General Specifications

PH200
2-Wire Type pH Meter

EXA PH

GS 12B7D1-E

GENERAL

The EXA PH intelligent pH transmitter is a highly reliable advanced-function pH measurement system designed for use in all industries in applications such as quality control in a wide variety of production processes, and industrial wastewater management.

The EXA PH intelligent pH transmitter features highly effective built-in functions for electrode diagnosis. These functions monitor for sensor errors even while pH measurements are in progress, enabling more highly reliable pH measurements. The transmitter also offers an interactive system for setting the various parameters, facilitating effective use of its wealth of functions.

The EXA PH intelligent pH transmitter is available not only in versions for general and hazardous atmospheres, but also for high-purity water service.

PH200G

High-Purity Water pH Measurements

High-purity water is widely used in numerous process plants today in a variety of chemical processes and boilers. Great emphasis is placed on measurement and monitoring of the pH of this water for quality control and water purification unit operational control.

However, the use of general-purpose pH meters for pH measurements in high-purity water meets with the following problems:

Since the pH sensors and holders for high-purity water service have been designed with consideration to countermeasures against the above problems, they can provide highly reliable pH measurements. Moreover, since the EXA PH intelligent pH transmitter is equipped with a reference temperature conversion function to compensate for pH variations due to measured liquid temperature variations, there is little effect from sample liquid temperature fluctuations, and devices such as sampling system coolers, etc. can be simplified.

FEATURES

Microprocessor-Based Intelligent pH Transmitter

Three types of standard solution tables built-in for easy automatic calibration.

Electrode replacement timing can be accurately determined from the deterioration in characteristics.

Since ordinary operations such as standard solution calibration can be performed without opening the case, they can be done even in wet weather with no worry about insulation deterioration.

If used in combination with the special companion distributor, a contact output is available to actuate a solenoid valve for cleaning.

Ryton pH Sensor Body

The compound sensor construction makes standard solution calibration and maintenance simple. Both the glass electrode and junction are easily replaced.

Variety of Cleaning Systems

Intrinsically Safe Explosion Protection Available

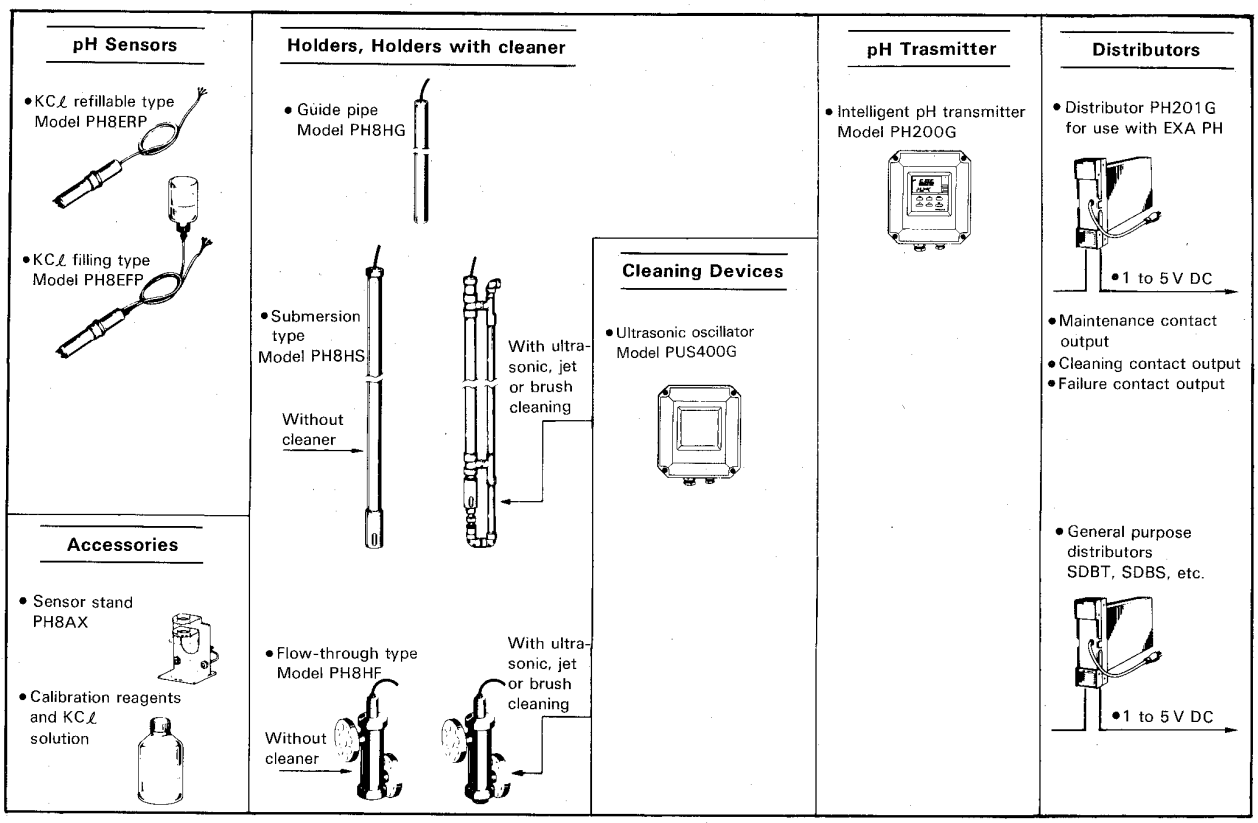
YOKOGAWA

Yokogawa Electric Corporation
2-9-32, Nakacho, Musashino-shi, Tokyo, 180 Japan
Tel.: 81-422-52-5644 Telex: 02822-327 YW MTJ Fax.: 81-422-55-8509

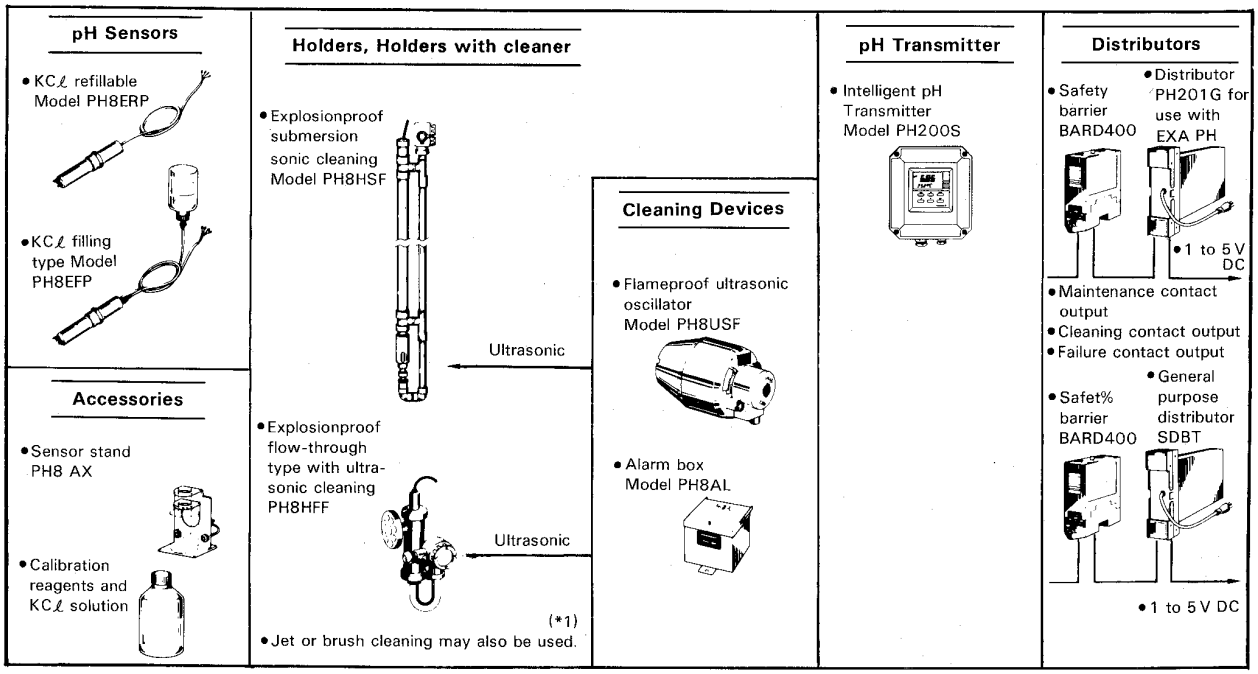
GS 12B7D1-E

3rd Edition Jan. 1997

System Configuration (General Purpose, Non-Explosionproof Types)



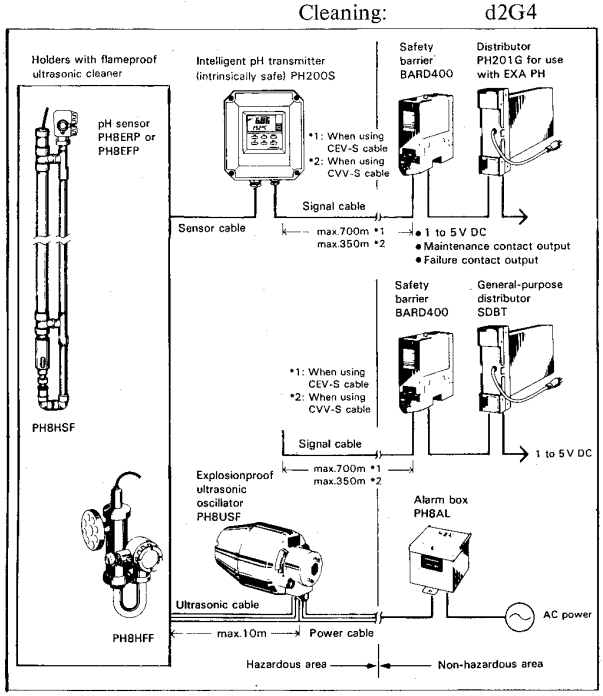
System Configuration (General Purpose and Explosion-Protected Types)



*1: The jet and brush cleaning versions of PH8HG, PH8HS, and PH8HF can be used in explosion-protected systems, as there is no electrical circuit in the cleaning system.

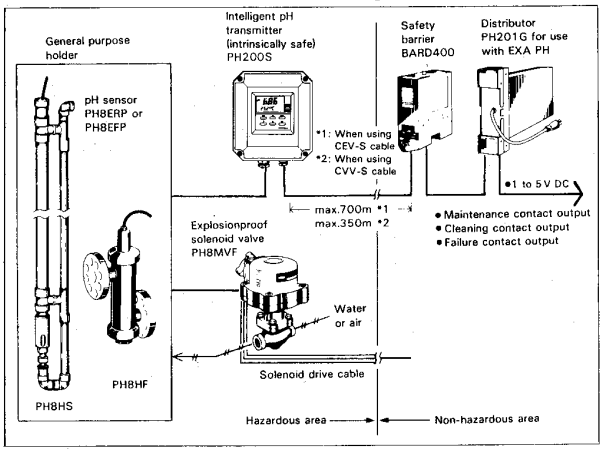
Ultrasonic Cleaning System for Hazardous Areas

Explosionproof construction: Measurement: i3aG4
Cleaning: d2G4

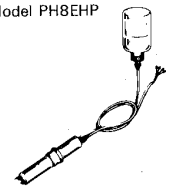
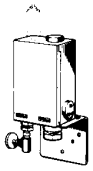
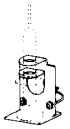
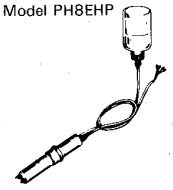
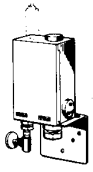
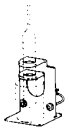


Jet and Brush Cleaning Systems for Hazardous Areas

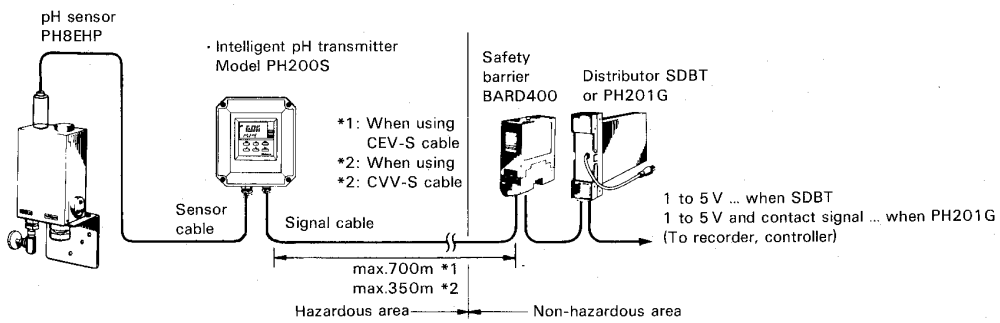
Explosionproof construction: Measurement: i3aG4
Cleaning: d2G4



System Configuration (For High-purity Water)

	pH Sensors	Holders	Accessories	pH Transmitters	Distributors
	• For high-purity water Model PH8EHP 	• For high-purity water Model PH8HH 	PH8AX • Sensor stand  • Reagents and KCℓ 	• Intelligent pH transmitter Model PH200G 	Same as for general purpose and explosionproof types
Explosionproof System	• For high-purity water Model PH8EHP 	• For high-purity water Model PH8HH 	• Sensor stand  • Reagents and KCℓ 	• Intelligent pH transmitter Model PH200S 	Same as for general purpose and explosionproof type

Intrinsically Safe Explosionproof System (for i3aG4 gas)



