User's
Manual

Model PH8HF, PH8HFF
Flow-Through Type Holder

IM 12B07N01-01E

vigilantplant.®

YOKOGAWA
Yokogawa Electric Corporation

IM 12B07N01-01E
4th Edition

INTRODUCTION

This manual covers the PH8HF, PH8HFF Flow-Through Type Holder. Other related items are described in the following manuals:

Model	Title	IM No.
PH8ERP	KCl Refillable type pH Sensor	IM 12B7K1-02E
PH8EFP	KCl Filling type pH Sensor	IM 12B7J1-01E
PH8EHP	pH Sensor for Pure Water	IM 12B7J2-01E
PH4☐,OR4☐	pH and ORP Sensors	IM 12B10B00-01EN
HA405	Solid Electrolyte (xerolyt) pH Sensor	IM 12B7E1-01E
HA406	Solid Electrolyte (xerolyt) pH Sensor with Temperature Element	IM 12B07E02-01E
DPAS405	pH Sensor for Small Culture Tanks	IM 12B7G1-01E
DPA405	pH Sensor for Chemical Processes	IM 12B7H1-01E
DPA406	pH Sensor for Chemical Process with Temperature Element	IM 12B07H02-01E
HF405	Hydrofluoric Acid-resistive pH Sensor	IM 12B07L01-01E
FLXA202,FLXA21	2-Wire Liquid Analyzer	IM 12A01A02-01E
PH201G*B	Distributor	IM 19B1E4-02E
PH450G	pH/ORP Converter	IM 12B07C05-01E
PUS400G	Ultrasonic Oscillator	IM 19C1B3-01E
PH8USF, PH8AL	Ultrasonic Oscillator (Explosionproof Type), Alarm Box	IM 12B5U2-E
WTB10-PH☐	Terminal Box	IM 19D01B01-01E
PH8TBG	Terminal Box	IM 12B07W01-01E
OR8EFG	KCl Filling type OPR Sensor	IM 12C07J01-01E
OR8ERG	KCl Refillable type OPR Sensor	IM 12C04K01-01E
OR8TBG	Terminal Box	IM 12C04W01-01E

◆ For the safe use of this equipment

■ Safety, Protection, and Modification of the Product

- In order to protect the system controlled by the product and the product itself and ensure safe operation, observe the safety precautions described in this user's manual. We assume no liability for safety if users fail to observe these instructions when operating the product.
- If this instrument is used in a manner not specified in this user's manual, the protection provided by this instrument may be impaired.
- Be sure to use the spare parts approved by Yokogawa Electric Corporation (hereafter simply referred to as YOKOGAWA) when replacing parts or consumables.
- Modification of the product is strictly prohibited.

■ Notes on Handling User's Manuals

- Please hand over the user's manuals to your end users so that they can keep the user's manuals on hand for convenient reference.
- Please read the information thoroughly before using the product.
- The purpose of these user's manuals is not to warrant that the product is well suited to any particular purpose but rather to describe the functional details of the product.
- No part of the user's manuals may be transferred or reproduced without prior written consent from YOKOGAWA.
- YOKOGAWA reserves the right to make improvements in the user's manuals and product at any time, without notice or obligation.
- If you have any questions, or you find mistakes or omissions in the user's manuals, please contact our sales representative or your local distributor.

■ Warning and Disclaimer

The product is provided on an "as is" basis. YOKOGAWA shall have neither liability nor responsibility to any person or entity with respect to any direct or indirect loss or damage arising from using the product or any defect of the product that YOKOGAWA can not predict in advance.

■ Signal Words

The following words are used in this manual.

CAUTION

This symbol gives information essential for understanding the operations and functions.

NOTE

This symbol indicates information that complements the present topic.

After-sales Warranty

- Do not modify the product.
- During the warranty period, for repair under warranty consult the local sales representative or service office. Yokogawa will replace or repair any damaged parts. Before consulting for repair under warranty, provide us with the model name and serial number and a description of the problem. Any diagrams or data explaining the problem would also be appreciated.
  - If we replace the product with a new one, we won't provide you with a repair report.
  - Yokogawa warrants the product for the period stated in the pre-purchase quotation Yokogawa shall conduct defined warranty service based on its standard. When the customer site is located outside of the service area, a fee for dispatching the maintenance engineer will be charged to the customer.
  - Returned goods that have been in contact with process fluids must be decontaminated and disinfected prior to shipment. Goods should carry a certificate to this effect, for the health and safety of our employees. Material Safety Data sheets must be included for all components of the process to which the sensor have been exposed.
- In the following cases, customer will be charged repair fee regardless of warranty period.
  - Failure of components which are out of scope of warranty stated in instruction manual.
  - Failure caused by usage of software, hardware or auxiliary equipment, which Yokogawa Electric did not supply.
  - Failure due to improper or insufficient maintenance by user.
  - Failure due to modification, misuse or outside-of-specifications operation which Yokogawa does not authorize.
  - Failure due to power supply (voltage, frequency) being outside specifications or abnormal.
  - Failure caused by any usage out of scope of recommended usage.
  - Any damage from fire, earthquake, storms and floods, lightning, disturbances, riots, warfare, radiation and other natural changes.
- Yokogawa does not warrant conformance with the specific application at the user site. Yokogawa will not bear direct/indirect responsibility for damage due to a specific application.
- Yokogawa Electric will not bear responsibility when the user configures the product into systems or resells the product.
- Maintenance service and supplying repair parts will be covered for five years after the production ends. For repair for this product, please contact the nearest sales office described in this instruction manual.

Model PH8HF, PH8HFF
Flow-Through Type Holder

IM 12B07N01-01E 4th Edition

CONTENTS

1. Specifications

The Model PH8HF☐ flow-through type holder is used:

- To connect two pipes and provide a “flow-through” path between them.
- To mount a pH sensor; the sensor measures the pH of liquid flowing through the holder.

Holder versions with or without cleaning for the pH sensor - ultrasonic cleaning or air/water jet cleaning - are available.

1.1 General Specifications

1.1.1 PH8HF Flow-through Type Holder

Applicable sensors:

General pH Sensor PH8ERP, PH8EFP

Special pH Sensor HA405, DPA405, HF405

PH4 Sensor PH4P, PH4PT,PH4F, PH4FT,PH4C, PH4CT

General ORP Sensor OR8ERG, OR8EFG

Special ORP Sensor HA485, DPA485

OR4 Sensor OR4P, OR4C

Note: An adapter is required when using special pH/ORP sensor or PH4/OR4 sensor.
When using with special pH/ ORP sensor or PH4/OR4 sensor, this holder cannot be used outdoors due to exposure to rain or due to condensation at a high humid place.

Mounting:

2-inch pipe mounting vertical or horizontal,with 1 set of mounting hard bracket.

Note: Make sure the mounting pipe is firmly installed.

Cleaning method:

Jet cleaning, brush cleaning or ultrasonic cleaning

Note: Brush cleaning and ultrasonic cleaning cannot be used when using special pH/ORP sensor or PH4/OR4 sensor.

Material:

Holder; Polypropylene or stainless steel(equivalent to SUS316)

O-ring; Fluoro rubber (FKM) or Perfluoroelastomer (FFKM)

Mounting bracket: Stainless steel (equivalent to SUS304)

Cleaning unit (wetted parts);

Ultrasonic;Stainless steel (equivalent to SUS316), titanium or Hastelloy C

Jet; Polypropylene

Brush; Polypropylene, titanium(shaft), Rulon®(bearings)

Weight:

Holder; Approx. 0.4 to 1.7 kg (polypropylene)
Approx. 3 to 6.1 kg (stainless steel)

Mounting bracket; Approx. 0.5 kg

Temperature range:

No Cleaning: -5 to 80 °C (polypropylene)
-5 to 105°C (stainless steel)

With Cleaning: -5 to 80°C

Note: The temperature may be limited by the specifications of the sensor.

Flow rate: 3 to 11 L/min

Note: The flow rate may be limited by the specifications of the sensor.

Pressure: Atmospheric pressure to 500 kPa

Note: The pressure may be limited by the specifications of the sensor.

Utility required for cleaning unit:Utility required for cleaning unit:

Type	Pressure (kPa)	Flow Ratee
Water jet	200 to 400 + Liquid pressure	5 to 20 l/min
Water brush	100 to 250 + Liquid pressure	20 to 30 l/min
Air jet	200 to 400 + Liquid pressure	100 to 300 Nl/min
Air brush	150 to 250 + Liquid pressure	300 to 600 Nl/min

Note 1: Pressure and flow rate must be simultaneously satisfied at the holder inlet port.
Note 2: A large braid-reinforced tube of ø22 x ø15 is recommended for supply due to the flow rate.

1.1.2 PH8HFF (Explosionproof Type)

The holder is used only when using Ultrasonic cleaning system in the explosionproof area.
Use PH8HF when using no cleaning, jet cleaning or brush cleaning.

Applicable sensors:

General pH Sensor PH8ERP, PH8EFP

General ORP Sensor OR8ERG, OR8EFG

Mounting: 2-inch pipe mounting vertical or horizontal, with 1 set of mounting bracket.

Note: Make sure the mounting pipe is firmly installed.

Cleaning method: Ultrasonic cleaning

Material:

Holder; Polypropylene or stainless steel (equivalent to SUS316)

O-ring; Fluoro rubber (FKM) or Perfluoroelastomer (FFKM)

Mounting bracket; Stainless steel (equivalent to SUS304)

Cleaning unit (wetted parts):

Ultrasonic; Stainless steel (equivalent to SUS316), titanium or Hastelloy C

Construction:

TIIS flameproof type (for d2G4 gas) Cable entrance port of terminal box; G 3/4

Weight:

Holder; Approx. 3 to 3.2 kg (polypropylene)
Approx. 5.6 to 7.6 kg (stainless steel)

Mounting bracket; Approx. 0.5 kg

Temperature range: -5 to 80°C

Note: The temperature may be limited by the specifications of the sensor.

Flow rate: 3 to 11 L/min

Note: The flow rate may be limited by the specifications of the sensor.

Pressure: Atmospheric pressure to 500 kPa

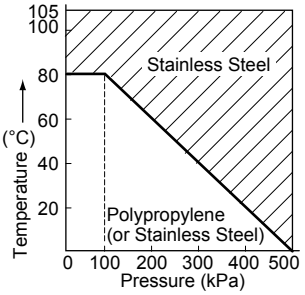
Note: The pressure may be limited by the specifications of the sensor.

1.2 Model and Suffix codes

1.2.1 Flow-Through Type Holder PH8HF

Model	Suffix Code		Option Code	Description
PH8HF	.....		.....	Flow-through type holder
Material (*7)	**-PP**		.....	Polypropylene (Refer to note below for selection)
	-S3		.....	Stainless steel
Process Connection	**-JPT**		.....	Rc1
	-NPT		.....	1 NPT female thread
	-J10		.....	JIS 10K 25 FF (*6)
	-A15		.....	ANSI Class 150 1 FF flange (for polypropylene holder -PP) (*6)
				ANSI Class 150 1 RF flange with serration (for SUS316 holder -S3)
pH Measuring System	**-T**		.....	Always -T
Cleaning System	**-NN**		.....	None
	-S3		.....	For ultrasonic cleaning (Transducer: SUS316) (*1)
	-TN		.....	For ultrasonic cleaning (Transducer: Titanium) (*2)
	-HC		.....	For ultrasonic cleaning (Transducer: Hastelloy C) (*3)
	-JT		.....	For jet cleaning. The solenoid valve must be specified separately
	-BR		.....	For brush cleaning. The solenoid valve must be specified separately
Cable Length for Ultrasonic Cleaning		**-NN**	.....	None
		-C1	.....	1m
		-C3	.....	3m
		-C6	.....	7m
		-C7	.....	10m
		-C8	.....	15m
		-C9	.....	20m
Connector for Jet or Brush Cleaning		**-JP**	.....	Rc1/2
		-NP	.....	1/2 NPT
Style Code		***A**	.....	Style A
Option	Special Mounting		**/MF1**	Mounting bracket (stainless steel) (*5)
	O-ring		**/PF**	Perfluoroelastomer (FFKM) (*4)

*1: General purpose (Normal pH 3 to 14)
*2: For salt water
*3: For acid (Normal pH 0 to 4)
*4: Choose Perfluoroelastomer (FFKM) when this holder is used in organic solvent, high alkali or high temperature alkali.
*5: Mounting bracket is generally not required when the stainless steel holder is installed in-line in a pipe
It is required where the holder is installed in a sampling rack (in which case the U-bolt included in /MF1 in not used).
*6: Only mating dimensioms are according to flange standard.
*7: Criteria for material selection (-PP or -S3)
In general, polypropylene is recommended from the viewpoint of chemical resistance.
However stainless steel is recommend in any of the following cases:
• The liquid contains organic reagent, oxidizing agents, etc., which can attack polypropylene.
• The temperature/pressure correlation of the process condition falls within the hatched area of the diagram shown right.
• The use of polypropylene is not reasonable from a viewpoint of strength or past experience.
For stainless steel, normally a 3 to 14 pH value is recommended.



