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H-1 Series DO Meter for Industrial Use (Two-Wire Type)

HD-300

■ Overview

● The HD-300 is designed to transmit the measured value for dissolved oxygen (DO) as a signal of 4 to 20 mADC on the power supply line when a DO sensor and a power source for 21 to 32 VDC are connected. The measured value and various settings are displayed on the LCD readout. When used with our cleaner, the transmission output during cleaning may be held.
It features a variety of self-diagnostic functions allowing you to detect a sensor error and a system error.

■ Measurement target

● Dissolved oxygen in sample water

■ Measuring principle

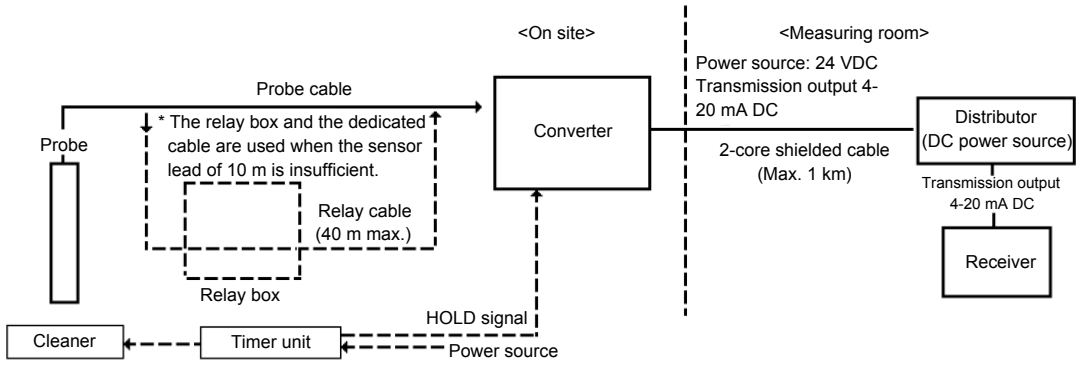
● Diaphragm type polarography

■ Intended use

● Dissolved oxygen in effluent treatment
● Dissolved oxygen in water tank for aquafarming and the like

■ System configuration diagram

Standard specification

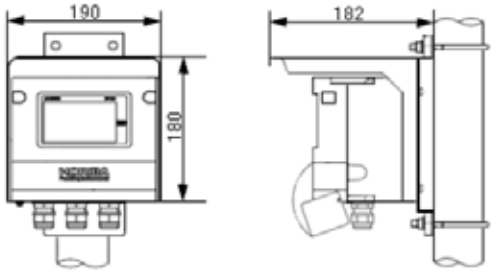


HD-300 Readout Converter

■ Features

- ●Outdoor installation type (equivalent to IP65; splash-proof construction)
- ●Selectable simultaneous display of temperature
- ●All settings available with front keys
- ●No atmospheric zero calibration is required (for zero calibration, electric zero calibration is performed in the equipment)
- ●Improved maintenance feature (self-diagnostic capability)
- ●Selectable transmission output range
- ●Two-wire transmission type (21 to 32 VDC)
- ●Backup of stored data
- ● Easily viewable readout (150% larger than the previous model)
- ●Improved operability of keys by using an emboss sheet

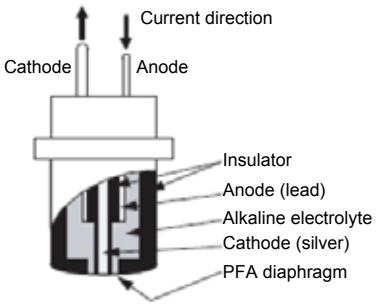
■ External Dimensions



Unit: mm

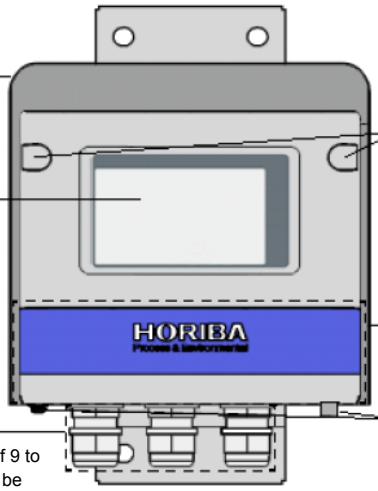
■Sensor

The structure of the diaphragm type polarographic sensor is shown in the right figure. The sensor has an anode made of silver and a cathode consisting of carbon closely attached to the diaphragm in gas permeation film made of PFA (fluorine resin film). The dissolved oxygen in the sample water transmits through the PFA diaphragm and causes the following electrochemical reaction on the cathode surface:
Cathode reaction: $O_2 + 2H_2O + 4e^- \rightarrow 4OH^-$
Anode reaction: $Ag + Cl^- \rightarrow AgCl + e^-$
Voltage is applied between both poles by the converter. Electric current flows as a reaction with oxygen occurs. The magnitude of this electric current is in proportion to the partial pressure of oxygen in the sample water. The dissolved oxygen can be measured by detecting the electric current. The transmittance of oxygen that transmits through the diaphragm changes with temperature. The amount of air-saturated oxygen in water also changes with temperature. Therefore, corrective calculation is performed by detecting the temperature. If the flow rate of the sample water is low, concentration gradient occurs on the surface of the diaphragm. This requires giving a higher flow rate than the specified one.



■ Configurations

● Front



Cover
This cover is used for outdoor installation.

Display part
The measured value and other information are displayed here.

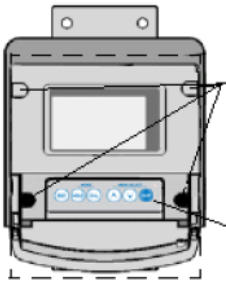
Conduit
Up to 6 electric wires of 9 to 11.5 mm diameter can be used.

Screw cap
When the two screw caps are removed, the front case screws appear.

Front cover
When the cover is opened, 6 operation keys appear.

Purge air inlet
Purge air is sent through this inlet to prevent internal corrosion. Normally no connection is required.

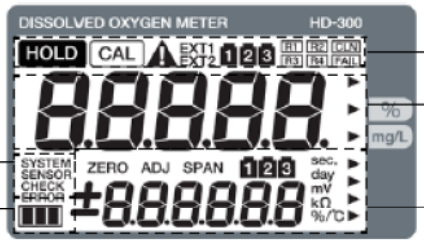
● With the front cover opened



Front case screw
When the four screws are removed, the front case can be opened.

Operation key section
6 operation keys appear

● Display part



Status display

Measured value display

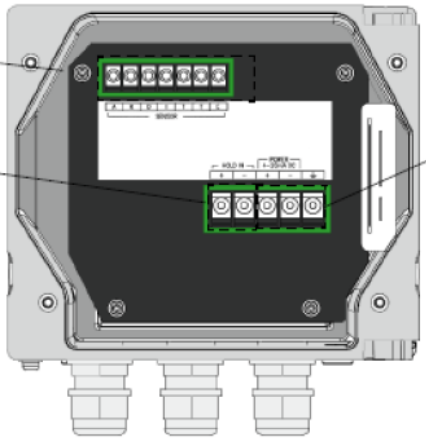
Status display

Indicator

Auxiliary display

● Operation keys

● Terminal block



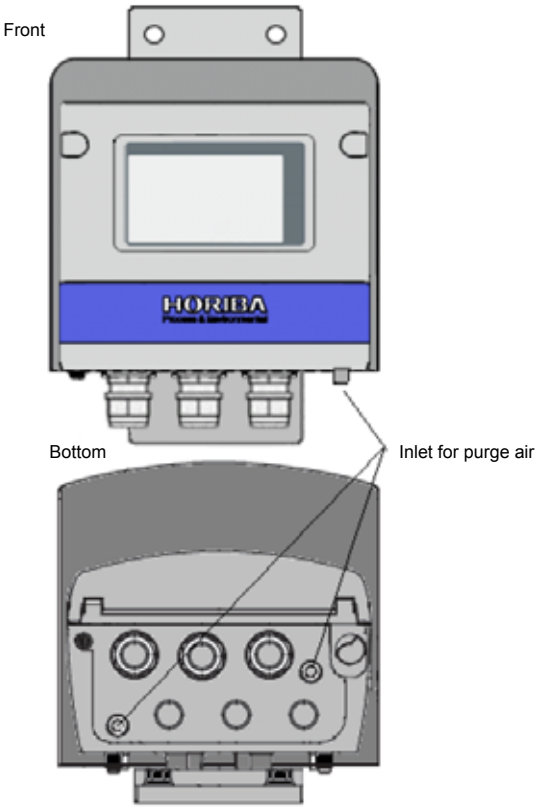
Probe connection terminal

HOLD input terminal

Power connection terminal

■ Air purge

Air inlets for purge are provided to prevent internal corrosion. To use the HD-300 in an environment where corrosive gas is generated, prevent corrosive gas from entering the inside by constantly sending instrument air.



■ Amount of saturated dissolved oxygen

The dissolved oxygen in the sample water transmits through the PFA diaphragm and causes an electrochemical reaction on the surface of the cathode.
Voltage is applied between the cathode and the anode by the converter. Electric current flows when a reaction with oxygen occurs. The magnitude of this electric current is in proportion to the partial pressure of oxygen in the sample water. The dissolved oxygen can be measured by detecting the electric current.

The transmittance of oxygen that transmits through the diaphragm changes with temperature. The amount of air-saturated oxygen in the water also changes with temperature. Therefore, the temperature is detected to perform corrective calculation.

If the flow rate of the sample water is low, concentration gradient occurs on the surface of the diaphragm. This requires giving a higher flow rate than the specified one.

Table 1 Amount of saturated dissolved oxygen (mg/L) at salt concentration and temperature

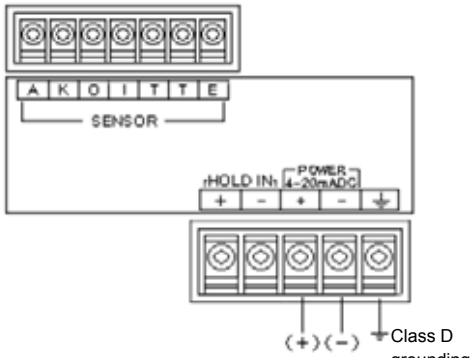
Temperature	Salinity (%)										
(°C)	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5
0	14.16	13.74	13.32	12.90	12.48	12.06	11.64	11.22	10.80	10.38	9.96
1	13.77	13.37	12.96	12.55	12.14	11.73	11.33	10.92	10.51	10.10	9.70
2	13.40	13.01	12.61	12.22	11.82	11.42	11.03	10.63	10.24	9.84	9.45
3	13.05	12.66	12.28	11.89	11.51	11.13	10.74	10.36	9.98	9.59	9.21
4	12.70	12.33	11.96	11.59	11.21	10.84	10.47	10.10	9.72	9.35	8.98
5	12.37	12.01	11.65	11.29	10.93	10.57	10.21	9.85	9.48	9.12	8.76
6	12.06	11.71	11.36	11.01	10.66	10.31	9.96	9.61	9.26	8.91	8.55
7	11.76	11.42	11.08	10.74	10.40	10.06	9.72	9.38	9.04	8.70	8.36
8	11.47	11.14	10.81	10.48	10.15	9.82	9.49	9.16	8.83	8.50	8.17
9	11.19	10.87	10.55	10.23	9.91	9.59	9.27	8.95	8.63	8.31	7.99
10	10.92	10.61	10.30	9.99	9.68	9.37	9.06	8.75	8.44	8.12	7.81
11	10.67	10.37	10.07	9.76	9.46	9.16	8.86	8.55	8.25	7.95	7.65
12	10.43	10.13	9.84	9.55	9.25	8.96	8.67	8.37	8.08	7.78	7.49
13	10.20	9.91	9.63	9.34	9.05	8.77	8.48	8.20	7.91	7.63	7.34
14	9.98	9.70	9.42	9.14	8.86	8.59	8.31	8.03	7.75	7.47	7.20
15	9.76	9.49	9.22	8.95	8.68	8.41	8.14	7.87	7.60	7.33	7.06
16	9.56	9.30	9.04	8.77	8.51	8.24	7.98	7.72	7.45	7.19	6.93
17	9.37	9.11	8.86	8.60	8.34	8.09	7.83	7.57	7.31	7.06	6.80
18	9.19	8.94	8.68	8.43	8.18	7.93	7.68	7.43	7.18	6.93	6.68
19	9.01	8.77	8.52	8.28	8.03	7.79	7.54	7.30	7.05	6.81	6.56
20	8.84	8.60	8.37	8.13	7.89	7.65	7.41	7.17	6.93	6.69	6.45
21	8.68	8.45	8.22	7.98	7.75	7.51	7.28	7.05	6.81	6.58	6.34
22	8.53	8.30	8.07	7.84	7.61	7.39	7.16	6.93	6.70	6.47	6.24
23	8.39	8.16	7.94	7.71	7.49	7.26	7.04	6.81	6.59	6.36	6.14
24	8.25	8.03	7.81	7.58	7.36	7.14	6.92	6.70	6.48	6.26	6.04
25	8.12	7.90	7.68	7.46	7.25	7.03	6.81	6.59	6.38	6.16	5.94
26	7.99	7.77	7.56	7.35	7.13	6.92	6.70	6.49	6.28	6.06	5.85
27	7.87	7.66	7.44	7.23	7.02	6.81	6.60	6.39	6.18	5.97	5.75
28	7.75	7.54	7.33	7.12	6.92	6.71	6.50	6.29	6.08	5.87	5.66
29	7.64	7.43	7.23	7.02	6.81	6.61	6.40	6.19	5.99	5.78	5.57
30	7.53	7.33	7.12	6.92	6.71	6.51	6.30	6.10	5.89	5.69	5.48
31	7.43	7.22	7.02	6.82	6.61	6.41	6.21	6.00	5.80	5.60	5.39
32	7.33	7.12	6.92	6.72	6.52	6.31	6.11	5.91	5.71	5.50	5.30
33	7.23	7.03	6.82	6.62	6.42	6.22	6.02	5.82	5.61	5.41	5.21
34	7.13	6.93	6.73	6.53	6.33	6.13	5.92	5.72	5.52	5.32	5.12
35	7.04	6.84	6.64	6.44	6.23	6.03	5.83	5.63	5.43	5.23	5.02
36	6.95	6.75	6.55	6.34	6.14	5.94	5.74	5.54	5.33	5.13	4.93
37	6.86	6.66	6.45	6.25	6.05	5.85	5.64	5.44	5.24	5.03	4.83
38	6.77	6.57	6.36	6.16	5.96	5.75	5.55	5.34	5.14	4.93	4.73
39	6.68	6.48	6.27	6.07	5.86	5.66	5.45	5.24	5.04	4.83	4.63
40	6.60	6.39	6.18	5.97	5.77	5.56	5.35	5.14	4.94	4.73	4.52

■ Power supply

•The HD-300 has no power switch. Provide a power switch near the HD-300 so that the power can be turned ON/OFF.
•A power source with rated voltage of 21 to 32 VDC for two-wire transmission is used.
•Operation outside the rated range can cause a fault. Therefore, check the power supply voltage. Make sure that the voltage fluctuations of the power source fall within a range between 21 and 32 VDC.
•Use a duplex shielded cable.
•If the HD-300 might be struck by lightning, install two arrestors between the HD-300 and the distributor.

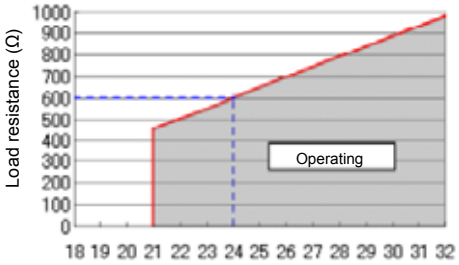
Be sure to ground the grounding terminal (class D grounding). Separate this grounding from any other grounding for electric equipment such as a motor.

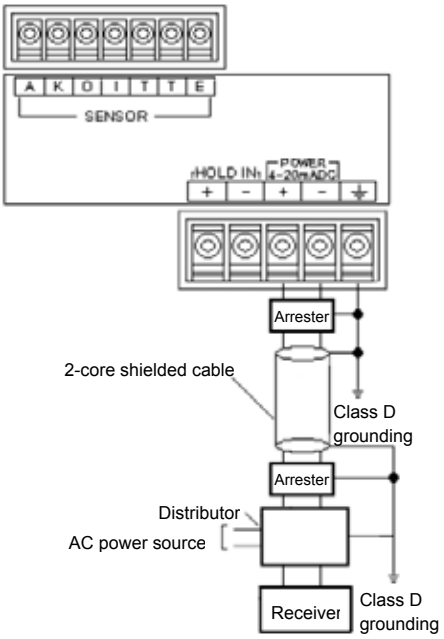
Power Source	Rated voltage: 24 VDC
	Power consumption: 0.6 W max.
Applicable electric wire	0.75 to 5.5 mm^2 (AWG18 to 10).



Supply power
Voltage: 21 to 32 VDC
Load resistance: See below.

Relation between current-voltage and load resistance





Recommended parts to be connected

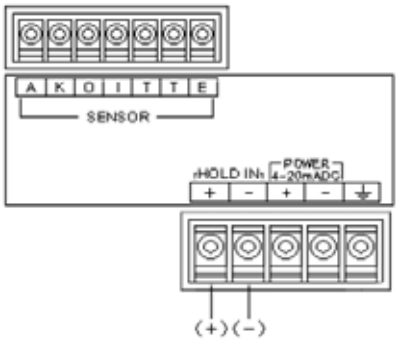
Item name	Model	Remarks
Distributor	DS-24-B	For 100 VAC
Arrester	MDP-24-1	For signals

Manufacturer: M-System Co., Ltd.

■HOLD input for cleaning

•When the HD-300 is used with a cleaner, connect this input.
•When the HOLD contact signal from the cleaner is turned ON, the transmission output is held.
•The HOLD mode may be changed by settings.
•The resistance for the contact input (HOLD input for cleaner) should be 40Ω maximum.

Holding mode
•The HOLD mode may be changed by settings.
HoLd: The previous value is held for output.
PrES: A freely specified value is output.

