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H-1 Series ORP Meter for Industrial Use

HO-200

■ Overview

●The HO-200 allows you to measure oxidation-reduction potentials (ORP) by connecting an ORP electrode.
The measured value and various settings are displayed on the LCD readout.When used with our cleaning apparatus, the HO-200 enables you to control the cleaning apparatus.
A variety of self-diagnostic capabilities is provided to allow you to detect a trouble with the pH electrode or the HO-200.

■ Measurement target

● ORP in solution

■ Measuring principle

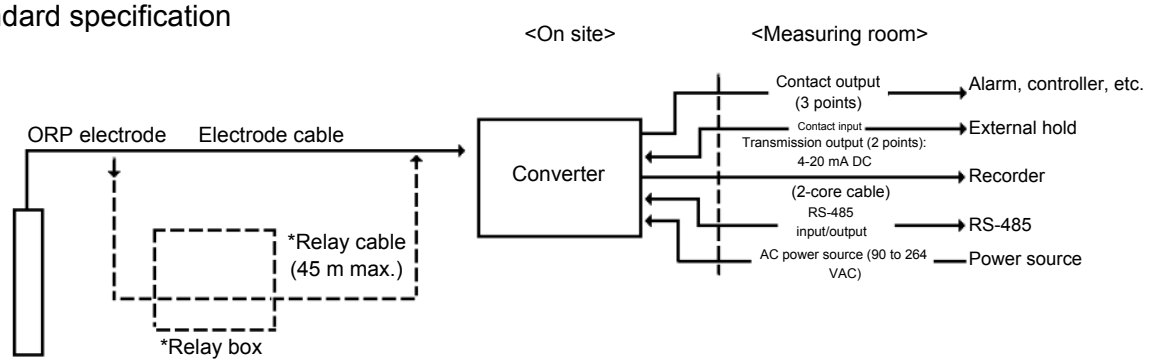
●Metal electrode type

■ Intended use

● Control and monitoring of drainage treatment and production process

■ System configuration diagram

Standard specification



* If the ORP electrode cable is shorter than the distance between the HO-200 and the converter, use a relay box or a relay cable.
The cable length between the ORP electrode and the converter is 50 m maximum (including the electrode cable).

H-1 Series ORP Meter for Industrial Use

HO-200 Readout Converter

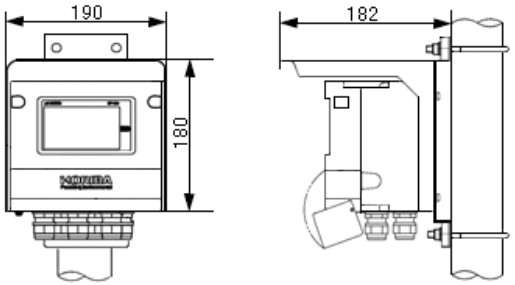
■ Features

- Outdoor installation type (equivalent to IP65; splash-proof construction)
- Selectable simultaneous display of temperature
- All settings available with front keys

Improved maintenance feature (self-diagnostic capability)

- Selectable transmission output range
- Backup of stored data
- Easy-to-read display (150% larger than former display)
- Improved operability of keys by using an emboss sheet
- Improved mode display by using icons
- 4 kinds of temperature compensation electrodes (500, 6.8 k, 1 k, and 10 k) Self-detection capability provided

■ External Dimensions



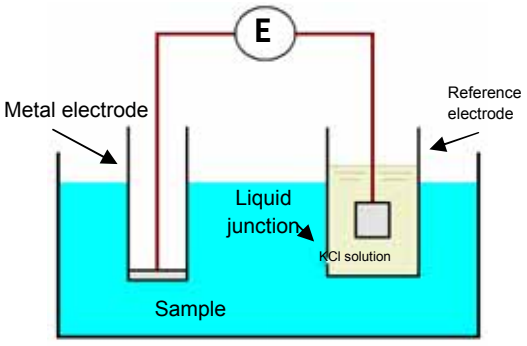
Unit: mm

■ Converter/Sensor

What is ORP?
ORP stands for oxidation-reduction potential.
It means an electric potential which is generated when a substance is oxidized or reduced as one of the chemical reactions.
What is oxidation?
It means that a substance is brought into chemical combination with oxygen. e.g. $C_2 + O_2 \rightarrow CO_2$
It means that a substance loses its electrons. e.g. $Zn \rightarrow Zn^{2+} + 2e^-$
It means the oxidation number of an atom increases. (No example is available.)
What is reduction?
It means that a substance loses its oxygen.e.g. $CO_2 \rightarrow C_2 + O_2$
It means that a substance gains electrons. Exemple $Zn^{2+} + 2e- \rightarrow Zn$
It means that the oxidation number of an atom increases. (No example is available.)
The electric potential is measured during one of the above chemical reactions.

Basically, the same principle as used to measure pH is applied except that a metal electrode (platinum) is used instead of a pH electrode.
The HO-200 uses two electrodes: a metal electrode (ORP electrode) and a comparison electrode. ORP is measured by determining the voltage (potential difference) generated between the two electrodes.

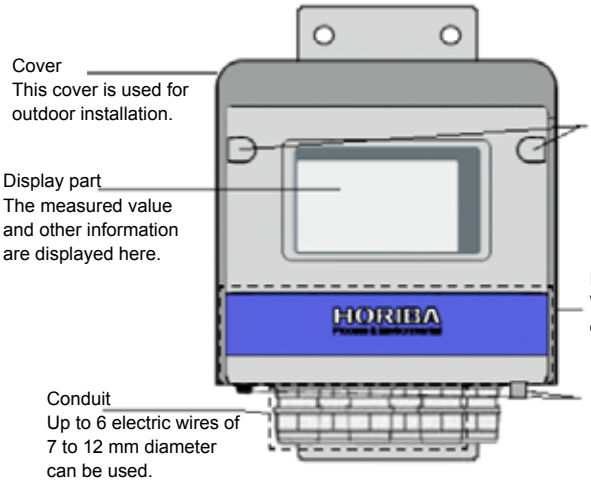
To measure the potential captured by the ORP electrode, another electrode is required. The comparison electrode (described above) must be very stable in electric potentials. For this purpose, its liquid junction is perforated or coated with ceramic
The ORP electrode is designed to enable accurate capture of potentials, while the comparison electrode is designed to ensure that no electromotive force is generated.



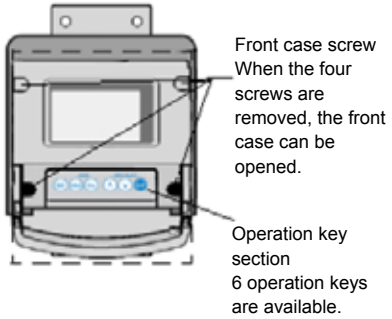
Principle diagram of ORP measurement

■Configurations

● Front



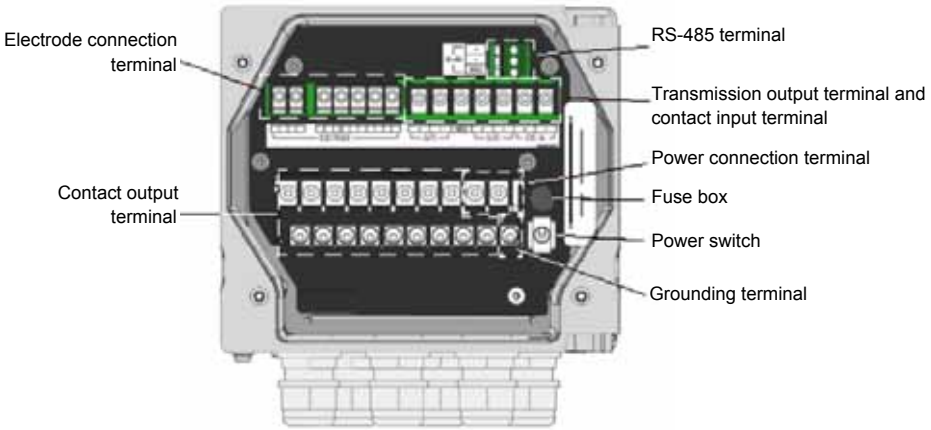
● With the front cover opened



● Display part

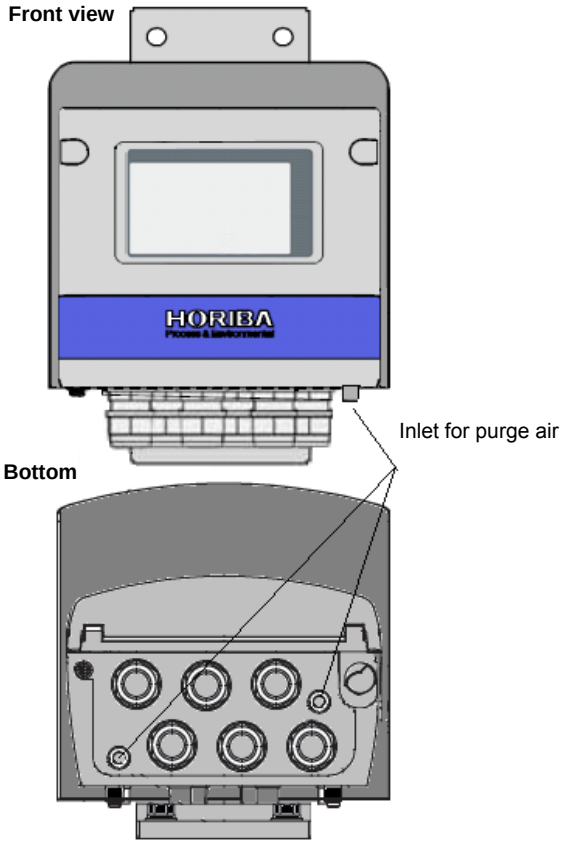
● Operation key section

● Terminal block



■ Air purge

Air inlets for purge are provided to prevent internal corrosion. To use the HO-200 in an environment where corrosive gas is generated, prevent corrosive gas from entering the inside by constantly sending instrument air.



■Temperature measurement

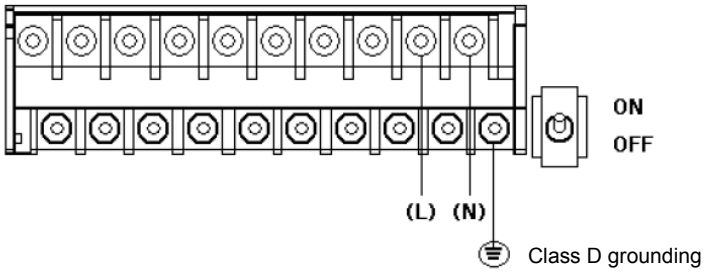
The resistance-temperature detector (RTD) to measure temperature uses an element that has a resistance value of 6.8 k Ω at 25℃.
(This is applicable for the ORP electrode 6870 only. No temperature can be measured using 6805 or 6815.)
The temperature calibration mode is available to enable temperature calibration by making a comparison with a high-precision thermometer.

■ Power supply

The HO-200 is provided with a power switch. It uses a free power source with rated voltage of 100 to 240 VAC.
Operation outside the rated range can cause a fault. Therefore, check the power supply voltage. Also check that fluctuations of the power supply voltage fall within ±10%.
Major specifications
•The terminal screw for the contact output is of M4.
•The applicable electric wire is of 0.75 to 5.5 mm2 (AWG18 to 10).

Position the power switch near the HO-200 so that the power can be turned ON/OFF. If lightning might strike, install an arrester on the output side of the HO-200 and on the side of receiving instruments.

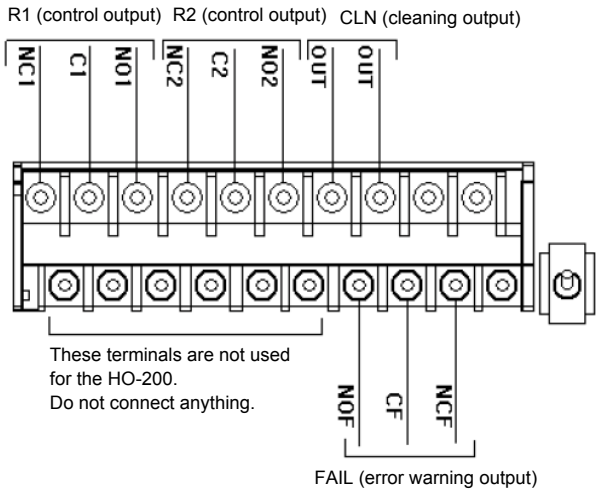
Be sure to ground the grounding terminal (class D grounding). Separate this grounding from any other grounding for electric equipment such as a motor.



Supply power	Voltage: 100 to 240 VAC
	Frequency: 50/60 Hz
Applicable	0.75 to 5.5 mm^2 (AWG18 to 10).

■ Contact output

Three contact output points are provided as standard.
Contact outputs such as transmission output hold and error alarm are available in addition to the upper and lower alarm contact outputs.
Major specifications
The contact capacity is 250 VAC, 3 A maximum or 30 VDC, 3 A maximum for resistance load.
•The terminal screw for the contact output is of M4.
•The applicable electric wire is of 0.75 to 5.5 mm2 (AWG18 to 10).

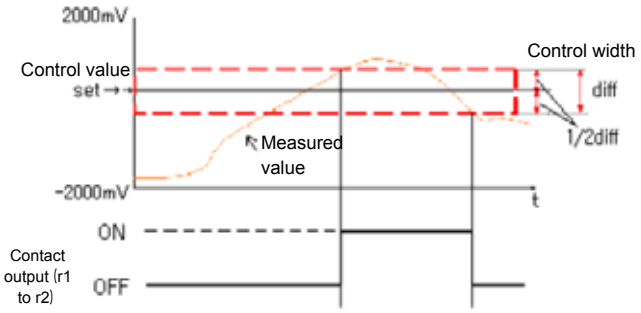


If noise is included in the load, use a varistor or a noise killer.
Only the CLN output involves voltage, allowing the connected power supply voltage to be output. The others are no-voltage contact outputs.
For only the FAIL output, the positions of NO and NOC are reversed. In the normal state (not FAIL), the CF-NOF contact is open and the CF-NFC contact is short-circuited. When the power is OFF, the C-NOF contact is short-circuited.
The blank terminals are internally connect to each other. Do not connect anything.
When a load larger than the contact capacity is connected or when an induction load (e.g. a motor or a pump) is used, t sure to connect the load via a power relay larger than the load rating.
When the HO-200 is OFF, the C-NC contact between R1 and R2 is short-circuited. Therefore, exercise care in connecting a load.

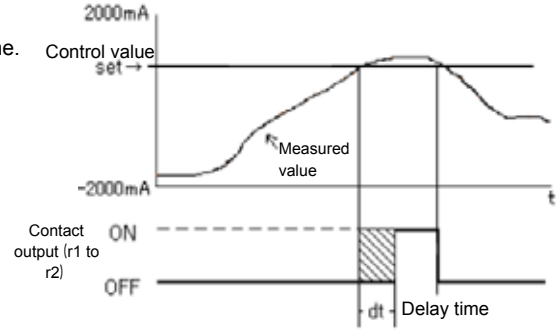
Contact Capacity:	250 VAC, 3A max. or 30 VDC, 3 A maximum
Applicable	0.75 to 5.5 mm2 (AWG18 to 10)
Kinds of alarms	CtrL control output, alarm output Temperature alarm output, HOLD output FAIL output, Clu output

CtrL: Control output
When the measured value is larger than (control value plus control width x 1/2), the control output is turned ON. When the measured value is smaller than (control value minus control width x 1/2), the control output is turned OFL

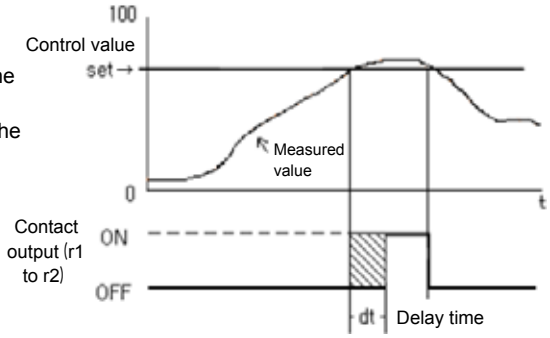
These are the upper-limit actions. For the lower-limit actions, reverse them)



"AL": Alarm output
When the measured value is larger than the setting value, the output will be turned ON to trigger the alarm after the delay time. When the measured value becomes smaller than the setting value, the output is turned OFF and the alarm is canceled.
The setting of output delay time (0 to 600 seconds) is also possible.
These are the upper-limit actions. For the lower-limit actions, reverse them)



"t": Temperature alarm output
When the temperature value is larger than the setting value, the output will turn ON to issue an alarm after the delay time.When the temperature valu becomes smaller than the setting value, the output is turned OFF and the alarm is canceled.The setting of output delay time (0 to 600 seconds) is also possible.
These are the upper-limit actions. For the lower-limit actions, reverse them)



HoLd: Output during hold mode
When the measured value is held, the output will be turned ON after the delay time. Immediately after the hold mode has been canceled, the output is turned OFF. The setting of output delay time (0 to 600 seconds) is also possible.

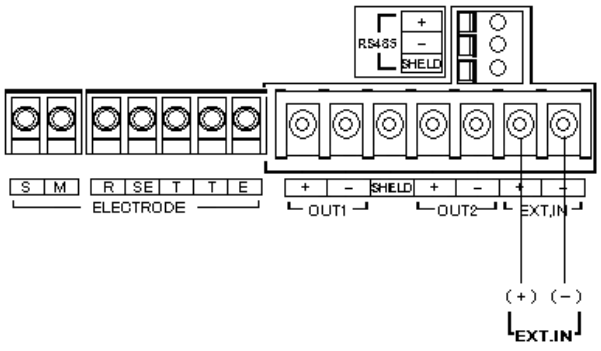
FAIL: FAIL output
This output is turned ON when the full-scale value is exceeded or when a system error occurs. The alarm is triggered when a trouble occurs in the HO-200.

CLn: Cleaning output
The contact signal is output (ON) while the cleaner is operating, or for 5 seconds after the cleaner has stopped.

■ Contact input

The HO-200 is provided with contact input as standard.
The output value is held with an external signal.
Major specifications
•The terminal screws for the contact input is of M3.5.
•The applicable electric wire is of 2 mm2 (AWG14) maximum.

For the transmission output cable, use a shielded cable.
When lightning might strike, install an arrestor on the output side of the HO-200 and on the side of receiving instruments.
The resistor for the contact input shall be 100 Ω maximum.



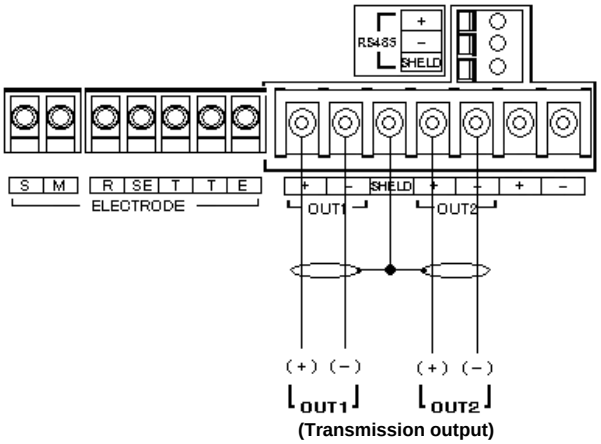
(Contact input)

Contact input	100Ω/km max.
Applicable electric wire	$2mm^2$ (AWG14) MAX

■ Transmission output

The HO-200 is provided with two transmission outputs (4 to 20 mA DC).
Transmission output 1 outputs electric conductivity and transmission output 2 temperature.
When both values fall within the respective full-scale ranges of measured values, arbitrary full-scale ranges may be set for the transmission output. The burnout setting (transmission output: 3.8 or 21 mA) is also possible. When the transmission output is held with an external signal, the HO-200 has a capability of allowing you to determine whether the output value is temporarily held at the immediately previous value or the preset value.
Example: Arbitrary setting of transmission output
When the full-scale range for pH measurements is between pH0 and pH14:
The transmission output of 4 mA may be set to pH6 and that of 20 mA to pH8.
Example: Transmission output hold
When the held value is set to the directly previous value:
If an external signal is received when the measured value is pH7.5, the transmission output maintains the output value of pH7.5.
Major specifications
The terminal screws for the contact input is of M3.5.
•The applicable electric wire is of 2 mm2 (AWG14) maximum.

For the transmission output cable, use a shielded cable.
When lightning might strike, install an arrestor on the output side of the HO-200 and on the side of receiving instruments.
The negative terminal (OUT1) (-) and OUT2 (-) for the transmission output are internally connected and have the same electric potential.

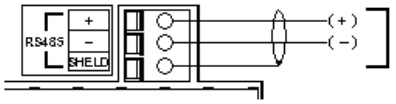


(Transmission output)

Maximum load resistance	900Ω
Applicable electric wire	$2mm^2$ (AWG14) MAX

■ RS-485

The HO-200 has an RS-485 communication terminal. To use this terminal, connect the necessary wiring.
•The applicable electric wire is of 0.14 to 2.5 mm2 (AWG26 to 14).
•For the communication output cable, use a twisted shielded pair.
A maximum of 32 units including the host computer may be connected.Specify their addresses.
•The communication cable length is 500 m maximum.
•Use a terminating resistor (Rt: 120Ω) for any device at which the RS-485 communication line is terminated.

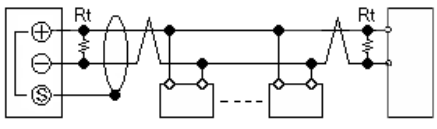


RS-485(Communication output)

RS-485 communication conditions	Baud rate	19200 bps
	Character length	8 bit
	Parity	non
	Stop bit	1 bit

Example of external connection for communication

HO-200 RS-485 (communication output)

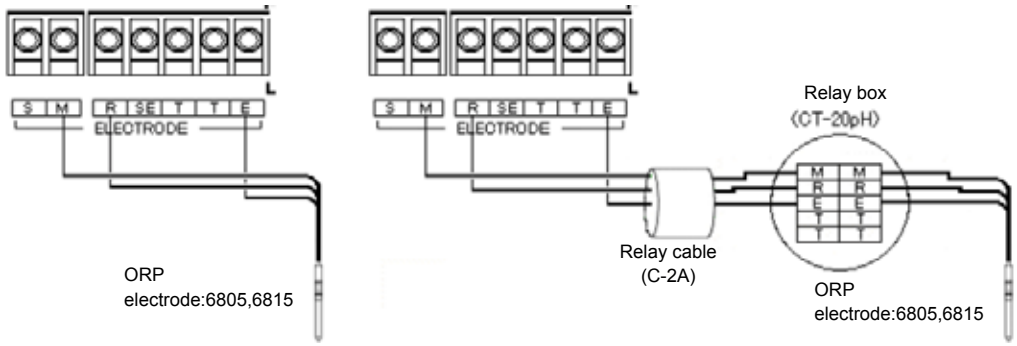


■Sensor

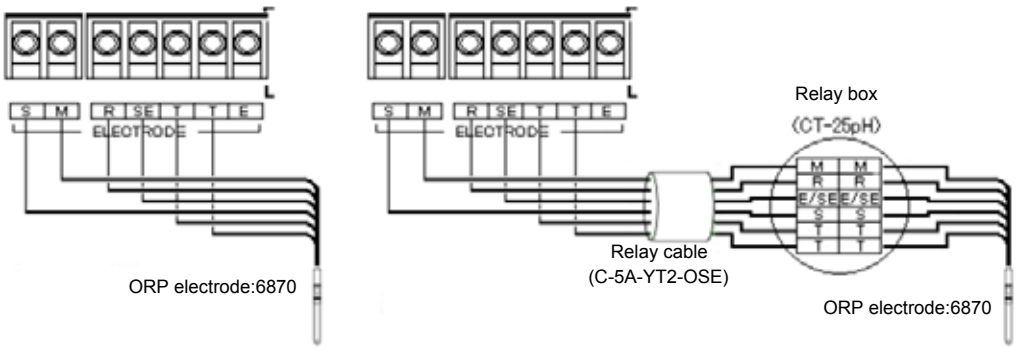
The ORP electrode cable is of high insulation. In handling this cable, pay attention to the following points:
•Do not wet the terminals and terminal block for cables with water or the like or contaminate them with your hand or oil. TI insulation will otherwise deteriorate.
The decreased insulation causes 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 electrode cable, give a margin to its length for checks with a standard solution and for the inspection and replacement of the electrode.
•In wiring the electrode cable and the relay cable, keep them away from inducting equipment such as a motor and is power cable.