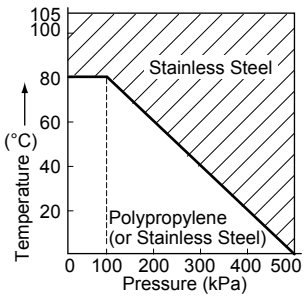
1.2.2 Flow-Through Type Holder (Explosionproof Type) PH8HFF

[Style: S2]

Model	Suffix Code	Option Code	Description
PH8HFF	.....	.....	Flow-through type holder
Material (*7)	**-PP**	.....	Polypropylene (Refer to note below for selection)
	-S3	.....	Stainless steel
Process Connection	**-JPT**	.....	Rc1
	-NPT	.....	1 NPT female thread
	-J10	.....	JIS 10K 25 FF flange
	-A15	.....	ANSI Class 150 1 FF flange equivalent (for polypropylene holder -PP) ANSI Class 150 1 RF Flange with serration (for SUS316 holder -S3)
pH Measuring System	**-T**	.....	Always -T
Cleaning System (*4) (Ultrasonic cleaning only)	**-S3**	.....	(SUS316 transducer) (*1)
	-TN	.....	(Titanium transducer) (*2)
	-HC	.....	(Hastelloy C transducer) (*3)
Explosion Protection	**-JS**	.....	TIIS Flameproof (d2G4)
Style Code	***A**	.....	Style A
Option	Special Mounting	**/MF1**	Mounting bracket (stainless steel) (*6)
	Flameproof Packing	**/PG2**	JIS flameproof packing adapter 3/4 inch
	Tag Plate	**/SCT**	Stainless steel tag plate
	O-ring	**/PF**	Perfluoroelastomer (FFKM) (*5)

*1: General purpose (Normal pH 3 to 14)
*2: For salt water
*3: For acid (Normal pH 0 to 4)
*4: Use PH8HS for no cleaning, Jet cleaning or Brush cleaning.
*5: Choose Perfluoroelastomer (FFKM) when this holder is used in organic solvent, high alkali or high temperature alkali.
*6: Mounting bracket is generally not required when the stainless steel holder is installed in-line in a pipe
It is required where the holder is installed in a sampling rack (in which case the U-bolt included in /MF1 in not used).
*7: Criteria for material selection (-PP or -S3)
In general, polypropylene is recommended from the viewpoint of chemical resistance.
However stainless steel is recommend in any of the following cases:
- The liquid contains organic reagent, oxidizing agents, etc., which can attack polypropylene.
- The temperature/pressure correlation of the process condition falls within the hatched area of the diagram shown right.
- The use of polypropylene is not reasonable from a viewpoint of strength or past experience.

For stainless steel, normally a 3 to 14 pH value is recommended.



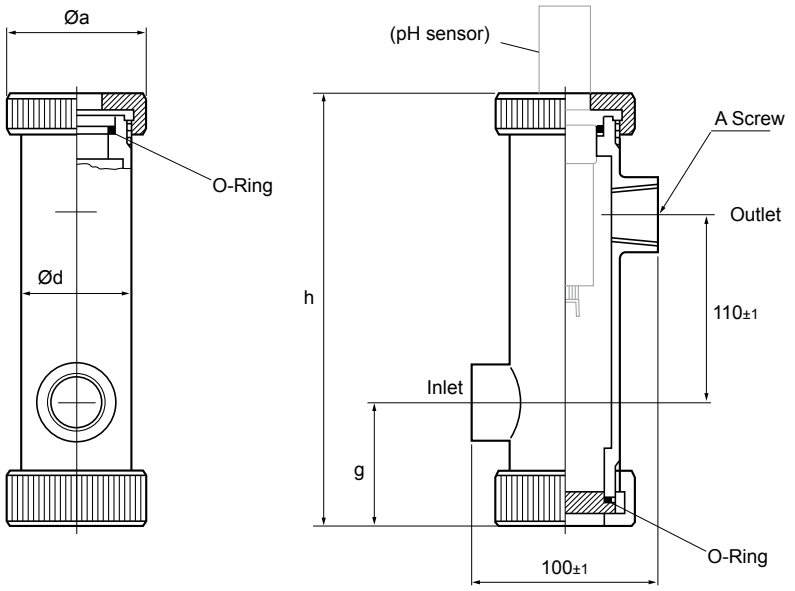
CAUTION

Select the material of wetted parts with careful consideration of process characteristics. Inappropriate selection may cause leakage of process fluids, which greatly affects facilities. Considerable care must be taken particularly in the case of strongly corrosive process fluid such as hydrochloric acid, sulfuric acid, hydrogen sulfide, and sodium hypochlorite. If you have any questions about the wetted part construction of the product, be sure to contact Yokogawa.

1.3 External Dimensions

1. PH8HF - PP - □PT - T - NN - NN, PH8HF - S3 - □PT - T - NN - NN

UNIT: mm



Model and Code	A Screw	a	d	g	h	Weight
PH8HF-PP-JPT-T-NN-NN	Rc1	80	Approx. 60	Approx. 70	Approx. 250	Approx. 0.4kg
PH8HF-PP-NPT-T-NN-NN	1NPT	80	Approx. 60	Approx. 70	Approx. 250	Approx. 0.4kg
PH8HF-S3-JPT-T-NN-NN	Rc1	70	Approx. 60	Approx. 70	Approx. 243	Approx. 3kg
PH8HF-S3-NPT-T-NN-NN	1NPT	70	Approx. 60	Approx. 70	Approx. 243	Approx. 3kg

□ Mounting Bracket (Option Code : /MF1) Weight : Approx. 0.5 kg

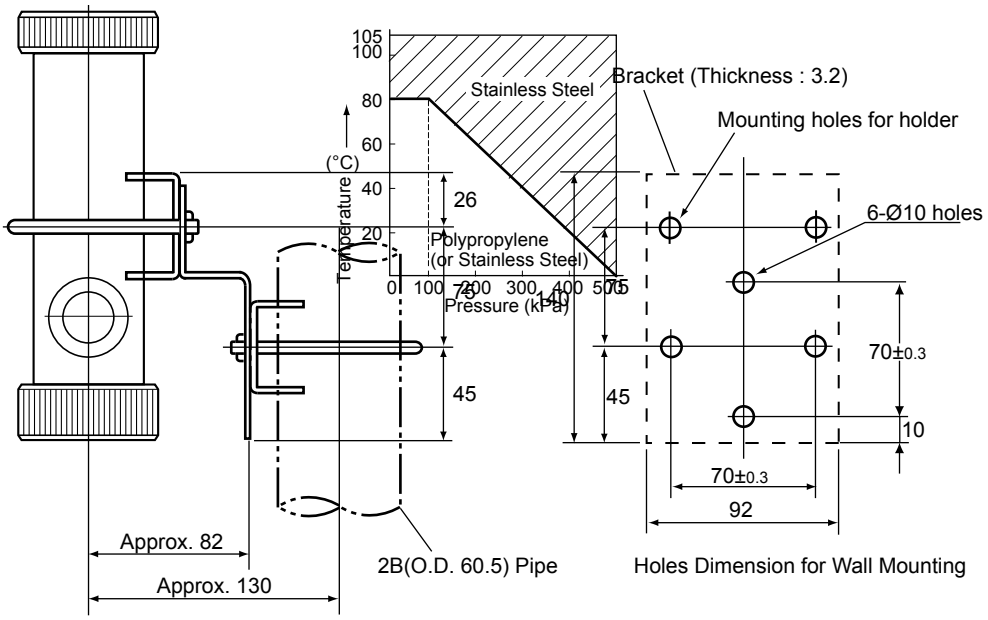
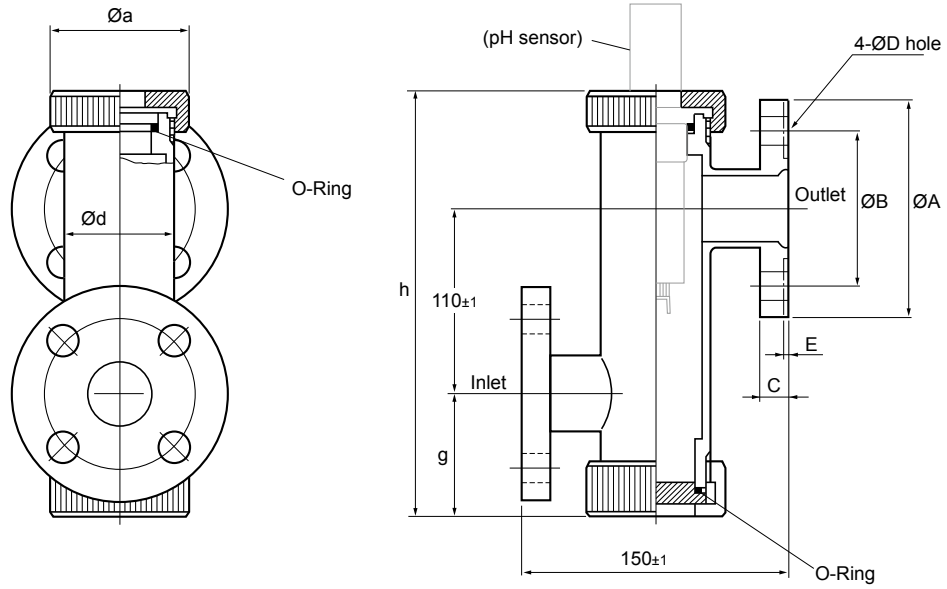


Figure 1.1 Flow-Through Type Holder

2. PH8HF - PP - □1□ - T - NN – NN, PH8HF - S3 - □1□ - T - NN - NN UNIT: mm



Model and Code	A	B	C	D	E	a	d	g	h	Weight
PH8HF-PP-J10-T-NN-NN	125	90	14	19	-	80	Approx. 60	Approx. 70	Approx. 250	Approx. 0.6kg
PH8HF-PP-A15-T-NN-NN	108	79.4	14.2	15.7	-	80	Approx. 60	Approx. 70	Approx. 250	Approx. 0.6kg
PH8HF-S3-J10-T-NN-NN	125	90	14	19	-	70	Approx. 60	Approx. 70	Approx. 243	Approx. 5kg
PH8HF-S3-A15-T-NN-NN	108	79.2	14.2	15.7	2	70	Approx. 60	Approx. 70	Approx. 243	Approx. 5kg

□ Mounting Bracket (Option Code : /MF1) Weight : Approx. 0.5 kg

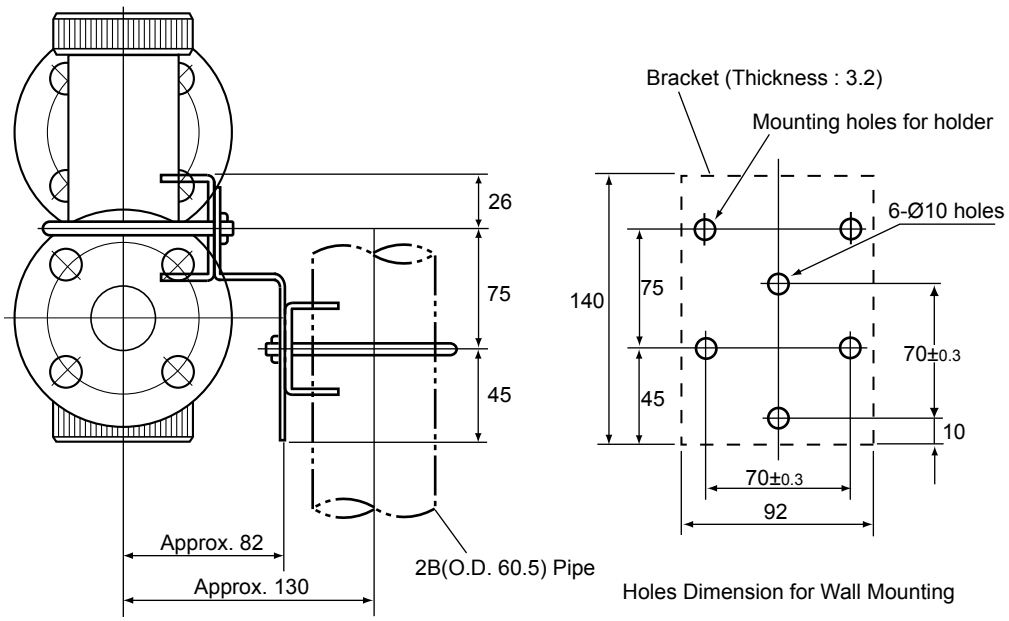
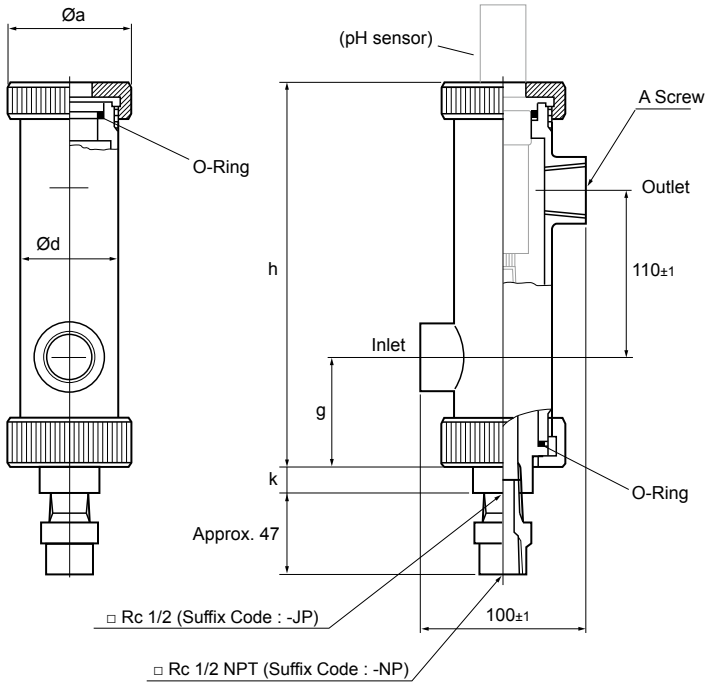
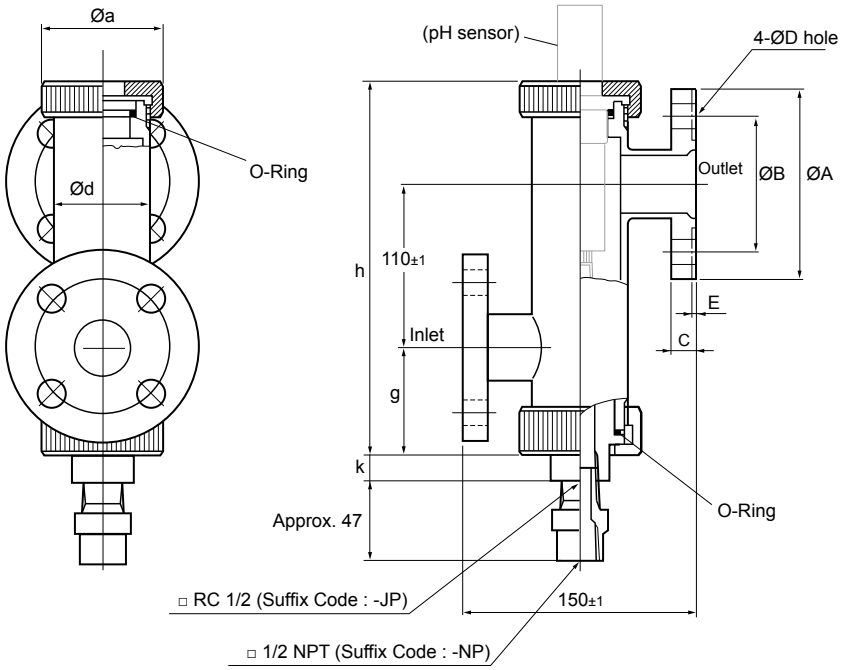