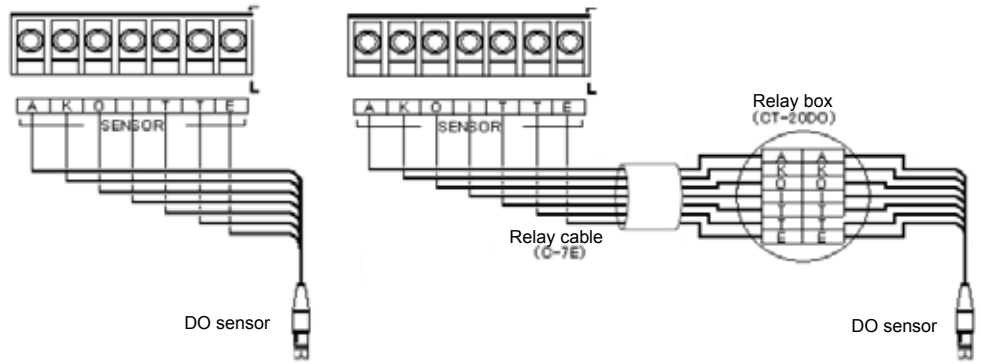


Contact input
(Cleaner HOLD input)

■Sensor

The probe cable for the DO meter is of high insulation. In handling this cable, pay attention to the following points:
•Do not wet the terminals and terminal block for cables with water or the like or contaminate them with your hand or oil The insulation will otherwise deteriorate.
The decreased insulation causes instable readouts. Keep the cable dry and clean.
If the electrode cable should be soiled, wipe it off with alcohol or the like and then well dry it.
•In wiring the probe cable and the relay cable, keep them away from a motor and other equipment that gives induction as well as their power cables.

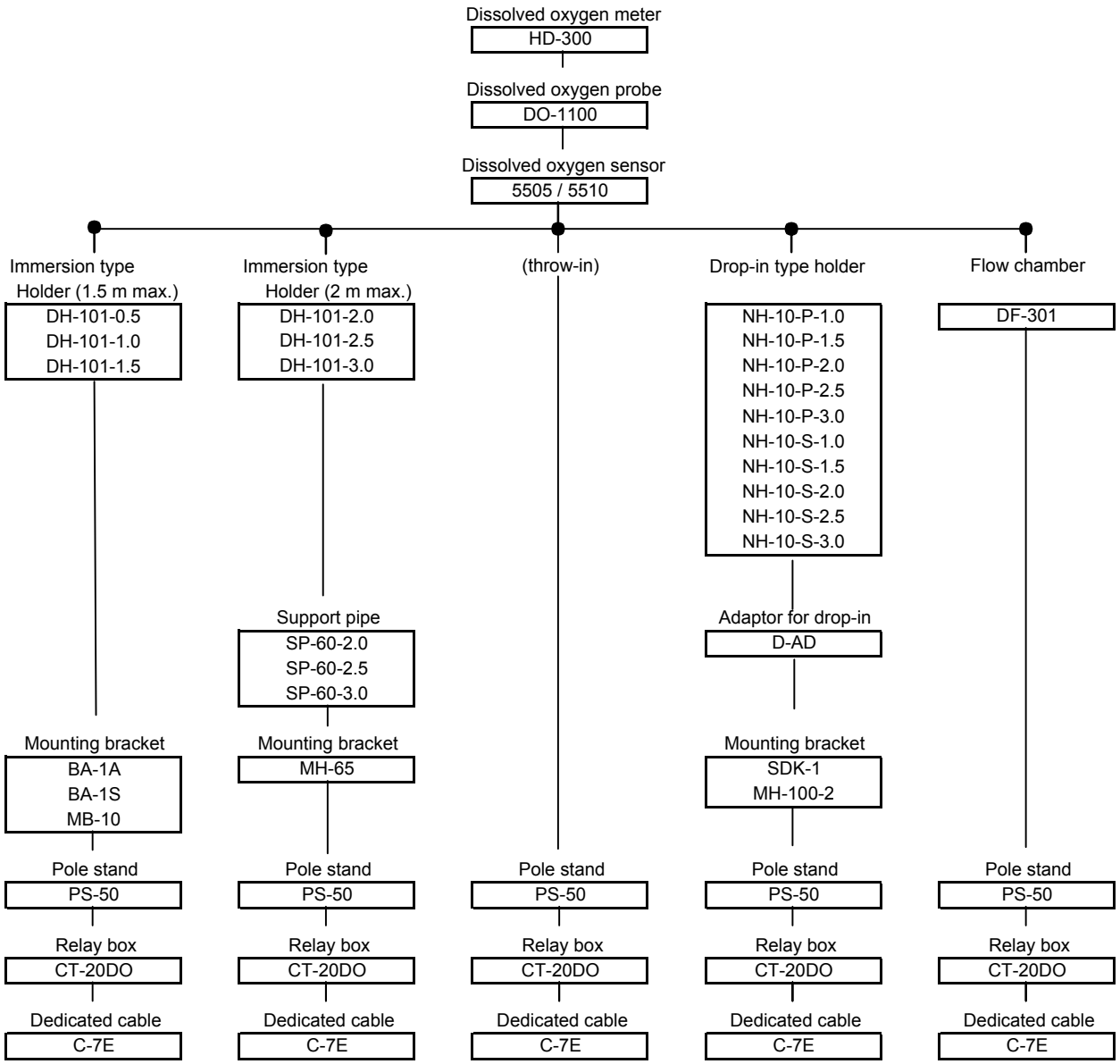
DO probe Cable	A: Anode terminal
	K: Cathode terminal
	O: External check terminal
	I: Internal check terminal
	T, T:Temperature compensation electrode terminal
	E: Shielded terminal



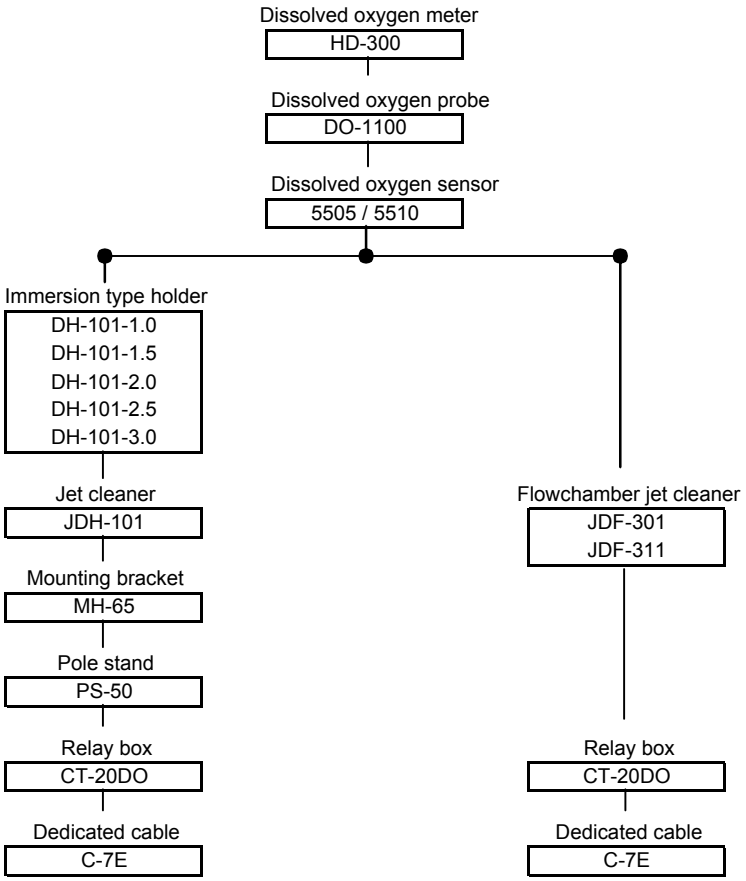
■ Combinations

The following diagram shows the possible combinations of converters, electrodes, holders, and others.
For the detailed specifications, see the items of each product.

When immersion or flow chamber is used



When a cleaner is used



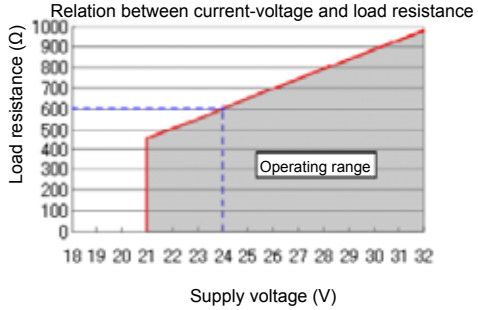
■ Specification 1 (HD-300 DO Meter for Industrial Use)

Product name	DO converter for industrial use (two-wire type)				
Model	HD-300				
Combination sensor	5505 and 5510 bipolar polalographic sensors				
Combination probe	DO-1100				
Measurable range	Dissolved oxygen		0 to 20mg/L (readout: 0 to 22mg/L)		
	Saturation degree		0% to 200% (readout range: 0% to 200%)		
	Temperature		0°C to 50°C (readout range: 10°C to 110°C)		
Display resolution	Dissolved oxygen		0.01m		
	Saturation degree		0.10%		
	Temperature		0.1°C		
Performance	Dissolved oxygen concentration	Repeatability	Within ±0.5% of full-scale value (with equivalent input)		
		Linearity	Within ±0.5% of full-scale value (with equivalent input)		
	Temperature	Repeatability	±0.5℃ (with equivalent input)		
		Linearity	±0.5℃ (with equivalent input)		
Transmission output	Output type		4-20 mADC input/output insulated type (two-wire transmission type)		
	Load resistance		600Ω max. (when power supply voltage is 24 VDC) (*1)		
	Repeatability		Within ±0.02 mA (output only)		
	Linearity		Within ±0.08 mA (output only)		
	Output range		Dissolved oxygen: Freely specifiable within the measurable range		
	Error output		With burn-out capability (3.8 or 21 mA)		
	Hold capability		Select holding the previous value or an arbitrary value		
Contact input	Number of input points		1		
	Contact type		Open collector, no-voltage a-contact		
	Conditions		ON resistance: 40Ω Open voltage: 1.2 V Short-circuit current: 21 mADC max.		
	Contact function		When a closed contact signal is input, transmission output is held.		
Temperature compensation	Applicable temperature element		Platinum resistor: 1 kΩ (0°C) (incorporated in the DO-1100 dedicated probe)		
	Temperature compensation range		0 to 50°C		
	Temperature calibration function		One-point calibration using comparison with reference thermometer		
Calibration	Calibration method		Atmospheric or saturated-liquid calibration		
	Number of calibration points		Atmospheric calibration: 1 point (for zero calibration, electric zero calibration is performed in the HD-300.		
			Saturated-liquid calibration: 2 points (zero calibration may be omitted)		
	Additional functions		Salt correction (0.0% to 5.0%) Automatic detection of calibration error (zero and sensitivity) Calibration history (zero, sensitivity, and the number of days that have elapsed since last calibration)		
Self-diagnostics	Calibration errors		Zero calibration error, sensitivity error, and beyond the temperature calibration range		
	Sensor diagnostic error		Sensor error (damaged diaphragm), sensor disconnection (disconnected sensor or damaged O-ring), temperature sensor short-circuit, and electrical discontinuity of sensor		
	Converter error		Converter error, CPU error, ADC error, and memory error		
Operating temperatu	-20°C to 60°C (without freeze)				
Operating humidity range	Relative humidity: 5% to 90% (without condensation)				
Storage temperature	-25 to 65°C				
Power Source	Rated voltage		24 VDC (operating voltage range: 21-32 VDC) (*1)		
	Power consumption		0.6 W max.		
Applicable standards	CE marking		EMC Directive (2000/108/EC)		
	EMC	Immu	Electrostatic discharge	IEC61000-4-2	
			Radiated radiofrequency electromagnetic field	IEC61000-4-3 (*2)	
			Electric fast transient/burst	IEC61000-4-4	
			Surge	IEC61000-4-5(*3)	
			Conducted interference induced by radiofrequency	IEC61000-4-6 (*2)	
		Emiss	Radiated disturbance	CISPR 11 CLASSA	
	FCC Rules		Part 15 CLASS A		

■ Specification 2 (HD-300 DC Meter for Industrial Use)

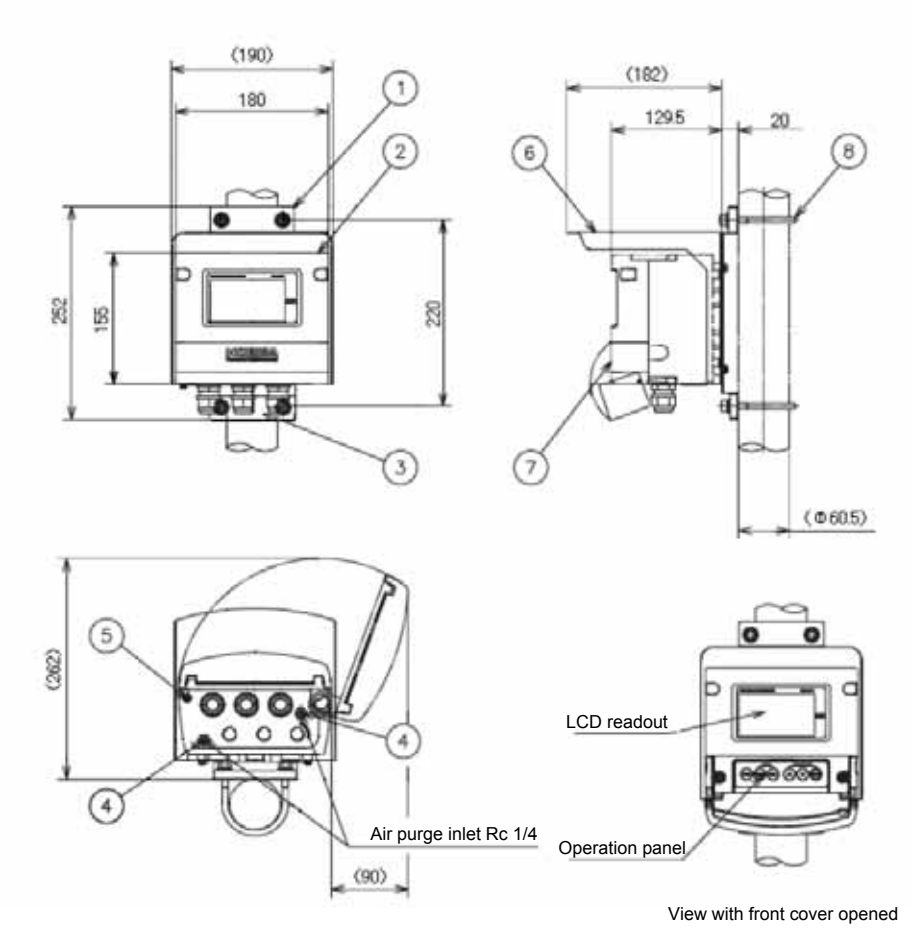
Structure	Installation	Outdoor installation type
	Installation method	50 A pole or wall mounting
	International protection code	IP65 IEC60529, JIS C0920
	Case material	Aluminum alloy (coated with epoxy modified melamine resin)
	Mounting bracket material	SUS304
	Hood material	SUS304 stainless steel (coated with epoxy modified melamine resin)
	Readout window material	Polycarbonate
	Readout element	Reflection type monochrome LCD
External dimensions	180 (W) x 155 (H) x 115 (D) (excluding the mounting bracket)	
Weight	Body: Approx. 2.8kg; hood and mounting bracket: Approx. 1 kg	

*1: The maximum load resistor may be used in the following range depending on the power supply voltage.



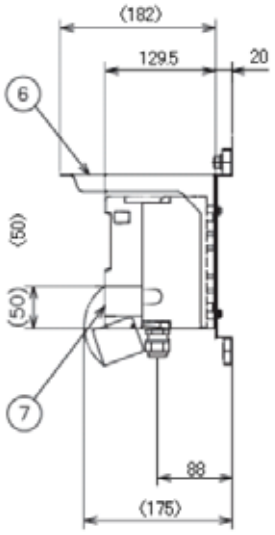
*2: The effect on readout in the radiated radiofrequency electromagnetic field and conducted interference tests shall be within measured DO value±0.4 mg/L as a criterior
*3: When the probe cable, transmission cable, or contact input cable is extended exceeding 30 m, the sur test in the EMC directive for CE marking is not applicable.
*4: For the transmission output, an arrester (sparkover voltage: 400 V) is provided. Yet install the most suital surge absorption element on the connected line considering the ambient environment, the equipment installation situation, and the externally connected equipmer

■ External dimensions (HD-300 DO Meter for Industrial Use)



View with front cover opened

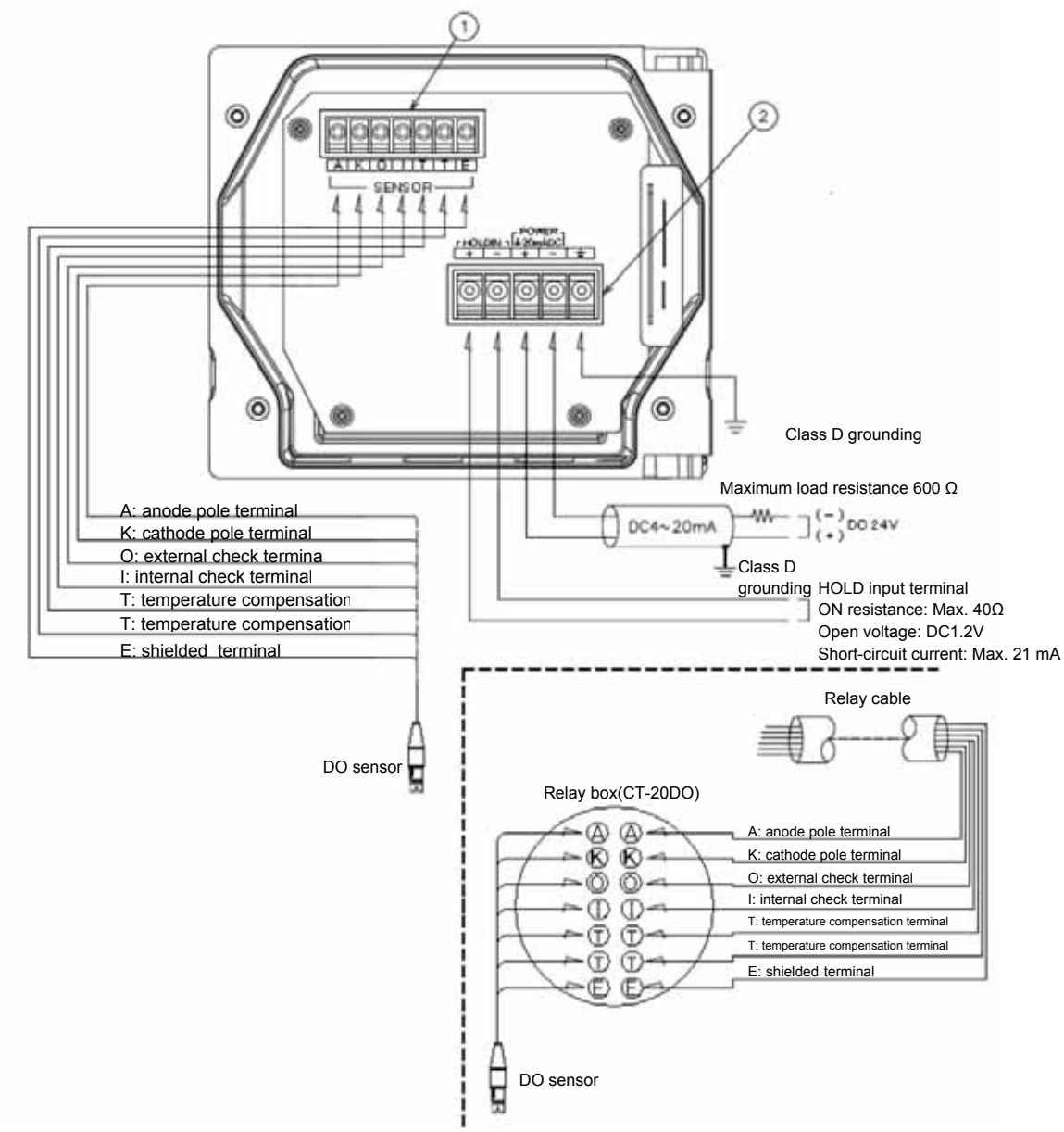
Drawing for external dimensions of HD-300 DO Meter for Industrial Use (wall-mounted)
(The other dimensions are as shown above.)



