, for highly accurate analyses, without the need for a conversion table.

Temperature compensation

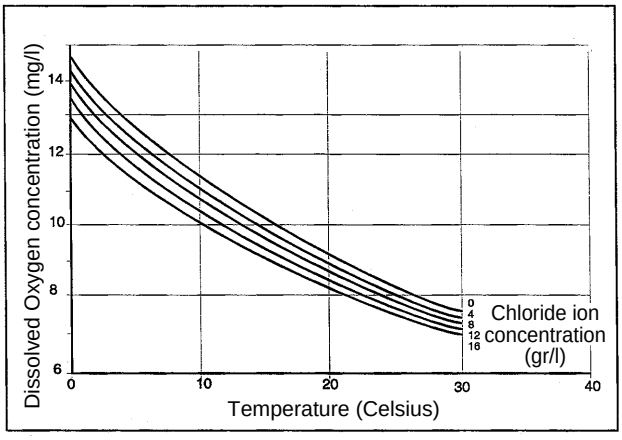
The micro-processor makes an accurate temperature compensation possible that performs well over the entire range of the instrument. No further adjustment tables are required.

Barometric air pressure compensation

Air pressure differences, due to weather conditions or altitude, can cause a variation up to 20 % in the dissolved oxygen concentration. A built-in air pressure sensor automatically compensates for barometric influences between 90 to 110 kPa (900 to 1100 hPa).

Sensor diagnostics

The YOKOGAWA DO sensor is checked for low impedance between the silver electrode and an earth connection in the liquid, to detect membrane integrity. Temperature sensor connections and sensor connections are checked for impedance. These faults are signalled by the FAIL contact and can be signalled to the control room by an output of 22 mA or 3.5 mA (0 mA) (Burn out). The fault is also signalled by a special marker held on the display, a LED on the front and an error code in the message display.
During calibration of a DO measuring system the slope deviation from nominal value (%) and sensor output (μA) at 0 mg/l are calculated and checked.
If any of these are outside the limits, an error is signalled.



■ OUTPUT SIGNALS

The standard DO402G features two 0-20 mA or 4-20 mA DC current outputs available for recording, and indication or control functions.
The user selectable outputs can represent:

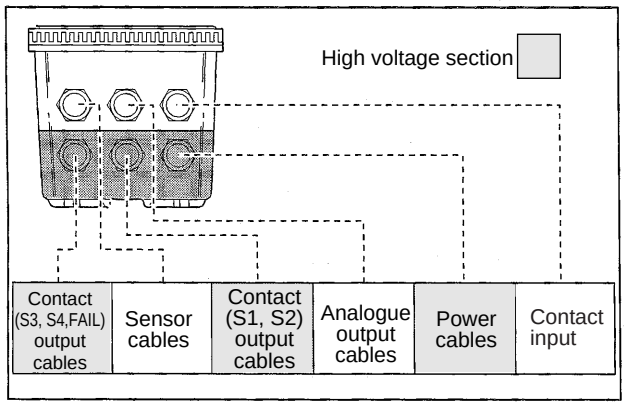
- dissolved oxygen mg/l or ppm
- saturation value %
- measured temperature value

In addition the following output functions are available:

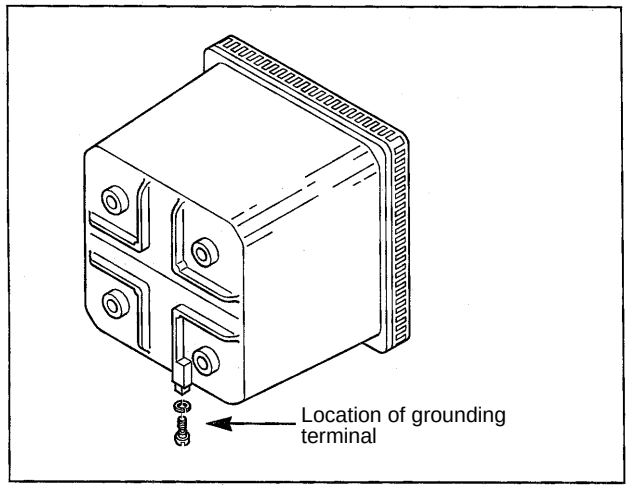
- a “HOLD” function that maintains last measured value or a fixed value until return to normal operation
- a “BURN” function that gives a high or low output at fail status
- a programmable output function that allows the user to linearise the output(s).
- a damping time constant can be set to even out random process fluctuations that can make the real value difficult to see.

■ CABLES AND TERMINALS

The DO402G is equipped with terminals suitable for the connection of finished cables in the size range of 0.13 to 4 mm^2 (26 to 12 AWG)
The glands will form a tight seal on cables of outside diameter in the range 6 to 12 mm .
Glands to be used for cabling
Grounding



Glands to be used for cabling



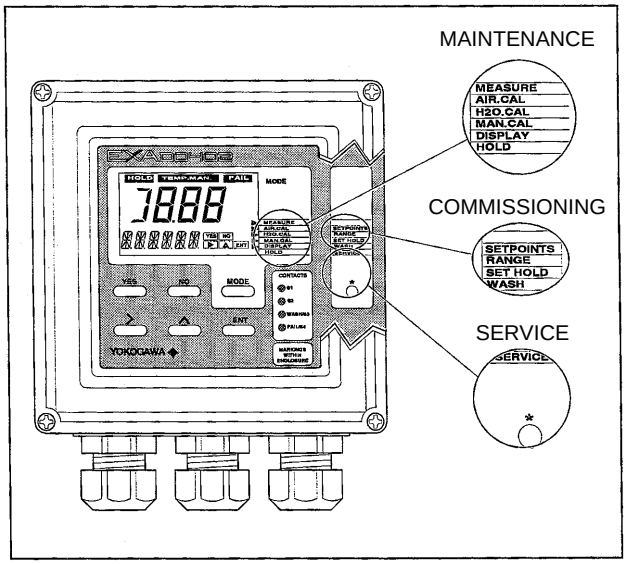
Grounding

■ THREE LEVEL OPERATION

The EXA DO402G converter uses a 3-level operating system to take full advantage of the microprocessor while retaining the traditional simplicity of analog converters. Advanced functions are separated from conventional operation to avoid confusion. They can be activated as required for each individual application.

