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H-1 series simplified fluoride ion concentration meter for industrial use

HC-300F



Overview

- The fluoride ion electrode and the power source of 24 VDC are connected to the HC-300F to send the measured value for fluoride ion concentration as a signal of 4 to 20 mADC on the power line. The measured value and various setting values are displayed on the LCD. When used with our cleaner, the transmission output during cleaning may be held. A variety of self-diagnostic capabilities is provided to allow you to detect a trouble with the pH electrode or the HC-300F.

Measurement target

- Free fluoride ions in the sample

Measuring principle

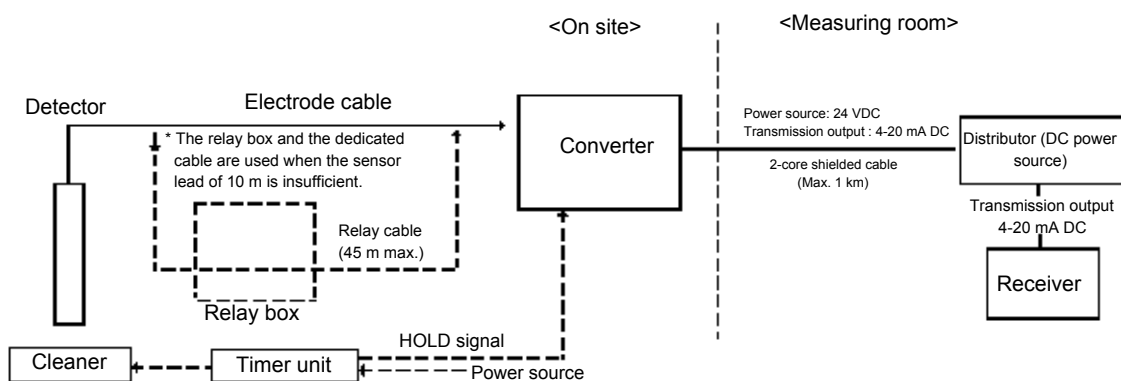
- Ion electrode method

Intended use

- Control of drainage from a semiconductor/FPD or glass factory.

System configuration diagram

Standard specification



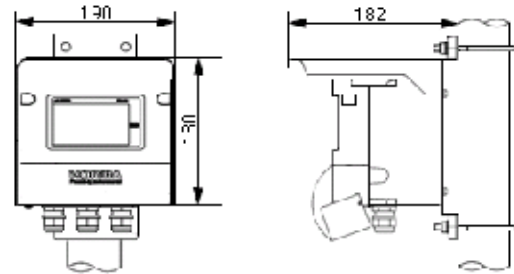
H-1 series simplified fluoride ion concentration meter for industrial use

HC-300F 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
- Two-wire transmission type (DC 24V)
- Backup of stored data
- Easily viewable readout (150, larger than former model)
- Improved operability of keys by using an emboss sheet
- Improved icon-based mode display

■ External Dimensions



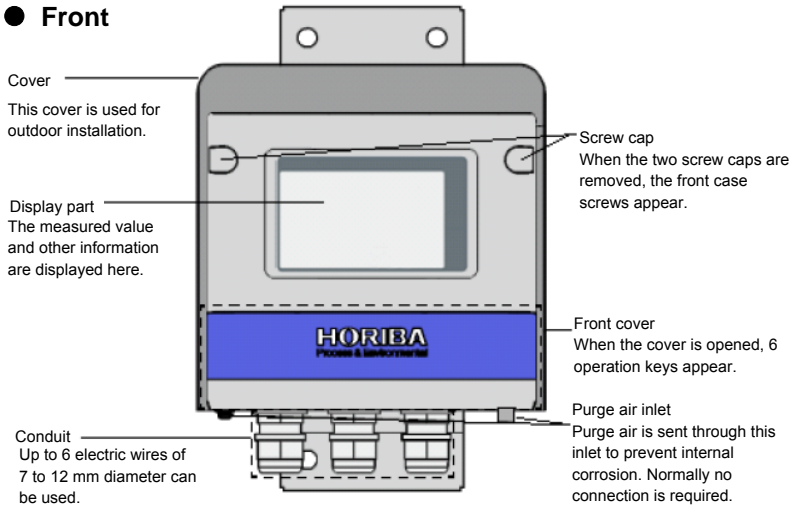
Unit: mm

■ Converter/Sensor

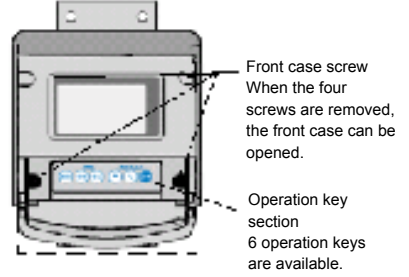
- Free fluoride ions (F^-) in the sample can be continuously measured.
- Any fluorine substance other than free fluoride ions (F^-) cannot be measured.
- The electrode potential has an almost linear relationship with the logarithm of fluoride ion concentration.
- The proper measurement condition is pH5 to pH8. Stable measurements can be made in the entire measurable range by adjusting the pH value to pH5 to pH8.

■ Configurations

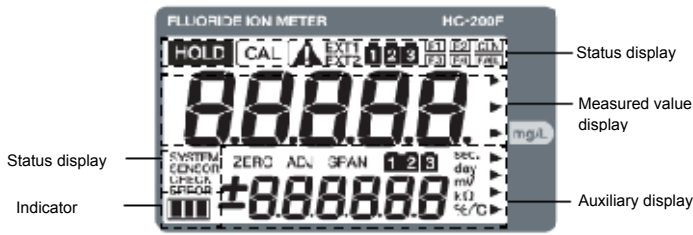
● Front



● With the front cover



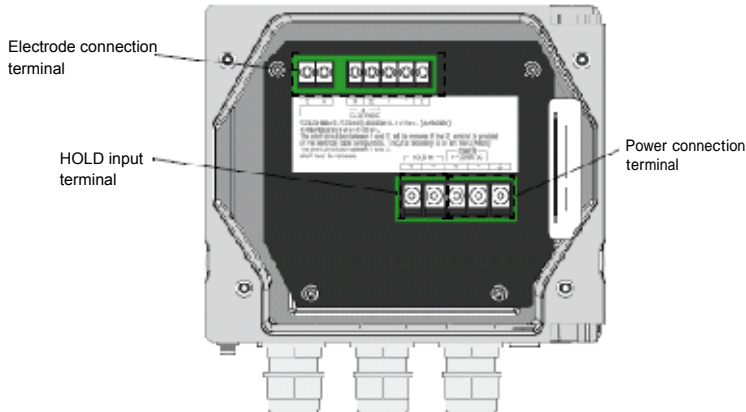
● Display part



● Operation key section

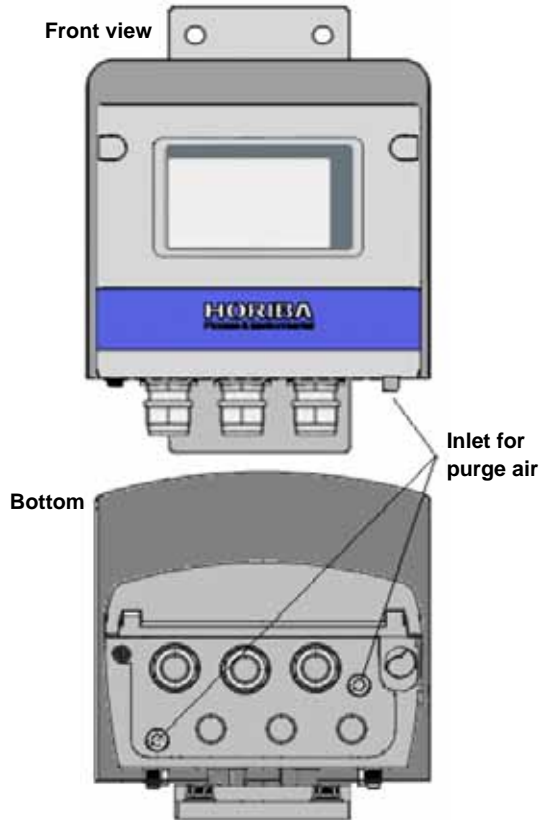


● Terminal block



■ Air purge

In order to prevent internal corrosion, a purge air inlet is provided. To use the HC-300F in an environment where corrosive gas is generated, prevent corrosive gas from entering the inside by constantly sending instrument air.



■ Measuring the temperature

The RTD, an element to measure the temperature, uses a resistance-temperature detector which has resistance of 1000 Ω at 0 ° C.

When a measurement is made by the ion electrode method, a reaction occurs with specific ions contained in the sample solution, generating electric potential.

Electric potential is given by the following equation:

$$E = E_0 + (2.303 RT/zF) \log a$$

E0: Constant potential difference (including reference potential of comparison electrode)

R: Gas constant

T: Absolute temperature

z: Ionic valence

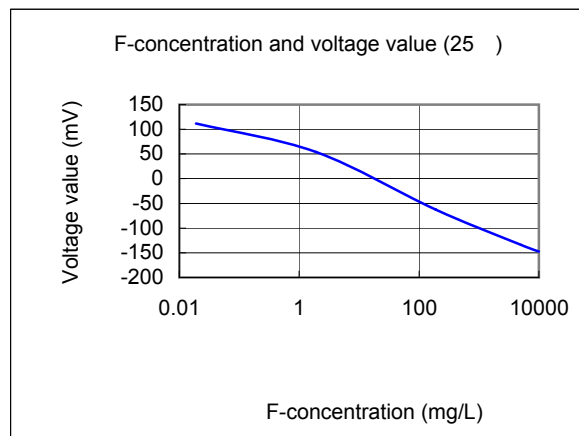
F: faraday constant

a: Activity of ion

2.303RT/zF in the above equation is a value equivalent to a change that occurs when ion activity a increases tenfold. It is called potential gradient, which is 59.16 mV for monovalent ion or 29.58 mV for bivalent ion at 25 ° C.

In a sample with a relatively low ion concentration, the activity of ion may be regarded as equivalent to the concentration. If a calibration line is previously created using the relationship between the target ion concentration and electric potential, the ion concentration can be obtained from electric potential.

Since the temperature affects this measurement, high accuracy of temperature measurement is required. The temperature accuracy of ± 0.3 ° C has been achieved. The temperature calibration mode is available to calibrate the temperature with a thermometer of higher accuracy.



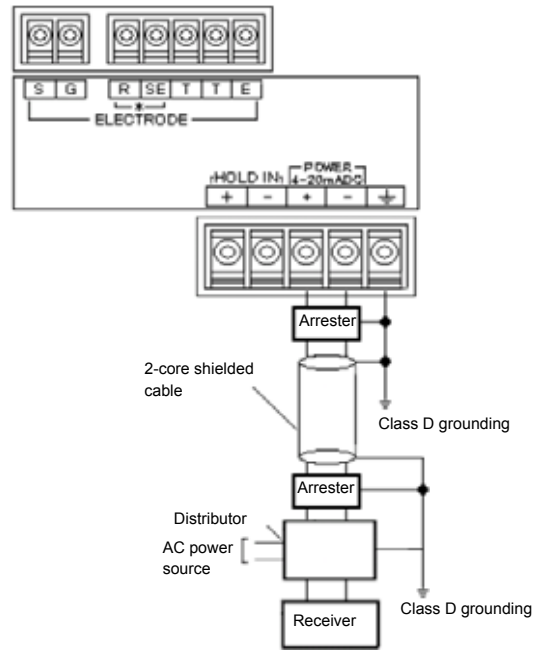
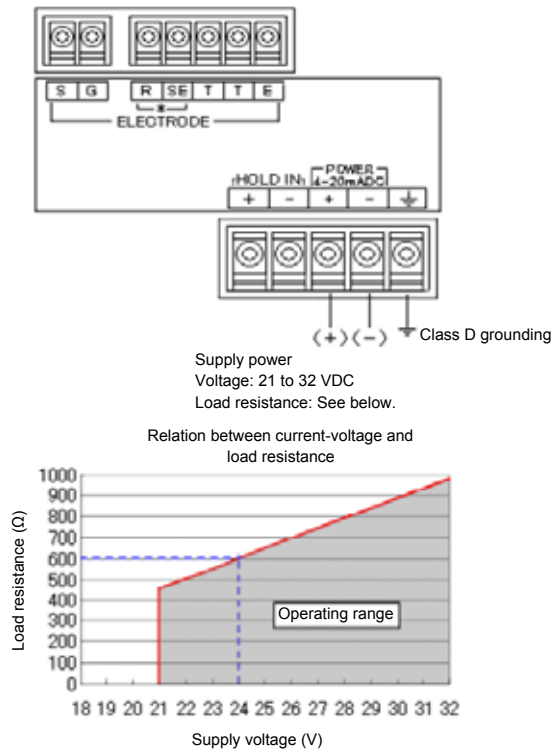
Power supply

- The HC-300F has no power switch. Provide a power switch near the HC-300F so that the power can be turned ON/OFF.
 - The power source is a two-wire transmission power source with rated voltage of 21 to 32 VDC.
 - Operation outside the rated range can cause a fault. Therefore, check the power supply voltage. Make sure that the voltage fluctuations of the power source fall within a range between 21 and 32 VDC.
 - Use a two-core shielded cable.
- If lightning strike might occur, install an arrester in two locations between the HC-300F and the distributor.

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

Power source	Rate power source: 24 VDC Operating voltage range: 21 to 32 VDC
Applicable electric wire	0.75 to 5.5 mm ² (AWG18 to 10).

Recommended typical connections



Recommended parts to be connected

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

Manufacturer: M-System Co., Ltd.

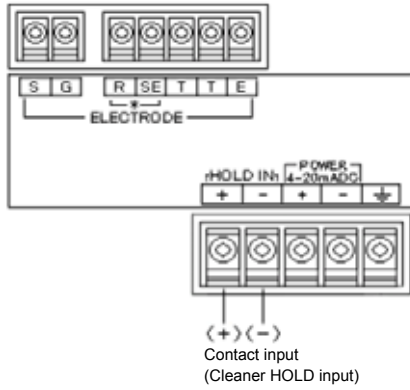
■ Entering HOLD for cleaning

- To use the HC-300F with the cleaner, connect the cleaner.
- When the HOLD contact signal from the cleaner turns ON, the transmission output is held.
- The holding mode may be changed by a setting.
- Limit the resistance of contact input (HOLD input to the cleaner) to 40Ω maximum.

Holding mode

- The holding mode may be changed by a setting.

[HoLd]: The previous value is held for output.
 [PrES]: A freely specified value is output.

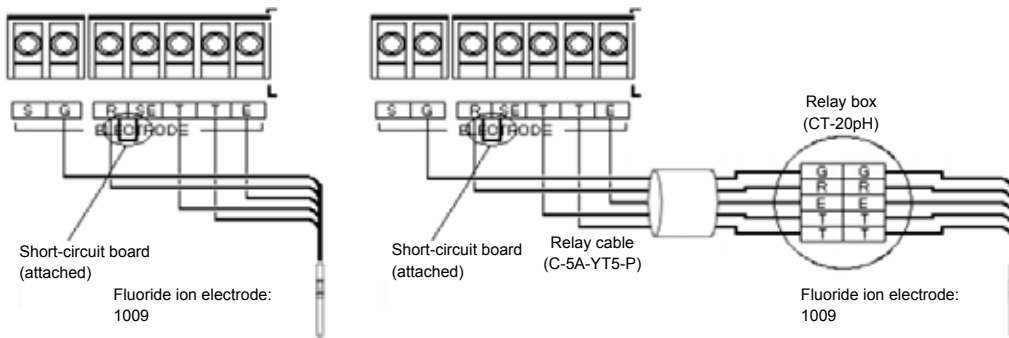


■ Electrode

- The electrode cable for fluoride ions is highly insulated. In handling this cable, be careful about 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. Insulation decreases.
 - The decreased insulation can cause instable readouts. Always maintain the electrode 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, allow for its length in order to calibrate a standard solution or to check and replace 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.

Fluoride ion electrode 1009	G: Ion electrode terminal
	R: Reference electrode terminal
	T, T: Temperature compensation electrode terminal
	E: Shielded terminal

The terminals on the electrode cable are assigned as follows:

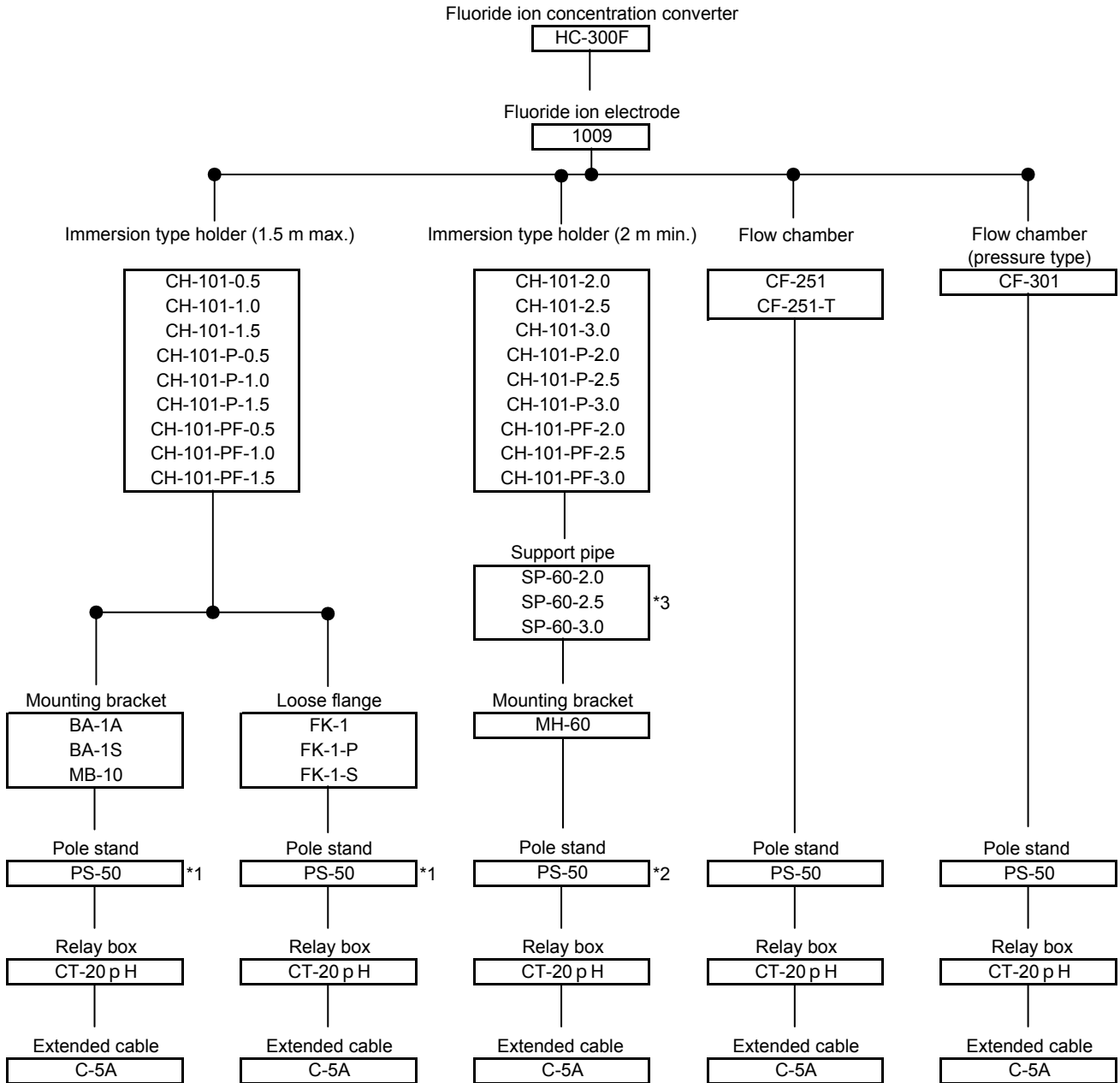


Attach the provided short-circuit plate between R and SE

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:

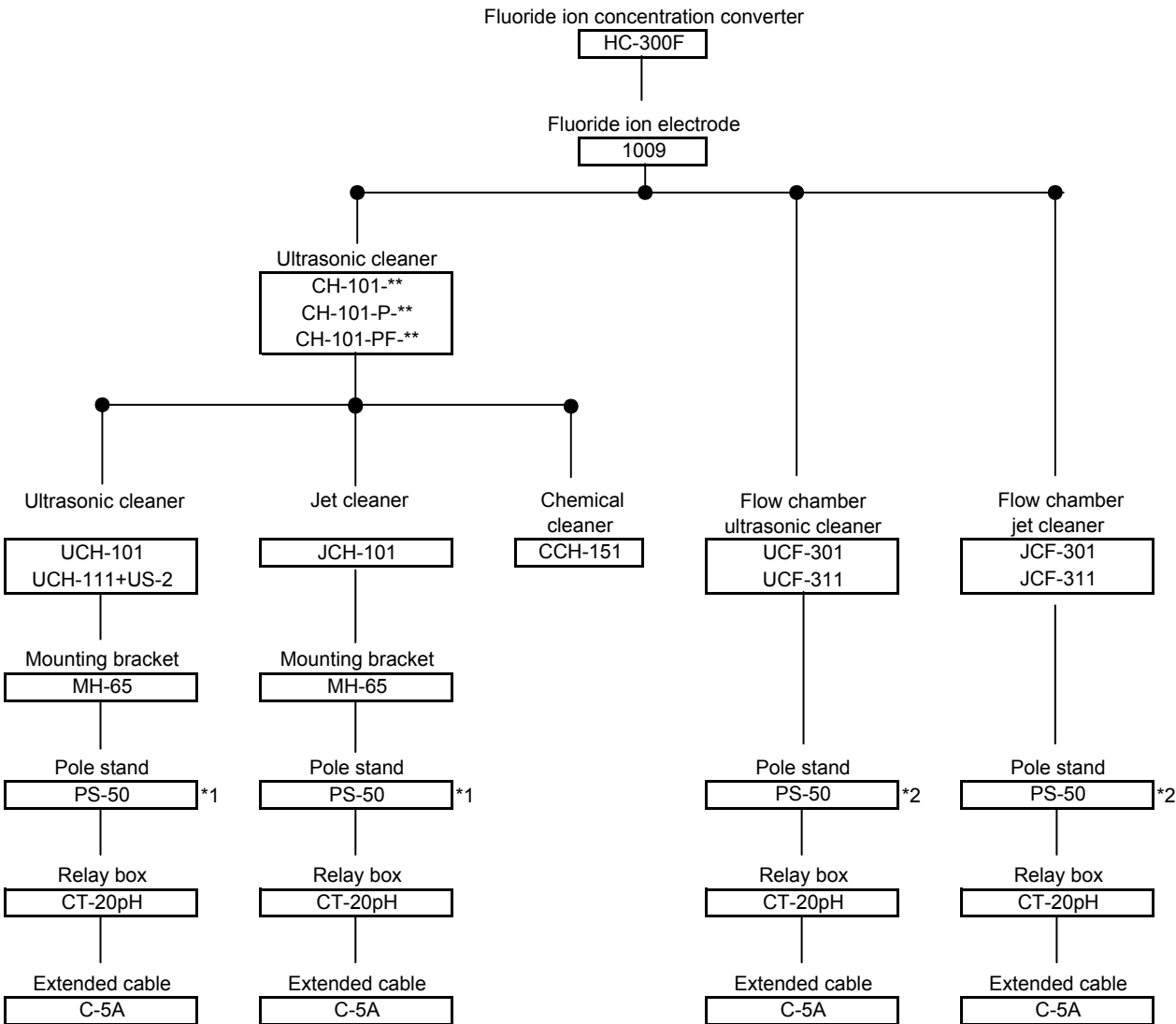


*1: This pole stand is used to attach the converter and the CT-20pH (relay box).

*2: This pole stand is used to attach the converter, the CT-20pH (relay box), and the MH-60 (mounting bracket).

*3: For any combinations with the CH-101PF series, contact us.

When the distribution type cleaner is used:



*1: This pole stand is used to attach the converter, the CT-20pH (relay box), and the MH-65 (mounting bracket).
 *2: This pole stand is used to attach the converter and the CT-20pH (relay box).