Figure 1.2 Flow-Through Type Holder (with Flange)

2.1. PH8HF - □□- □PT - T - □□ – □P, PH8HF - □□- □1□ - T - □□ - □P UNIT: mm



Model and Code	A Screw	a	d	g	h	k	Weight
PH8HF-PP-JPT-T-□□-□P	Rc1	80	Approx. 60	Approx. 70	Approx. 250	15	Approx. 1.4kg
PH8HF-S3-JPT-T-□□-□P	Rc1	70	Approx. 60	Approx. 70	Approx. 245	17	Approx. 4kg
PH8HF-PP-NPT-T-□□-□P	1NPT	80	Approx. 60	Approx. 70	Approx. 250	15	Approx. 1.4kg
PH8HF-S3-NPT-T-□□-□P	1NPT	70	Approx. 60	Approx. 70	Approx. 245	17	Approx. 4kg

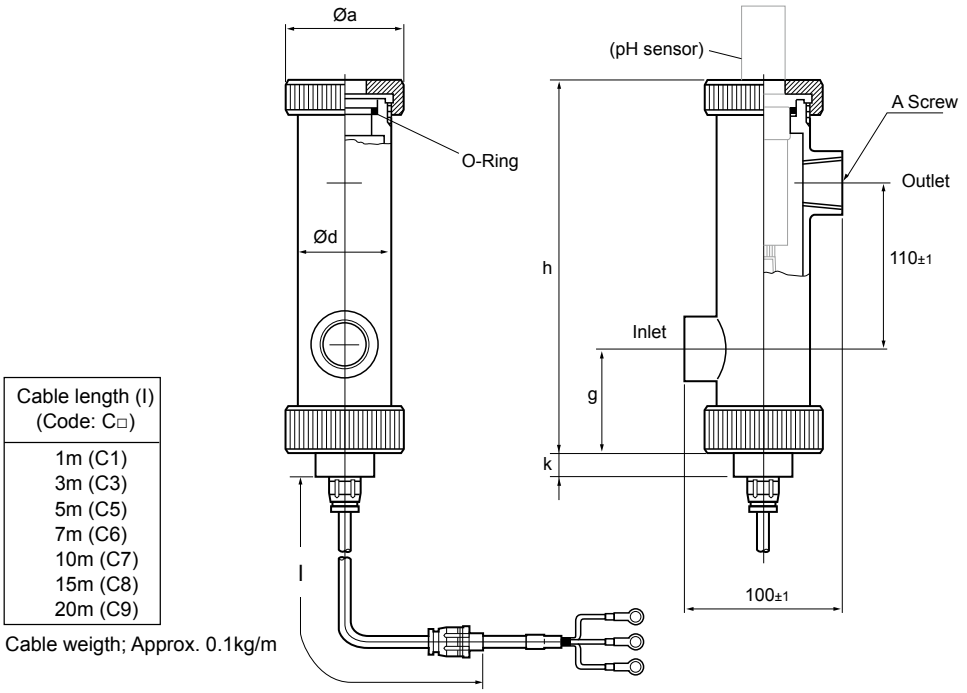


Model and Code	A	B	C	D	E	a	d	g	h	k	Weight
PH8HF-PP-J10-T-□□-□P	125	90	14	19	-	80	Approx. 60	Approx. 70	Approx. 250	15	Approx. 1.6kg
PH8HF-S3-J10-T-□□-□P	125	90	14	19	-	70	Approx. 60	Approx. 70	Approx. 245	17	Approx. 6kg
PH8HF-PP-A15-T-□□-□P	108	79.4	14.2	15.7	-	80	Approx. 60	Approx. 70	Approx. 250	15	Approx. 1.6kg
PH8HF-S3-A15-T-□□-□P	108	79.2	14.2	15.7	2	70	Approx. 60	Approx. 70	Approx. 245	17	Approx. 6kg

F1.2.1.ai

Figure 1.2.1 Flow-Through Type Holder (with Jet, Brush Cleaner)

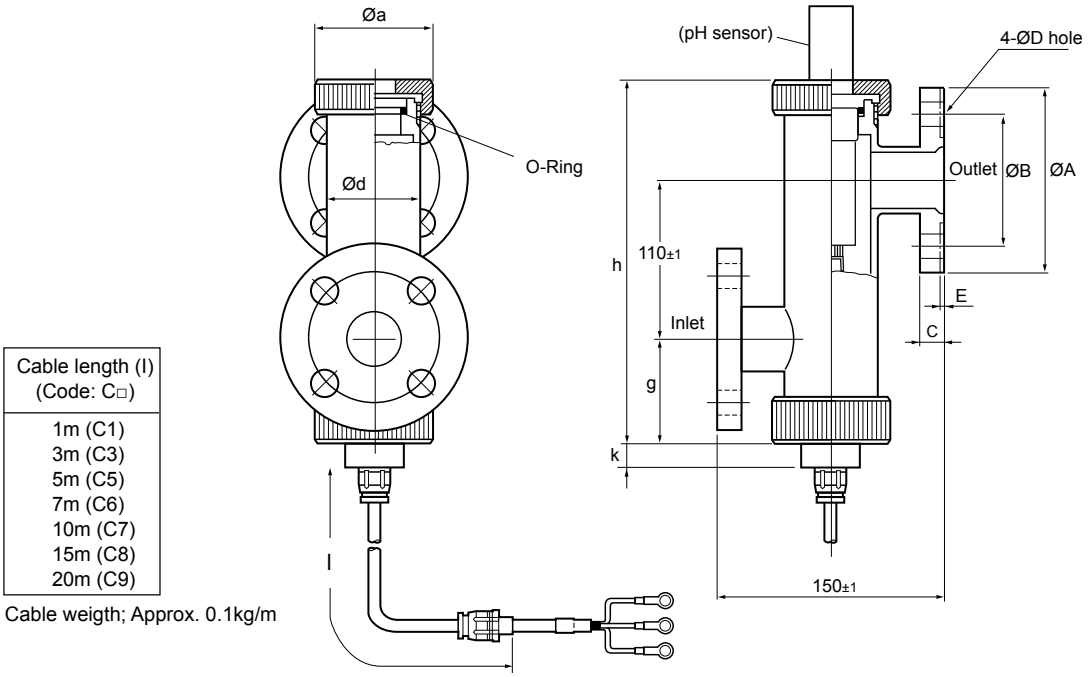
2.2 PH8HF - □□- □PT - T - □□ – C□, PH8HF - □□- □1□ - T - □□ - C□ UNIT: mm



Cable length (l) (Code: C□)
1m (C1)
3m (C3)
5m (C5)
7m (C6)
10m (C7)
15m (C8)
20m (C9)

Cable weigth; Approx. 0.1kg/m

Mode and Code	A Screw	a	d	g	h	k	Weight
PH8HF-PP-JPT-T-□□-C□	Rc1	80	Approx. 60	Approx. 70	Approx. 250	15	Approx. 1.5kg
PH8HF-S3-JPT-T-□□-C□	Rc1	70	Approx. 60	Approx. 70	Approx. 245	17	Approx. 4.1kg
PH8HF-PP-NPT-T-□□-C□	1NPT	80	Approx. 60	Approx. 70	Approx. 250	15	Approx. 1.5kg
PH8HF-S3-NPT-T-□□-C□	1NPT	70	Approx. 60	Approx. 70	Approx. 245	17	Approx. 4.1kg



Cable length (l) (Code: C□)
1m (C1)
3m (C3)
5m (C5)
7m (C6)
10m (C7)
15m (C8)
20m (C9)

Cable weigth; Approx. 0.1kg/m

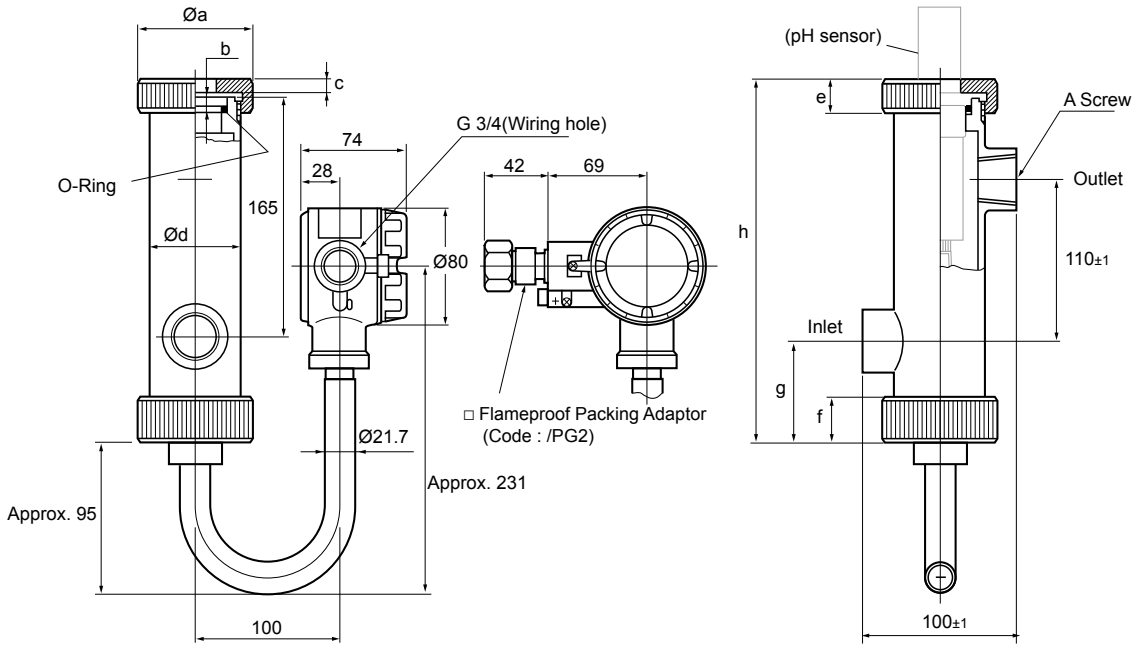
Model and Code	A	B	C	D	E	a	d	g	h	k	Weight
PH8HF-PP-J10-T-□□-C□	125	90	14	19	-	80	Approx. 60	Approx. 70	Approx. 250	15	Approx. 1.7kg
PH8HF-S3-J10-T-□□-C□	125	90	14	19	-	70	Approx. 60	Approx. 70	Approx. 245	17	Approx. 6.1kg
PH8HF-PP-A15-T-□□-C□	108	79.4	14.2	15.7	-	80	Approx. 60	Approx. 70	Approx. 250	15	Approx. 1.7kg
PH8HF-S3-A15-T-□□-C□	108	79.2	14.2	15.7	2	70	Approx. 60	Approx. 70	Approx. 245	17	Approx. 6.1kg

F1.2.2.ai

Figure 1.2.2 Flow-Through Type Holder (with Ultrasonic Cleaner)

3. PH8HFF - □□ - □PT - T - □□ - JS

UNIT: mm



Model and Code	A Screw	a	b	c	d	e	f	g	h	Weight
PH8HFF-PP-JPT-T-□□-JS	Rc1	80	9	11	60	25	30	70	Approx. 250	Approx. 3kg
PH8HFF-S3-JPT-T-□□-JS	Rc1	70	10	6	60.5	26	26	69	Approx. 245	Approx. 5.6kg
PH8HFF-PP-NPT-T-□□-JS	1NPT	80	9	11	60	25	30	70	Approx. 250	Approx. 3kg
PH8HFF-S3-NPT-T-□□-JS	1NPT	70	10	6	60.5	26	26	69	Approx. 245	Approx. 5.6kg