	PARTS	NOTES
1	Mounting plate	SUS304
2	Case	ADC12
3	Conduit	O.DΦ7 to Φ12cable
4	Plug	SUS304
5	Earth	SUS304 M4
6	Cover	SUS304
7	Front cover	ADC12
8	U-bolt	SUS304　50A MB

Coated with epoxy modified melamine resir
(Munsell 10PB/7/1)
Approx. 4.1 kg
IP65 (IEC60529,JIS C0920)

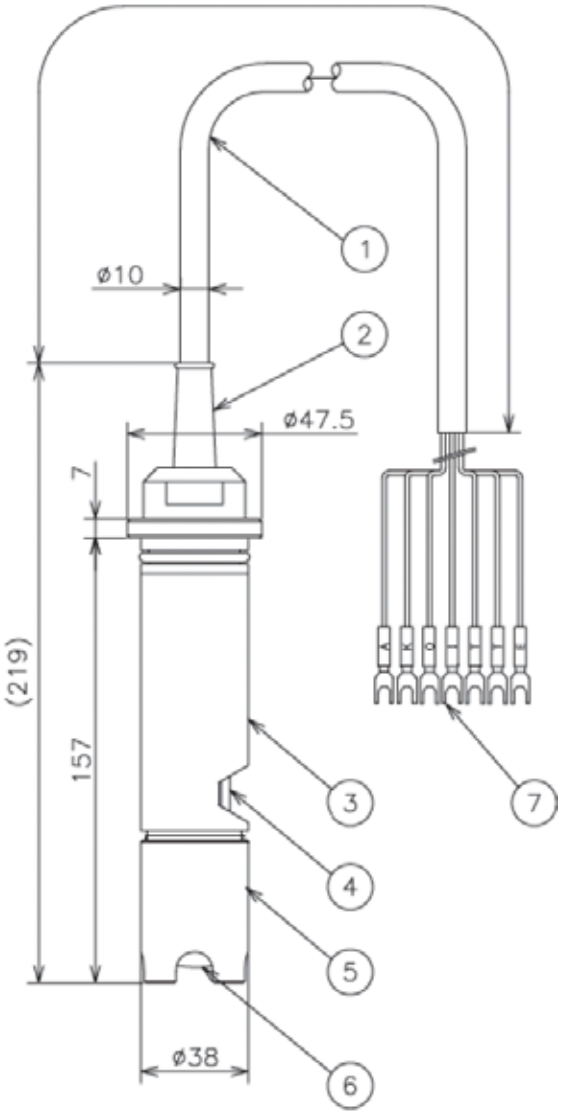
■ External connection diagram (HD-300 DO Meter for Industrial Use)



	Terminal screw	Applicable crimp-type terminal	Applicable electric wire	Screw tightening torque
①	M3	MAX6.5 MAX3.2 MAX6.2	1.25mm²/MAX (AWG16)	0.8N・m
②	M4	MAX7.6 MAX4.2 MAX8.5	3.5mm²/MAX (AWG12)	1.2N・m

■ Dissolved oxygen probe

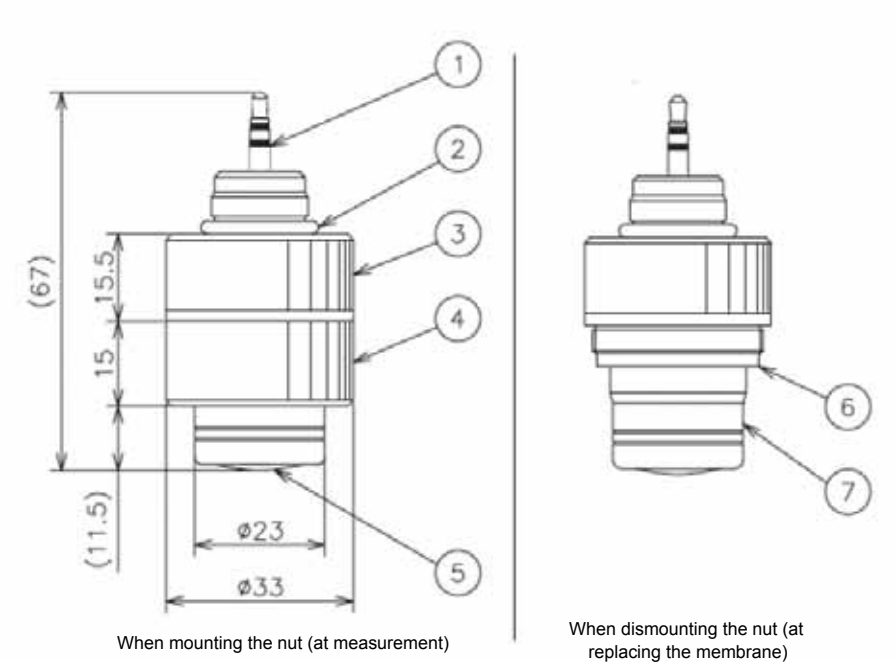
Cable length: 5m (standard)



Model	DO-1100
Measuring liquid pressure	0 to 0.5MPa
Wetted material	PPO,EPDM,Ti
Cable length	10m (*1)
Operating temperature range	0°C to 50°C (without freeze)
Storage temperature	-5 to 55°C
Drawing for external dimensions	12 mm dia. x 170 mm L excluding the cable
Weight	Approx. 1.5kg

	PARTS	NOTES
(1)	Cable	PVC(CH-101-P)
(2)	Cable cover	EPDM
(3)	Probe	PPO
(4)	Temperature sensor	Ti
(5)	Protective tube	PPO
(6)	DO sensor	5500 series
(7)	Terminal	

■ Dissolved oxygen sensor (5500 series): Specification and external dimensions



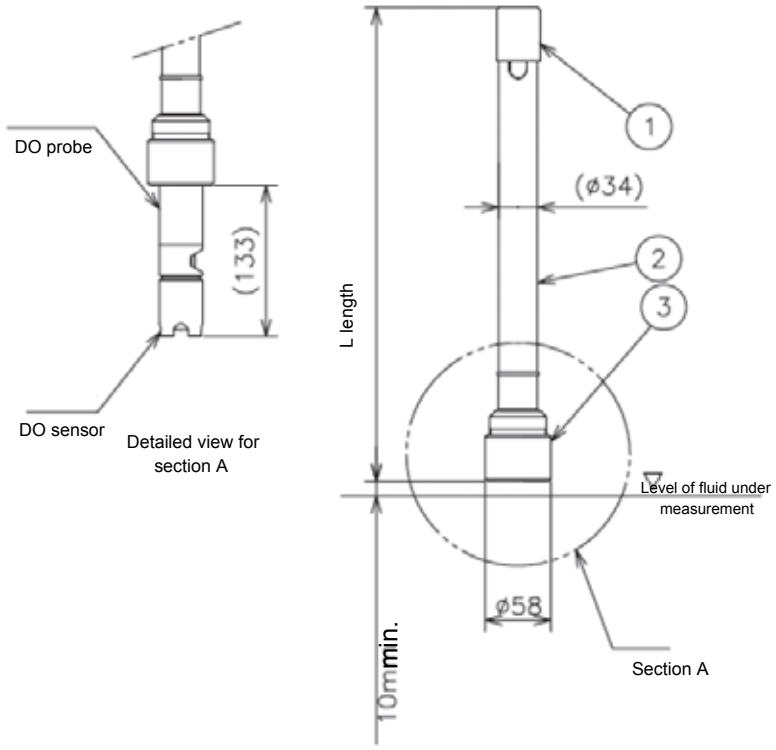
When mounting the nut (at measurement)

When dismounting the nut (at replacing the membrane)

Model		5505	5510
Measuring principle		Bipolar polarography	
Measurable range		0 to 20mg/L	
Material	Diaphragm pressure	50μm	100μm
	Diaphragm material	PFA	
	Pole material	PFC-Ag	
	Wetted material	PPO,PFA,EPDM	
	Internal fluid	KcL (neutral)	
Performance (at 25°C)	Response speed (90% response)	Within 120 seconds	Within 240 seconds
	Repeatability	±0.1 mg/L	
Measuring conditions	Measuring liquid pressure	0 to 0.5MPa	
	Flow rate conditions	20cm/sec	10cm/sec
Operating temperature range		0 to 50°C	
Storage temperature		0 to 55°C	
External dimensions (mm)		Φ33×66.5 (L)	
Weight		Approx. 0.1kg	

	PARTS	NOTES
(1)	Plug	Plating Au
(2)	O-ring	EPDM
(3)	Sensor body	PPO
(4)	Hexagon cap nut	PPO
(5)	Response film	PFA (5505:50μm)
		PFA (5510:100μm)
(6)	Gasket	EPDM
(7)	Cap with film	PPO

■ Immersion type holder (DH-101): Specification and external dimensions

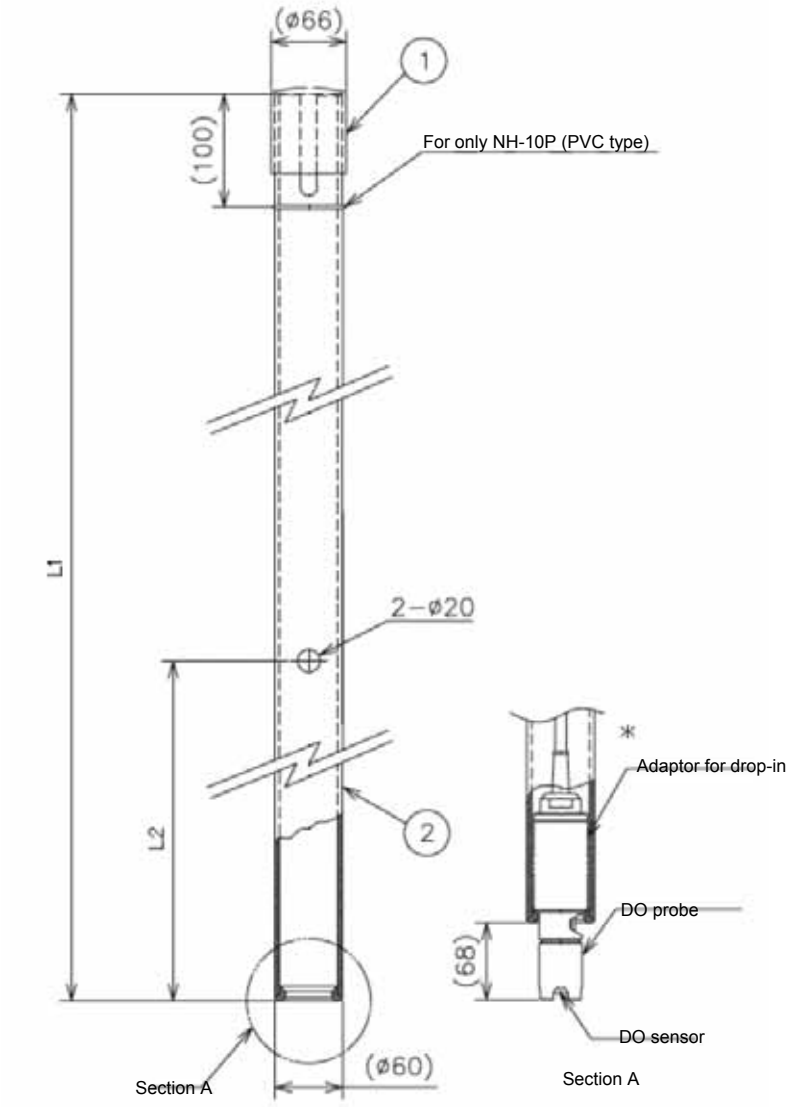


	PARTS	NOTES
(1)	Protective cap	PVC
(2)	Holder	PVC
(3)	Nut	PVC

Nominal lengt	Length (mm)
0.5m	418±10
1m	918±10
1.5m	1418±10
2m	1918±10
2.5m	2418±10
3m	2918±10

Model			DH-101
Holder material			PVC
Ambient Temperature			-5 to 50°C
Conditions for measurement solution	Temperature		-5 to 50°C
			For the actual operating temperature range, see the specifications for the electrodes to be combined
	Pressure		Atmospheric pressure
	Flow rate		0.2 to 2m/sec
Wetted material			PVC
Holder length (m)			0.5, 1, 1.5, 2, 2.5, 3
Weight (kg)	Holder length	0.5m	Approx. 0.28
		1m	Approx. 0.5
		1.5m	Approx. 0.72
		2m	Approx. 0.94
		2.5m	Approx. 1.16
		3m	Approx. 1.38

■ Drop-in type holder (DH-10 series): Specification and external dimensions

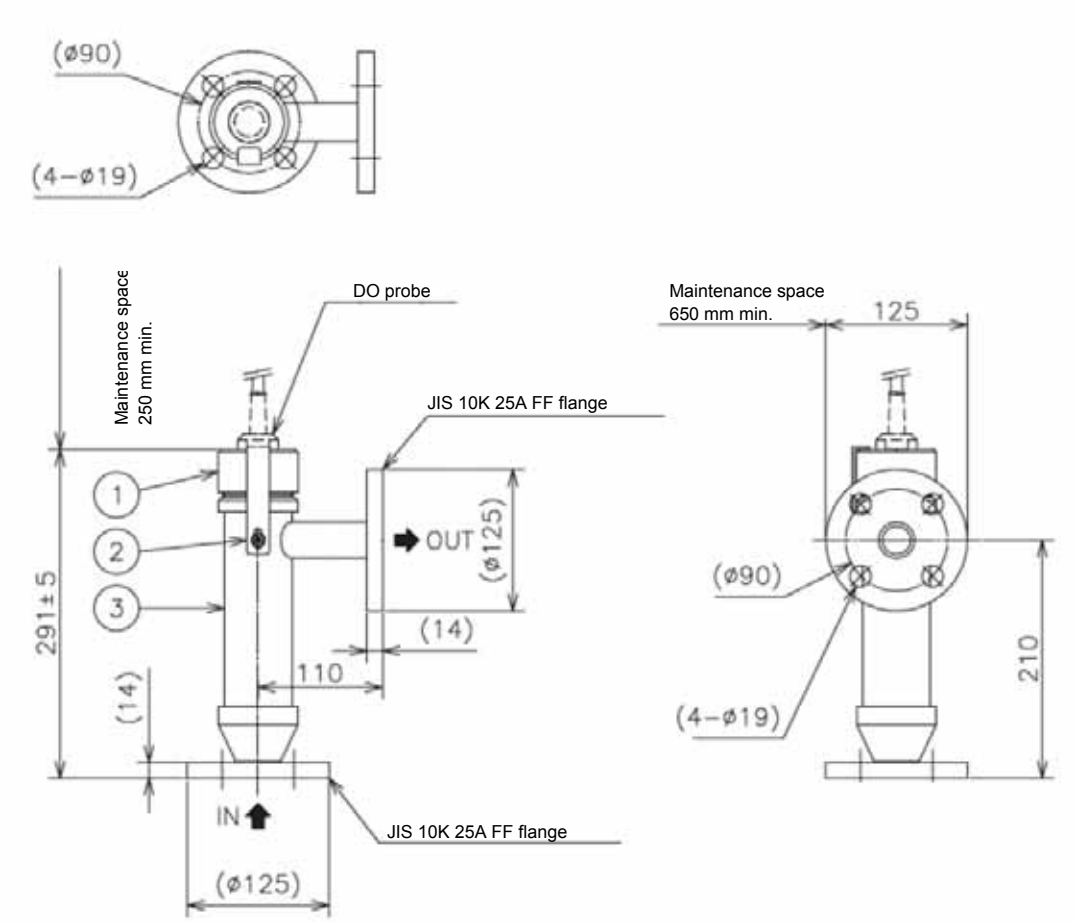


	PARTS	NOTES
(1)	Cap	PVC
(2)	Guide pipe	PVC

Nominal length	L1 length (mm)	Length (mm)
1m	800±5	300±5
1.5m	1300±5	650±5
2m	1800±5	600±5
2.5m	2300±5	1100±5
3m	2800±5	1600±5

*The adaptor (D-AD) for drop-in is required

■ Flow chamber (DF-301): Specification and external dimensions

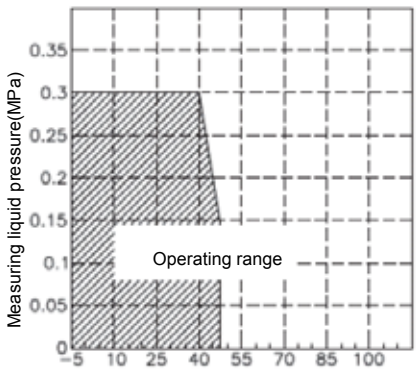


	PARTS	NOTES
(1)	Tightening nut	PVC
(2)	Locking plate	SUS304
(3)	Holder	PVC

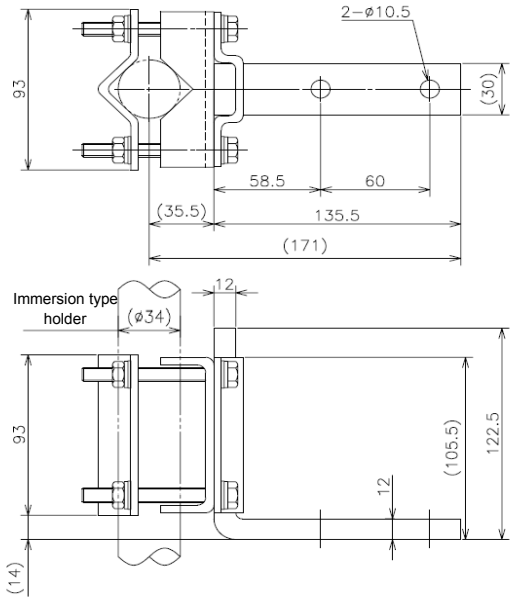
Model		DF-301
Ambient Temperature		-5 to 50°C
Ambient Temperature		-5 to 60°C
Conditions for measurement solution	Temperature	-5 to 50°C (*1)
	Pressure	-5 to 40°C :0.30MPa 40 to 50°C :0.15MPa
	Flow rate	0.3 to 20L/miln
Wetted material		PVC, EPDM
Connection		JIS 10K 25A FF flange
Weight		Approx. 0.8kg

*1: For the actual operating temperature range, refer to the specification of the electrode to be This product comes with the holder, but no detector is provided.