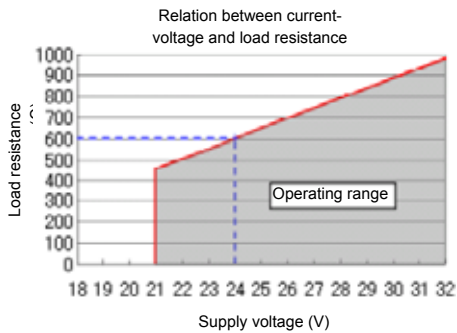
■ Specification -1 (HC-300F Simplified Fluoride Ion Concentration for Industrial Use)
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Product name	Simplified Fluoride Ion Concentration Converter (Two-Wire Type) for Industrial Use			
Model	HC-300F			
Combination electrode	Fluoride ion electrode			
Measurable range	Concentration	0 to 10000 mg/L (readout range: 0 to 11000 mg/L)		
	Temperature	0 to 100 (readout range: -20 to 130)		
Display resolution	Concentration	0.1mg/L (in a range between 0.0 and 20.0mg/L)		
		1mg/L (in a range between 0 and 200mg/L)		
		10mg/L (in a range between 0 and 2,000mg/L)		
		100 mg/L (in a range between 0 and 10000 mg/L)		
Performance	ORP	Repeatability	Within $\pm 7\%$ of full-scale value (with equivalent input)	
		Linearity	Within $\pm 10\%$ of full-scale value (with equivalent input)	
	Temperature	Repeatability	Within $\pm 0.3^\circ\text{C}$ (for equivalent input)	
		Linearity	Within $\pm 0.3^\circ\text{C}$ (for equivalent input)	
	Output type	4-20 mADC input/output insulated type (two-wire transmission type)		
	Load resistance	600 Ω max. (*1)		
	Repeatability	Within ± 0.02 mA (output only)		
	Linearity	Within ± 0.08 mA (output only)		
	Output range	Concentration: Any value may be specified within the measurable range.		
	Error output	With burn-out capability (3.8 or 21 mA)		
Contact input	Hold capability	Selectable from previous value hold, arbitrary value hold, and calibration value hold		
	Number of input points	1		
	Contact type	Open collector, no-voltage a-contact		
	Conditions	ON resistance: 40 Ω Open voltage: 1.2 V Short-circuit current: 21 mADC max.		
Temperature compensation	Applicable temperature element	Platinum resistive element: 1 k Ω (0 $^\circ\text{C}$) Positive thermosensing property resistor: 10 k Ω (25 $^\circ\text{C}$) or no temperature element		
	Temperature compensation range	0 $^\circ\text{C}$ to 100 $^\circ\text{C}$		
	Temperature calibration function	One-point calibration using comparison with reference thermometer		
Calibration	Calibration method	Arbitrary 1 or 2 points		
	Number of calibration points	Select 1-point or 2-point calibration.		
	Kinds of standard solutions	1st point: standard solution with concentration of 50-100% of the measurable limit		
		2nd point: standard solution with concentration of 1-20% of the measurable limit		
Additional functions	Automatic calibration failure detection (asymmetry potential, sensitivity, and stability) Calibration history (asymmetry potential, sensitivity, and number of days elapsed after last calibration) Manual sensitivity calibration (0.500 to 1.500)			
Self-diagnostics	Calibration errors	Asymmetry potential error, sensitivity error, response time error, and temperature calibration range error		
	Electrode diagnostic error	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 60 (without freezing)			
Operating humidity range	Relative humidity: 5% to 90% (without condensation)			
Storage temperature	-25 ~ 65			
Power source	Rated voltage	24 VDC (operating voltage range: 21-32 VDC) (*1)		
	Power consumption	0.6 W max.		
Applicable standards	CE marking	EMC directive (2004/108/EC) EN61326-1: 2006		
		Immunity Industrial location	Electrostatic discharge	IEC61000-4-2
			Radiated radiofrequency electromagnetic field	IEC61000-4-3
			Electric fast transient/burst	IEC61000-4-4
			Surge	IEC61000-4-5(*2)
			Conducted interference induced by radiofrequency	IEC61000-4-6
	Emission class A	Radiated disturbance	CISPR 11 CLASS A	
FCC Rules	Part 15 CLASS A			

■ Specification -2 (HC-300F Simplified Fluoride Ion Concentration for Industrial Use)

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

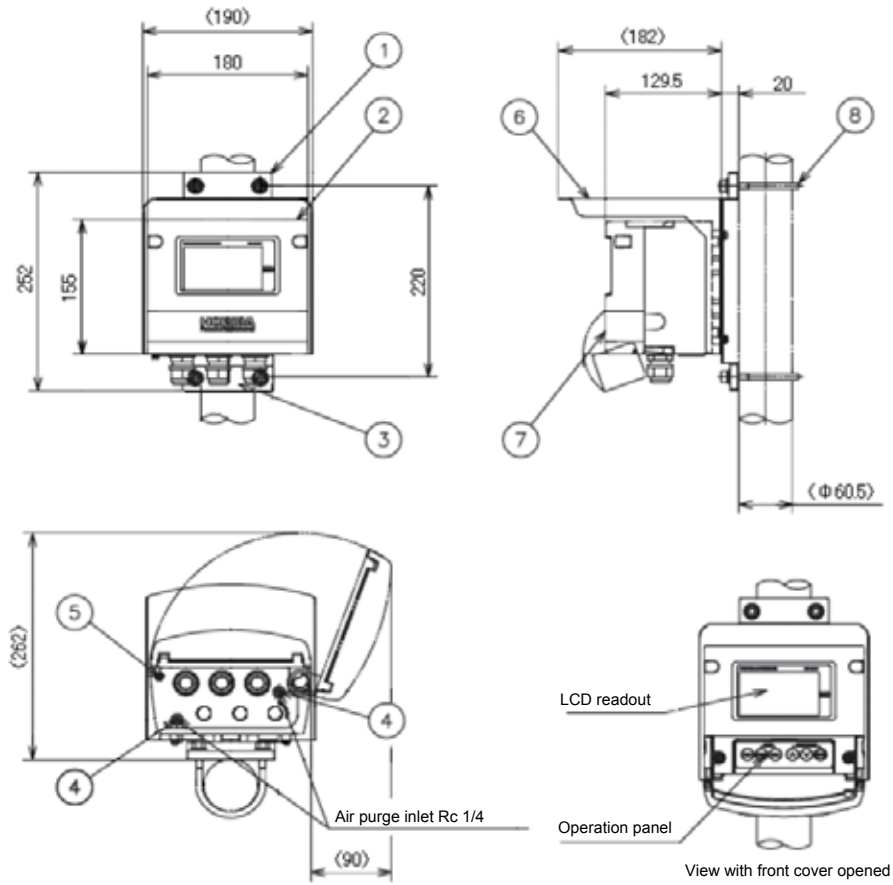
*1: The maximum load resistor may be used in the following range depending on the power supply voltage.



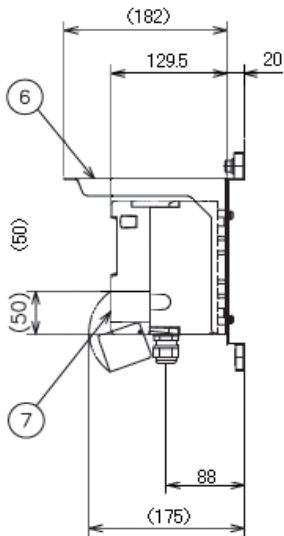
*2: When the sensor cable, the transmission cable, or the contact input cable is extended to more than 30 m, the surge test in the EMC Directive is not applicable for CE marking.

*3: An arrester (sparkover voltage: 400 V) is mounted for transmission output. However, use the most suitable surge absorbing element on the connection line in accordance with the ambient environment, the equipment installation situation, and the externally connected equipment.

External dimensions (HC-300F Simplified Fluoride Ion Concentration for Industrial Use)



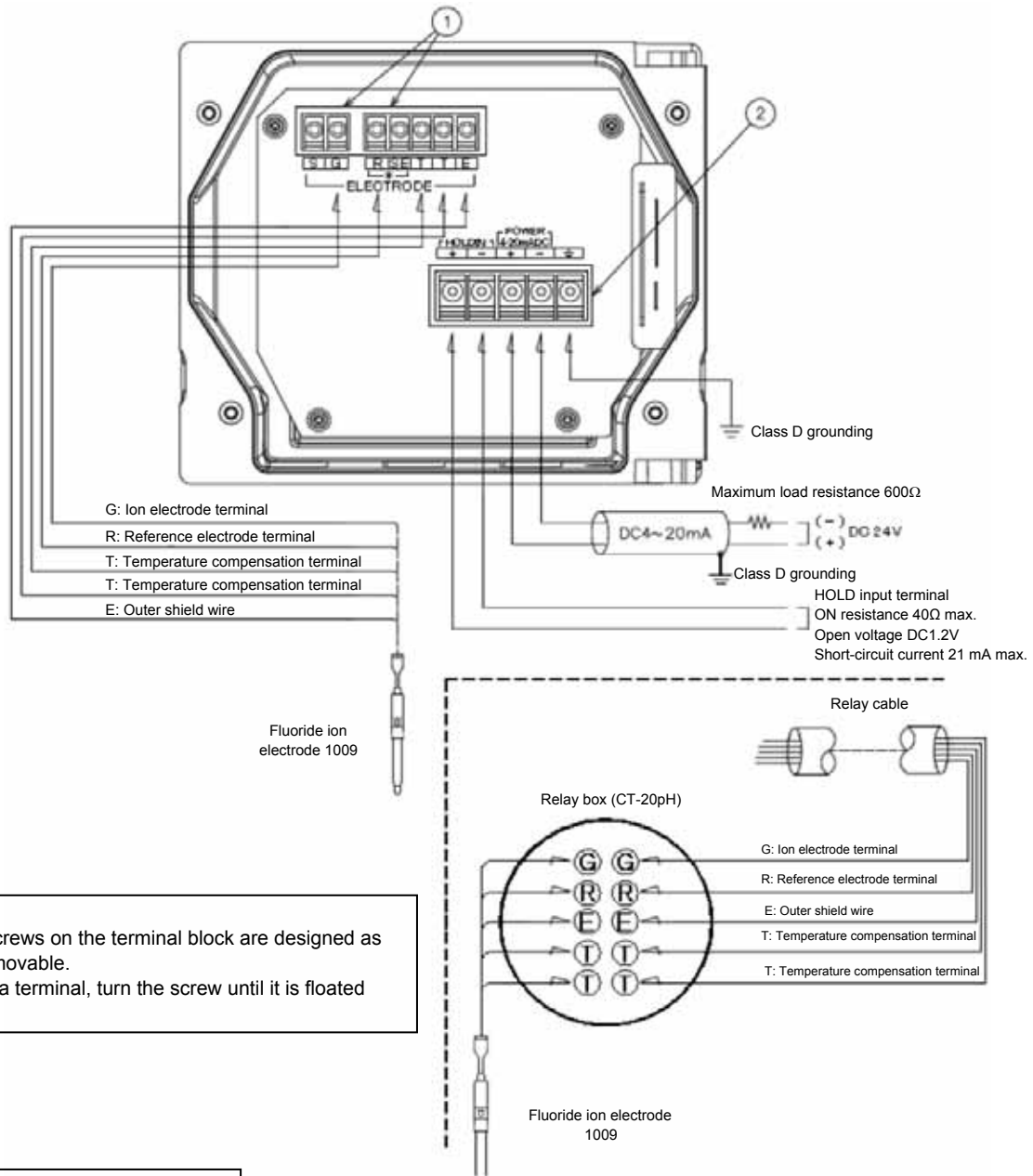
Dimensional outer drawing (wall-mount) for HC-300F Simplified Fluoride Ion Concentration Meter for Industrial Use
(The other dimensions are as shown above.)



	PARTS	NOTES
1	Mounting plate	SUS304
2	Case	ADC12
3	Conduit	O.D Φ 7~ Φ 12cable
4	Plug	SUS304
5	Earth	SUS304 M4
6	Cover	SUS304
7	Front cover	ADC12
8	U-bolt	SUS304 50A MB

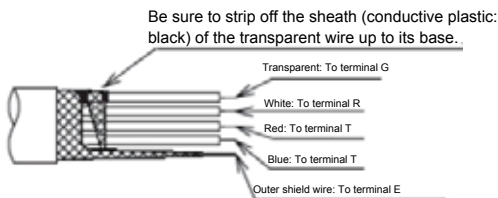
Coated with epoxy modified melamine resin
(Munsell 10PB/7/1)
Approx. 2.8 kg
IP65(IEC60529、JIS C0920)

External connection diagram (HC-300F Simplified Fluoride Ion Concentration for Industrial Use)



Note
: The screws on the terminal block are designed as non-removable.
To use a terminal, turn the screw until it is floated
Turn

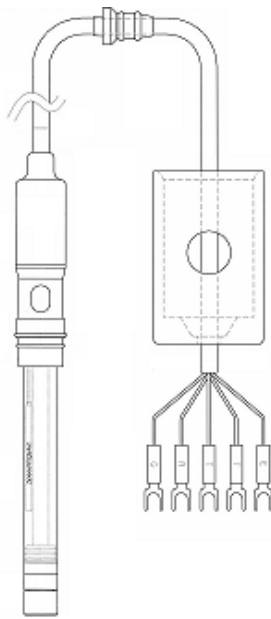
Relay cable termination method



Terminal screw	Applicable crimp-type terminal	Applicable electric wire	Screw tightening torque
(1) M3	MAX6.5 MAX3.2 MAX5.2	1.25mm ² /MAX (AWG16)	0.8N·m
(2) M4	MAX7.6 MAX4.2 MAX9.5	3.5mm ² /MAX (AWG12)	1.2N·m

Note
:Sheath (conductive plastic: black) for transparent line
Be sure to strip off the sheath (conductive plastic: black) of the transparent wire up to its base.

Fluoride ion electrode



Model		1009
Measuring method		Ion electrode method (response membrane: contains lanthanum fluoride Eu 0.5%).
Measurable range		0.2 to 10000mg/L
Accuracy (including the converter)	Linearity	Within $\pm 30\%$ of full-scale value
	Repeatability	Within $\pm 30\%$ of full-scale value
Sample water conditions	pH range	pH4 to pH8 at 0.2 mg/L
		pH4 to pH10 at 20 mg/L
		pH4 to pH12 at 2,000mg/L
	Temperature range	0-40
	Electric conductivity	500 $\mu\text{S}/\text{cm}$ min.
	Flow velocity range	1 to 20 cm/s
Standard substance for calibration		Highest quality NaF or KF
Comparison electrode	Internal electrode	Ag/AgCl
	Internal fluid	KCl 3.3 mol/L supply type Zirconia ceramic junction
Temperature compensating element		Pt 1000 Ω
Temperature compensation range		0-40
Dimensional outline drawing		12 mm dia. x 170 mm length excluding the cable and any protrusion
Weight		Approx. 200g

About measurements

- Free fluoride ions (F⁻) in the sample can be continuously measured.
- Any fluorine substance other than free fluoride ions (F⁻) cannot be measured.
- The electrode potential has an almost linear relationship with the logarithm of fluoride ion concentration.
- The proper measurement condition is pH5 to pH8. Stable measurements can be made in the entire measurable range by adjusting the pH value to pH5 to pH8.

The measurement is affected by OH-ions.

The use of the following equation is recommended to see whether the measurement is affected by OH-ions.
 (allowable limit value for coexistence) \times (measured ion concentration) > (interfering ion concentration)

:Measurable

[allowable limit for interfering ion coexistence: OH=10 (index showing the effect of interfering ions)]

Example: (10) \times 0.1 mol/L < 2 mol/L ... Not measurable

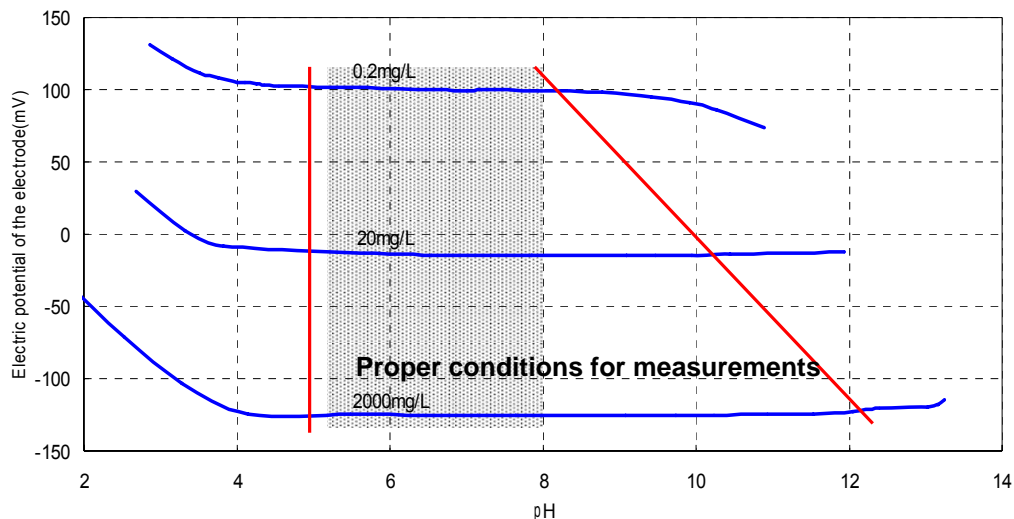
(10) \times 0.1 mol/L > 0.5 mol/L ...Measurable

The above interfering ion reacts with the response membrane of the electrode and affects the electric potential of the electrode. This appears as an error.

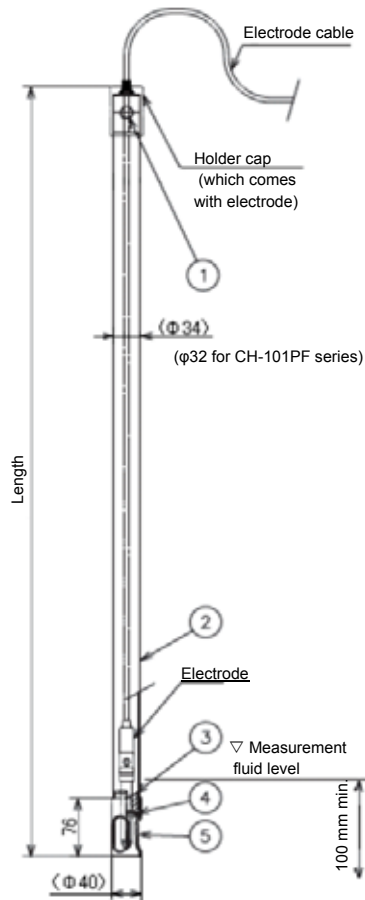
Complexation affects the measured value. (Fe₃⁺, Al₃⁺, or the like)

If multivalent metal ions (e.g. Fe₃⁺ or Al₃⁺) coexist, they will form complexes (FeF₆³⁻ and AlF₆³⁻) with fluoride ions. This may cause the free fluoride ion concentration to decrease, resulting in a lower measured value for concentration.

Effect of fluoride ion electrode by pH



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

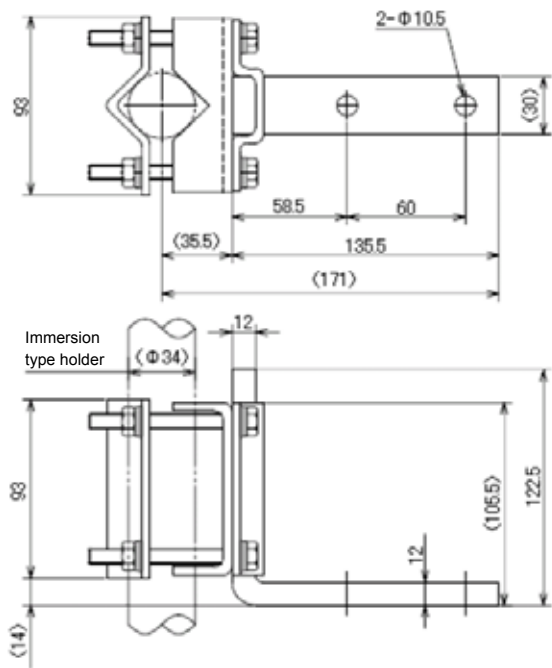


	PARTS	NOTES
(1)	Internal fluid inlet	
(2)	Holder	PP(CH-101) PVC(CH-101-P) PVDF(CH-101-PF)
(3)	Electrode gasket	FKM
(4)	Washer	PP(CH-101, CH-101-P) PVDF(CH-101-PF)
(5)	Protective tube	PP(CH-101, CH-101-P) PVDF(CH-101-PF)

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-101-P series	CH-101-PF series	
Holder material		PP	PVC	PVDF	
Temperature		-5 to 80	-5 to 50	-5 to 100	
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	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. 0.85
	3m	Approx. 0.9	Approx. 1.33	Approx. 1.25	

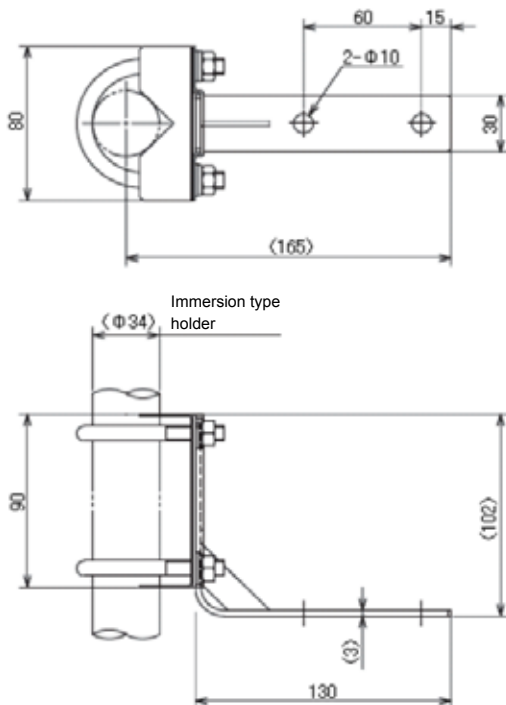
■ Mounting bracket (BA-1A): Specifications and external dimensions



Model	BA-1A
Material	ABS resin
Mounting	Anchoring

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

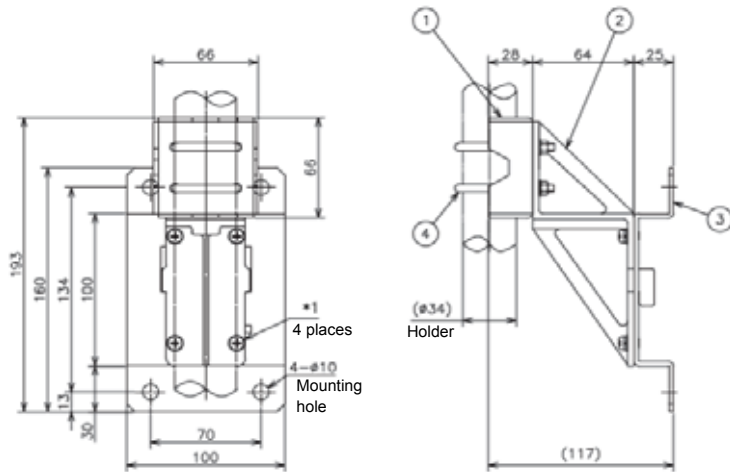
■ Mounting bracket (BA-1S): Specifications and external dimensions



Model	BA-1S
Material	SUS304
Mounting	Anchoring

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

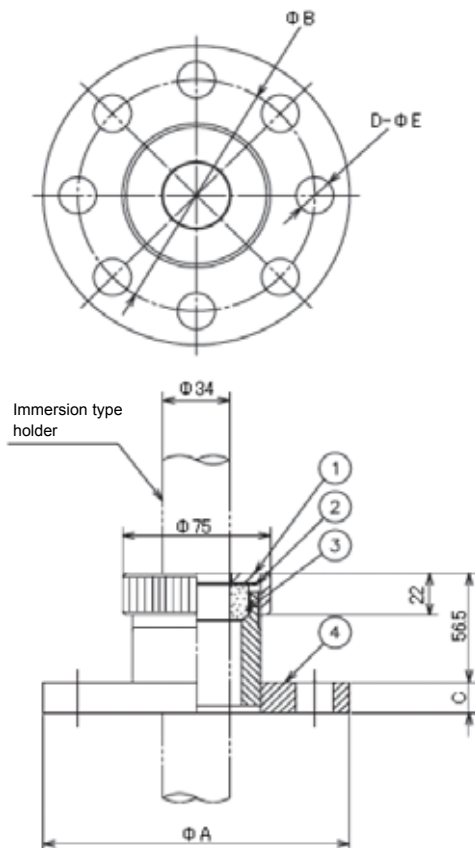
Mounting holder (MB-10): Specifications and external dimensions



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

Mounting pipe: 50 A
 *1: If any wobble or vibration occurs, the immersion type holder may drop off. Fasten four points with M5 screws.

Mounting bracket (FK-1 series): Specifications and external dimensions



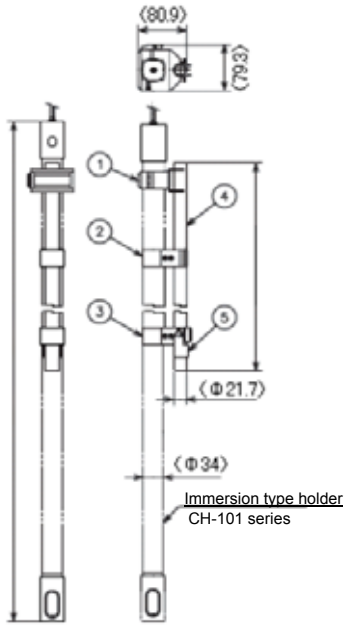
Model	FK-1	FK-1P	FK-1S
Materia Flange	PP	PVC	SUS316
Nut	PP	PVC	SUS304
Washer	PP	PVC	PP
Gasket	FKM	FKM	FKM
Flange standard	JIS 10K 50A FF, etc.		