1. The normal maintenance functions are accessible through the flexible window by pushing the keys underneath.
2. Functions required to commission the instrument are hidden to discourage unauthorized tampering. The front cover is removed to reveal the commissioning menu and the hidden access key (marked*).
3. Specialised functions can be adjusted via the SERVICE menu. In this case access is by using “service codes.”

Three level operation



Three level operation

MAINTENANCE level

Use	: Normal operation and checking
How	: Simple operation by dialog through the closed front cover
Example	: Calibration

COMMISSIONING level

Use	: For normal commissioning
How	: Removal of the front cover reveals the access key and second menu
Example	: Output range setting

SERVICE level

Use	: Only for specialised functions
How	: Through special service code entries
Example	: Selecting salinity compensation

With this 3-level user-friendly approach, the instrument can be operated by anyone. Commissioning is straight-forward and needs no calibration equipment compared to analog instruments. Special functions available via access codes are invisible during normal operation. All three levels can be separately protected against unauthorised access by a password system using a three digit code.

■ GENERAL SPECIFICATIONS, DO402G CONVERTER

A. Input specifications : The DO402G Dissolved Oxygen converter measures the current,that is generated by the Dissolved Oxygen sensor. The flexibility of the input circuit allows the use of many commercially available sensors, whether they are of the Galvanic type (Driving Voltage generated internally) or Polarographic type (driving voltage supplied by converter).
The input range varies from 0.0 nA up to 500 nA for polarographic sensors and 0.0 to 50 µA for galvanic sensors. Temperature measurement for automatic temperature compensation utilises Pt1000 RTD elements or PB36 as used in DO8X and DO30 sensors as well as the 22kNTC as used by Ingold sensors

B. Input ranges

• Dissolved Oxygen	: 0- 50 mg/l (ppm)
• Temperature	: 0- 50 ºC

C. Span

- DO concentration	: minimum: 1 mg/l (ppm) maximum: 50 mg/l (ppm)
- % saturation	: minimum: 10 % maximum: 300 %
- Temperature	: minimum: 25 ºC maximum: 50 ºC

D. Transmission Signals

: Two isolated outputs of 0/4-20 mA DC with common negative.
Maximum load 600 Ω.
The range of mA1 output can be switched by remote control. (Remote wash cycle start is unavailable when this function is available.)
Auxiliary output can be chosen from temperature, DO, burn up (22 mA) or burn down (0 or 3.5 mA) to signal failure.

E. Temperature compensation

: 0 - 50 ºC
Sensor types: Pt 1000 RTD; PB36 ; 22kNTC
Automatic or Manual temperature compensation.

F. Calibration : Semi-automatic calibration with automatic compensation for influence of barometric pressure and altitude on partial pressure of Oxygen in air (or solubility of Oxygen in water). Automatic compensation for influence of salinity of water on solubility of Oxygen in water is program-mable.
The correction for pressure, salinity and temperature meets ISO 5814
Possible calibration routines are:
- Slope (span) calibration in ambient air. The calibration table is based on 70% rH and is determined empirically.

- Slope (span) calibration in water, saturated with air: according ISO 5814
- Zero calibration (normally inactive)

G. Display : Custom liquid crystal display, with a main display of 3 1/2 digits 12.5 mm high. Message display of 6 alphanumeric characters, 7 mm high.

H. Contact Outputs

- General : Four (4) SPDT relay contacts with LED indicators. For S1, S2, and S3, the LED is on when relay is powered. NOTE: For S4 (FAIL) LED lights when power is removed (Fail safe).
Contact outputs configurable for hysteresis and delay time.
- Switch capacity : Maximum values 100 VA, 250 VAC, 5 Amps.
Maximum values 50 Watts, 250 VDC, 5 Amps.
- Status : High/low process alarms, selected from process parameter and temperature.
Contact output is also available to signal “Hold active”

Contact status

	Contact S1~S3			Contact S4		
Status	LED	NO	NC	LED	NO	NC
Alarm, Fail ON	ON	Closed	Open	ON	Open	Closed
Alarm, Fail OFF	OFF	Open	Closed	OFF	Closed	Open
Power OFF	OFF	Open	Closed	OFF	Open	Closed

T07.EPS

- Control function : On / Off
PI pulsed : Proportional duty cycle control with integral term.
PI frequency : Proportional frequency control with integral term. In addition wash cleaning control signal on S3, and FAIL alarm for system and diagnostic errors on S4.

I. Contact Input : Remote wash cycle start, or remote range selection.
ON input impedance: 10Ω or less
OFF input impedance: 100kΩ or more

J. Power Supply : - 230 VAC ±15%, 50/60 Hz, maximum consumption 10 VA.
- 115 VAC ±15%, 50/60 Hz, maximum consumption 10 VA.
- 100 VAC ±15%, 50/60 Hz, maximum consumption 10 VA.

■ OPERATING SPECIFICATIONS

A. Performance : DO (at t process = 25 °C)

- Linearity : ≤ 0.03 mg/l ± 0.02 mA
- Repeatibility : ≤ 0.03 mg/l ± 0.02 mA
- Accuracy : ≤ 0.05 mg/l ± 0.02 mA

B. Performance : Temperature (Pt1000, PB36, 22kNTC)

- Linearity : ≤ 0.3 ºC ± 0.02 mA
- Repeatibility : ≤ 0.1 ºC ± 0.02 mA
- Accuracy : ≤ 0.3 ºC ± 0.02 mA

C. Response time

0- 90% : 10 s

NOTE:
The specifications are expressed with simulated inputs, because the DO402G can be used with many different sensors with their unique characteristics.

D. Ambient operating temperature

: -10 to + 55 °C

E. Storage temperature

: -30 to +70 °C

F. Humidity : 10 to 90% RH non-condensing.

G. Housing

- Case : Cast aluminium with chemically resistant coating
- Finish : Polyurethane baked finish
- Cover : Flexible polycarbonate window
- Case color : Frosty-white (Equivalent to Munsell 0.6GY3.1/1.2)
- Cover color : Deepsea Moss green (Equivalent to Munsell 0.6GY3.1/2.0)
- Cable entry : Via six 1/2” nylon glands
- Cable terminals : For up to 2.5 mm^2 finished wires
- Protection : Compatible with the IP65 and NEMA4X standards for water-tightness.
- Mounting : Pipe, wall or panel, using optional hardware.