Relation between temperature and pressure



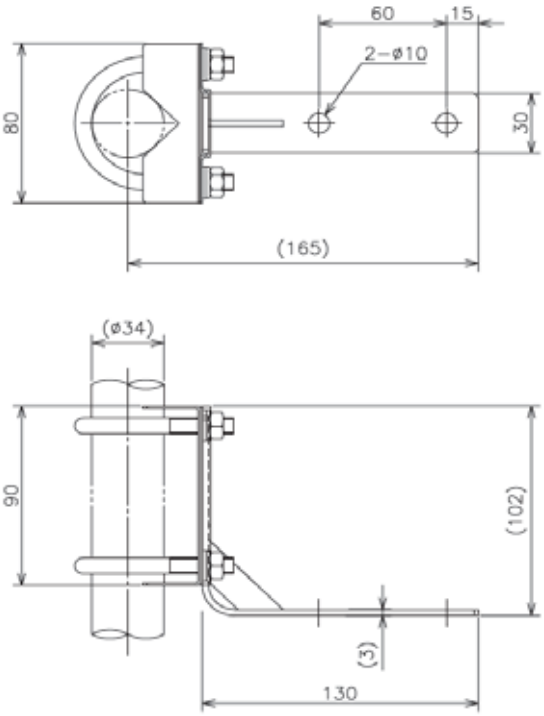
■ Mounting bracket (BA-1A): Specifications and external dimensions



Model	BA-1A
Material	ABS resin
Mounting pipe	50A

This product is applicable for immersion holders of 1.5 m maximum.

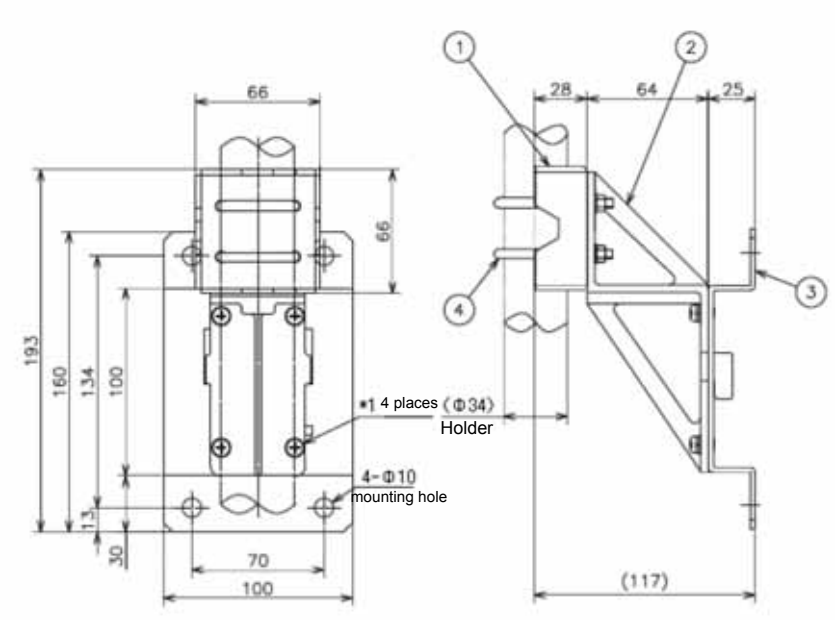
■ Mounting bracket (BA-1S): Specifications and external dimensions



Model	BA-1S
Material	SUS304
Mounting pipe	50A

This product is applicable for immersion holders of 1.5 m maximum.

■ Mounting bracket (MB-10): Specifications and external dimensions

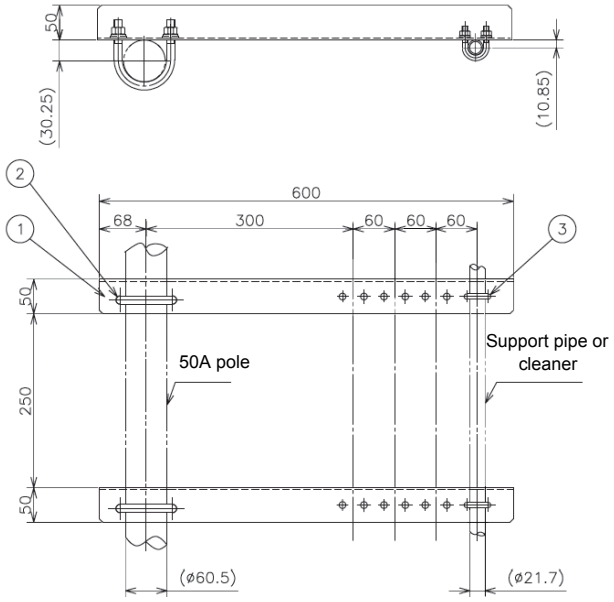


	PARTS	NOTES
(1)	Base 1	SUS304
(2)	Mounting plate	SCS13
(3)	Base 2	SUS304
(4)	U-bolt	SUS304

Mounting pipe: 50 A

*1. Wobbling or vibration, if any, may cause the immersion holder to fall off. Fasten four places with M5 screws.

■ Mounting bracket (MH-60): Specification and external dimensions

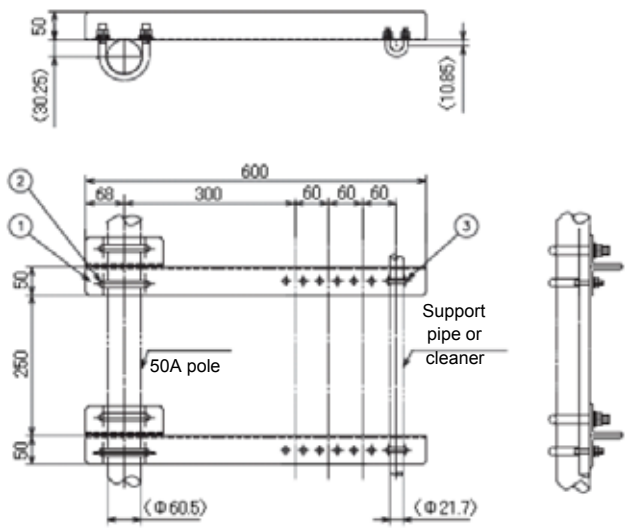


Model		MH-60
Material	Arm	SUS-304
	U-bolt	SUS-304
Mounting pipe		50A

This hardware is used to secure the support pipe (SP-60 series) to the pole stand.

	PARTS	NOTES
(1)	Arm	SUS304
(2)	U-bolt	SUS304 stainless steel (for 50A)
(3)	U-bolt	SUS304 stainless steel (for 15A)

■ Mounting bracket (MH-65): Specification and external dimensions

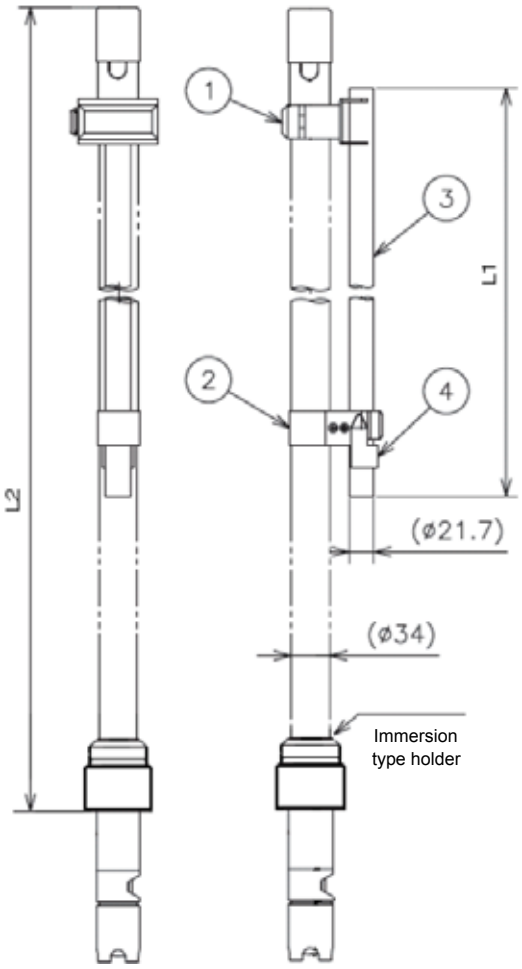


Model		MH-65
Materia	Arm	SUS304
	U-bolt	SUS304
Mounting pipe		50A

This hardware is used to secure the cleaner to the pole stand.

	PARTS	NOTES
(1)	Arm	SUS304
(2)	U-bolt	SUS304 stainless steel (for 50A)
(3)	U-bolt	SUS304 stainless steel (for 15A)

■ Supporting bracket (SP-60): Specifications and external dimensions



Model	SP-60
Material	SUS316
Applicable holder length	1,1.5,2,2.5,3
Applicable holder	CH-101 series

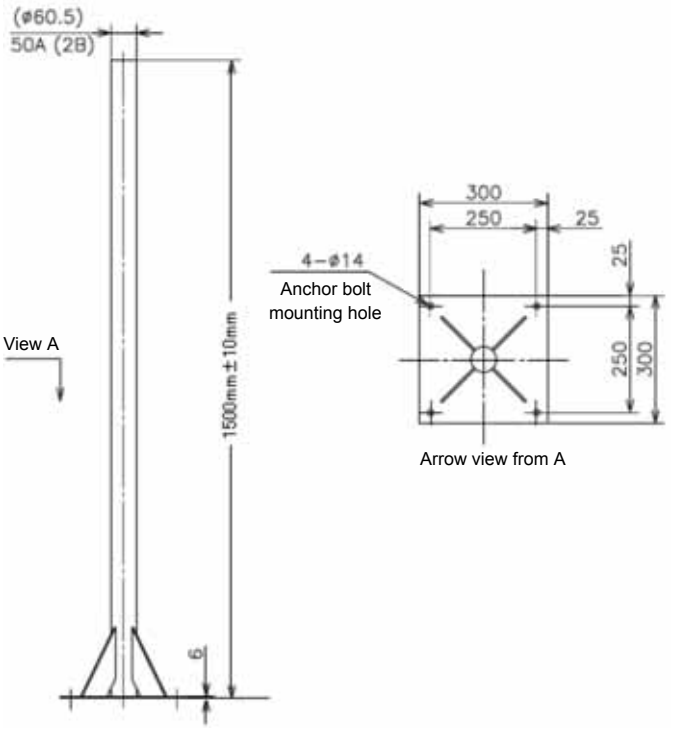
When the flow rate is fast even if the holder length is no longer than 1.5 m, the support pipe may be required.

	PARTS	NOTES
(1)	Holder mounting bracket	PVC
(2)	Intermediate hook	SUS316
(3)	Hook	SUS316
(4)	Support pipe	SUS316
(5)	Stopper	SUS316

The intermediate hook is provided when the immersion type holder length is 1.5m or more.

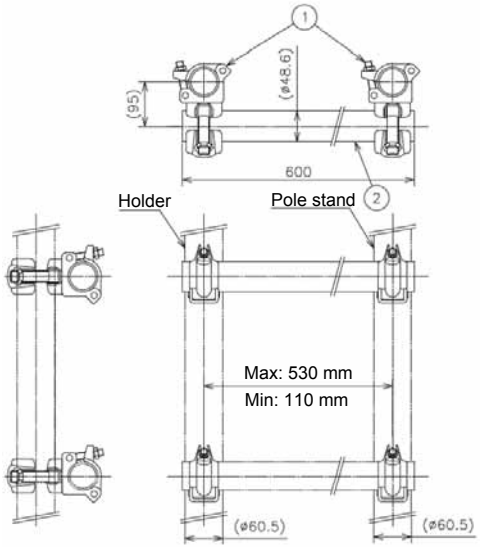
	Support pipe L1(mm)	Immersion type holder L2(mm)
For 1m	500±10	990±10
For 1.5m	1000±10	1490±10
For 2 m	1500±10	1990±10
For 2.5m	2000±10	2490±10
For 3m	2500±10	2990±10

■ Pole stand (PS-50): Specifications and external dimensions



Model	PS-50
Material	SUS304
Pipe diameter	50A

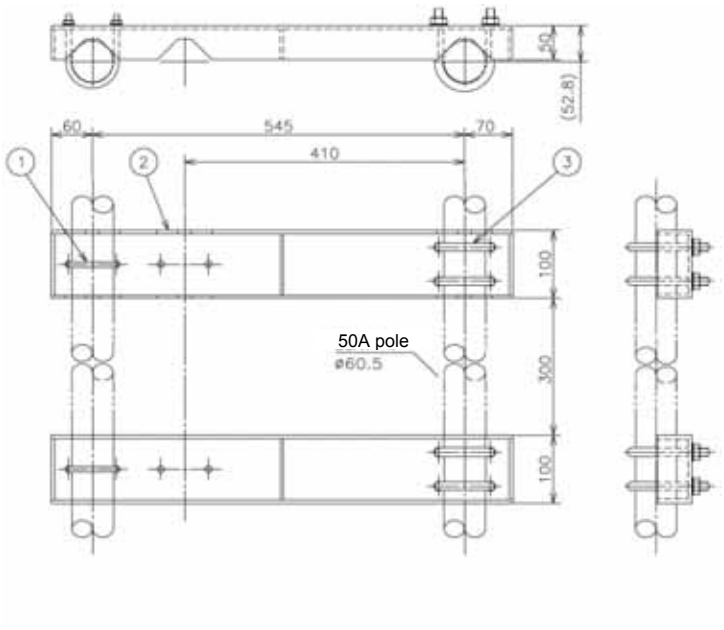
■ Mounting bracket (SDK-1): Specifications and external dimensions



	PARTS	NOTES
(1)	Clamp	SPCC (zinc-plated)
(2)	Arm	SGPW 40A (zinc-plated copper pipe for tap water)

For any holder of 1.5 m maximum, use 1 set; for any holder exceeding 1.5 m, use 2 sets.
(This differs depending on the installation site and the flow rate condition.)

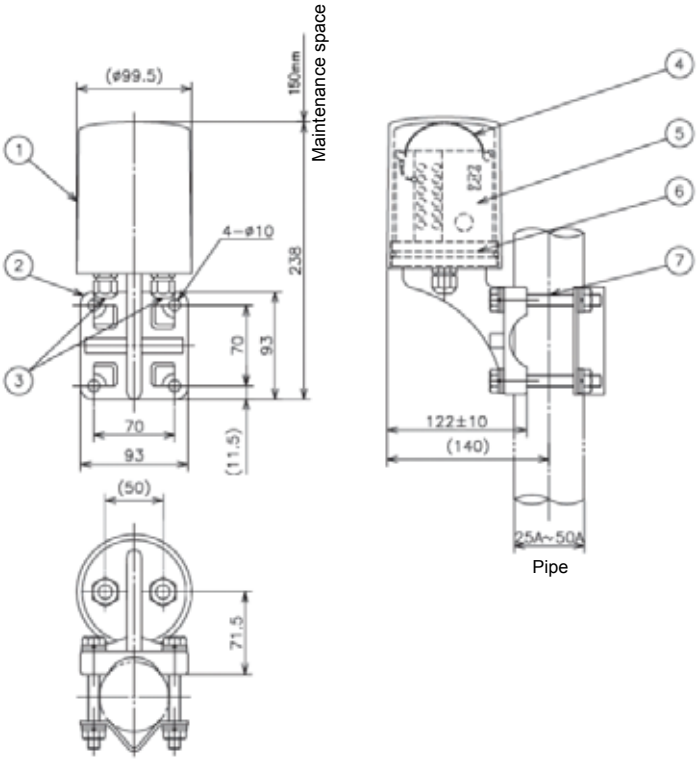
■ Mounting bracket (MH-100): Specifications and external dimensions



	PARTS	NOTES
(1)	U-bolt	SUS304 M8
(2)	Mounting arm	SUS304
(3)	U-bolt	SUS304 M12

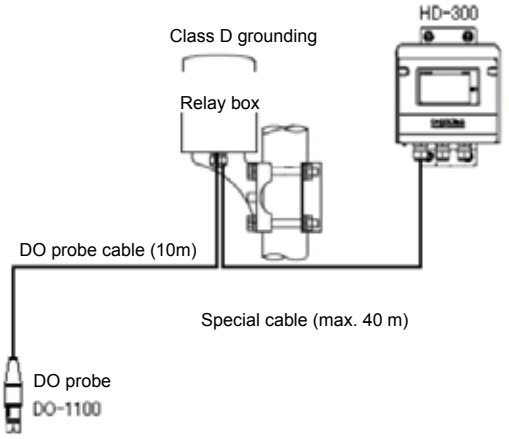
Changing the mounting position of the U-bolt allows you to set the distance between the holder and the 50A pole to 545 or 410 mm as illustrated.

■ Relay box (CT-20DO): Specifications and external dimensions



	PARTS	NOTES
(1)	Cover	ABS
(2)	Bracket	ABS
(3)	Conduit	
(4)	Spring	SUS304
(5)	Terminal board	ABS
(6)	O-ring	NBR
(7)	Bolt (provided)	SUS304 M8

•When the distance between the probe and the converter is longer than the probe cable length, be sure to use the relay box.
•For wiring, be sure to use the dedicated cable. Do not use the general cable or halfway splice the dedicated cable.
•The relay box is designed as rainproof.