ORP electrode	S: Shielded drive terminal on ORP electrode
	M: ORP electrode terminal
	R: Reference electrode terminal
	SE: Wetted pole terminal
	T, T:Temperature compensation electrode terminal
	E: Shielded terminal

Connection method for ORP electrodes 6805 and 6815 without S-terminal, SE-terminal, or temperature electrode



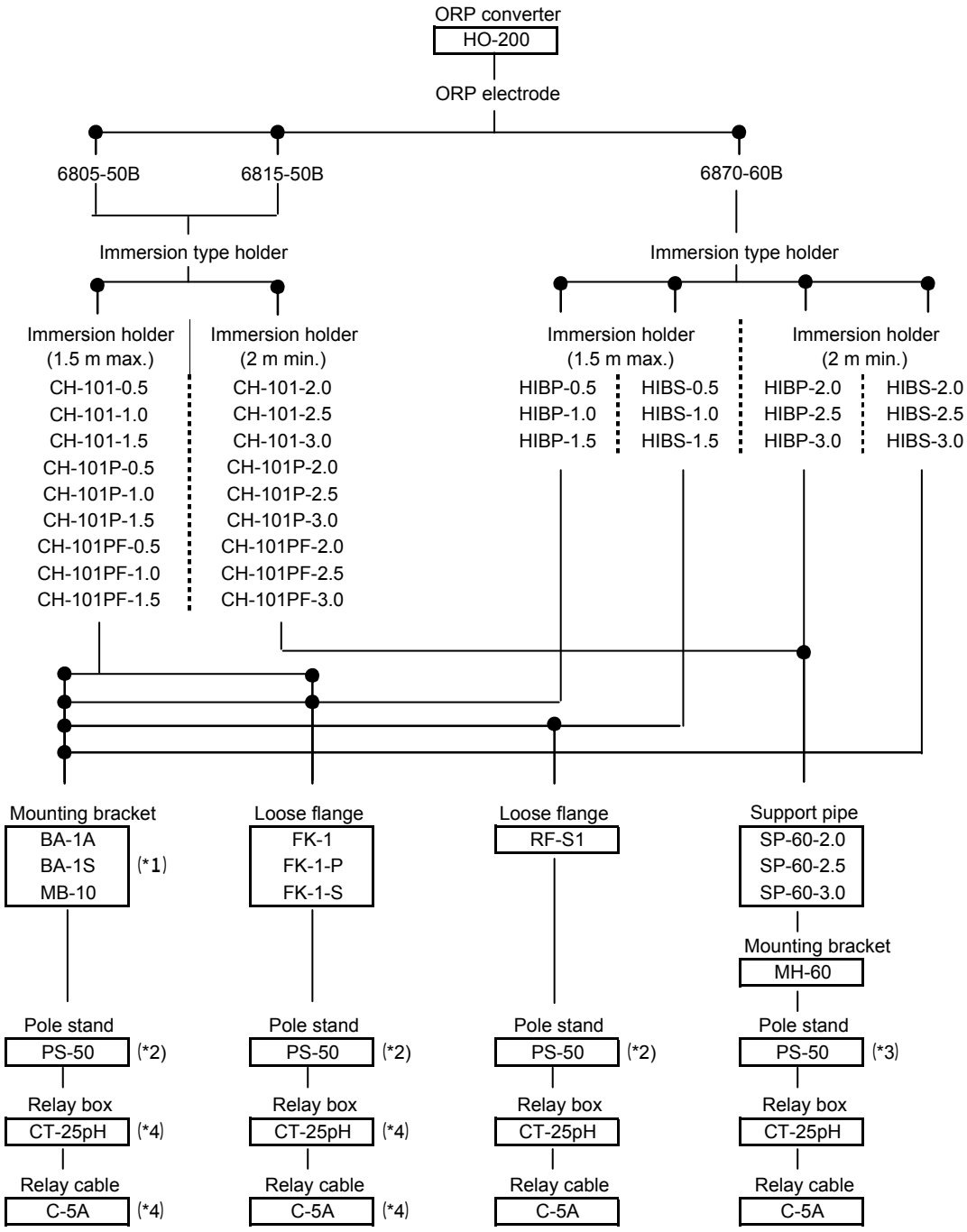
Connection methods for ORP electrodes 6870, etc. with S-terminal, SE-terminal, or temperature electrode



■ 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 the immersion type holder is used



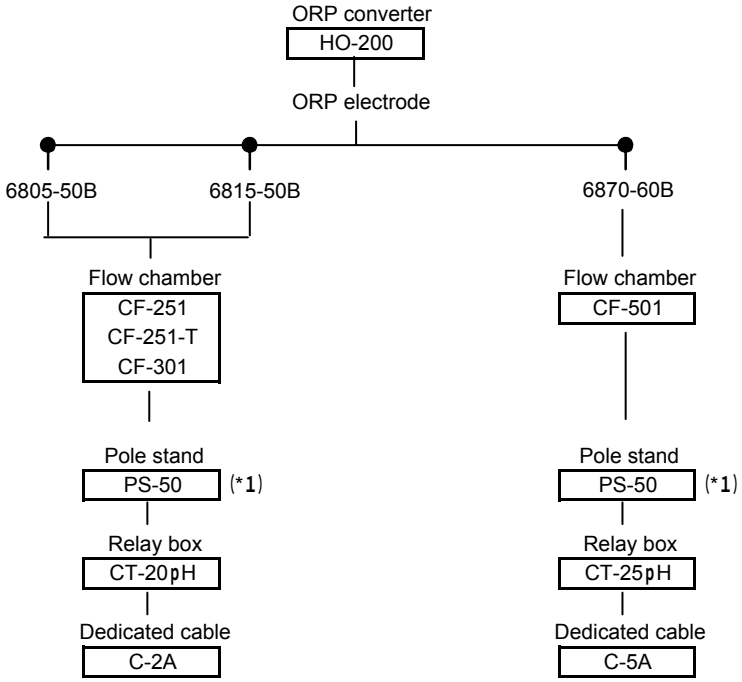
*1: The immersion holder HIBP (made of SUS stainless steel) is only applicable for the MB-10.It is not applicable for the BA-1A and the BA-1S.

*2: For installing the converter and the relay box

*3: For installing the converter, the relay box, and the mounting hardware (MH-60)

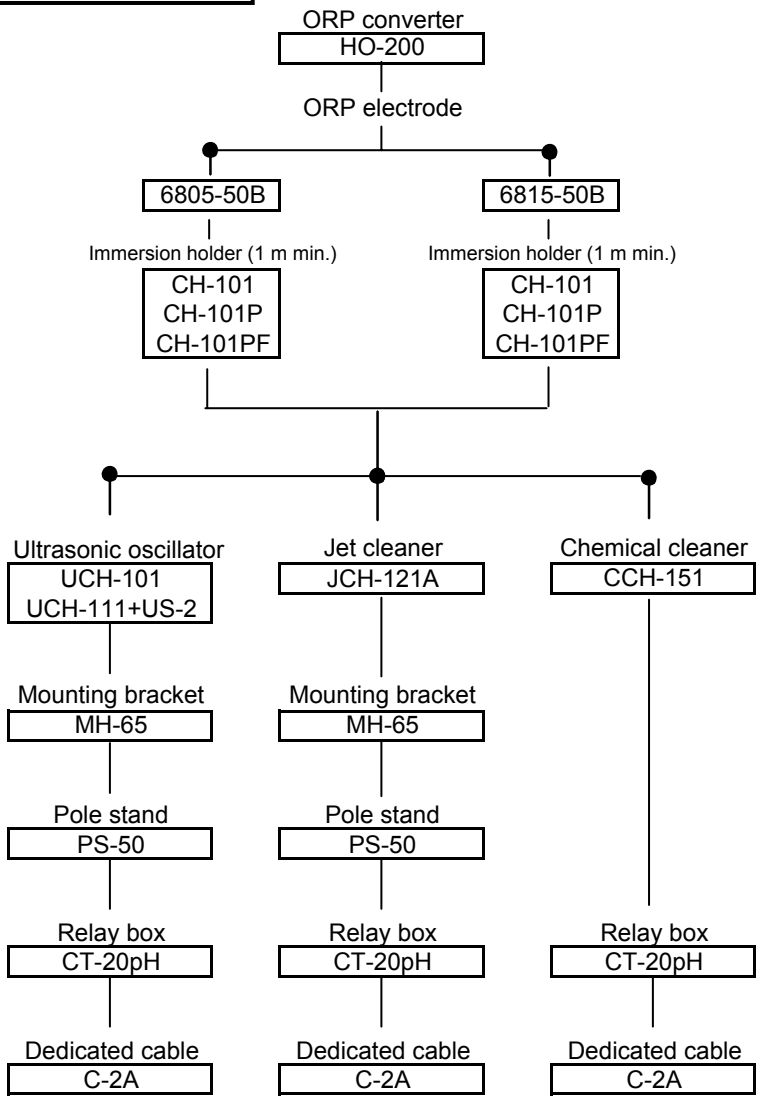
*4: When the cable is to be extended to use the ORP electrode 6805-50B or 6815-50B, select the relay box (CT-25pH) and the dedicated cable (C-2A).

When the distribution type holder is used

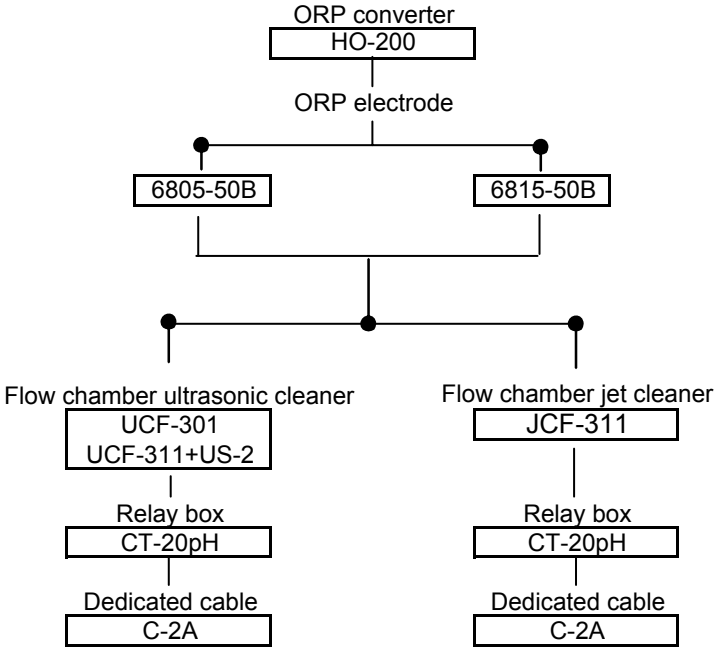


*1: For installing the converter and the relay box

When using an immersion type cleaner



When the distribution type cleaner is used



■Specification 1

Product name	Industrial ORP converter		
Model	HO-200		
Combination electrod	ORP electrode		
Measurable range	ORP		-2000 to 2000 mV (readout range: -2200 to 2200 mV)
	Temperature		0 to 100°C When using the automatic identification function for temperature sensor type; readout range: -10-110℃ Readout range: -20℃ to 130℃ (when temperature sensor type is specified manually)
Display resolution	ORP		1mV
	Temperature		0.1℃
Performance	ORP	Repeatability	Within ±5 mV (with equivalent input)
		Linearity	Within ±5 mV (with equivalent input)
	Temperature	Repeatability	Within ±0.3℃ (for equivalent input)
		Linearity	Within ±0.3℃ (for equivalent input)
Transmission output	Number of output points		2 (the negative terminals for transmission outputs are internally connected to each other and have the same electric potential.
	Output type		4 to 20 mA DC, input/output insulation type
	Load resistance		900Ω max.
	Repeatability		Within ±0.02 mA (output only)
	Linearity		Within ±0.08 mA (output only)
	Output range	Output 1	ORP: Selectable from a fixed range or freely specifiable within the measurable range
		Output 2	Temperature: Freely specifiable within a range between -20℃ and 130℃
	Error output		With burn-out capability (3.8 or 21 mA)
	Hold capability		Selectable from previous value hold, arbitrary value hold, and calibration value hold
Outpu	Number of output points		3
	Output type		No-voltage contact output
	Contact type		Relay contact, SPDT (1c)
	Contact Capacity:		250 VAC 3 A; 30 VDC 3A (resistance load)
	Contact function	Rl、R2	Selectable from upper limit alarm, lower limit alarm, ON/OFF control, transmission output hold, and washing output (closed when the alarm is triggered; normally
		FAIL	Error alarm (closed when normal; opened when an error occurs; opened when
	Description of alarm function		Setting range: -2000 to 2000 mV •Delay time: 0 to 600 seconds
	Descri	ON/OFF	Setting range: -2000 to 2000 mV •Control width: 2 to 400 mV (±1 to ±200 mV)
Washi	Number of output points		1
	Output type		Voltage contact output (output of connected power supply voltage)
	Contact type		Relay contact, SPST (1a)
	Contact Capacity:		250 VAC 3 A; 30 VDC 3 A (resistance load)
	Contact function		Actuation of solenoid valve for washing
	Descri	Washing frequency	0.1 to 168.0 hours
		Washing time	2 to 600 seconds
		Hold time	2 to 600 seconds
	Timer accuracy		Within 2 minutes per month
	Description of washing		Function as internal timer •Function as internal timer and function with external input •The internal timer is enabled only when external input is used. •Washing start signal (the internal washing sequence is started when this signal is kept ON for 2 seconds or more) Select one of the above options
Conta	Number of input points		1
	Contact type		Open collector, no-voltage a-contact
	Conditions		ON
	Contact function		External input for washing

■Specification 2

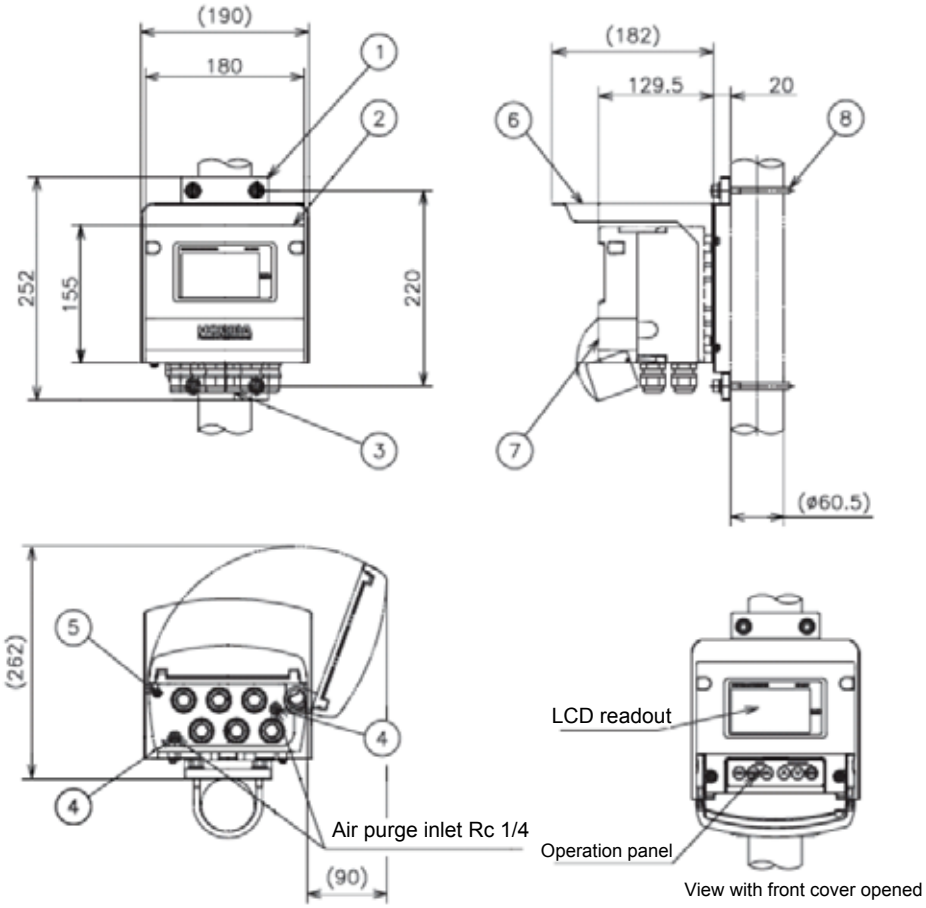
Comm	Method			RS-485	
	Signal type			Two-wire, input/output insulated type (not insulated from transmission output)	
Temperature compensation	Applicable temperature element			Platinum resistive element: 1 KΩ (0℃)	
				Positive temperature-sensitive resistive element: 10 kΩ (25℃), positive temperature-sensitive resistive element: 500 Ω (25℃), 6.8 kΩ (25℃), 10 kΩ (25℃)	
	Element selection method			Automatic detection of automatic temperature sensor type or manual selection (omission of temperature compensation is also possible)	
Calibration	ORP correction			Manual adjustment (offset) correction (-200 to 200 mV) Manual sensitivity correction (0.500 to 1.500)	
	Temperature calibration function			One-point calibration by making a comparison with the reference thermometer	
Self-diagnostics	Electrode diagnostic error			Comparison electrode impedance error (only for an electrode with a wetted pole) Temperature sensor short-circuit, temperature sensor error, and temperature measurement range error	
	Converter error			CPU error, ADC error, and memory error	
Operating temperature range	-20℃ to 55℃ (without freeze)				
Operating humidity range	Relative humidity: 5% to 90% (without condensation)				
Storage temperature	-25 to 65°C				
Power source	Power supply voltage range			AC90 to 264V 50/60Hz	
	Power consumption			15VA(max)	
	Others			With built-in time lag fuse (250 V, 1 A)	
				With built-in power switch for maintenance	
Applic	CE			EMC Directive (2000/108/EC)	
				Low Voltage Directive (2006/95/EC) EN61010-1: 2001	
		EMC	Immunity Industrial location	Electrostatic discharge	IEC61000-4-2
				Radiated radiofrequency electromagnetic field	IEC61000-4-3 (*1)
				Electric fast transient/burst	IEC61000-4-4
				Surge	IEC61000-4-5(*2)
				Conducted interference induced by radiofrequency	IEC61000-4-6 (*1)
				Voltage dip, short-time power outage, and voltage fluctuation	IEC610000-4-11
			Emission ClassA	Radiated disturbance	CISPR 11 CLASSA
				Noise terminal voltage	CISPR 11 CLASSA
		Low voltage		Contamination level 2	
	FCC Rules			Part 15 CLASS A	
Structure	Installation			Outdoor installation type	
	Installation method			50 A pole or wall mounting	
	International protection code			IP65	
	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. 3.5 kg; hood and mounting bracket: Approx. 1 kg				

*1: The criterion for the effect on the readout in the radiated radiofrequency electromagnetic field and conducted interference tests is within the measured value for ORP ± 15 mV.

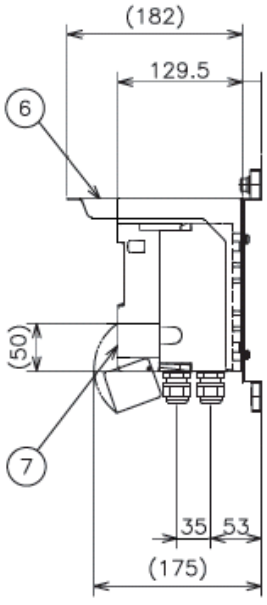
*2: When the sensor cable, the transmission cable, or the contact input cable is extended to more than 30 m, the surge test in the EMC Directive is not applicable for CE marking.

*3: An arrestor (sparkover voltage: 400 V) is provided for transmission output, contact input, and communication. However, use the most suitable surge absorption element on the connection line considering the ambient environment, the installation situation, and externally connected equipment.

■External dimensions of HO-200 ORP Meter



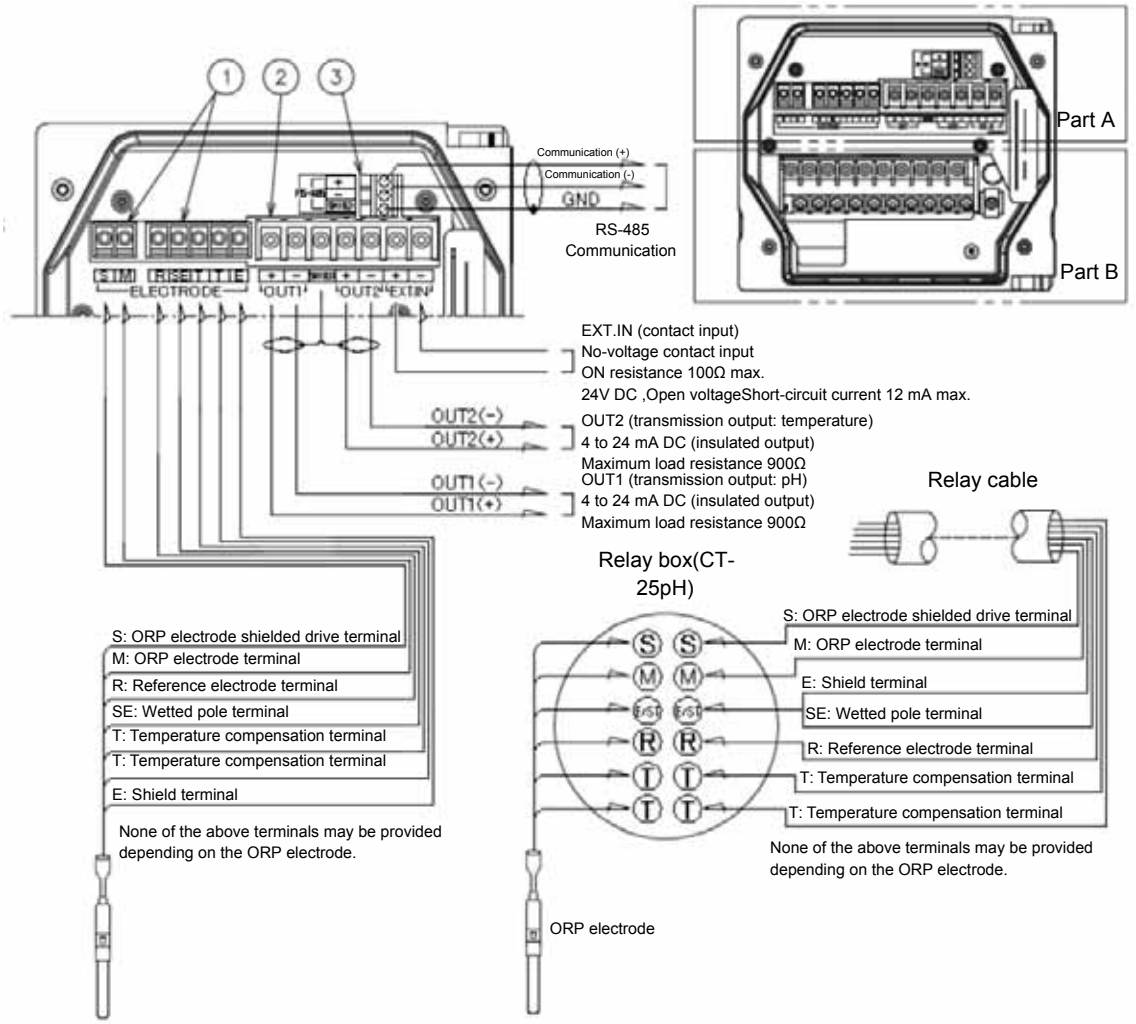
Drawing for external dimensions of HO-200 ORP Meter (wall-mounted)
(The other dimensions are as shown above.)



	PARTS	NOTES
(1)	Mounting plate	SUS304
(2)	Case	ADC12
(3)	Wiring hole	O.DΦ7 to Φ12cable
(4)	Plug	SUS304
(5)	Earth	SUS304 M4
(6)	Cover	SUS304
(7)	Front cover	ADC12
(8)	U-bolt	SUS304 50A M8

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

■External connection diagram 1 (HO-200 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	M3.5	MAX6.2 MAX3.6 MAX7.2	2mm²/MAX (AWG14)	0.8~1.2N・m
③	M3		0.14~2.5mm² (AWG26~14) Single or stand wire	0.5~0.6N・m

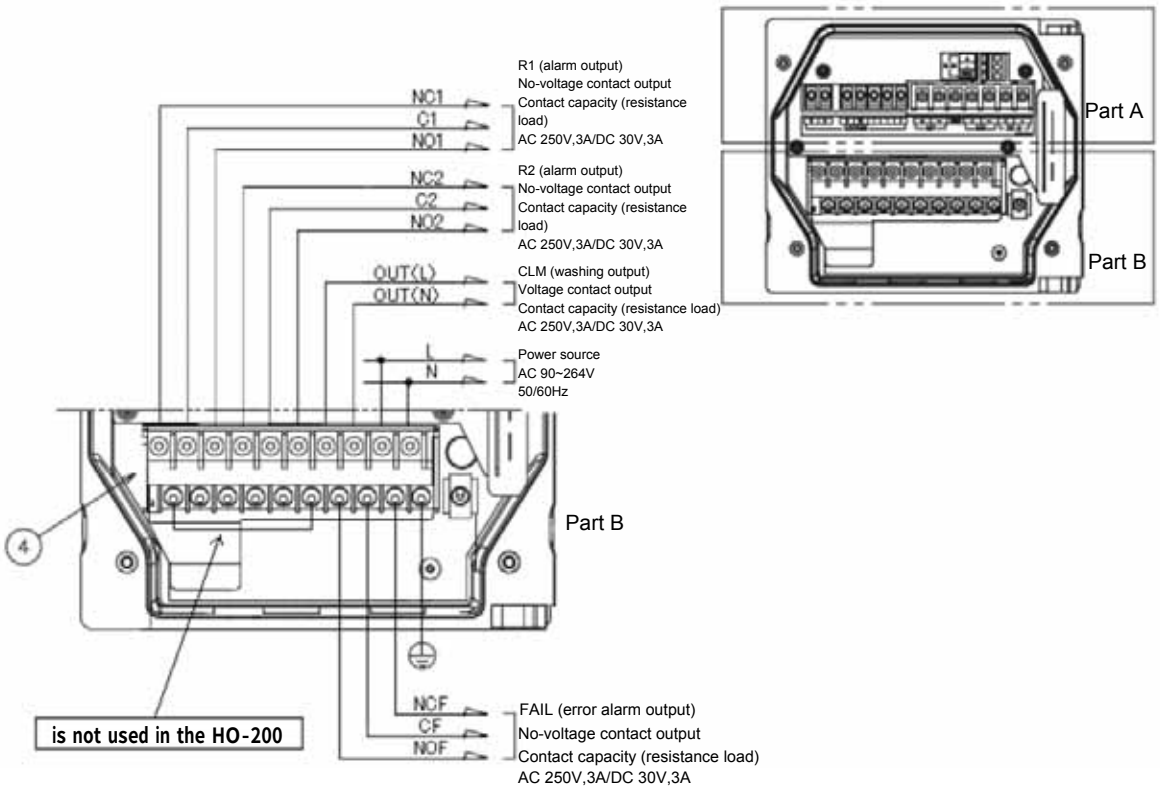
Note: The screws on the terminal block are designed to be non-removable. To connect a cable to a terminal, turn the screw until it is floated.

:The negative terminals OUT1(-) and OUT2(1) are internally connected and have the same electric potential.

:On the setup menu of the HO-200, choose CLAUSE in"R-SE connection" for "SENSOR."
(when either of the ORP electrodes 6805 and 6815 is used)

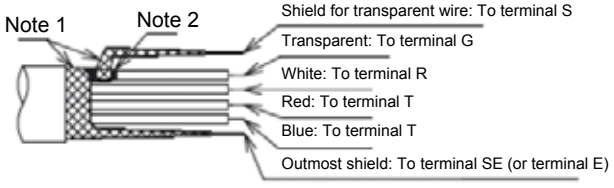
:Set "R-SE Connection Setting" in the setup menu "SENSOR" of the HO-200 to OPEN.
(when the ORP electrode 6870 is used)

■External connection diagram 2 (HO-200 Meter for Industrial Use)



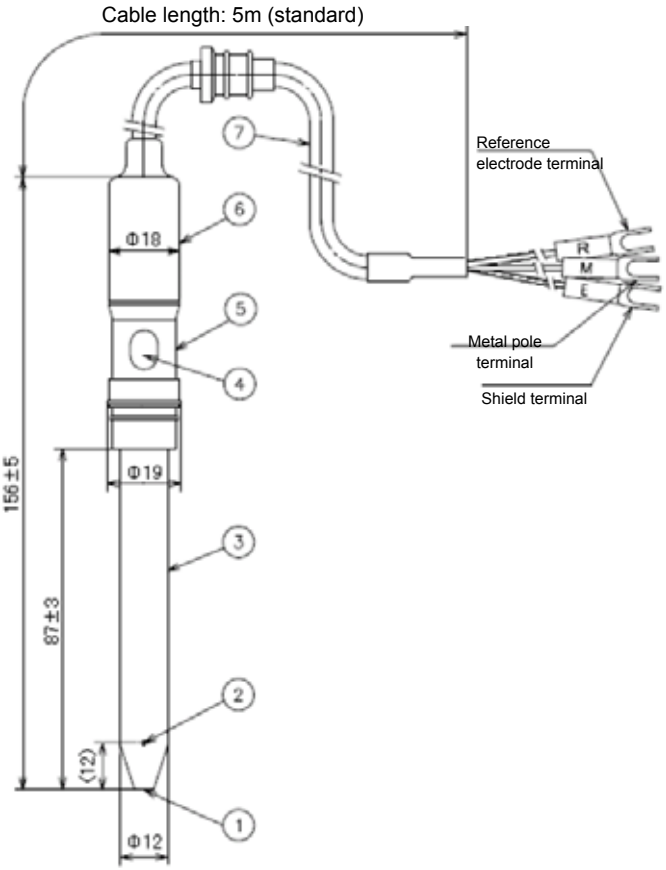
	Terminal screw	Applicable crimp-type terminal	Applicable electric wire	Screw tightening torque
④	M4	MAX8 MAX4.7 MAX8.5	5.5mm²/MAX (AWG10)	1.2~1.8N・m

Relay cable termination method



Note: Insulate the braided shields to terminals S and SE with insulating tubes or the like so that they do not come into contact with each other.
:Strip the covering (conductive plastic: black) of transparent wire up to the root.