H. Data protection : Non-volatile memory for configuration and logbook, and lithium battery for clock support.

I. Automatic safeguard

: Return to measuring mode when no keystroke is made for 10 min.

J. Power interruption : Less than 50 milliseconds no effect.
More than 50 milliseconds reset to measurement.

K. Operation protection

: 3-digit programmable password.

L. Connection cable : Using WTB10 Terminal box the distance between sensor and transmitter can be up to 50 meters

■ CONTROL AND ALARM FUNCTIONS

Control output (mA) : Pl control on the 2nd mA output. The 2nd mA output can be configured to give a PI (proportional and integral) control output. The setpoint, proportional band and integral time are each fully programmable.

- Adjustable parameters : Setpoint, proportional range and integral time.

Process alarm : The contact will be switched when the process value reaches a limit. This can either be a high or low limit.

- Adjustable parameters : Setpoint for the process value
  Hysteresis of the switching action
  Delay time of the relay (0 to 200 s)

PI duty cycle control : The contact is used to control the time a solenoid dosing valve is opened. The proportional control is achieved by opening and closing the solenoid valve and varying the ratio of on and off time (ton, toff).

- Adjustable parameters : Setpoint, proportional range and integral time. Total period of the pulse period (5 to 100 s)

PI pulse frequency control

: The contact is used to control a pulse-driven dosing pump. The frequency of pulses regulates the pump speed.

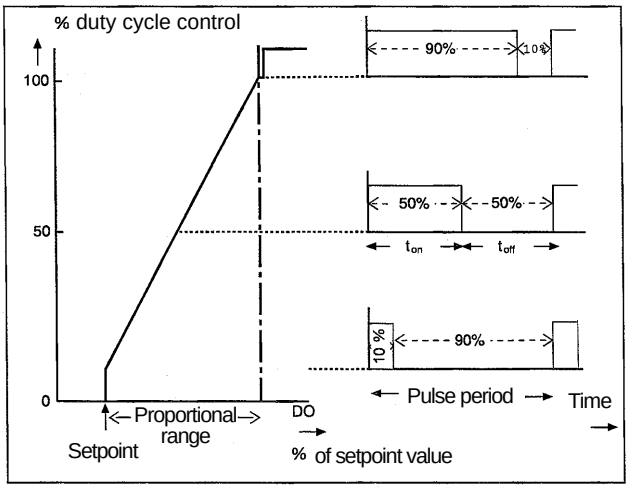
- Adjustable parameters : Setpoint, proportional range & integral time.
  Maximum pulse frequency (50 to 120/min.)

Wash cleaning of sensors

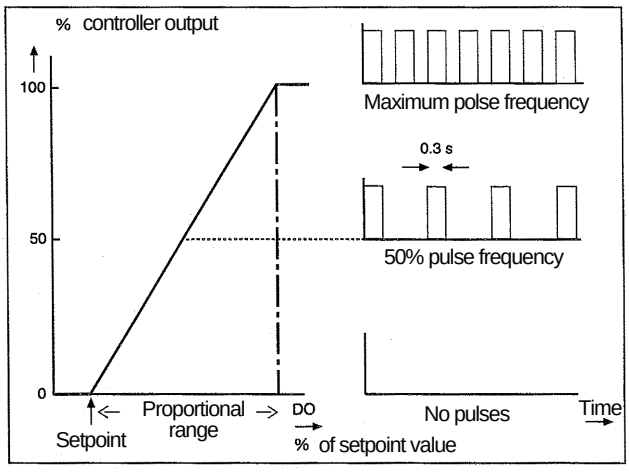
: Contact S3 is used to control the wash cycle, or as a process alarm.

- Adjustable parameters : Cleaning time or washing time (tw)
  Recovery time after washing (tr)
  Interval time for wash cycle.
  The graph shows a typical response curve during washing. The wash and recovery times need to be set to suit the process.

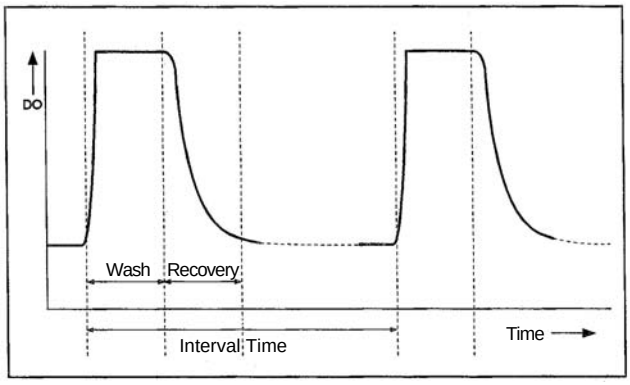
Fault alarm : Contact S4 by default set to function as an alarm, indicating that the EXA has found a fault in the measuring loop. If the self diagnostics of the EXA indicate a fault or error, the FAIL contact will be switched. In most cases this will be caused by a malfunction of the measuring loop. The FAIL contact is also closed when the power is removed.
The “FAIL” contact may also be configured as a fourth process alarm.



Duty cycle control



Pulse frequency control



Dynamic response during wash

■ GENERAL SPECIFICATIONS, DO30G SENSOR

Dissolved Oxygen: 0 to 20 mg/l (ppm)
Liquid Temperature: 0 to 40℃
Liquid Pressure: 0 to 100 kPa (0 to 1 kgf/cm^2)
Flow speed: 20 cm/s or more
Sensor for Temperature Compensation: Pt1000
Wetted Part Material: rigid polyvinyl chloride, stainless steel JIS SUS304, fluorinated ethylenepropylene, nitrile rubber, heat-resistant soft polyvinyl chloride, and polycarbonate
Cable Length: 3 m, 5 m, 10 m, 15 m and 20 m
Weight: Approx. 0.3 kg + 0.12 × N kg N: cable length (ex. for cable length of 5 m, approx. 0.9 kg)