□ Mounting Bracket (Option Code : /MF1) Weight : Approx. 0.5 kg

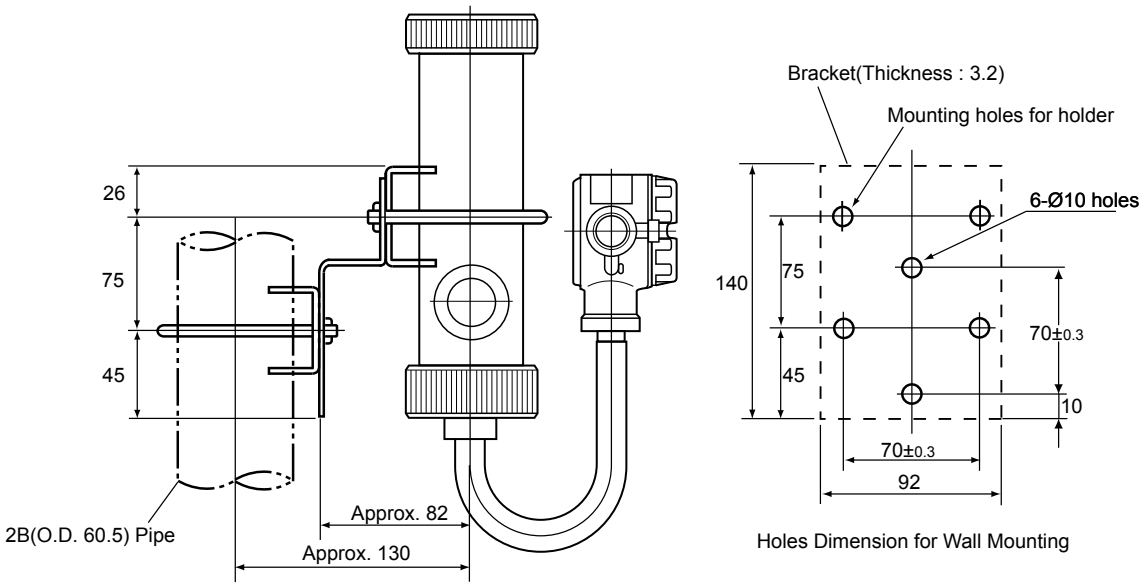
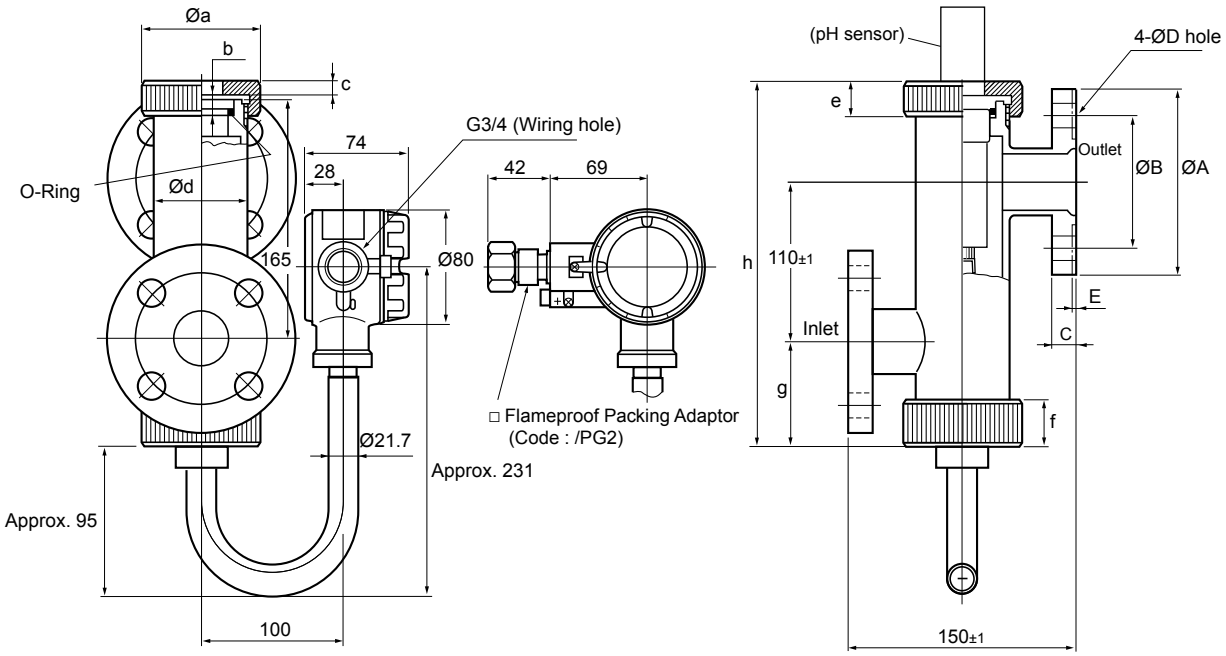


Figure 1.3 Flow-Through Type Holder (with Fameproof type Ultrasonic Cleaner)

4. PH8HFF - □□ - □1□ - T - □□ - JS

UNIT: mm



Model and Code	A	B	C	D	E	a	b	c	d	e	f	g	h	Weight
PH8HFF-PP-J10-T-□□-JS	125	90	14	19	-	80	9	11	60	25	30	70	Approx. 250	Approx. 3.2kg
PH8HFF-S3-J10-T-□□-JS	125	90	14	19	-	70	10	6	60.5	26	26	69	Approx. 245	Approx. 7.6kg
PH8HFF-PP-A15-T-□□-JS	108	79.4	14.2	15.7	-	80	9	11	60	25	30	70	Approx. 250	Approx. 3.2kg
PH8HFF-S3-A15-T--□□-JS	108	79.2	14.2	15.7	2	70	10	6	60.5	26	26	69	Approx. 245	Approx. 7.6kg

□ Mounting Bracket (Option Code : /MF1) Weight : Approx. 0.5 kg

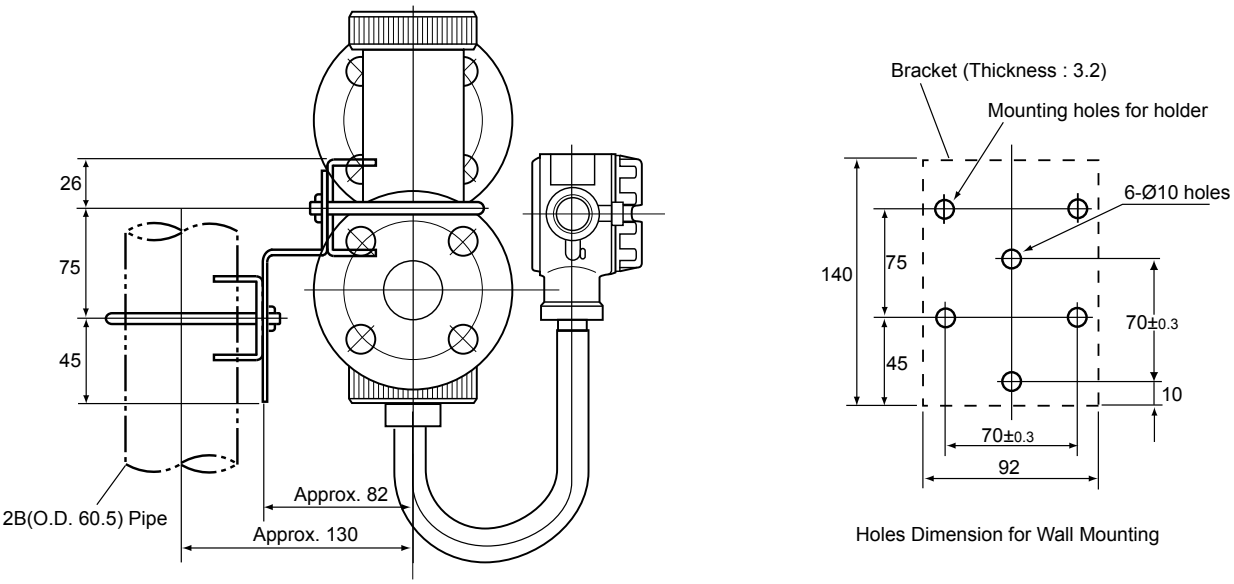
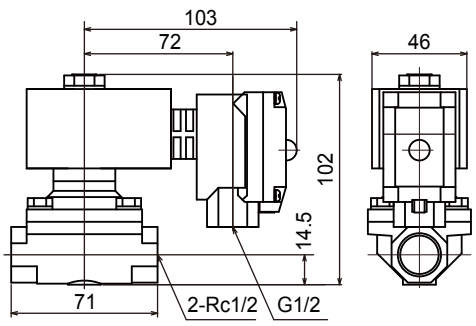


Figure 1.4 Flow-Through Type Holder (with Fameproof type Ultrasonic Cleaner)

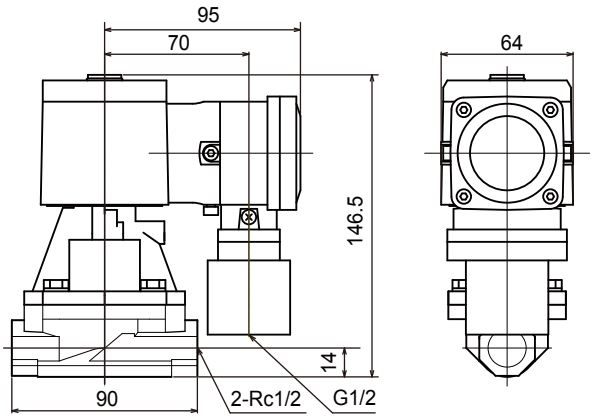
5. Solenoid Valve

UNIT: mm

General Purpose Solenoid Valve
PH8MV*D



Explosionproof Solenoid Valve
PH8MVF*B



Cautions on Installation of Solenoid Valve for Jet / Brush Cleaning

1. Do not allow a sample solution to flow backward into the solenoid valve or to be replaced with the driving fluid.
   For this take relevant measures; e.g. install a check valve to prevent inverse pressure between the inlet and outlet of the solenoid valve, or install the solenoid valve higher than the holder, especially when using the air jet/brush cleaning system.
2. Make sure to avoid the risk of corrosion of the solenoid body (bronze) and seal (nitrilel rubber) by vapor or gaseous components generated from a sample solution, especially when using the air jet/brush cleaning system.

F1.5.ai

Figure 1.5 Solenoid Valve for Jet & Brush Cleaning

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2. Installation, Piping and Wiring

2.1 Holder Installation

2.1.1 Installation Site

Install the flow-through type holder in a site where the holder can be easily maintained.

2.1.2 Mounting the Flow-through Type Holder

When strong piping - e.g. process piping - is next to the holder, mount the holder on it as shown in Figure 2.1.

When a polypropylene holder is used, be careful not to apply excessive force to it.

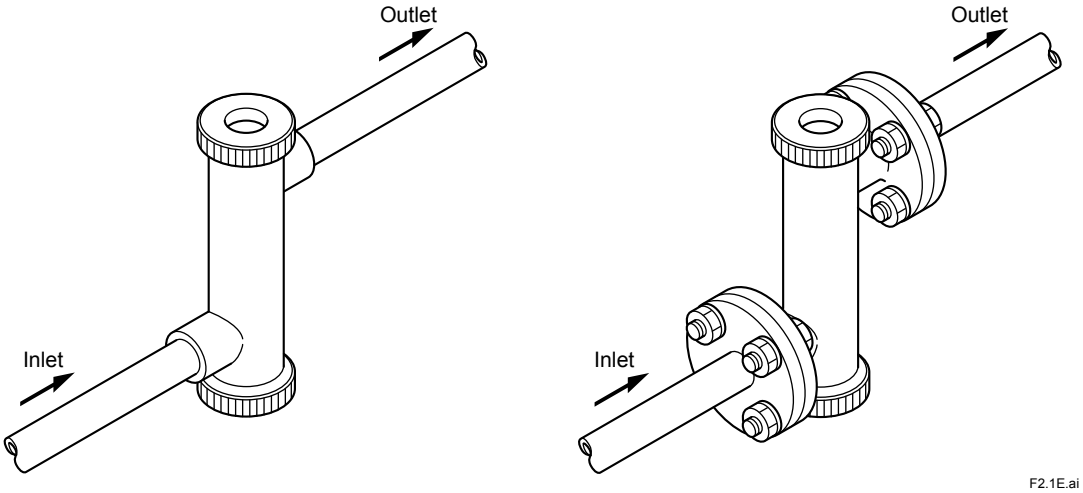


Figure 2.1 Support by Process Piping

If the process piping is not strong enough to mount the holder, use mounting hardware (available as option) to mount the holder on a vertical (or horizontal) pipe with sufficient strength as shown in Figure 2.2. The holder can be mounted on a bracket as shown in Figure 2.3 (remove unnecessary parts from the metal fittings).