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

■ 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 CH-101P series

When the flow rate is fast even if the holder length is shorter than 1.5 m, A support pipe may be required.

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

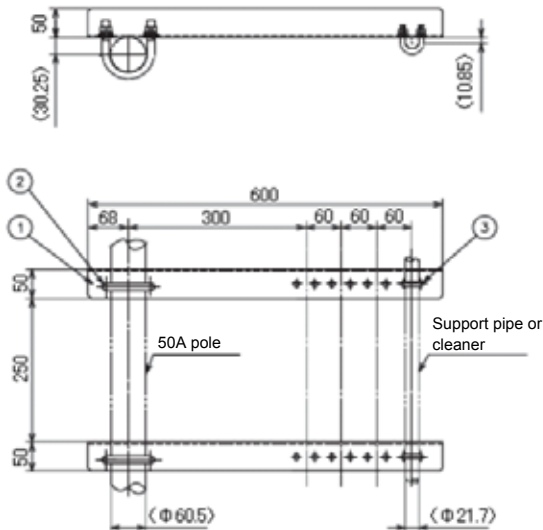
The intermediate hook is provided when the immersion type holder length is 2 m or more.

No combinations with the CH-101PF are available.

	Support pipe L1 length (mm)	Immersion type holder L2 length (mm)
Fog 1m	500±10	1000 ±10
Fog 1.5m	1000±10	1500 ±10
Fog 2m	1500±10	2000 ±10
Fog 2.5m	2000±10	2500 ±10
Fog 3m	2500±10	3000 ±10

For possible combinations with the CH-101PF, contact us.

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

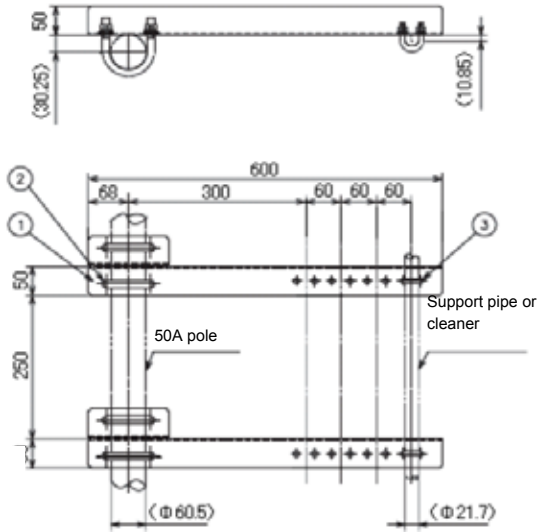


Model	MH-60	
Material	Arm	SUS304
	U-bolt	SUS304
Mounting pipe	50A	

Used to secure the support pipe (SP-60 series) to the pole stand.

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

Mounting bracket (MH-65): Specifications and external dimensions

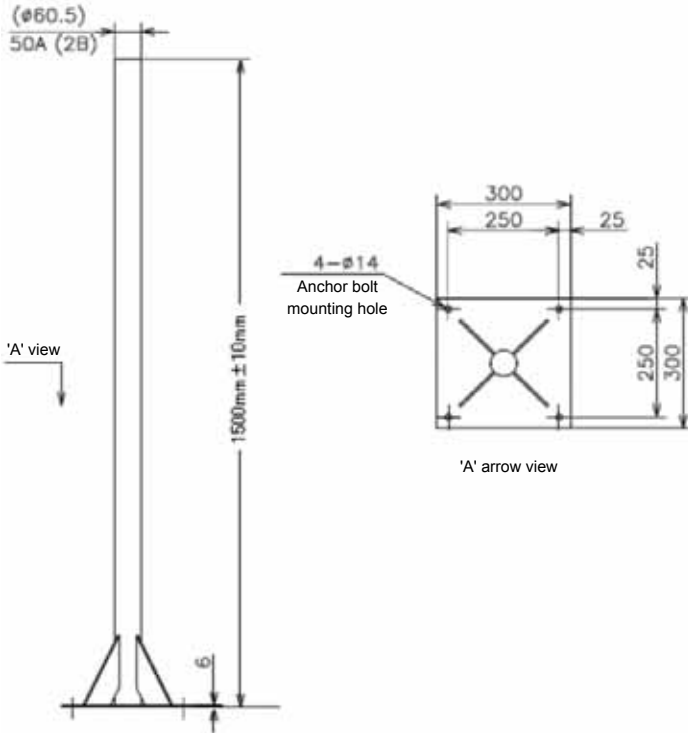


Model	MH-65	
Material	Arm	SUS304
	U-bolt	SUS304
Mounting pipe	50A	

To mount the cleaner on the pole stand, use the MH-65.

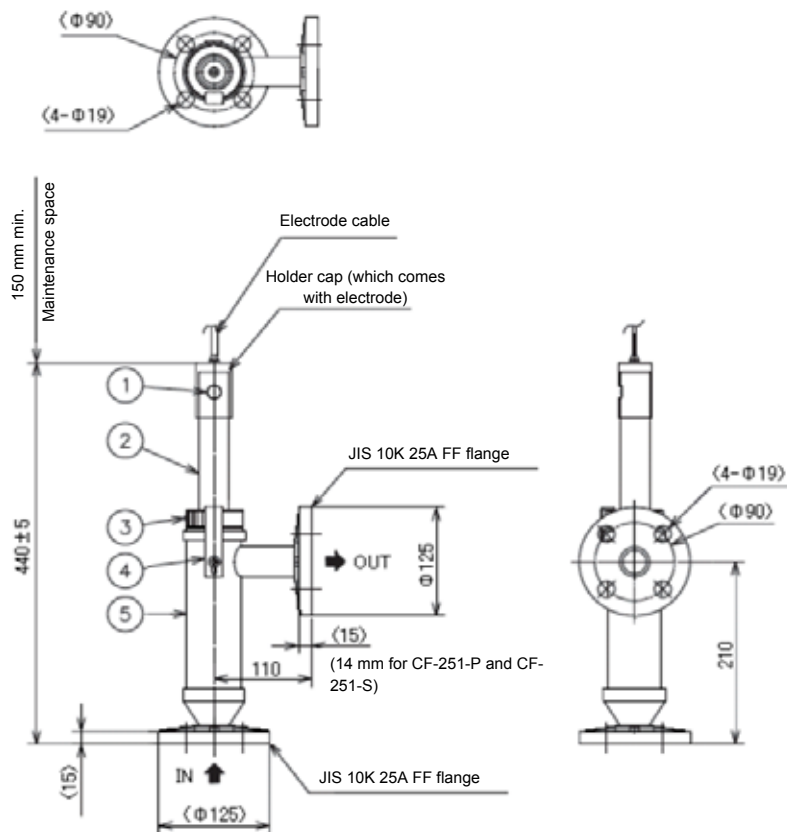
	PARTS	NOTES
(1)	Arm	SUS304
(2)	U-bolt	SUS304 stainless steel (for 50A)
(3)	U-bolt	SUS304 stainless steel (for 15A)

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



Model	PS-50-300
Material	SUS304
Pipe diameter	50A

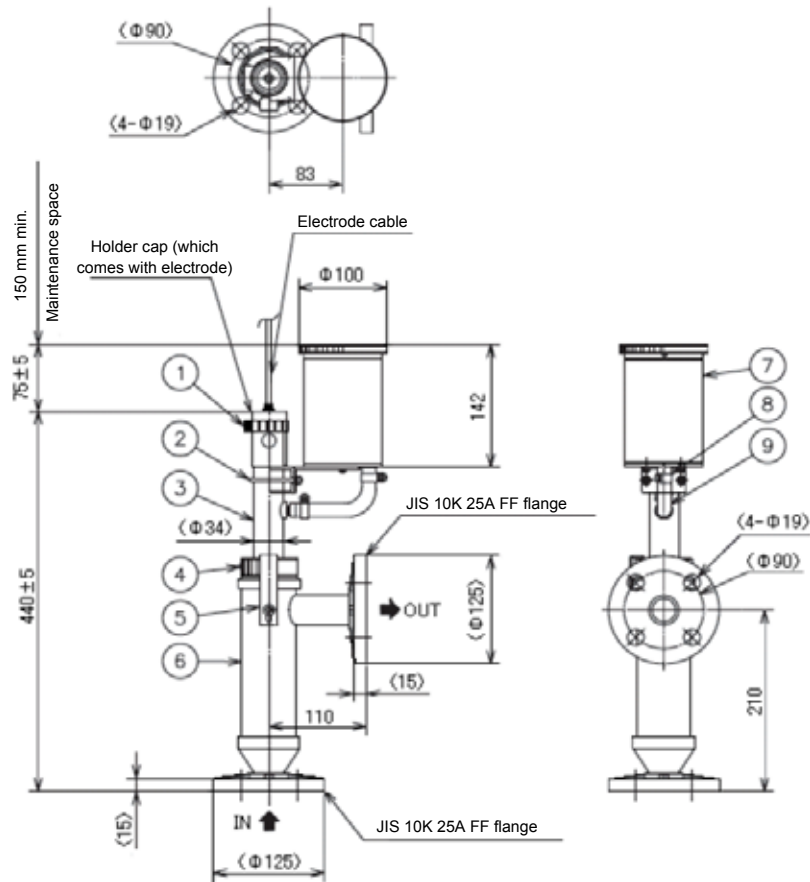
Flow chamber (CF-251 series): Specifications and external dimensions



Model	CF-251	CF-251P	CF-251S	
Material of distribution holder	PP	PVC	SUS316	
Ambient Temperature	-5 to 60	-5 to 50	-5 to 60	
Conditions for measurement solution	Temperature	-5 to 80	-5 to 100	
	For the actual operating temperature range, check the specifications of electrodes to be combined.			
	Pressure	Atmospheric pressure		
	Flow Rate	0.3 to 10L/min		
Wetted material	Packing	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 fluid inlet	
(2)	Holder	PP(CF-251)
		PVC(CF-251P)
		PVDF(CF-251S)
(3)	Tightening nut	PP(CF-251)
		PVC(CF-251P)
		SUS304(CF-251S)
(4)	Lock plate	SUS304
(5)	Distribution holder	PP(CF-251)
		PVC(CF-251P)
		SUS316(CF-251S)

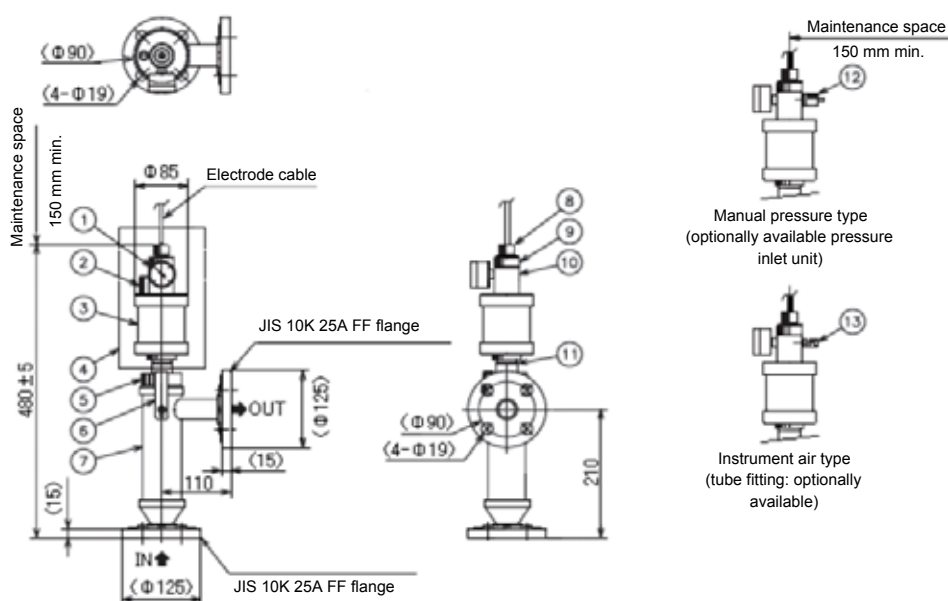
Flow chamber (CF-251-T series): Specifications and external dimensions



Model	CF-251-T	CF-251P-T	CF-251S-T	
Holder material	PP	PVC	SUS316	
Ambient Temperature	-5 to 60	-5 to 50	-5 to 60	
Conditions for measurement solution	Temperature	-5 to 80	-5 to 60	-5 to 100
	Working temperature ranges vary with combinational electrodes. Check the working temperature of an electrode.			
	Pressure	Atmospheric pressure		
	Flow Rate	0.3 to 10L/min		
Wetted material	Packing	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 the sample properties that affect FKM (fluorine rubber) (strong alkali, etc.), please consult with HORIBA Advanced Techno.				
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) Lock 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 MPa to 0.5 Mpa
(2) KCl inlet	PVC
(3) KCl tank	PVC(CF-301/CF-301P) PP(CF-301S)
(4) Pressure holder	PP(CF-301)
(5) Tightening nut	PVC(CF-301P) SUS304(CF-301S)
(6) Lock plate	SUS304

PARTS	NOTES
(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 of distribution holder	PP	PVC	SUS316	
Ambient Temperature	-5 to 60	-5 to 50	-5 to 60	
Conditions for use	Temperature	-5 to 80	-5 to 50	-5 to 100
	For the actual operating temperature range, check the specifications of the electrodes to be combined.			
	Pressure	-5 to 40 : 0.30MPa 40 to 60 : 0.22MPa 60 to 80 : 0.15MPa	-5 to 40 : 0.30MPa 40 to 50 : 0.15MPa	-5 to 40 : 0.30MPa 40 to 60 : 0.25MPa 60 to 80 : 0.20MPa 80 to 100 : 0.15MPa
Flow Rate	0.3 to 10L/min			
Wetted material	Packing	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.				
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	

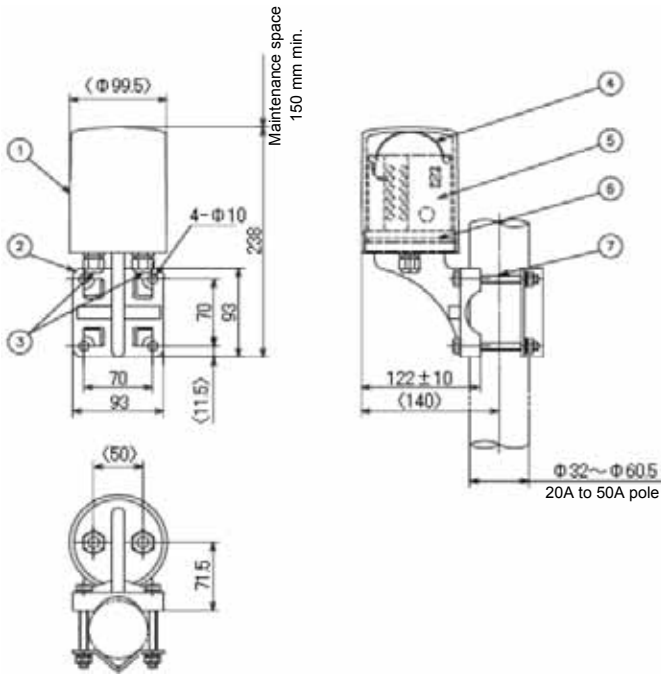
*1 Maintain a pressure in the Pressurizing Holder at the level of 0.03 to 0.05 MPa higher than a measured liquid pressure at all times.

If periodical pressurization is manually performed, separately place a purchase order for optional parts: pressurizing inlet and hand pump.

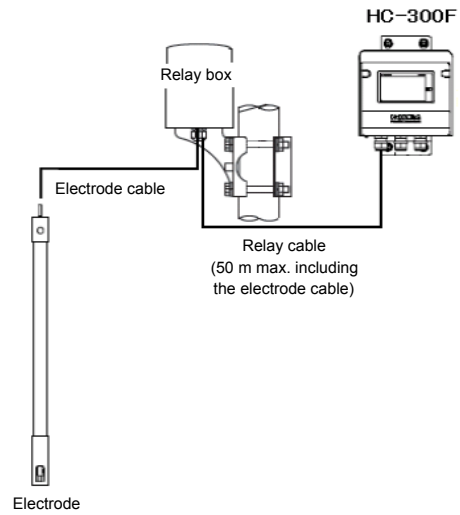
Holders are detached at the time of maintenance. So use a flexible pipe for instrument air.

Provide a regulator with a mist cap and a filter to an instrument air line.

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



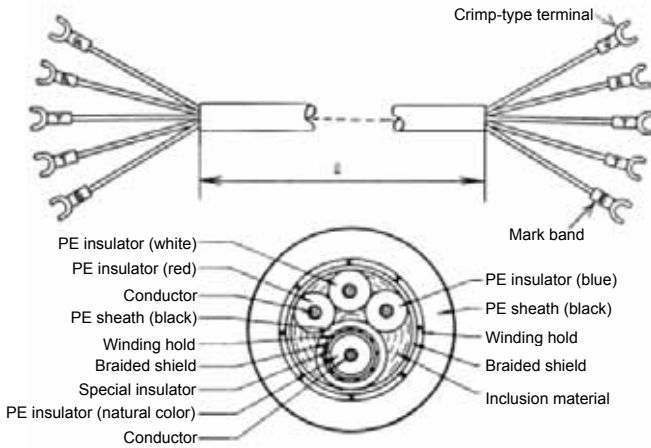
	PARTS	NOTES
(1)	Cover	ABS
(2)	Bracket	ABS
(3)	Conduit	
(4)	Spring	SUS304
(5)	Terminal board	ABS
(6)	O-ring	NBR
(7)	Bolt (provided)	SUS304 M8



If the distance between the electrode and the converter is longer than the electrode cable length, be sure to use the relay box.

- For wiring, be sure to use the relay 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	63.2 Ω /km max.
Withstand voltage	Shall withstand 1000 VAC for 1 minute.
Insulation resistance	10000M Ω /km
Rated temperature	90
Capacitance	150 PF/m max.

- To extend the electrode cable by 5 m or longer, use this relay cable.
- For wiring, be sure to use the dedicated relay cable. Do not use the general cable or halfway splice the dedicated cable.
- To extend the cable, use the relay box.

■ Installation (power source, transmission, etc.)

The description of the following installation (power source, transmission, etc.) assumes that the HC-300F is of the standard specification.
 For the HC-300F, the optionally available cleaner may be installed.
 The installation of the HC-300F 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

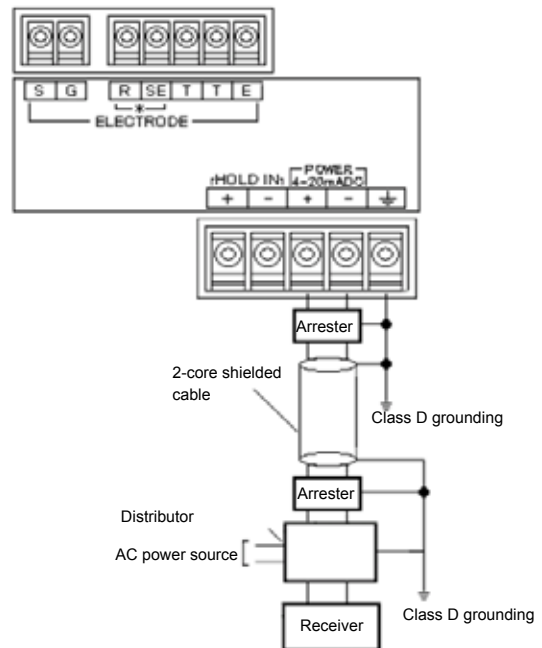
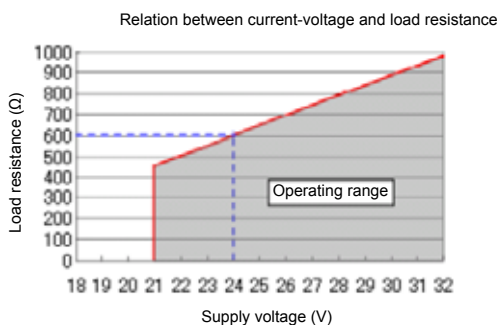
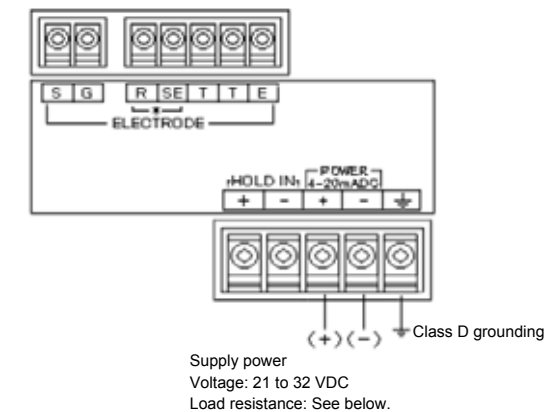
- The HC-300F has no power switch. Provide a power switch near the HC-300F so that the power can be turned ON/OFF.
- The power source is a two-wire transmission power source with rated voltage of 24 VDC.
- Operation outside the rated range can cause a fault. Therefore, check the power supply voltage. Make sure that the voltage fluctuations of the power source fall within a range between 21 and 32 VDC.
- Use a two-core shielded cable.

If lightning strike might occur, install an arrester in two locations between the HC-300F and the distributor.

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

Power source	Rate power source: 24 VDC
	Operating voltage range: 21 to 32 VDC
Applicable electric wire	0.75 to 5.5 mm ² (AWG18 to 10).

Recommended typical connections



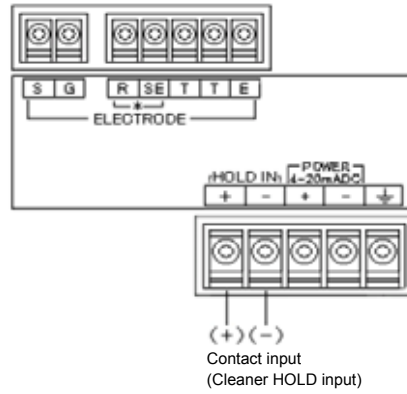
Recommended parts to be connected

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

Manufacturer: M-System Co., Ltd. Manufacturer: M-System Co., Ltd.

Cleaning hold

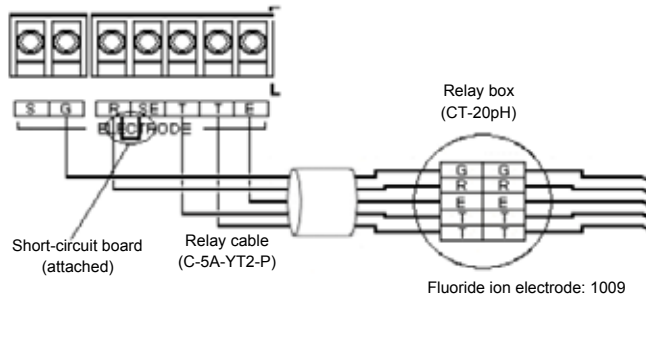
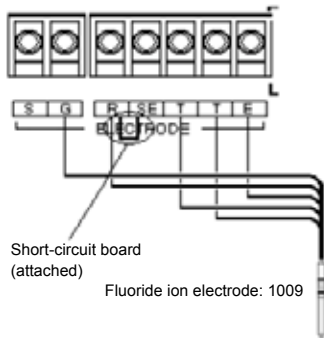
- To use the HC-300F with the cleaner, connect the cleaner.
- When the HOLD contact signal from the cleaner turns ON, the transmission output is held.
- The holding mode may be changed by a setting.
- Limit the resistance of contact input (HOLD input to the cleaner) to 40 Ω maximum.



Electrode cable

- The electrode cable is highly insulated. Exercise care in handling the sensor cable.
- Do not wet the terminals and terminal block for cables with water or the like or contaminate them with your hand or oil. Insulation decreases. The decreased insulation can cause instable readouts. Always maintain the electrode dry and clean.
 - If the electrode cable should be soiled, wipe it off with alcohol or the like and then well dry it.
 - For the purposes of calibration with a standard solution and the checks and replacement of electrodes, carry out wiring with an allowance given to the electrode cable length.
 - Route the electrode cable and the relay cable by avoiding any place near inducing equipment such as a motor and keeping them away from the power cable for such equipment.

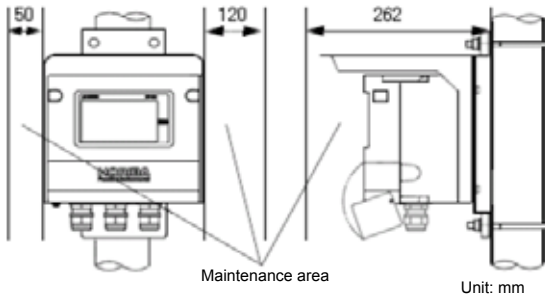
Fluoride	G: Ion electrode terminal
Ion electrode 1009	R: Reference electrode terminal
	T, T: Temperature
	E: Shielded terminal



■ Installation (mounting)

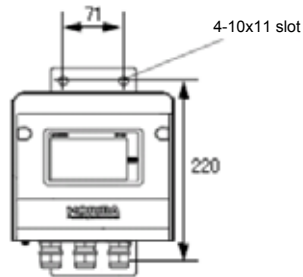
The description of the following installation (mounting) assumes that the HC-300F is of the standard specification. For the HC-300F, the optionally available cleaner may be installed.