■ GENERAL SPECIFICATIONS, OTHERS

• WTB10 Terminal Box
Used when DO converter is installed at a distance from the DO sensor.
Ambient temperature: –10 to 50˚C
Construction: JIS waterproof
Case material: Fiberglass reinforced polycarbonate resin
Electrical connections
DO sensor side: JIS A8 watertight plastic gland
DO converter side: JIS A15 watertight plastic gland with cable (max. 40 m)
Conduit adaptor (optional) available
Case color: Grayish green (Munsel) 2.5GY5.0/1.0)
Weight: Body 0.5 kg Mounting hardware: 0.7 kg

• Parts Set for Maintenance
A set of zero-adjusting reagent and maintenance parts
<Contents>
Zero adjusting reagent (sodium sulfite 500 g) ..... 1 bottle
Membrane assembly
(for membrane thickness of 50 µm) ..... 3 sets
Electrolyte for sensor (50 ml) ..... 1 bottle
Syringe for replacing electrolyte 1
Polish for silver electrode (30 g) ..... 1 bottle
Polyethylene beaker (200 ml) 1

• Calibration Set (optional)
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.

■ CHARACTERISTICS

Repeatability: 0.1 mg/l or 3% FS, whichever is greater (including sensor)
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)

■ MODEL AND SUFFIX CODES

1. DO Converter

[Style : S2]

Model	Suffix Code	Option Code	Description
DO402G	·····	·····	Converter for dissolved oxygen
Type	-1 ·····	·····	General
Power Supply voltage	-1 ·····	·····	115 volts 50/60 Hz
	-2 ·····	·····	230 volts 50/60 Hz
	-5 ·····	·····	100 volts 50/60 Hz
Language	-J ·····	·····	Japanese
	-E ·····	·····	English
Option Mounting Hardware		/U ·····	Pipe, wall mounting bracket (Stainless steel)
		/PM ···	Panel mounting bracket (Stainless steel)
Hood		/H3 ····	Hood for sun protection (carbon steel)
		/H4 ····	Hood for sun protection (stainless steel)
Tag plate		/SCT ···	Stainless steel tag plate
Conduit adaptor		/AFTG	G 1/2
		/ANSI···	NPT 1/2
		/SPS···	With screws for salt protection *1
		/X1····	Epoxy baked finish *2

*1:The SUS screws with teflon coating are used at the four corners of the cover.
*2:The housing is coated with epoxy resin.

2. DO Sensor

Model	Suffix Code	Option Code	Description
DO30G	·····	·····	DO sensor
–	-NN·····	·····	Always -NN
Membrane thickness	-50 ·····	·····	50 µm
Cable length	-03 ·····	·····	3m
	-05 ·····	·····	5m
	-10 ·····	·····	10m
	-15 ·····	·····	15m
	-20 ·····	·····	20m
Cable terminal	-PN ···	·····	Pin terminal *
	-FK ···	·····	Fork terminal

* Select pin terminal for DO402G.

3. Terminal Box

Model	Suffix Code	Option Code	Description
WTB10	·····	·····	Terminal box
Combinned system	-D03 ·····	·····	For DO402G
–	-NN ·····	·····	Always -NN
Specify cable length	-00 ·····	·····	No cable
	-05 ·····	·····	5m
	-10 ·····	·····	10m
	-20 ·····	·····	20m
	-30 ·····	·····	30m
	-40 ·····	·····	40m
Option Mounting hardware		/P ·····	Pipe mounting hardware
		/W ·····	Wall mounting hardware
Conduit work adaptor		/AWTB···	G 1/2
		/ANSI ···	1/2NPT

4. Accessories (parts set for maintenance)

Model	Suffix Code	Option Code	Description
DOX8A	·····	·····	Parts set for maintenance (for membrane thickness of 50 µm)
Sensor	-M ·····	·····	For membrane replacing type sensor
–	*B ·····	·····	Style B