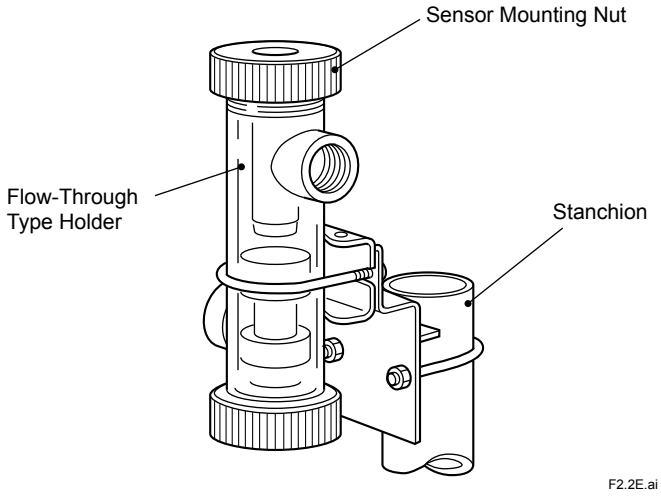


Figure 2.2 Pipe Mounting

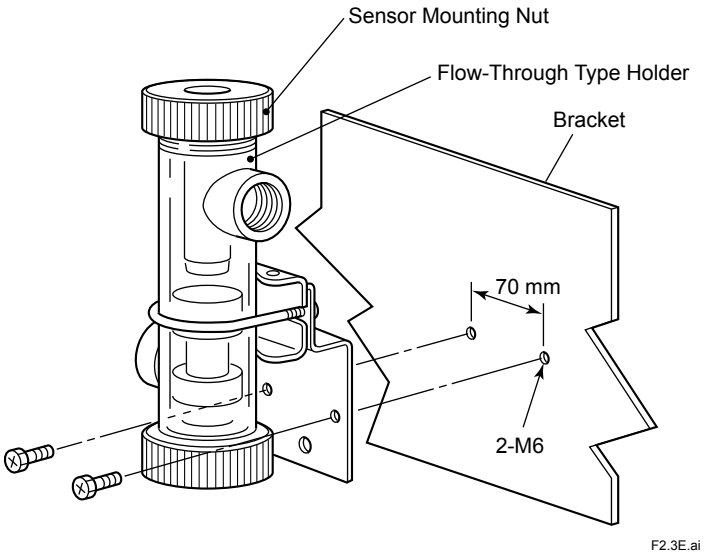


Figure 2.3 Bracket Mounting

2.2 Process Piping

Piping (through which the process fluid flows) connected to the holder: The process piping should be installed as per specifications, and the temperature, pressure and flow rate of process fluid conforms to the specifications of the sensor and holder to be used. When a holder with jet or brush cleaning is used, the piping should be installed accordingly. You should also keep “ease of maintenance” and “calibration with standard solution” in mind when installing the piping.

2.2.1 Main Precautions for Piping

(1) When a holder with jet or brush cleaning is used:

The cleaning fluid (water or air) is at higher pressure than the process fluid. If you want to prevent water or air flowing up line, a check valve should be provided as shown in Figure 2.4.

Note

For safety’s sake you should confirm that it is safe for the cleaning fluid to flow into the down-line piping.

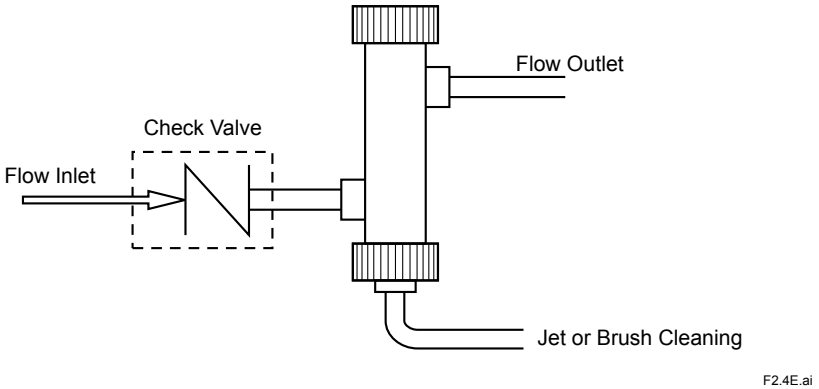
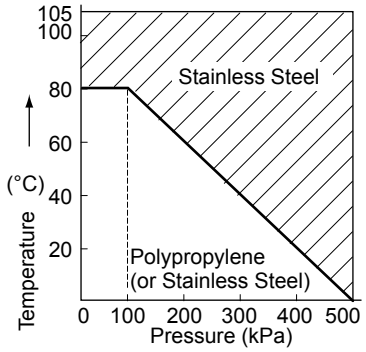


Figure 2.4 Check Valve Installation

(2) When a polypropylene holder is used:

Keep the temperature and pressure of the process fluid (pressure of the cleaning fluid for holders with jet or brush cleaning) within the range shown in Figure 2.5.

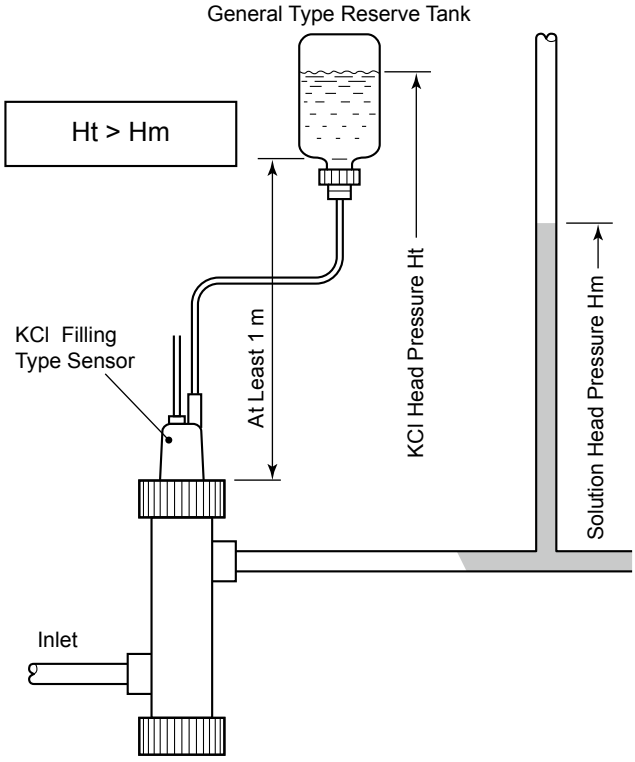


F2.5E.ai

Figure 2.5 Temperature and Pressure Diagram for Polypropylene Resin Holder

(3) When a general use sensor with KCl, solution tank is used:

The pressure of the process fluid inside the holder should not exceed the tank head pressure 10 kPa (0.1 kg/cm^{2}G).



F2.6E.ai

Figure 2.6 Relationship between the Solution Pressure, Pressure and Reserve Tank Height

(4) When a sensor with medium pressure KCl, solution tank is used:

Provide stop valves in the up-line and down-line piping adjacent to the holder.

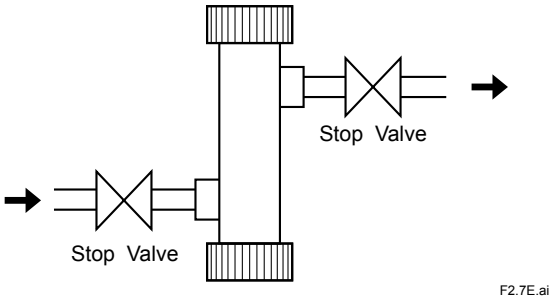


Figure 2.7 Stop Valve Installation

2.2.2 Piping Procedure

Piping Materials:

Use the materials shown below for the process piping adjacent to the flow-through type holder.

- Hard polyvinylchloride pipe — Nominal diameter 25 mm
- Polypropylene pipe — Nominal diameter 25 mm
- Wire rainforced soft polyvinylchloride pipe — Nominal diameter 25 mm
- Stainless steel pipe (JIS G3459)
  SUS304 or SUS316 — Nominal diameter 25 mm

Piping Example:

1. The outlet tube should be as short as possible to expel the solution to atmosphere.
2. When a horizontal outlet tubing is long, a vertical tube (H) should also be long.

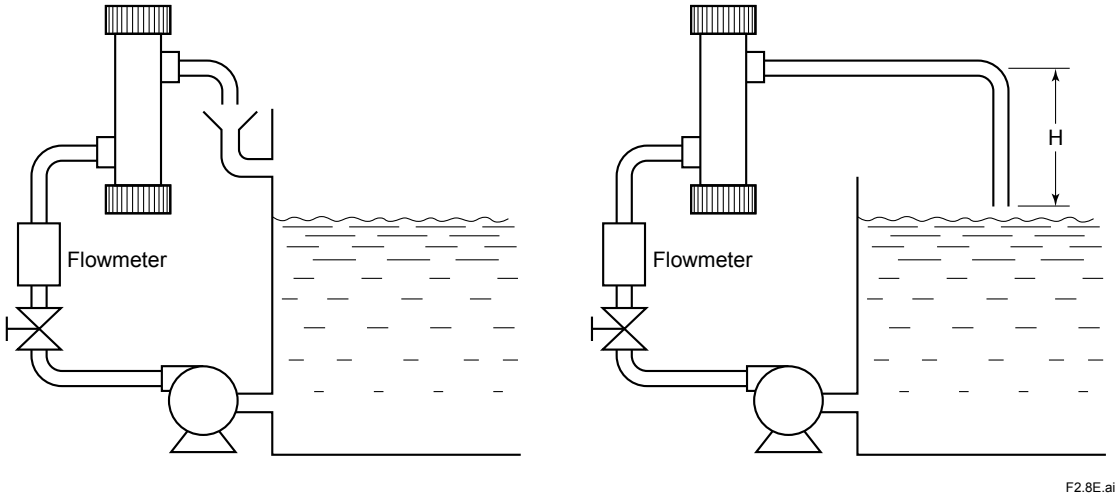


Figure 2.8 Sensor with General Type Reserve Tank

1. Install stop valves upstream and downstream of the flow-through holder to allow ease of maintenance.
2. Install a check valve before the flow-through holder as necessary.

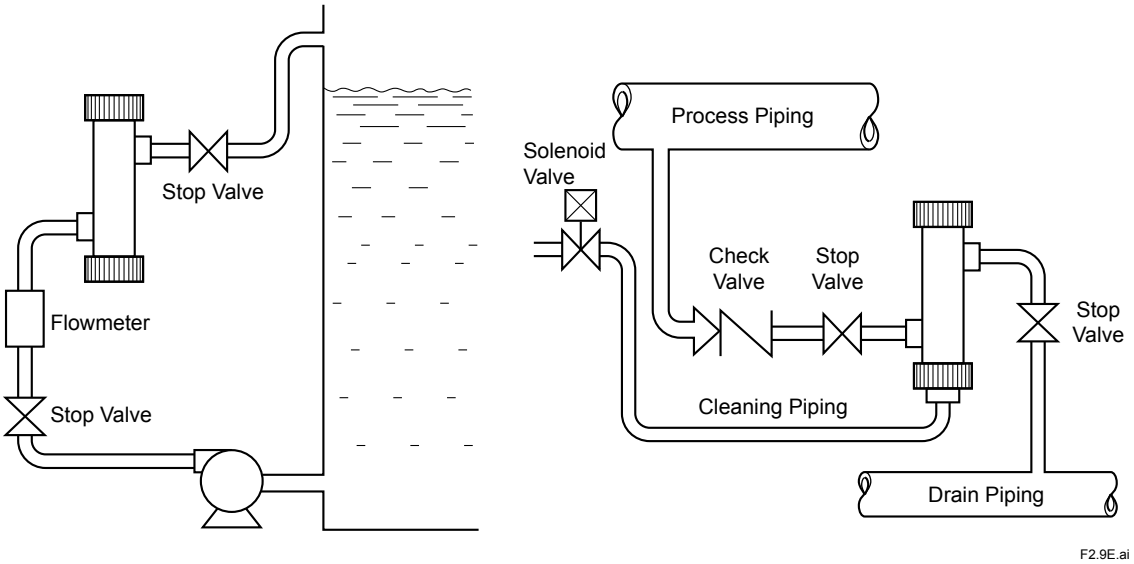


Figure 2.9 When the Solution has a Pressure

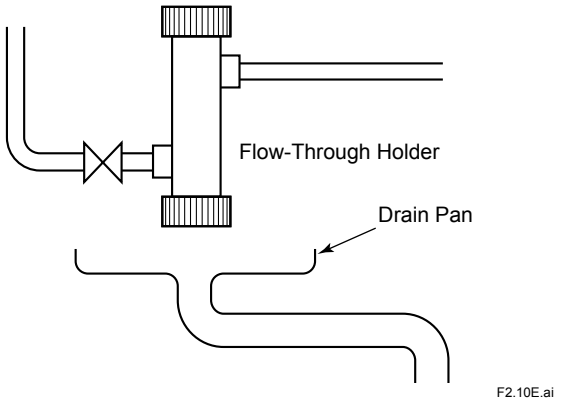


Figure 2.10 Cleaning the Flow-Through Holder

2.3 Installing the Sensor

Refer to the separate manual describing the sensor to be used.

2.4 Cleaner Piping

This section applies only to the submersion type holder with cleaner.

2.4.1 Piping Precautions

(1) Provide a slight slack in a flexible tubing between the cleaner and a mating device to allow ease of maintenance.

(2) Determine the cleaner pipe size to allow sufficient flow and pressure. Use nominal 15 mm pipe for air cleaning piping. If the water/jet cleaner pipe or water/brush cleaner pipe is subject to freezing temperature during winter, cover it with a suitable insulation material.

(3) Use a normally-open (opens when relay is energized) nominal 15 mm diameter solenoid valve for the cleaning line. The solenoid valve supplied by Yokogawa meets the following specifications.

[Model PH8MV Solenoid Valve]

Pilot kick operated, 2-port valve. Open when energized.

Fluid: Normal tap water, industrial water, or air.