■ORP electrode (6805/6815)



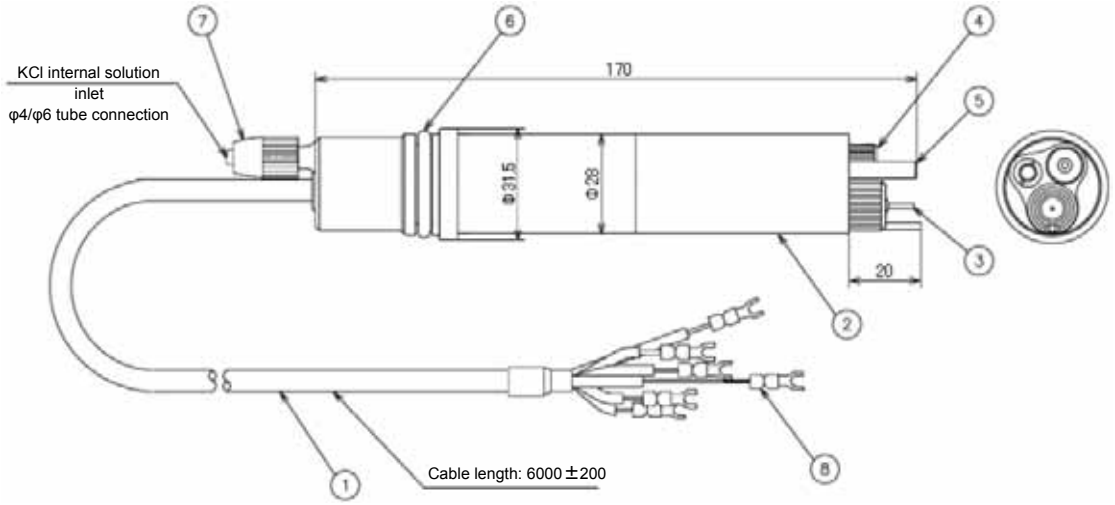
Model		6805-50B
Measuring method		Metal electrode method
Measurable range		-2000 to 2000mV
Sample water conditions	Temperature range	0 to 80°C (without freeze)
	Pressure	0 to 0.03MPa
Reference electrode	Liquid junction	Porous ceramics
	Internal fluid	3.3mol KCl (filling type)
Cable length		Standard: 5±50 mm

	PARTS	NOTES
(1)	Metal pole	Pt
(2)	Liquid junction	Porous ceramics
(3)	Supporting tube	Glass
(4)	Internal solution refilling port	
(5)	Sensor body	PP
(6)	Sensor cap	Silicone
(7)	Cable	PVC

Model		6815-50B
Measuring method		Metal electrode method
Measurable range		-2000 to 2000mV
Sample water conditions	Temperature range	0 to 80°C (without freeze)
	Pressure	0 to 0.03MPa
Reference electrode	Liquid junction	Porous ceramics
	Internal fluid	3.3mol KCl (filling type)
Cable length		Standard: 5±50 mm

	PARTS	NOTES
(1)	Metal pole	Pt+Au plating
(2)	Liquid junction	Porous ceramics
(3)	Supporting tube	Glass
(4)	Internal solution refilling port	
(5)	Sensor body	PP
(6)	Sensor cap	Silicone
(7)	Cable	PVC

■ORP electrode (6870)



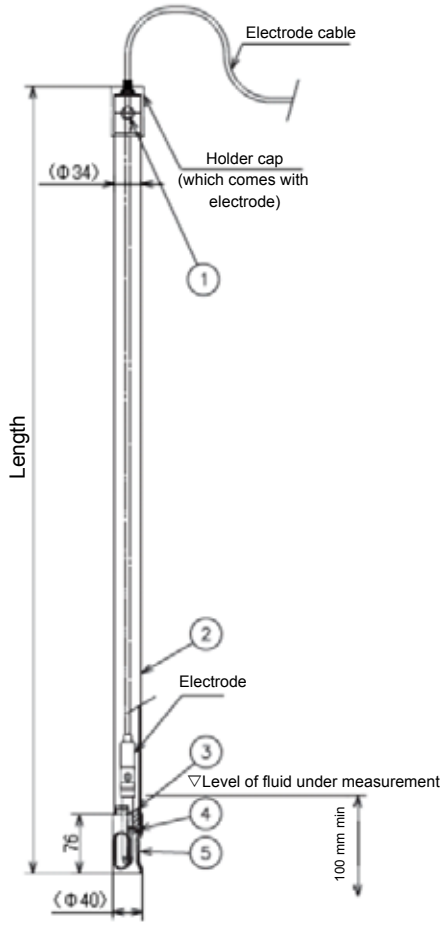
Model		6870-60B
Measuring method		Metal electrode method
Measurable range		-2000 to 2000mV
Sample water conditions	Temperature range	0 to 105°C (without freeze)
	Pressure	0 to 0.03MPa
Reference electrode	Liquid junction	Porous ceramics
	Internal fluid	3.3mol Kcl (filling type)
Cable length		Standard: 6±200 mm
Temperature sensor		Resistance-

	PARTS	NOTES
(1)	Sensor cable	
(2)	Sensor body	PPS
(3)	ORP sensor tip	
(4)	Liquid junction chip	Porous ceramics
(5)	Temperature sensor/ground pole	Ti
(6)	O-ring	FPM P22.4
(7)	Hexagon cap nut	PPS
(8)	Terminal	M3

ORP sensor tip

	Pole material	
7312	Pt	Standard
7712	Au	Optional

■ Immersion type holder (CH-101 series): Specifications and external dimensions

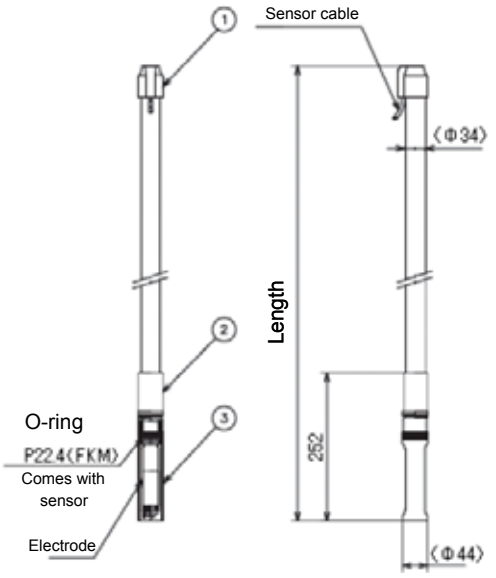


	PARTS	NOTES
(1)	Internal solution refilling port	
(2)	Holder	PP(CH-101)
		PVC(CH-101P)
		PVDF(CH-101PF)
(3)	Electrode gasket	FKM
-4	Washer	PP(CH-101、CH-101P)
		PVDF(CH-101PF)
(5)	Protective tube	PP(CH-101、CH-101P)
		PVDF(CH-101PF)

Nominal length	Length (mm)
0.5m	500±10
1m	1000±10
1.5m	1500±10
2m	2000±10
2.5m	2500±10
3m	3000±10

Model			CH-101 series	CH-101P series	CH-101PF series
Holder material			PP	PVC	PVDF
Temperature			-5 to 80°C	-5 to 50°C	-5 to 100°C
			For the actual operating temperature range, see the specifications for the electrodes to be combined.		
Pressure			Atmospheric pressure		
Flow rate			2 m/sec. max.		
Wetted material	Electrode gasket		FKM	FKM	FKM
	Washer		PP	PP	PVDF
	Protective tube		PP	PP	PVDF
Holder length (m)			0.5,1,1.5, 2, 2.5, 3		
Weight (kg)	Holder length	0.5m	Approx. 0.2	Approx. 0.23	Approx. 0.25
		1m	Approx. 0.3	Approx. 0.45	Approx. 0.45
		1.5m	Approx. 0.45	Approx. 0.67	Approx. 0.65
		2m	Approx. 0.6	Approx. 0.89	Approx. 0.85
		2.5m	Approx. 0.75	Approx. 1.11	Approx. 1.05
		3m	Approx. 0.9	Approx. 1.33	Approx. 1.25

■ Immersion type holder (HIBP series): Specifications and external dimensions

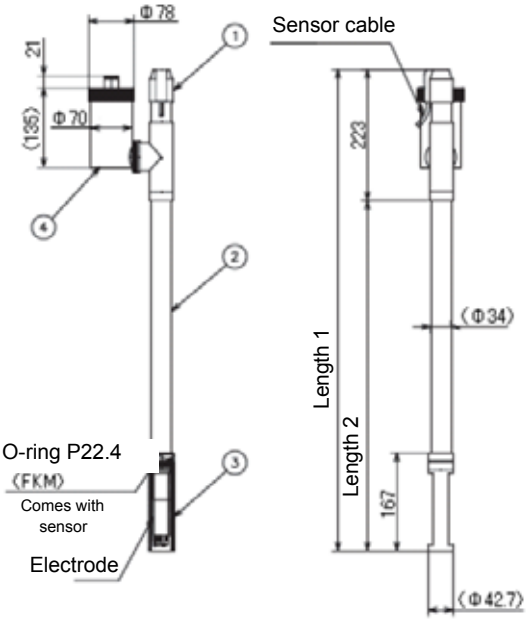


Model	HIBP
Holder material	PP
Temperature	-5 to 80°C
	For the actual operating temperature range, check the specifications of the electrodes to be combined.
Pressure	Atmospheric pressure
Flow rate	2 m/sec. max.
Wetted material	PP (excluding the electrode)

	PARTS	NOTES
(1)	Holder cap	EPT
(2)	Holder	PP
(3)	Protective tube	PP

Nominal length	Length (mm)
0.5m	772±10
1m	1272±10
1.5m	1772±10
2m	2272±15
2.5m	2772±20
3m	3272±20

■ Immersion type holder (HIBS series): Specifications and external dimensions

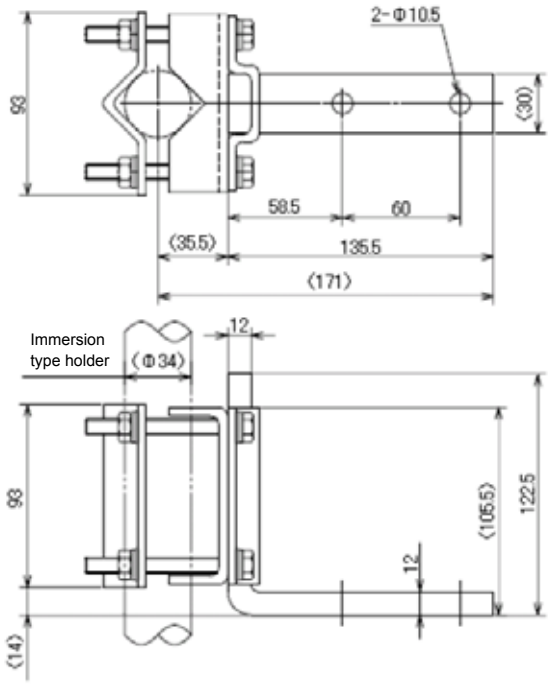


Model	HIBS
Holder material	SUS316
Temperature	-5 to 100°C
	For the actual operating temperature range, check the specifications of the electrodes to be combined.
Pressure	Atmospheric pressure
Flow rate	2 m/sec. max.
Wetted material	SUS316 (excluding the electrode)

	PARTS	NOTES
(1)	Holder cap	EPT
(2)	Holder	SUS316
(3)	Protective tube	SUS316
(4)	KCl internal solution tank	PC 300ml

Nominal length	L1 length (mm)	L2 length (mm)
0.5m	818±10	595
1m	1318±10	1095
1.5m	1818±15	1595
2m	2318±20	2095
2.5m	2818±20	2595
3m	3318±20	3095

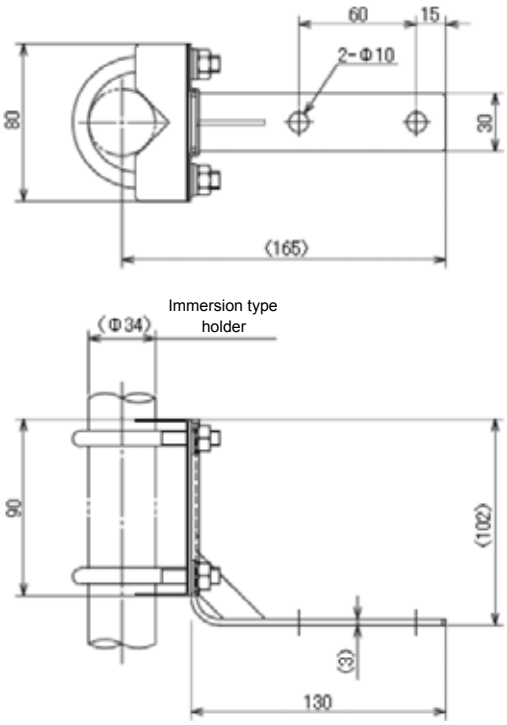
■ Mounting bracket (BA-1A): Specifications and external dimensions



Model	BA-1A
Material	ABS resin
Mounting	Anchoring

Applicable for immersion type resin-made holders of 1.5 m max.

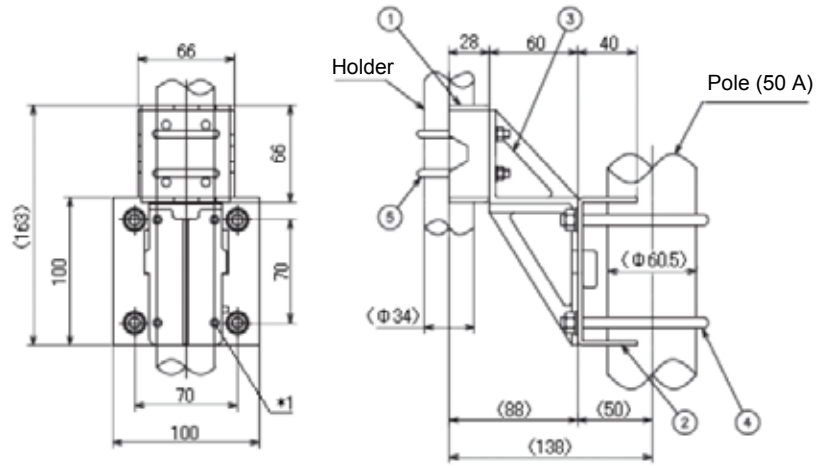
■ Mounting bracket (BA-1S): Specifications and external dimensions



Model	BA-1S
Material	SUS304
Mounting	Anchoring

Applicable for immersion type resin-made holders of 1.5 m max.

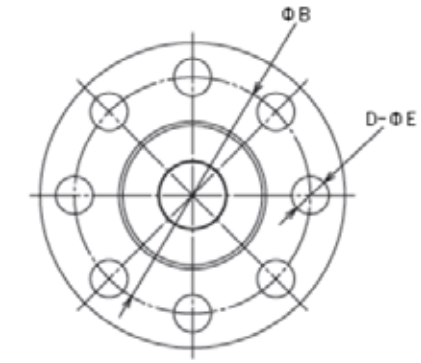
■ Mounting bracket (MB-10): Specifications and external dimensions

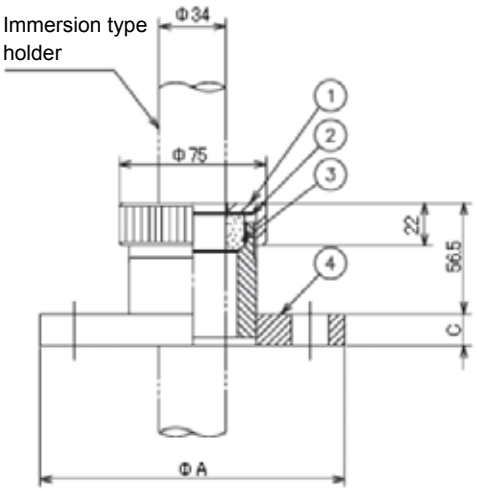


	PARTS	NOTES
(1)	Base 1	SUS304
(2)	Mounting plate	SCS13
(3)	Base 2	SUS304
(4)	U-bolt	SUS304

Mounting pipe: 50 A
*1. Wobbling or vibration, if any, may cause the immersion holder to fall off. Fasten four places with M5 screws.

■ Loose flange (FK-1 series): Specifications and external dimensions





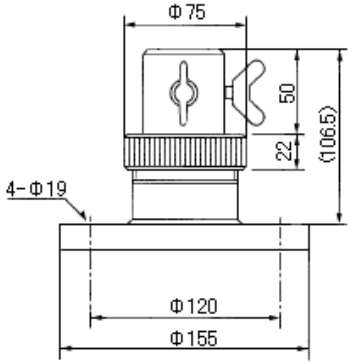
Model		FK-1	FK-1P	FK-1S
Material	Flange	PP	PVC	SUS316
	Nut	PP	PVC	SUS304
	Washer	PP	PVC	PP
	Gasket	FKM	FKM	FKM
Flange standard		JIS 10K 50A FF, etc.		

Applicable for immersion type resin-made holders of 1.5 m max.
For any combination with the CH-101PF, contact us.

	PARTS	NOTES
(1)	Hexagon cap nut	-
(2)	Washer	-
(3)	Gasket	FKM
(4)	Loose flange	-

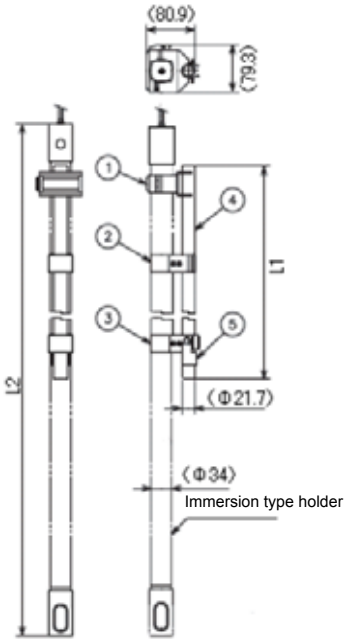
Flange standard	ΦA	ΦB	C	D-ΦE
JIS 10K 50A FF	Φ155	Φ120	16	4-Φ19
JIS 10K 100A FF	Φ210	Φ175	18	8-Φ19
JIS 10K 150A FF	Φ280	Φ240	22	8-Φ23
JIS 10K 200A FF	Φ330	Φ290	22	12-Φ23

■ Loose flange (RF-S1): Specifications and external dimensions



Model	RF-S1
Material	SUS316
Flange standard	JIS 10K 50A FF, etc.
Applicable immersion type holders	HIBS series

■ 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

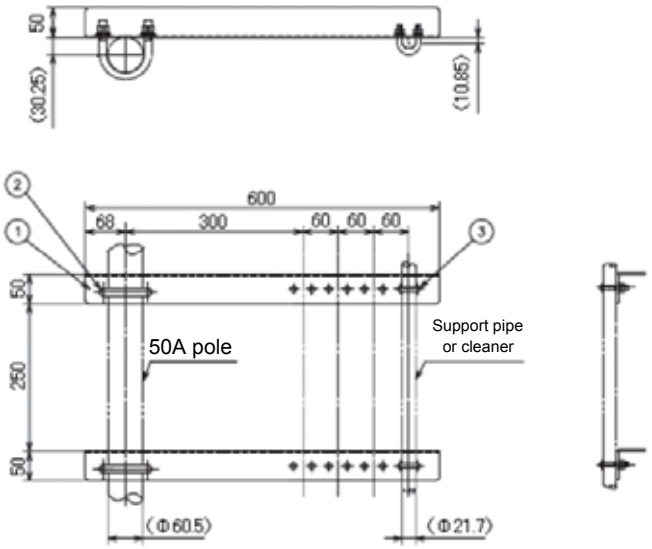
When the flow rate is fast even if the holder length is no longer than 1.5 m,the support pipe may be required.

	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 2 m or more.
For any combination with the CH-101PF, contact us.

	Support pipe L1(mm)	Immersion type holder L2(mm)
For 1m	500±10	1000 -5/+10
For 1.5m	1000±10	1500 -5/+10
For 2 m	1500±10	2000 -5/+10
For 2.5m	2000±10	2500 -5/+10
For 3m	2500±10	30000 -5/+10

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

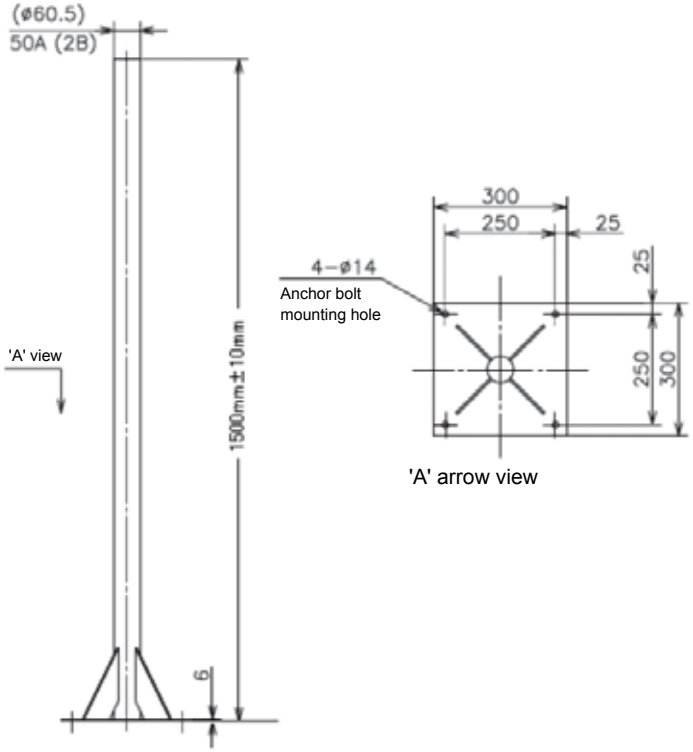


Model		MH-60
Material	Arm	SUS304
	U-bolt	SUS304
Mounting pipe		50A

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

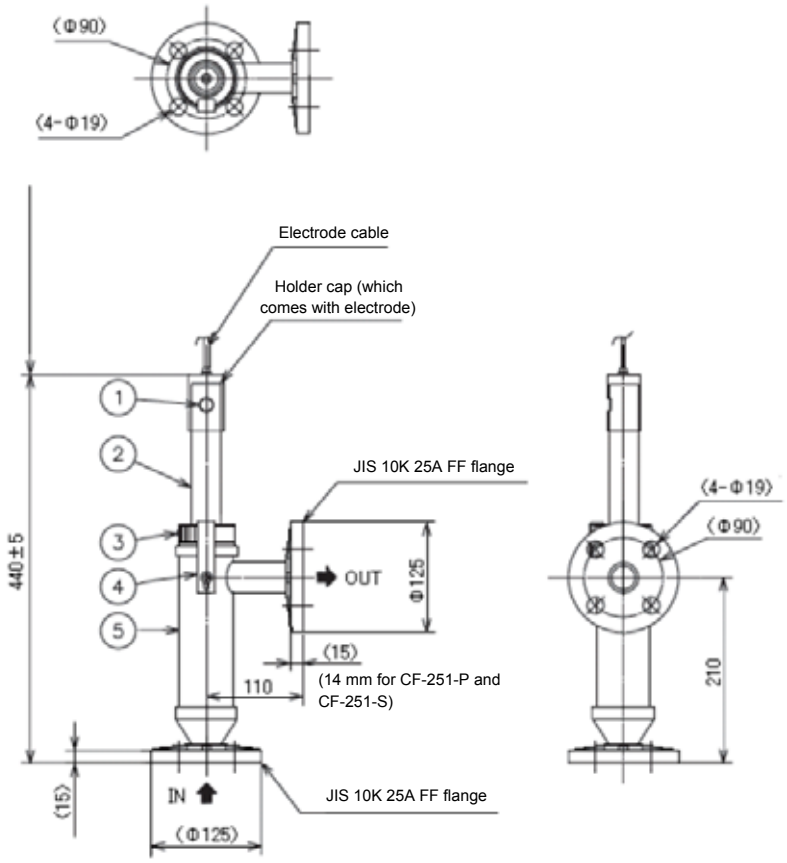
	PARTS	NOTES
(1)	Arm	SUS304
(2)	U-bolt	SUS304 stainless steel (for 50A)
(3)	U-bolt	SUS304 stainless steel (for 15A)

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



Model	PS-50
Material	SUS304
Pipe diameter	50A

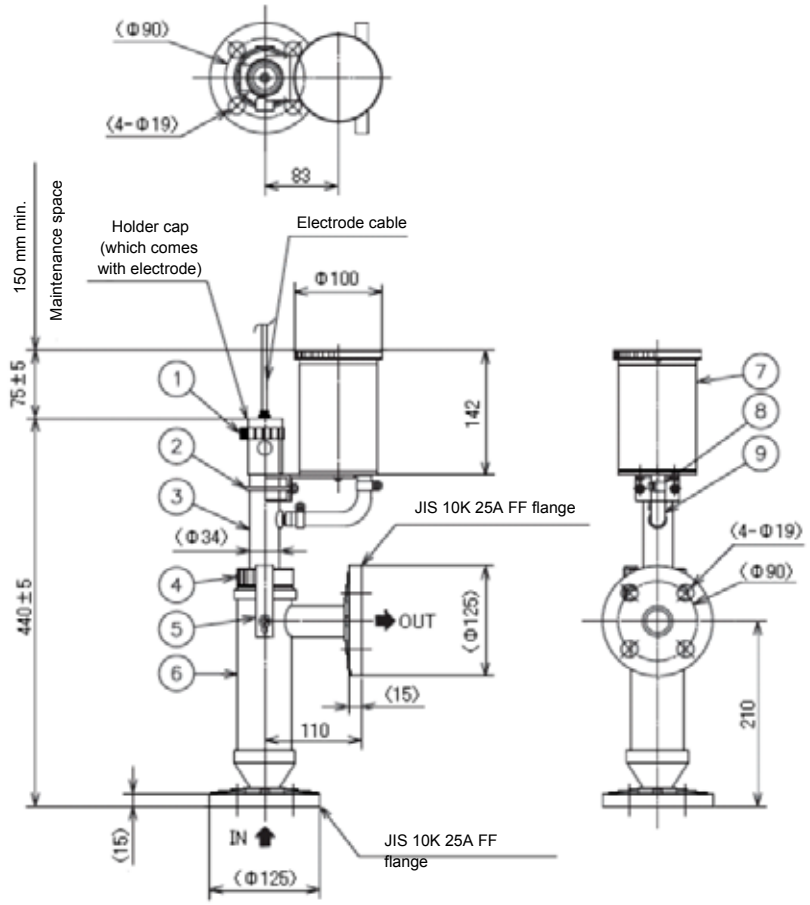
■ Flow chamber (CF-251 series): Specifications and external dimensions