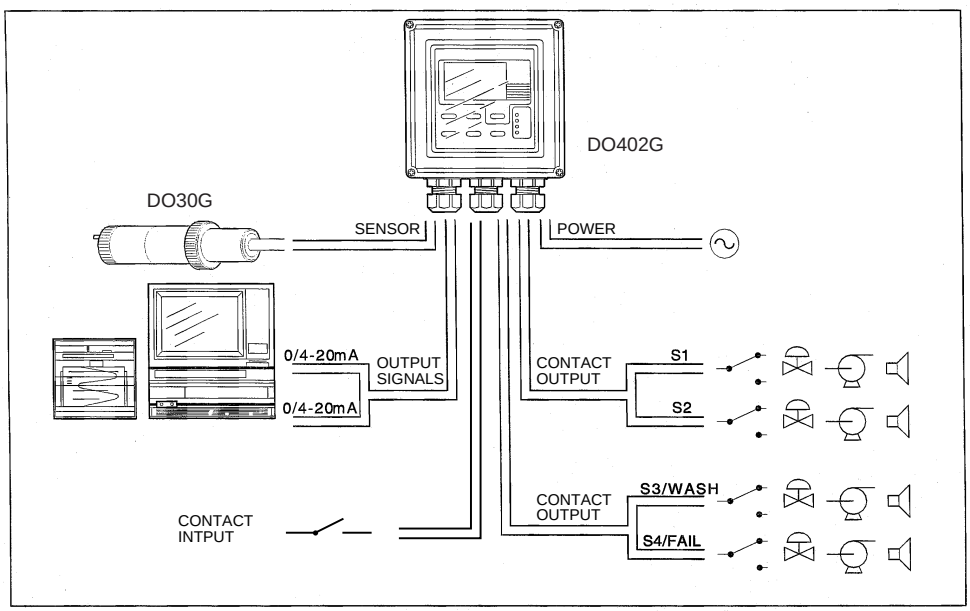
5. Caribration Set

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

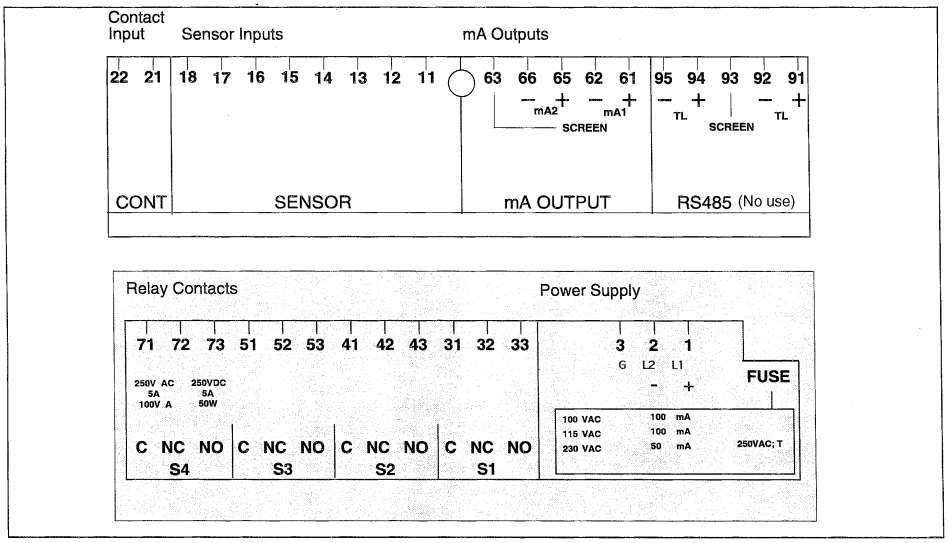
6. Spare Parts

Part Name	Part No.	Remarks
Membrane and electrolyte for sensor	K 9171HK	3 membrane assemblies (thickness of 50µm) 50 ml of electrolyte
Zero adjusting reagent	L 9920BR	Sodium sulfite 500g
Polisher	K 9088PE	For polishing silver electrode 30g