SPECIFICATIONS

pHΣ Series General Specifications

Measured object: Hydrogen ion concentration (pH) in aqueous solutions
Measuring principle: Glass electrode method
Measuring range: 0 to 14 pH
Measuring conditions:
- Solution temperature: See Table 1; for high-purity water, 0 to 50°C
- Solution pressure: See Table 2; for high-purity water, atmospheric pressure (measured liquid outlet side open to atmosphere)
- Solution flow rate: Max. 2 m/s for submersion/guide-pipe type 3 to 11 ℓ/min for flowthrough type, for high-purity water, see Figure 1.
- Solution conductivity: Min. 50 μS/cm, for high-purity water, see Figure 1.
- Temperature compensation range: −5 to 105°C

Table 1. pH and Temperature Ranges

(a) pH and Liquid Temperature Ranges for pH Sensor

pH Sensor	Holder Type	Solution pH Range	Solution Temperature Range (°C)
KCℓ refillable type	Guide-pipe Submersion (*3) Flow-through	2 to 12	−5 to 80 (*2)
KCℓ filling type	Guide-pipe	2 to 12	−5 to 80 (*2)
	Submersion (*3) Flow-through	0 to 14 (*1)	−5 to 105 (*1)

(b) Solution Temperature Ranges for Holders

Holder Type	Holder Material	Cleaner	Liquid Temperature (°C)
Guide-pipe	PV	None	−5 to 50
	PP	None	−5 to 80
Submersion	PP	None	−5 to 100
		Provided	−5 to 80
	S3 (*4)	None	−5 to 100
		Provided	−5 to 80
Flow-through (*3)	PP	None	−5 to 80
		Provided	−5 to 80
	S3 (*4)	None	−5 to 105
		Provided	−5 to 80

PV: Hard PVC
PP: Polypropylene
S3: SUS 316

Notes:
(*1) The solution temperature should preferably be below 80°C when the pH value is in the range 11 to 14. Even if the solution is below 80°C, electrode service life may be shortened in some solutions. In such cases the KCℓ filling type is recommended.
(*2) Maximum temperature 50°C when Hard PVC guide pipe is used.
(*3) For flow-through types, refer also to the solution temperature and pressure graph (in notes following Model and Suffix code table for flow-through type holders).
(*4) Solutions with normal pH ranges of 3 to 14 are recommended for stainless steel (SUS316).

Table 2. Solution Pressure Range

pH Sensor / Holder	KCℓ Refillable Type	KCℓ Filling Type
Submersion type Guide-pipe type	Atmospheric pressure (max. 3 m submersion depth)	
Flow-through	Atmospheric pressure to 0.5 kg/cm²G	Atmospheric pressure to 0.1 kg/cm²G when general purpose reserve tank is used.
		Atmospheric pressure to 5 kg/cm²G when medium-pressure reserve tank is used. See also the solution temperature/pressure diagram.

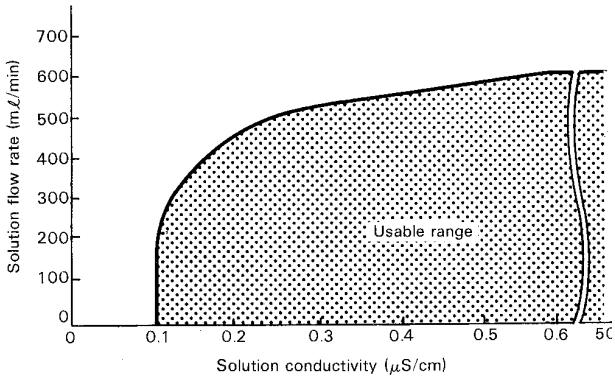


Figure 1. Solution Flow Rate and Solution Conductivity for Sensor and Holder Used for High-purity Water

1. pH Sensors: PH8ERP, PH8EFP, PH8EHP

A compound electrode assembly consisting of glass electrode, reference electrode, temperature sensor, and ground tip.
Type: KCℓ filling and KCℓ refillable types
Measuring range: 0 to 14 pH (for KCℓ refillable type: normal pH = 2 to 12 pH)
Refer to "Selection Criteria for pH Sensors and Holders" shown on the last page to select KC1 filling or refillable type sensors.
Temperature compensation sensor: Platinum RTD (Pt1000Ω)

Wetted part materials:

pH Sensor	Wetted part materials
KCℓ refillable type	Ryton (PPS resin), glass, ceramics, titanium or Hastelloy C, fluorocarbon rubber and chlorinated polyethylene rubber (cable sheath ... only when suspended in guide-pipe)
KCℓ filling type	Same as above. Plus heat resistant soft PVC (KCℓ tube ... only when suspended in guide-pipe)

Construction: Compound type intrinsically-safe explosionproof type (i3aG5)
Weight: KCℓ refillable type: Approx. 0.4 kg
KCℓ filling type:
Body: Approx. 0.4 kg
Tank: General purpose ... Approx. 0.3 kg
Medium-pressure ... Approx. 1 kg
For high-purity water:
Body: Approx. 0.4 kg
Tank: Approx. 0.3 kg

Note: Although sensors other than the EXA PH pH sensor (Pt1000Ω temperature sensor) can also be used, there are some restrictions on function. Also, since reference performance values will difer, please consult your Yokogawa sales representative.

2A. General-Purpose Holders: PH8HG, PH8HF, PH8HS

Materials: Polypropylene, SUS316, PVC (guide-pipe only)
Cleaning: Ultrasonic, jet, or brush cleaning
Cleaning Unit Wetted Materials:
Ultrasonic unit; SUS316, titanium, or Hastelloy C
Jet unit; Polypropylene
Brush unit; Polypropylene, titanium (shaft), Ryton W (bearings)
Construction: Non-explosionproof or flameproof type (for d2G4 gas) (PH8HSF and PH8HFF only)
Terminal box cable entrance port; PF 3/4
Mounting: Mount on 50 A vertical or horizontal pipe
Mounting hardware: One or two sets (submersion type) or one set (flow-through type)
Weight: See Table 3

Table 3. Holder Weight

Material / Holder	Polypropylene	SUS316	Hard PVC
Submersion type	Approx. 0.5 to 2.2 kg	Approx. 1.5 to 6 kg	–
Flow-through type	Approx. 0.5 to 2 kg	Approx. 7 to 8.5 kg	–
Guide-pipe	Approx. 1 kg	–	Approx. 1.6 kg

Note: Table 3 does not include mounting hardware weights.
Mounting hardware weights:
For submersion type; approx. 1 kg/set
For flow-through type; approx. 0.5 kg

Table 4. Utilities (For Jet Cleaning or Brush Cleaning)

	Pressure (kg/cm²G)	Consumption
Water jet	2.0 to 4.0 kg/cm²	5 to 20 ℓ/min
Water brush	1.0 to 2.5 kg/cm²	20 to 30 ℓ/min
Air jet	2.0 to 4.0 kg/cm²	100 to 300 Nℓ/min
Air brush	1.5 to 2.5 kg/cm²	300 to 600 Nℓ/min

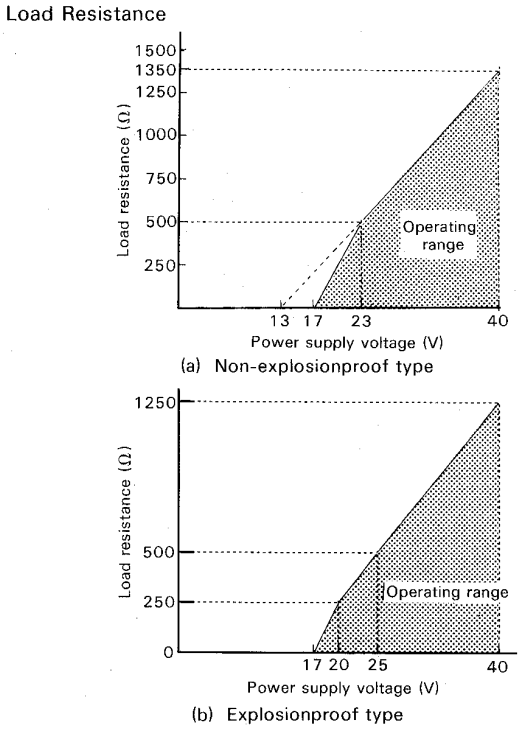
Notes: (1) Pressure and consumption flow requirements must be simultaneously satisfied at the holder inlet port.
(2) A large braid-reinforced tube of $\phi 22 \times \phi 15$ A is recommended for water or air supply due to the high flow rate.

2-2. Holder For High-purity Water: PH8HH

Materials: Acrylic resin, SUS316, chloroprene rubber
Process connections: PT 1/4 female (inlet) and PT 1/2 (outlet), or 1/4 NPT (inlet) and 1/2 NPT (outlet)
Mounting: Mount on 50 A vertical or horizontal pipe, or wall-mount (specify mounting hardware)
Weight: Body: 1.7 kg
Mounting hardware: 0.7 kg

3. Intelligent pH Transmitters: PH200G and PH200S

Measuring range: −2 to 15 pH
Display method: Digital (liquid crystal) display
Display range: −2 to 15 pH
Transmission signal: 4 to 20 mA DC, isolated transmission output
Transmission signal range: Freely adjustable to any desired range of 1 pH unit or greater (set to 0 to 14 pH when shipped)
Power supply voltage: 17 to 40 V DC
See Figure 2 for the relationship between supply voltage and load resistance. In intrinsically-safe systems, use an SDBT type or PH201G type distributor.
Ambient temperature: −10 to 55°C (hood may be fitted as option)
Construction: Watertight complying with JIS C0920, equivalent to NEMA type 4.
Non-explosionproof or intrinsically safe i3aG4
Storage temperature: −30 to 70°C
Materials:
Case: Aluminum alloy casting
Window: Polycarbonate
Finish: Baked polyurethane resin coating
Finish colors:
Cover: Deep sea moss green (Munsell 0.6GY3.1/2.0)
Case: Frosty white (Munsell 2.5Y8.4/1.2)
Mounting: Mounts on 50 A dia. vertical or horizontal stanchion, wall, rack or panel
Signal cable inlet port: ϕ22.7 hole
JIS A15 equivalent watertight plastic gland (Cable OD:9 to 12 A)
Weight:
Body: Approx. 2.4 kg
Mounting hardware: Approx. 0.7 kg
Dimensions: 180 × 162 × 115 mm



(Note) Use these condition as follows.
SDBT+BARD 400≦50Ω
PH201G+BARD 400≦200Ω

Figure 2. Usable Operating Range for Power Supply Voltage and Load Resistance

<Functional Specifications>

Input impedance: $10^{12}\Omega$ minimum

Note: Sensor with liquid grounding electrode used for differential amp (uses two high-impedance amplifiers).

Asymmetric potential adjustment range: pH 7 ± 2 pH

Slope adjustment range: +20% and −5% for deviation from pH 7

Automatic temperature compensation range: −10 to +130°C (manual temperature compensation is also possible)

Standard temperature conversion coefficient (standard Temperature 25°C):

At shipment: 0

Adjustment range: −1.0 to +1.0 pH/10°C

The conversion to standard temperature is used only for high-purity water, or when the measured solution temperature coefficient is known.

<Standard Performance> (when used with a pH sensor)

Repeatability: 0.05 pH (electrode submerged 3 times in the same buffer solution)

Response time: 10 seconds (90% response, using pH sensor and buffer solution both equalized to 20°C, with adequate agitation)

Accuracy: ±0.1 pH (using KCℓ filling type pH sensor, high-purity water pH sensor)
±0.15 pH (using KCℓ refillable pH sensor)

Temperature repeatability: 1°C

<Operation Functions>

Display: 3-1/2 digit numeric (data display)
6 digit alphanumeric
(message or data display)

Display functions: pH
Temperature
mA output
Reference electrode impedance
EMF slope
Asymmetric potential
mV (EMF)
Error display (when error detected)
Interactive prompt messages
Key operation request display

Operation level settings/executable functions:

One-touch calibration (buffer selection is manual, indication stability check is automatic)
Manual calibration
Message area display content selection
Temperature parameter setting
Automatic/manual temperature compensation selection
Manual temperature setting
Standard temperature conversion
Hold-setting/cancel

Setting level settings/executable functions:

Output range setting
Hold/parameter setting
Hold/no-hold selection
Last-previous value/preset value hold selection
Preset value setting
Cleaning parameter setting
Manual cleaning start/stop selection
Timer on/off selection
Cleaning cycle period setting
Delay time setting
Cleaning time setting
Service level code input

Service level settings/executable functions:

°C/°F selection
Use/do not use standard temperature conversion
Temperature sensor selection
Check item setting
Single-point temperature calibration
Electrode type selection (glass electrode, antimony)
Alarm output on/off
pH display value selection (0.1 pH/0.01 pH)
Half-value return time check on/off
Burn-up on/off
(for output overrange at 20 mA or greater at time of abnormality)

Response stability criterion parameter set (one-touch calibration)
Self-test function error detection:
Reponse time error during calibration
Asymmetric potential error
Temperature range error
pH range error
Glass electrode impedance abnormal
(measured solution 50 μS/cm minimum, 60°C maximum)

Reference electrode impedance abnormal
(measured solution 50 μS/cm minimum)
Half-value return time error
Reponse error
Buffer temperature error

4. Dedicated Distributor: PH201G

General

This distributor, designed exclusively for use with these pH transmitters, supplies drive power to the 2-wire transmitter while simultaneously receiving a 4 to 20 mA DC current signal from the transmitter and converting it to a 1 to 5 V DC voltage signal; it also simultaneously receives a digital signal superimposed on the 4 to 20 mA DC signal, and provides contact outputs during maintenance, failure, and/or cleaning.