Model		CF-251	CF-251P	CF-251S
Flow-through type t-holder		PP	PVC	SUS316
Ambient Temperature		-5 to 60°C	-5 to 50°C	-5 to 60°C
Conditions for measurement solution	Temperature	-5 to 80°C	-5 to 50°C	-5 to 100°
	For the actual operating temperature range, check the specifications of electrode to be combined.			
	Pressure	Atmospheric pressure		
	Flow rate	0.3 to 10L/miln		
Wetted material	Gasket	FKM	FKM	FKM
	Washer	PP	PP	PVDF
	Protective tube	PP	PP	PVDF
	If any problem with weatherability occurs under direct sunshine, use a holder made of PVC or a holder made of SUS316+PVDF. For the sample properties that affect FKM (fluorine rubber) (strong alkali, etc.), please consult with HORIBA Advanced Techno.			
Weight		Approx. 0.6kg	Approx. 0.9kg	Approx. 4.5kg

	PARTS	NOTES
(1)	Internal solution refilling port	
(2)	Holder	PP(CF-251)
		PVC(CF-251P)
		PVDF(CF-251S)
(3)	Tightening nut	PP(CF-251)
		PVC(CF-251P)
		SUS304(CF-251S)
(4)	Locking plate	SUS304
(5)	Distribution holder	PP(CF-251)
		PVC(CF-251P)
		SUS316(CF-251S)

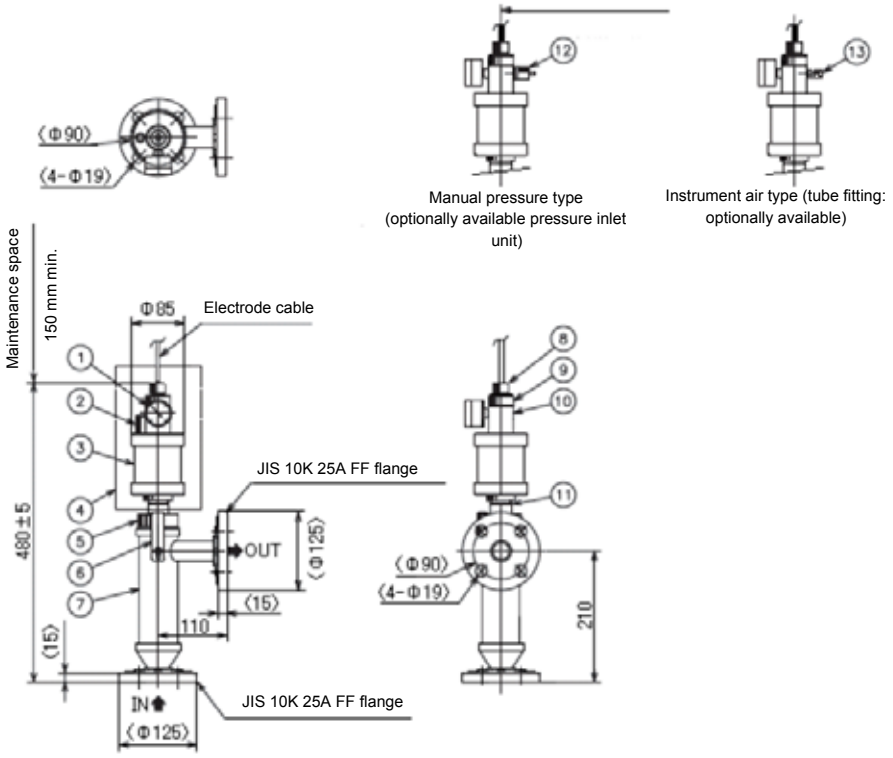
■ Flow chamber (CF-251-T series): Specifications and external dimensions



Model		CF-251-T	CF-251P-T	CF-251S-T
Holder material		PP	PVC	SUS316
Ambient Temperature		-5 to 60°C	-5 to 50°C	-5 to 60°C
Conditions for measurement solution	Temperature	-5 to 80°C	-5 to 50°C	-5 to 100°C
	For the actual operating temperature range, see the specifications for the electrodes to be combined.			
	Pressure	Atmospheric pressure		
	Flow rate	0.3 to 10L/miln		
Wetted material	Gasket	FKM	FKM	FKM
	Washer	PP	PP	PVDF
	Protective tube	PP	PP	PVDF
	If a problem arises with weather resistance under direct sunlight, use a model made of PVS or SUS 316 stainless steel plus PVDF. For any sample with properties (strong acidity) that corrode fluorine-contained rubber (FKM), contact us.			
Weight		Approx. 1.3kg	Approx. 1.6kg	Approx. 5.2kg

	PARTS	NOTES
(1)	Clamping band	SUS304
(2)	Mounting bracket	SUS304
(3)	Holder	PP(CF-251-T)
		PVC(CF-251P-T)
		PVDF(CF-251S-T)
(4)	Tightening nut	PP(CF-251-T)
		PVC(CF-251P-T)
		SUS304(CF-251S-T)
(5)	Locking plate	SUS304
(6)	Distribution holder	PP(CF-251-T)
		PVC(CF-251P-T)
		SUS316(CF-251S-T)
(7)	KCl tank	PVC
(8)	Hose band	SUS304
(9)	Hose	PVC

■ Flow chamber (CF-301 series): Specifications and external dimensions

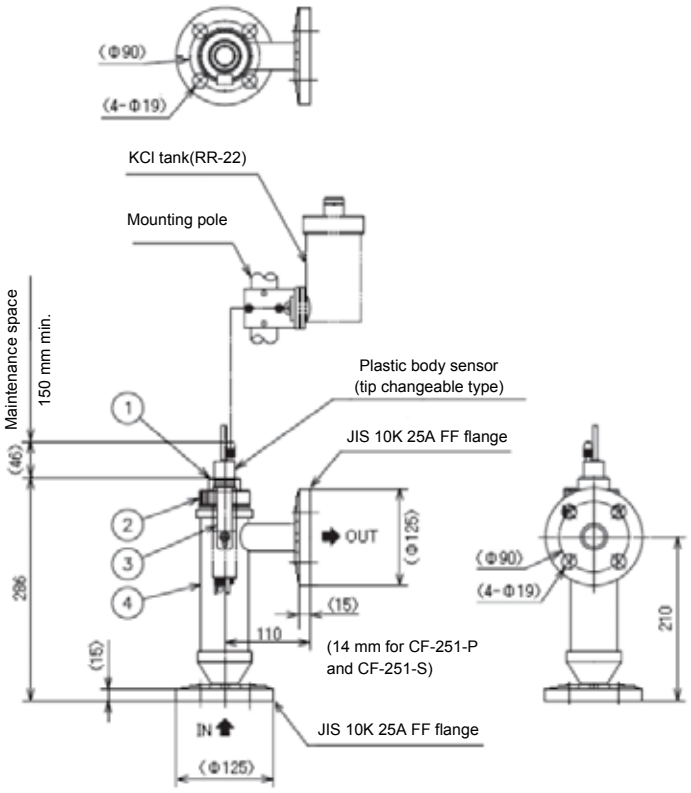


	PARTS	NOTES
(1)	Pressure gauge	0 to 0.5MPa
(2)	KCl inlet	PVC
(3)	KCl tank	PVC(CF-301/CF-301P)
		PP(CF-301S)
(4)	Pressure holder	
(5)	Tightening nut	PP(CF-301)
		PVC(CF-301P)
		SUS304(CF-301S)
(6)	Locking plate	SUS304
(7)	Distribution holder	PP(CF-301)
		PVC(CF-301P)
		SUS316(CF-301S)
(8)	Cable cap	PPO
(9)	Holder cap	PPO
(10)	Pressure mating screw	Rc1/8
(11)	Holder	PP(CF-301)
		PVC(CF-301P)
		SUS316(CF-301S)
(12)	Pressure union	C3604
(13)	Fitting	for tube PVDF of 6 mm o.d./4 mm i.d.

Model		CF-301	CF-301P	CF-301S
Material for flow-through type holder		PP	PVC	SUS316
Ambie		-5 to 60°C	-5 to 50°C	-5 to 60°C
Conditions for measurement solution	Temperature	-5 to 80°C	-5 to 50°C	-5 to 100°C
		For the actual operating temperature range, check the specifications of electrode to be combined.		
	Pressure	-5 to 40°C:0.30MPa 40 to 60°C:0.22MPa 60 to 80°C:0.15MPa	-5 to 40°C:0.30MPa 40 to 50°C:0.15MPa	-5 to 40°C:0.30MPa 40 to 60°C:0.25MPa 60 to 80°C:0.20MPa 80 to 100°C:0.15MPa
	Flow rate	0.3 to 10L/min		
Wetted material	Gasket	FKM	FKM	FKM
	Washer	PP	PP	PVDF
	Protective tube	PP	PP	PVDF
	If there is a problem with weather resistance under direct sunlight, use the version made of PVC or of SUS316 stainless steel plus PVDF. For the sample properties that affect FKM (fluorine rubber) (strong alkali, etc.), please consult with HORIBA Advanced Techno.			
Bore Size of Measured Liquid Connection		JIS 10K 25A FF flange		
Pressurizing Inlet for Holder's Internal Pressure (*1)		Rc 1/8		
Weight		Approx. 1.2kg	Approx. 1.5kg	Approx. 5.1kg

*1 Maintain a pressure in the Pressurizing Holder at the level of 0.03 to 0.05 MPa higher than a measured liquid pressure at all times.
If periodical pressurization is manually performed, separately place a purchase order for optional parts: pressurizing inlet and hand pump.
Holders are detached at the time of maintenance. So use a flexible pipe for instrument air.
Provide a regulator with a mist cap and a filter to an instrument air line.

■ Flow chamber (CF-501 series): Specifications and external dimensions



Flow-through holders CF-501

	PARTS	NOTES
(1)	Sensor adaptor	PP
(2)	Tightening nut	PP
(3)	Locking plate	SUS304
(4)	Distribution holder	PP

Flow-through holders CF-501P

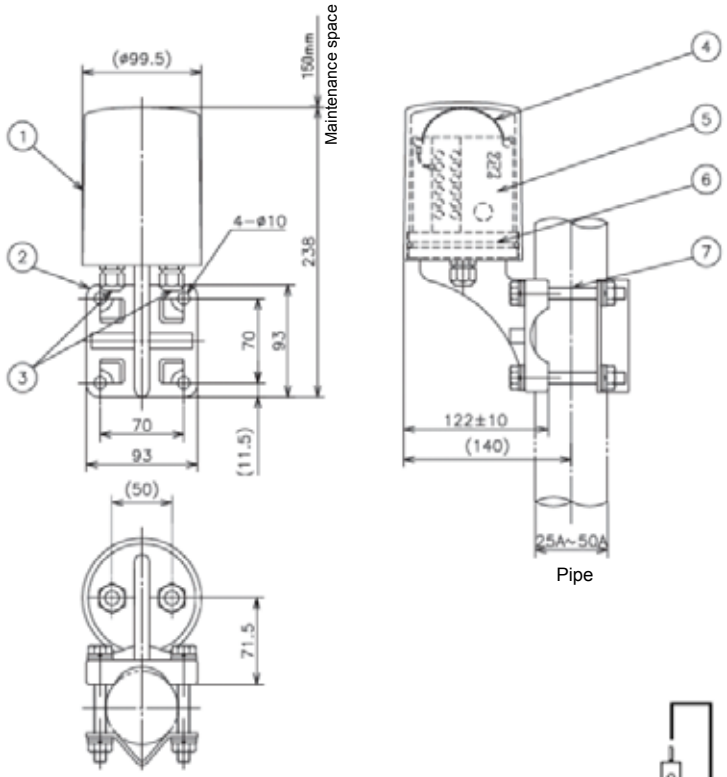
	PARTS	NOTES
(1)	Sensor adaptor	PVC
(2)	Tightening nut	PVC
(3)	Locking plate	SUS304
(4)	Distribution holder	PVC

Flow-through holders CF-501S

	PARTS	NOTES
(1)	Sensor adaptor	PPS
(2)	Tightening nut	SUS304
(3)	Locking plate	SUS304
(4)	Distribution holder	SUS316

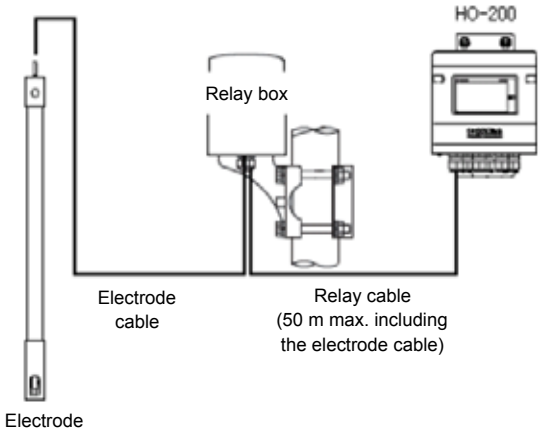
Model		CF-501	CF-501P	CF-501S
Ambient Temperature		-5 to 60°C	-5 to 50°C	-5 to 60°C
Conditions for measurement solution	Temperature	-5 to 80°C	-5 to 60°C	-5 to 100°C
		Working temperature ranges vary with combinational electrodes. Check the working temperature of an electrode. Moreover, measurements cannot be made when a measured liquid is in a freezing or boiling state.		
	Pressure	Atmospheric pressure (with outlet being open)		
	Flow rate	0.3 to 10L/miln		
Wetted material		PP, FKM	PVC, PP, FKM	SUS316, PPS, FKM
Bore Size of Measured Liquid Connection		JIS 10K 25A FF flange		
Weight		Approx. 0.6kg	Approx. 0.9kg	Approx. 4.2kg
Special Note		• Be sure to use it in combination with the KCl Tank (RR-22). This product is not supplied with the electrode/KCl tank. •If any problem with weatherability occurs under direct sunshine, use a holder made of PVC or a holder made of SUS316+PVDF. For the sample properties that affect FKM (fluorine rubber) (strong alkali, etc.), please consult with HORIBA Advanced Techno.		

■ Relay box (CT-25pH/CT-20pH): Specifications and external dimensions

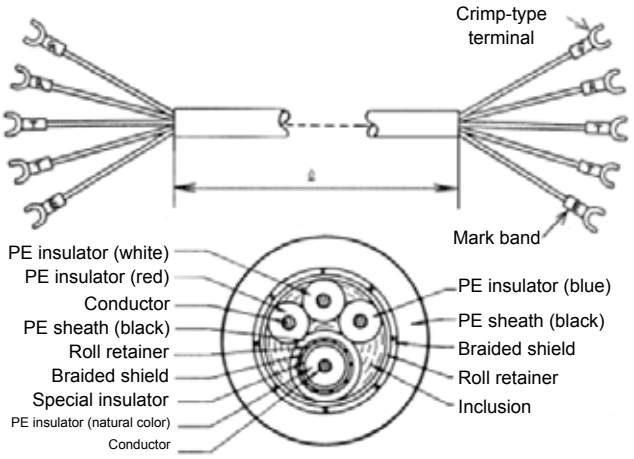


	PARTS	NOTES
(1)	Cover	ABS
(2)	Bracket	ABS
(3)	Wiring hole	
(4)	Spring	SUS304
(5)	Terminal board	ABS
(6)	O-ring	NBR
(7)	Bolt (provided)	SUS304 M8

When the distance between the sensor and the converter is longer than the sensor 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.



■ Relay cable (C-5A): Specifications and external dimensions



Characteristics

Conductor resistance	63.2Ω/km max.
Withstand voltage	Shall withstand 1000 VAC for 1 minute.
Insulation resistance	10000MΩ/km
Rated temperature	90℃
Capacitance	150 PF/m max.

To extend the standard cable of 5 m for the pH electrode, use this item.
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.

The above requirements differ depending on the relay cable type.

■ Installation (power source, transmission, etc.)

The description of the following installation (power source, transmission, etc.) assumes that the HP-200 is of the standard specification.
For the HP-200, the optionally available cleaner may be installed.
The installation of the HP-200 with the cleaner will be described in the section for the cleaner.

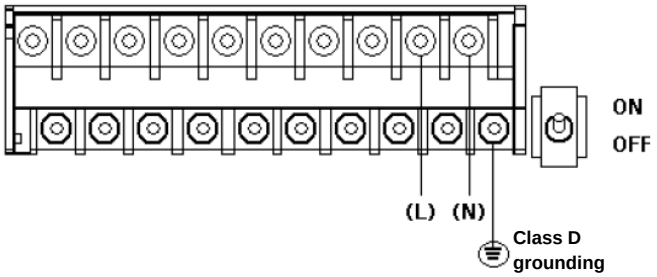
Carry out the installation of execution of work while paying attention to the following points

Power source
•The HO-200 is provided with a power switch.
•Operation outside the rated range can cause a fault. Therefore check the power supply voltage.
•Check that fluctuations of the power supply voltage fall within +/-10%.

Provide the power switch in a place near the HP-200 so that the power can be turned ON/OFF. If lightning might strike, install an arrester on the output side of the HP-200 and on the side of receiving instruments.

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

Supply power	Voltage: 100 to 240 VAC
	Frequency: 50/60 Hz
Terminal screw	M4
Applicable electric wire	0.75 to 5.5mm(AWG18 to 10)



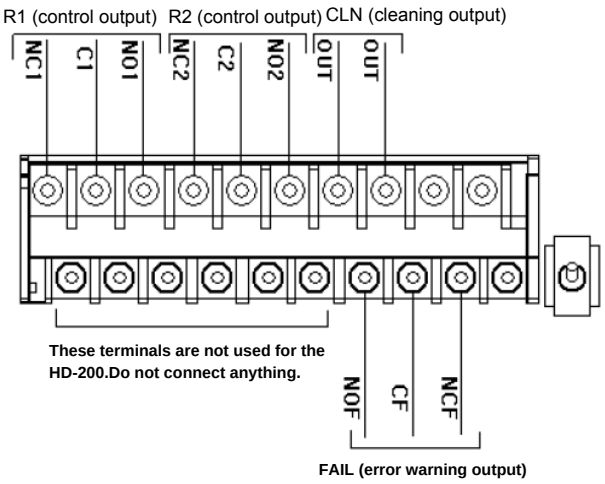
Output terminal
•If noise is included in the load, use a varistor or a noise killer.

Only the CLN output involves voltage, providing the connected power supply voltage. The others are no-voltage contact outputs.
For only the FAIL output, the positions of NO and NC are reversed. In the normal state (not FAIL), the CF-NOF contact is open and the CF-NFC contact is short-circuited. When the power is OFF, the C-NOF contact is short-circuited.

The reserved terminals are connected internally.
Do not connect anything.

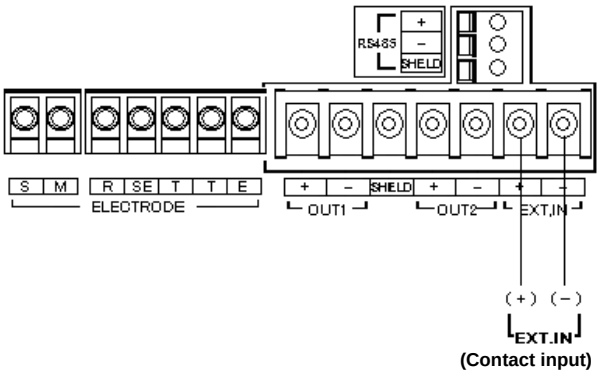
•To connect any load exceeding the contact capacity or any induction load (e.g., a motor or a pump), be sure to use a power relay exceeding the load rating.
•When the HO-200 is OFF, the C-NC contact between R1 and R2 is short-circuited. Therefore, exercise care in connecting a load.

Contact Capacity:	250 VAC, 3A max. or 30VDC, 3A max.
Terminal screw	M4
Applicable electric wire	0.75 to 5.5 mm2 (AWG18 to 10)



Contact input
•Use a shielded cable.
•If the HO-200 might be affected by lightning, install an arrestor on the output side of the HO-200 and the receiving instrument side.

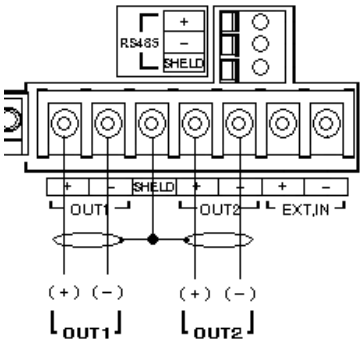
Contact input resistance	100Ω/km max.
Terminal screw	M3.5
Applicable electric wire	0.75 to 5.5 mm2 （AWG18 to 10）



(Contact input)

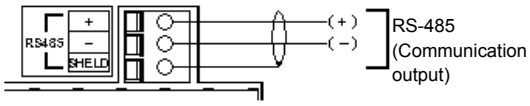
Transmission output
•For the transmission output cable, use a shielded cable.
•If the HO-200 might be affected by lightning, install an arrestor on the output side of the HO-200 and the receiving instrument side.
•The negative terminal (OUT1) (-) and OUT2 (-) for the transmission output are internally connected and have the same electric potential.

Maximum load resistance	900Ω
Terminal screw	M3.5
Applicable electric wire	2mm^2 (AWG14) MAX



(Transmission output)

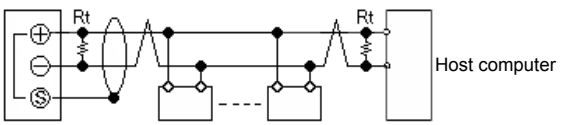
RS-485
•For the communication output cable, use a twisted shielded pair.
•The communication cable length is 500 m maximum.
•Use a terminating resistor (Rt: 120Ω) for any device at which the RS-485 communication line is terminated.
A maximum of 32 units including the host computer may be connected. Specify their addresses.



RS-485 communication conditions	Baud rate	19200 bps
	Character length	8 bit
	Parity	non
	Stop bit	1 bit

Example of external connection for communication

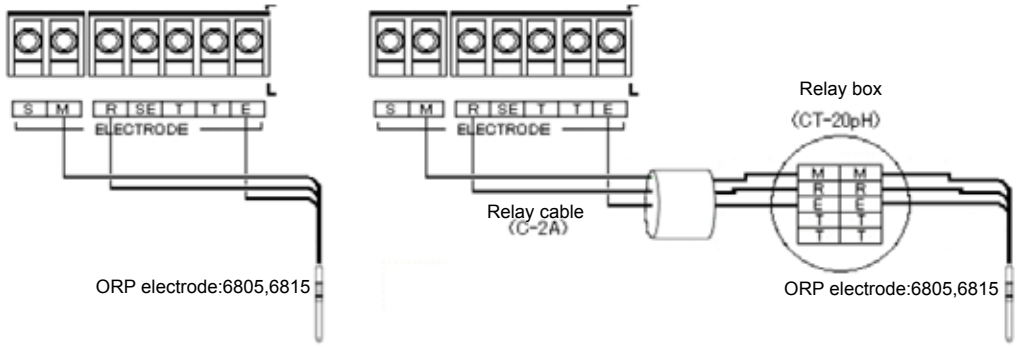
HO-200
RS-485 (communication output)



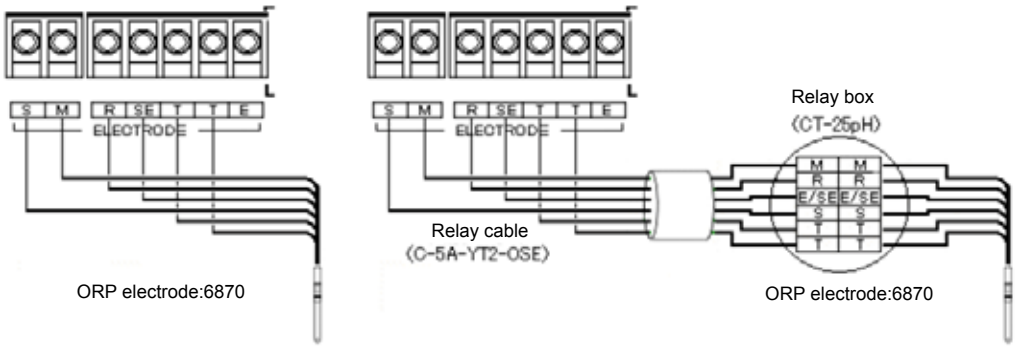
Electrode cable
The electrode cable is highly insulated. Exercise care in handling the sensor cable.
Do not wet any cable terminal or the terminal block with water or the like; also do not soil it with dirt, oil, or the like. The insulation will otherwise deteriorate. The decreased insulation causes 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.
In wiring, give a margin to the sensor cable length for checks with standard solutions and for the inspection and replacement of the sensor.
Keep the sensor cable and the relay cable away from any motor and other inductive device and their power cables.

ORP electrode	S: Shielded drive terminal on ORP electrode
	M: ORP electrode terminal
	R: Reference electrode terminal
	SE: Wetted pole terminal
	T, T:Temperature compensation electrode terminal
	E: Shielded terminal

Connection method for ORP electrodes 6805 and 6815 without S-terminal, SE-terminal, or temperature ele



Connection methods for ORP electrodes 6870, etc. with S-terminal, SE-terminal, or temperature electrode



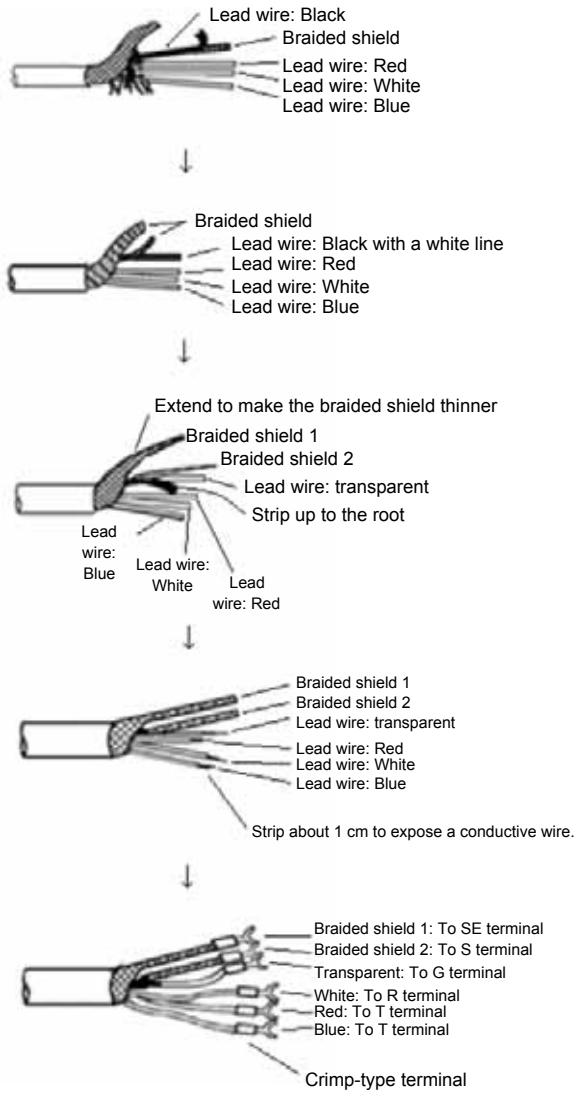
Extending the sensor cable

•Be sure to use the dedicated relay cable and relay box when necessary.