Operating Pressure: 0 to 1 MPa

Forward (reverse) Pressure Resistance: 2 MPa

Fluid Temperature: Water; 5 to 60°C, Air; -10 to 60°C

Cv: 4.5

Process Connection: Rc 1/2

Power Supply: 100/110/200/220 V AC, 50/60 Hz

Power Consumption: 10 W

Construction: IP53

Material: Body; Bronze
Sealing; Nitrile rubber

Ambient Temperature: Maximum 50°C

Cable Inlet Connection: G 1/2

Weight: Approx. 0.9 kg

[Model PH8MVF Explosionproof Solenoid Valve]

Pilot kick operated, 2-port valve. Open when energized.

Fluid: Normal tap water, industrial water, or air.

Operating Pressure: 0.05 to 1 MPa

Forward (reverse) Pressure Resistance: 1.5 MPa

Fluid Temperature: Water; 5 to 60°C, Air; -10 to 60°C

Cv: 4.5

Process Connection: Rc 1/2

Power Supply: 100V AC, 50/60 Hz., 110V AC, 60 Hz
200V AC, 50/60 Hz., 220V AC, 60 Hz

Power Consumption: 10 W

Construction: TIIS flameproof (for d2G4 gas).

Material: Body; Bronze
Seal; Nitrile rubber

Ambient Temperature: Maximum 50°C

Valve Seat Leakage: 300 Nml/min. (At air pressure 50 to 700 kPa)

Cable Inlet Connection: G 1/2 (Frameproof packing adaptor)

Mounting Position: Vertical mounting with coil in top

Weight: Approx. 1.9 kg

2.4.2 Piping Procedure

(1) Air piping examples

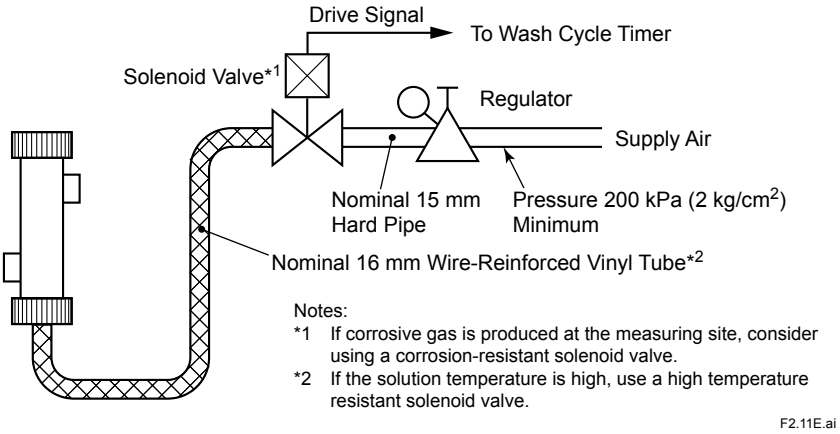


Figure 2.11 Typical Brush/jet Cleaner Air Piping

(2) Industrial water piping examples

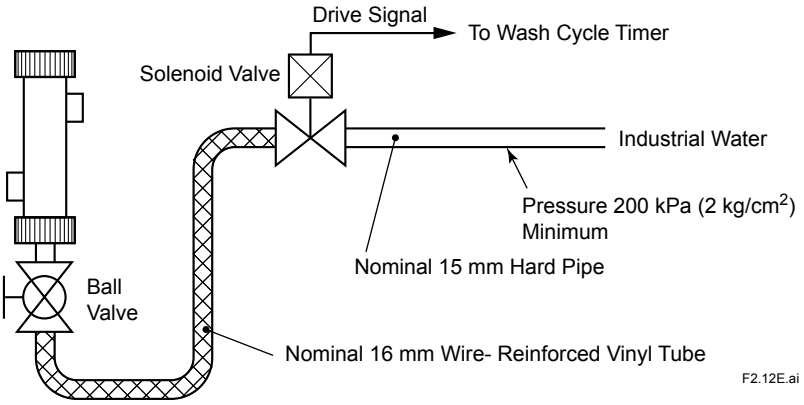


Figure 2.12 Industrial Water Piping for Typical Brush/Jet Cleaner

(3) Tap water piping examples

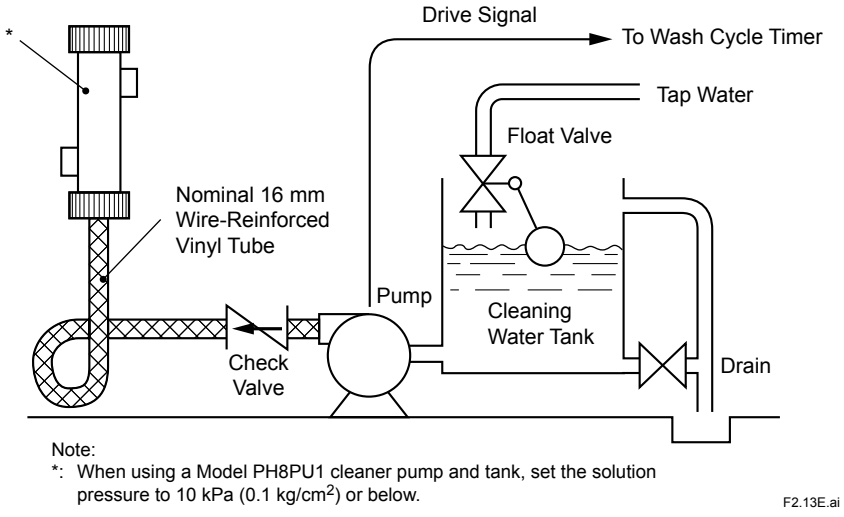


Figure 2.13 Tap Water Piping for Typical Brush/Jet Cleaner

2.4.3 Installation of PH8PU1 Washer Pump and Water Tank

The PH8PU1 Washer Pump and Tank are used to provide water jet and brush cleaning in drinking water applications. For details, refer to the separate IM 19C1E1-01E on PH8PU1 Washer Pump and Tank.

2.5 Wiring

This section describes the wiring between the ultrasonic oscillator and cleaner, and between the solenoid valve, pump, and PH201G distributor. For the sensor wiring, refer to the chapter describing the sensor.

2.5.1 Ultrasonic Oscillator Circuit Wiring

For the non-explosionproof ultrasonic oscillator, connect the cable from the cleaner directly to the terminals inside the PUS400G Ultrasonic Oscillator.

For details of PUS400G, refer to the separate IM 19C1B3-01E.

For the explosionproof ultrasonic oscillator, connect the cable from the cleaner directly to the terminals inside the PH8USF Ultrasonic Oscillator and PH8AL Alarm Box.

For detailsof PH8USF, PH8AL, refer to the separate IM 12B5U2-E.

2.5.2 Solenoid Valve Circuit Wiring

This is the wiring for the water jet or brush cleaning.

The wash timer in the Intelligent pH transmitter outputs a contact signal via the PH201G Distributor. You should wire this contact to operate the solenoid valve. If you are using the PH8PU1 Washer Pump and Tank, then the wiring is described in Sec. 2.5.3.

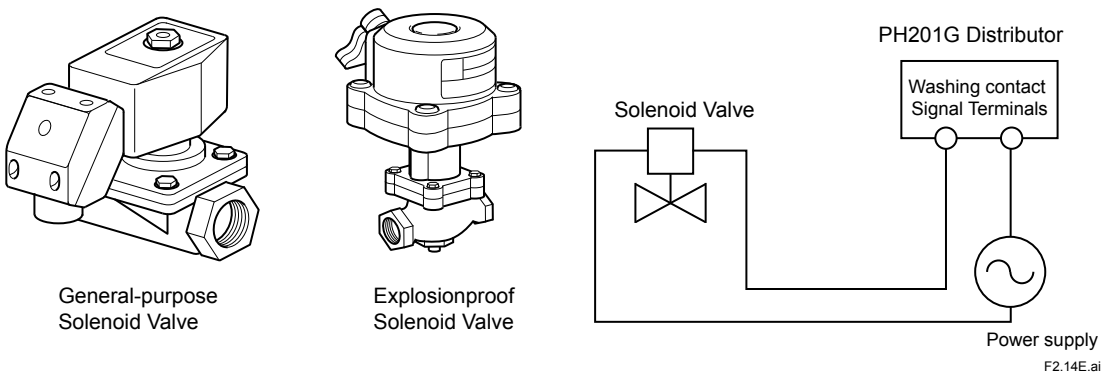


Figure 2.14 Wiring the Solenoid Valve Circuit

[Non-explosionproof solenoid valve]

Use a 2-conductor vinyl-sheathed cable with an outer diameter of 10 to 12 mm for the wiring.

[Explosionproof solenoid valve]

When the PH8MVF explosionproof solenoid valve is used, use tapped (screw-in) explosionproof conduit for wiring.

2.5.3 Wiring for PH8PU1 Washer Pump and Tank

Figure 2.15 shows the internal and external wiring for the PH8PU1 Washer Pump and Tank.

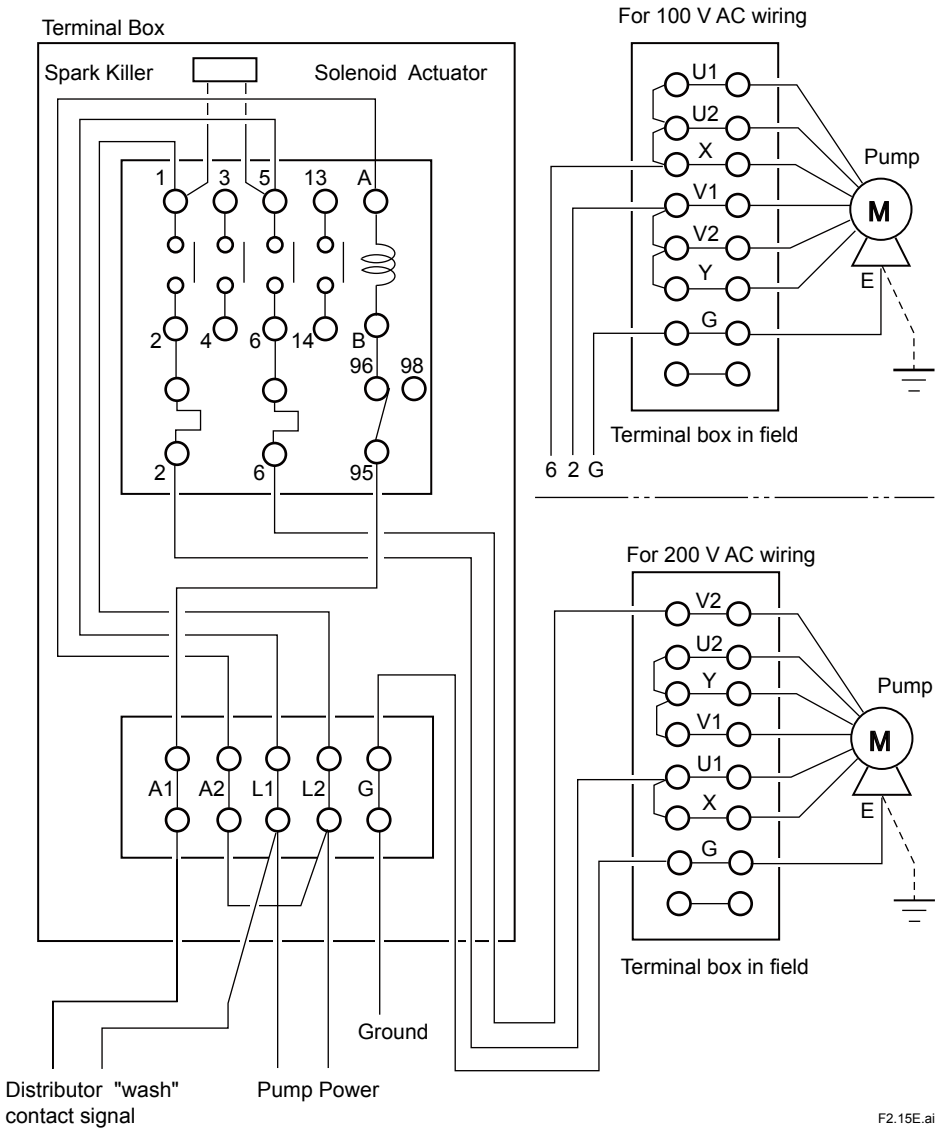


Figure 2.15 Internal and external wiring for the PH8PU1 Washer Pump and Tank

As shown in the figure, connect terminals "A1" and "L1" from the PH201G distributor to terminals A1 and L1 in the terminal box, and connect the power supply to operate the pump between terminals L1 and L2. Also connect together terminals A2 and L2 as shown in the figure. Be sure to ground the ground terminal G.

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3. Maintenance/Inspection

3.1 Cleaning the Holder

When process fluid contains slurry which tends to settle in the holder regularly so that the slurry does not build up. Remove the plug or cleaning element on the holder bottom to clean the holder.