■ Extension cable (C-7E): Specifications and external dimensions

•To extend the probe cable exceeding 10 m, use the extension cable.
•For wiring, be sure to use the dedicated cable. Do not use a general cable or connect to the standard cable halfway.
•To extend the standard cable, use the relay box.

Characteristics	
Conductor resistance	63.2Ω/hm max.
Withstand voltage	Shall withstand 1000 VAC for 1 minute.
Insulation resistance	10000MΩ/hm
Rated temperature	90°C
Capacitance	150 PP/m max.

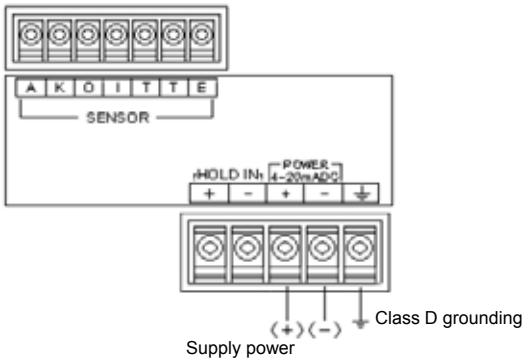
■ Installation (power source, transmission, etc.)

The description of the following installation (power source, transmission, etc.) assumes that the HD-300 is of the standard specification.
For the HD-300, the optionally available cleaner may be installed.
The installation of the HD-300 with the cleaner will be described in the section for the cleaner.

Carry out the installation of execution of work while paying attention to the following points:

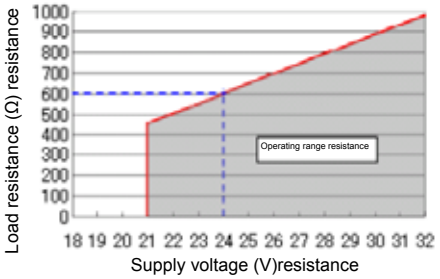
Power Source
•The HD-300 has no power switch. Provide a power switch near the HD-300 so that the power can be turned ON/OFF.
•A power source with rated voltage of 21 to 32 VDC for two-wire transmission is used.
•Operation outside the rated range can cause a fault. Therefore, check the power supply voltage. Make sure that the voltage fluctuations of the power source fall within a range between 21 and 32 VDC
•Use a duplex shielded cable.
•If the HD-300 might be struck by lightning, install two arrestors between the HD-300 and the distributor.
•Be sure to ground the grounding terminal (class D grounding).
•Separate this grounding from any other grounding for electric equipment such as a motor.

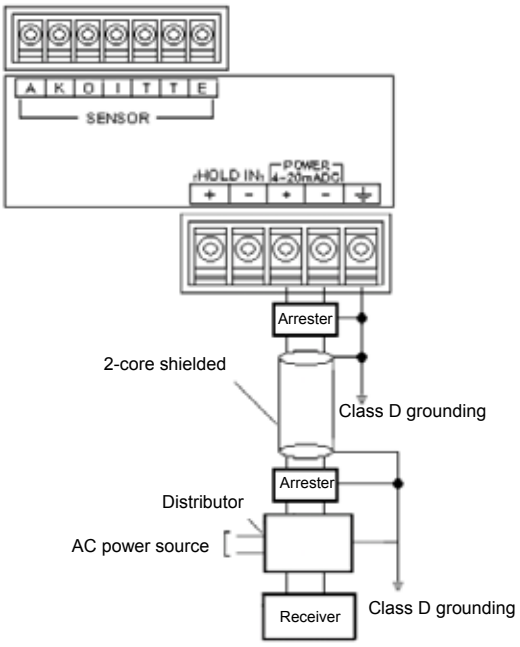
Power Source	Rated voltage: 24 VDC
	Power consumption: 0.6 W max.
Applicable electric wire	0.75 to 5.5 mm^2 (AWG18 to 10).



Supply power
Voltage: 21 to 32 VDC
Load resistance: See below

Relation between current-voltage and load resistance





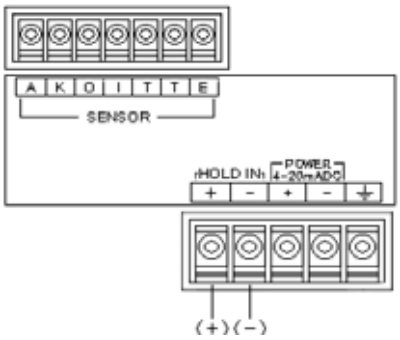
Recommended parts to be connected

Item name	Model	Remarks
Distributor	DS-24-B	For 100 VAC
Arrester	MDP-24-1	For signals

Manufacturer: M-System Co., Ltd.

Cleaning hold

•When the HD-300 is used with a cleaner, connect this input.
•When the HOLD contact signal from the cleaner is turned ON, the transmission output is held.
•The HOLD mode may be changed by settings.
•The resistance for the contact input (HOLD input for cleaner) should be 40Ω maximum.

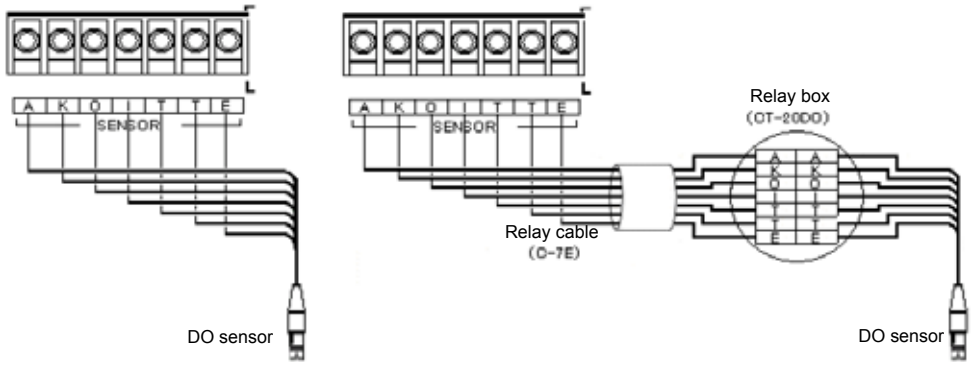


Contact input
(Cleaner HOLD input)

Probe cable

The probe cable is of high insulation. Exercise care in handling the sensor cable.
•Do not wet any cable terminal or the terminal block with water or the like; also do not soil it with dirt, oil, c the like. The insulation will otherwise deteriorate.
The decreased insulation causes instable readouts. Keep the cable dry and clean.
If the electrode cable should be soiled, wipe it off with alcohol or the like and then well dry it.
•Give a margin to the probe cable length for zero calibration and the check/replacement of the sensor.
•In wiring the probe cable and the relay cable, keep them away from a motor and any other equipment that gives induction as well as their cables.

DO sensor Cable	A: Anode terminal
	K: Cathode terminal
	O: External check terminal
	I: Internal check terminal
	T, T:Temperature compensation electrode terminal
	E: Shielded terminal

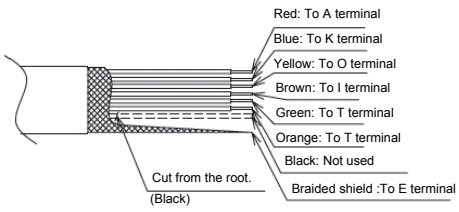


Extension of probe cable

•Be sure to use the dedicated relay cable and relay box when necessary.
•Relay cable exclusively for probe cable (CT-20DO)
•Dedicated relay box (CT-20DO)

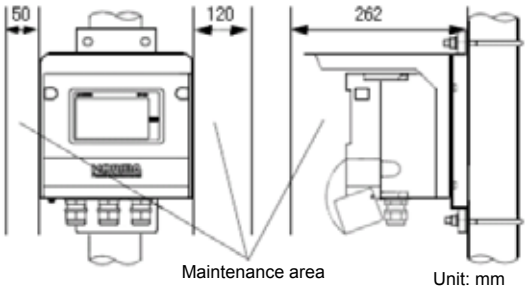
•The maximum extendable distance between the HD-300 and the probe is 50 m.
•It is recommended that the dedicated relay cable be placed in a conduit in order to prevent static electricity from being generated by induction or vibration. In this case, the wiring near any instrument should be passed through a flexible tube.

Termination method for extension cable

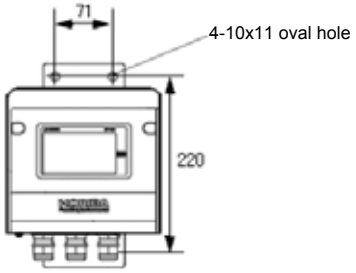


■ Installation (mounting)

The description of the following installation (mounting) assumes that the HD-300 is of the standard specification.
For the HD-300, the optionally available cleaner may be installed.
The installation of the HD-300 with the cleaner will be described in the section for the cleaner.



•The body may be mounted on the pole or the wall.
•For pole-mounting, use the 50A pole.
•In either mounting method, provide a maintenance space.

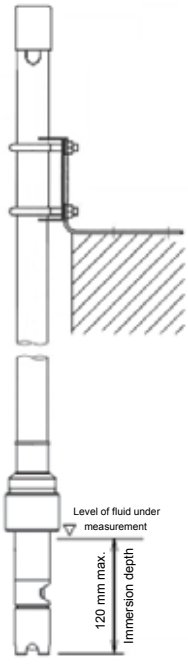


Immersion type holder + mounting bracket (BA-1A or BA-1S)

•The mounting bracket BA-1A or BA-1S should be secured with 2-Φ10 bolts.

•Position the immersion type holder so that its lower part of 120mm minimum is immersed in sample water.

•Any immersion type holder of 1.5 m maximum may be installed. (It may be impossible to install the holder because of the effect of the flow rate in the installation location.))

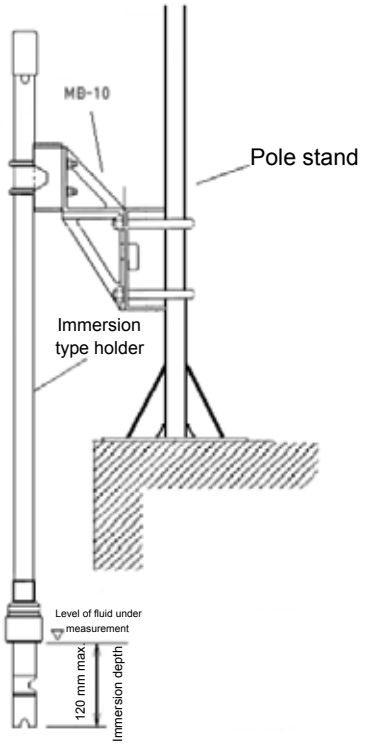


Immersion type holder + mounting bracket (MB-10)

•The mounting bracket MB-10 should be secured to the 50A pole.

•Position the immersion type holder so that its lower part of 120mm minimum is immersed in sample water.

•Any immersion type holder of 1.5 m maximum may be installed. (It may be impossible to install the holder because of the effect of the flow rate in the installation location.)

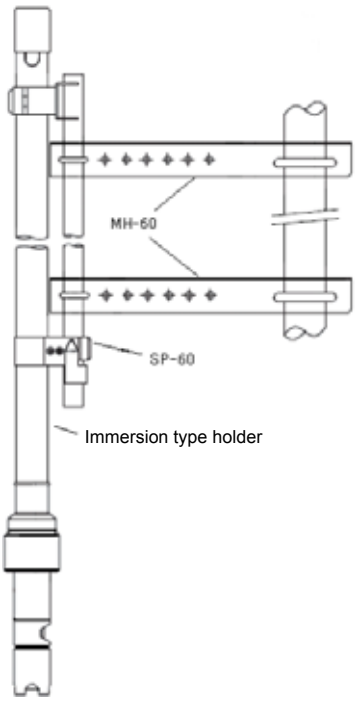


Immersion type holder + support pipe (SP-60 series) + mounting bracket (MH-60)

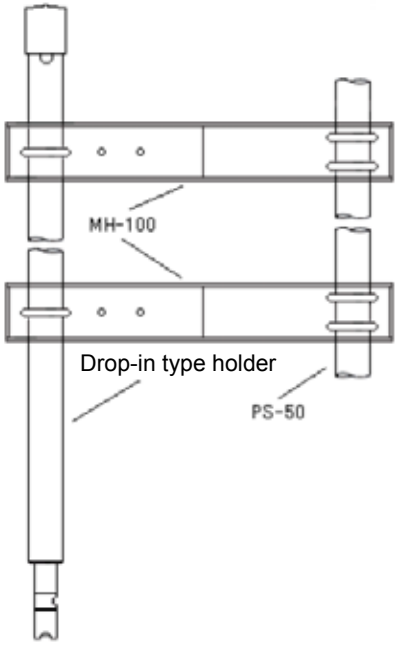
•In using any immersion type holder of 1.5 m minimum, it is recommended that the immersion type holder be secured using a support pipe.

•Before using the support pipe, check the length of the immersion type holder. (The lengths at which the immersion type holder and the support pipe can be used are determined.))

•To use the immersion type holder, secure it to the support pipe.
•To use the support pipe, secure it with the mounting bracket (MH-60).
•Secure the MH-60 mounting hardware to the 50A pole.



Drop-in holder + mounting bracket (MH-100)



•When the drop-in type holder is used, it is recommended that the holder be secured by the mounting hardware (MH-100).

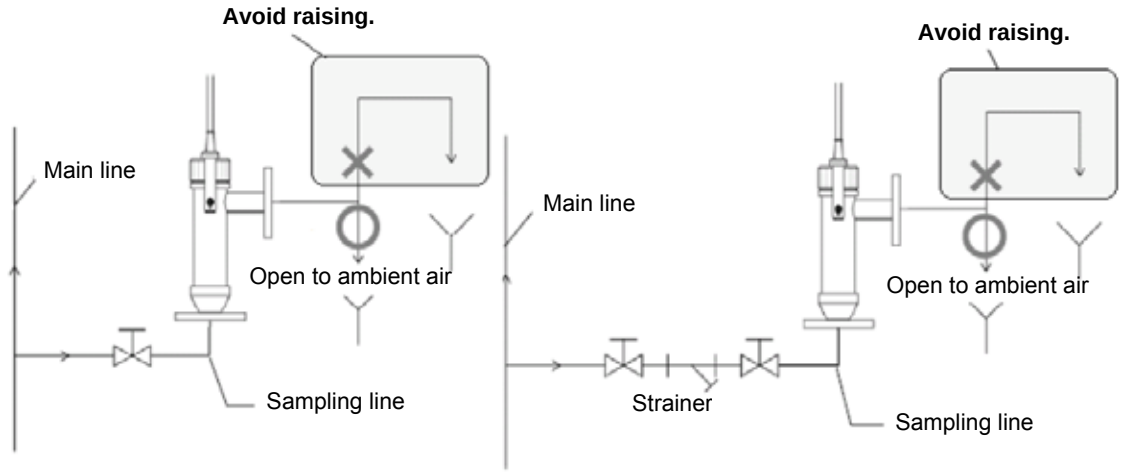
•Secure the MH-100 mounting hardware to the 50A pole.

•The drop-in adaptor (D-AD) is required.

Flow chamber

•The basic size of the DF-301 flow chamber is JIS 10K 25A KK. To install a special type of flow-through holder, previously check its size.
• Be sure to install the flow chamber upright.
• Install the Cleaner at a location where maintenance work can be easily performed.
• Secure a maintenance space of at least 25 cm in height above the tightening nut. Give a margin to the probe cable so that it can be disconnected and reconnected for maintenance or the like.
• Avoid installation in a location with severe vibration or a high dust level.
• Install the flow chamber so as to ensure that the sensor is not floated to air as the liquid under measurement in the holder is drained, even if the liquid stops

•Avoid installation in a location where a corrosive solution is scattered or there is corrosive gas.
•Avoid installation in a location near a heating element with surface/ambient temperature of 50℃ minimum.
•For any liquid under measurement containing solids that may damage the sensor and the probe, previously remove them.
•Do not include the flow chamber in the main line. Be sure to provide a sample line to install the holder.
(Unless the main line is stopped, the maintenance work cannot be done.)



Immersion type jet cleaner for H-1

JDH-101

■Overview

●This cleaner is designed to intermittently clean the response film with a jet flow of cleaning water or air. This cleaner has a timer that allows you to specify cleaning intervals and duration.

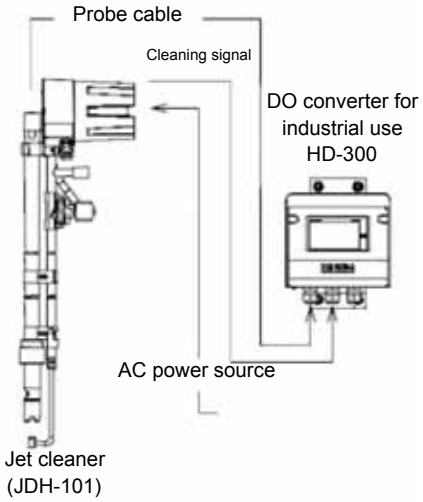
■Objects

The jet wave cleaner is relatively effective for the following materials:
However, its effect differs with various conditions and is not guaranteed.