- Extension cable (C-5A) exclusively for electrode cable
- Dedicated relay box (CT-25pH)

•The extendable distance between the HO-200 and the electrode is 50 m maximum.
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



Strip covering of the lead wire (black) up to a place near the remaining covering of the electrode cable and then take out the braided shield for that lead wire.

Strip covering of the lead wire (black with a white line).

Strip covering of the lead wire (black with a white line) and strip covering (conductive plastic: black with a white line) up to the root of the transparent lead wire.

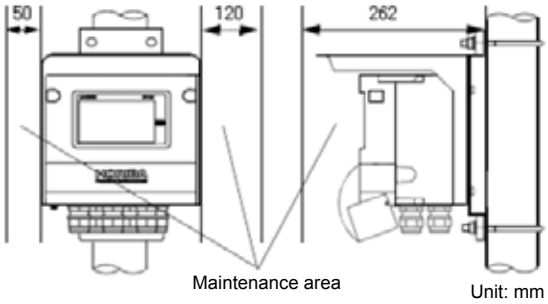
Strip each of the lead wires so that its copper wire end is exposed about 1 cm.
Cover each of braided shields 1 and 2 with a shrinking tube to avoid short-circuit.

Crimp the conductive wire with a crimp tool.

■ Installation (mounting)

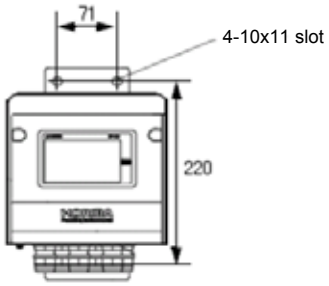
The description of the following installation (mounting) assumes that the H O-200 is of the standard specification.
For the HO-200, the optionally available cleaner may be installed.
The installation of the HO-200 with the cleaner will be described in the section for the cleaner.

Main unit (as mounted on the pole)



The body may be mounted on the pole or the wall.
•For pole mounting, use a 50A pole.
•In either case, mount the body considering maintenance space.

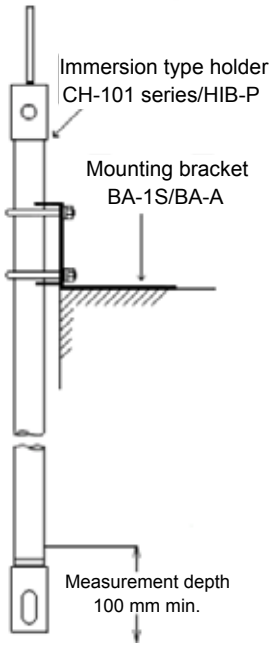
Body (to be wall-mounted)



Immersion holder + mounting bracket (BA-1A or BA1S)

The mounting bracket BA-1A or BA-1S should be secured with 2-Φ10 bolts.
•In mounting the immersion holder, ensure that it is located 250 mm minimum above slab.
•In installing the immersion holder, ensure that its lower part is immersed 100 mm minimum in the sample water.

•The length of the immersion holder (made of resin) must be 1.5 m maximum.

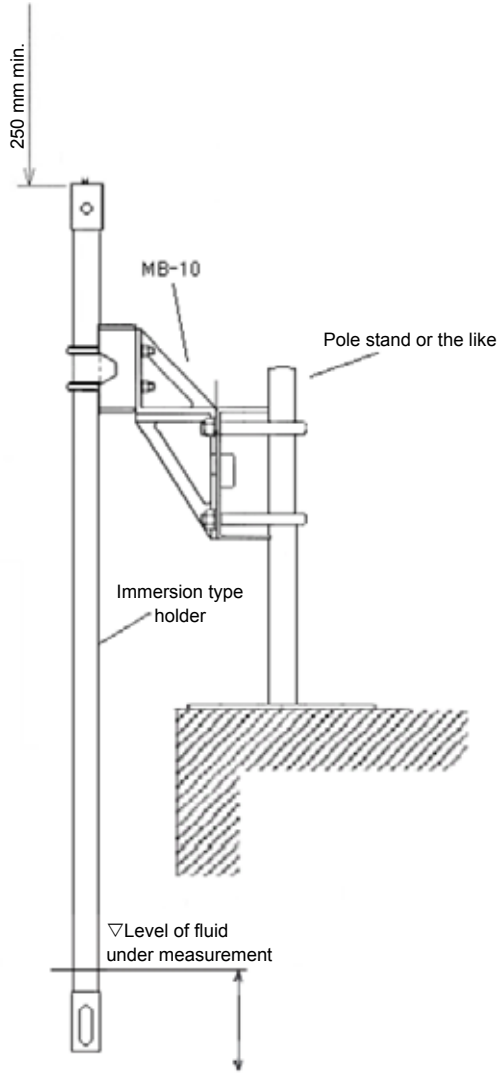


Immersion holder + mounting bracket (MB-10)

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

•In mounting the immersion type holder with the MB-10, position it about 250 mm above the U-bolt on the MB-10.

•In installing the immersion holder, ensure that its lower part is immersed 100 mm minimum in the sample water.



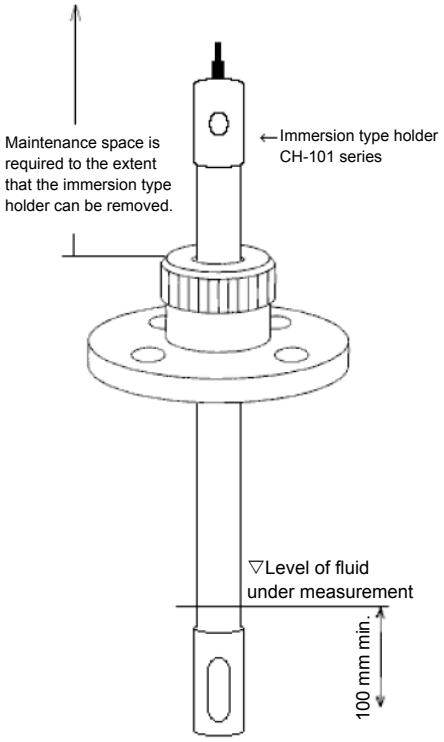
Immersion type holder + loose flange (FK-1 series)

•For the FK-1 series, the basic size is JIS 10K 50A FF. Before installing a loose flange of any special type, check its size.

In installing the immersion holder on the FK-1 series, ensure that it is positioned 200 mm minimum above the hexagon cap nut on the loose flange.

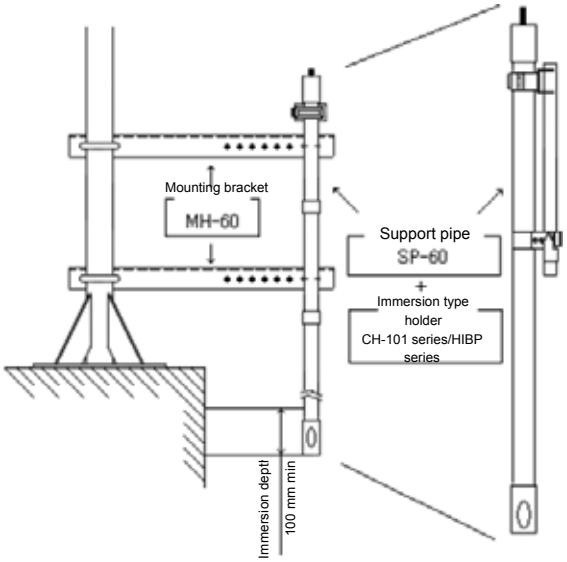
•In installing the immersion holder, ensure that its lower part is immersed 100 mm minimum in the sample water.

•The mountable immersion type holder is limited to 1.5 m.



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

•When an immersion holder of 1.5 mm or longer is used, it is recommended that the immersion holder is secured using the support pipe.
•Before using the support pipe, check the length of the immersion holder. [The length enabling the use of an immersion holder (holder length) and a support pipe is predetermined.])
•The immersion holder must be secured to the support pipe when used.
•To use the support pipe, secure it with the mounting bracket (MH-60).
•The mounting bracket MB-60 should be secured to the 50A pole.
•In installing the immersion holder, ensure that its lower part is immersed 100 mm minimum in the sample water.



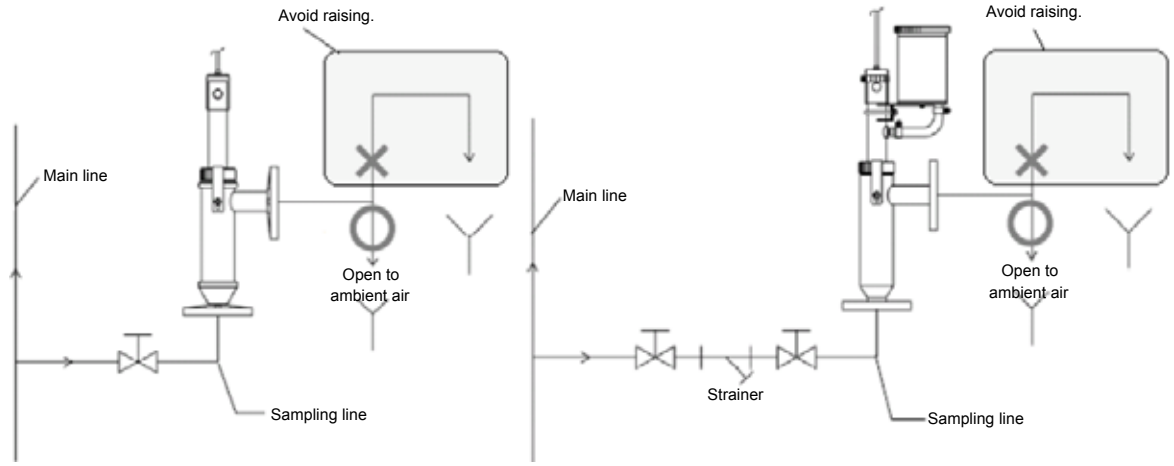
Flow chamber

•The CR-251 and CF-501 series flow chambers are used when the water under measurement has no pressure applied (pressure released at outlet) JIS 10K 25A FF is the basic mating size. Before installing a flow chamber of any special type, check its size.

•Make sure that the holder is installed upright.

CF-251 series/CF-501 series
•Install a valve at the inlet on the flow chamber.
Minimize the piping length at the outlet so that no back pressure is applied. (The piping at the outlet is open to the atmosphere.))
• Do not use a riser for outlet piping.
Back pressure will be applied to the inside of the flow chamber, causing the liquid under measurement to reversely leak into the ORP electrode. This will prevent you from carrying out accurate measurements. The ORP electrode exposed to the reverse leakage cannot be used.

Provide a bypass line from the main line so that the sample flows to the upper lateral side from under the flow chamber.
Be sure to provide a valve on the influx side. If the flow rate of the liquid under measurement is too fast, the readout may fluctuate because of the occurrence of cavitation or the pressurization of the liquid junction of the ORP electrode by the flow rate. If the flow rate is too slow, the response of the readout will be delayed. Control the flow rate with the conditions of tl liquid under measurement.
•If many suspended solids are contained in the measured liquid, provide a strainer on the inflow side of the Distribution Holder.



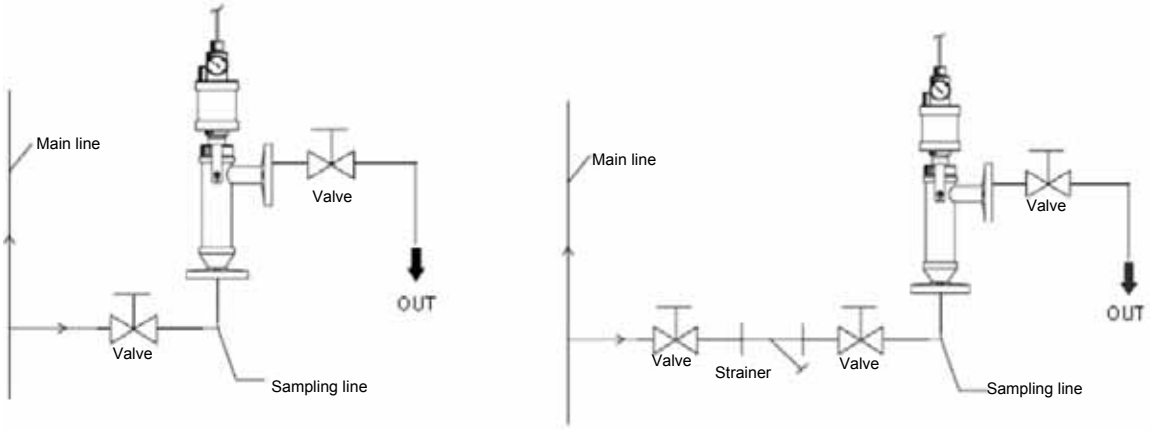
Flow chamber

•The CF-301 series flow chamber is used by pressuring the inside of the holder when the sample water has pressure. Its basic size is JIS 10K 25A FF. Before installing a flow-through holder of any special type, check its size.

•Make sure that the holder is installed upright.

CF-301 series
•Also provide a valve at the inlet and outlet of the flow chamber.
•Maintain the pressure in the pressurization holder 0.03 to 0.05 MPa higher than the water pressure.
•To use instrument air, use a flexible hose considering maintenance easiness.

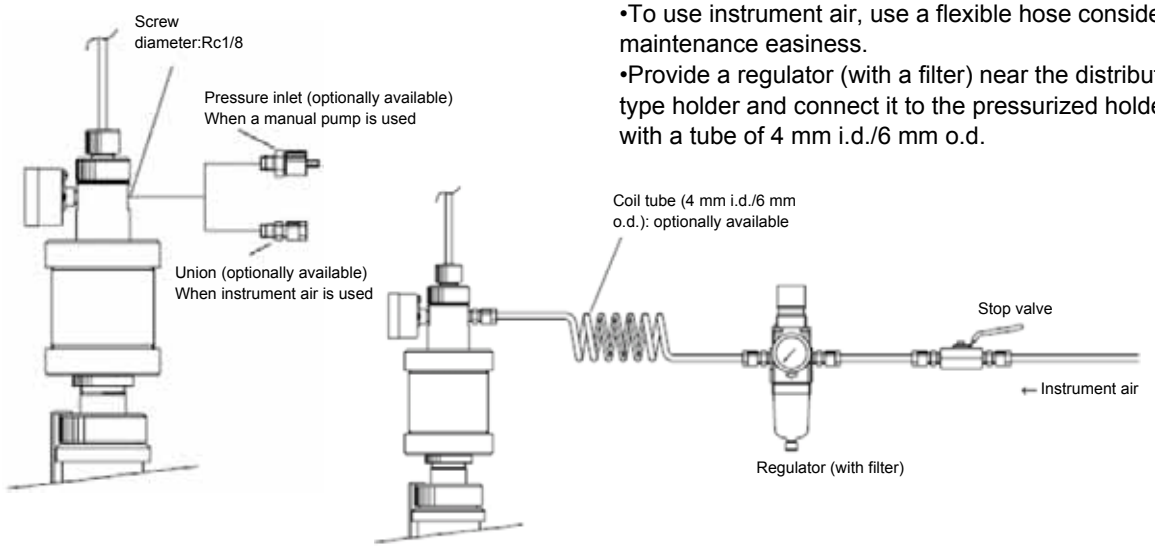
Provide a bypass line from the main line so that the sample flows to the upper lateral side from under the flow chamber.
Be sure to provide a valve on the influx side. If the flow rate of the solution under measurement is too fast, the reading may fluctuate with occurrence of cavitation or application of pressure to the sensor liquid junction due to the flow rate. If the flow rate is too slow, the response of the readout will be delayed. Control the flow rate with the conditions of the liquid under measurement.
•If many suspended solids are contained in the measured liquid, provide a strainer on the inflow side of the Distribution Holder.



Pressurization

•For pressurization with an inflator, use the pressure inlet.
•Maintain the pressure in the pressurized holder in 0.03 to 0.05 MPa higher than sample water pressure.
•To use instrument air, use a flexible hose considering maintenance easiness.

For pressurization with instrument air, use a union.
•Maintain the pressure in the pressurized holder in 0.03 to 0.05 MPa higher than sample water pressure.
•To use instrument air, use a flexible hose considering maintenance easiness.
•Provide a regulator (with a filter) near the distribution type holder and connect it to the pressurized holder with a tube of 4 mm i.d./6 mm o.d.



Immersion type ultrasonic cleaner for H-1 series

UCH-series

■ Overview

●This cleaner is designed to remove foreign matter adhering to the electrode or to prevent the electrode from being contaminated.
The electrode is irradiated with ultrasonic waves and this cavitation effect removes dirt adhering to the electrode.
In order to improve the cleaning effect, ultrasonic waves are intermittently oscillated (burst oscillation).

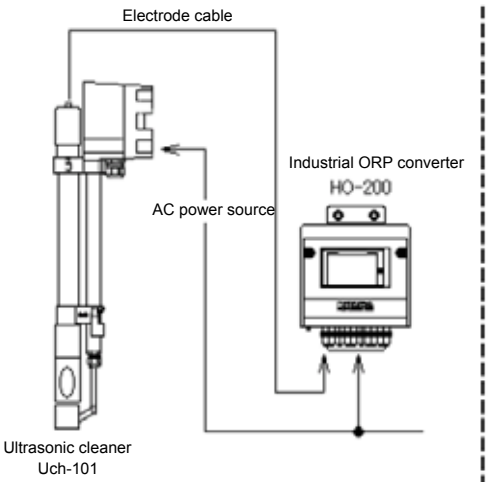
■Objects

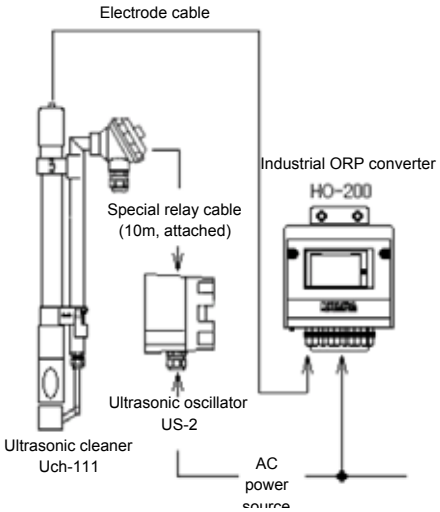
The Ultrasonic Cleaner is relatively effective to the following objects.
However, its effect differs with various conditions and is not guaranteed.

Properties	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.	○

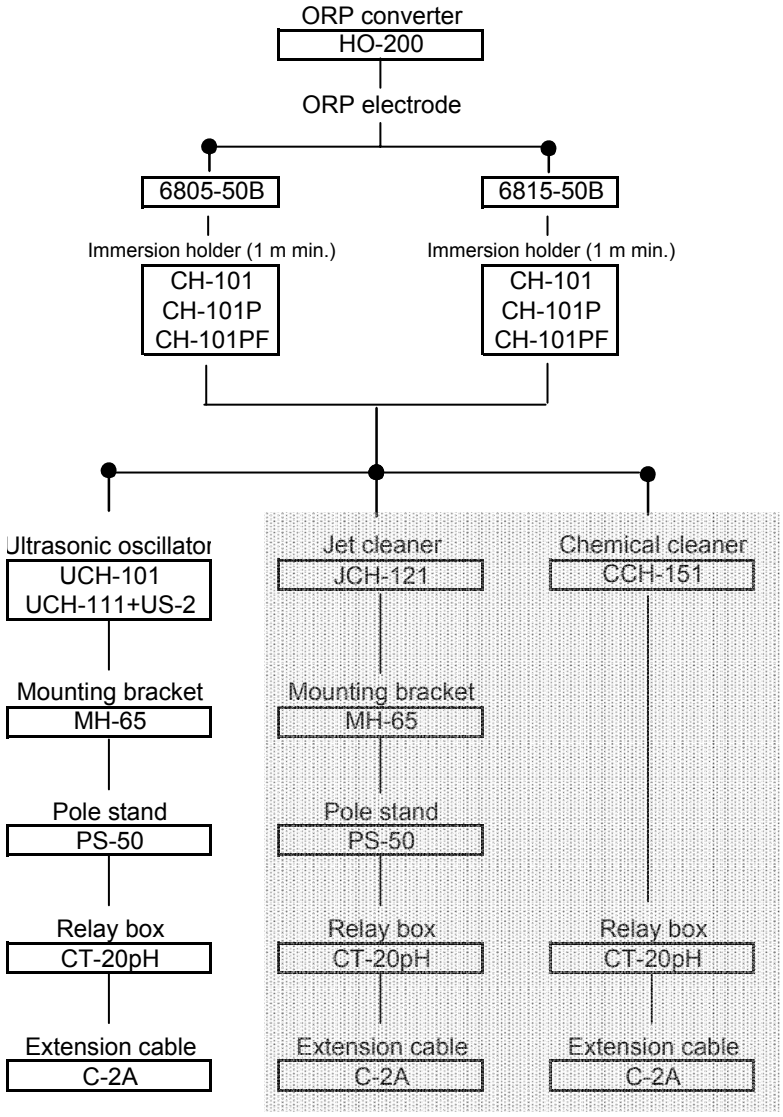
⊙:Good ○:Acceptable ×:Not acceptable

System configuration





■Combination (immersion type ultrasonic cleaner)



■Specification (UCH-101 and UCH-111)

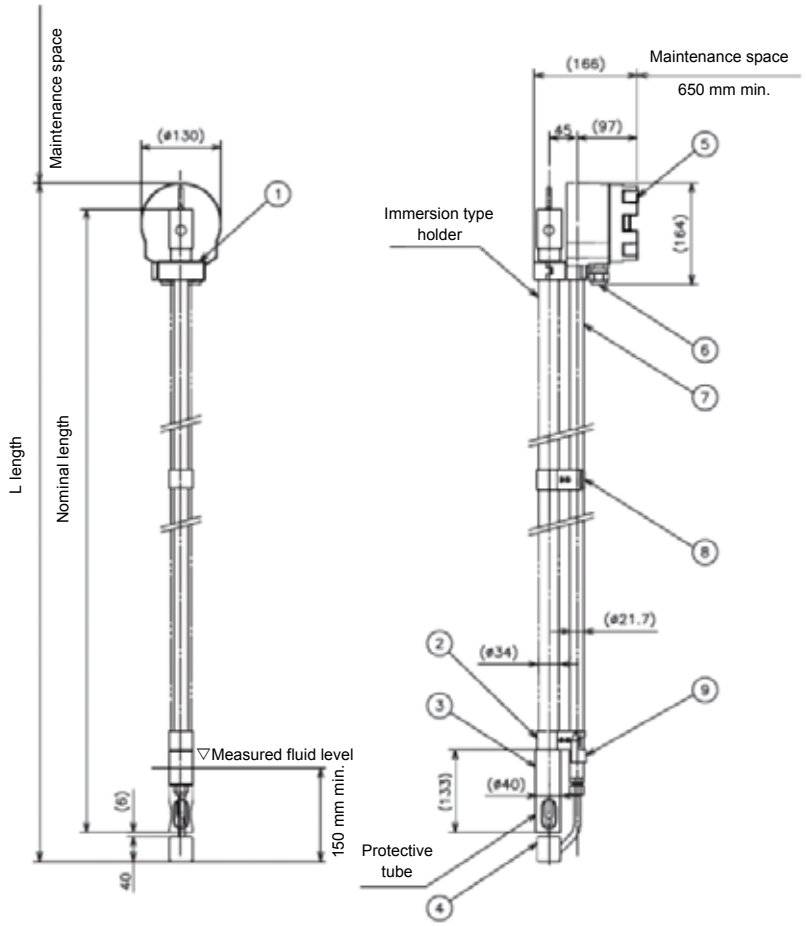
Product name		Ultrasonic cleaner for immersion type (incorporating the ultrasonic oscillator into a single unit)
Model		UCH-101
Supply Voltage		AC 100 to 240V　50/60Hz
Permissible Voltage Variation Range		90% to 110% of supply voltage
Power consumption		10VA
Cleaning Method		Ultrasonic wave continuous irradiation system
Control System		Burst system by oscillation time control
Oscillation Frequency		Approx. 70kHz
Ambient Temperature		-5 to 50°C
Ambient Humidity		5% to 90% RH (No condensation)
Temperature of liquid under measurement (*1)		-5°C to 80°C (non-freezing)
Flow Velocity of Measured Liquid		2 m/sec. max.
Measuring liquid pressure		Atmospheric pressure
Wetted material		SUS316 (not including an electrode and materials for Immersion Holders)
Weight		Approx. 4.0kg (when immersion type holder is 1 m long)
Oscillator 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 electrodes and an Immersion Holder.

*1: The operating temperature range differs depending on the combined electrode and holder. Refer to the temperature of each product in the specification.

Product name		Ultrasonic cleaner for immersion type (with ultrasonic oscillator separately installed)
Model		UCH-111
Supply Voltage		AC 100 to 240V　50/60Hz
Permissible Voltage Variation Range		Supply Voltage 90 to 110%
Power consumption		10VA
Cleaning Method		Ultrasonic wave continuous irradiation system
Control System		Burst system by oscillation time control
Oscillation Frequency		Approx. 70kHz
Ambient Temperature		-5 to 50°C
Ambient Humidity		5% to 90% RH (No condensation)
Temperature of liquid under measurement (*1)		-5°**C** to 80°**C** (non-freezing)
Flow Velocity of Measured Liquid		2 m/sec. max.
Measuring liquid pressure		Atmospheric pressure
Wetted material		SUS316 (not including an electrode and materials for Immersion Holders)
Weight	Oscillator	Approx. 2.0kg
	Vibrator holder	Approx. 2.5kg (when immersion type holder is 1 m long)
Oscillator 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 electrodes and an Immersion Holder.

*1: The operating temperature range differs depending on the combined electrode and holder.Refer to the temperature of each product in the specification.