Body (for pole mounting)



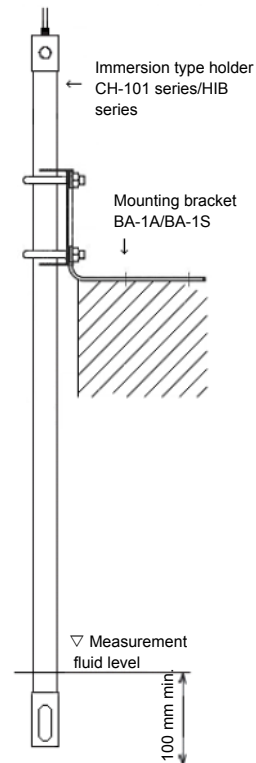
- The body may be mounted on the pole or the wall.
- For pole mounting, use a 50A pole.
- In either case, mount the body considering maintenance space

Body (to be wall-mounted)



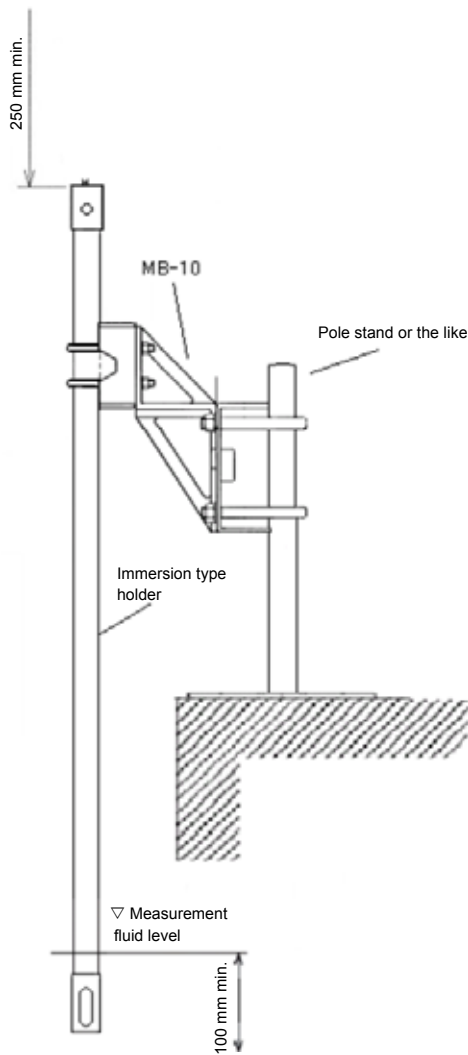
Immersion type holder + mounting bracket (BA-1A or BA-1S)

- The mounting bracket BA-1A or BA-1S should be secured with 2-Φ10 bolts.
- The immersion type holder should be mounted 250 mm minimum above the slab.
- In mounting the immersion type holder, ensure that its lower part of 100 mm minimum is immersed in sample water.
- The mountable immersion type holder (made of resin) is limited to 1.5 m.



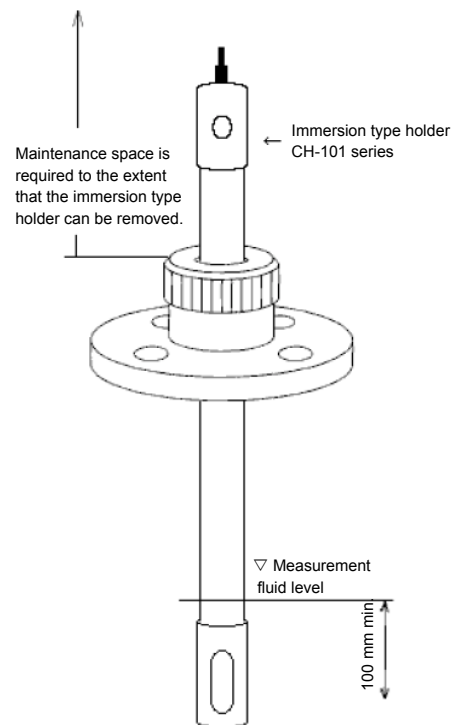
Immersion type holder + mounting bracket (MB-10)

- 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 mounting the immersion type holder, ensure that its lower part of 100 mm minimum is immersed in sample water.



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

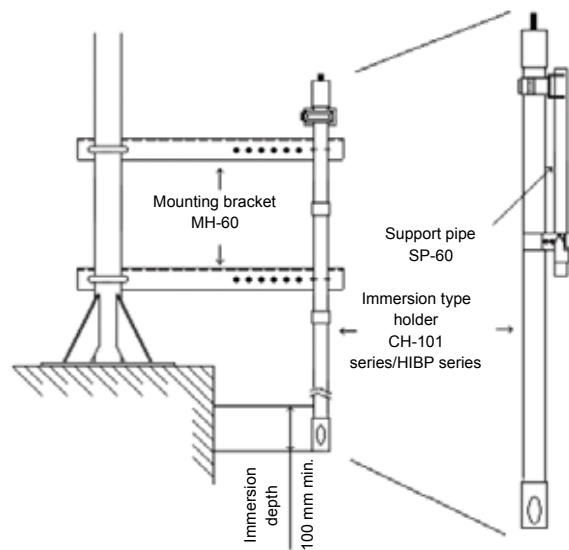
- The FK-1 series uses JIS 10K 50A FF as its basic size. To install any loose flange of special specification, previously check its size.
- In mounting the immersion type holder with the FK-1 series, position it 200 mm minimum above the top of the hexagon cap nut on the loose flange.
- In mounting the immersion type holder, ensure that its lower part of 100 mm minimum is immersed in sample water.



* For use with the CH-101PF, contact us.

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

- When the immersion type holder of 1.5 m minimum is used, it is recommended that the support pipe be used to secure the immersion type holder.
- Before using the support pipe, check the length of the immersion type holder. (The length enabling the use of an immersion holder (holder length) and a support pipe is predetermined.)
- To use the immersion type holder, secure it to the support pipe.
- To use the support pipe, secure it with the mounting bracket (MH-60).
- The mounting bracket MB-60 should be secured to the 50A pole.
- In mounting the immersion type holder, ensure that its lower part of 100 mm minimum is immersed in sample water.
- For use with the CH-101PF, contact us.



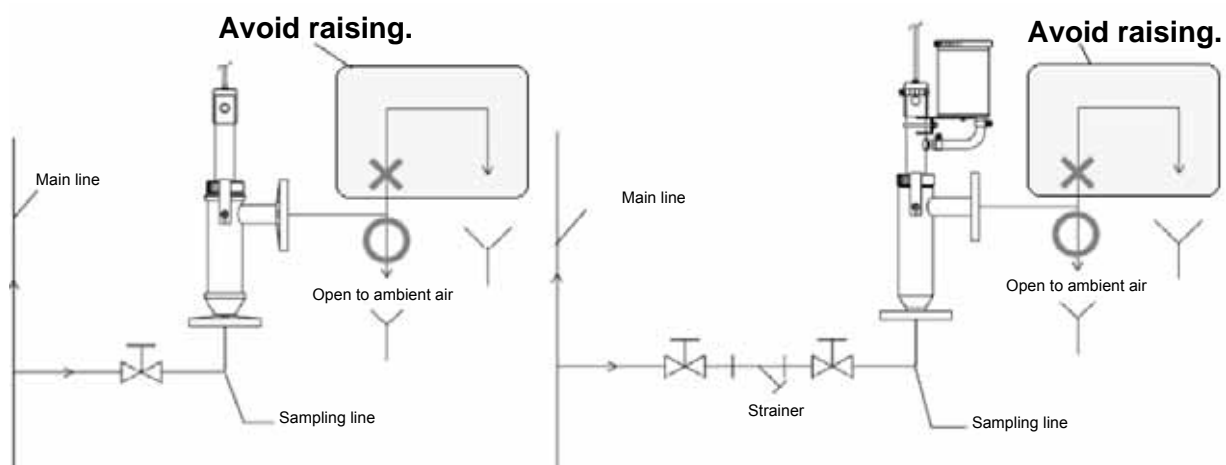
Flow chamber

- The CF-251 series flow chamber uses JIS 10K 25A FF as its basic size. To install a special type of flow chamber, previously check its size.
- Make sure that the holder is installed upright.

CF-251 series

- Install a valve at the inlet of the flow chamber.
 - Minimize the piping at the outlet so that no back pressure applies. (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 reverse leakage of the solution under measurement into the electrode.

- 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 a valve on the flow-in side. If the flow rate of the solution under measurement is too fast, the occurrence of capitation or the pressure applied by the flow velocity to the liquid junction of the pH electrode may cause the readout to fluctuate. If the flow rate is too low, the readout response may be delayed. Adjust the flow rate under the conditions for the solution under measurement.
- If many suspended solids are contained in the measured liquid, provide a strainer on the inflow side of the flow chamber.



Flow chamber

CF-301 series flow chamber

If sample water has pressure, the type used by pressurizing the inside of the holder uses JIS 10K 25A FF as its basic size. To install a special type of flow chamber, previously check its size.

- Make sure that the holder is installed upright.

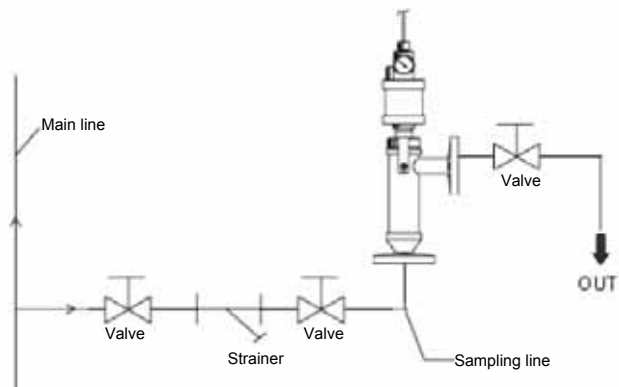
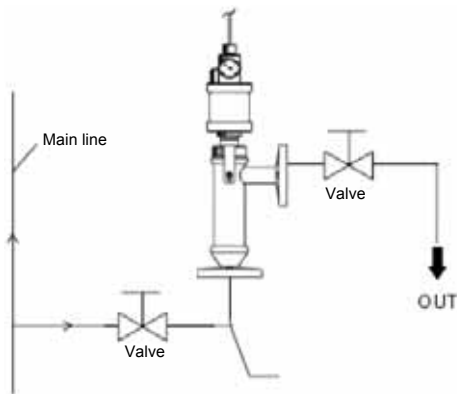
CF-301 series

- Install a valve both at the inlet and outlet of the flow chamber.
- Maintain the pressure in the pressurized holder at 0.03 to 0.05 MPa.
- To use instrument air, use a flexible hose considering maintenance easiness.

- 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 a valve on the flow-in side. If the flow rate of the solution under measurement is too fast, the occurrence of capitation or the pressure applied by the flow velocity to the liquid junction of the pH electrode may cause the readout to fluctuate. If the flow rate is too low, the readout response may be delayed. Adjust the flow rate under the conditions for the solution under measurement.

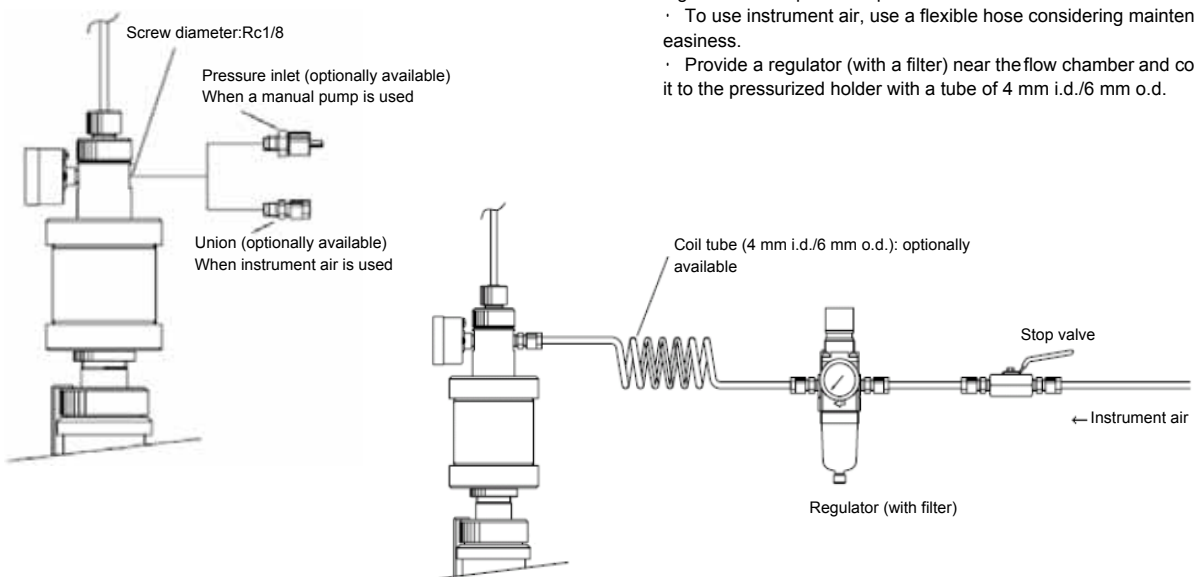
- If many suspended solids are contained in the measured liquid, provide a strainer on the inflow side of the flow chamber.



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 flow chamber 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

The ultrasonic cleaner removes dirt adhering to the electrode or prevents dirt from adhering to the electrode. 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).

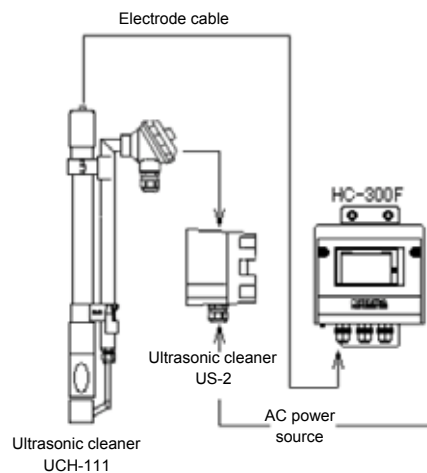
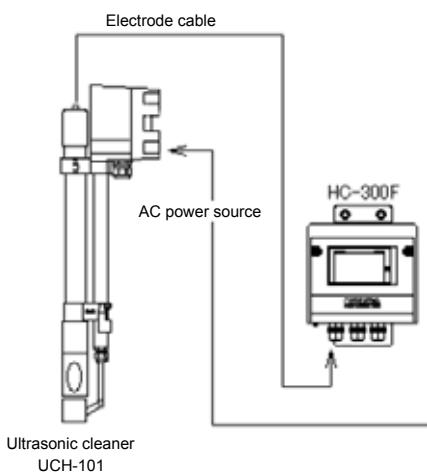
Objects

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

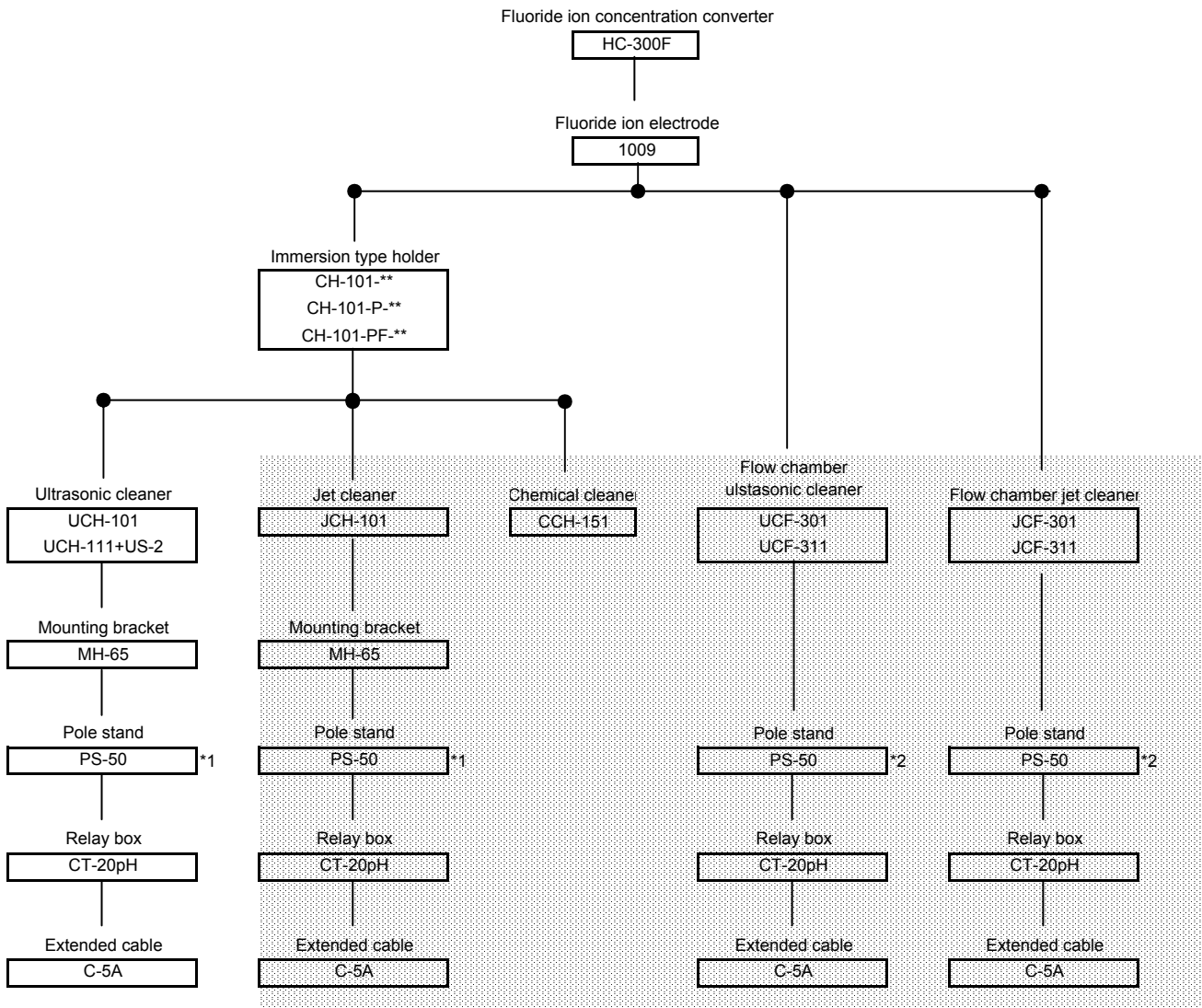
Properties Classification	Objects	
Slime	food, paper, pulp, algae	○
Microorganism	bacteria (activated sludge), slag	
Oily	tar, heavy oil	×
	light oil	○
	fatty acid, amine	×
Suspended Matters	earth and sands	
	metallic minute powder	○
	clay, calcareous	○
Scale	coagulated deposit and neutralized effluent treatment CaCO ₃ , etc.	○

:Good ○:Acceptable ×:Not acceptable

System configuration



■ Combinations (immersion type ultrasonic cleaner)



*1: This pole stand is used to attach the converter, the CT-20pH (relay box), and the MH-65 (mounting bracket).

*2: This pole stand is used to attach the converter and the CT-20pH (relay box).

Specifications (UCH-101 • UCH-111)

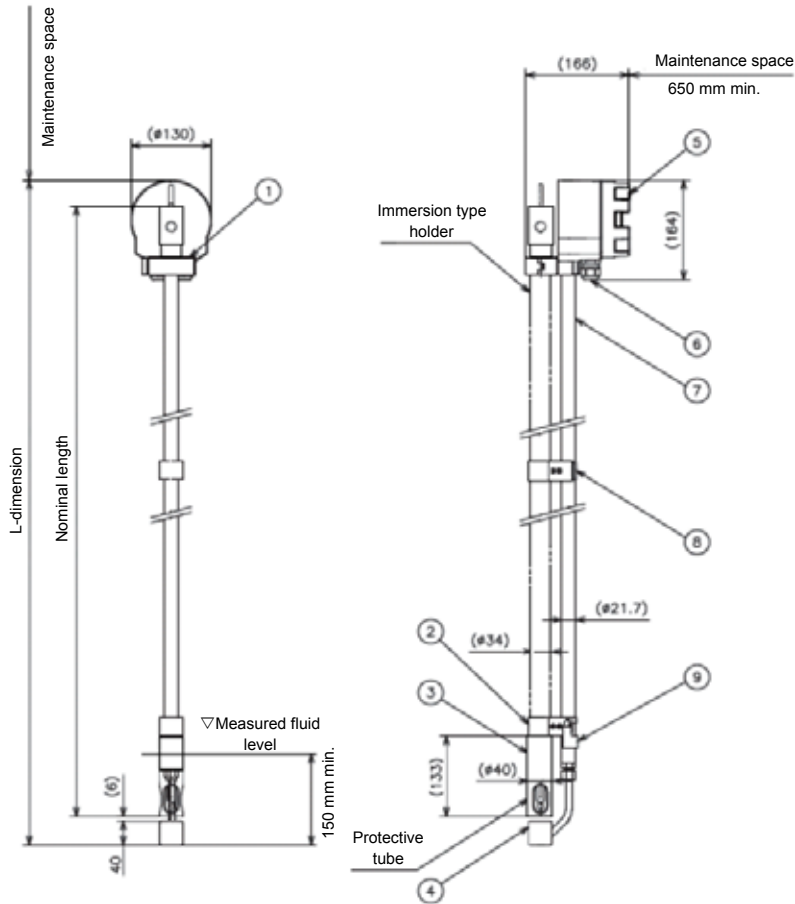
Product name		Immersion Type Ultrasonic Cleaner (ultrasonic oscillator-integrated)
Model		UCH-101
Supply Voltage		AC 100 to 240V 50/60Hz
Permissible Voltage Var		90% to 110% of supply voltage
Power consumption		10VA
Cleaning Method		Ultrasonic wave continuous irradiation system
Control System		Burst system by oscillation time control
Oscillation Frequency		Approx. 70kHz
Ambient Temperature		-5 to 50
Ambient Humidity		Relative humidity of 5% to 90% (without dew condensatic
Measured Liquid (*1)		-5°C to 80°C (without dew condensation)
Flow Velocity of Measured Liquid		2 m/sec. max.
Pressure of fluid under measurement		Atmospheric pressure
Wetted material		SUS316 (not including an electrode and materials for Imm
Weight		Approx. 4.0kg (holder length of 1.0 m)
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. Check the specification temperature for each product.

Product name		Immersion Type Ultrasonic Cleaner (ultrasonic oscillator-separately installed)
Model		UCH-111
Supply Voltage		AC 100 to 240V 50/60Hz
Permissible Voltage Var		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
Ambient Humidity		Relative humidity of 5% to 90% (without dew condensatic
Measured Liquid (*1)		-5°C to 80°C (without dew condensation)
Flow Velocity of Measured Liquid		2 m/sec. max.
Pressure of fluid under measurement		Atmospheric pressure
Wetted material		SUS316 (not including an electrode and materials for Imm
Weight	Oscillator	Approx. 2.0kg
	Oscillator Holder	Approx. 2.5kg (holder length of 1.0 m)
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. Check the specification temperature for each product.

External dimensions (UCH-101)



Dimension L and tolerance of the UCH-101 Immersion Type Ultrasonic Cleaner are shown in the table below:

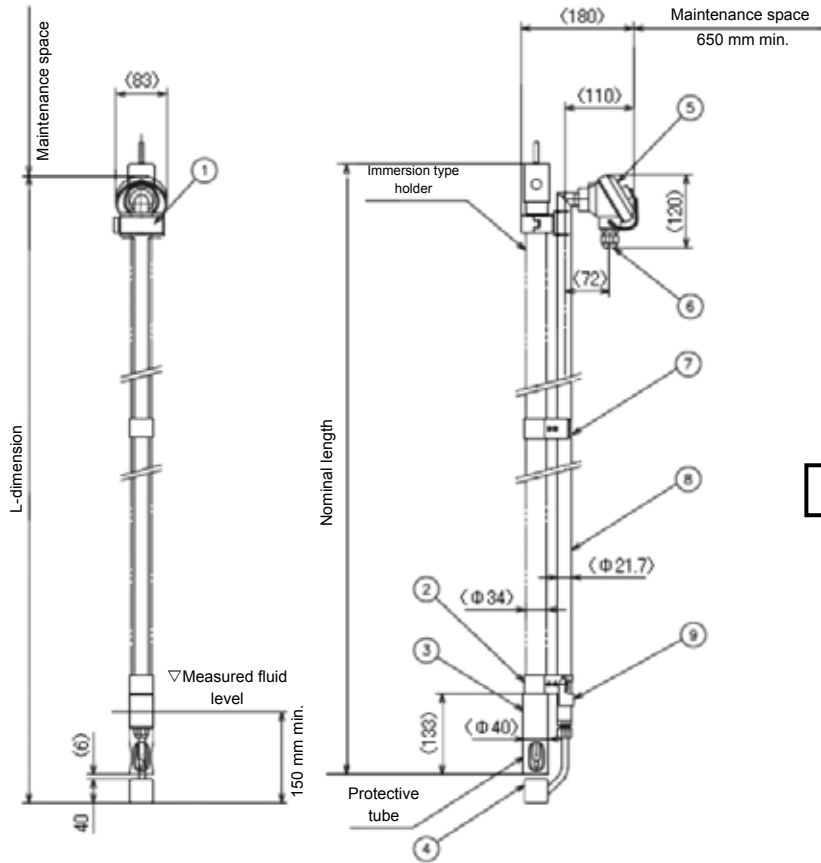
No	PARTS	NOTES
(1)	Electrode holder mounting bracket	PVC
(2)	Hook	SUS316
(3)	Spacer	PP
(4)	Ultrasonic vibrator	SUS316
(5)	Ultrasonic oscillator	AC4C
(6)	Piping slot	O.Dφ7to12cabel
(7)	Oscillator Holder	SUS316
(8)	Support hook	SUS316
(9)	Stopper	SUS316

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

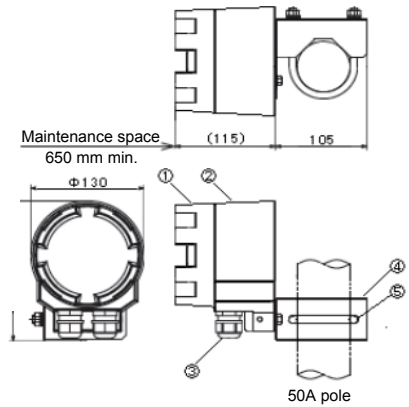
It is necessary to provide a maintenance space above the ultrasonic oscillator.