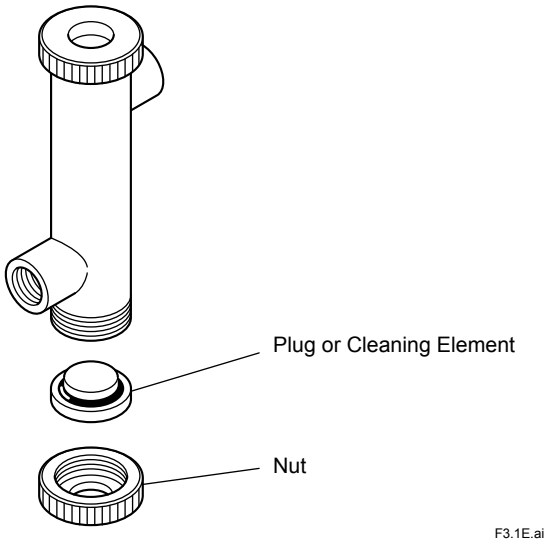


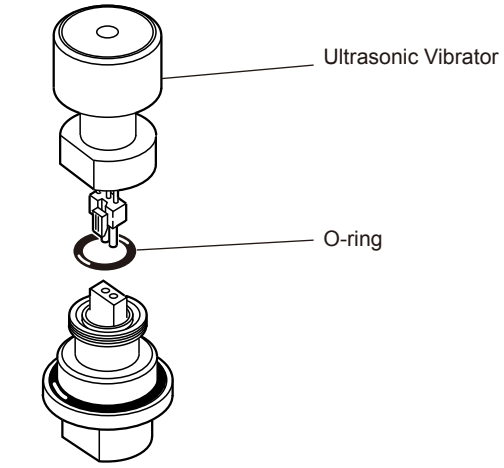
Figure 3.1 Plug and Nut

3.1.1 Inspecting the O-ring Seal

The O-ring seal used in the wetted part of the flow-through type holder is made of fluorocarbon rubber, which has superior resistance to corrosion - suitable for use with most process fluids.

Usually, therefore, no periodic inspection is necessary. When a flow-through holder with ultrasonic cleaner is used, if the process fluid enters the ultrasonic cleaner, parts replacement may be required to repair it. Inspect the O-ring seal when checking or repairing the ultrasonic cleaner.

To prevent trouble, replace the O-ring seal periodically - e.g. every two years.



Note: This ultrasonic cleaning element is non-explosionproof type.

Figure 3.2 Ultrasonic Cleaner O-ring

3.2 Checking the Cleaning Element

This section applies to the flow-through type holder with cleaning element. Check the cleaning element to maintain the flow-through type holder in good operating condition.

3.2.1 Jet Cleaning Element

If the cleaner does not clean the sensor electrode, check if the sensor nozzles are clogged. Use a 0.8 mm diameter wire to remove any material clogging the sensor nozzles.

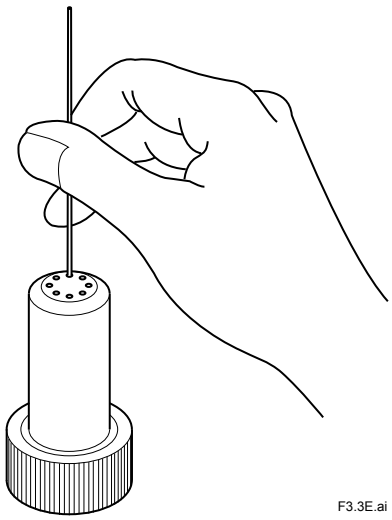


Figure 3.3 Cleaning the Nozzle Holes

3.2.2 Cleaning the Brush

If the electrode becomes dirty, the brush may be excessively worn. When the brush is worn out, replace it. Insert a screwdriver into the cleaner hole to prevent the rotor from turning, and then turn the brush assembly counterclockwise. The brush can be easily removed from the rotor. See Figure 3.4. When mounting a new brush, reverse the disassembly procedure.

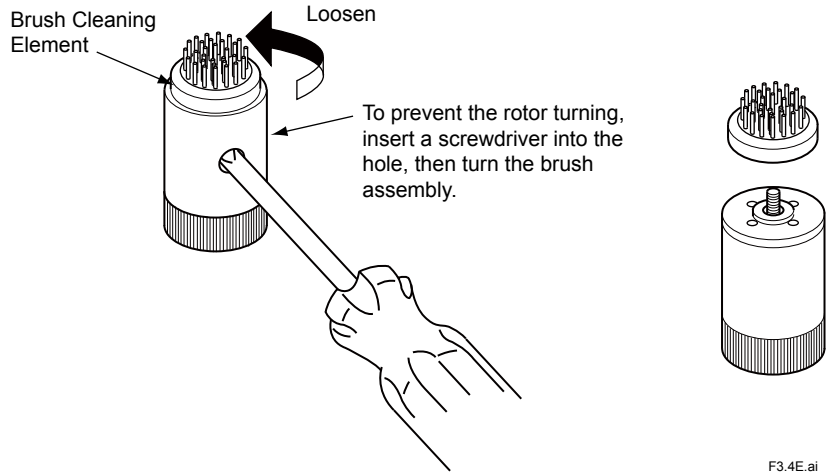


Figure 3.4 Disassembling the Brush

3.2.3 Ultrasonic Cleaning Element

For several weeks after starting the operation, check the ultrasonic cleaning element for corrosion. If corroded, replace it with the type most suitable for the measurement solution, selecting from among the element materials: SUS316 stainless steel, titanium and Hastelloy C. If a corroded element is not replaced, the solution may enter the ultrasonic element and cause problems. If this occurs, replace the cleaning element immediately.

[Non-explosionproof ultrasonic cleaning element]

(1) To remove a defective ultrasonic cleaning element, unscrew the cleaning element mounting screw, so the cleaning element holder can be removed from the screw connector. Move the cleaning element out until the connector appears, and disconnect the vibrator leadwire connector from the holder side connector. See Figure 3.5.

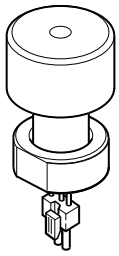


Figure 3.5 Non-Explosionproof Cleaning Element

(2) Check that there is no corrosion around the O-ring sealed surface. It is recommended that the O-ring be replaced whenever the element cleaned.

(3) Mounting a new ultrasonic cleaning element. After attaching the connector, rotate the cleaning element two to three turns and store the cable inside the holder. Secure the cleaning element mounting screw. Check the cleaning element material by the marking on the surface of the vibrator element; H for Hastelloy, T for titanium, none for SUS316 stainless steel.

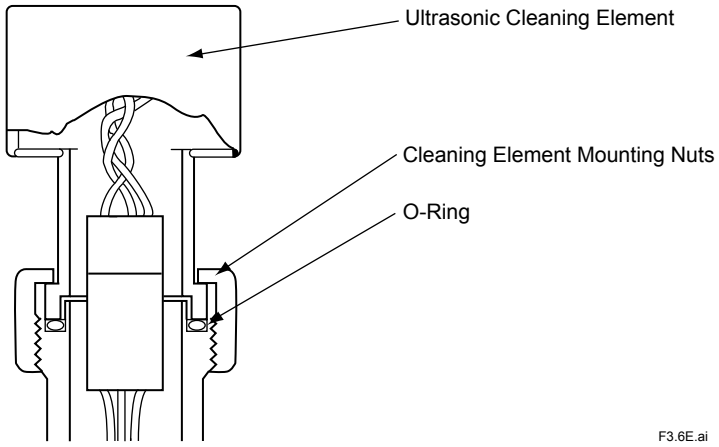


Figure 3.6 Non-Explosionproof Ultrasonic Cleaning Element

[Replace the explosionproof cleaning element]

For replacing the ultrasonic cleaning element, consults with Yokogawa service personnel.

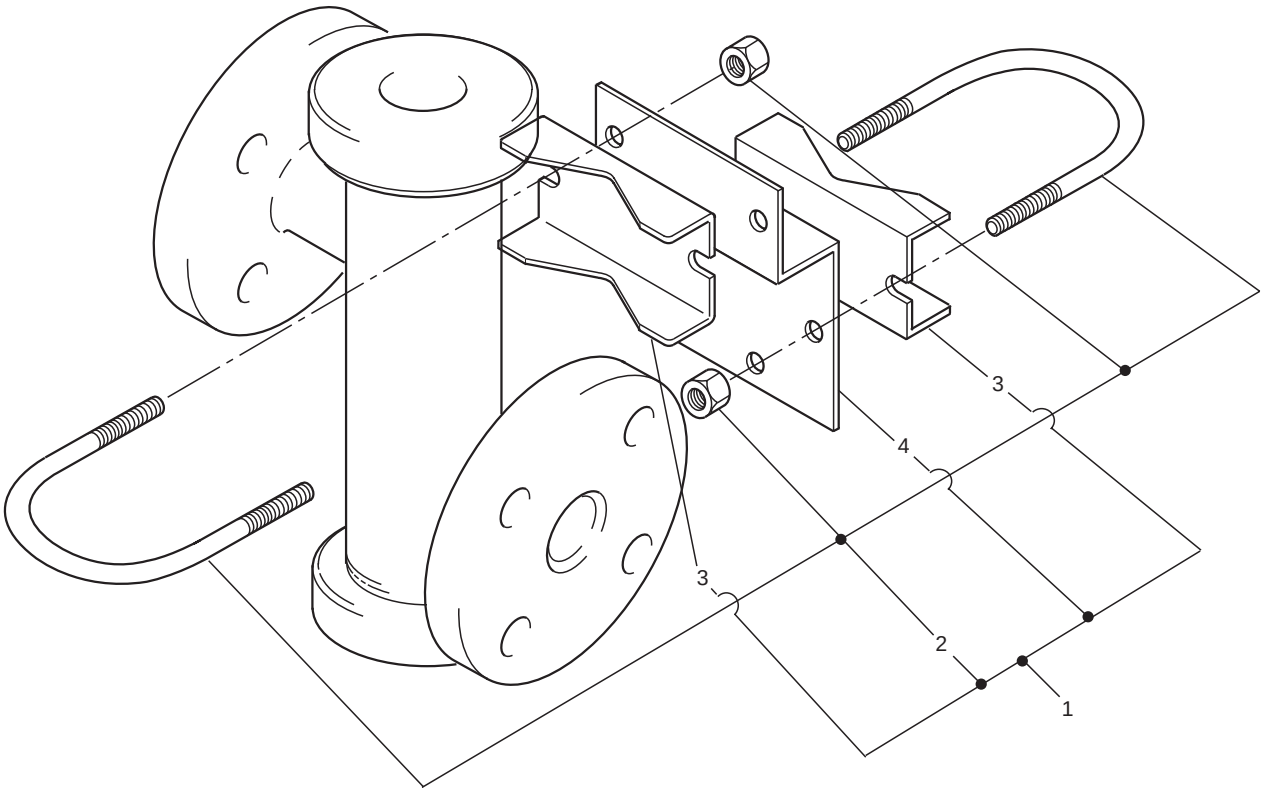
3.2.4 Maintenance of PH8PU1 Washer Pump and Tank

For details, refer to the separate IM 19C1E1-01E.

Customer Maintenance Parts List

Model PH8HF, PH8HFF
Flow-Through type Holders

Pipe Mounting Kit (Option code: /MF1)

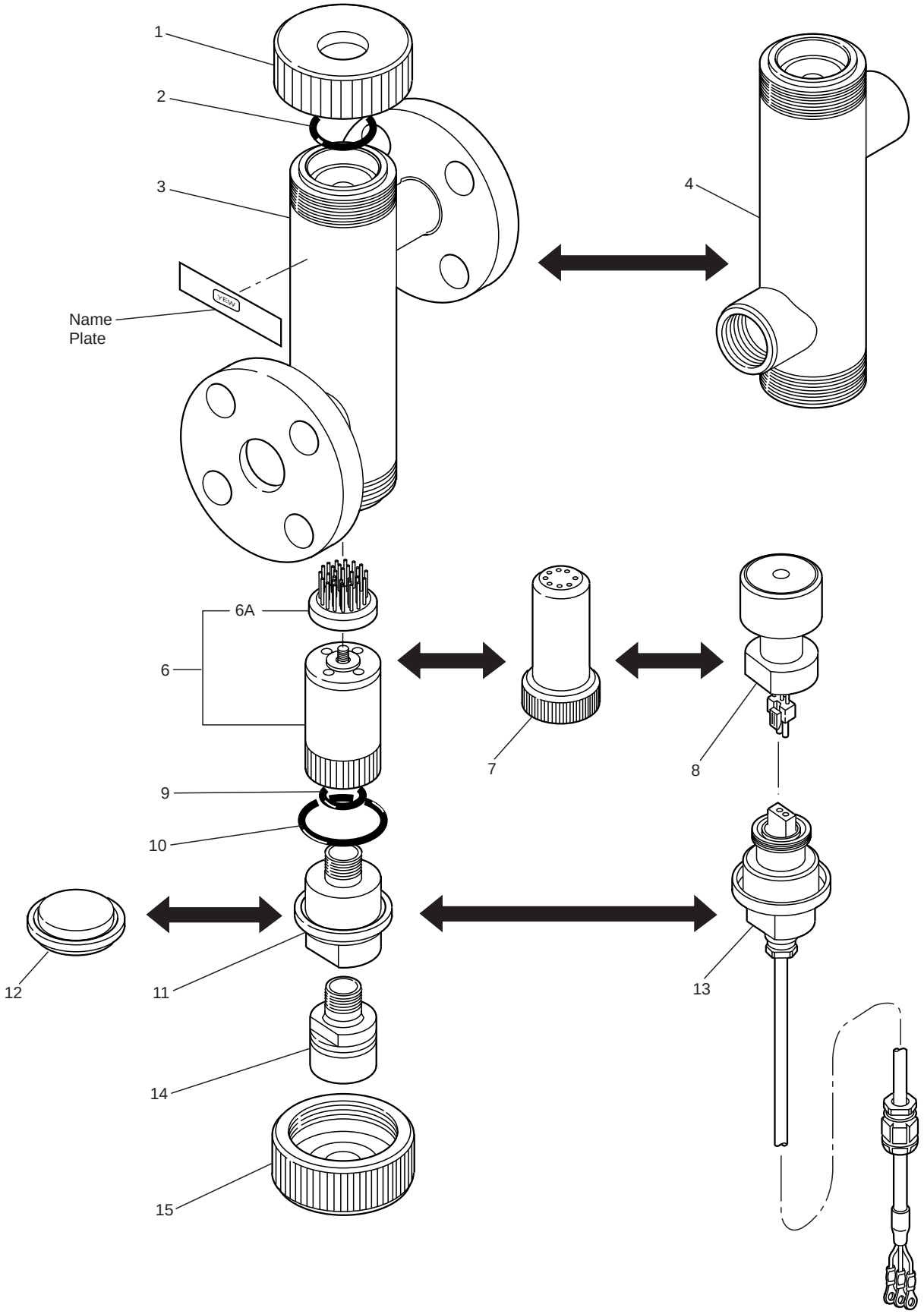


Item	Part No.	Qty	Description
1	K9145LD	1	Mounting Kit
2	D0117XL-A	2	U-Bolt & Nut
3	L9826AL	2	Bracket
4	K9145LE	1	Bracket