■External dimensions (UCH-101)



	PARTS	NOTES
(1)	Electrode holder mounting bracket	PVC
(2)	Hook	SUS316
(3)	spacer	PP
(4)	Ultrasonic vibrator	SUS316
(5)	Ultrasonic oscillator	AC4C
(6)	Piping slot	O.DΦ7to12cabel
(7)	Vibrator holder	SUS316
(8)	Support hook	SUS316
(9)	Stopper	SUS316

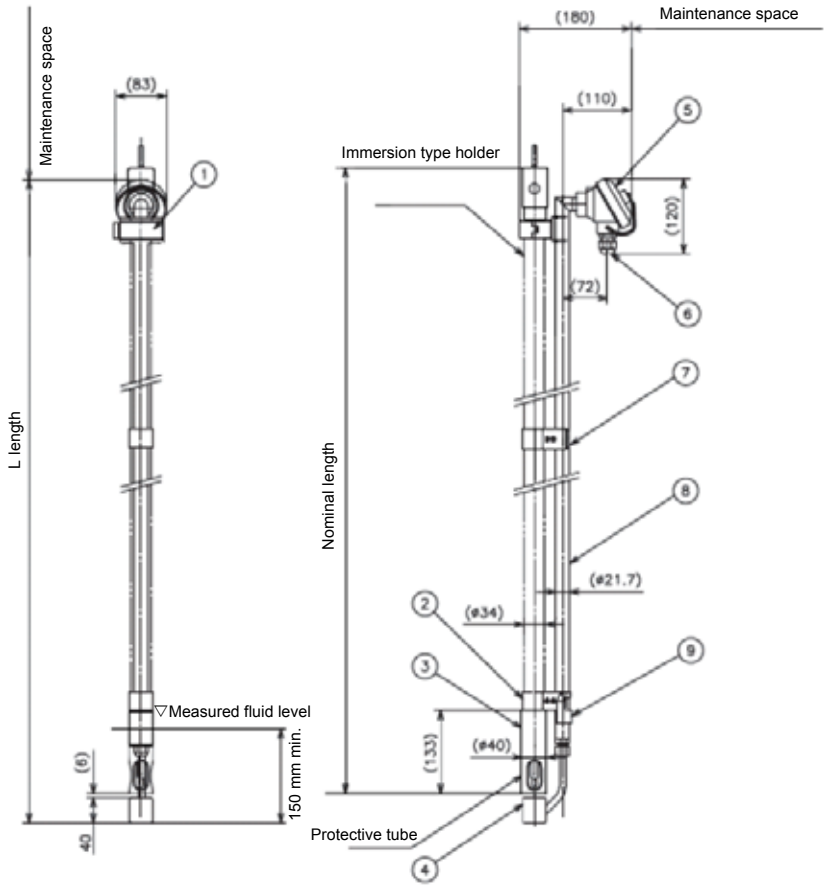
The L length and tolerance of the UCH-101 immersion type ultrasonic cleaner are shown in the following table:

Nominal length (m)	L length (mm)	Maintenance space (mm)
0.5	588±10	500 or more
1	1088±10	1000 or more
1.5	1588±10	1500 or more
2	2088±10	2000 or more
2.5	2588±10	2500 or more
3	3088±10	3000 or more

A maintenance space is required above the ultrasonic oscillator.

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

■External dimensions (UCH-111)



	PARTS	NOTES
(1)	Immersion holder fixing bracket	PVC
(2)	Hook	SUS316
(3)	spacer	PP
(4)	Ultrasonic vibrator	SUS316
(5)	Relay terminal box	Al
(6)	Piping slot	O.DΦ7to12cabel
(7)	Vibrator holder	SUS316
(8)	Support hook	SUS316
(9)	Stopper	SUS316

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

The L length and tolerance of the UCH-101 immersion type ultrasonic cleaner are shown in the following table:

Nominal length (m)	L length (mm)	Maintenance space (mm)
0.5	528±10	500 or more
1	1028±10	1000 or more
1.5	1528±10	1500 or more
2	2028±10	2000 or more
2.5	2528±10	2500 or more
3	3028±10	3000 or more

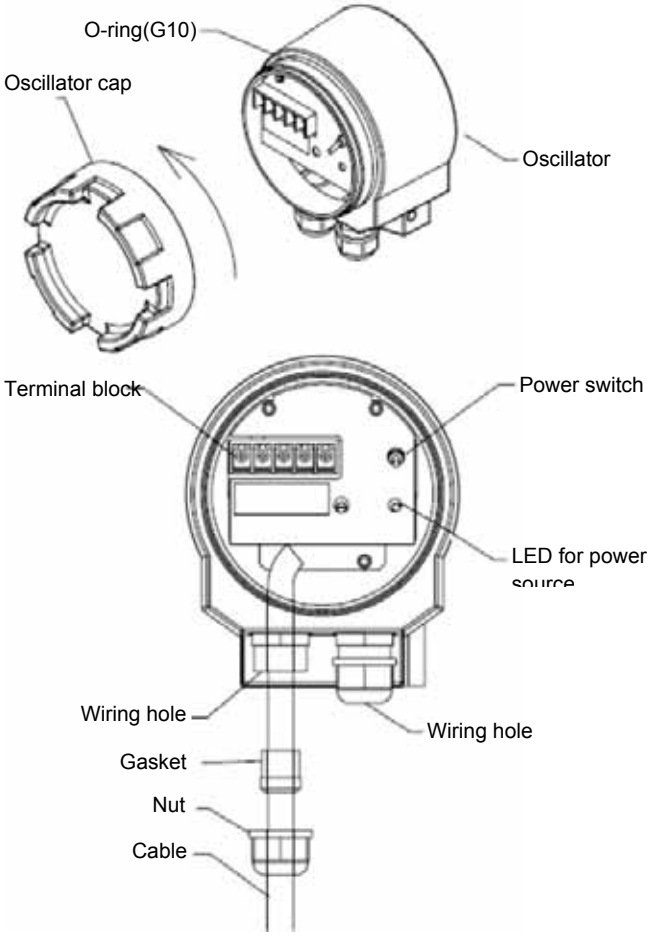
A maintenance space is required above the ultrasonic oscillator.

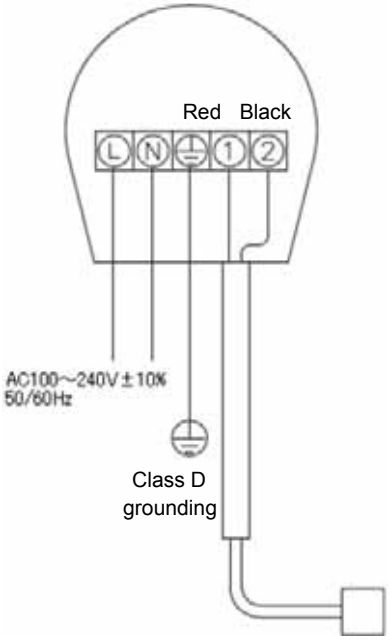
■Installation (UCH-101) (connections)

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

Power source
•The HO-200 is provided with a power switch. Turn this switch OFF during installation.
•Operation outside the rated range can cause a fault. Therefore, check the power supply voltage.
•Check that fluctuations of the power supply voltage fall within ±10%.
•Be sure to ground the grounding terminal (class D grounding).
•The applicable cable diameter for the wiring hole is 7 to 12 mm.
•After the installation, be sure to put the oscillator cap to prevent electric shocks.
•The ultrasonic vibrator is already connected to the corresponding terminal.

Supply power	Voltage: 100 to 240 VAC
	Frequency: 50/60 Hz
Applicable electric wire	Φ7 to Φ12



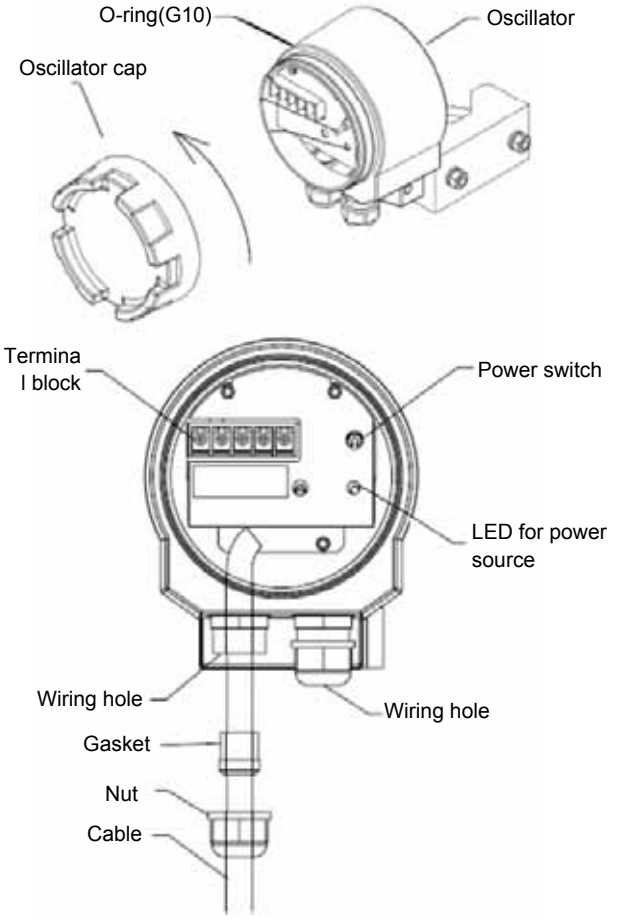


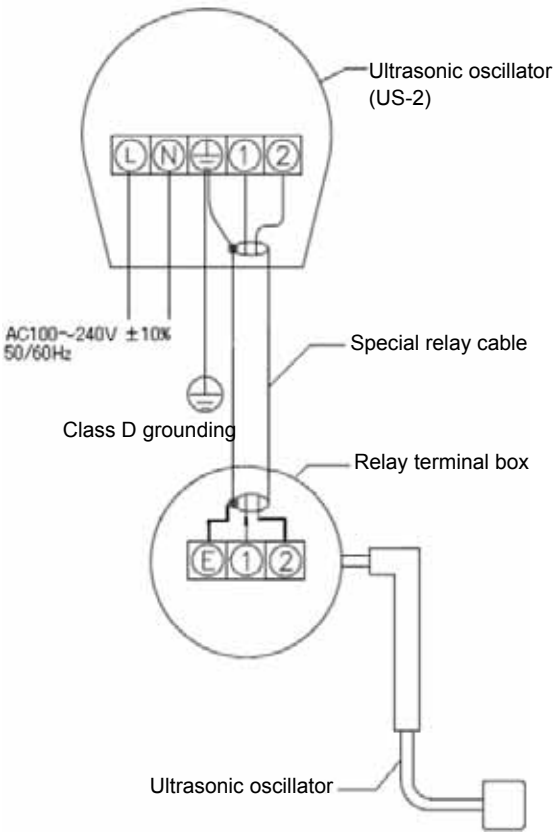
■Installation (UCH-111)

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

Power source
•The HO-200 is provided with a power switch. Turn this switch OFF during installation.
•Operation outside the rated range can cause a fault. Therefore, check the power supply voltage.
•Check that fluctuations of the power supply voltage fall within ±10%.
•Be sure to ground the grounding terminal (class D grounding).
•The applicable cable diameter for the wiring hole is 7 to 12 mm.
•After the installation, be sure to put the oscillator cap to prevent electric shocks.

Supply power	Voltage: 100 to 240 VAC
	Frequency: 50/60 Hz
Applicable electric wire	Φ7 to Φ12

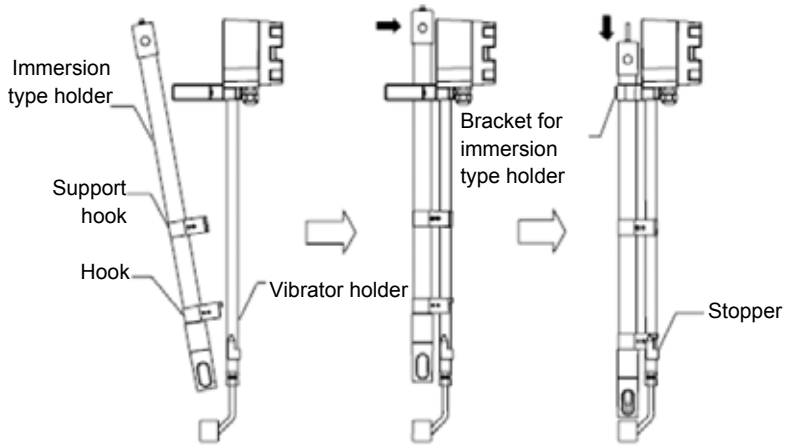




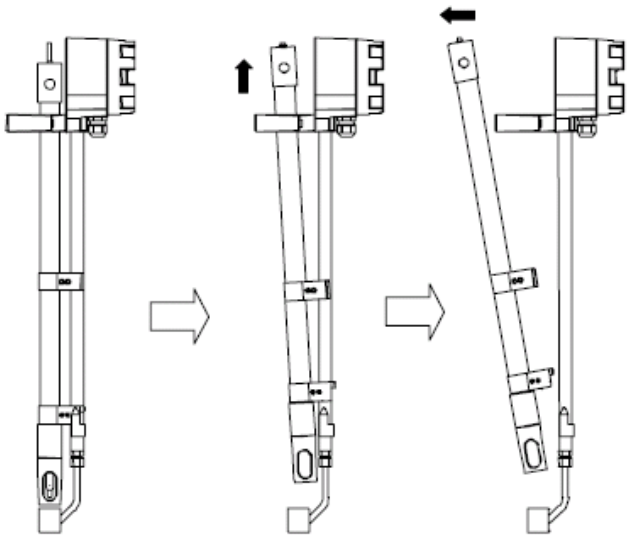
■Installation (ultrasonic cleaner and holder)

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 on the oscillator holder, fasten the immersion holder fixing hardware.

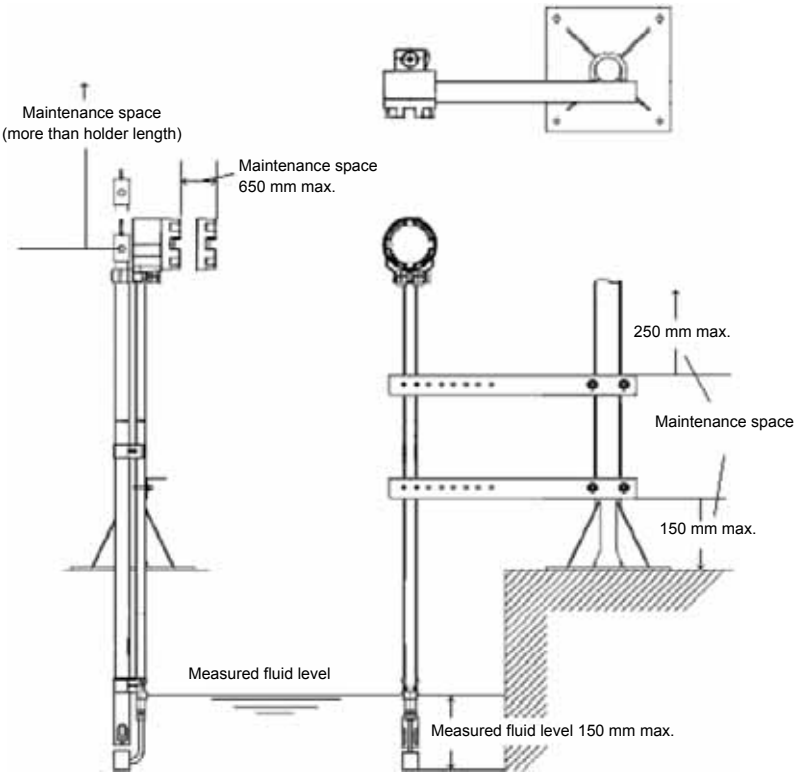


Removal
•Remove the immersion holder fixing hardware.
•Pull up the immersion holder.
•Remove the hook and the support hook from the vibrator holder.



■Installation

Installation environment
•Install the Cleaner at a location where maintenance work can be easily performed.
•Ensure that the ORP electrode remains immersed even if the level of the liquid under measurement 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.



Immersion type jet cleaner for H-1

JCH-121A

■ Overview

●This cleaner intermittently cleans the electrode with cleaning water and air. Since the cleaner has no timer function, use the timer function of the converter to specify cleaning intervals and duration.

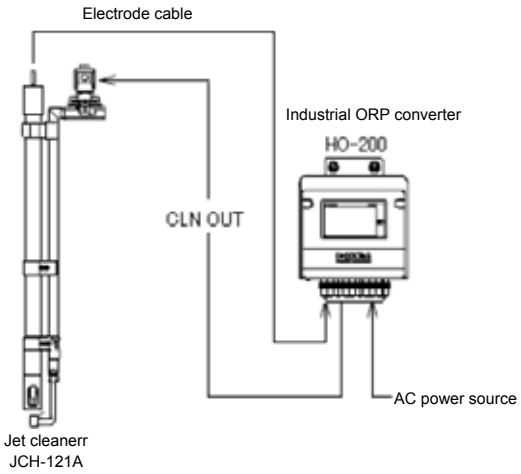
■Objects

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

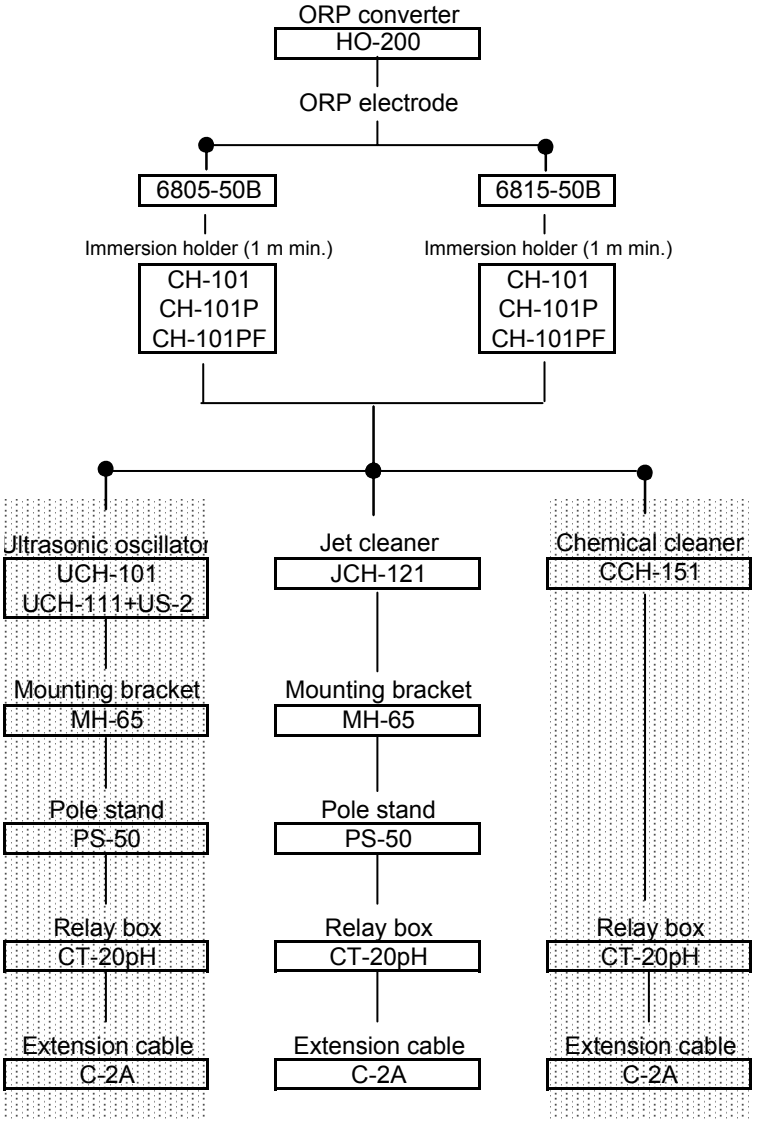
Properties Classification	Objects	
slime	food, paper, pulp, algae	⊙
Microorganism	bacteria (activated sludge), slag	⊙
Oily	tar, heavy oil	×
	light oil	○
	fatty acid, amine	○
suspended matters	earth and sands	○
	metallic minute powder	○
	clay, calcareous	○
scale	coagulated deposit and neutralized effluent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

⊙:Good ○:Acceptable ×:Not acceptable

■System configuration



Combination (immersion type jet cleaner)



■Specification(JCH-121A)

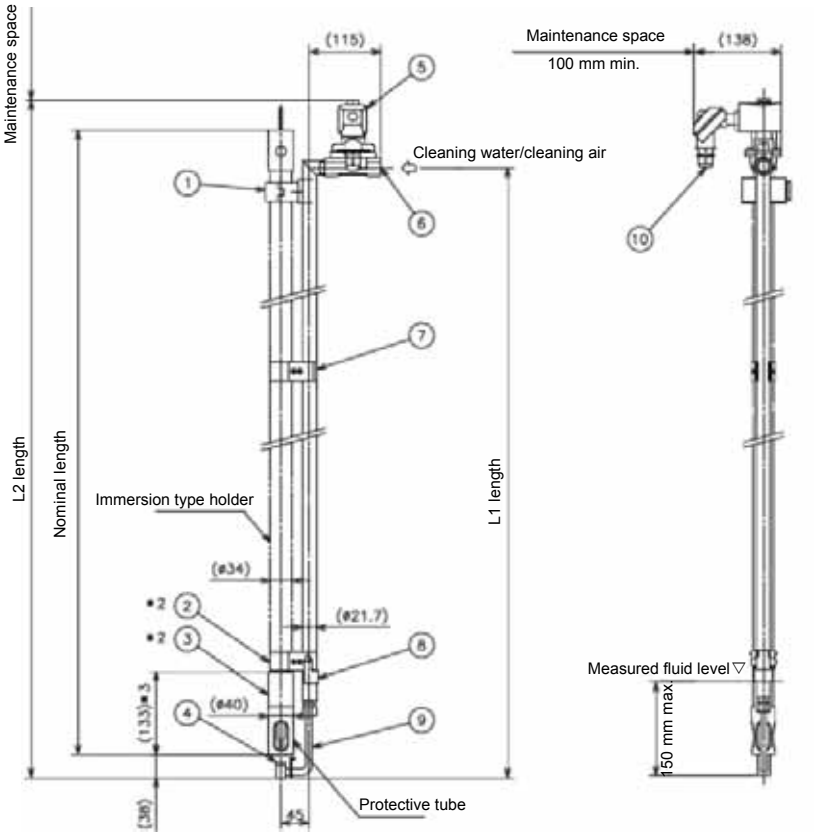
Product name		Immersion type jet cleaner (solenoid valve integrated type)
Model		JCH-121A
Supply Voltage (*1)		AC 100V 50/60Hz
Permissible Voltage Variation Range		90% to 110% of supply voltage
Power consumption		Max. 30VA
Cleaning Method		Intermittent water jet/air jet cleaning
Ambient Temperature		-5 to 50°C
Ambient Humidity		5% to 90% RH (No condensation)
Temperature of liquid under measurement (*2)		-5℃ to 80℃ (non-freezing)
Flow Velocity of Measured Liquid		2 m/sec. max.
Measuring liquid pressure		Atmospheric pressure
Cleaning pressure	Water	0.05 to 0.5 MPs (consumption: approx. 4 L/min) (*3)
	Air	0.05 to 0.2 MPs (consumption: approx. 90 L/min)
Bore diameter connected for cleaning		Rc 1/2
Wetted material		SUS316, FKM (not including an electrode and materials for Immersion Holders)
Weight		Approx. 3.5kg (when immersion type holder is 1 m long)
International protection code		IP54(IEC60529,JIS C0920)
Special Note		This Product does not come with electrodes and an Immersion Holder.

*1: Power supply voltage of 200 VAC is optionally available. For any other power supply voltage, contact us.

*2: The operating temperature range differs depending on the combined electrode and holder. Refer to the temperature of each product in the specification.

*3: In using tap water for cleaning water, the water supply law prohibits supplying it directly from water works.
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 (JCH-121A)



	PARTS	NOTES
(1)	Bracket for immersion type	PVC
(2)	Hook	SUS316
(3)	spacer	PP
(4)	Nozzle	SUS316
(5)	Solenoid valve	
(6)	Cleaning water/air inlet	Rc1/2
(7)	Support hook	SUS316
(8)	stopper	SUS316
(9)	Nozzle holder	SUS316
(10)	Piping slot	O.D Φ7toΦ12cable

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

Nominal length (m)	L1 length	**Maintenance space**	L2 length
1	977±10	1000 or more	1085
1.5	1477±10	1500 or more	1585
2	1977±10	2000 or more	2085
2.5	2477±10	2500 or more	2585
3	2977±10	3000 or more	3085

JCH-121 Immersion Type Jet Cleaner Unit: mm

L length and tolerance are as follows:

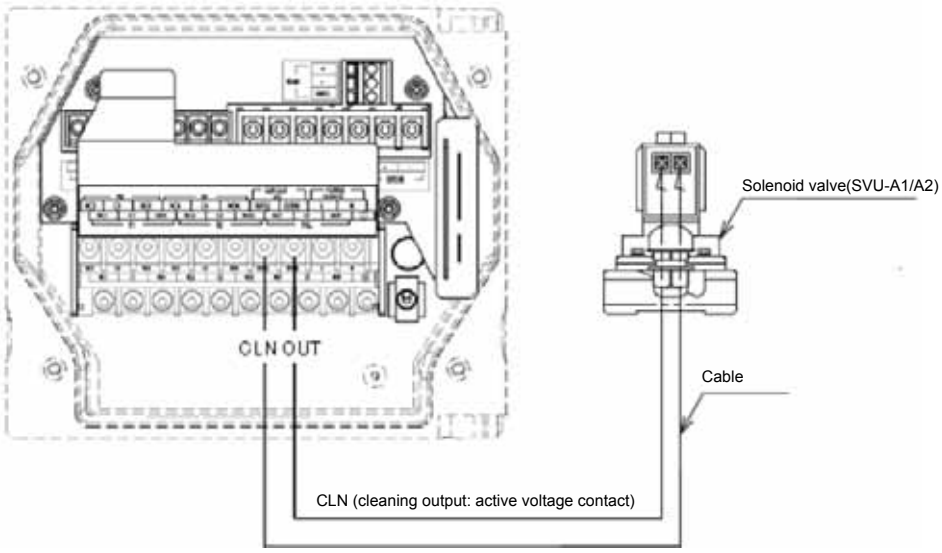
The maintenance space is required above the solenoid valve.

■Installation(JCH-121A)(connections)

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

Connections
•Be sure to ground the grounding terminal (class D grounding).
•The applicable cable diameter for the wiring hole is 7 to 12 mm.
•Output with voltage is provided from the CLN OUT terminal on the converter in accordance with the specification.

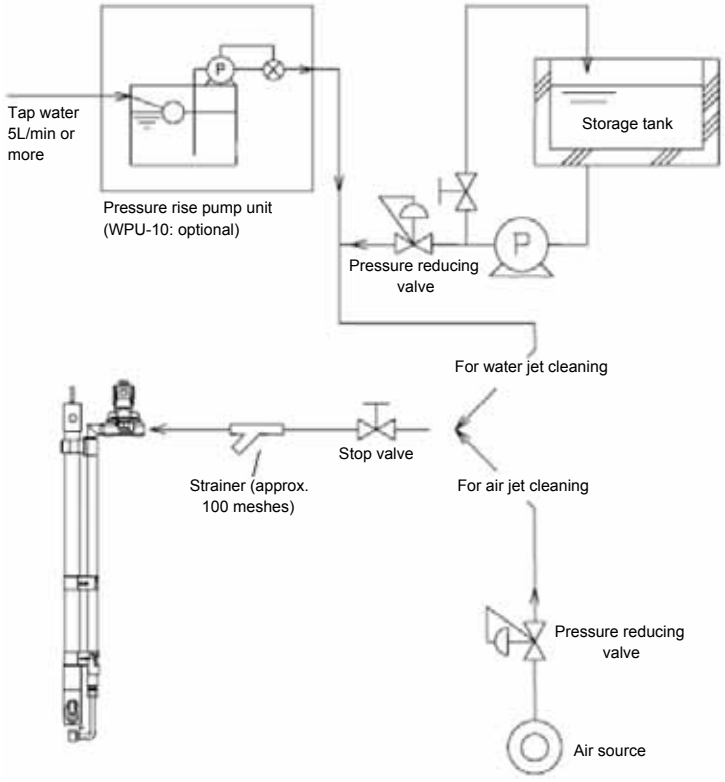
Applicable electric wire	Φ7 toΦ12, 0.75 mm2 min.