• The support hook is not provided on any cleaner of 1.5 m or less.

External dimensions (UCH-111)



External dimensions (US-2)



	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)	Oscillator Holder	SUS316
(8)	Support hook	SUS316
(9)	Stopper	SUS316

• The support hook is not provided on any cleaner of 1.5 m or less.

No	PARTS	NOTES
(1)	Oscillator cover	AC4C
(2)	Oscillator Case	AC4C
(3)	Conduit	O.DΦ7to12cabel
(4)	Mountii SUS304	SUS304
(5)	U-bolt	SUS304 M8

Mass: Approx. 2.0 kg

Protection Class: IP 54

(IEC60529, JIS C0920) (Category 2)

Finish: Epoxy degenerated melamine resin painting (Munsell 10PB5/1)

Dimension L and tolerance of the UCH-111 Immersion Type Ultrasonic Cleaner are shown in the table below:

Nominal length (m)	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

It is necessary to provide a maintenance space above the ultrasonic oscillator.

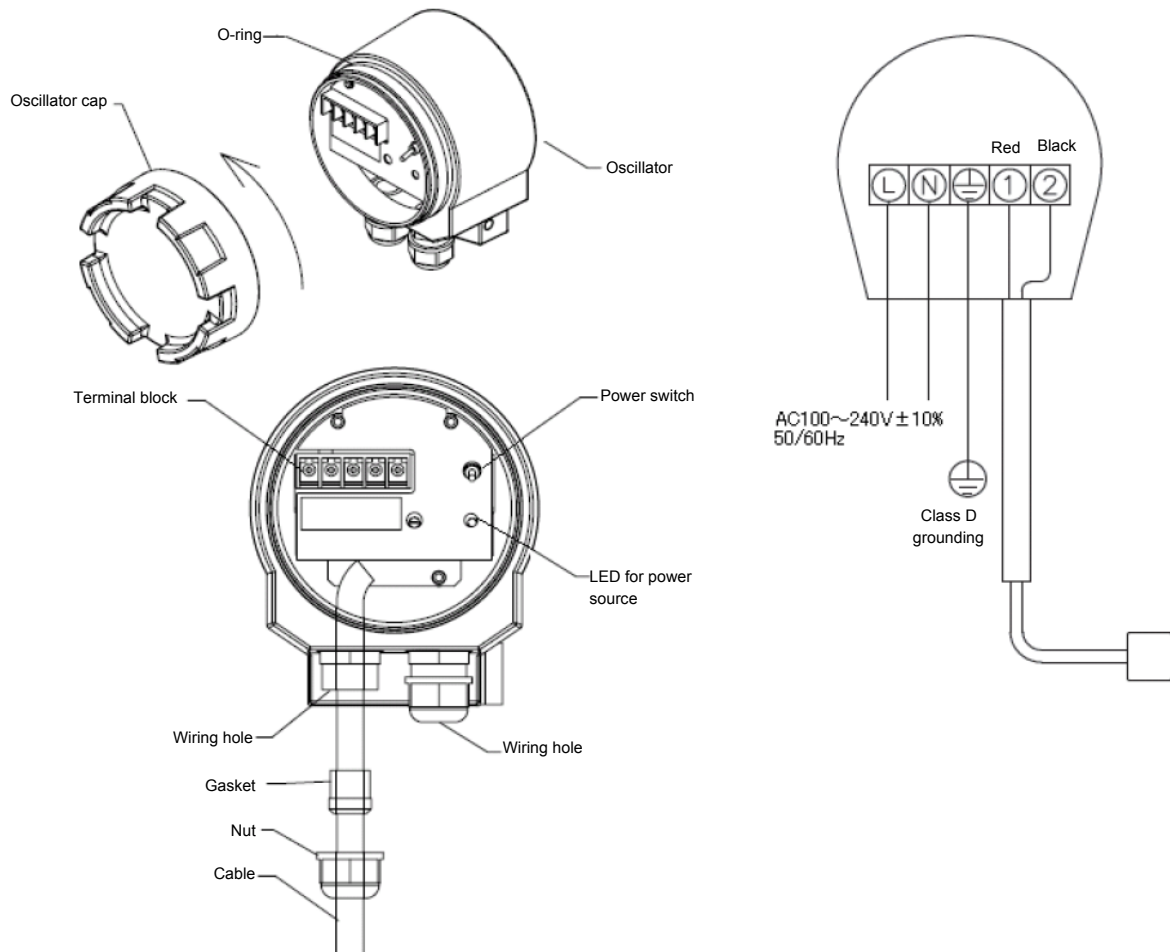
■ Installation (UCH-101) (connections)

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

Power source

- The HC-300F has a power switch. Turn OFF the power switch during work.
- 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 $\pm 10\%$.
- 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 work has been finished, be sure to put the oscillator cap to prevent electric shocks during operation.
- The ultrasonic vibrator is already connected to the corresponding terminal.

Power supplied	Voltage: 100 to 240 VAC
	Frequency: 50/60 Hz
Applicable electric wire	7 to 12 mm dia.



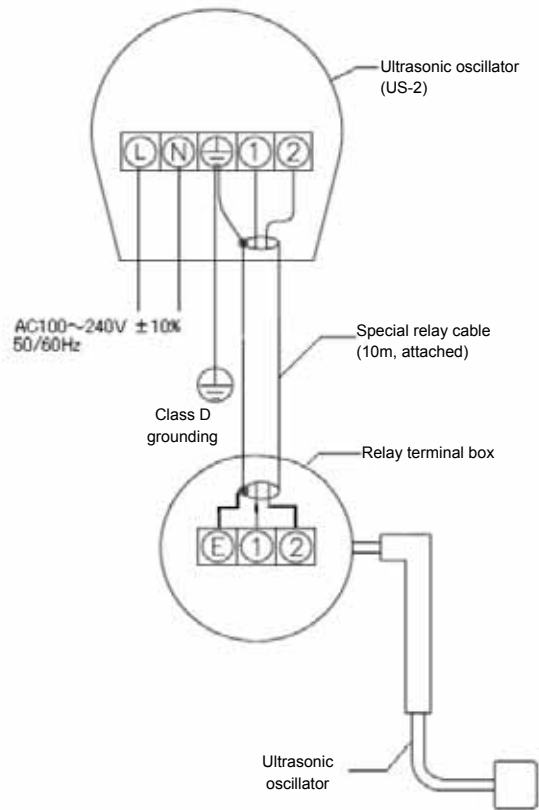
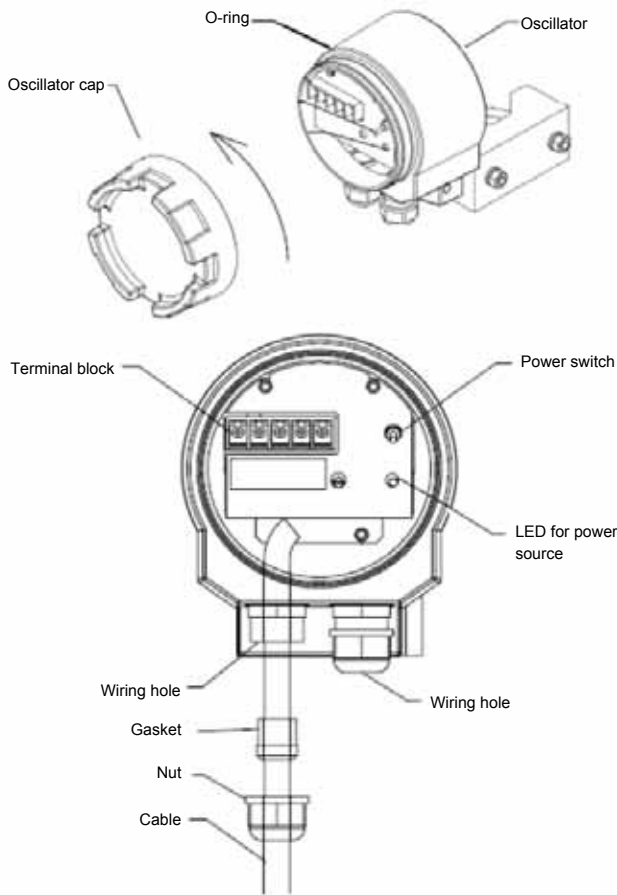
Installation (UCH-111) (connections)

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

Power source

- The HC-300F has a power switch. Turn OFF the power switch during work.
- 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 $\pm 10\%$.
- 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 work has been finished, be sure to put the oscillator cap to prevent electric shocks during operation.

Power supplied	Voltage: 100 to 240 VAC
	Frequency: 50/60 Hz
Applicable electric wire	7 to 12 mm dia.

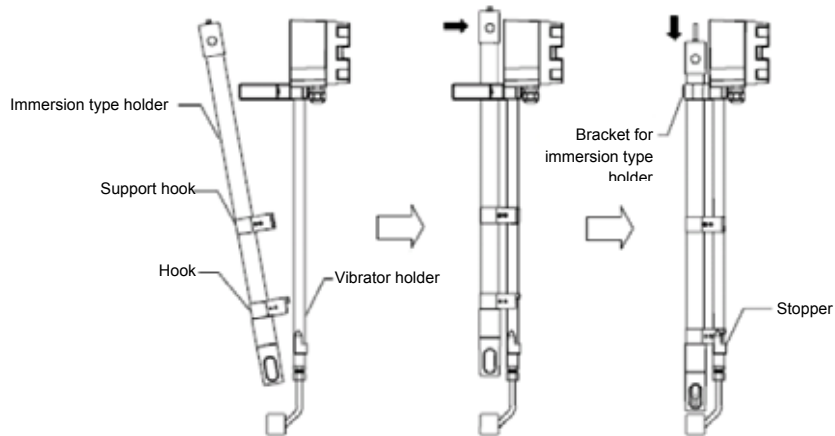


Installation (ultrasonic cleaner and holder)

Carry out installation and execution of work as illustrated below

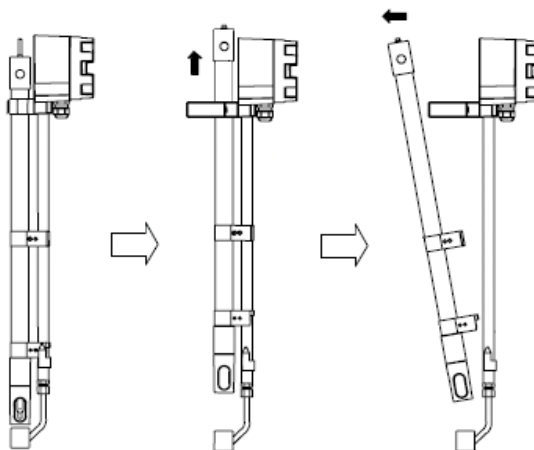
Installation

- Mount and lock the hook on the immersion type holder.
- Slowly lower the hook along the oscillator holder.
- After the hook has been caught by the stopper on the oscillator holder, lock the immersion type holder fitting.



Removal

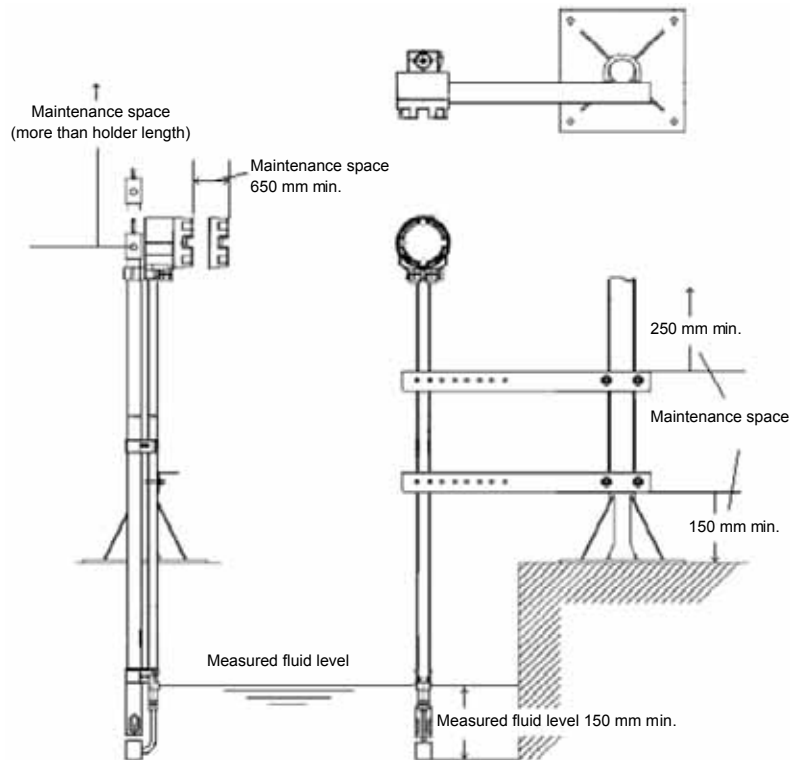
- Remove the immersion type holder fitting.
- Pull up the immersion type holder.
- Remove the hook and the support hook from the vibrator holder.



■ Installation

Installation environment

- Install the Cleaner at a location where maintenance work can be easily performed.
- Ensure that the installed 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 installing the Cleaner at a location where a surface temperature and an ambient temperature are 50 ° C or higher in the vicinity of a heat source.



Distribution type jet cleaner for H-1 series

H-1 series Immersion Jet Cleaner

JCH-101



Overview

- The JCH-101 is used to intermittently clean the fluoride ion electrode (1009) with cleaning water and air. Since this cleaner is not provided with a timer, use the timer on the converter to specify cleaning intervals and cleaning duration.

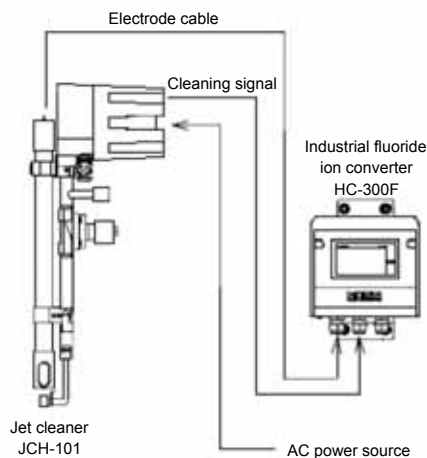
Objects

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

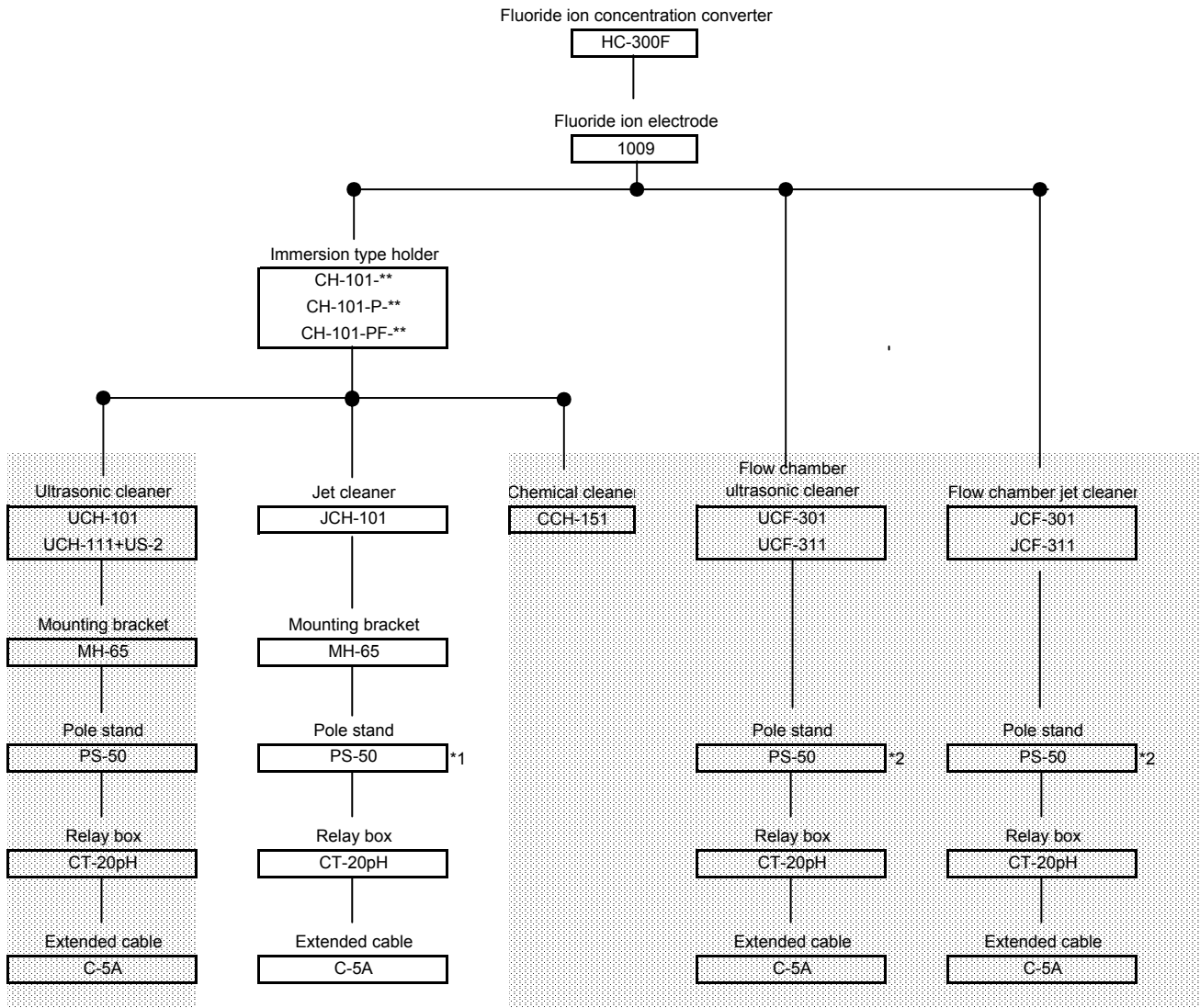
Properties	Objects	
Slime	food, paper, pulp, algae	
Microorganism	bacteria (activated sludge), slag	
Oily	tar, heavy oil	×
	light oil	○
	fatty acid, amine	○
Suspended Matters	earth and sands	○
	metallic minute powder	○
	clay, calcareous	○
Scale	coagulated deposit and neutralized effluent treatment CaCO ₃ , etc.	○

:Good ○:Acceptable ×:Not acceptable

System configuration



■ Combinations (immersion type jet cleaner)



*1: This pole stand is used to attach the converter, the CT-20pH (relay box), and the MH-65 (mounting bracket).

*2: This pole stand is used to attach the converter and the CT-20pH (relay box).

■ Specifications (JCF-101)

Product name		Immersion type jet cleaner (with built-in timer unit)
Model		JCH-101
Supply Voltage (*1)		AC 100V 50/60Hz
Permissible Voltage Var		90% to 110% of supply voltage
Power consumption		40 VA max.
Signal output during cleaning Output	Contact type	Relay contact SPDT(1c)
	Contact capacity	250 V AC 3 A, 30 V DC 3 A (resistance load)
	Conditions	Short-circuited between NO-COM. Opened between NC-COM
Start of external cleaning Input (*2)	Contact type	No-voltage contact
	Contact capacity	DC30V 0.1A
	Conditions	Pulse input, closed time of 100 msec or more
Cleaning stop signal Input (*3)	Contact type	No-voltage contact
	Contact capacity	DC30V 0.1A
	Conditions	Stopped by turning OFF continuous input
Timer	Washing frequency	0.1 to 3.0 hours
	Washing time	Between 0.5 and 10.0
	Signal output during cleaning	Between 0.2 and 5.0
	Delay time	
Cleaning Method		Intermittent water jet/air jet cleaning
Ambient Temperature		-5 to 50
Ambient Humidity		Relative humidity of 5% to 90% (without dew condensatic
Measured Liquid (*4)		-5°C to 80°C (without dew condensation)
Flow Velocity of Measured Liquid		2 m/sec. max.
Pressure of fluid under measurement		Atmospheric pressure
Cleaning pressure	Water	0.05 MPa to 0.5MPa (consumption: approx. 4L/min)(*5)
	Air	0.05MPa to 0.2MPa(consumption: approx. 90L/min)
Connection hole diameter for celaning		Rc 1/2
Wetted material		SUS316, FKM (not including an electrode and materials for Immersion Holders)
Weight		Approx. 6.5kg (holder length of 1.0 m)
Timer case	International protection	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 power supply voltage of 200 VAC is available optionally. For any other power supply voltage, contact us.

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

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

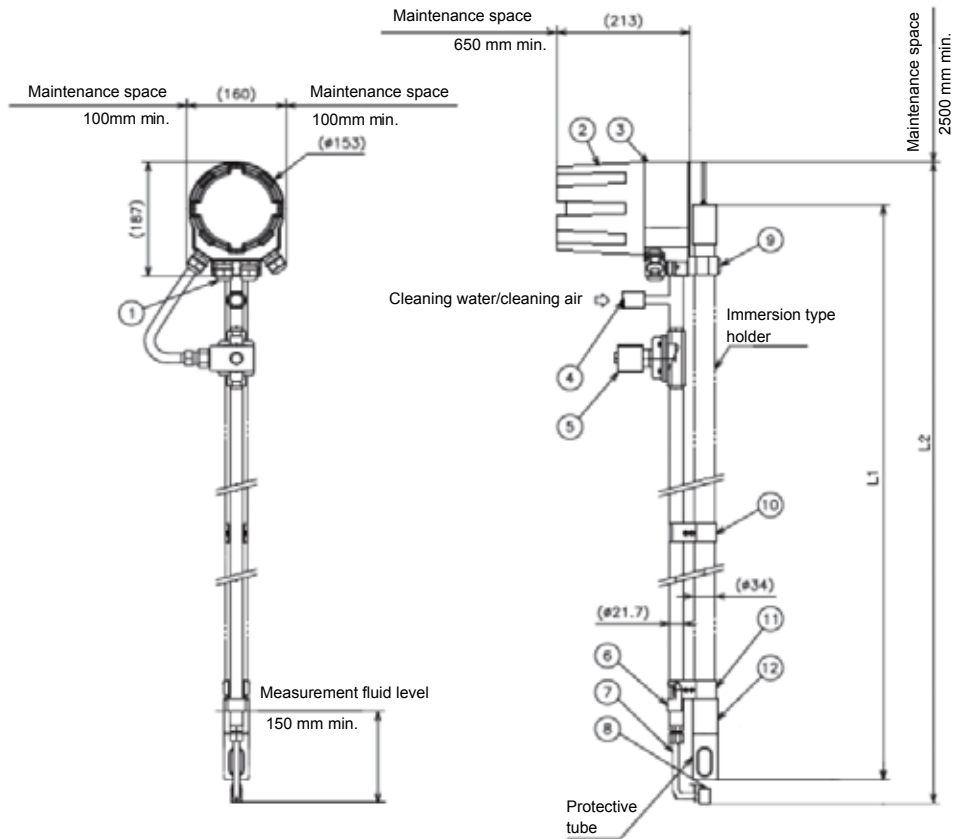
*4: The operating temperature range differs depending on the combined electrode and immersion holder. Therefore check the specified temperature for each model.

*5: The water supply law prohibits supplying tap water directly from waterworks for use as cleaning water.

Use a tap water pressurization device to insulate your line from the general tap water pipe.

Moreover, if cleaning water may be frozen, provide heat insulated piping against warm and cold weather.