A current limiter function is built into this unit so it can continue to operate properly even with a short circuit on the transmitter side.

Standard Specifications

<Input Signal/Output Signal Specifications>
Number of input points (number of transmitter units connectable): 1 point
Output signals: 1 to 5 V DC (2 points)
Load resistance: 2 kΩ minimum (1 to 5 V DC output)
Isolation system: Loop isolation type

<Mounting/Form>
Mounting method: Indoor location, rack mounting
Connection methods:
External signal connection: M4 screw terminal connection
Power supply/ground connections
100 V: JIS C8303 ground type 2 plug connection
220 V: CEE 7VII (European electrical device standard) plug connection
Cable length: 300 A
External dimensions (height × width × depth from mounting surface): 180 × 48 × 300 mm
Weight: 1.7 kg (including rack and case)

<Standard Performance>
Accuracy: +0.2% of span
Transmitter supply voltage: 26.5 ± 1.5 V DC
Maximum current and power consumption
24 V DC: Approx. 200 mA
100 V AC: Approx. 7 VA
220 V AC: Approx. 11 VA
Insulation resistance
Between I/O terminals and ground pin: 100 MΩ/500 V DC
Between power supply pins and ground pin: 100 MΩ/500 V DC
Dielectric strength
Between I/O terminals and ground pin: 500 V AC/1 minute
Between power supply pins and ground pin:
1000 V AC/1 minute (100 V power supply)
1500 V AC/1 minute (220 V power supply)

<Normal Operating Conditions>
Ambient temperature: 0 to 50°C
Ambient humidity: 5 to 90% RH (non-condensing)
Power supply voltage: Dual use AC/DC
100 V: DC power 20 to 130 V, no polarity
AC power 80 to 138 V, 47 to 63 Hz
220 V: DC power 120 to 340 V, no polarity
AC power 138 to 264 V, 47 to 63 Hz
Contact outputs
Contact rating: 250 V AC, maximum 100 VA
220 V DC, maximum 50 VA
Maintenance contact output: N.C. 1 contact, normally energized; contact closes when power is off or during maintenance
Failure contact output: N.C. 1 contact, normally energized; contact closes when power is off or during failure
Cleaning contact output: Contact closed during cleaning only; used as drive contact for solenoid valve for cleaning

5A. Ultrasonic Oscillator (Non-Explosionproof, model PUS400G)

Combination Device:
Holder with ultrasonic cleaner (PH8HS, PH8HF)
Holder is provided with a cable to the transducer
Cleaning Method: Continuous ultrasonic emission
(Frequency Sweep Method)
Oscillation frequency: Approx. 65 to 81 kHz
Sweep period: Approx. 2 to 4 seconds
Output Voltage: Approx. 70V
Power Supply: 100/110/115/200/220/240 V AC±10% 50/60 Hz
Power Consumption: Approx. 15VA
Insulation Resistance:
Power Supply—G: 100 MΩ or more /500V DC
Output terminals—G: 100MΩ or more /500V DC
Withstand Voltage:
Power Supply—G: 1000/1500V AC for 1 min.
Output terminals—G: 1000/1500V AC for 1 min.
Ambient Temperature: −10 to 50°C (hood may be fitting as option)
Storage Temperature: −25 to 70°C
Construction: JIS C0920 Water-tight
(NEMA4 equivalent waterproof construction)
Material: Case: Cast aluminum alloy
Window: Polycarbonate
Finish: Baked polyurethane resin coating (Standard)
Baked epoxy resin coating (Option)
Color:
Case: Frosty white (Munsell 2.5Y8.4/1.2 or equivalent)
Cover: Deep sea-moss green (Munsell 0.6G3.1/2.9 or equivalent)
Mounting: Pipe mounting, Wall or Rack mounting or Panel mounting
Mounting Material: Stainless steel
Cable inlet port: φ22.7 hole×2
PG16 watertight plastic gland
Cable/Terminal: For 7 to 12 mm, M4
Conduit adapter: Power Supply side (Option)
Material: Polycarbonate resin
Connection: G1/2 or 1/2 NPT
Weight: Body: Approx. 2.5 kg
Mounting: Approx. 0.7kg
Dimension: 180×162×115
Note: 1. Output of Ultrasonic Oscillator changes with Power Supply voltage. The output lowers when the voltage lowers.
2. Output of Ultrasonic Oscillator changes with connected cable. The output lowers when the length of the cable is long.

5B1. Flameproof Ultrasonic Oscillator (Model PH8USF)

Specifications are identical to the non-explosionproof type except for the following.
Construction: JIS flameproof construction (d2G4)
Solution leakage into the vibrator can be detected when used in combination with those holders having flameproof ultrasonic cleaners. This oscillator must be used with the associated alarm box. This box provides power circuit interruption and failure alarm contact outputs.
Case material: Aluminum allow casting
Finish: Baked epoxy resin coating
Coating color: Munsell 7.5GS4/1.5
Electrical connection: PF 3/4 ports to both the ultrasonic vibrator and the alarm box.
Cable:
To vibrator: 4-conductor shielded cable, OD 10 to 12 mm, maximum length 10 m. Can be specified with suffix code /C□□.
To alarm box: 2-conductor shielded cable, OD 10 to 12 mm, maximum length 1000 m.
Total resistance of two leadwires should be 10 Ω or less.
Leadwires must be installed in metal conduit (completely grounded in explosion-protected installations).
Weight: Approx. 9.5 kg

5B2. Alarm Box (Model PH8AL)

Case: Square shape, for wall mounting. Dustproof steel plate construction. Mounting orientation free.
Coating color: Gray (Munsell N-7.0)
Finish: Baked melamine resin coating
Associated oscillator: Model PH8USF flameproof ultrasonic oscillator
Number of associated oscillators: 1
Power supply: 100 V or 110 to 120 V AC, 200 V or 220 to 240 V AC ± 10%, 50/60 Hz
Weight: Approx. 2.0 kg
Ambient temperature: −10 to +50°C

6A. Solenoid Valve for Jet or Brush Cleaning (Non-Explosionproof, Model PH8MV)

Pilot-kick type 2-port valve — open when energized.
Fluid: Tap water or industrial water, or air
Operating pressure: 0 to 10 kg/cm²G
Maximum forward (reverse) pressure: 20 kg/cm²G
Fluid temperature: 5 to 60°C for water;
60°C or less for air
Cv value: 4.5
Fluid connection: PT 1/2 female
Power supply: 100 V AC 50/60 Hz, 200 V AC 50/60 Hz, 110 V AC 60 Hz, 220 V AC 60 Hz
Rated voltage: +10%
Power consumption: 10 W
Construction: outdoor installation type
Materials: Body: Bronze; Seal: Nitrile rubber; Coil case and terminal box: Aluminum casting and nylon (cover)
Ambient temperature: Maximum 50°C
Electical connection: PF 1/2 female
Weight: Approx. 1 kg

6B. Flameproof Solenoid Valve for Jet or Brush Cleaning (Model PH8MVF)

Specifications are identical to those of the non-explosionproof type except for the following.
Construction: JIS flameproof construction (d2G4)
Materials: Body: Bronze; Seal: Nitrile rubber; Coil case and terminals box: Aluminum alloy
Operating pressure: 0.5 to 10 kg/cm²G
Maximum forward (reverse) pressure: 15 kg/cm²G
Cv value: 3.1
Valve seat leakage: 400 Nmℓ/min (at pneumatic pressure of 0.5 to 7 kg/cm²G)
Mounting attitude: Vertical mounting with coil in top
Weight: Approx. 3.3 kg

7. Cleaning Pump/Tank (Model PH8PU1)

Pump and tank assembly for jet cleaning or brush cleaning.
Enables cleaning with tap water from tank with level control on water-supply side.
Cleaning water: Normal tap water or industrial water (when supply system isolation is required)
Inlet pressure: 5 kg/cm²G maximum
Cleaning water outlet pressure: Maximum 3 kg/cm²G (pressure and flowrate are adjustable with by-pass valve).
Cleaning water outlet flow: Maximum 30ℓ/min (pressure and flowrate are adjustable by by-pass valve).
Connectable cleaning devices: Holder with jet or brush cleaner (submersion or flow-through type), 1 unit. However, sample pressure must be less than 0.1 kg/cm²G for flow-through type.
Tank section: Tank with ball tap (float valve for level control), effective volume about 40 liters
Pump section: Suction-type pump with single-phase squirrel-cage induction motor, electromagnetic contactor with overcurrent protection
Cleaning water inlet/outlet connection ports: PF 1/2 male (inlet), PF 1/2 female (outlet), PT 1/2, 1/2-inch NPT available with adaptor
Electrical inlet: JIS A15 watertight plastic gland
Connection cable OD 9 to 12 A
Conduit adaptors (optional) available
Operating ambient temperature range: 5 to 50°C
Power: 100 V AC or 200 V AC +10%, 50/60 Hz, single-phase
Power consumption: 0.4 kW
Construction: Waterproof construction
Color: Bright gray (Munsell 2.8GY6.4/0.9)
Dimensions: Approx. 442W × 804D × 771H
Finish: Baked urethane enamel
Weight: Approx. 55 kg

8. Terminal Box

Used when pH transmitter is installed at a distance from the pH sensor.
Ambient temperature: −10 to +50°C
Construction: JIS waterproof
Case material: Fiberglass reinforced polycarbonate resin
Electrical connections
pH sensor side: JIS A8 watertight plastic gland
pH transmitter side: JIS A15 watertight plastic gland with cable (maximum 20 m)
Conduit adaptor (optional) available
Case color: Grayish green (Munsell 2.5GY5.0/1.0)
Weight: Body: 0.5 kg
Mounting hardware: 0.7 kg

9. Accessories (Purchased Separately)

Accessory set identical to that provided for pHΣ series pH instrument startup.
Detailed composition: See model and suffix code tables.

MODELS AND CODES

When ordering, specify model and codes, product name and/or part numbers.

Items to be specified	For non-hazardous areas	For hazardous areas (flameproof or intrinsically safe)
1. pH sensor	PH8ERP, PH8EFP or PH8EHP	
2. Holder	PH8HG, PH8HS, PH8HF or PH8HH	PH8HSF, PH8HFF or PH8HH; PH8HS(*1) or PH8HF(*1)
3. pH transmitter	PH200G	PH200S
4. Ultrasonic oscillator..... For ultrasonic cleaning only	PUS400G	PH8USF
5. Solenoid valve..... } For jet or brush cleaning only	PH8CT PH8MV	Explosion-protected system available in combination with PH8MVF.
6. Cleaning pump/tank..... } For jet or brush cleaning only	PH8PU1	———
7. Terminal box ..... Only for installation of pH transmitter at distance from pH sensor	PH8TBG	
8. Accessories	PH8AX	
9. Distributor	PH201G, SDBT, etc	

Note: (*1) These can be used only if no cleaner is used, or if jet or brush cleaning is used (reason: no electrical circuitry provided).

1. pH Sensor

For selection of KCℓ filling or refillable type pH sensors, refer to "Selection Criteria For pH Sensors and Holders" on page 24, and "Table of Corrosion-Resistant Materials" on page 25 of this manual.

<KCℓ Refillable Type pH Sensor>

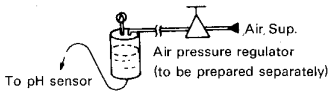
Model	Suffix code	Optional code	Specifications
PH8ERP	.....	.....	KCℓ refillable type sensor
Cable length	-03.....	.....	3 m
	-05.....	.....	5 m
Solution ground tip	-TN.....	.....	Titanium
	-HC.....	.....	Hastelloy C
———	-NN.....	.....	Always NN
pH measuring system	-T.....	.....	Always T
———	*A.....	.....	Style A
Option	O-ring	/PF.....	Daielperfrow *1

*1 Please choose Daielperfrow when this is used in Organic Solvent, High alkali, or High temperature alkali

<KCℓ Filling Type pH Sensor>

Model	Suffix code	Option Code	Specifications
PH8EFP			KCℓ filling type pH sensor
Cable and KCℓ filling tube length	-03		3 m
	-05		5 m
Solution ground tip	-TN		Titanium
	-HC		Hastelloy C
With KCℓ reserve tank (with mounting hardware for 50A pipe)	-TT1		General purpose (250 mℓ solution inlet)
	-TT2		Medium pressure (flow-through type holder for medium pressure) (*1)
Without KCℓ reserve tank (with KCℓ filling tube)	-TN1		General purpose (for maintenance)
	-TN2		Medium pressure (for maintenance)
———	-NN		Always NN
pH measuring system	-T		Always T (*2)
———	*A		Style A
Option	O-ring	/PF	Daielperfrow (*3)

Notes: (*1) Prepare an air pressure regulator as shown in the diagram below when the medium-pressure reserve tank (PH8EFG-□-TT2) is used.



(*2) Fork-type terminal treatment.