■Installation (JCH-121A)

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

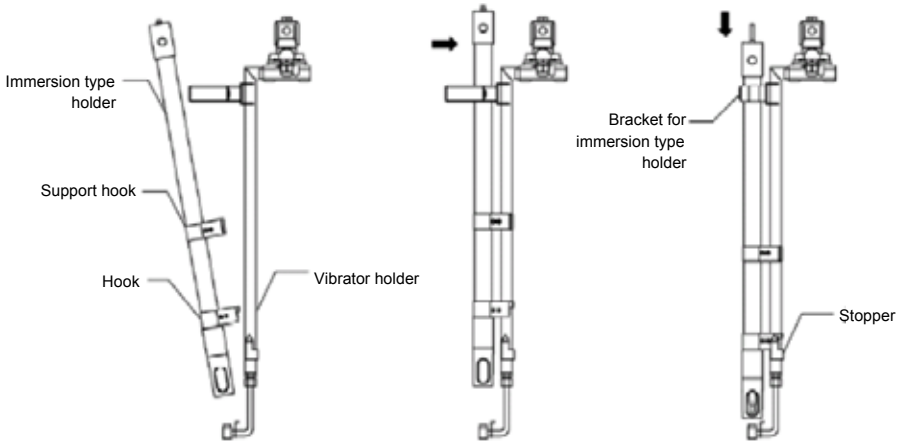
Piping
•Since the cleaner must be removed during maintenance, use flexible piping and give an allowance to its length.
•Before connecting the piping to the cleaner, be sure to flush off the piping with water.
•With the regulator, adjust the cleaning water to a specified pressure.
In using tap water for cleaning water, the water supply law prohibits supplying it directly from water works. Temporarily receive the tap wat 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.



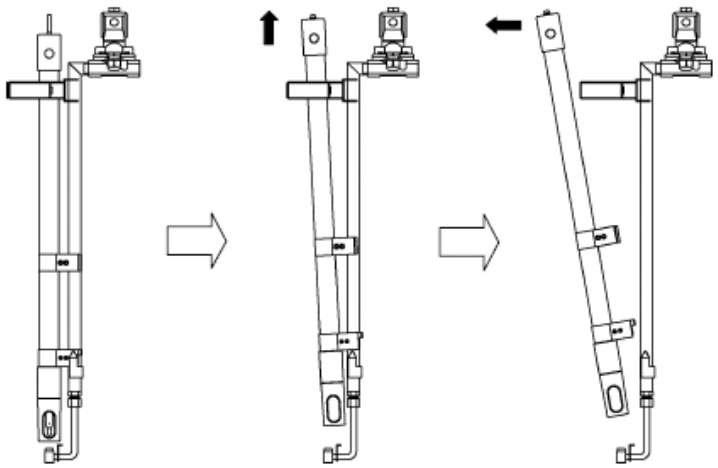
■Installation (jet cleaner and holder)

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 nozzle holder.
Once the hook is caught by the stopper on the nozzle holder, fasten the immersion holder fixing hardware.

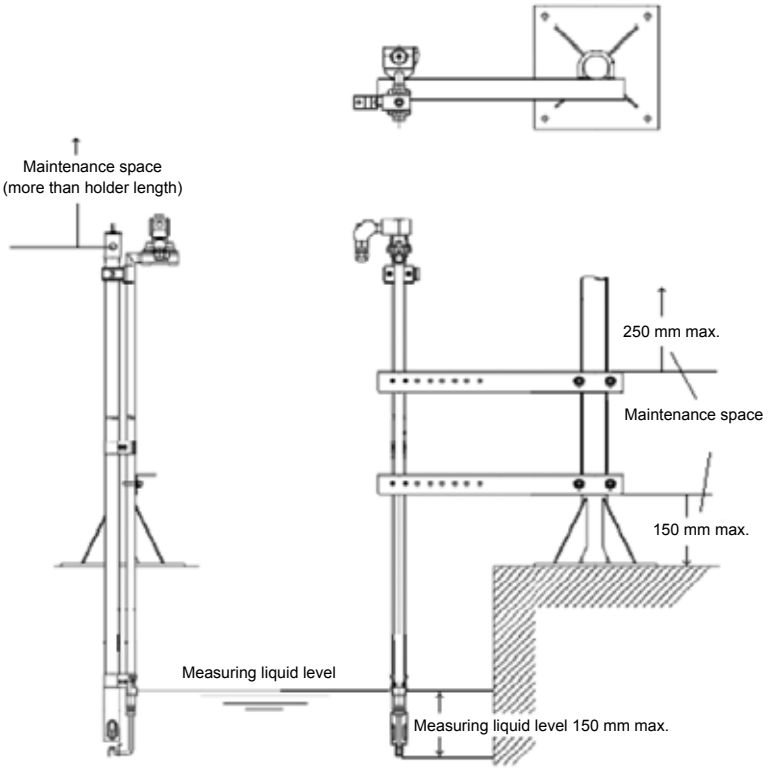


Removal
•Remove the immersion holder fixing hardware.
•Moves up the immersion type holder.
•Remove the hook and the support hook from the vibrator holder.



■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.



Flow chamber ultrasonic cleaner for H-1 series

UCF-series

■ Overview

This cleaner, when used with the electrode, cleans the electrode by removing foreign matter adhering to the electrode and prevents the electrode from being contaminated.
The electrode is irradiated with ultrasonic waves and this cavitation effect removes dirt adhering to the electrode.
In order to improve the cleaning effect, ultrasonic waves are intermittently oscillated (burst oscillation).

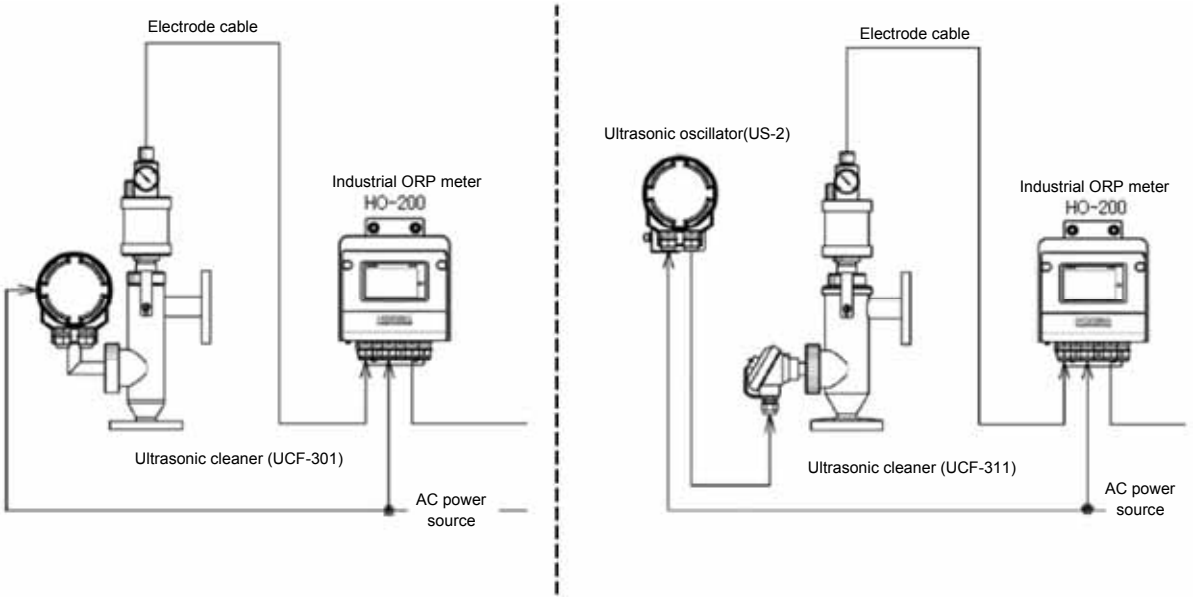
■Objects

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

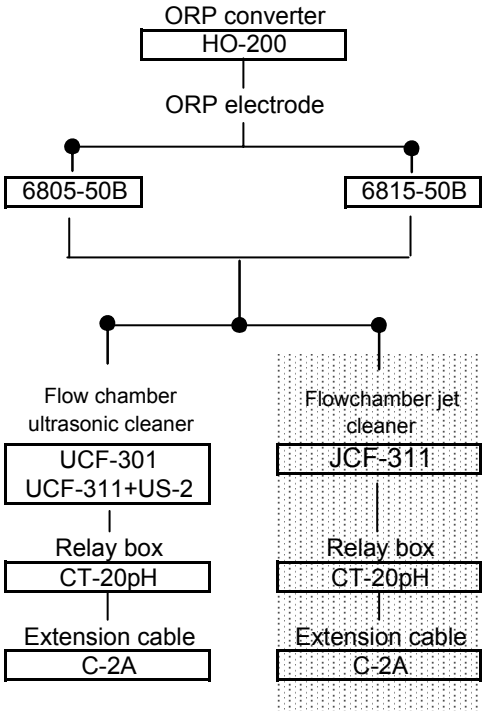
Properties Classification	Objects	
slime	food, paper, pulp, algae	○
Microorganism	bacteria (activated sludge), slag	⊙
Oily	tar, heavy oil	×
	light oil	○
	fatty acid, amine	×
suspended matters	earth and sands	⊙
	metallic minute powder	○
	clay, calcareous	○
scale	coagulated deposit and neutralized effluent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

⊙:Good ○:Acceptable ×:Not acceptable

■System configuration



Combination (flow chamber ultrasonic cleaner)



■Specification (UCF-301 and UCF-311)

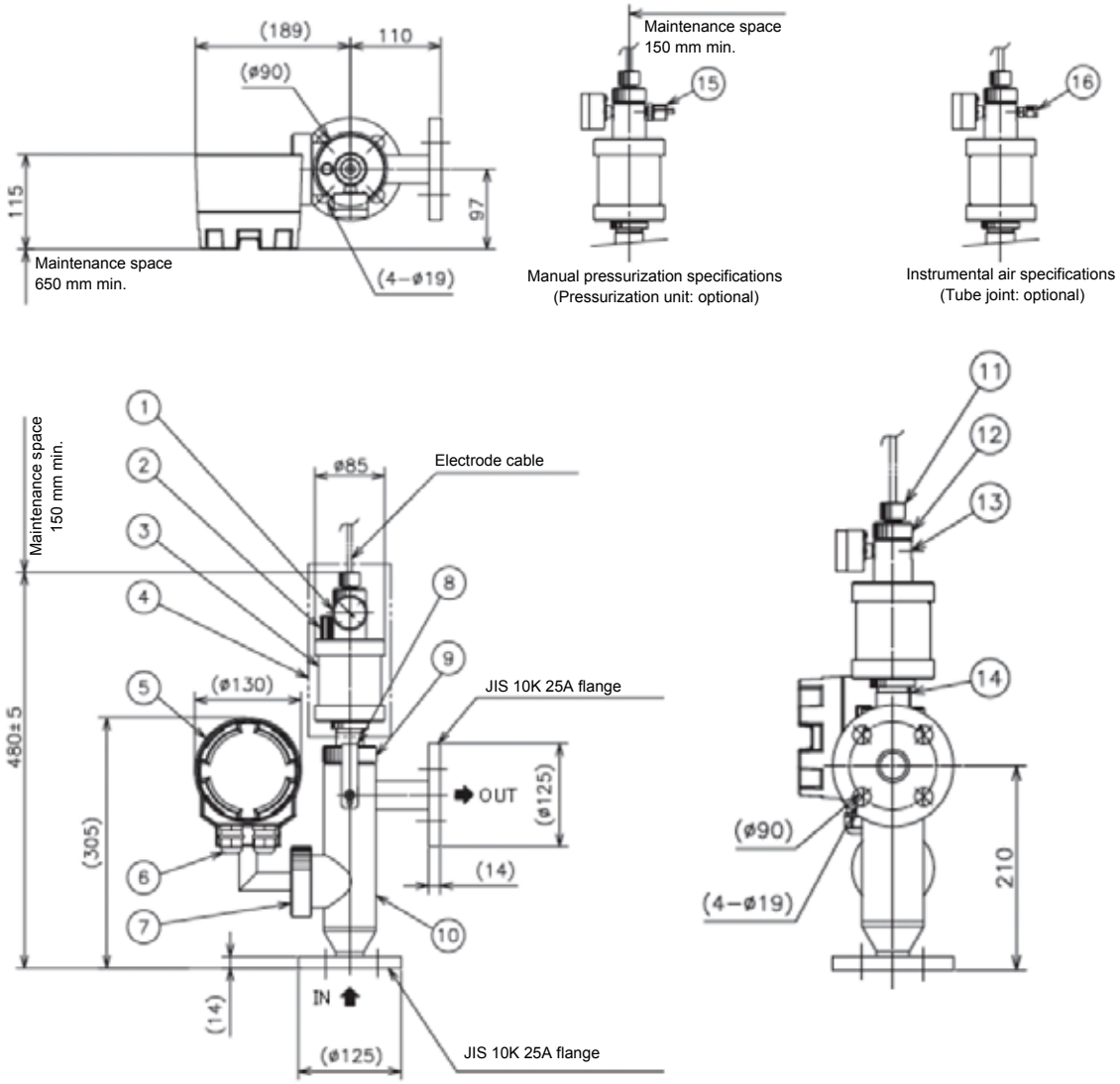
Product name		Ultrasonic cleaner for flow chamber	Ultrasonic cleaner for flow chamber
Model		UCF-301	UCF-311
Ambient Temperature		-5 to 50°C	
Ambient Humidity		5% to 90% RH (No condensation)	
Conditions for measurement solution	Temperature (*1)	-5℃ to 80℃ (non-freezing)	
	Pressure	-5 to 40°C:0.30MPa 40 to 60°C:0.22MPa 60 to 80°C:0.15MPa	
	Flow rate	0.3 to 10L/min	
Materials for Liquid Junction Section		SUS316、PP、FKM(not including materials for electrode)	
Supply Voltage		AC 100 to 240V 50/60Hz	
Permissible Voltage Variation Range		90% to 110% of supply voltage	
Power consumption		10VA	
Cleaning Method		Ultrasonic wave continuous irradiation system	
Control System		Burst system by oscillation time control	
Oscillation Frequency		Approx. 70kHz	
Oscillator case	International protection code	IP54(IEC60529, 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	
Internal pressurization inlet of holder (*3)		Rc1/8	
Weight		Approx. 7.0kg	Oscillator:Approx. 2.0 kg Cleaning unit:Approx. 3.0 kg
Special Note		To manually perform periodical pressurization, purchase the optionally available pressurization inlet and hand pump. •Since the holder is removed and reinstalled during maintenance, use flexible piping for instrumentation air. •Provide a mist catcher and a regulator with a filter on the instrumentation air line. •his Product does not come with electrodes.	

*1: The operating temperature range differs depending on the combined electrode and holder. Refer to the temperature of each product in the specification.

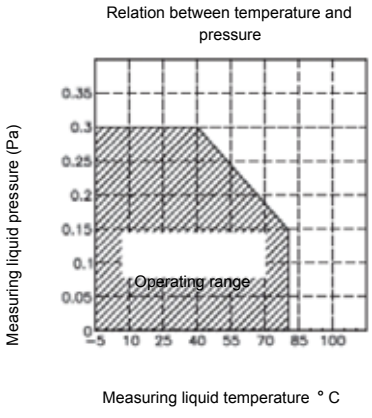
*2: If your sample has any property (e.g. alkalinity) of damaging FKM (fluoro-rubber), contact us.

*3. Maintain the pressure in the pressurization holder 0.03 to 0.05 MPa higher than the pressure of the liquid under measurement.

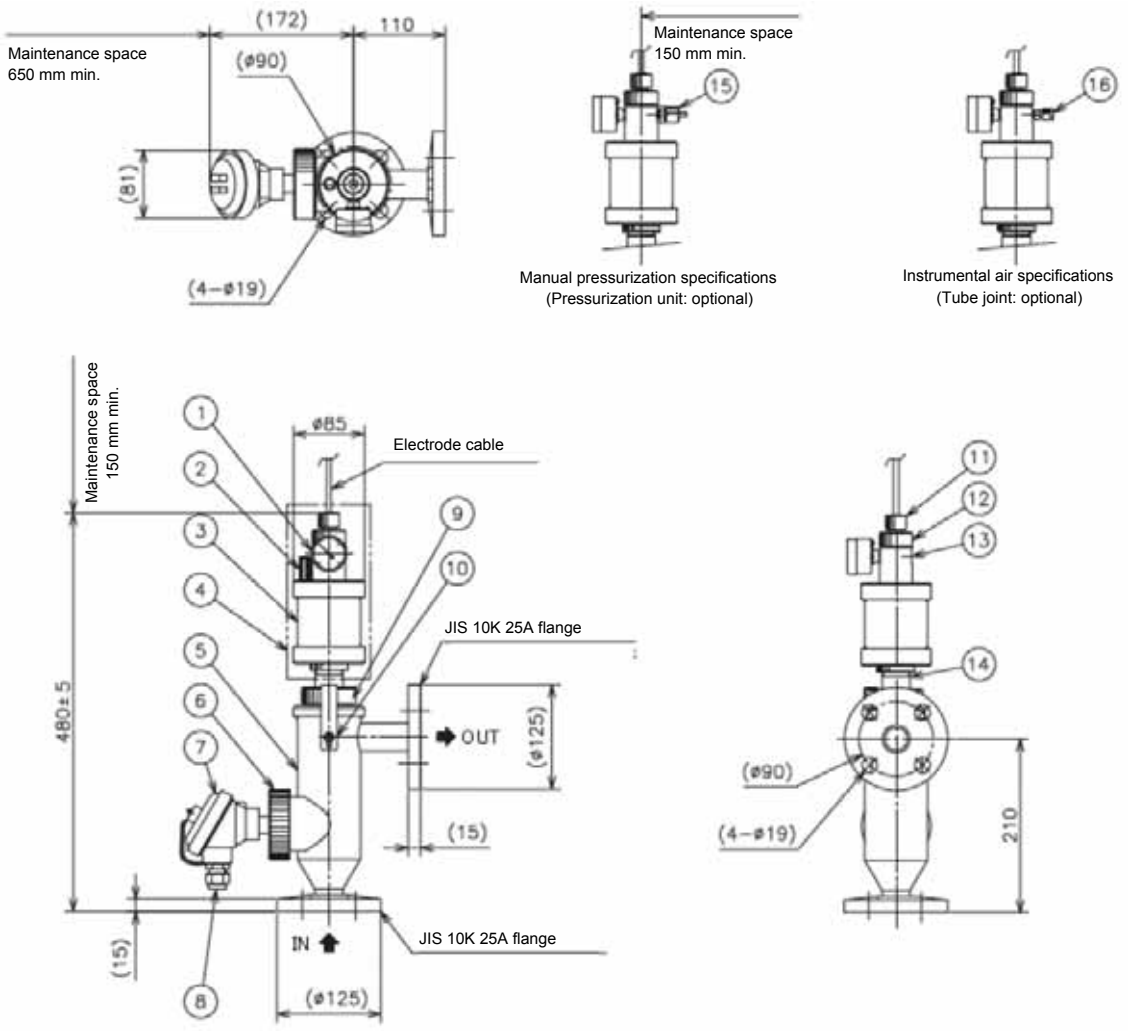
■ External dimensions (UCF-301)



	PARTS	NOTES	
(1)	Pressure gauge	0 to 0.5MPa SUS304	
(2)	KCl inlet	PVC	
(3)	KCl tank	PVC	
(4)	Pressure holder		
(5)	Ultrasonic oscillator	AC4C	
(6)	Piping slot	O.DΦ7to12cabel	
(7)	Vibration mounting nut	SUS304	
(8)	Locking plate	SUS304	
(9)	Tightening nut	SUS304	
(10)	Distribution holder	SUS316	
(11)	Cable cap	PPO	
(12)	Holder cap	PPO	
(13)	Pressure mating screw	Rc1/8	
(14)	Holder	PP	
(15)	Pressure union	C3604	←optionally available
(16)	Fitting	for tube PVDF of 6 mm o.d./4 mm i.d.	←optionally available

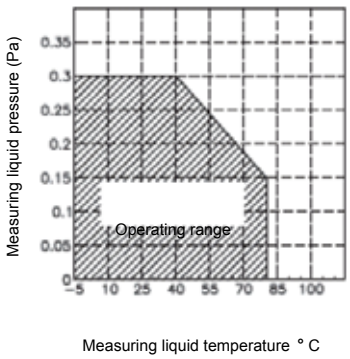


■ External dimensions (UCF-311)



	PARTS	NOTES	
(1)	Pressure gauge	0 to 0.5MPa SUS304	
(2)	KCl inlet	PVC	
(3)	KCl tank	PVC	
(4)	Pressure holder		
(5)	Distribution holder	PP	
(6)	Vibration mounting nut	PP	
(7)	Relay box	AI	
(8)	Wiring hole	Cable with 7 to 12 mm o.d.	
(9)	Tightening nut	PP	
(10)	Locking plate	SUS316	
(11)	Cable cap	PPO	
(12)	Holder cap	PPO	
(13)	Pressure mating screw	Rc1/8	
(14)	Holder	PP	
(15)	Pressure union	C3604	←optionally available
(16)	Fitting	for tube PVDF of 6 mm o.d./4 mm i.d.	←optionally available

Relation between temperature and pressure



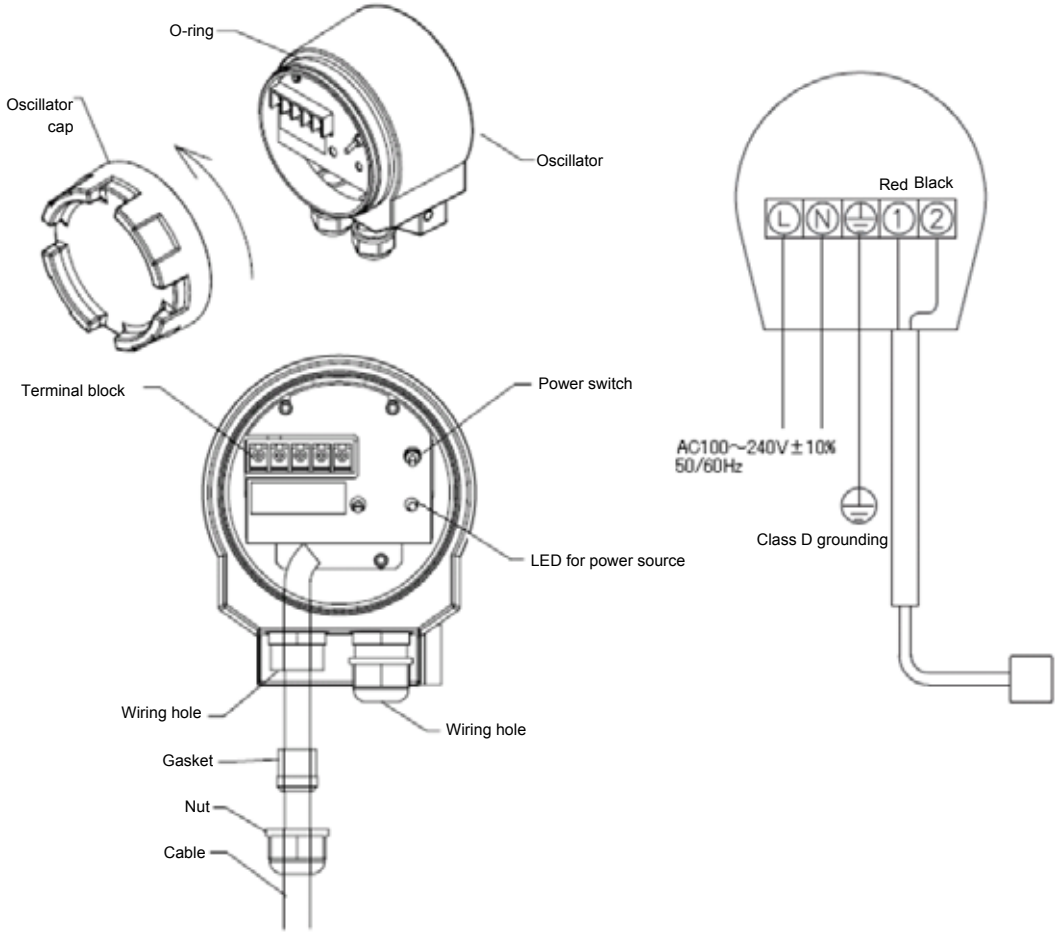
Measuring liquid temperature ° C

Installation (UCH-301) (connections)

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

Power source
•The HO-200 is provided with a power switch. Turn this switch OFF during installation.
•Operation outside the rated range can cause a fault. Therefore, check the power supply voltage.
•Check that fluctuations of the power supply voltage fall within ± 10%.
•Be sure to ground the grounding terminal (class D grounding).
•The applicable cable diameter for the wiring hole is 7 to 12 mm.
•After the installation, be sure to put the oscillator cap to prevent electric shocks.
•The ultrasonic vibrator is already connected to the corresponding terminal.