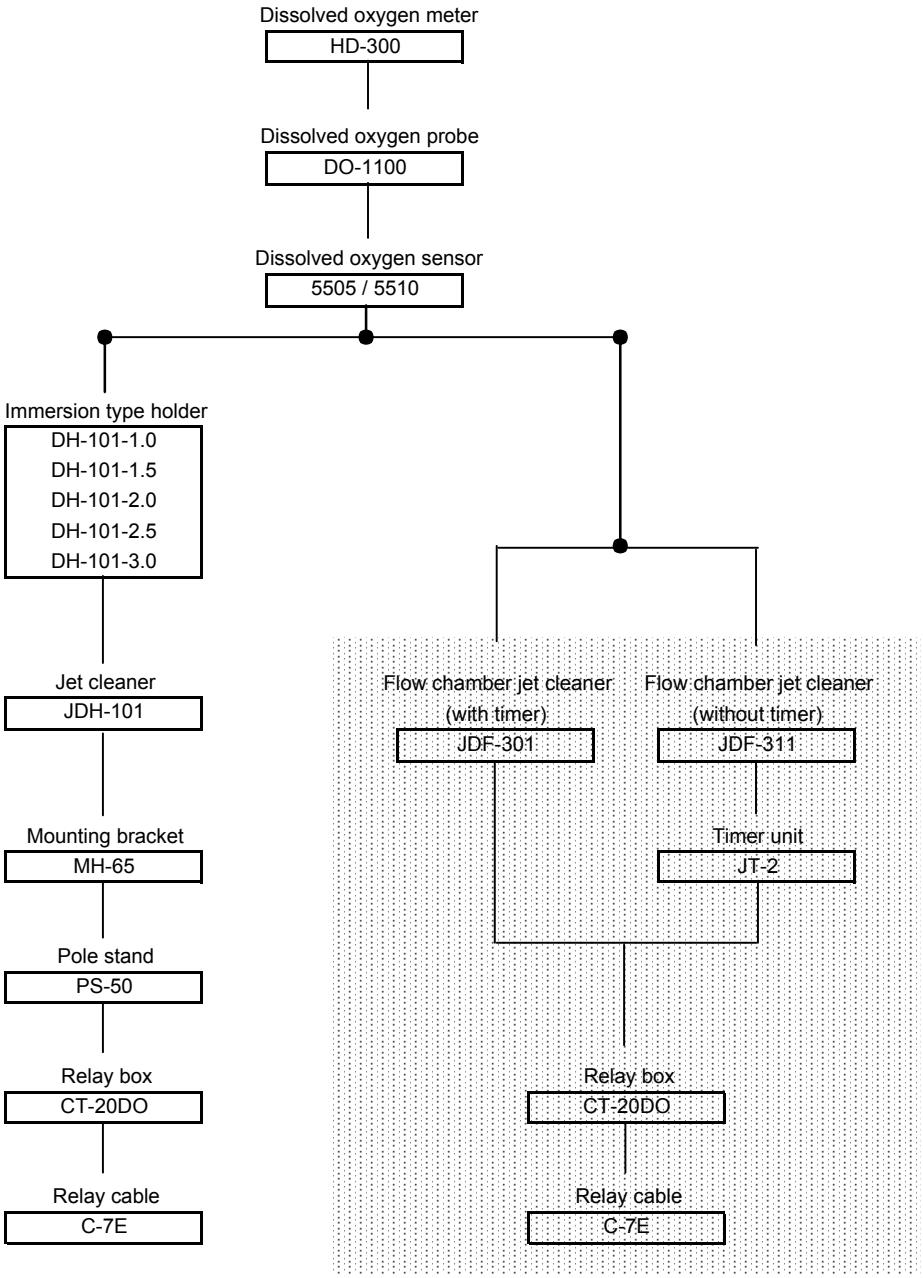
Properties Classification	Objects	
slime	food, paper, pulp, algae	◎
Microorganisn	bacteria (activated sludge), slag	◎
Oily	tar, heavy oil	×
	light oil	○
	fatty acid, amine	○
suspended matters	earth and sands	○
	metallic minute powder	○
	clay, calcareous	○
scale	coagulated deposit and neutralized effluent treatment CaCO3, etc.	○

◎:Good ○:Acceptable ×:Not acceptable

■System configuration



■Possible combination (immersion type jet cleaner)

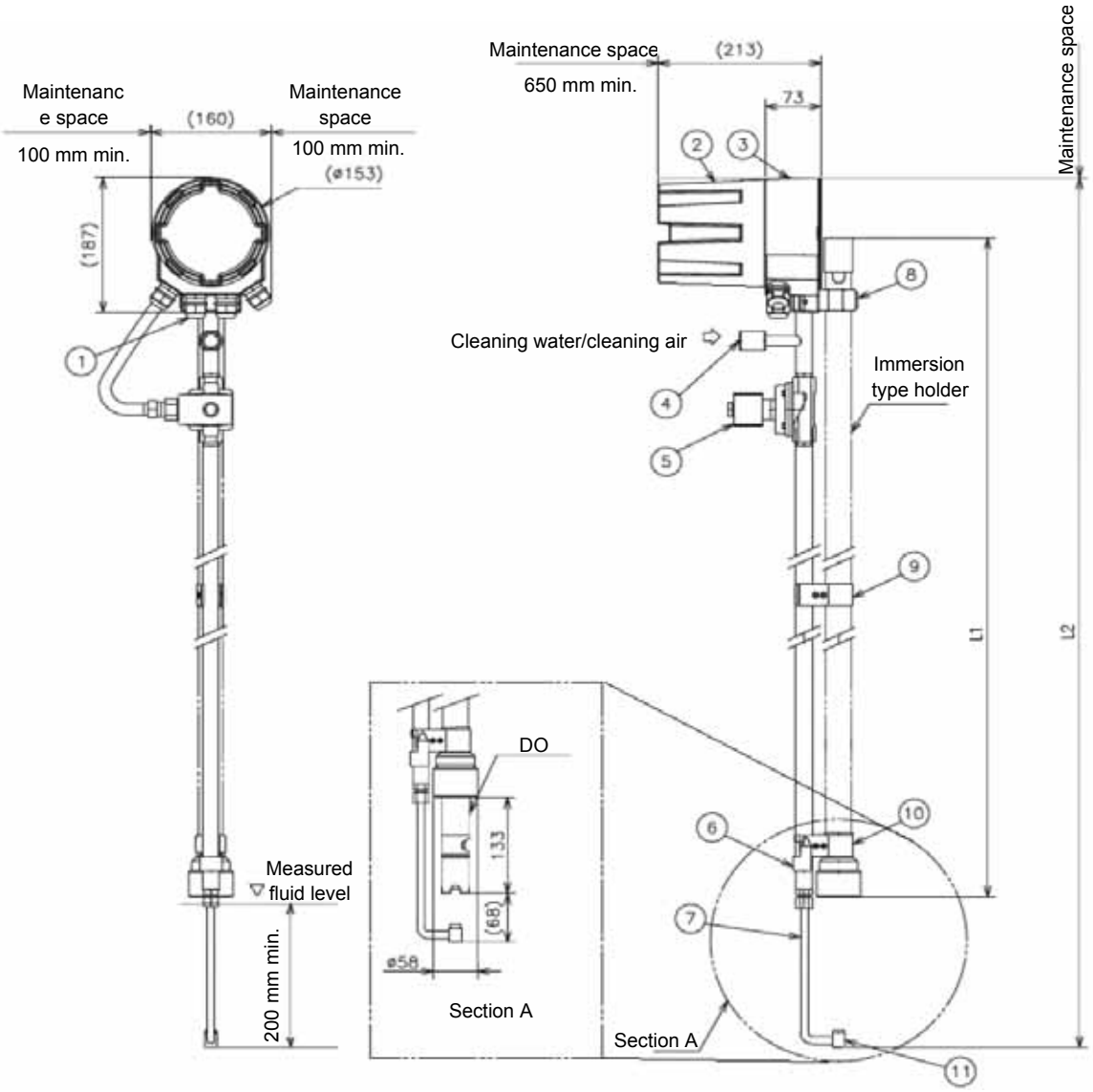


■Specification (JDH-101)

Product name		Immersion type jet cleaner (timer-incorporated type)
Model		JDH-101
Supply Voltage (*1)		AC 100V 50/60Hz
Permissible Voltage Variation Range		90% to 110% of supply voltage
Power consumption		40 VA max.
Cleaning signal	Contact type	Relay contact SPDT (1c)
	Contact Capacity:	250 VAC 3 A; 30 VDC 3A (resistance load)
	Conditions	NO-COM short-circuited and NC-COM opened
External Cleaning Start Input (*2)	Contact type	No-voltage contact
	Contact Capacity:	30 VDC, 0.1 A min.
	Conditions	Pulse input close time 100 msec min.
Input of cleaning stop signal (*3)	Contact type	No-voltage contact
	Contact Capacity:	30 VDC, 0.1 A min.
	Conditions	Stopped by turning OFF continuous input
Timer	Washing frequency	0.1 to 3.0 hours
	Washing time	Between 0.5 and 10.0
	Cleaning signal Delay time	Between 0.2 and 5.0
Cleaning Method		Intermittent water jet/air jet cleaning
Ambient Temperature		-5 to 50°C
Ambient Humidity		5% to 90% RH (No condensation)
Temperature of liquid under measurement (*4)		-5°C to 50°C (without freeze)
Measuring liquid pressure		Atmospheric pressure
Flow Velocity of Measured Liquid		2 m/sec max. (secure a flow rate of 20 cm/sec min.)
Cleaning pressure		Water :0.050 to 2MPa (*5)
		Air :0.03 to 0.05MPa
Bore diameter connected for cleaning		Rc1/2
Wetted material		SUS316 stainless steel and FKM (excluding the sensor, the probe, and the sensor material)
Weight		Approx. 6.5 kg (when the holder length is 1 m)
Timer case	International protection code	IP54(IEC60529, JIS C0920)(Category 2)
	Material	AC4C
	Finish	Epoxy degenerated melamine resin painting (Munsell 10PB5/1)
Special Note		This product does not come with any probe, sensor, and holder.

*1: Power supply voltage of 200 VAC is optionally available. For any other power supply voltage, contact us.
*2: When the input line to start external cleaning is used. remove the cleaning frequency timer (T1).
*3: The terminals were short-circuit at factory. To input the cleaning stop signal, remove the short-circuit line.
*4: The operating temperature range differs depending on the combined probe, sensor, and holder.
Refer to the temperature of each product in the specification.
*5: In using tap water for cleaning water, the water supply law prohibits supplying the tap water directly from waterw
Use a tap water pressurization system or the like to insulate the tap water from the common tap water pipe.
If cleaning water might be frozen, use thermally insulated piping.

■ External dimensions (JDH-101)



No	PARTS	NOTES
(1)	Conduit	O.Dϕ7toϕ12cabel
(2)	Timer unit cover	AC4C
(3)	Timer unit	AC4C
(4)	Cleaning water/air inlet	Rc1/2
(5)	Solenoid valve	
(6)	Stopper	SUS316
(7)	Nozzle holder	SUS316
(8)	Bracket for immersion type holder	PVC
(9)	Support hook	SUS316
(10)	Hook	SUS316
(11)	Nozzle	SUS316

•The support hook does not come with any cleaner of 1.5 m maximum.

The L1 and L2 lengths and tolerance of the JDH-101 immersion type jet cleaner are shown in the table below:
The L1 and L2 lengths are shown in the table below:

Nominal length (m)	L1 length (mm)	L2 length (mm)	Maintenance space (mm)
1	918	1201±10	900 min.
1.5	1418	1701±10	1400 min.
2	1918	2205±10	1900 min.
2.5	2418	2701±10	2400 min.
3	2918	3201±10	2900 min.

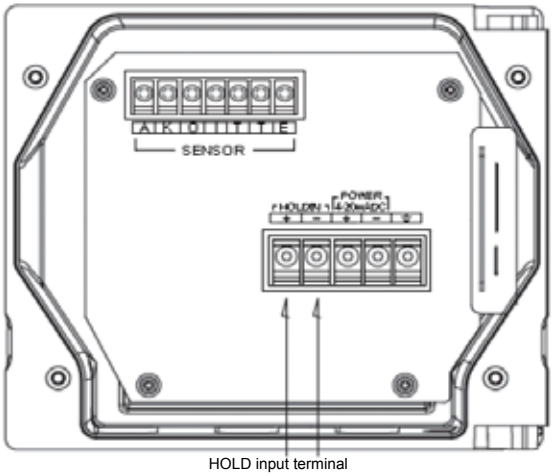
Provide a maintenance space above the jet cleaner.

■ Installation (connections)

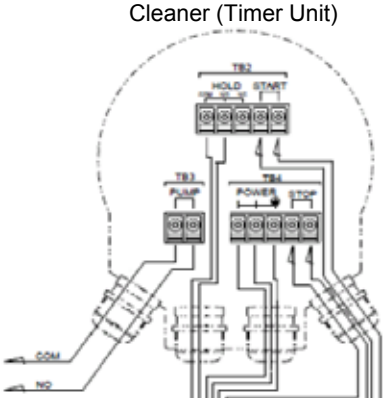
Carry out the installation of execution of work while paying attention to the following points:

Power Source
•Operation outside the rated range can cause a fault. Therefore, check the power supply voltage.
•Be sure to ground the grounding terminal (class D grounding).
•The applicable cable diameter for the wiring hole is 7 to 12 mm.

Power Source	Rated voltage: 100 VAC
	Frequency: 50/60 Hz
Applicable electric wire	$\phi 7$ to $\phi 12$
	0.75 mm^2 min.



Cleaner (Timer Unit)



HOLD input terminal
ON resistance: Max. 40Ω
Open voltage: 1.2 VDC
Short-circuit current: Max. 21 mA

Cleaning signal output
Voltage contact output
:AO100V/200V
(Equivalent to input power voltage)

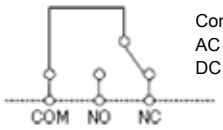
External cleaning start input
Contact Form: No-voltage contact
Contact Capacity: 30 V DC, 0.1 A or more
Conditions: Pulse input, closed time of 100 ms or more

Cleaning signal output
Contact Form: Relay contact SPDT (1c)
Contact Capacity: 250 V AC, 3 A and 30 V DC, 3 A (resistance load)
Conditions: Short-circuited between NO-COM. Opened between NC-COM

Cleaning stop input
Contact Form: No-voltage contact
Contact Capacity: 30 V DC, 0.1 A or more
Conditions: Pulse input, closed time of 100 ms or more

Power Source
AC 100V±10% 50/60Hz (Standard)
AC 200V±10% 50/60Hz (Optional)

Wiring for HOLD (signal output during cleaning -- output of HOLD signal)
Wiring of cleaning signal output (hold signal output)
•Contact capacity under resistance load is 250 V AC, 3 A and 30 V DC, 3 A (resistance load).
•Cleaning signal output can be produced from the "COM, NO, and NC" Terminals in the Terminal Block.



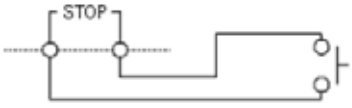
Contact Capacity:
AC 250V 3A
DC 30V 3A

COM, NO ••• "ON" at cleaning
COM, NO ••• "OFF" at cleaning

Wiring of START (external cleaning start input)
•Cleaning operation can be started from the outside by using the external cleaning start input line.
•Produce an input of "Closed" signal of 100 ms or more to the "START" Terminal in the Terminal Block.

Closed Time:
No-voltage contact pulse input of 100 ms or more
Load relay:
30 VDC, 0.1 A or more

Wiring of STOP (cleaning stop signal input)
•Cleaning operation can be stopped by using the "STOP" Terminal.
•This "STOP" terminal is arranged in series with the power supply line to the motor.
•If this terminal is opened, the motor is not powered. This allows you to stop the cleaning process. The terminal is normally short-circuited with a short bar.

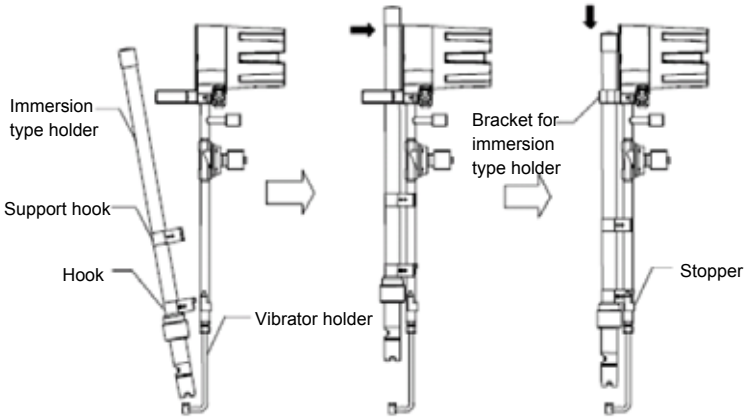


Cleaning stop signal
Close •••••• Cleaning "ON"
Open •••••• Cleaning "OFF"
Load: 100 VAC, 500 mA

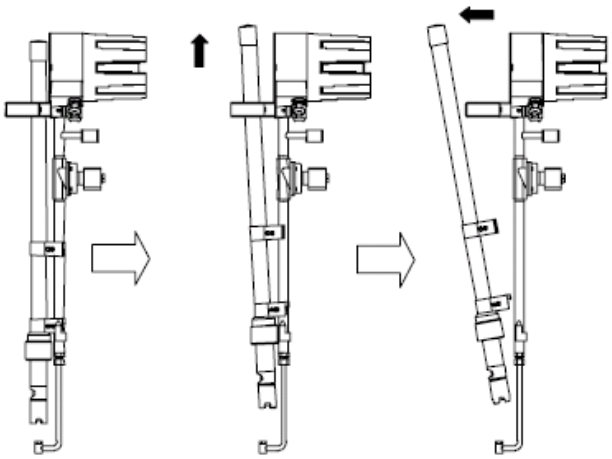
Installation (jet cleaner and holder)

Carry out installation and execution of work as illustrated below:

Installation
•Attach the hook to the immersion holder.
•Slowly move down the hook along the vibrator holder.
•Once the hook is caught by the stopper, close the fixing hardware for the immersion type holder.



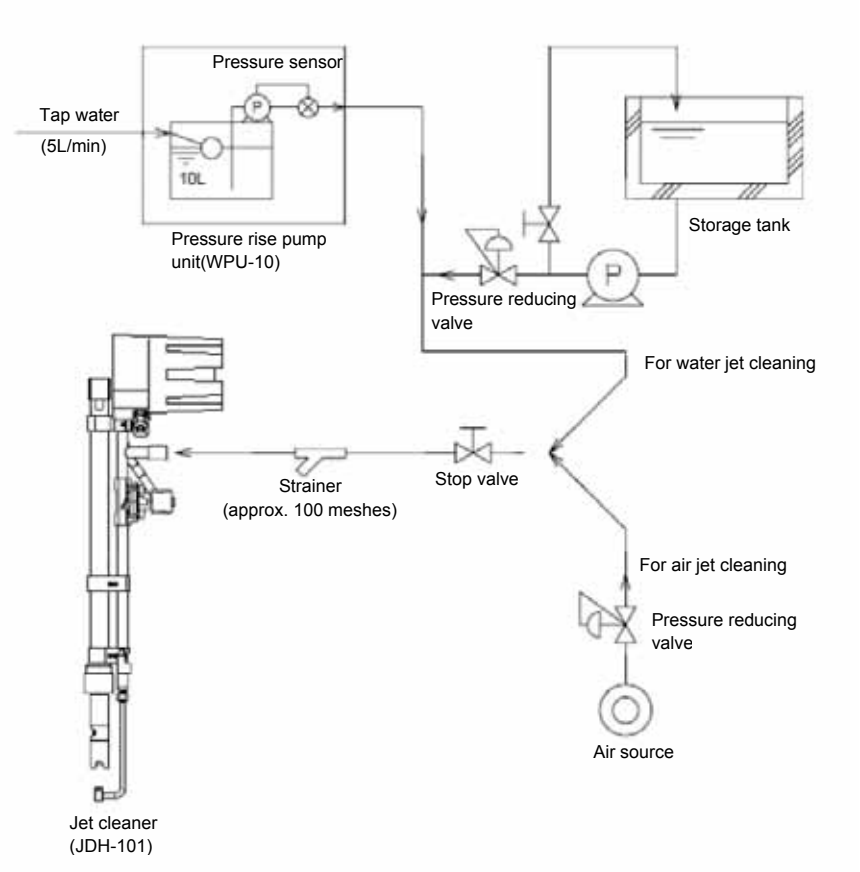
Removal
•Open the immersion holder retainer.
•Vertically pull up the immersion holder.
•Remove the hook and the support hook from the nozzle holder.