(*3) Please choose Daielperfrow when this is used in Organic Solvent, High alkali or High temperature alkali

<pH Sensor for High-Purity Water>

Model	Suffix code	Option code	Specifications
PH8EHP			pH sensor for high-purity water
Cable and KCℓ filling tube length	-03		3 m
	-05		5 m
Solution ground tip	-TN		Titanium
With KCℓ reserve tank (with mounting hardware for 50A pipe)	-TT1		General purpose (250 mℓ solution inlet)
Without KCℓ reserve tank (with KCℓ filling tube)	-TN1		General purpose (for maintenance)
———	-NN		Always NN
pH measuring system	-H		High-purity water pH system
———	*A		Style A

2. Holders

<Guide-pipe Type>

Model	Suffix code	Option code	Specifications
PH8HG			Guide-pipe for submersion
Materials	-PV		Hard PVC (solution temperature 50°C maximum)
	-PP		Polypropylene (solution temperature 80°C maximum)
———	*A		Style A

Notes: (*1) Pipe length: 2 m
(*2) Provided with mounting hardware for 50A pipe

<Submersion Type> (Non-Explosionproof Type)

Model	Suffix code	Option code	Specifications
PH8HS			Submersion type holder
Materials	-PP		Polypropylene (solution −5 to 100°C)
	-S3		SUS316 (solution −5 to 105°C)
Pipe length	-10		1.0 m
	-15		1.5 m
	-20		2.0 m
pH measuring system	-T		2-wire pH transmitter system
Cleaning device	-NN		Not provided
	-S3		For ultrasonic cleaning (SUS316 transducer) *1
	-TN		For ultrasonic cleaning (titanium transducer) *2
	-HC		For ultrasonic cleaning (Hastelloy C transducer) **3
	-JT		For jet cleaning, solenoid valve specified separately.
	-BR		For brush cleaning, solenoid valve specified separately.
Ultrasonic cleaning cable length	-NN		Not required
	-C3		3 m
	-C5		5 m
Connector for jet or brush cleaner	-JP		PT1/2
	-NP		1/2NPT
———	*A		Style A
Options (Mounting hardware)		/MS1	Mounting hardware for submersion type: 1 set
		/MS2	Mounting hardware for submersion type: 2 sets
		/MS3	Stainless steel mounting hardware for submersion type: 1 set
		/MS4	Stainless steel mounting hardware for submersion type: 2 sets
Special mounting		/F	Flange mounting
O-ring		/PF	Daiel Powerfrow *4

*1 General purpose (normal pH 3 to 14)
*2 For aqueous chloride salt solutions
*3 For acids (normal pH 0 to 4)
*4 Please choose Daielperfrow when this is used in Organic Solvent, High alkali or High temperature alkali

Note: (1) The exact number of mounting hardware sets required depends on the installation location and flow rate.
In general, one set is sufficient for pipe lengths of 1 meter, and otherwise two sets are required.

＜**Submersion Type**＞ (JIS Flameproof type)

Model	Suffix code	Option code	Specifications
PH8HSF			Submersion type holder
Materials	-PP		Polypropylene
	-S3		SUS316
Pipe length	-10		1.0 m
	-15		1.5 m
	-20		2.0 m
pH measuring system	-T		2-wire pH transmitter system
Cleaning devices (ultrasonic cleaning only) *4	-S3		SUS316 transducer *1
	-TN		Titanium transducer *2
	-HC		Hastelloy C transducer *3
Explosion protection	-JS		JIS flameproof (d2G4)
———	*A		Style A
Options: Mounting hardware		/MS1	1 set
		/MS2	2 sets
		/MS3	Mounting stainless steel hardware for submersion type: 1 set
		/MS4	Mounting stainless steel hardware for submersion type: 2 sets
Special mounting		/F	Flange mounted
Flameproof packing		/PG2	Flameproof packing type adaptor 3/4-inch
Tagplate		/SCT	Stainless steel tag plate
O-ring		/PF	Daielperfrow *4

*1 General purpose (normal pH 3 to 14)
*2 For aqueous chloride salt solutions
*3 For acids (normal pH 0 to 4)
*4 Please choose Daielperfrow when this is used in Organic Solvent, High alkali or High temperature alkali

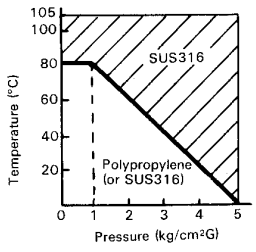
Note: (1) The exact number of mounting hardware sets required depends on the installation location and flow rate.
In general, one set is sufficient for pipe lengths of 1 meter, and otherwise two sets are required.

＜**Flow-Through Type**＞ (Non-Explosionproof Type)

Model	Suffix code	Option code	Specifications
PH8HF			Flow-through type holder
Materials	-PP		Polypropylene (Refer to note below concerning selection.)
	-S3		SUS316
Process connection	-JPT		PT1 female thread
	-NPT		1-inch NPT female thread
	-J10		JIS 10K25A FF flange
	-A15		ANSI 1-inch 150℔b FF flange (used with PP material) ANSI 1-inch 150℔b RF flange with serrations (used with SUS316 material)
pH measuring system	-T		2-wire pH transmitter system
Cleaning device	-NN		None
	-S3		For ultrasonic cleaning (SUS316 transducer) *1
	-TN		For ultrasonic cleaning (titanium transducer) *2
	-HC		For ultrasonic cleaning (Hastelloy C transducer) *3
	-JT		For jet cleaning, solenoid valve specified separately.
	-BR		For brush cleaning, solenoid valve specified separately.
Ultrasonic cable length	-NN		None
	-C1		1 m
	-C3		3 m
Jet or brush cleaning connection	-JP		PT 1/2
	-NP		1/2 NPT
———	*A		Style A
Options: Mounting hardware		/MF1	Mounting hardware for flow-through type holder
O-ring		/PF	Daielperfrow *4

*1 General purpose normal pH 3 to 14)
*2 For aqueous chloride salt solutions
*3 For acids (normal pH 0 to 4)
*4 Please choose Daielperfrow when this is used in Organic Solvent, High alkali or High temperature alkali

Notes: (1) Mounting hardware is generally not required when the SUS316 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 is not used).
(2) Criteria for material selection (PP or S3?)
In general, polypropylene is recommended from the viewpoint of chemical resistance. However, SUS316 is recommended in any of the following cases:
a. The liquid contains organic reagents, oxidizing agents, etc., which can attack polypropylene.
b. The temperature/pressure relationship falls within the hatched portion of the diagram below.
c. The use of polypropylene is not reasonable from a viewpoint of strength or past experience.
(3) For SUS316, normally a 3 to 14 pH value is recommended.

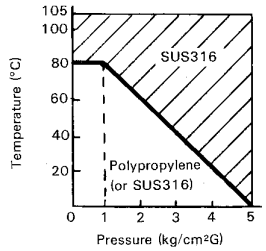


<Flow-Through> (JIS Flameproof Type)

Model	Suffix code	Option code	Specifications
PH8HFF			Flow-through type holder
Materials	-PP		Polypropylene
	-S3		SUS316
Process connection	-JPT		PT1 female thread
	-NPT		1-inch NPT female thread
	-J10		JIS 10K25A, FF flange
	-A15		ANSI 1-inch 150℔b. FF flange (used with PP material) ANSI 1-inch 150℔b RF flange with serrations (used with SUS material)
pH measuring system	-T		2-wire pH transmitter system
Cleaning device (ultra-sonic cleaning only)(*4)	-S3		SUS316 transducer*1
	-TN		Titanium transducer*2
	-HC		Hastelloy C transducer*3
Explosion protection	-JS		JIS flameproof d2G4
———	*A		Style A
Options: Mounting hardware		/MF1	Mounting hardware for flow-through type holder
Options: Flameproof packing		/PG2	JIS flameproof packing type adaptor 3/4-inch
Options: Tag plate		/SCT	Stainless steel tag plate
Options: O-ring		/PF	Daielperfrow *5

*1: General purpose (normal pH 3 to 14)
*2: For adueous chloride salt solutions
*3: For acids (normal pH 0 to 4)
*4: For jet or brush cleaning use PH8HF.
*5: Please choose Daielperfrow when this is used in Organic Solvent, High alkali or High temperature alkali

Notes: (1) Mounting hardware is generally not required when the SUS316 holder is installed in-line in a pipe.
Mounting hardware is required where the holder is installed in a sampling rack (in which case the U-bolt included in MF1 is not used)
(2) Criteria for material selection (PP or S3?)
In general, polypropylene is recommended from the viewpoint of chemical resistance. However, SUS316 is recommended in any of the following cases:
a. The liquid contains organic reagents, oxidizing agents, etc., which can attack polypropylene.
b. The temperature/pressure relationship falls within the hatched portion of the diagram below.
c. The use of polypropylene is not reasonable from a viewpoint of strength or past experience.
(3) For SUS316, normally a 3 to 14 pH value is recommended.



<Holder for High-Purity Water>

Model	Suffix code	Option code	Specifications
PH8 HH			Holder for high-purity water
Connection ports	-JPT		PT 1/4 (inlet), PT 1/2 (outlet),
	-NPT		1/4 NPT (inlet port), 1/2 NPT (outlet)
pH measuring system	-H		High-purity water measuring system
———	*A		Style A
Options: Mounting hardware		/P	Pipe mounting hardware
		/W	Wall mounting hardware

3. Intelligent pH Transmitter (Product Codes: J210, J211)

Model	Suffix code	Option code	Specifications
PH200G			Non-explosionproof type pH transmitter
PH200S			Intrinsically safe type pH transmitter
Explosion protection	-N		Non-explosionproof (always-N for PH200G)
	-J		JIS explosionproof
Companion sensor	-PT1		Temperature measurement unit Pt1000Ω
Language for warnings, etc.	-J		Japanese
	-E		English
———	*A		Style A
Options: Mounting hardware		/PI	Pipe mounting hardware
		/PS	Pipe mounting hardware (SUS)
		/W	Wall mounting hardware (SUS)
		/PA	Panel mounting hardware (SUS)
Options: Hood		/H	Awning hood
Special coating		/X1	Baked epoxy resin coating
Tag plate		/SCT	Stainless steel tag plate
Conduit adaptor		/AFTG	PF 1/2 (female thread)
		/ANSI	1/2 NPT

4. Distributor for Use with EXA PH (Part Code: J212)

Model	Suffix code	Option code	Specifications
PH201G			Distributor
Power supply	-A1		100V power supply
	-A2		220V power supply
———	*A		Style A
Options		/TB	Terminals for power connection

5A. Ultrasonic Oscillator (Non-Explosionproof, model PUS400G)

Model	Suffix code	Option code	Specifications
PUS400G			Ultrasonic Oscillator
	-NN		Always -NN
Appreciation	-NN		Standard
Power Supply voltage	-1		100V AC 50/60Hz
	-2		110V AC 50/60Hz
	-3		115V AC 50/60Hz
	-4		200V AC 50/60Hz
	-5		220V AC 50/60Hz
	-6		240V AC 50/60Hz
Language	-J		Japanese
	-E		English
Option Mounting hardware		/PS	Pipe mounting hardware (SUS)
		/W	Wall mounting hardware (SUS)
		/PA	Panel mounting hardware (SUS)
Hood		/H	Awning hood
Special coating		/X1	Baked epoxy resin coating
Tag plate		/SCT	Stainless tag plate
Conduit adapter		/AFTG	G 1/2 (PF 1/2 female thread)
		/ANSI	1/2 NPT

5B1. Flameproof Ultrasonic Oscillator

Model	Suffix code	Option code	Specifications
PH8USF			Flameproof ultrasonic oscillator
Power supply voltage	-3		200V AC, 50/60Hz
	-4		220 to 240V AC, 50/60Hz. Specify voltage.
	-5		100V AC, 50/60Hz
	-7		100 to 120V AC, 50/60Hz. Specify voltage.
Explosion protection standard	-JS		JIS Flameproof d2G4
———	*A		Style A
Options Mounting hardware		/PM	Pipe mounting hardware
Connection cable between oscillator and holder		/C□□	Enter the length in m. □□. No end treatment. For example, if the length is 3m, enter /C03. Standard cable lengths: 3, 7 and 10A
Flameproof packing		/PG2	JIS flameproof packing adaptor 3/4-inch, 2 places
Tag plate		/SCT	Stainless steel tag plate

Must be used with Model PH8AL alarm box.