Supply power	Voltage: 100 to 240 VAC
	Frequency: 50/60 Hz
Applicable electric wire	Φ7 to Φ12

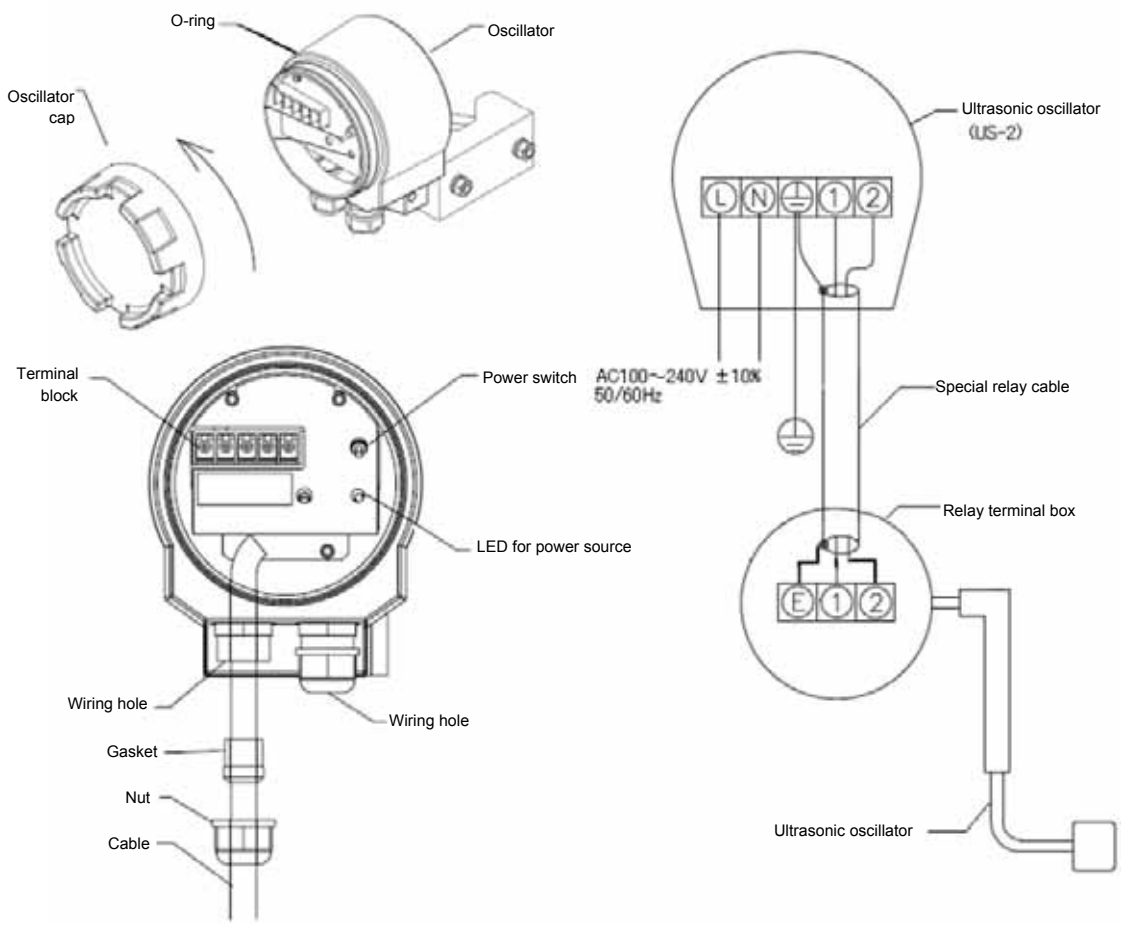


■Installation (UCF-311)

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

Power source
•The HO-200 is provided with a power switch. Turn this switch OFF during installation.
•Operation outside the rated range can cause a fault. Therefore, check the power supply voltage.
•Check that fluctuations of the power supply voltage fall within ±10%.
•Be sure to ground the grounding terminal (class D grounding).
•The applicable cable diameter for the wiring hole is 7 to 12 mm.
•After the installation, be sure to put the oscillator cap to prevent electric shocks.

Supply power	Voltage: 100 to 240 VAC
	Frequency: 50/60 Hz
Applicable electric wire	Φ7 to Φ12



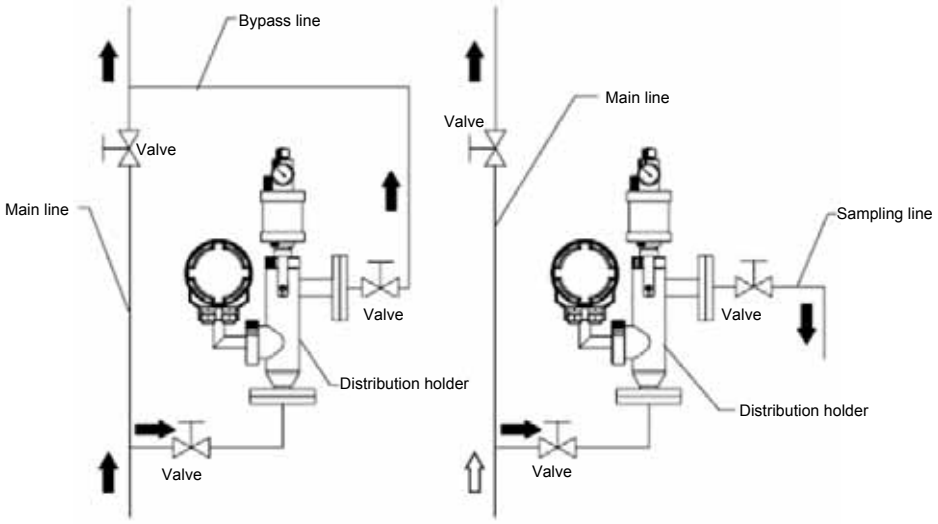
■Installation (UCF-301)

Be sure to following the following instructions for setup.

Installation environment

• Install the UCH-301 in a location where maintenance and other services can be done with ease.
• Provide a maintenance space of 15 cm minimum in height above the pressurization type holder. 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 UCH-301 so that the electrode will not be floated into air as the liquid under measurement in the line is drained even if the liquid under measurement 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℃ 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-through type holder 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 Distribution Holder, provide a bypass line from the main line so that the measured liquid flows into the bottom side of the Distribution Holder and flows out of the lateral side of the Distribution Holder.
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 fast, the readout may fluctuate because of the occurrence of caviation or the pressurization of the liquid junction of the ORP electrode by the flow rate. If the flow rate is too slow, the response of the readout will be delayed. Therefore, 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

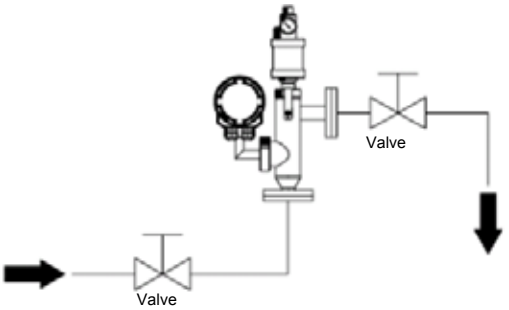
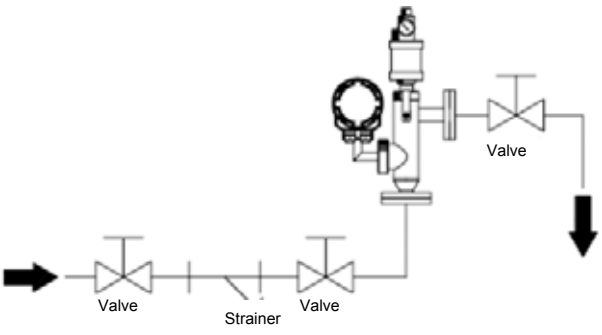
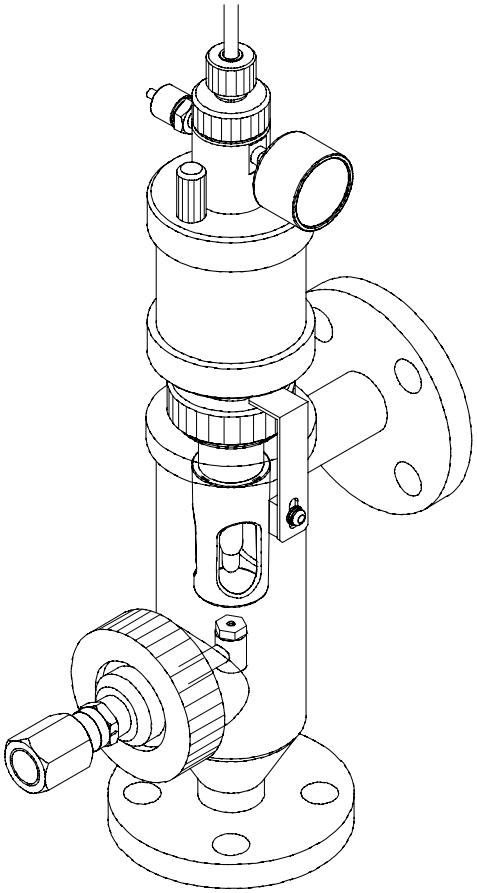


Fig. 2



Flow chamber jet cleaner for H-1 series

JCF-311



■ Overview

This cleaner, when used with the electrode, cleans the electrode by removing foreign matter adhering to the electrode and prevents the electrode from being contaminated.
This Jet Cleaner can intermittently clean any dirt off the glass film and liquid junction section of an electrode with a jet flow of cleaning water or air.
The Timer in the Timer Unit is used to make settings for cleaning interval and cleaning time.
This Jet Cleaner is comparatively effective against the following objects.
However, its effect differs with various conditions and is not guaranteed.

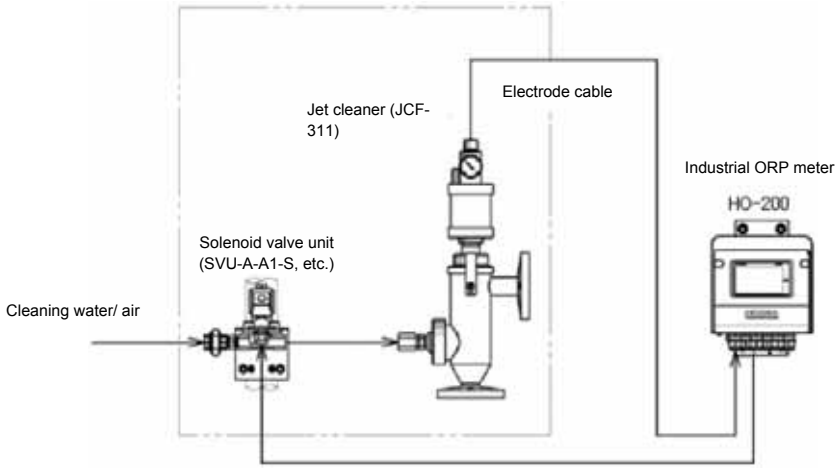
■Objects

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

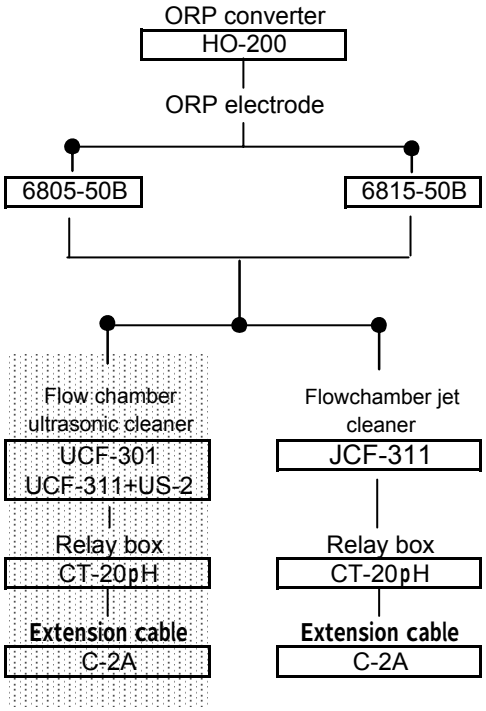
Properties Classification	Objects	
slime	food, paper, pulp, algae	⊙
Microorganism	bacteria (activated sludge), slag	⊙
Oily	tar, heavy oil	×
	light oil	○
	fatty acid, amine	○
suspended matters	earth and sands	○
	metallic minute powder	○
	clay, calcareous	○
scale	coagulated deposit and neutralized effluent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

⊙:Good ○:Acceptable ×:Not acceptable

■System configuration



■Combination (flow chamber jet cleaner)

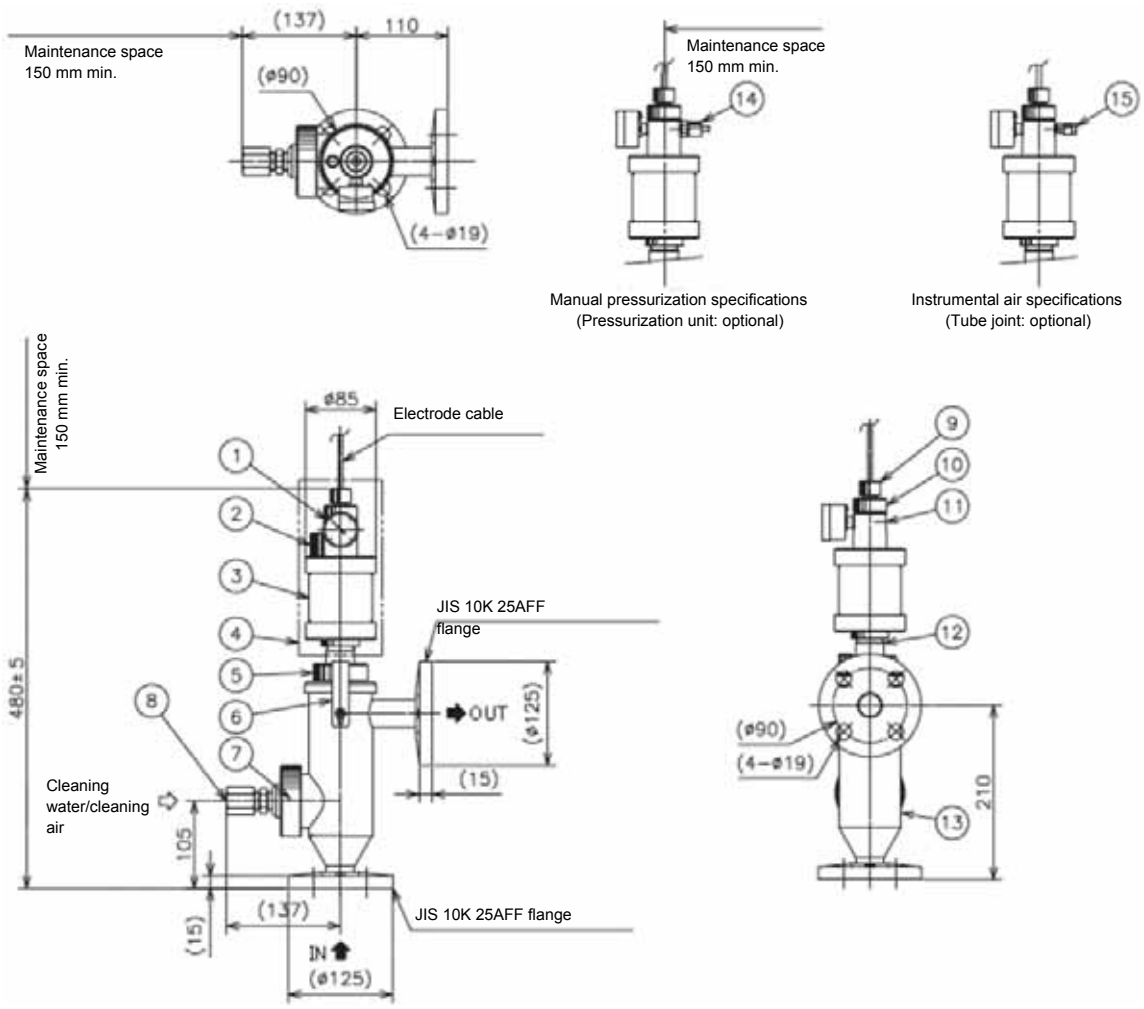


■Specification(JCF-311)

Product name		Flowchamber jet cleaner (Separately installed type timer unit)
Model		JCF-311
Ambient Temperature		-5 to 50°C
Ambient Humidity		5% to 90% RH (No condensation)
Conditions for measurement solution	Temperature (*1)	-5°C to 80°C (non-freezing)
	Pressure	-5 to 40°C:0.30MPa 40 to 60°C:0.22MPa 60 to 80°C:0.15MPa
	Flow rate	0.3 to 10L/min
Materials for Liquid Junction Section		SUS316、PP、FKM (not including materials for electrode)
Cleaning pressure		water/air:0.05 to 0.5MPa (*3) Adjust a cleaning pressure to a measured liquid pressure + 0.05 MPa to 0.2 MPa.
Bore diameter connected for cleaning		Rc1/2
Bore Size of Measured Liquid Connection		JIS 10K 25A FF flange
Internal pressurization inlet of holder (*4)		Rc1/8
Weight		Approx. 3.0kg
Special Note		•To manually perform periodical pressurization, purchase the optionally available pressurization inlet and hand pump. •Holders are detached at the time of maintenance. So use a flexible pipe for instrument air. •Provide a regulator with a mist cap and a filter to an instrument air line. •This Product does not come with electrodes

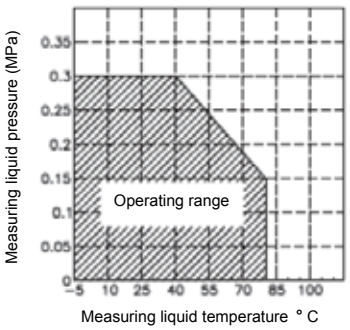
*1: The operating temperature range differs depending on the combined electrode. Refer to the temperature of the electrode in the specification.
Moreover, a measured liquid in a frozen state cannot be measured.
*2: If your sample has any property (e.g. alkalinity) of damaging FKM (fluoro-rubber), contact us.
*3: To use tap water for cleaning water, use a tap water pressurizing device or the like to insulate from the general tap water pipe because the water supply law prohibits direct supply from water works.
If cleaning water might be frozen, use thermally insulated piping.
*4. Maintain the pressure in the pressurization holder 0.03 to 0.05 MPa higher than the pressure of the liquid under measurement.

■External dimensions (JCF-311)



	PARTS	NOTES	
(1)	Pressure gauge	0 to 0.5MPa SUS304	
(2)	KCl inlet	PVC	
(3)	KCl tank	PVC	
(4)	Pressure holder		
(5)	Tightening nut	PP	
(6)	Locking plate	SUS304	
(7)	Nozzle mounting nut	PP	
(8)	Cleaning water/air	Rc1/2	
(9)	Cable cap	PPO	
(10)	Holder cap	PPO	
(11)	Pressure mating screw	Rc1/8	
(12)	Holder	PP	
(13)	Distribution holder	PP	
(14)	Pressure union	C3604	←optionally available
(15)	Fitting	for tube PVDF of 6 mm o.d./4 mm i.d.	←optionally available

Relation between temperature and pressure

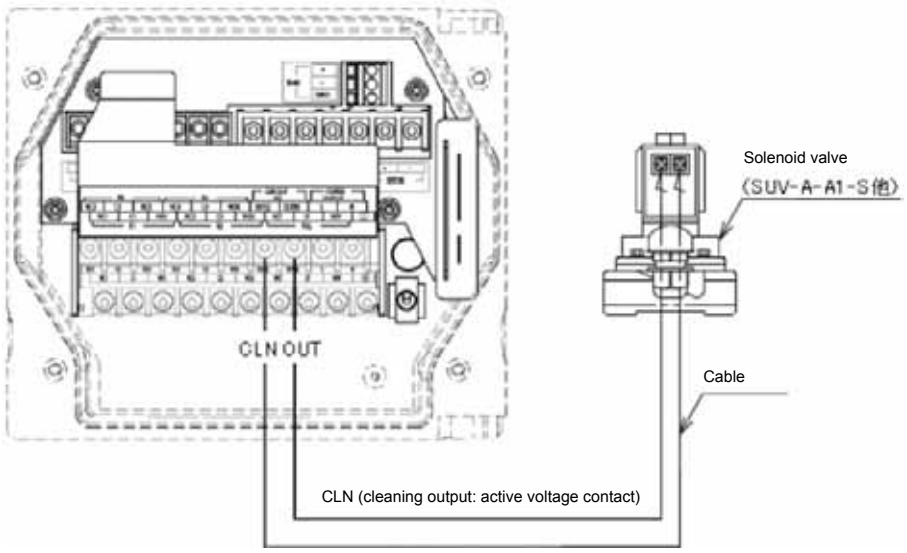


■Installation (JCF-311)

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

Connections
•Be sure to ground the grounding terminal (class D grounding).
•The applicable cable diameter for the wiring hole is 7 to 12 mm
•Output with voltage is provided from the CLN OUT terminal on the converter in accordance with the specification.

Applicable electric wire	Φ7 toΦ12, 0.75 mm^2 min.

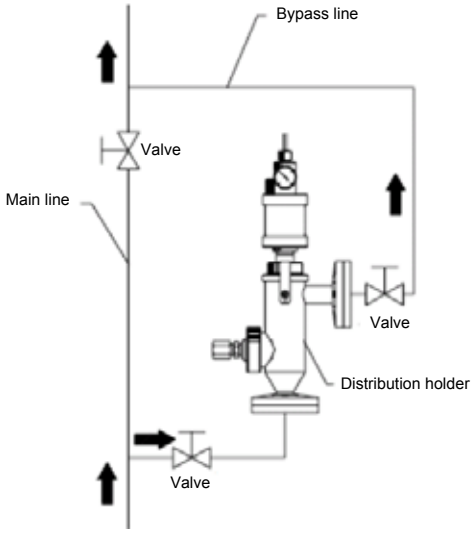


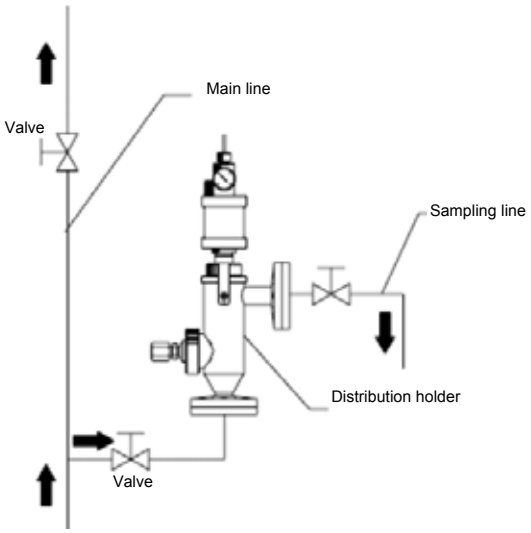
■Installation (JCH-311) (piping)

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

Installation environment
• Install the JCH-311 in a location where maintenance and other services can be done with ease.
• Provide a maintenance space of 15 cm minimum in height above the pressurization type holder.
• 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 JCH-311 so that the electrode will not be floated into air as the liquid under measurement in the line is drained even if the liquid under measurement 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-through type holder 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.)

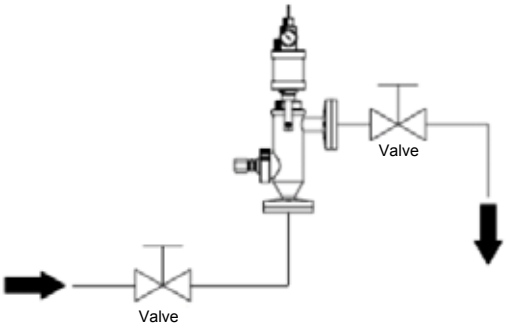


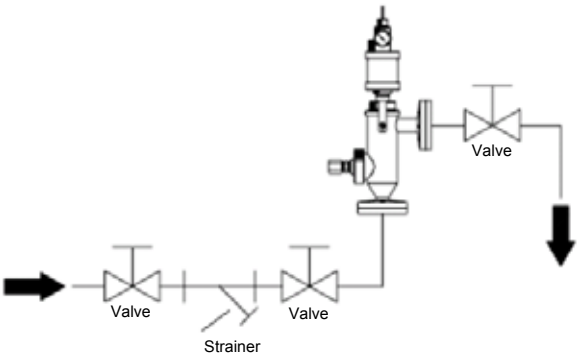


Piping
For installation of the flow chamber, provide a bypass line from the main line so that the measured liquid flows into the bottom side of the flow chamber and flows out of the lateral side of the flow chamber. Be sure to provide valves on the inflow and outflow sides respectively. See Fig. 1.

If the flow rate of the liquid under measurement is too fast, the readout may fluctuate because of the occurrence of caviation or the pressurization of the liquid junction of the ORP electrode by the flow rate. If the flow rate is too slow, the response of the readout will be delayed. Therefore, 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

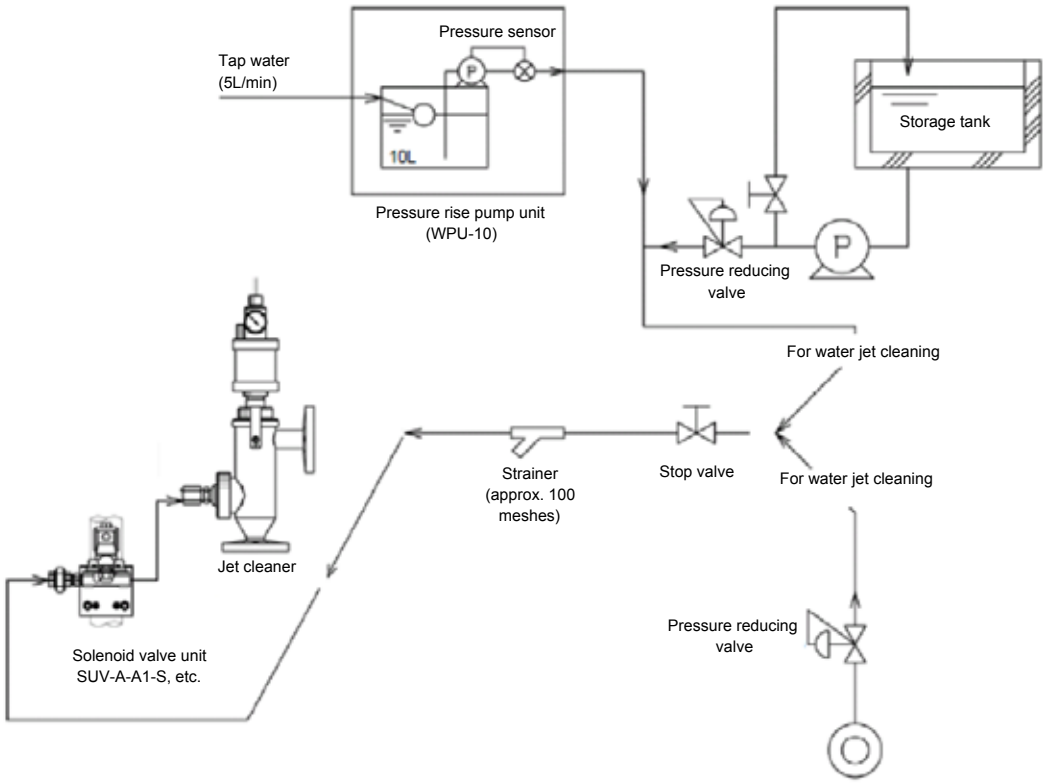




■Installation (JCH-311) (piping)

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 distributed after passing through a tank located on the roof or the like, it may
also be connected as it is insulated.



Pressurized piping

•For pressurization with an inflator, use the pressure inlet.
•Maintain the pressure in the pressurized holder in 0.03 to 0.05 MPa higher than sample water pressure.
•To use instrument air, use a flexible hose considering maintenance easiness.

For pressurization with instrument air, use a union.
•Maintain the pressure in the pressurized holder in 0.03 to 0.05 MPa higher than sample water pressure.
•To use instrument air, use a flexible hose considering maintenance easiness.
•Provide a regulator (with a filter) near the distribution type holder and connect it to the pressurized holder with a tube of 4 mm i.d./6 mm o.d.