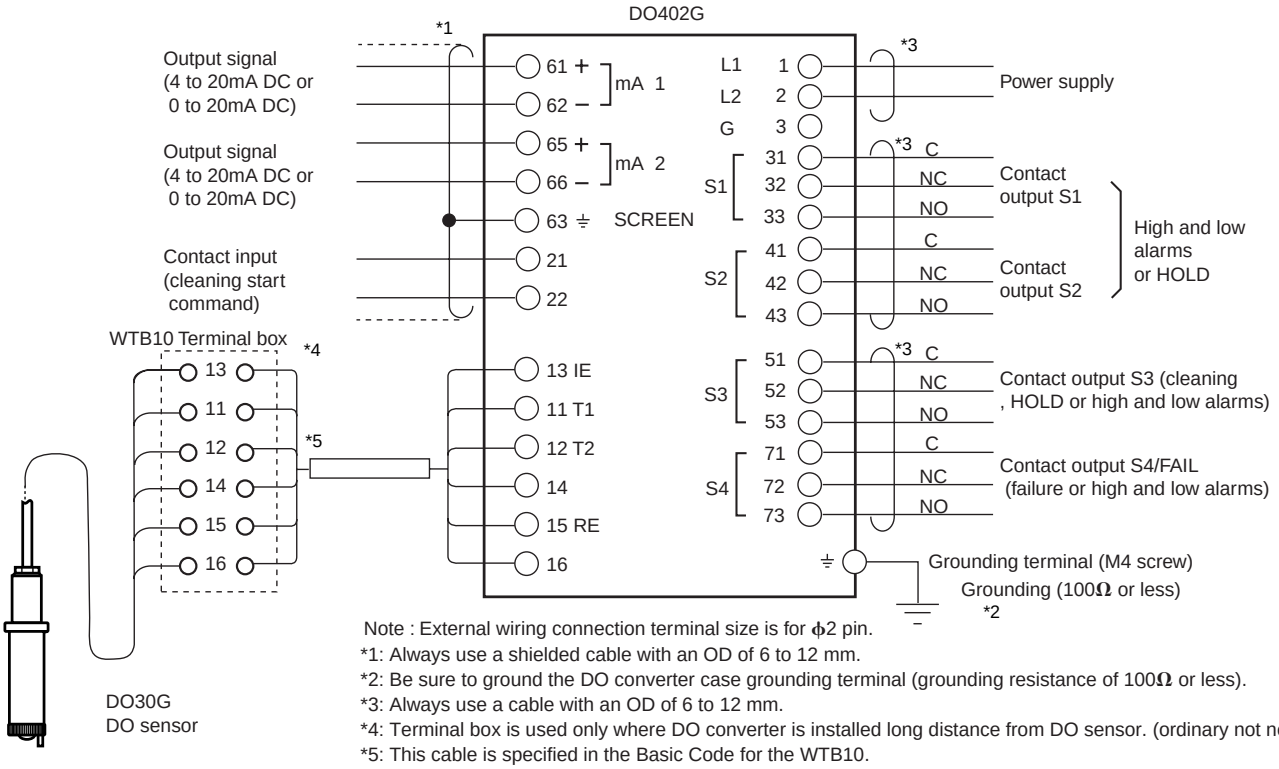
■ EXTERNAL WIRING



INPUT AND OUTPUT CONNECTIONS



■ WIRING DIAGRAM

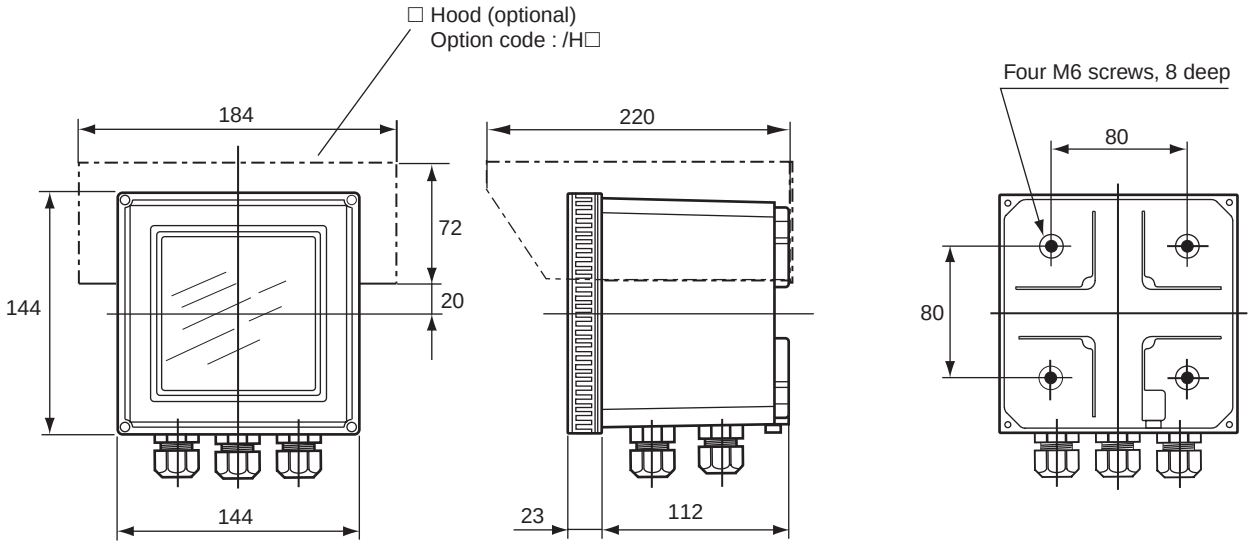


Note : External wiring connection terminal size is for ϕ2 pin.
*1: Always use a shielded cable with an OD of 6 to 12 mm.
*2: Be sure to ground the DO converter case grounding terminal (grounding resistance of 100Ω or less).
*3: Always use a cable with an OD of 6 to 12 mm.
*4: Terminal box is used only where DO converter is installed long distance from DO sensor. (ordinary not needed)
*5: This cable is specified in the Basic Code for the WTB10.

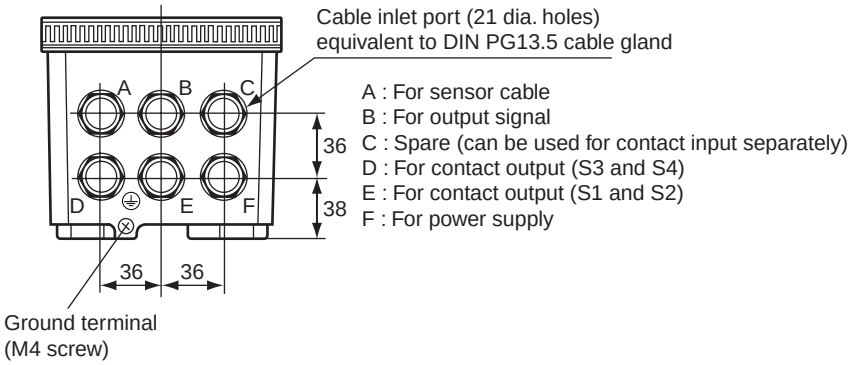
■ EXTERNAL WIRING

Unit : mm

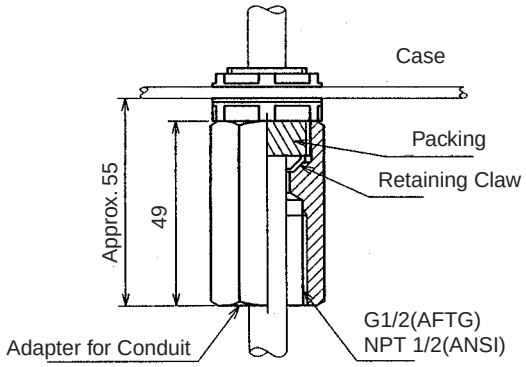
DO Converter DO402G



Weight: Approx. 1.8 kg

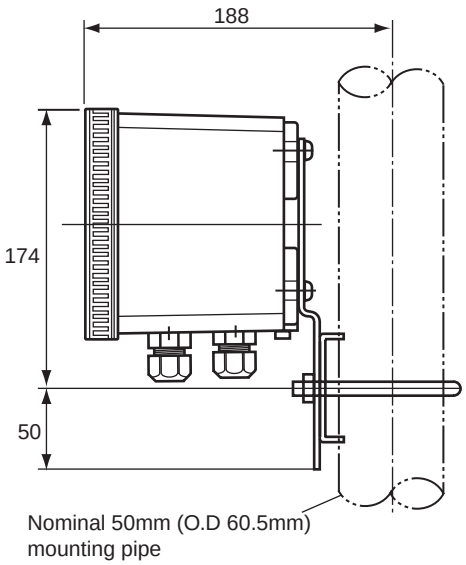


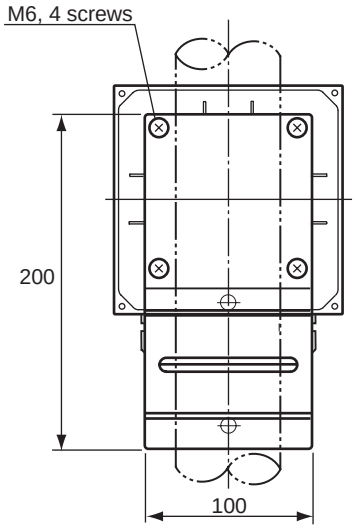
Adaptor for conduit work (option code: /AFTG, /ANSI)



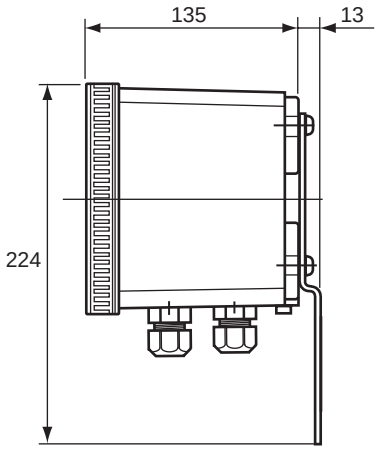
Pipe/Wall Mounting Brackets (Option Code: /U) Weight: approximately 0.7 kg Unit: mm

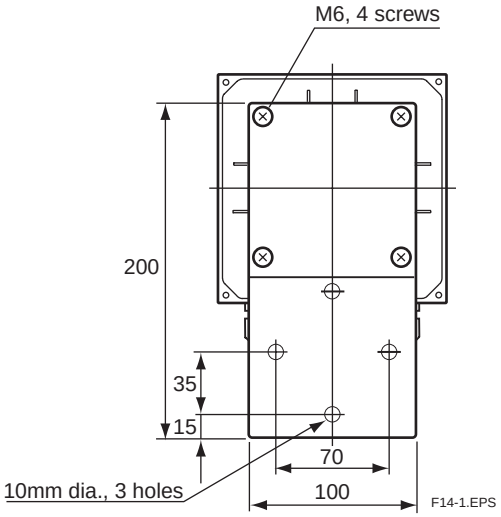
•Example of bracket used for pipe mounting