[Notes] For 110 to 120V AC or 220 to 240V AC power supplies, specify the voltage when ordering.
Tolerance is +10% of the rated voltage.
Example: Power supply voltage: 110V

5B2. Alarm Box

Model	Suffix code	Option code	Specifications
PH8AL			Alarm box
Power supply voltage	-3		200V AC, 50/60Hz
	-4		200 to 240V AC, 50/60Hz
	-5		100V AC, 50/60Hz
	-7		110 to 120V AC, 50/60Hz
———	*A		Style A
Options		/APC	Air purge connector PT 1/4

6A. Solenoid Valve (Non-Explosionproof Type)

Model	Suffix code	Option code	Specifications
PH8MV			
Fluid	-A		For air
	-W		For water
Power supply voltage	-200		200V AC, 50/60Hz
	-220		220V AC, only 60Hz available
	-100		100V AC, 50/60Hz
	-110		110V AC, only 60Hz available
Power supply frequency	-50		50Hz
	-60		60Hz
Style code	*B		Style B

6B. Flameproof Type Solenoid Valve (JIS Flameproof Type)

Model	Suffix code	Option code	Specifications
PH8MVF			
Fluid	-A		For air
	-W		For water
Power supply voltage	-200		200V AC, 50/60Hz
	-220		220V AC, only 60Hz available
	-100		100V AC, 50/60Hz
	-110		110V AC, only 60Hz available
Power supply frequency	-50		50Hz
	-60		60Hz
Explosion-protection standard	-JS		JIS flameproof (d2G4)
———	*A		Style A
Options Tag plate		/SCT	Stainless steel tag plate

7. Cleaning Pump/Tank

Model	Suffix code	Option code	Specifications
PH8PU1			
Power supply	-3		200V AC, 50/60Hz
	-5		100V AC, 50/60Hz
———	*A		Style A
Special connection for cleaning water inlet, outlet		/PT	PT 1/2 with adaptor
		/NP	1/2-inch NPT with adaptor
Anchor bolt		/AN	Four L-type M 12×160 (SS41)
Conduit adaptor		/APUG	PF 1/2 (female thread)

8. Terminal Box

Model	Suffix code	Option code	Specifications
PH8TBG	.....	.....	Terminal box
———	*A	.....	Style A
Options: Mounting hardware		/P	Pipe mounting hardware
		/W	Wall mounting hardware
Options: Dedicated cable (between terminal box and converter)		/C□	Specify cable length (m) in □, maximum 20 m. Example: For 3m cable, /C03
Options: Conduit adaptor		/ATBG	PF 1/2 (female thread)

9. Accessories

Model	Suffix code	Option code	Specifications
PH8AX	.....	.....	pHΣ accessories (*1)
Calibration reagents	-L	.....	Two bottles, each containing 250 mℓ solution (pH7 and pH4, respectively)
	-P	.....	Total of 24 bags, each bag containing powder for 500 mℓ solution (pH7 or pH4), and two 500 mℓ polyethylene bottles
———	*A	.....	Style A
Options		/STD	Sensor stand (with mounting hardware for 50A pipe)
		/KCLL	KCℓ solution (one 250 mℓ polyethylene bottle)(*2)
		/KCLP	KCℓ powder (three bags, 250 mℓ solution each)(*2)
		/TMP	Thermometer (0 to 100°C)

(*1) Includes the following:
(1) Two 200 mℓ polyethylene cups)(*2)
(2) One cleaning bottle

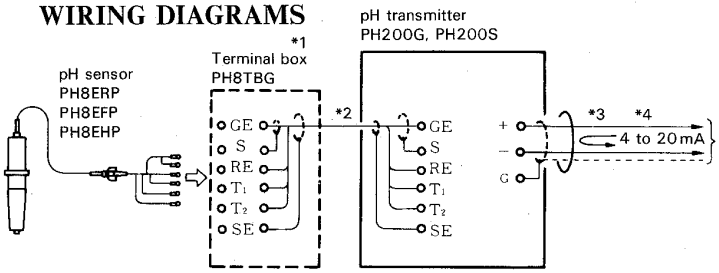
(*2) Either KCLL or KCLP is required for PH8EF G/S-□-TT2.

10. Consumables

Part name		Part number	Remarks
Glass electrode	General purpose	K9142TN	One For KCℓ filling and refillable pH sensors
		K9319NA	Daielperflow O-ring
Junction		K9142TH	One For KCℓ filling and refillable pH sensors
		K9319NB	Daielperfrow O-ring
Junction		K9142TK	One For high-purity water
		K9319QA	Daielperflow O-ring
Desiccant		K9020XR	One bag
KCℓ solution (3.3M)		K9084LP	Six 250 mℓ polyethylene bottles
Buffer solution for calibrations (pH4)(*1)		K9084LL	Six 250 mℓ polyethylene bottles
Buffer solution for calibration (pH7)(*1)		K9084LM	Six 250 mℓ polyethylene bottles
Buffer solution for calibration (pH9)(*1)		K9084LN	Six 250 mℓ polyethylene bottles
Powder for buffer solution (pH4)		K9020XA	12 bags, each for preparation of 500 mℓ of solution
Powder for buffer solution (pH7)		K9020XB	12 bags, each for preparation of 500 mℓ of solution
Powder for buffer solution (pH9)		K9020XC	12 bags, each for preparation of 500 mℓ of solution
KCℓ powder for KCℓ filling type sensor		K9020XU	8 bags, each for preparation of 250 mℓ of solution
KCℓ powder for KCℓ refillable type sensor		K9142TT	2 bags of powder, 1 bottle of 3.3M solution, and 1 syringe
Brush		K9134KM	Replacement brush

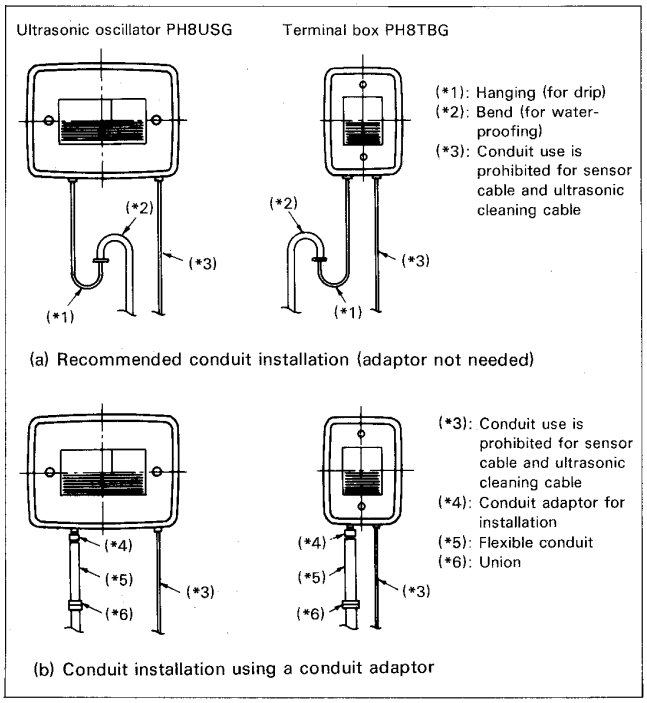
(*1) The pH value of the calibrating buffer solution may vary depending on storage conditions. Prepare a new solution from powder for accurate instrument calibration.

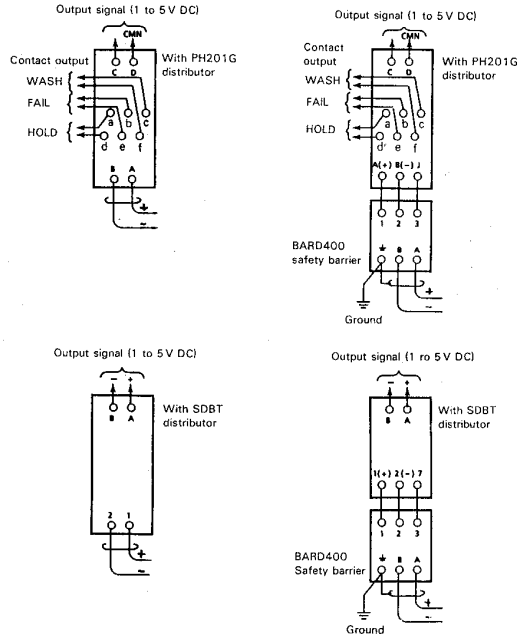
WIRING DIAGRAMS



*1: Terminal box is used only where pH transmitter is installed some distance from pH sensor (ordinarily not needed).
*2: This cable is specified in the option code for the PH8TBG. Maximum length is 20m.
*3: Use only shielded pair cable eith an outside diameter of 10 to 12A. Shield line must be grounded at the power source.
*4: For the intrinsically safe system use the cable terminals with insulated cover.

<Notes for Conduit Installation>

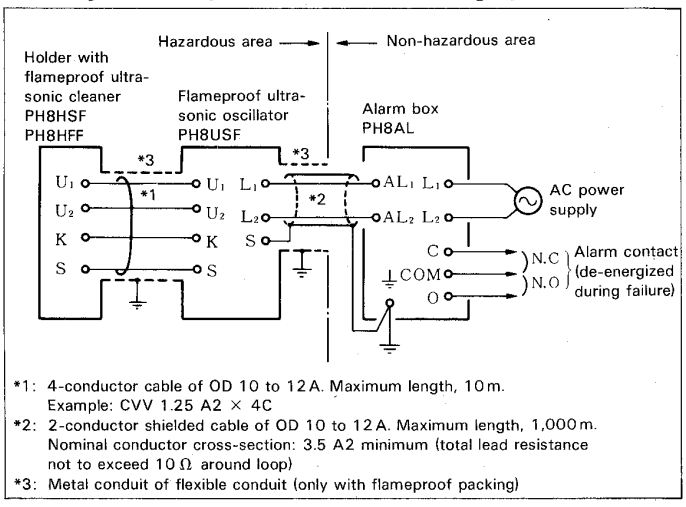




(1) Example of Non-Explosionproof System

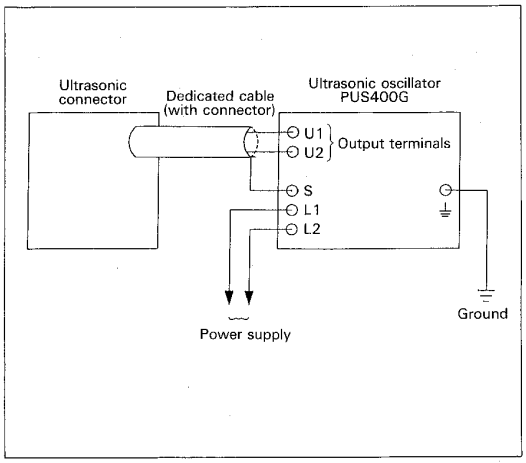
(2) Example of Intrinsically Safe Explosionsproof System

<Wiring for flameproof ultrasonic cleaning system>



*1: 4-conductor cable of OD 10 to 12A. Maximum length, 10m.
Example: CVV 1.25 A2 × 4C
*2: 2-conductor shielded cable of OD 10 to 12A. Maximum length, 1,000m.
Nominal conductor cross-section: 3.5 A2 minimum (total lead resistance not to exceed 10Ω around loop)
*3: Metal conduit of flexible conduit (only with flameproof packing)

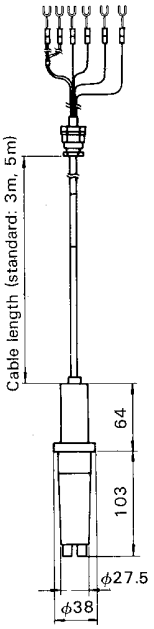
<Wiring for ultrasonic cleaning system>



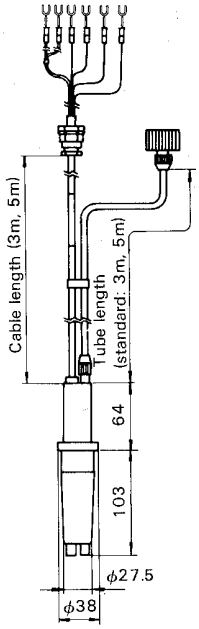
DIMENSIONS

Units: mm

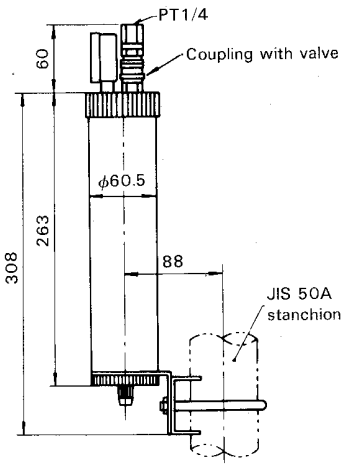
KCℓ refillable pH sensor PH8ERP-□



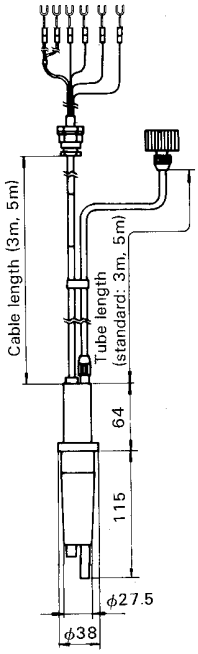
KCℓ filling pH sensor PH8EFP-□



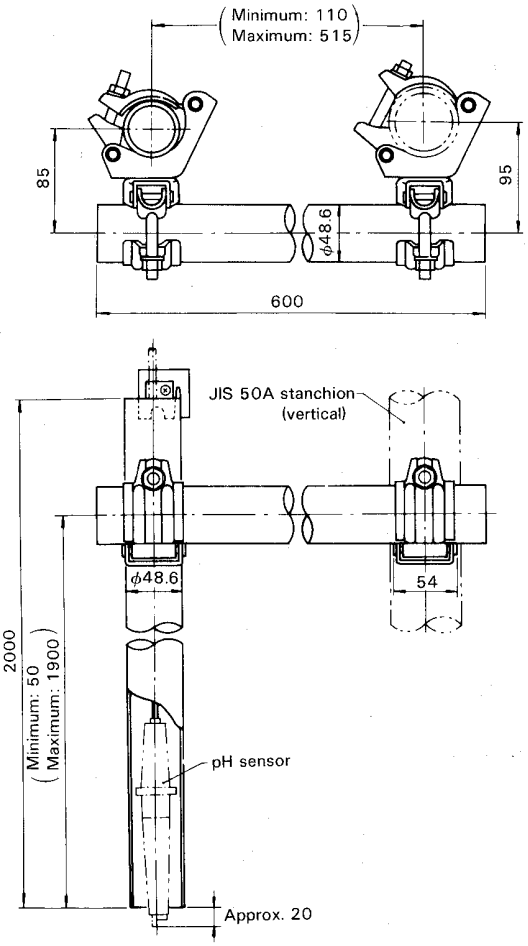
Medium pressure KCℓ reserve tank for KCℓ filling pH sensor (with mounting hardware) (PH8EFP-□)-TT2



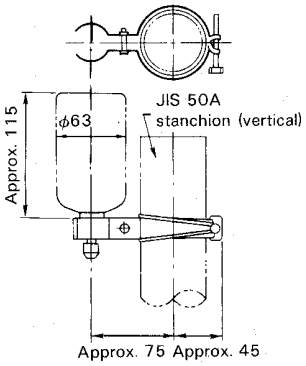
pH sensor for high-purity water PH8EHP-□



Guide-pipe for submersion type (with mounting hardware)