External dimensions (JCH-101)



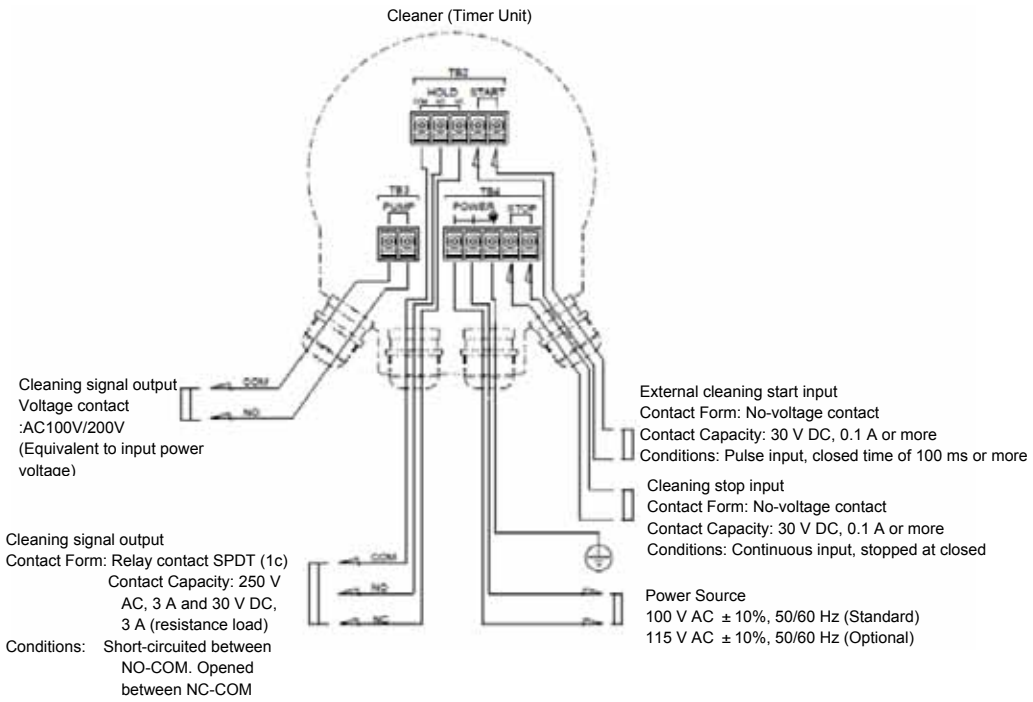
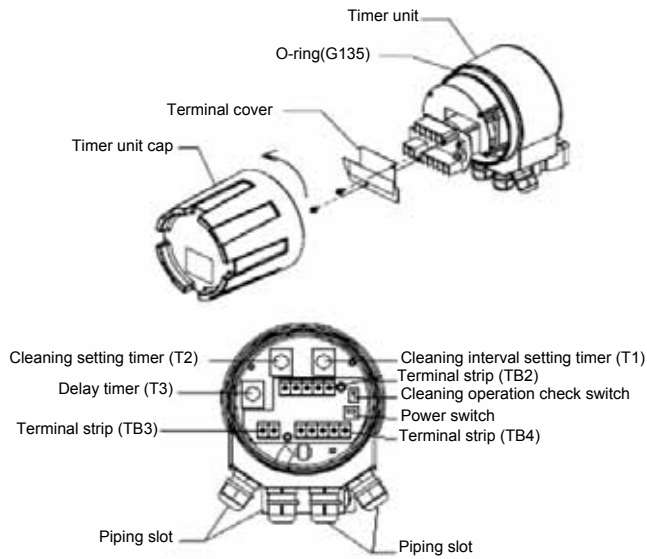
No	PARTS	NOTES
(1)	Piping slot	O.D $\Phi 7$ to $\Phi 12$ cable
(2)	Timer unit cover	AC4C
(3)	Timer unit	AC4C
(4)	Cleaning water/air inlet	Rc1/2
(5)	Solenoid valve	
(6)	Stopper	SUS316
(7)	Nozzle holder	SUS316
(8)	Nozzle	SUS316
(9)	Immersion holder fixing bracket	PVC
(10)	Support hook	SUS316
(11)	Hook	SUS316
(12)	Spacer	PP

No support hook is provided on the cleaner of 1.5 m or less.

L1 (m) (nominal length)	L2
1	1108 \pm 10
1.5	1608 \pm 10
2	2108 \pm 10
2.5	2608 \pm 10
3	3108 \pm 10

Unit: mm

Part names/terminals (JCH-101)



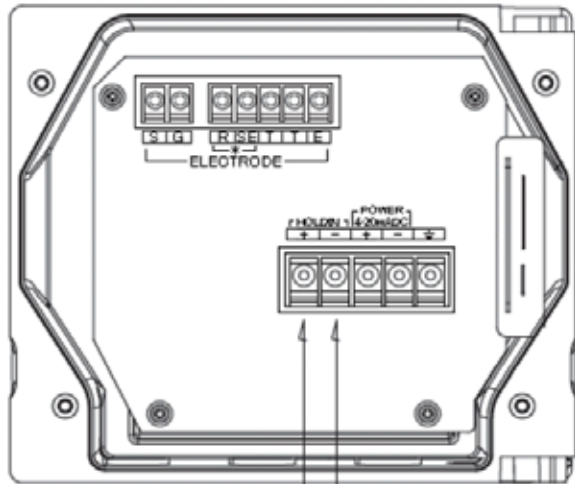
■Precautions for installation (JCH-101)

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

Connections

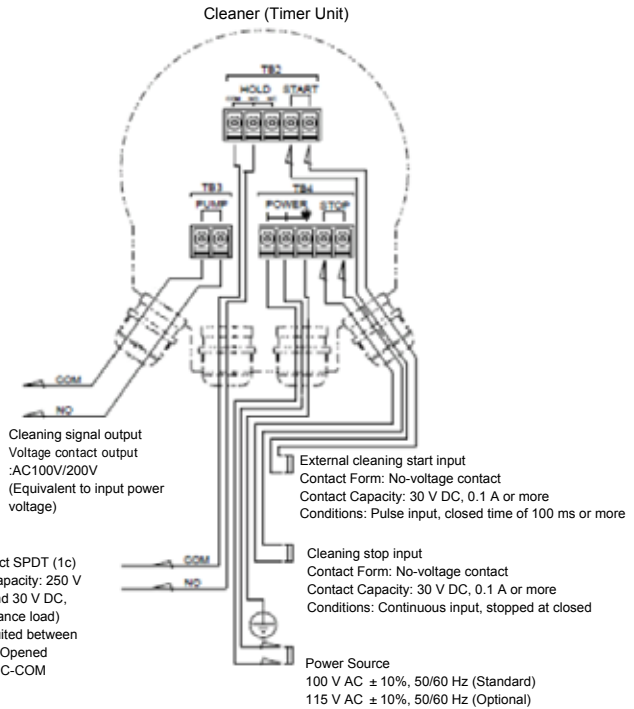
- Be sure to ground the grounding terminal (class D grounding).
- The applicable cable diameter for the wiring hole is 7 to 12 mm.

Applicable electric wire $\phi 7$ to $\phi 12$ mm dia. 0.75 mm² min.



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

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



Cleaning signal output
Voltage contact output
:AC100V/200V
(Equivalent to input power voltage)

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

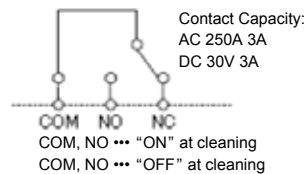
Cleaning stop input
Contact Form: No-voltage contact
Contact Capacity: 30 V DC, 0.1 A or more
Conditions: Continuous input, stopped at closed

Power Source
100 V AC \pm 10%, 50/60 Hz (Standard)
115 V AC \pm 10%, 50/60 Hz (Optional)

Wiring for HOLD (signal output during cleaning -- output of HOLD signal)

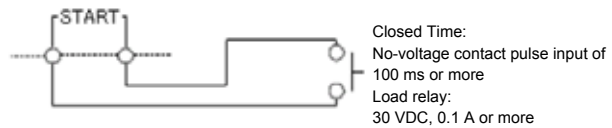
Wiring for (HOLD signal output)

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



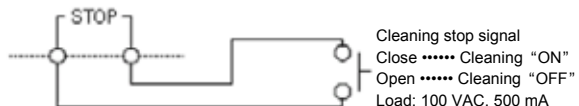
Wiring of START (external cleaning start input)

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



Wiring of STOP (cleaning stop signal input)

- Cleaning operation can be stopped by using the "STOP" Terminal.
- This "STOP" terminal is arranged in series with the power supply line to the motor.
- When this terminal is opened, the solenoid valve is not powered, allowing you to stop cleaning. The terminal is normally short-circuited with a short bar.

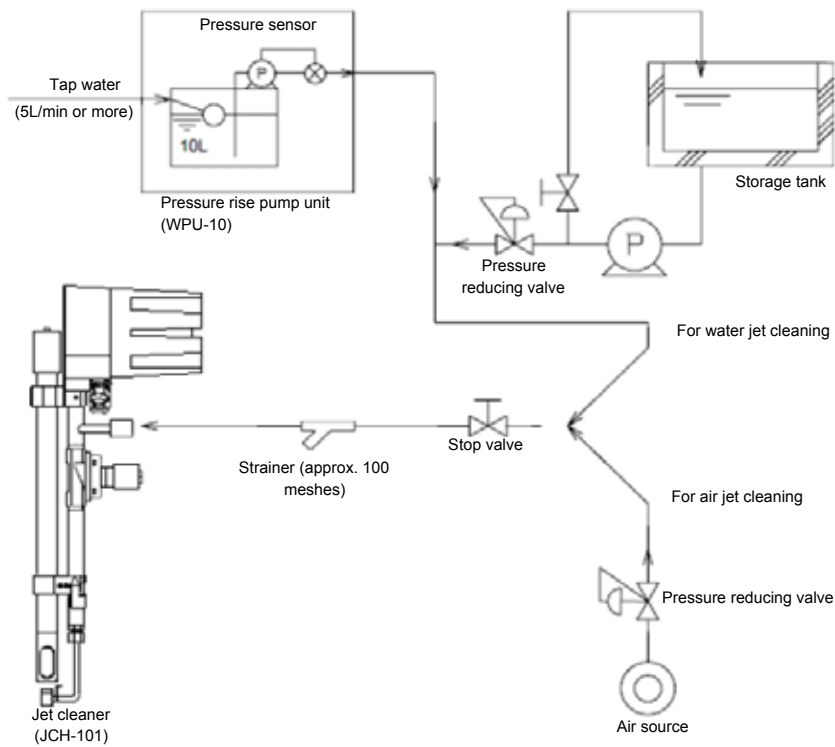


■ Installation (JCH-101) (piping)

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

Piping

- Since the Cleaner may be detached for a maintenance purpose, use a flexible pipe that can allow enough room for its length.
- Before connecting a pipe to the Cleaner, be sure to pour water into the pipe to flush garbage inside the pipe.
- With the regulator, adjust the cleaning water to a specified pressure.
- The water supply law prohibits supplying tap water directly from waterworks for use as cleaning water. Use a method of temporarily receive tap water in a water tank or the like and then pressurize the tap water with a pump. However, tap water may be directly connected when your original industrial water (tertiary treatment water) is used. Even tap water may be connected if supplied through a rooftop tank and insulated

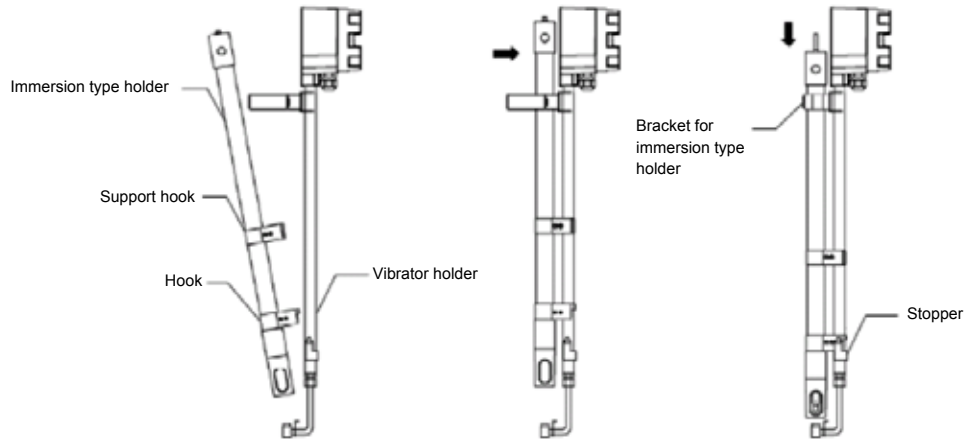


■ Installation (jet cleaner and holder)

Carry out installation and execution of work as illustrated below:

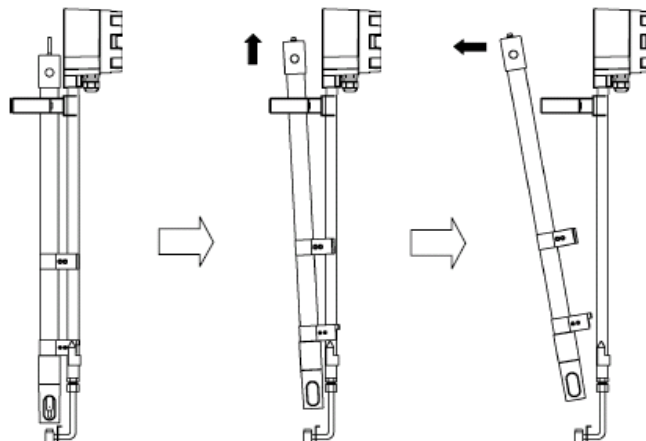
Installation

- Attach the hook to the immersion type holder.
- Slowly move down the hook along the nozzle holder.
- Once the hook is caught by the stopper of the nozzle holder, secure the bracket for the immersion type holder.



Removal

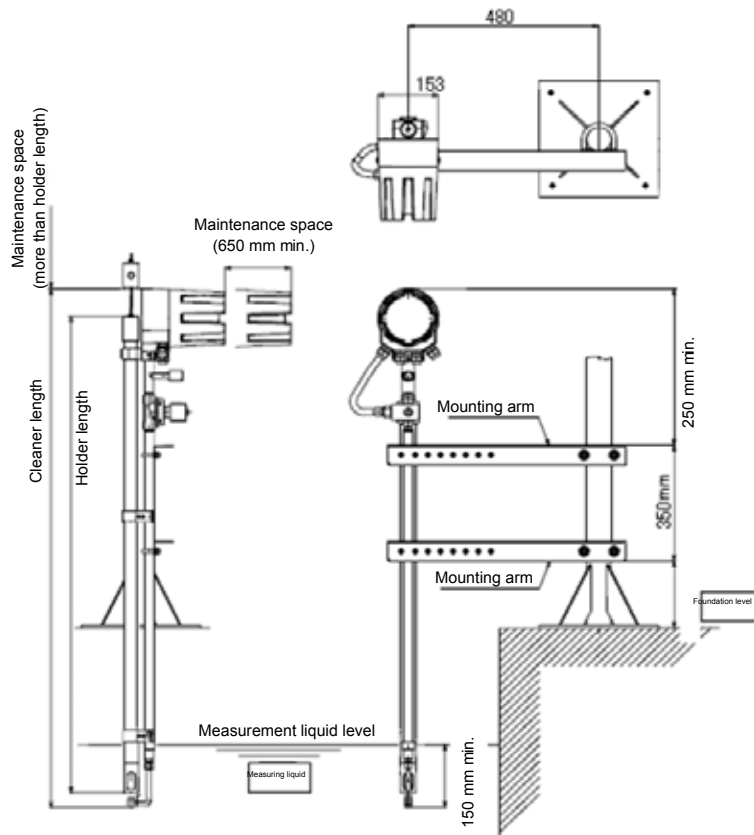
- Remove the bracket for the immersion type holder.
- Moves up the immersion type holder.
- Remove the hook and the support hook from the vibrator holder.



■ 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 installing the Cleaner at a location where a surface temperature and an ambient temperature are 50 °C or higher in the vicinity of a heat source.



Flow chamber ultrasonic cleaner for H-1 series

UCF-series



Overview

● The UCF-series is used with the fluoride ion electrode (1009) to remove foreign matter from the electrode or to prevent foreign matter from adhering to the electrode. 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).

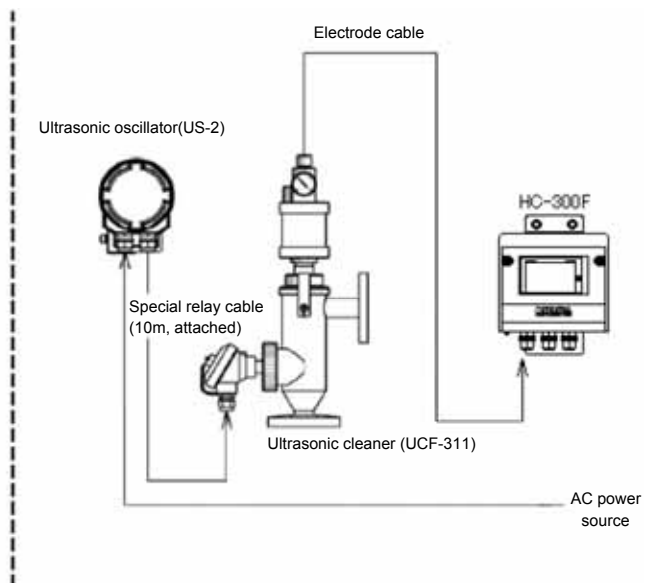
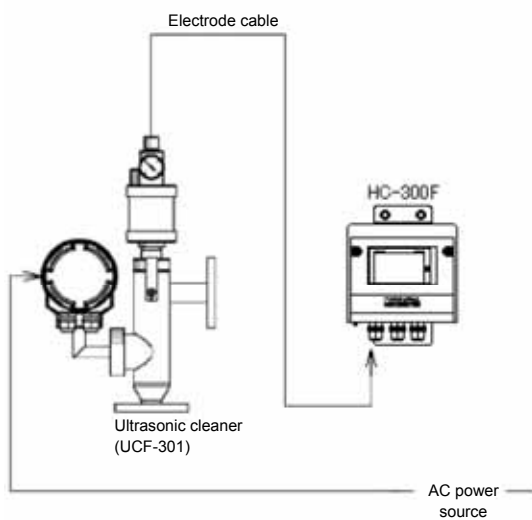
Objects

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

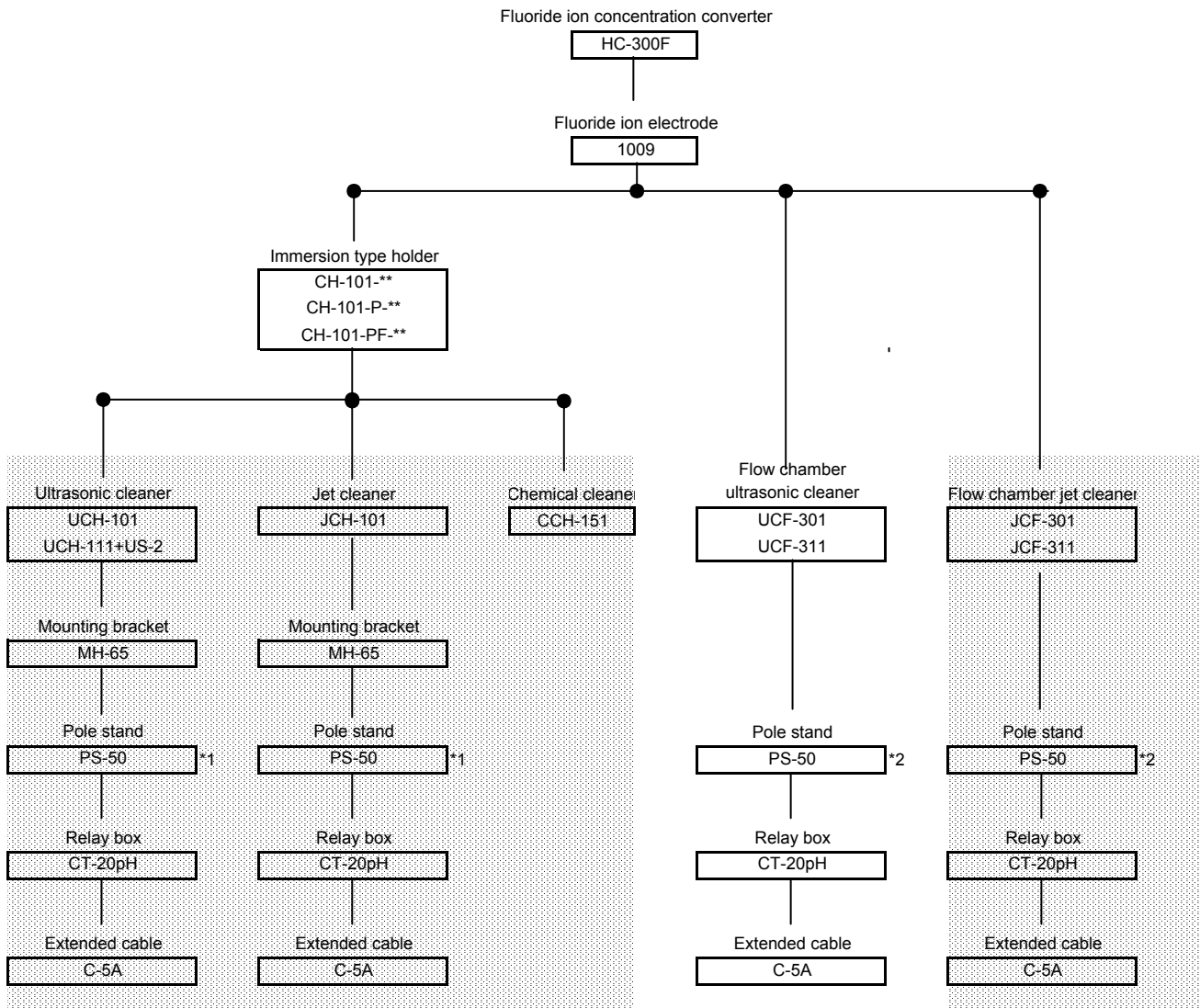
Properties Classification	Objects	
Slime	food, paper, pulp, algae	○
Microorganism	bacteria (activated sludge), slag	
Oily	tar, heavy oil	×
	light oil	○
	fatty acid, amine	×
Suspended Matters	earth and sands	
	metallic minute powder	○
	clay, calcareous	○
Scale	coagulated deposit and neutralized effluent treatment CaCO ₃ , etc.	○

:Good ○:Acceptable ×:Not acceptable

System configuration



■ Combinations (Flow Chamber Ultrasonic Cleaner)



*1: This pole stand is used to attach the converter, the CT-20pH (relay box), and the MH-65 (mounting bracket).

*2: This pole stand is used to attach the converter and the CT-20pH (relay box).

■ Specifications (UCF-301 • UCF-311)

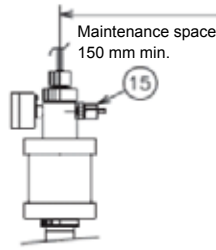
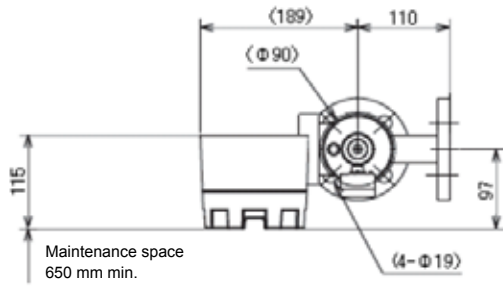
Product name		Ultrasonic cleaner for flow-through type	Ultrasonic cleaner for flow-through type
Model		UCF-301	UCF-311
Ambient Temperature		-5 to 50	
Ambient Humidity		Relative humidity of 5% to 90% (without dew condensatic	
Conditions for measurement solution	Temperature *1	-5°C to 80°C (without dew condensation)	
	Pressure	-5 to 40 : 0.30MPa 40 to 60 : 0.22MPa 60 to 80 : 0.15MPa	
	Flow Rate	0.3 to 10L/min	
SUS316, PP, FKM (not including an electrode materials)		SUS316, PP, FKM (not including an electrode materials)	
Supply Voltage		100 to 240VAC 50/60Hz	
Permissible Voltage Var		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	IP54 (IEC60529, JIS C0920) (Category 2)	
	Material	AC4C	
	Finish	Epoxy degenerated melamine resin painting (Munsell 10PB5/1)	
Bore diameter connected for cleaning		JIS 10K 25A FF flange	
Pressurizing Inlet for Holder's Internal Pressure (*3)		Rc1/8	
Weight		Approx. 7.0kg	Oscillator : Approx. 2.0 kg Cleaning unit:Approx.3.0kg
Special Note		<p>If periodical pressurization is manually performed, separately place a purchase order for optional parts: pressurizing inlet and hand pump.</p> <ul style="list-style-type: none"> • 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 is supplied with holders, but electrodes are not supplied. 	

*1: The operating temperature range differs depending on the combined electrode and holder. Check the specification temperature for each product.