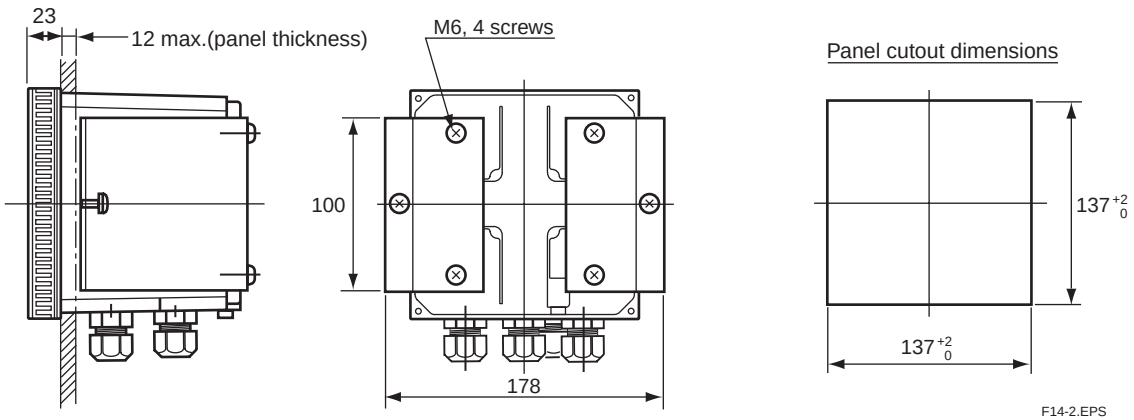


•Example of bracket used for wall mounting





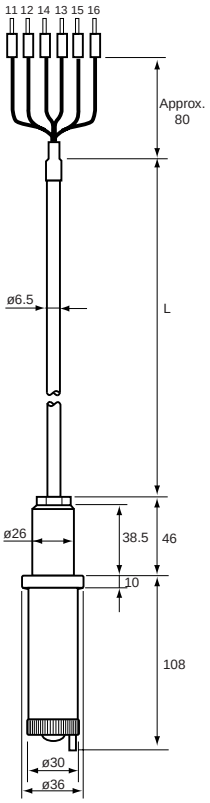
Pipe Mounting Brackets (Option Code: /PM) Weight: approximately 0.4 kg



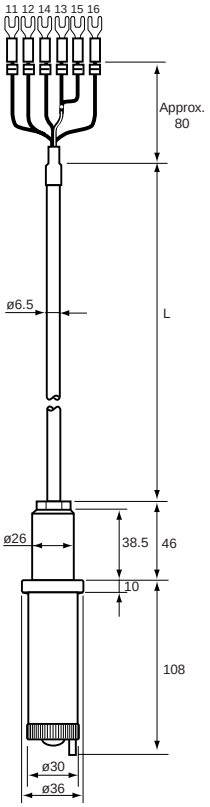
DO Sensor DO30G

Unit : mm

• Dissolved-oxygen sensor with pin terminals



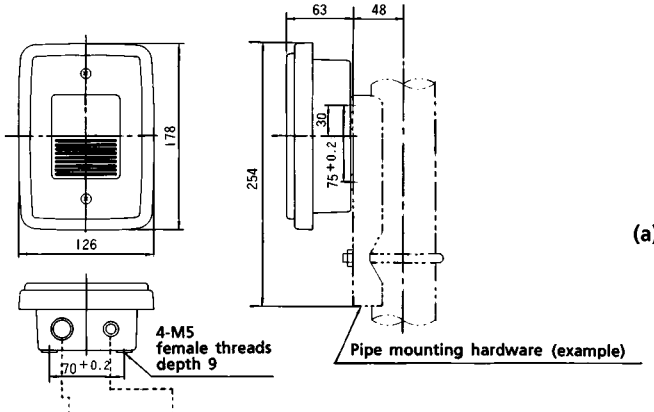
• Dissolved-oxygen sensor with square crimping terminals



Model and Suffix Codes	L	Weight (kg)
DO30G - NN - 50 - 03 - PN	3 000	Approx. 0.6
DO30G - NN - 50 - 05 - PN	5 000	Approx. 0.8
DO30G - NN - 50 - 10 - PN	10 000	Approx. 1.4
DO30G - NN - 50 - 15 - PN	15 000	Approx. 2.0
DO30G - NN - 50 - 20 - PN	20 000	Approx. 2.6

Model and Suffix Codes	L	Weight (kg)
DO30G - NN - 50 - 03 - FK	3 000	Approx. 0.6
DO30G - NN - 50 - 05 - FK	5 000	Approx. 0.8
DO30G - NN - 50 - 10 - FK	10 000	Approx. 1.4
DO30G - NN - 50 - 15 - FK	15 000	Approx. 2.0
DO30G - NN - 50 - 20 - FK	20 000	Approx. 2.6

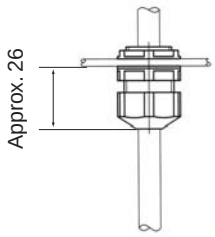
Terminal Box WTB10



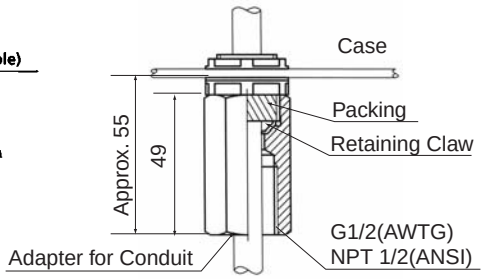
WTB10	Cable to converter	DO sensor cable
Cable gland	A15	A8

Note: Cable OD for A15 should be 9 to 12mm

Detailed drawing of cable gland for terminal box



(a) Watertight plastic cable gland (St'd)

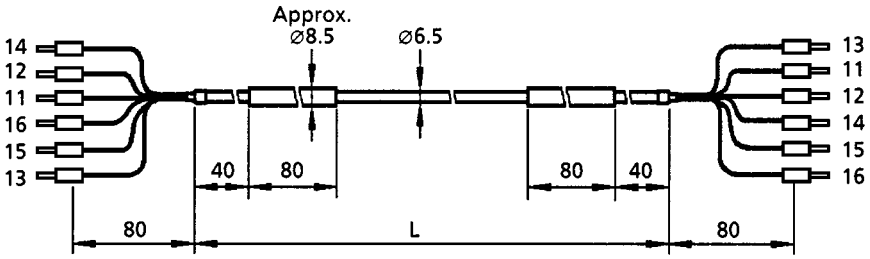


(Please use the watertight cable gland of the attachment. If metallic conduit is directly connected with the case, it becomes the factor of the measurement error.)