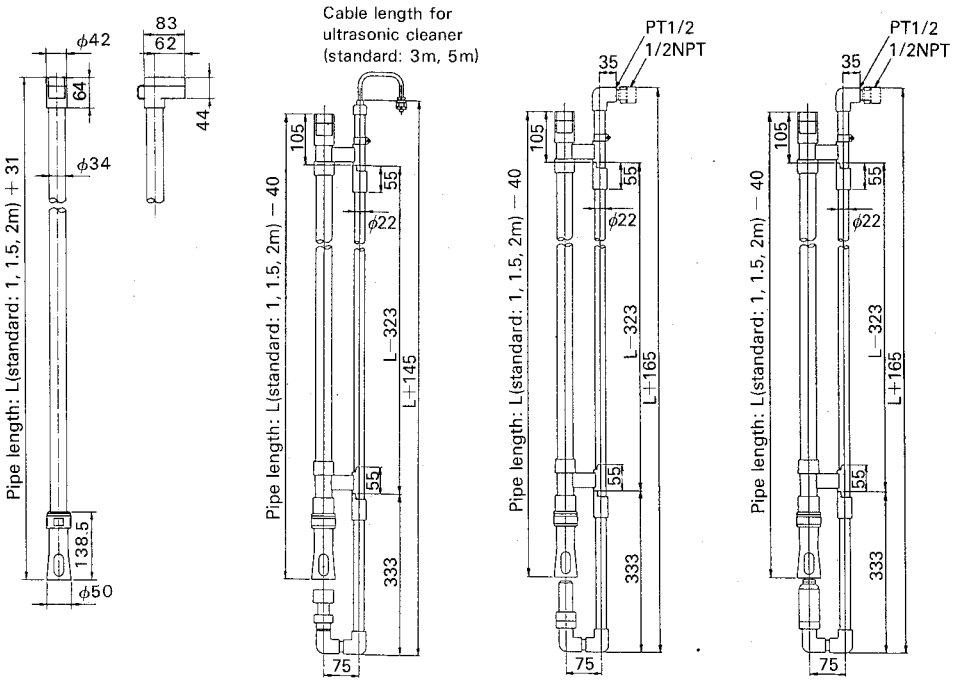
General purpose KCℓ reserve for KCℓ filling pH of high-purity water sensor (with mounting hardware) (PH8EFP-□)-TT1 (PH8EHP-□)-TT1



Submersion holder — polypropylene (see separate drawings for mounting hardware)
PH8HS-PP

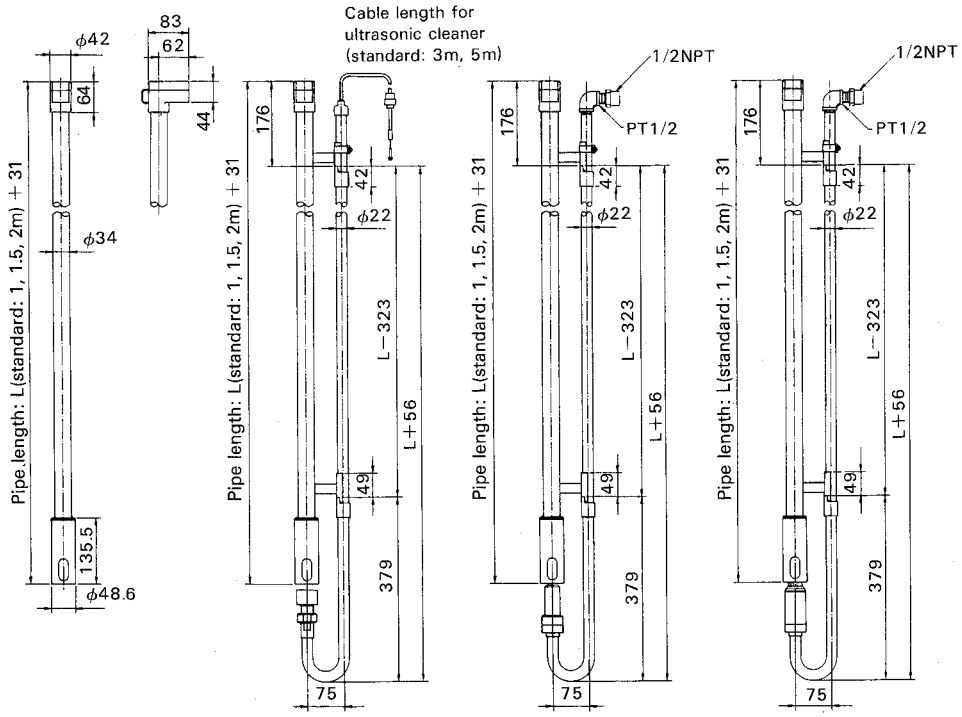
Unit: mm

<Without cleaner> <With ultrasonic cleaner> <With jet cleaner> <With brush cleaner>



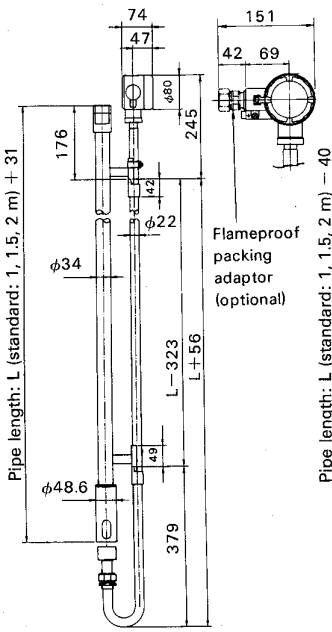
Submersion type holder — SUS316— (see separate drawings for mounting hardware)
PH8HS-S3

<Without cleaner> <With ultrasonic cleaner> <With jet cleaner> <With brush cleaner>

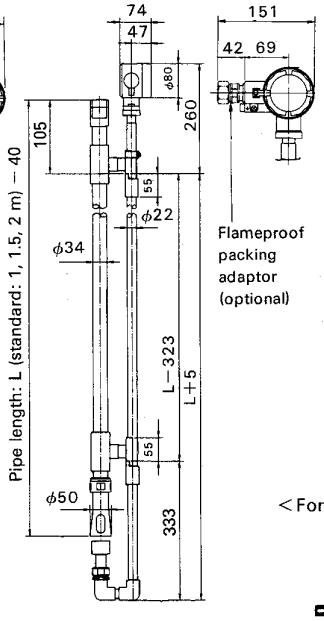


Unit: mm

Submersion type holder
with flameproof ultrasonic
cleaner — SUS316 —
(see separate drawings
for mounting hardware)
PH8HSF-S3

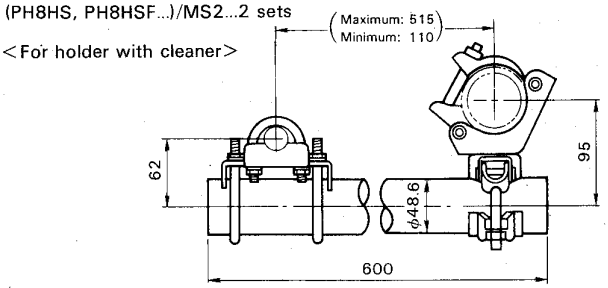


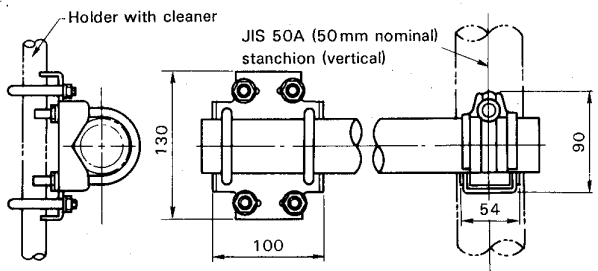
Submersion type holder
with flameproof ultrasonic
cleaner — Polypropylene —
(see separate drawings
for mounting hardware)
PH8HSF-PP



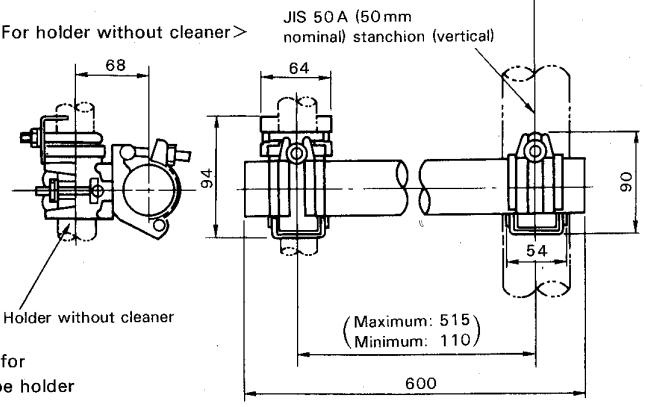
Mounting hardware for submersion type holder
(PH8HS, PH8HSF...)/MS1...1 set
(PH8HS, PH8HSF...)/MS2...2 sets

<For holder with cleaner>

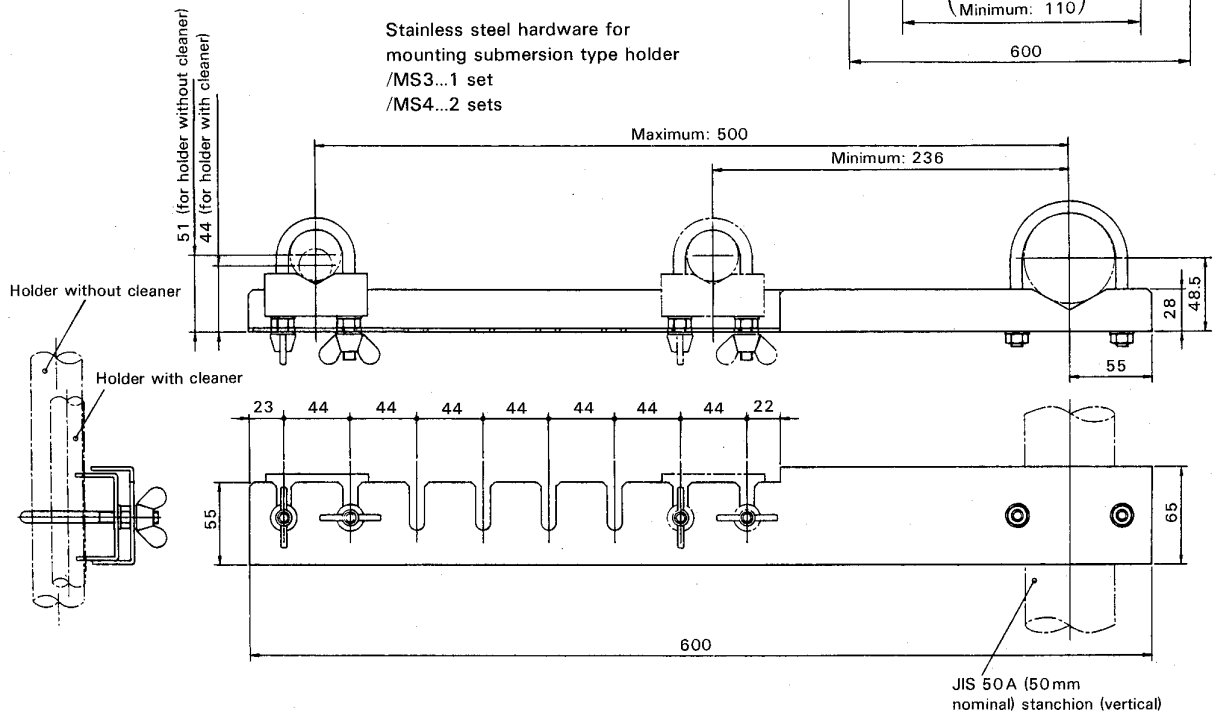




<For holder without cleaner>

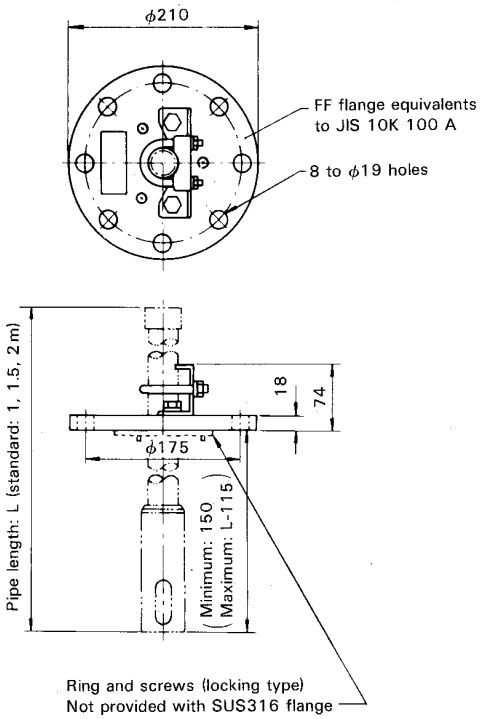


Stainless steel hardware for
mounting submersion type holder
/MS3...1 set
/MS4...2 sets