■ Installation (piping)

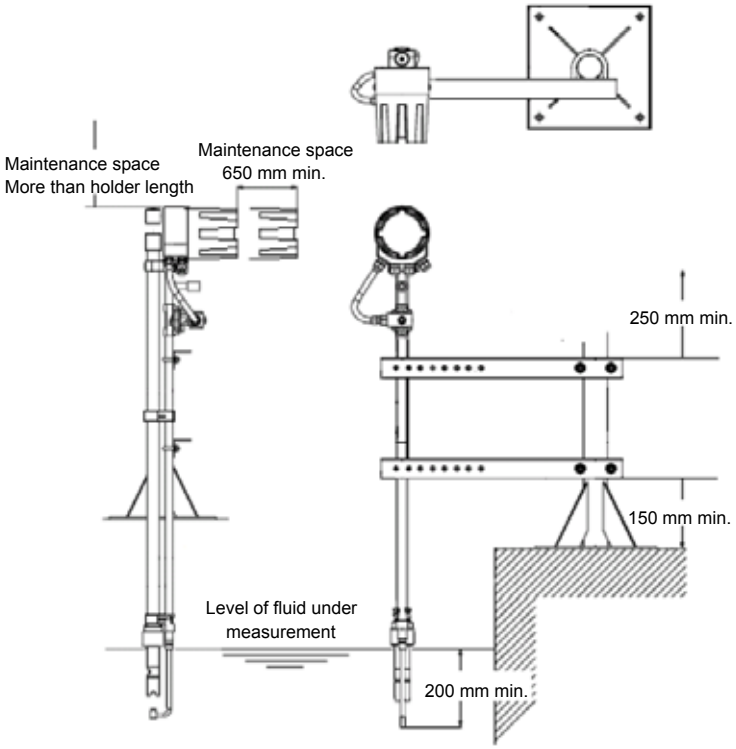
Be sure to following the following instructions for setup.

Piping
•Since the cleaner must be removed during maintenance, use flexible piping and give an allowance to its length.
•Before connecting the piping to the cleaner, be sure to flush off the piping with water.
•With the regulator, adjust the cleaning water to a specified pressure.
•In using tap water for cleaning water, the water supply law prohibits supplying it directly from water works. Temporarily receive the tap water in a tank or the like and then pressurize it with a pump. However, if original water for industrial use (tertiary treatment water) is used, it may be connected directly. If tap water is distributed after passing through a tank located on the roof or the like, it may also be connected as it is insulated.

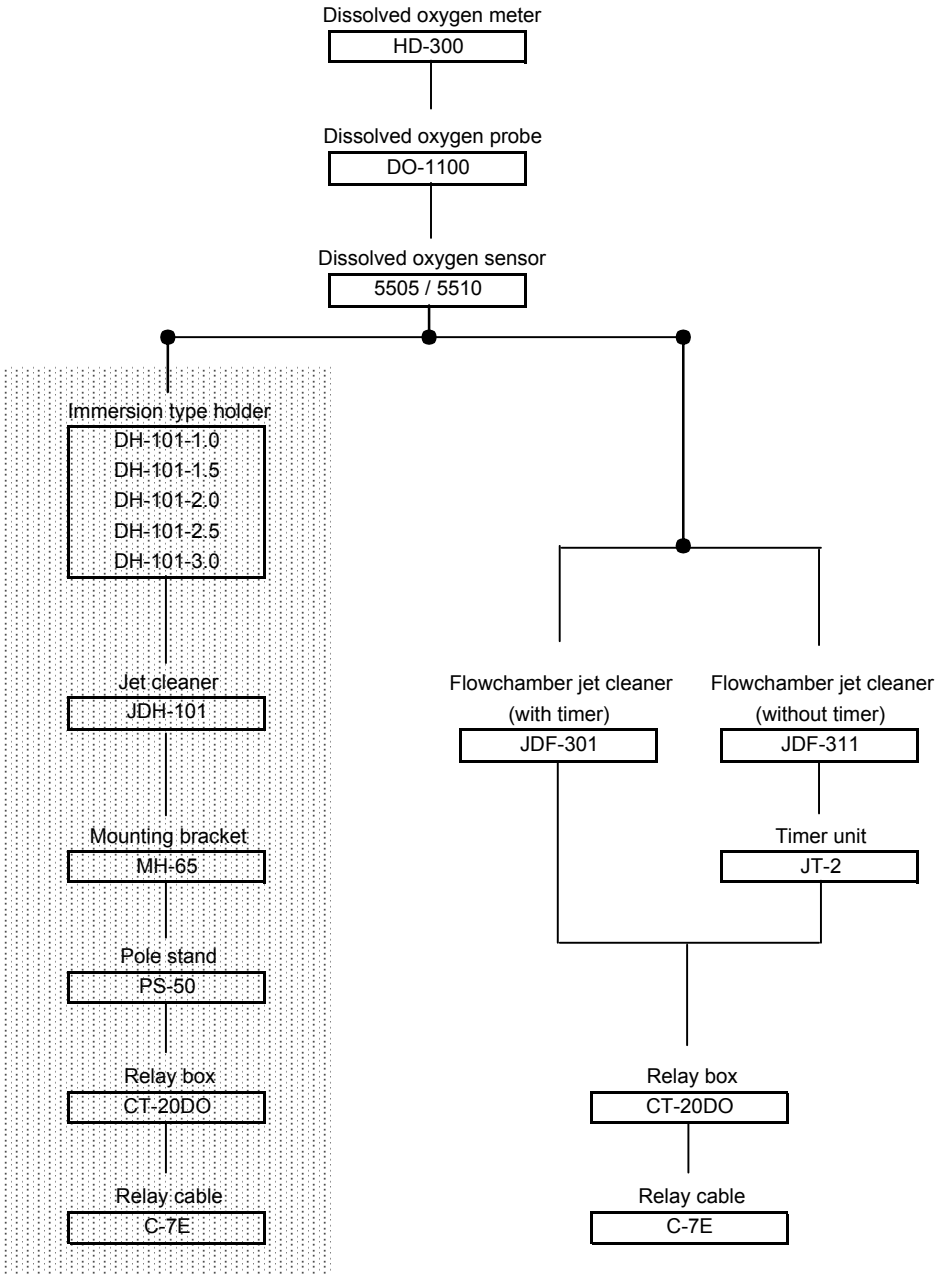


■Installation

Installation environment
•Install the Cleaner at a location where maintenance work can be easily performed.
•Install the Cleaner at a height where an electrode is always immersed in measured liquid even if a measured liquid level changes.
•Avoid installing the Cleaner at a location exposed to corrosive fluid and gas. etc.
•Avoid installation in a location near a heating element or the like, where the surface and ambient temperatures reach 50℃ or higher.

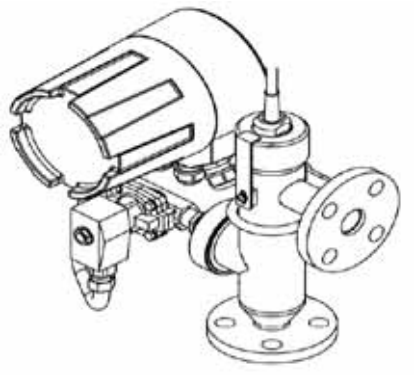


■Combination (distribution type jet cleaner)

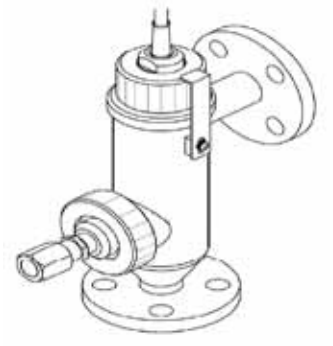


Flow chamber jet cleaner for H-1 series

JDF-301/311



JDF-301



JDF-311

■ Overview

● This cleaner is designed to intermittently clean the response film with a jet flow of cleaning water or air. This model JDF-301 is equipped with a timer. The model JDF-311 plus a timer unit (JT-2) offer various timer functions that allow you to specify cleaning intervals and duration.

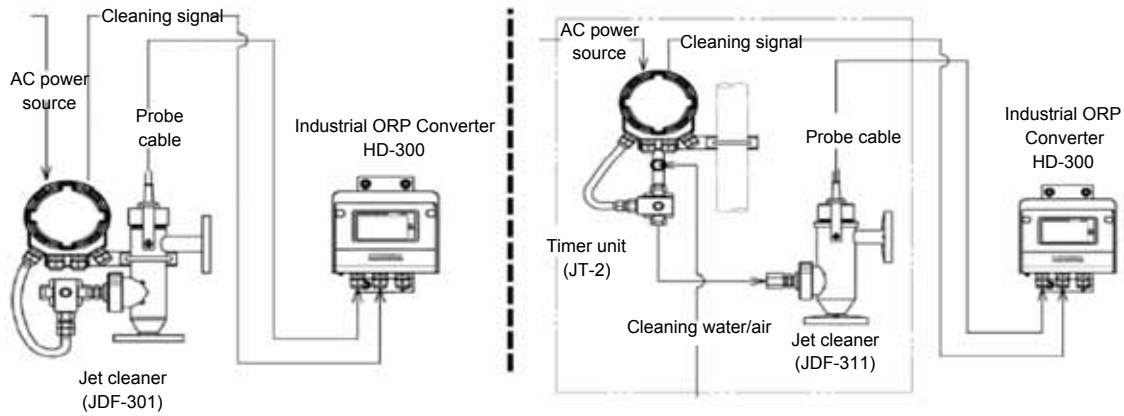
■Objects

The Ultrasonic Cleaner is relatively effective to the following objects.
However, its effect differs with various conditions and is not guaranteed.

Properties Classification	Objects	
slime	food, paper, pulp, algae	◎
Microorganism	bacteria (activated sludge), slag	◎
Oily	tar, heavy oil	×
	light oil	○
	fatty acid, amine	○
suspended matters	earth and sands	○
	metallic minute powder	○
	clay, calcareous	○
scale	coagulated deposit and neutralized effluent treatment CaCO3, etc.	○

◎：Good ○：Acceptable ×：Not acceptable

■System configuration



■ Specification (JDF-301)

Product name		Flow chamber jet cleaner
Model		JDF-301
Ambient Temperature		-5 to 50°C
Ambient Humidity		5% to 90% RH (No condensation)
Conditions for measurement solution	Temperature (*1)	-5°C to 50°C (without freeze)
	Pressure	0 to 0.15MPa
	Flow rate	0.5 to 20L/min
Wetted material		SUS316, EPDM
Supply Voltage		100 VAC, 50/60 Hz
Range		90% to 110% of supply voltage
Power consumption		40 VA max.
Cleaning signal	Contact type	Relay contact SPDT (1c)
	Contact Capacity:	250 VAC 3 A; 30 VDC 3A (resistance load)
	Conditions	NO-COM short-circuited and NC-COM opened
External Cleaning Start Input (*2)	Contact type	No-voltage contact
	Contact Capacity:	30 VDC, 0.1 A min.
	Conditions	Pulse input close time 100 msec min.
stop signal (*3)	Contact type	No-voltage contact
	Contact Capacity:	30 VDC, 0.1 A min.
	Conditions	Stopped by turning OFF continuous input
Timer	Washing frequency	0.1 to 3.0 hours
	Washing time	Between 0.5 and 10.0
	Cleaning signal Delay time	Between 0.2 and 5.0
Cleaning Method		Intermittent water jet/air jet cleaning
Cleaning pressure		Water: 0.05 to 0.2 MPa (*4)
		Air: 0.03 to 0.05 MPa
		*Adjust the cleaning pressure, in principle, at +0.05 to 0.15 MPa of the pressure of the liquid under measurement.
Connector for cleaning		Rc1/2
International protection code		IP54 (IEC 60529, JIS C0920) (category 2)
Material		AC4C
Finish		Epoxy degenerated melamine resin painting (Munsell 10PB5/1)
Bore Size of Measured Liquid Connection		JIS 10K 25A FF flange
Weight		Approx. 9.1 kg
Special Note		This product comes with a holder, but no DO probe and DO sensor are provided.

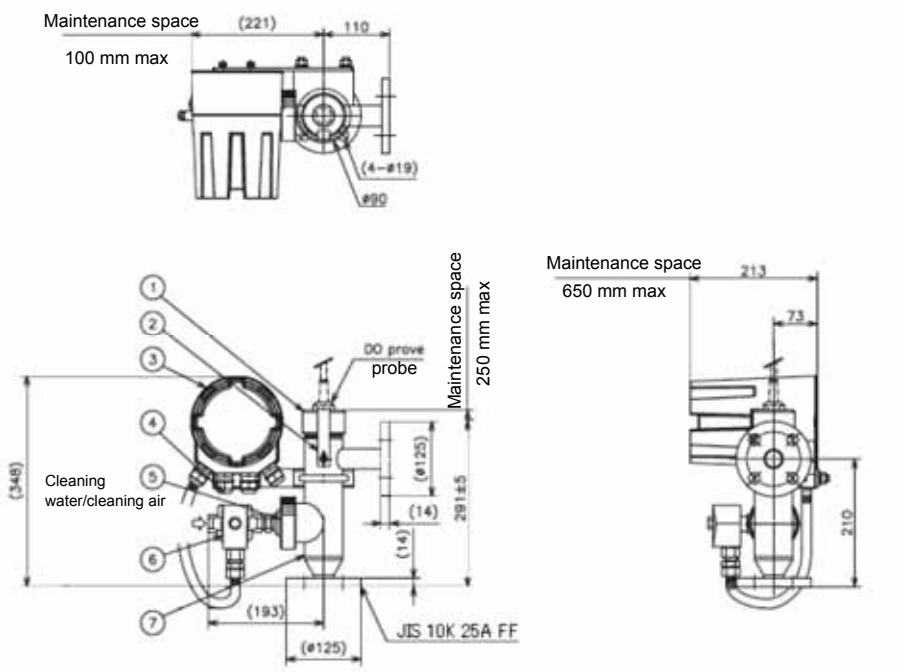
*1: The operating temperature range differs depending on the combined DO probe and DO sensor. Refer to the temperature of each product in the specification.
The liquid under measurement cannot be measured when frozen.

*2: When the input line to start external cleaning is used. remove the cleaning frequency timer (T1).

*3: The terminals were short-circuit at factory. To input the cleaning stop signal, remove the short-circuit line.

*4: In using tap water for cleaning water, the water supply law prohibits supplying the tap water directly from waterworks.
Use a tap water pressurization system or the like to insulate the tap water from the common tap water pipe.
If cleaning water might be frozen, use thermally insulated piping.

■ External dimensions (JDF-301)



No	PARTS	NOTES
(1)	Tightening nut	SUS304
(2)	Locking plate	SUS304
(3)	Timer unit	AC4C
(4)	Conduit	O.DΦ7 to Φ12cable
(5)	Nozzle mounting nut	SUS304
(6)	Solenoid valve	Rc1/2
(7)	Distribution holder	SUS316

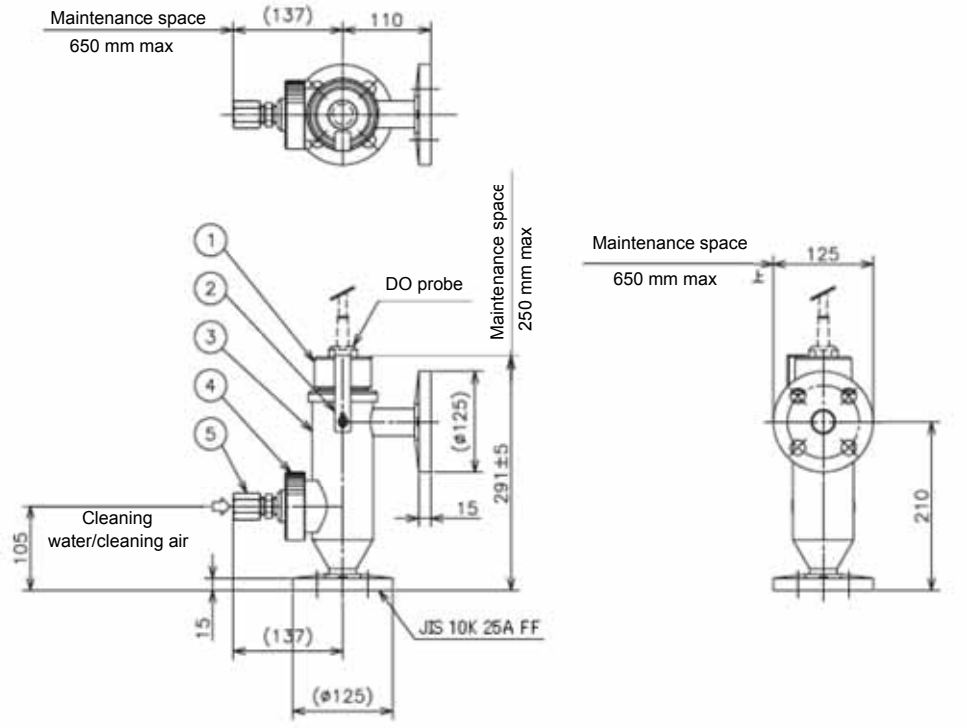
■ Specification (JDF-311)

Product name		Flow chamber jet cleaner
Model		JDF-311
Ambient Temperature		-5 to 50°C
Ambient Humidity		5% to 90% RH (No condensation)
Conditions for measurement solution	Temperature (*1)	-5°C to 50°C (without freeze)
	Pressure	0 to
	Flow rate	0.5 to 20L/min
Wetted material		PVC, EPDM
Cleaning pressure		Water: 0.05 to 0.2 MPa (*2)
		Air: 0.03 to 0.05 MPa
		*Adjust the cleaning pressure, in principle, at +0.05 to 0.15 MPa of the pressure of the liquid under measurement.
Connector for cleaning		Rc1/2
Bore Size of Measured Liquid Connection		JIS 10K 25A FF flange
Weight		Approx. 1.6kg
Special Note		

*1: The operating temperature range differs depending on the combined probe, sensor, and holder. Refer to the temperature of each product in the specification. The liquid under measurement cannot be measured when frozen.