YOKOGAWA
Yokogawa Electric Corporation

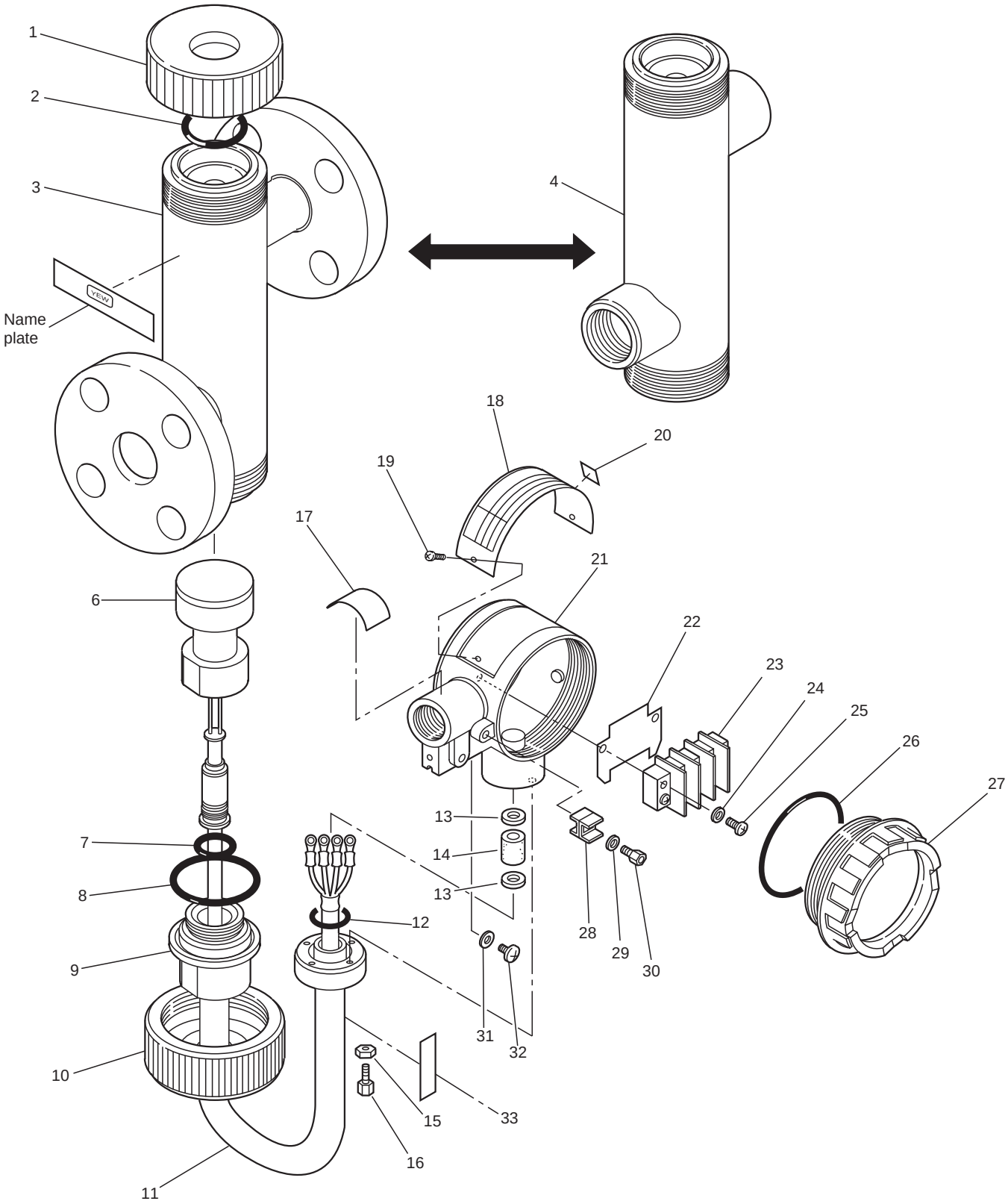
CMPL 12B05N01-01E

PH8HF Non-Explosionproof Type

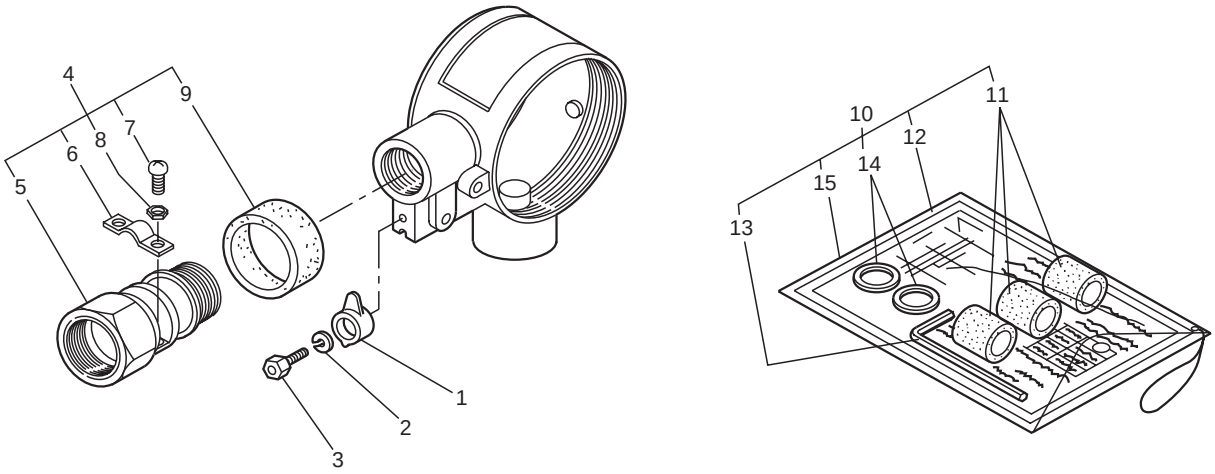


Item	Part No.	Qty Model PH8HF-PP	Qty PH8HF-S3	Description
1	K9145EA	1		Cap
	K9145EB		1	Cap
2	—			O-Ring
	K9142QW	1	1	Viton®
	K9319RG	1	1	for /PF option
3	K9145FC	1		Chamber Assembly } Process Connection:
	K9145FJ		1	Chamber Assembly } JIS 10K 25A FF Flange
	K9145FD	1		Chamber Assembly } Process Connection:
	K9145FK		1	Chamber Assembly } ANSI Class 150 1 FF Flange
4	K9145FA	1		Chamber Assembly } Process Connection:
	K9145FG		1	Chamber Assembly } Rc1 (JIS) Female Thread.
	—	1		Chamber Assembly } Process Connection:
	K9145FH		1	Chamber Assembly } 1 NPT Female Thread.
6	K9143KA	1	1	Brush Assembly (for brush cleaning)
6A	K9143KM	1	1	Brush
7	K9143JN	1	1	Nozzle (for jet cleaning)
8	—			Vibrator Assembly
	K9143QA	1	1	Transducer: Stainless Steel } (for ultrasonic cleaning)
	K9143QB	1	1	Transducer: Titanium } (for ultrasonic cleaning)
	K9143QC	1	1	Transducer: Hastelloy C } (for ultrasonic cleaning)
9	—			O-Ring
	K9142QT	1	1	Viton® for Ultrasonic Cleaning
	K9319RD	1	1	/PF option for Ultrasonic Cleaning
	K9142QU	1	1	Viton® for Jet or Brush Cleaning
	K9319RS	1	1	/PF for Jet or Brush Cleaning
10	—			O-Ring
	K9142QX	1	1	Viton®
	K9319RH	1	1	for /PF option
11	K9145DA	1		Plug } (for jet or brush cleaning)
	K9145DB		1	Plug } (for jet or brush cleaning)
12	K9145DG	1		Plug } (for without cleaning)
	K9145DH		1	Plug } (for without cleaning)
13	K9145CA	1		Plug Assembly } Cable Length 1m } (for ultrasonic cleaning)
	K9145CC		1	Plug Assembly } Cable Length 1m } (for ultrasonic cleaning)
	K9145CB	1		Plug Assembly } Cable Length 3m } (for ultrasonic cleaning)
	K9145CD		1	Plug Assembly } Cable Length 3m } (for ultrasonic cleaning)
14	K9115RS	1		Connector } For Jet or Brush Cleaning,
	L9832AT		1	Connector } (1/2 NPT Female)
15	K9145EJ	1		Cap
	K9145EK		1	Cap

PH8HFF Explosionproof Type



Item	Part No.	Qty Model PH8HFF-PP	Qty PH8HFF-S3	Description
1	K9145EA	1		Cap
	K9145EB		1	Cap
2	—			O-Ring
	K9142QW	1	1	Viton®
	K9319RG	1	1	for /PF option
3	K9145FC	1		Chamber Assembly } Process Connection:
	—		1	Chamber Assembly } JIS 10K 25A FF Flange
	K9145FD	1		Chamber Assembly } Process Connection:
	K9145FK		1	Chamber Assembly } ANSI Class 150 1 FF Flange
4	K9145FA	1		Chamber Assembly } Process Connection:
	K9145FG		1	Chamber Assembly } Rc1 (JIS) Female Thread.
	K9145FB	1		Chamber Assembly } Process Connection:
	K9145FH		1	Chamber Assembly } 1 NPT Female Thread.
6	—			Vibrator Assembly
	K9143SA	1	1	Transducer: Stainless Steel
	K9143SB	1	1	Transducer: Titanium
	K9143SC	1	1	Transducer: Hastelloy C
7	—			O-Ring
	—	1	1	Viton®
	—	1	1	for /PF option
8	—			O-Ring
	K9142QX	1	1	Viton®
	K9319RH	1	1	for /PF option
9	—	1		Plug
	—		1	Plug
10	—	1		Cap
	—		1	Cap
11	—	1	1	Pipe Assembly
12	—	1	1	O-Ring
13	—	2	2	Washer
14	—	1	1	Gasket
15	—	4	4	Washer
16	—	4	4	Bolt
—	—	1	1	Gland Assembly
17	—	1	1	Sheet
18	—	1	1	Nameplate
19	F9202FY	2	2	Screw
20	—	1	1	Label
21	—	1	1	Case
22	—	1	1	Nameplate
23	—	1	1	Terminal
24	—	2	2	Washer
25	Y9416LB	2	2	B.H. Screw, M4×16
26	G9303AK	1	1	O-Ring
27	F9281AJ	1	1	Case
28	F9273WE	1	1	Bracket Assembly
29	Y9400SU	1	1	Washer
30	Y9410ZU	1	1	Bolt
31	Y9500SU	1	1	Washer
32	—	1	1	B.H. Screw, M5×6
33	—	1	1	Tag Plate



Item	Part No.	Qty	Description
1	F9203SB	1	Clamp
2	Y9400SU	1	Washer
3	Y9410ZU	1	Bolt
4	—	1	Gland Assembly
5	—	1	Gland
6	F9203QJ	1	Clamp
7	Y9412JB	2	Pan H.Screw, M4×12
8	Y9400SP	2	Washer
9	L9811CP	1	Cover
10	—	1	Packing Set
11	—	1	Gasket (for cable diameter 10.0 to 10.7 mm)
	F9203WW	1	Gasket (for cable diameter 10.8 to 11.4 mm)
	F9203WX	1	Gasket (for cable diameter 11.5 to 12.0 mm)
12	—	1	Instruction Card
13	E9135GY	1	Allen Wrench
14	—	2	Washer
15	X9930CK	1	Vinyl Bag

Revision Information

- Title : Model PH8HF, PH8HFF Flow-Through Type Holder
- Manual No. : IM 12B07N01-01E

Nov. 2015/4th Edition

Revision by the version up of GS.; page-i ♦ INTRODUCTION “2. Contents“ Add PH4□,OR4□ and FLXA202. Delete PH400G, PH100 and PH8PU1; page 1-11 Some revision of solenoid valve of PH8MV and PH8MVF; Page 2-6 Some revision of Specification of PH8MV and PH8MVF; Some revision of page 5 on CMPL 12B07N01-01E 3rd edition (P/N deletion for explosion-proof type).

Oct. 2011/3rd Edition Page layout changed by InDesign

p.1-1, Some addition of Caution on use, and correction of jet cleaning unit material; p.3-4 to p.3-7 Deletion of procedure for [Replace the explosionproof cleaning element].

Dec. 2005/2nd Edition

Some error correction.

Oct. 2004/1st Edition

Newly published.

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