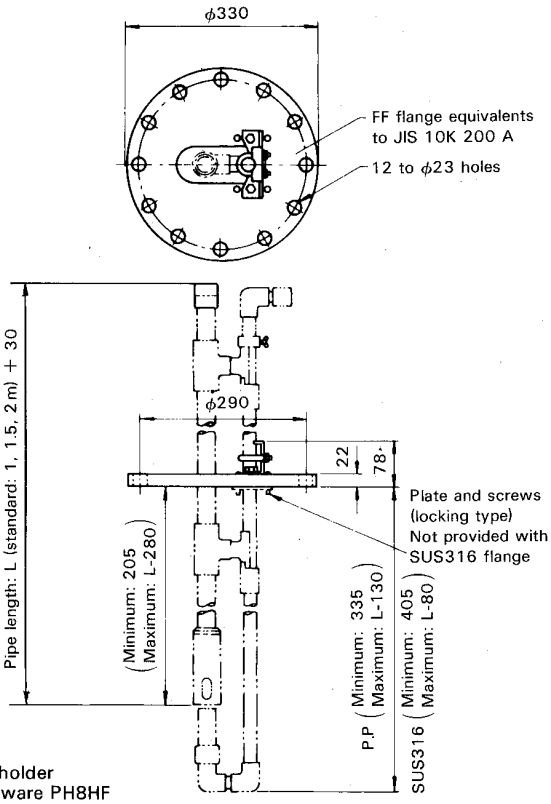


Unit: mm

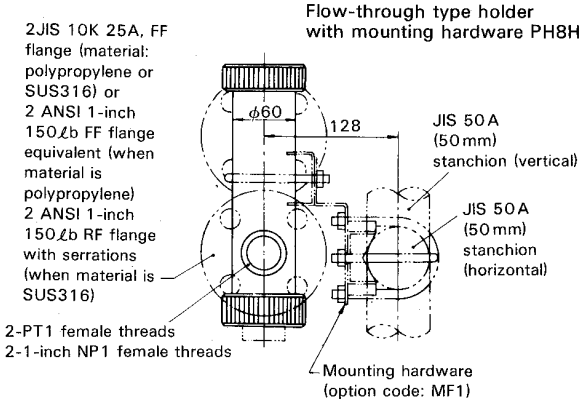
Mounting hardware for submersion type holder
Flange mounting hardware for holder without cleaner
Material: Polypropylene or SUS316

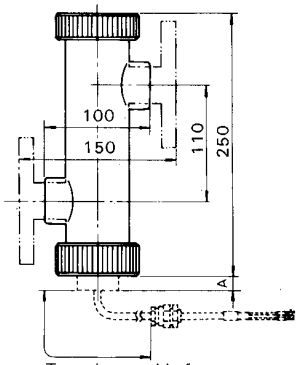


Mounting hardware for submersion type holder
Flange mounting hardware for holder with cleaner
Material: Polypropylene or SUS316



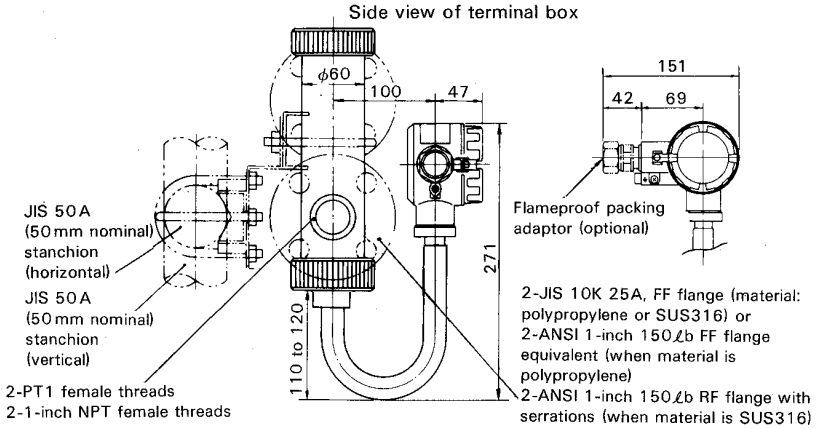
Flow-through type holder with mounting hardware PH8HF



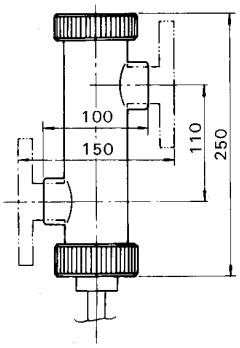


Cleaner	Dimension A	Connection
Without cleaner	0	–
Ultrasonic	35	Cable
Jet or brush	12	PT1/2
	49±8	1/2NPT

Flow-through type holder with flameproof ultrasonic cleaner and mounting hardware PH8HFF
Side view of terminal box

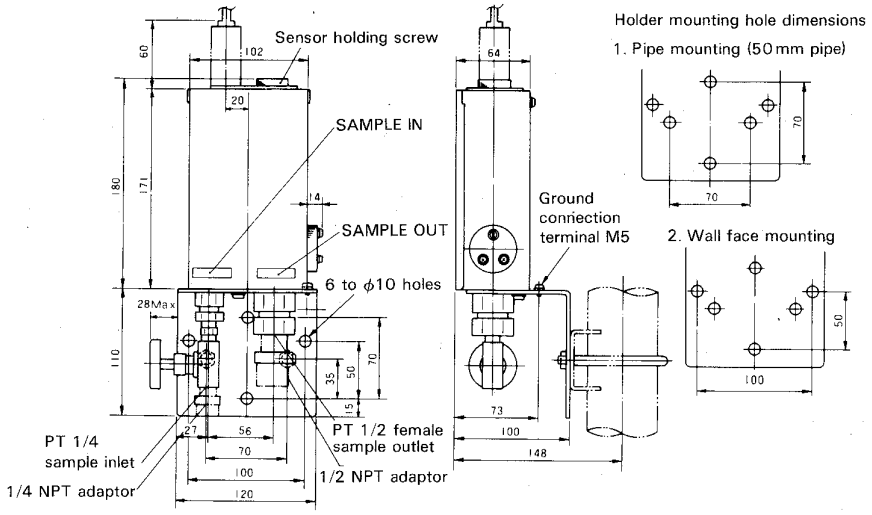


Dimensions for piping connection

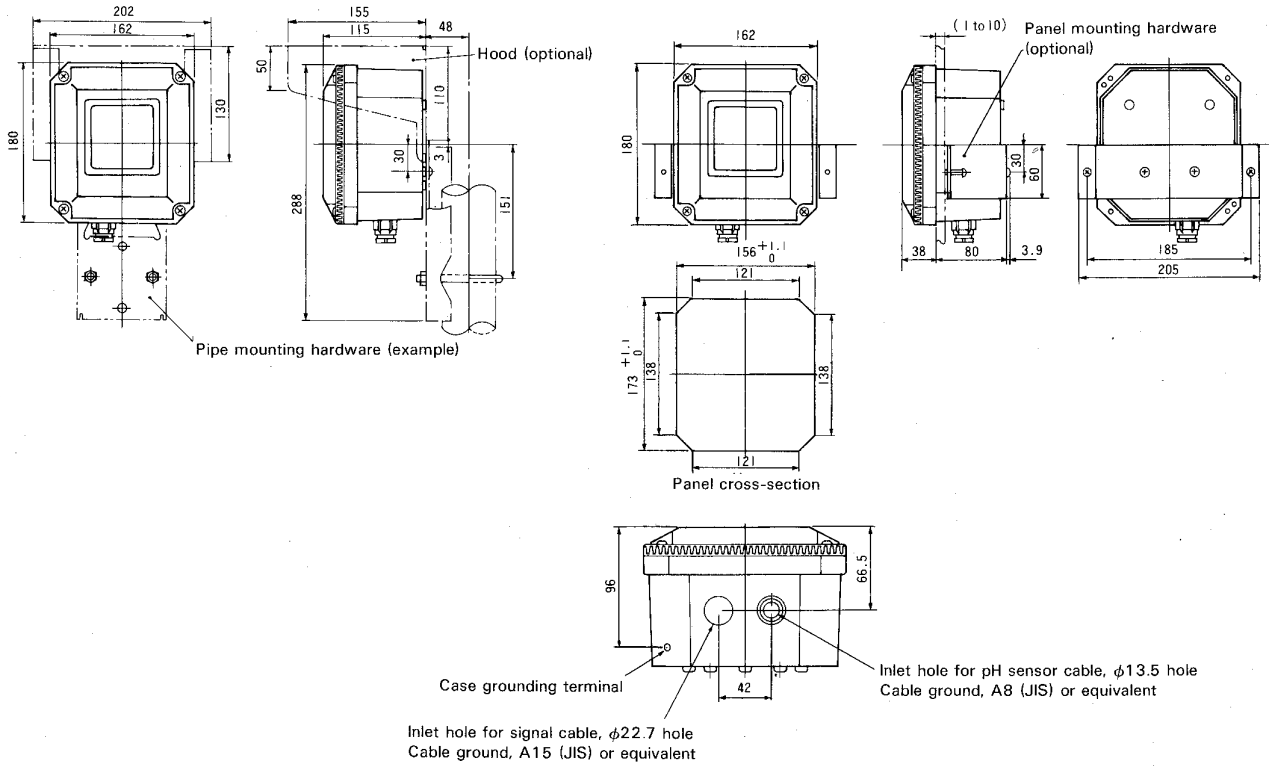


Units: mm

Holder for high-purity water PH8HH



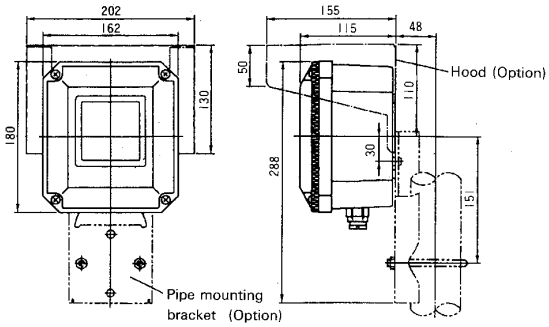
Intelligent pH transmitter PH200G, PH200S
(see separate drawings for mounting hardware)

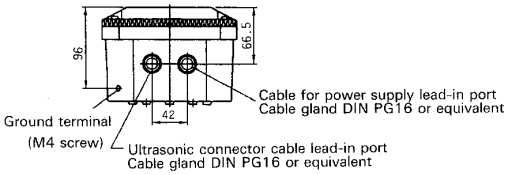


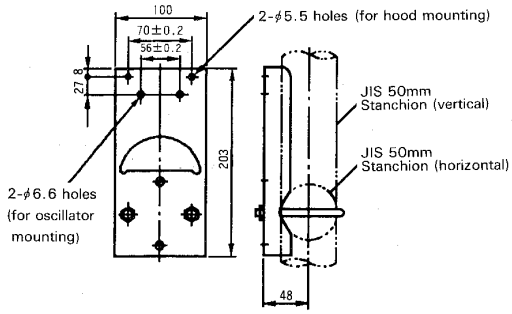
Ultrasonic oscillator (PUS400G)

unit: mm

Pipe mounting

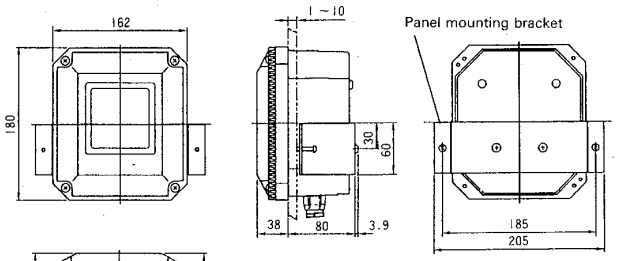


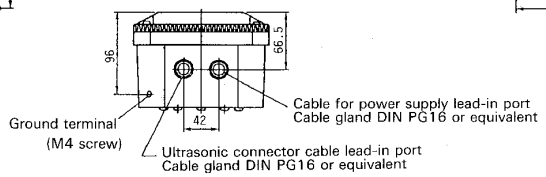


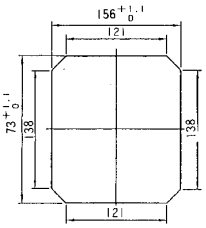


Pipe mounting bracket

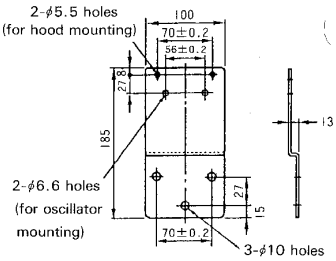
Panel mounting, wall mounting





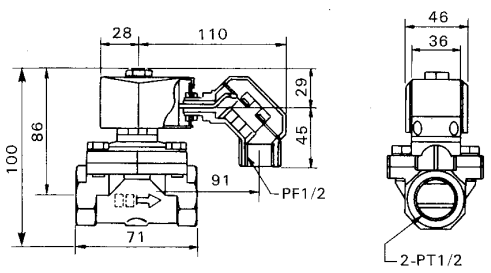


Panel cutput

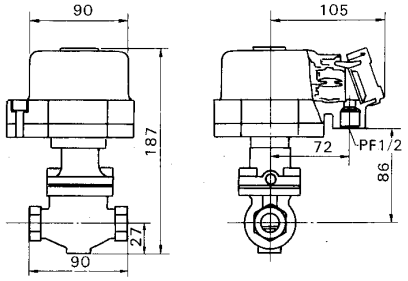


Wall mounting bracket

General purpose solenoid valve
PH8MV...*B



Flameproof solenoid valve
PH8MVF



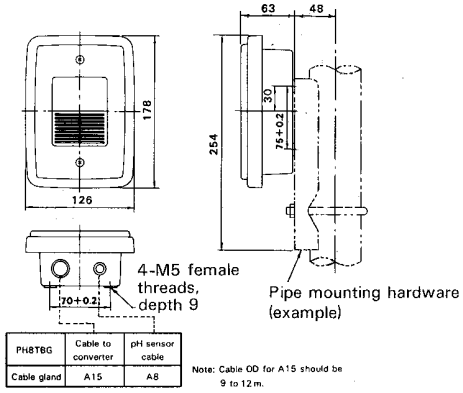
<Installation Cautions for Solenoid Valve Used with Jet and Brush Cleaning>

(1) Take precautions against back-flow of the pH measurement solution into the solenoid valve, and against its presence in the drive fluid. For example, install a check-valve in the line between solenoid valve and holder (if there is a danger of back-pressure building up between solenoid valve outlet and inlet), or install the solenoid valve higher than the holder (particularly in the case of an air-driven jet/brush cleaner), etc.