*2: In using tap water for cleaning water, the water supply law prohibits supplying the tap water directly from waterworks. Use a tap water pressurization system or the like to insulate the tap water from the common tap water pipe.
If cleaning water might be frozen, use thermally insulated piping.

■ External dimensions (JDF-311)



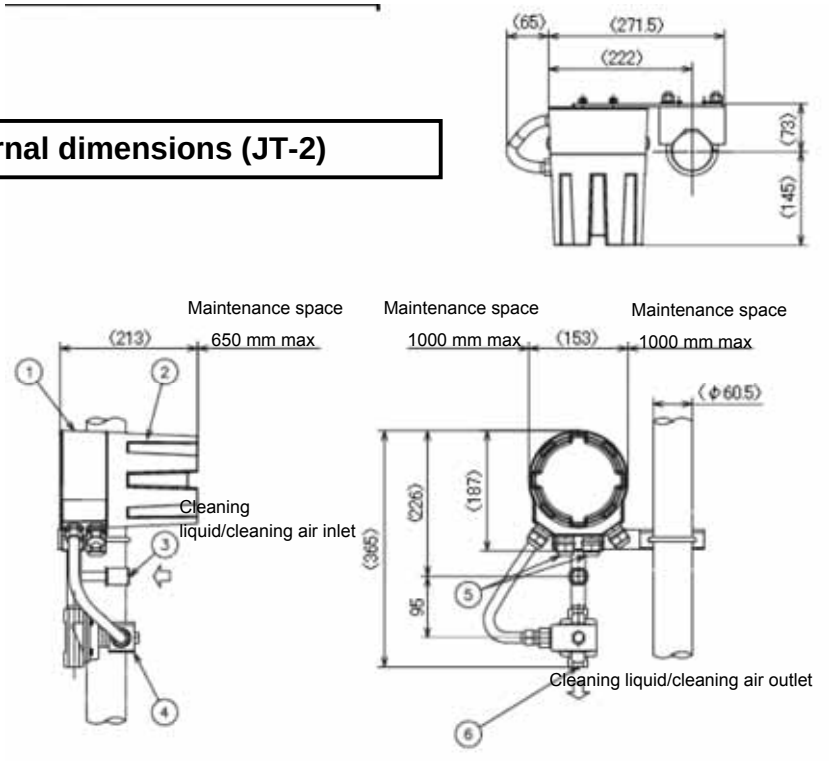
No	PARTS	NOTES
(1)	Tightening nut	PVC
(2)	Locking plate	SUS304
(3)	Holder	PVC
(4)	Nozzle mounting nut	PVC
(5)	Cleaning water/air inlet	Rc1/2

■ Specification (JT-2)

Product name		Timer unit
Model		JT-2
Supply Voltage		100 VAC, 50/60 Hz
		90% to 110% of supply voltage
Power consumption		Max. 30VA
Cleaning signal outpu	Contact type	Relay contact SPDT (1c)
	Contact Capacity:	250 VAC 3 A; 30 VDC 3A (resistance load)
	Conditions	NO-COM short-circuited and NC-COM opened
External Cleaning Start Input (*2)	Contact type	No-voltage contact
	Contact Capacity:	30 VDC, 0.1 A min.
	Conditions	Pulse input close time 100 msec min.
Input of cleaning stop signal (*3)	Contact type	No-voltage contact
	Contact Capacity:	30 VDC, 0.1 A min.
	Conditions	Stopped by turning OFF continuous input
Timer	Washing frequency	0.1 to 3.0 hours
	Washing time	Between 0.5 and 10.0
	Cleaning signal Delay time	Between 0.5 and 10.(
Ambient Temperature		-5 to 50°C
Ambient Humidity		5% to 90% RH (No condensation)
Connector for cleaning		Rc1/2
Weight		Approx. 9.1 kg
Timer case	ationa	IP54（IEC60529, JIS C0920） (category 2)
	Material	AC4C
	Finish	Epoxy degenerated melamine resin painting (Munsell 10PB5/1)
Special Note		This product does not come with any cleaner holder.

*1: Power supply voltage of 200 VAC is optionally available. For any other power supply voltage, contact us.
*2: When the input line to start external cleaning is used. remove the cleaning frequency timer (T1).
*3: The terminals were short-circuit at factory. To input the cleaning stop signal, remove the short-circuit line.
*4: In using tap water for cleaning water, the water supply law prohibits supplying the tap water directly from
Use a tap water pressurization system or the like to insulate the tap water from the common tap water pipe.
If cleaning water might be frozen, use thermally insulated piping.

■ External dimensions (JT-2)

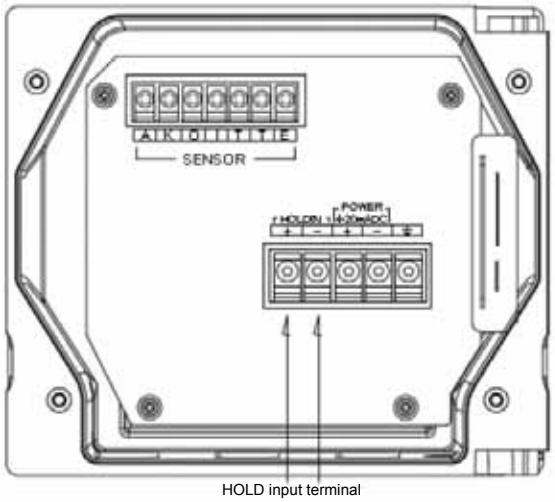


■ Installation (connections) (JDH-301/JT-2)

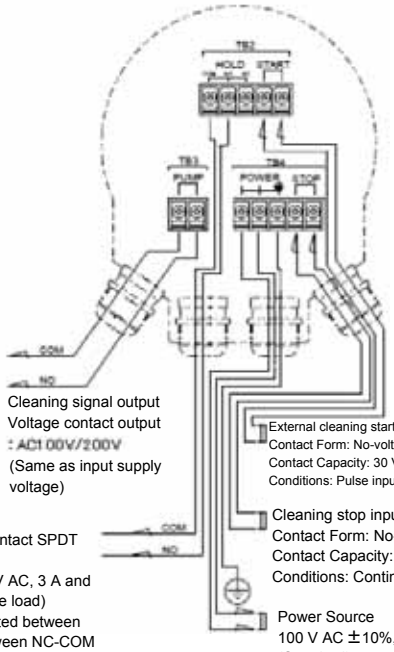
Carry out the installation of execution of work while paying attention to the following points:

Power Source
• Operation outside the rated range can cause a fault. Therefore, check the power supply voltage.
• Be sure to ground the grounding terminal (class D grounding).
• The applicable cable diameter for the wiring hole is 7 to 12 mm.

Power Source	Rated voltage: 100 VAC
	Frequency: 50/60 Hz
Applicable electric wire	Φ7 to Φ12
	0.75 mm^2 min.



Cleaner (timer unit)



HOLD input terminal
ON resistance: Max. 40Ω
Open voltage: 1.2 VDC
Short-circuit current: Max. 21 mA

Cleaning signal output
Voltage contact output
: AC100V/200V
(Same as input supply voltage)

External cleaning start input
Contact Form: No-voltage contact
Contact Capacity: 30 V DC, 0.1 A or more
Conditions: Pulse input, closed time of 100 ms or more

Cleaning stop input
Contact Form: No-voltage contact
Contact Capacity: 30 V DC, 0.1 A or more
Conditions: Continuous input, stopped at closed

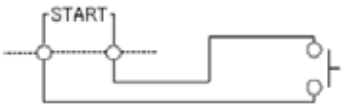
Cleaning signal output
Contact Form: Relay contact SPDT (1c)
Contact Capacity: 250 V AC, 3 A and 30 V DC, 3 A (resistance load)
Conditions: Short-circuited between NO-COM. Opened between NC-COM

Power Source
100 V AC ±10%, 50/60 Hz (Standard)
200 V AC ±10%, 50/60 Hz (Optional)

Wiring for HOLD (signal output during cleaning output of HOLD signal)
Wiring of cleaning signal output (hold signal output)
• Contact capacity under resistance load is 250 V AC, 3 A and 30 V DC, 3 A (resistance load).
• Cleaning signal output can be produced from the "COM, NO, and NC" Terminals in the Terminal Block.

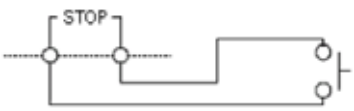
COM, NO ••• "ON" at cleaning
COM, NO ••• "OFF" at cleaning

Wiring of START (external cleaning start input)
• Cleaning operation can be started from the outside by using the external cleaning start input line.
• Produce an input of "Closed" signal of 100 ms or more to the "START" Terminal in the Terminal Block.



Closed Time:
No-voltage contact pulse input of 100 ms or more
Load relay:
30 VDC, 0.1 A or more

Wiring of STOP (cleaning stop signal input)
• Cleaning operation can be stopped by using the "STOP" Terminal.
• This "STOP" terminal is arranged in series with the power supply line to the motor.
• If this terminal is opened, the motor is not powered. This allows you to stop the cleaning process. The terminal is normally short-circuited with a short bar.



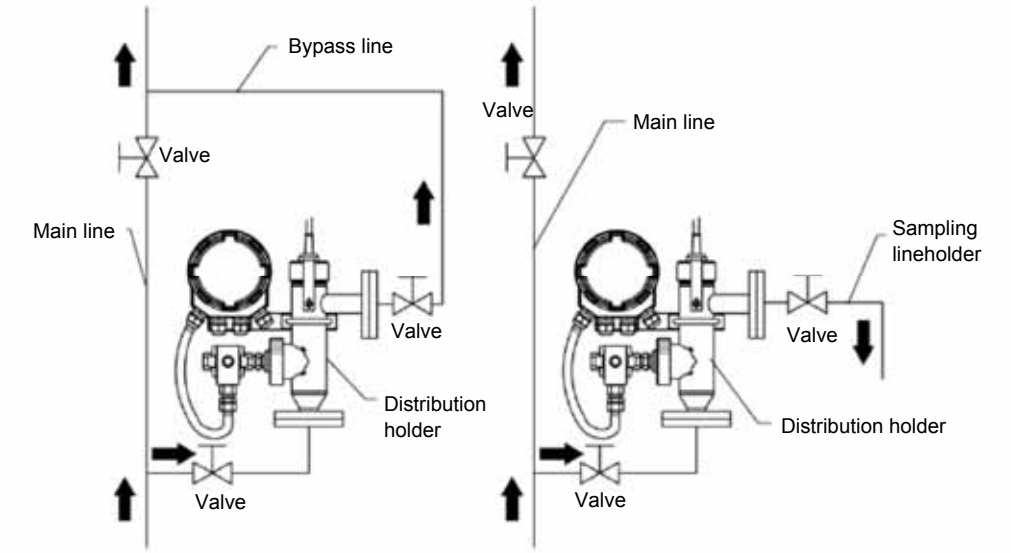
Cleaning stop signal
Close •••••• Cleaning "ON"
Open •••••• Cleaning "OFF"
Load: 100 VAC, 500 mA

■ Installation (JDF-301)

Be sure to following the following instructions for setup.

Installation environment
• Install the JDF-301 in a location where maintenance and other services can be done with ease.
• Provide a maintenance space of 25 cm in height above the flow chamber. Give a margin to the electrode cable so that it can be removed.
• Avoid installation in a location exposed to severe vibrations or a high dust level.
• Install the holder so as to ensure that the sensor is not floated to air as the liquid under measurement in the line is drained, even if the liquid stops.
• Avoid installation in a location exposed to corrosive liquid or gas.

• Avoid installation in a location near a heating element or the like, where the surface and ambient temperatures reach 50° C or higher.
• For any liquid under measurement containing air bubbles, slurry, or any solid that may damage the electrode, previously remove them.
• Do not include the flow chamber in the main line. For installation, be sure to provide a bypass line or a sampling line. Unless the main line is stopped, the maintenance work cannot be done.)



To install the flowchamber, provide a bypass line in the main line so that the sample flows in from under the flow chamber and then flows out laterally.
Be sure to provide valves on the inflow and outflow sides respectively.See Fig. 1.

If the flow rate of the sample is too low, the readout will decrease. Control the flow rate.
If the sample contains many suspended solids, provide a strainer on the influx side of the holder.
See Fig. 2.

Fig. 1

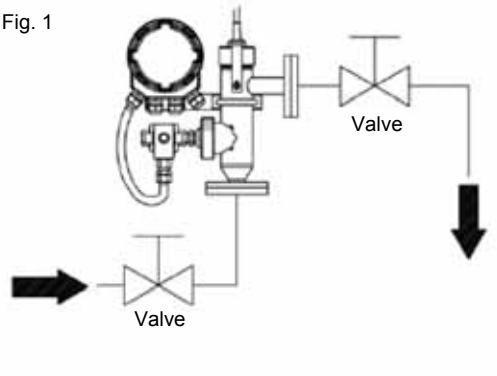
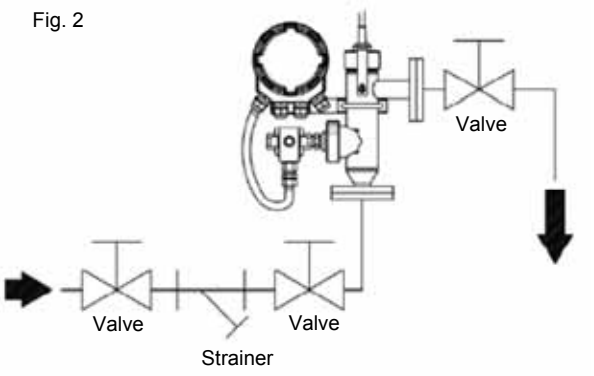


Fig. 2



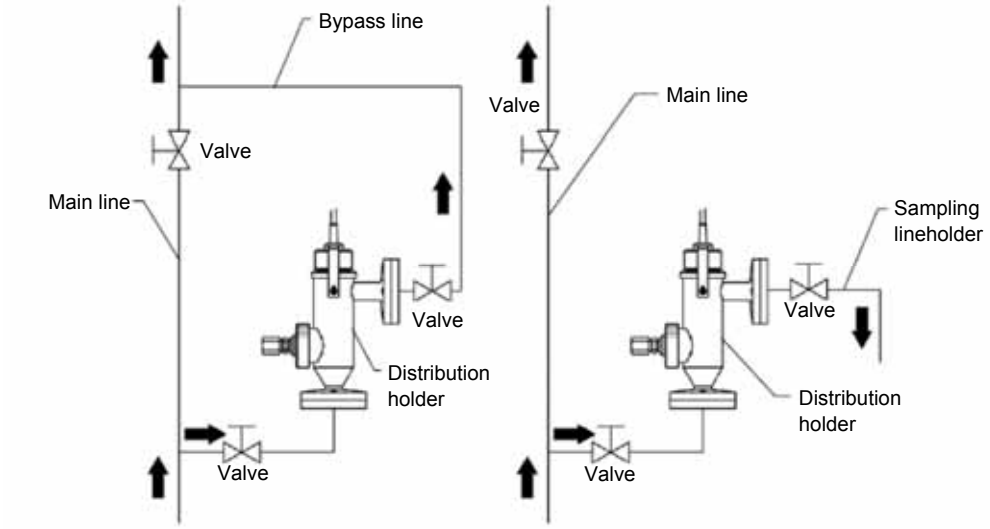
■ Installation (JDF-311)

Be sure to following the following instructions for setup.

Installation environment

• Install the JDF-311 in a location where maintenance and other services can be done with ease.
•Provide a maintenance space of 25 cm in height above the flow chamber. Give a margin to the electrode cable so that it can be removed.
• Avoid installation in a location exposed to severe vibrations or a high dust level.
•Install the holder so as to ensure that the sensor is not floated to air as the liquid under measurement in the line is drained, even if the liquid stops.
• Avoid installation in a location exposed to corrosive liquid or gas.

• Avoid installation in a location near a heating element or the like, where the surface and ambient temperatures reach 50 ° C or higher.
• For any liquid under measurement containing air bubbles, slurry, or any solid that may damage the electrode, previously remove them.
• Do not include the flow chamber in the main line. For installation, be sure to provide a bypass line or a sampling line. Unless the main line is stopped, the maintenance work cannot be done.)



Piping

For installation of the flow chamber, provide a bypass line from the main line so that the measured liquid flows into the bottom side of the flow chamber and flows out of the lateral side of the flow chamber.
Be sure to provide valves on the inflow and outflow sides respectively.
See Fig. 1.

If the flow rate of the liquid under measurement is too low, the readout will decrease. Control the flow rate in accordance with the conditions of the liquid under measurement.
If there are many suspended solids in the liquid under measurement, provide a strainer at the influx side of the holder.
See Fig. 2.

Fig. 1

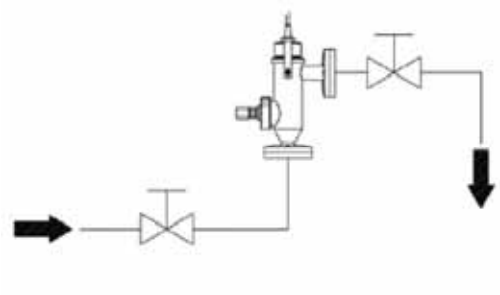
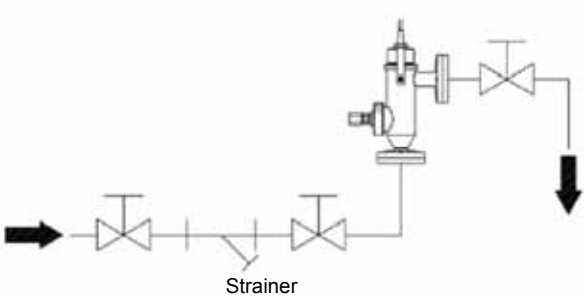


Fig. 2



■ Installation (JDF-301/311) (piping)

Be sure to following the following instructions for setup.

Piping
• Since the cleaner must be removed during maintenance, use flexible piping and give an allowance to its length.
• Before connecting the piping to the cleaner, be sure to flush off the piping with water.
• With the regulator, adjust the cleaning water to a specified pressure.
• In using tap water for cleaning water, the water supply law prohibits supplying it directly from water works. Temporarily receive the tap water in a tank or the like and then pressurize it with a pump. However, if original water for industrial use (tertiary treatment water) is used, it may be connected directly. If tap water is distributed after passing through a tank located on the roof or the like, it may also be connected as it is insulated.