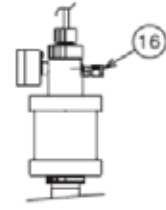
*2: If your sample has any property (e.g. alkalinity) of damaging FKM (fluoro-rubber), contact us.

*3 Maintain a pressure in the Pressurizing Holder at the level of 0.03 MPa to 0.05 MPa higher than a measured liquid pressure at all times.

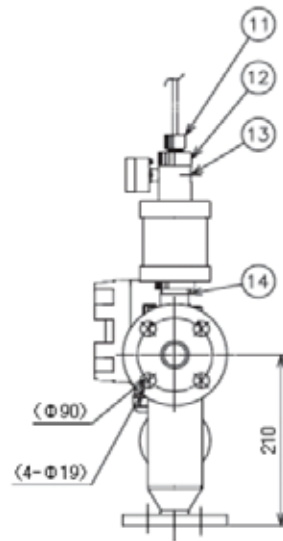
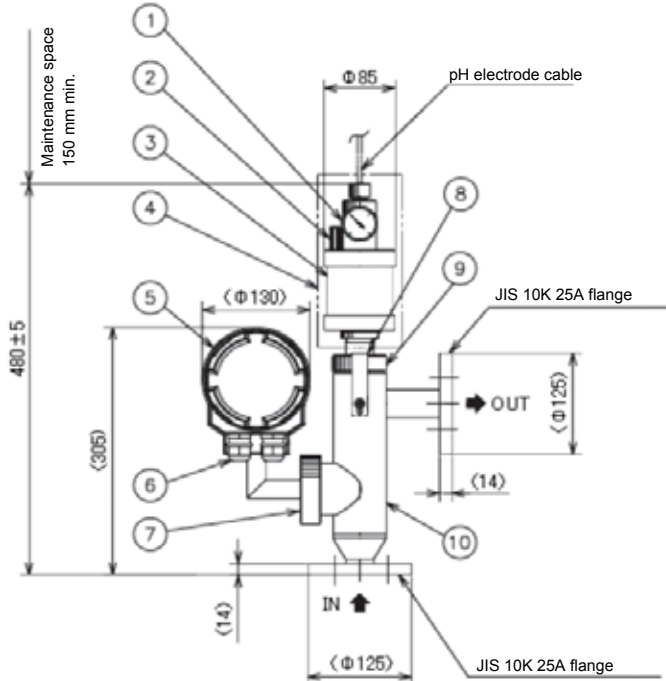
External dimensions (UCF-301)



Manual pressurization specifications
(Pressurization unit: optional)



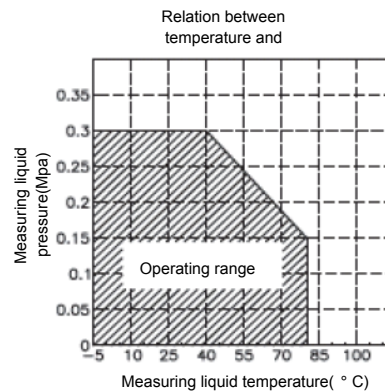
Instrumental air specifications
(Tube joint: optional)



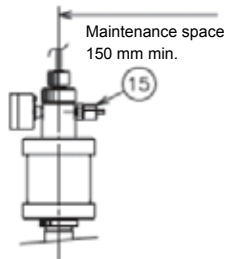
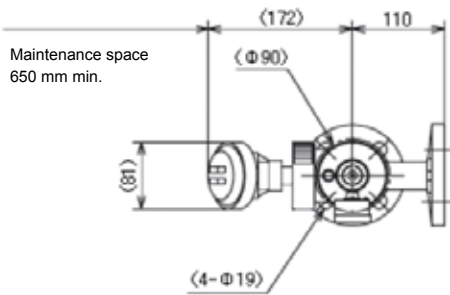
PARTS	NOTES
(1) Pressure gauge	0 MPa to 0.5 Mpa SUS304
(2) KCl inlet	PVC
(3) KCl tank	PVC
(4) Pressure holder	
(5) Ultrasonic oscillator	AC4C
(6) Piping slot	O.DΦ7to12cabel
(7) Vibration mounting nut	SUS304
(8) Lock plate	SUS304
(9) Tightening nut	SUS304
(10) Distribution holder	SUS316
(11) Cable cap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

← optionally available

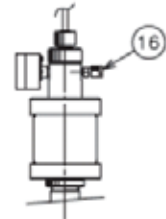
← optionally available



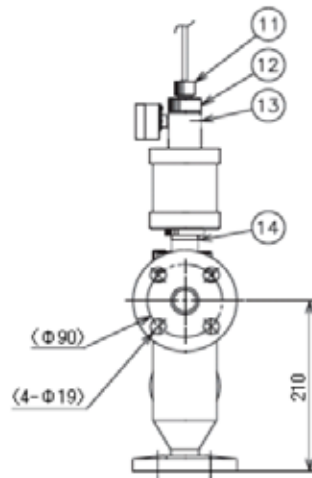
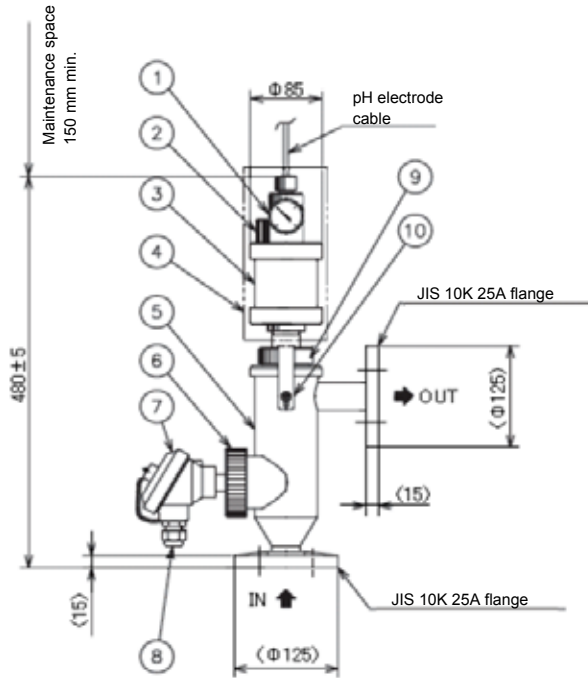
External dimensions (UCF-311)



Manual pressurization specifications
(Pressurization unit: optional)

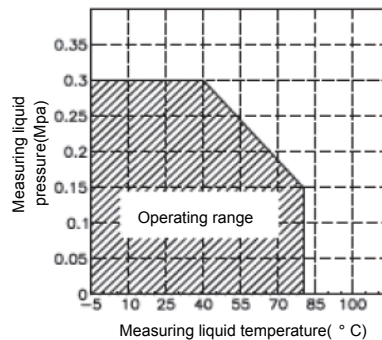


Instrumental air specifications
(Tube joint: optional)



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

Relation between temperature and pressure



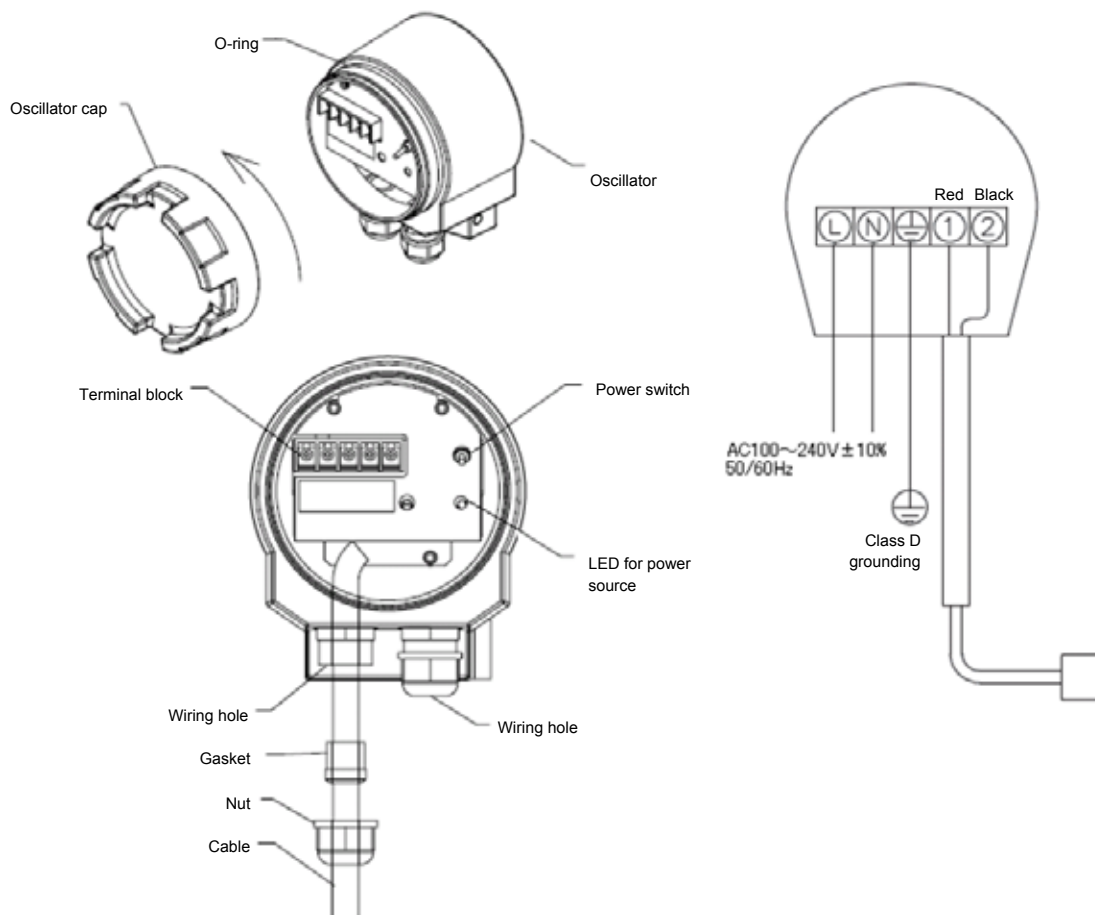
■ Installation (UCH-301) (connections)

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

Power source

- The HC-300F has a power switch. Turn OFF the power switch during work.
- 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 $\pm 10\%$.
- 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 work has been finished, be sure to put the oscillator cap to prevent electric shocks during operation.
- The ultrasonic vibrator is already connected to the corresponding terminal.

Power supplied	Voltage: 100 to 240 VAC
	Frequency: 50/60 Hz
Applicable electric wire	7 to 12 mm dia.



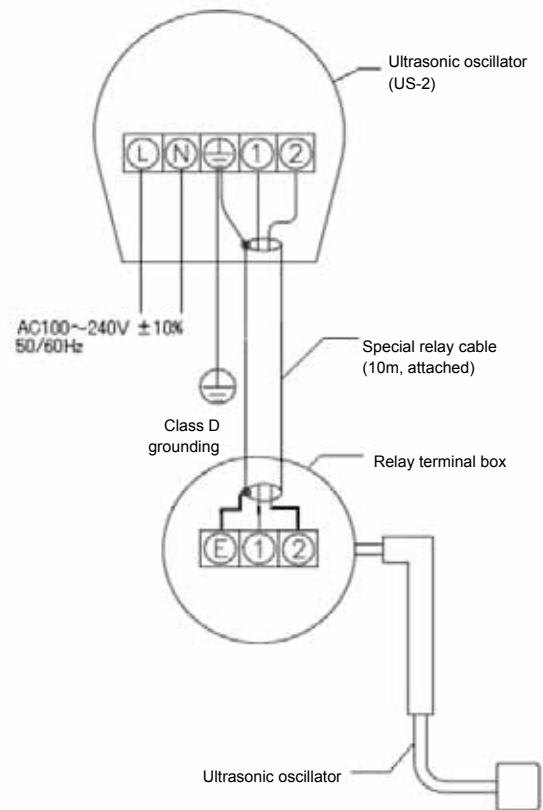
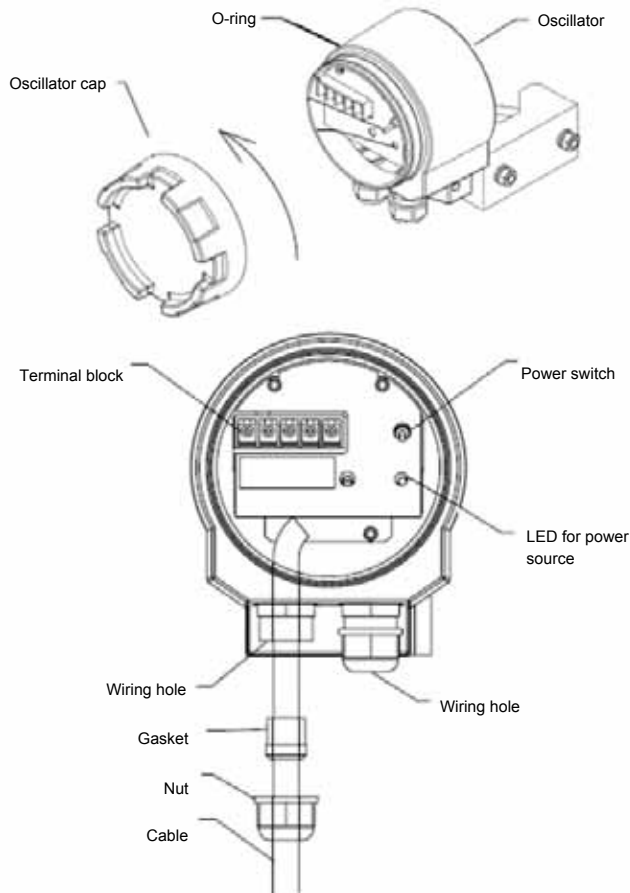
■ Installation (UCF-311)

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

Power source

- The HC-300F has a power switch. Turn OFF the power switch during work.
- 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 $\pm 10\%$.
- 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 work has been finished, be sure to put the oscillator cap to prevent electric shocks during operation.

Power supplied	Voltage: 100 to 240 VAC
	Frequency: 50/60 Hz
Applicable electric wire	7 to 12 mm dia.



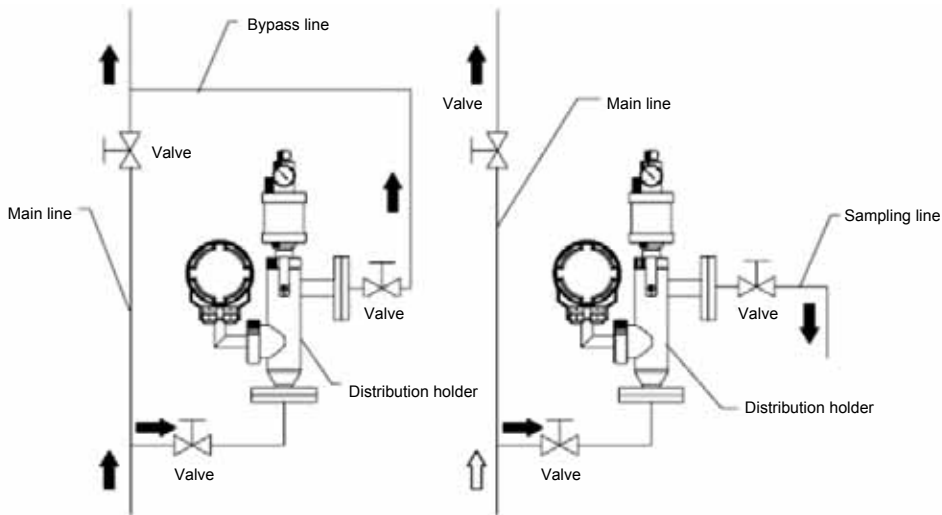
Installation (UCF-301)

Be sure to following the following instructions for setup.

Installation environment

- Install the flow chamber at a location where maintenance work can be easily performed.
- Allow a maintenance space of 15 cm above the pressure type holder.
- Allow for the electrode cable so that the UCF-301 can be removed.
- Avoid installing the flow chamber at a location exposed to violent vibrations or heavy dust.
- Attach an electrode so that it does not float up in the air even when the supply of an internal liquid is stopped and the internal liquid in the pipeline is drawn out.
- Avoid installing the flow chamber. at a location exposed to corrosive liquid or gas.

- Avoid installing the flow chamber. at a location where a surface temperature and an ambient temperature are 50 ° C or higher in the vicinity of a heat source.
- If measured liquid contains air bubbles, slurry and solids that may cause damage to an electrode, eliminate them from the measured liquid in advance.
- Do not use the pressure type holder on the main line. Be sure to provide a bypass line or a sampling line. (Maintenance cannot be performed unless the main line is stopped.)



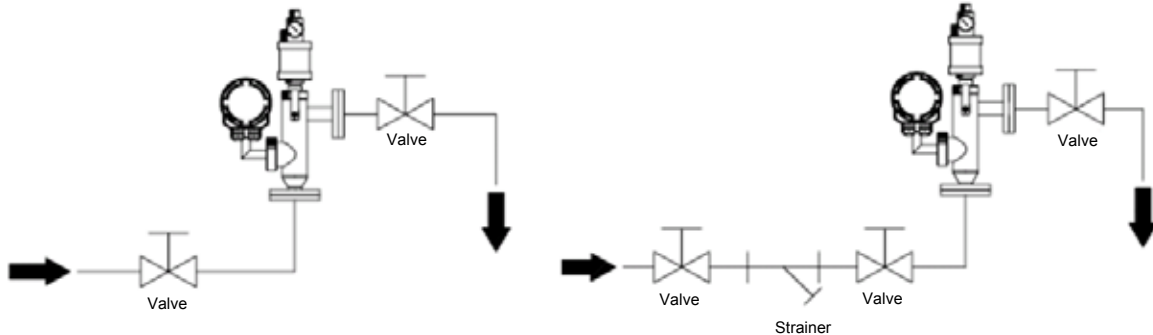
Piping

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 solution under measurement is too fast, the occurrence of capitation or the pressure applied by the flow velocity to the liquid junction of the electrode may cause the readout to fluctuate. If the flow rate is too slow, the readout will be delayed. Therefore, adjust the flow rate in accordance with the conditions for the solution under measurement.

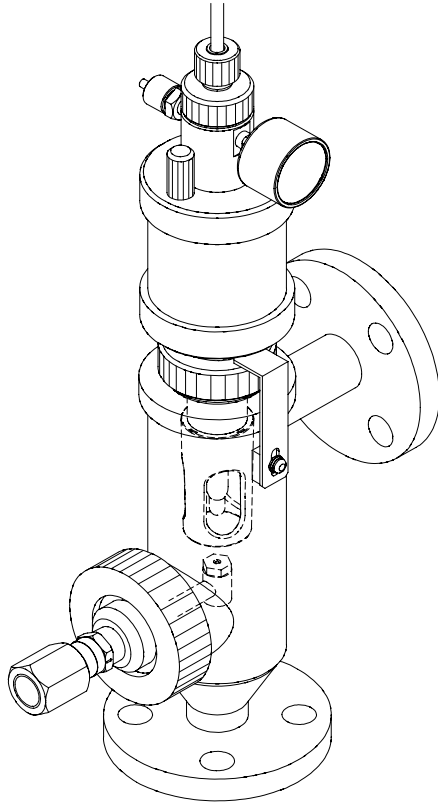
Fig. 1

Fig. 2



Flow chamber jet cleaner for H-1 series

JCF-series



Overview

- The UCF-series is used with the fluoride ion electrode (1009) to remove foreign matter from the electrode or to prevent foreign matter from adhering to the electrode. 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.

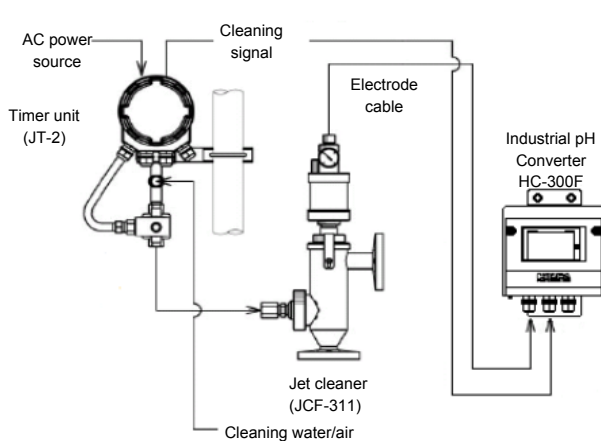
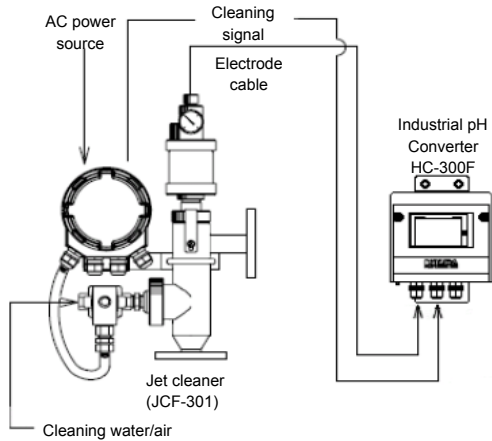
Objects

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 CaCO ₃ , etc.	○

○:Good ○:Acceptable ×:Not acceptable

System configuration



■ Specifications 1 (JCF-301/311)

Product name		Flow-through type jet cleaner (timer unit incorporated type)	Flow-through type jet cleaner (timer unit separated type)
Model		JCF-301	JCF-311
Ambient Temperature		-5 to 50	
Ambient Humidity		Relative humidity of 5% to 90% (without dew condensation)	
Conditions for measurement solution	Temperature *1	-5°C to 80°C (without dew condensation)	
	Pressure	-5 to 40 : 0.30MPa 40 to 60 : 0.22MPa 60 to 80 : 0.15MPa	
	Flow Rate	0.3 to 10 L/min	
SUS316, PP, FKM (not including an electrode materials)		SUS316, PP, FKM (not including an electrode materials)	
Supply Voltage		100 VAC, 50/60 Hz	-
Permissible Voltage Variation Range		90% to 110% of supply voltage	-
Power consumption		Max. 30VA	-
Cleaning Signal Output	Contact type	Relay contact SPDT (1c)	-
	Contact capacity	250 V AC 3 A, 30 V DC 3 A (resistance load)	-
	Conditions	Short-circuited between NO-COM. Opened between NC-COM	-
External Cleaning Start Input (*3)	Contact type	No-voltage contact	-
	Contact capacity	30 VDC, 0.1 A min.	-
	Conditions	Pulse input, closed time of 100 msec or more	-
Input of cleaning stop signal (*4)	Contact type	No-voltage contact	-
	Contact capacity	30 VDC, 0.1 A min.	-
	Conditions	Stopped by turning OFF continuous input	-
Timer	Washing frequency	0.1 to 3.0 hours	-
	Washing time	Between 0.5 and 10.0	-
	Signal output during cleaning	Between 0.2 and 5.0	-
	Delay time		-
Cleaning Method		Intermittent water jet/air jet cleaning	
Cleaning pressure (*5)		Water/air: 0.05 to 0.5 MPa Adjust a cleaning pressure to a measured liquid pressure + 0.05 MPa to 0.2 MPa.	
Connection hole diameter for cleaning		Rc1/2	
International protection code		IP54 (IEC60529, JIS C0920) (category 2)	-
Material		AC4C	-
Finish		Epoxy modified melamine resin paint (Munsell 10PB5/1)	-
Bore diameter connected for cleaning		JIS 10K 25A FF flange	
Pressurizing Inlet for Holder's Internal Pressure (*6)		Rc1/8	
Weight		Approx. 9.5kg	Approx. 3.0kg
Special Note		<p>If periodical pressurization is manually performed, separately place a purchase order for optional parts: pressurizing inlet and hand pump.</p> <ul style="list-style-type: none"> • 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 is supplied with holders, but electrodes are not supplied. 	

*1: The operating temperature range differs depending on the combined electrode. Check the specification temperature of the electrode. 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: When the input line to start external cleaning is not used, remove the cleaning frequency time (T1).