(b) Watertight plastic cable gland with conduit adaptor

Dedicated Extension Cable (Not Supplied If Suffix Code “-00” Is Selected)

Unit: mm

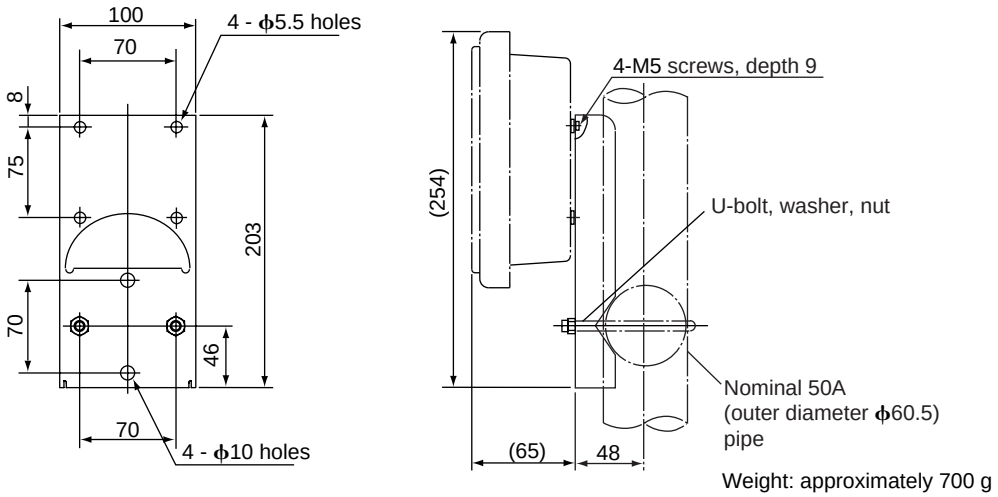


Model and Suffix Codes	L
WTB10 - D03 - NN - 05	Approx. 5 000
WTB10 - D03 - NN - 10	Approx.10 000
WTB10 - D03 - NN - 20	Approx.20 000
WTB10 - D03 - NN - 30	Approx.30 000
WTB10 - D03 - NN - 40	Approx.40 000

Weight : Approx. 120 g/m

F17.EPS

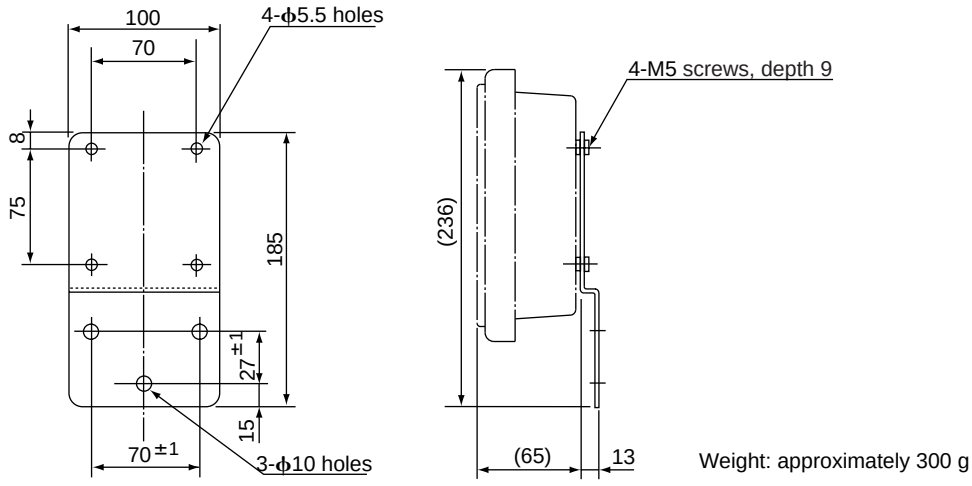
Pipe Mounting Bracket (Optional)
(Option Code: /P)



Weight: approximately 700 g

F18.EPS

Wall Mounting Bracket (Optional)
(Option Code: /W)



Weight: approximately 300 g

F19.EPS

Inquiry Specifications Sheet for Dissolved Oxygen Analyzer

For inquiries on the Yokogawa dissolved oxygen analyzer, please tick (✓) the appropriate box (☐) and write down the relevant information in the blanks.

1. General

Name of your firm : _____
Person in charge : _____ Department : _____ (Phone No. _____)
Name of plant : _____
Measuring point : _____
Purpose of use : ☐ Indication ☐ Recording ☐ Alarm ☐ Control
Power : _____ V AC

2. Measurement Conditions

(1) Liquid temperature : _____ to, Normal _____ [°C]
(2) Liquid pressure : _____ to, Normal _____ [kPa]
(3) Flow speed : _____ to, Normal _____ [m/s]
(4) Name of liquid to be measured : _____
(5) Components of liquid to be measured : _____
(6) Other conditions : _____

3. Installation Site

(1) Ambient temperature : _____
(2) Location : ☐ Outdoors ☐ Indoors _____
(3) Other information : _____

4. Requirements

(1) Measurement range : ☐ 0 to 50 mg/l ☐ _____
(2) Transmission output : ☐ 4 to 20 mA DC ☐ 0 to 20 mA DC
(3) System component selection : ☐ Sensor ☐ Holder ☐ Converter ☐ Cleaning system ☐ Calibration set
☐ Parts set for maintenance ☐ Terminal Box
(4) Length of sensor cable : ☐ 3 m ☐ 5 m ☐ 10 m ☐ 15 m ☐ 20 m
(5) Type of holder : ☐ Guide pipe ☐ Submersion ☐ Floating ball ☐ Suspension
(6) Cleaning method : ☐ No cleaning ☐ Jet cleaning
(7) Other requirements :
_____