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

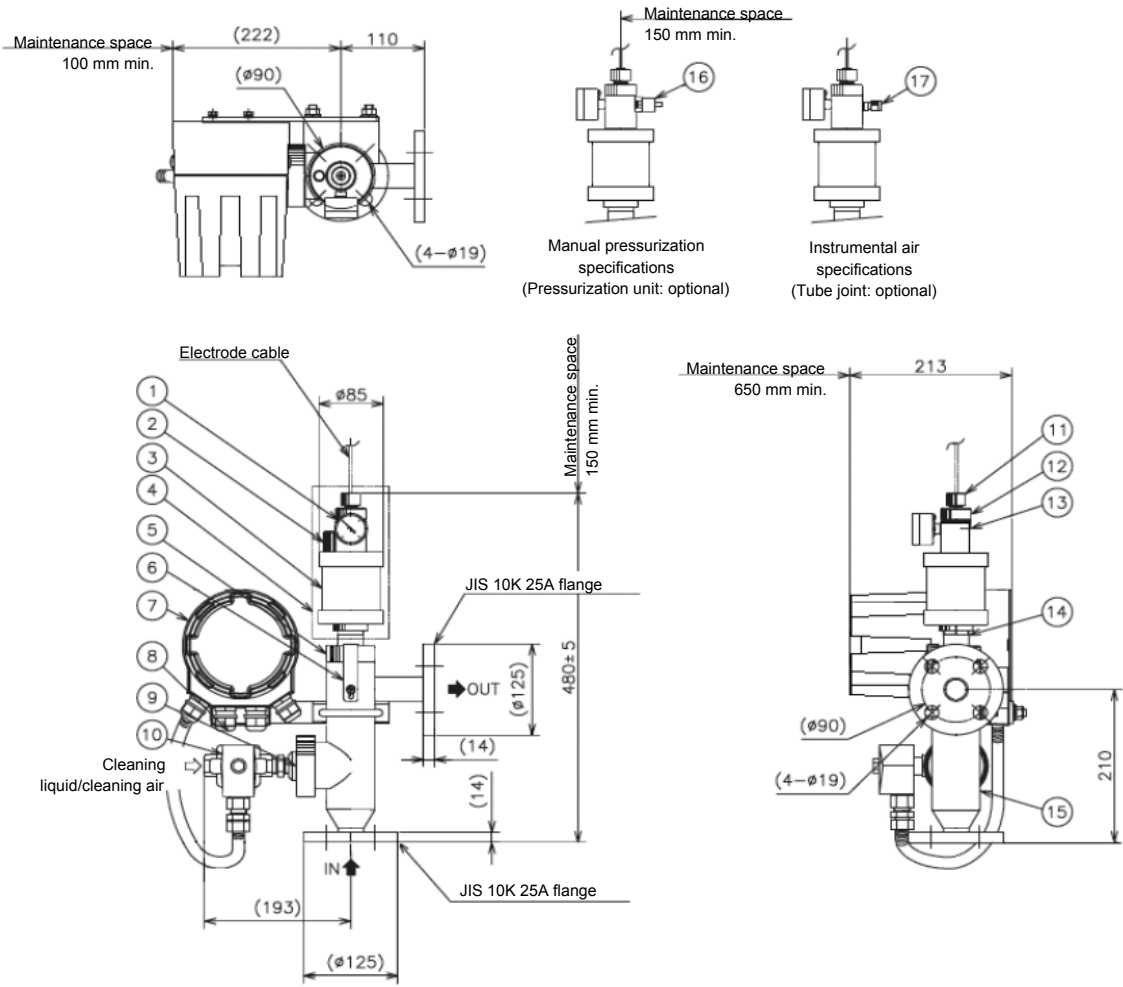
*5: The water supply law prohibits supplying tap water directly from waterworks for use as cleaning water.

Use a tap water pressurization device to insulate your line from the general tap water pipe.

Moreover, if cleaning water may be frozen, provide heat insulated piping against warm and cold weather.

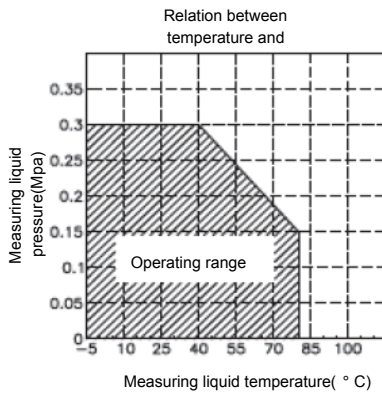
*6 Maintain a pressure in the Pressurizing Holder at the level of 0.03 MPa to 0.05 MPa higher than a measured liquid pressure at all times.

External dimensions (JCF-301)

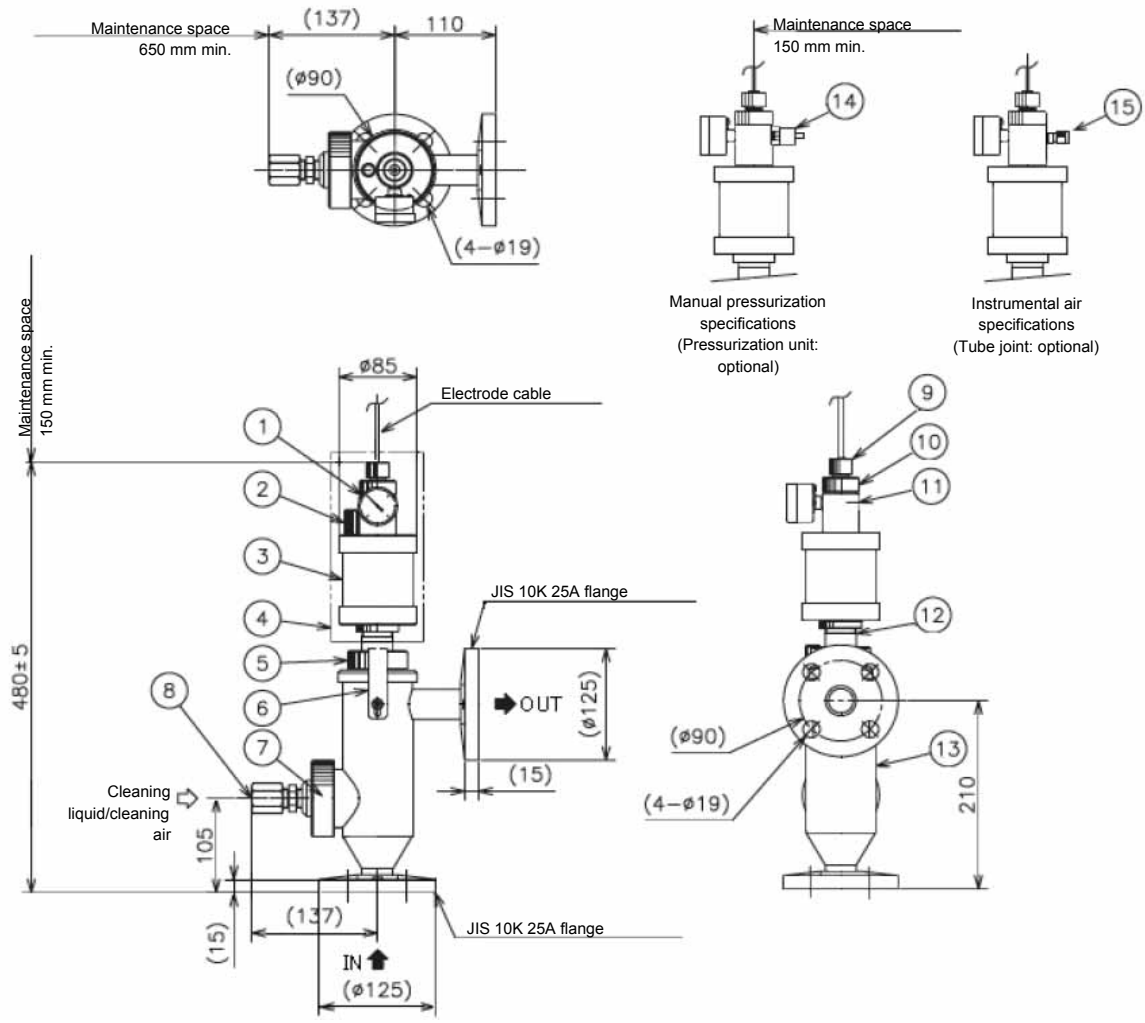


PARTS	NOTES
Pressure gauge	0 MPa to 0.5 Mpa SUS304
KCl inlet	PVC
KC tank	PVC
Pressure holder	
Tightening nut	PP
Lock plate	SUS304
Timer unit	AC4C
Conduit	O.D Φ 7 to Φ 12 cable
Nozzle mounting nut	PP
Solenoid valve	Rc1/2
Cable cap	PPO
Holder cap	PPO
Pressure mating screw	Rc1/8
Holder	PP
Distribution holder	SUS316
Pressurizing unit	C3604
Fitting	for tube PVDF of 6 mm o.d./4 mm i.d.

← optionally available
 ← optionally available

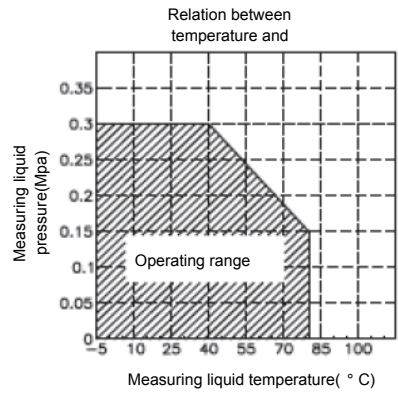


External dimensions (JCF-311)

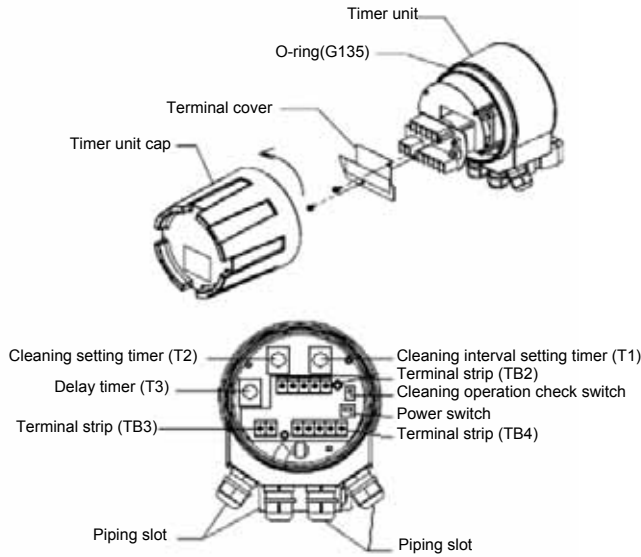


No	PARTS	NOTES
(1)	Pressure gauge	0 MPa to 0.5 Mpa SUS304
(2)	kcl inlet	PVC
(3)	kcl tank	PVC
(4)	Pressure holder	
(5)	Tightening nut	PP
(6)	Lock plate	SUS304
(7)	Nozzle mounting nut	PP
(8)	Cleaning water/air inlet	Rc1/2
(9)	Cable cap	PPO
(10)	Holder cap	PPO
(11)	Pressure mating screw	Rc1/8
(12)	Holder	PP
(13)	Distribution holder	PP
(14)	Pressurizing unit	C3604
(15)	Fitting	for tube PVDF of 6 mm o.d./4 mm i.d.

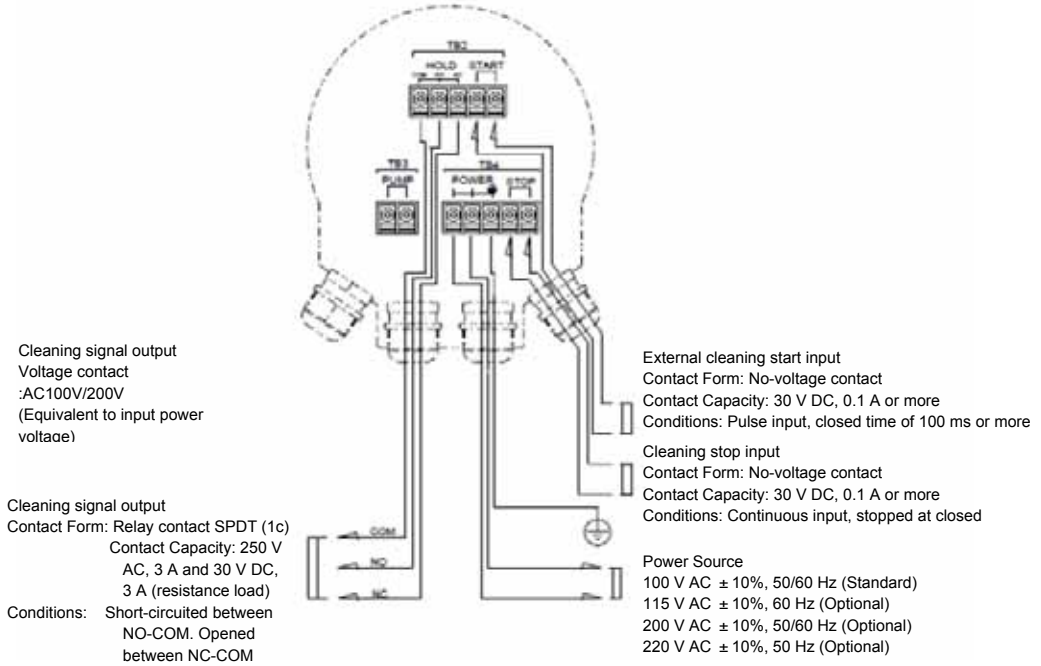
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Part names/terminals (JCF-301/JT-2 -- JCF-311)



Cleaner (Timer Unit)



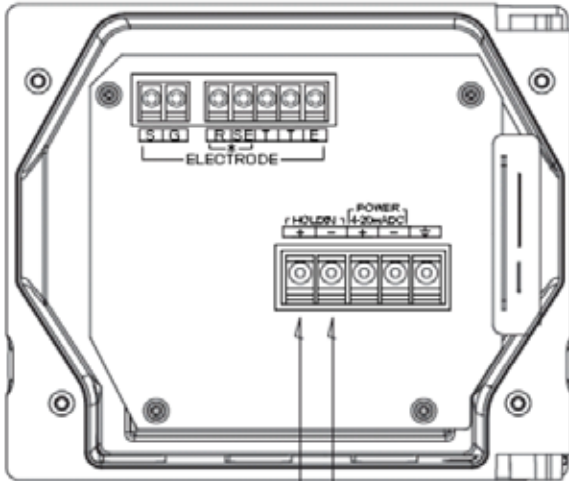
■Precautions for installation (JCF-301/JT-2 - JCF-311) (connections)

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

Connections

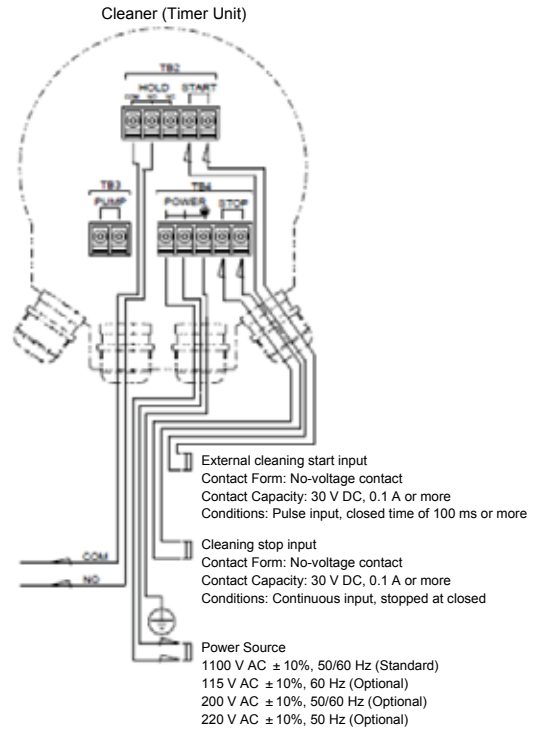
- Be sure to ground the grounding terminal (class D grounding).
- The applicable cable diameter for the wiring hole is 7 to 12 mm.

Applicable electric wire $\phi 7$ to $\phi 12$ mm dia. 0.75 mm^2 min.



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

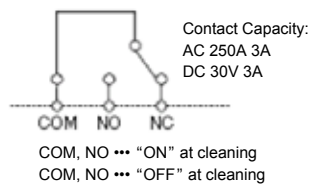
Cleaning signal output
Contact Form: Relay contact SPDT (1c)
Contact Capacity: 250 V AC, 3 A and 30 V DC, 3 A (resistance load)
Conditions: Short-circuited between NO-COM. Opened between NC-COM



Wiring for HOLD (signal output during cleaning -- output of HOLD signal)

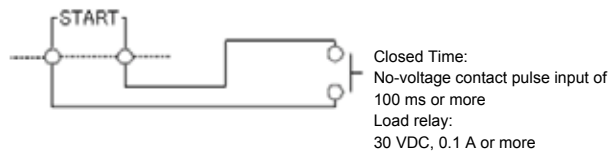
Wiring for (HOLD signal output)

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



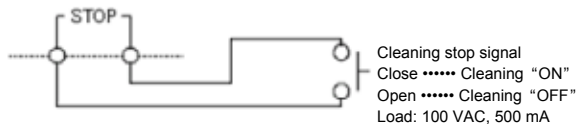
Wiring of START (external cleaning start input)

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



Wiring of STOP (cleaning stop signal input)

- Cleaning operation can be stopped by using the "STOP" Terminal.
- This "STOP" terminal is arranged in series with the power supply line to the motor.
- When this terminal is opened, the solenoid valve is not powered, allowing you to stop cleaning. The terminal is normally short-circuited with a short bar.



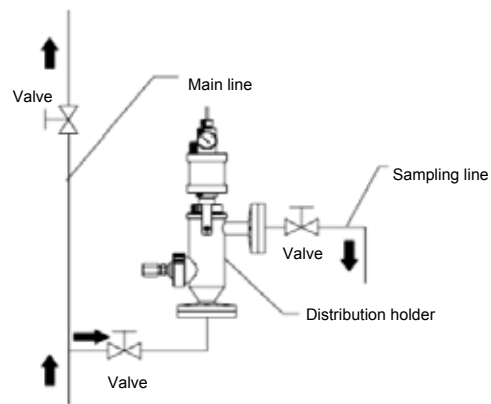
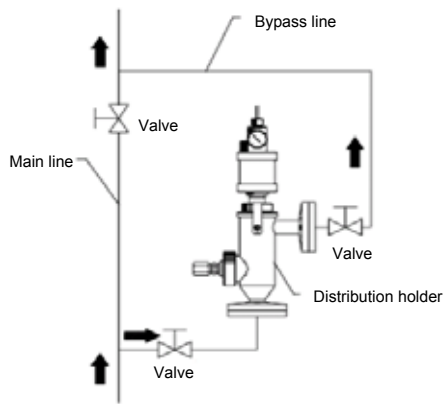
■Precautions for installation (JCF-301/JCF-311) (piping)

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

Installation environment

- Install the flow chamber at a location where maintenance work can be easily performed.
- Allow a maintenance space of 15 cm above the pressure type holder.
- Allow for the electrode cable so that the UCF-301 can be removed.
- Avoid installing the flow chamber at a location exposed to violent vibrations or heavy dust.
- Attach an electrode so that it does not float up in the air even when the supply of an internal liquid is stopped and the internal liquid in the pipeline is drawn out.
- Avoid installing the flow chamber at a location exposed to corrosive liquid or gas.

- Avoid installing the flow chamber at a location where a surface temperature and an ambient temperature are 50 ° C or higher in the vicinity of a heat source.
- If measured liquid contains air bubbles, slurry and solids that may cause damage to an electrode, eliminate them from the measured liquid in advance.
- Do not use the pressure type holder on the main line. Be sure to provide a bypass line or a sampling line. (Maintenance cannot be performed unless the main line is stopped.)



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.

If the flow rate of the solution under measurement is too fast, the occurrence of capitation or the pressure applied by the flow velocity to the liquid junction of the electrode may cause the readout to fluctuate. If the flow rate is too slow, the readout will be delayed. Therefore, adjust the flow rate in accordance with the conditions for the solution under measurement.

Fig. 1

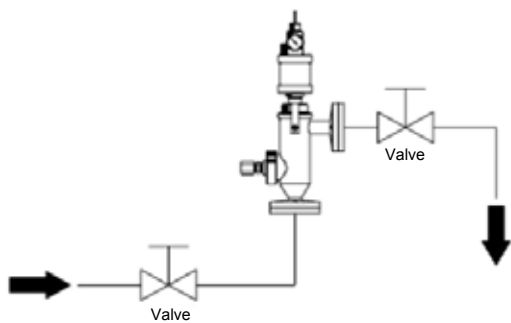
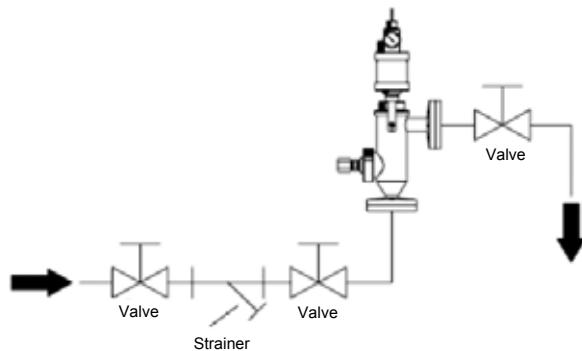


Fig. 2

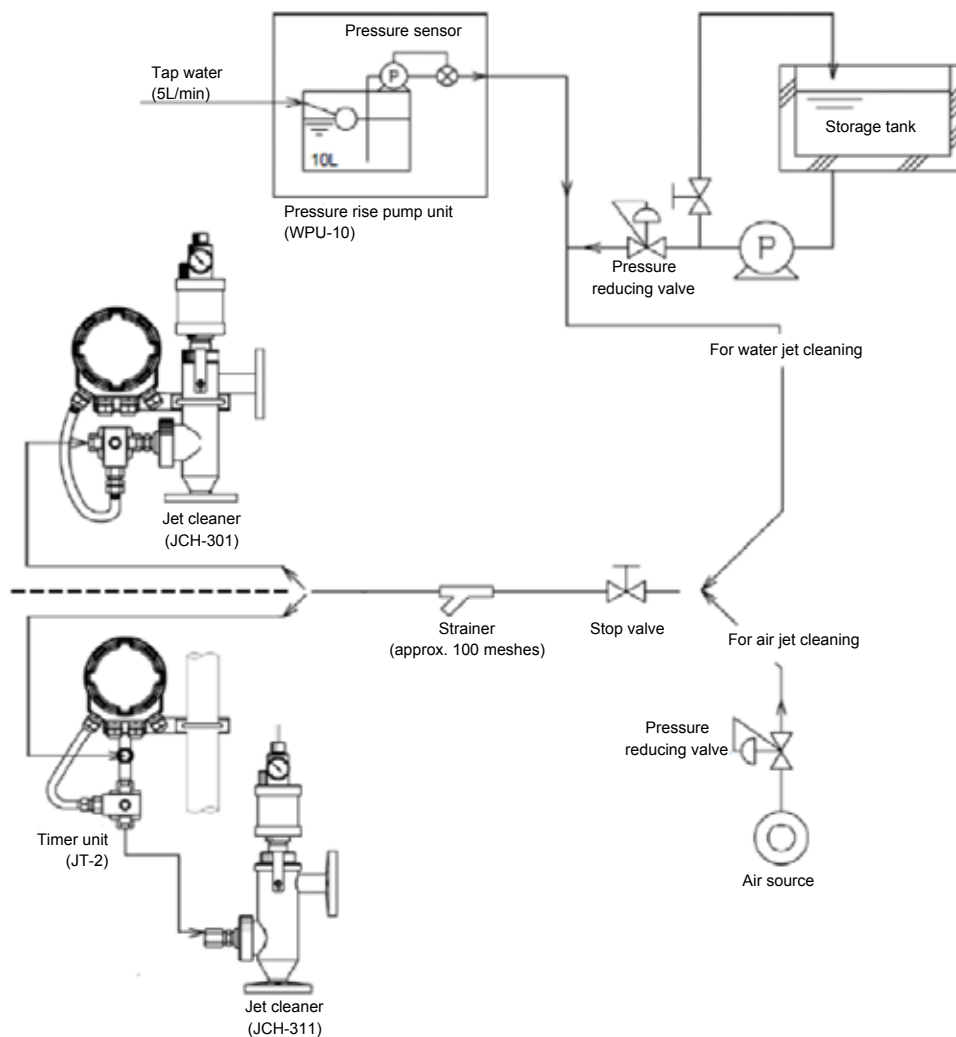


■Precautions for installation (JCF-301/JCF-311) (piping)

Be sure to following the following instructions for setup.

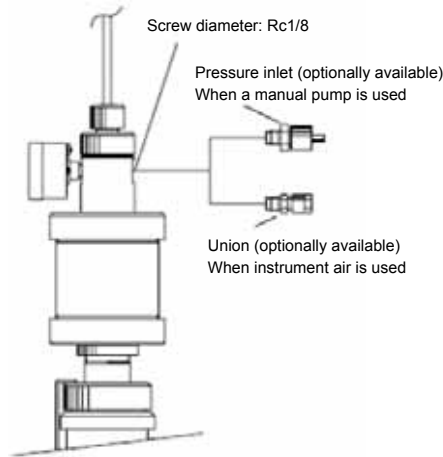
Piping

- Since the Cleaner may be detached for a maintenance purpose, use a flexible pipe that can allow enough room for its length.
 - Before connecting a pipe to the Cleaner, be sure to pour water into the pipe to flush garbage inside the pipe.
 - With the regulator, adjust the cleaning water to a specified pressure.
 - The water supply law prohibits supplying tap water directly from waterworks for use as cleaning water. Use a method of temporarily receive tap water in a water tank or the like and then pressurize the tap water with a pump.
- However, tap water may be directly connected when your original industrial water (tertiary treatment water) is used. Even tap water may be connected if supplied through a rooftop tank and insulated.



Pressurized piping

- For pressurization with an inflator, use the pressure inlet.
- Maintain the pressure in the pressurized holder at 0.03 to 0.05 MPa.
- 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 at 0.03 to 0.05 MPa.
- 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.