(2) Insure that the vapors from the pH measuring solution do not corrode the valve wetted materials (bronze and nitrile rubber), particularly in the case of air-driven jet/brush cleaners.

Terminal box PH8TBG
– See separate drawing for mounting hardware –
See separate drawing for details of cable gland

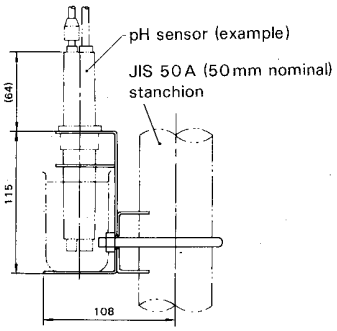
Units: mm



PH8TBG	Cable to converter	pH sensor cable
Cable gland	A15	A8

Note: Cable OD for A15 should be 9 to 12 m.

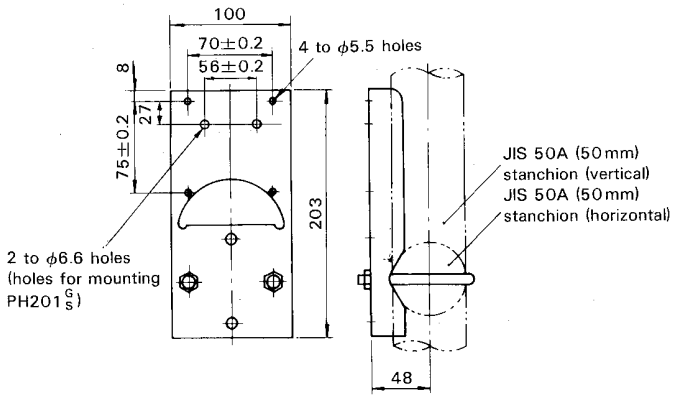
Sensor stand
(PH8AX-□)/STD



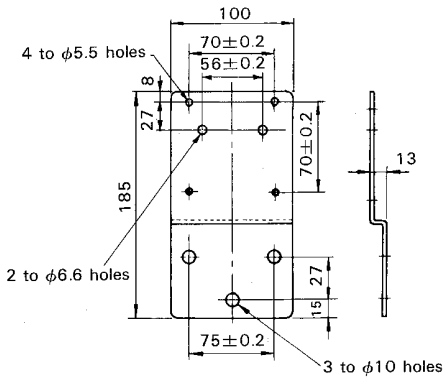
Mounting hardware for pH transmitter, ultrasonic oscillator and terminal box (PH200G, PH8USG, PH8TBG)../P, /W

Units: mm

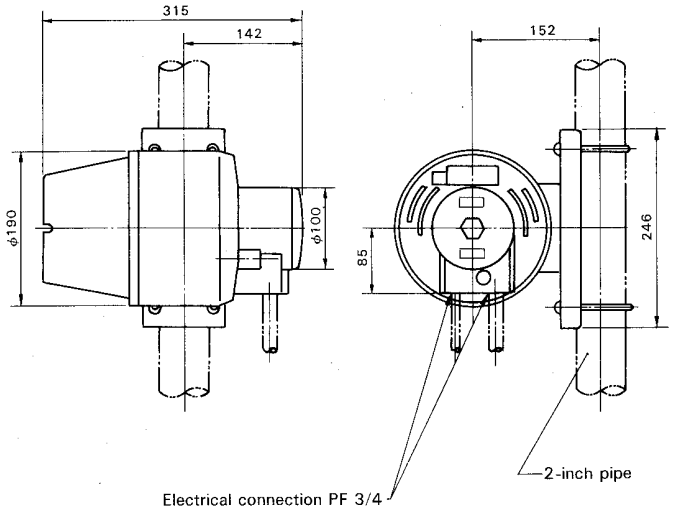
<Pipe mounting hardware>



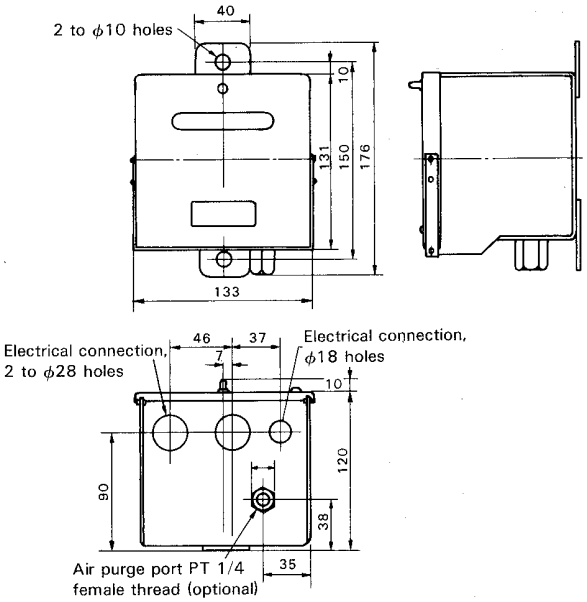
<Wall mounting hardware>



Flameproof ultrasonic oscillator PH8USF

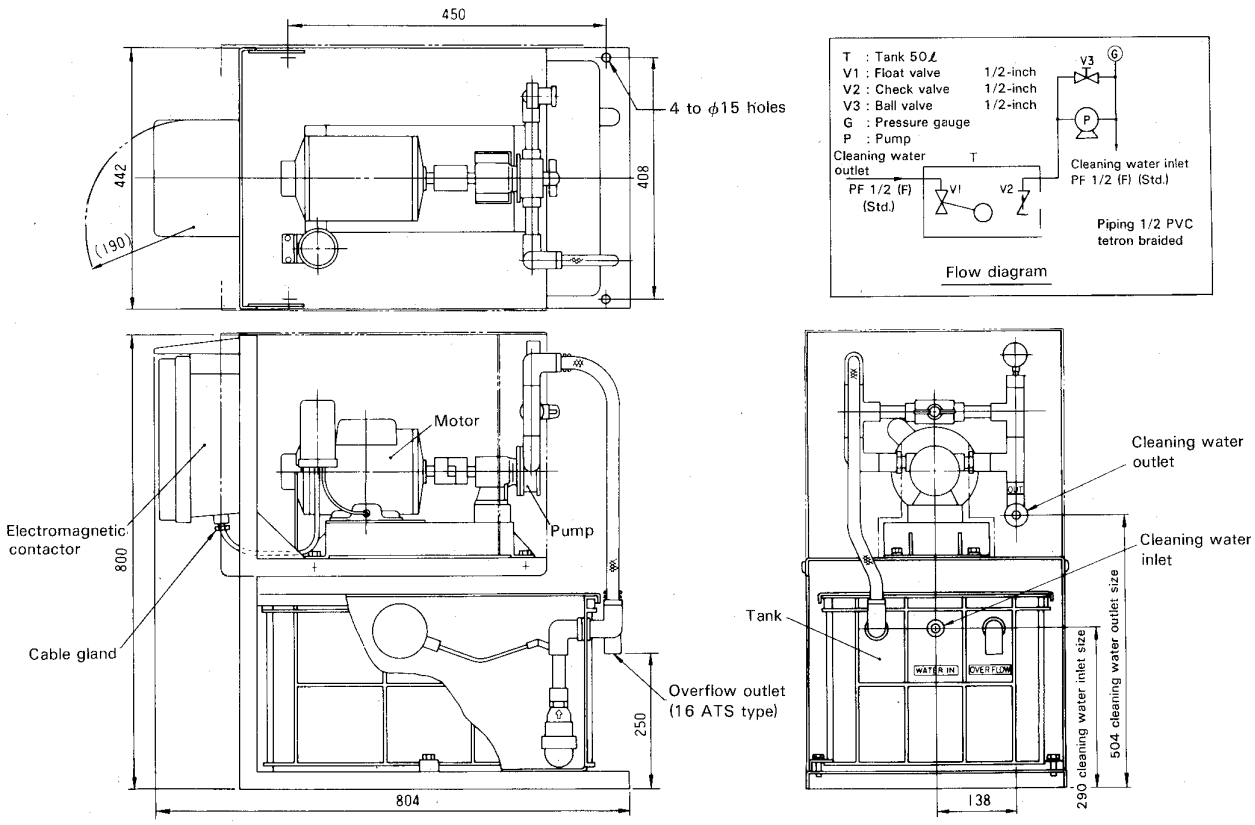


Alarm box PH8AL

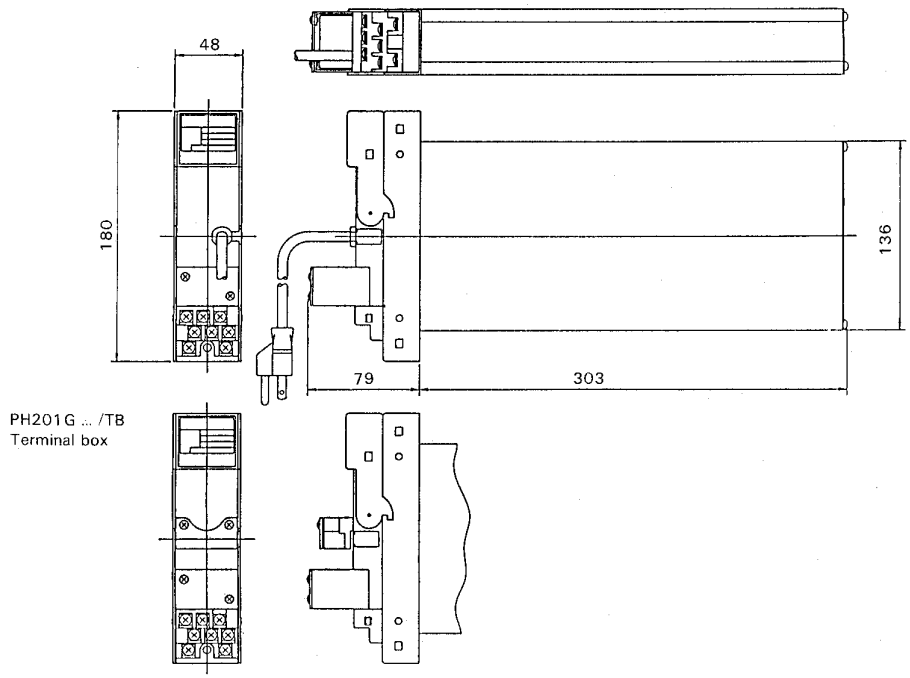


Cleaning pump/tank PH8PU1

Units: mm



Distributor for Use with EXA PH PH201G



SELECTION CRITERIA FOR pH SENSORS AND HOLDERS

● General Overall Criteria

1. When any of the two conditions listed below are applicable, select a KCℓ filling-type pH Sensor and either the submersion or flow-through type holders.
   - The solution is out of the range $2 < pH < 12$.
   - The solution contains organic or oil in the order of a few percent.

When any of the two conditions listed below are applicable, consult our sales.

- Strong oxidizing solutions such as aqua regia, chromic acid, hypochloric acid, perchloric acid etc.
- The solution contains corrosive gases (ammonia, chlorine, hydrogen sulfide).

● Individual criteria

○: can be used △: shortens useful life ×: cannot be used

	Chemical	Concentration and pH		Holder	
		W/V (%)	*pH (25°C)	Flow-through, Submersion	Guide-pipe
Inorganic acid	Sulfuric acid	0.5	1.0	○	×
		0.05	2.0	○	○
	Hydrochloric acid	0.4	1.0	○	×
		0.04	2.0	○	○
	Nitric acid	0.6	1.0	○	×
		0.06	2.0	○	○
	Phosphoric acid	1.0	1.5	○	△
	Boric acid	0.6	5.0	○	○
	Carbonic acid	0.6	3.6	○	△
	Chromic acid	1.2	0.8	○	×
	Sulfurous acid	0.8	1.4	○	△
Organic acids	Acetic acid	0.6	2.8	○	○
	Formic acid	0.5	2.3	○	○
	Oxalic acid	0.9	1.0	○	△
	Lactic acid	0.9	2.4	○	○
	Phenol acid	0.9	5.4	○	△
	Monochloroacetic acid	0.9	1.8	○	×
Alkali	Calcium hydroxide	0.2	12.4	○	○
	Potassium hydroxide	0.5	12.7	○	△
	Sodium hydroxed	0.4	12.9	○	△
Acid salts	Ammonium chloride	5		○	○
	Aluminous water	5		○	○
	Zinc chloride	5		○	○
	Ferric chloride	5		○	○
	Ferric nitrate	5	1.3	○	△
Basic salts	Sodium sulfite	5		○	○
	Sodium carbonate	5	11.8	○	○
	Sodium phosphate	5		○	△
Neutral salts	Potassium chloride	5		○	○
	Sodium sulfate	5		○	○
	Calcium chloride	5		○	○
	Sodium nitrate	5	8.2	○	×
	Aluminum chloride	5		○	○
Oxidizing agents	Hydrogen peroxide	1		○	○
	Sodium hypochlorite solution	1	12.5	○	△
	Chlorinated lime	1		○	△
	Potassium bichromate	5	4.5	○	○
Organic solvents	Alcohol	10		○	△
	Organic solvent or oil (excluding alcohol)			○	×

Note: pH values in table are calculated from dissociation constant (included measured values).

TABLE OF CORROSION-RESISTANT MATERIALS

Note: This table shows corrosion resistance for each single substance alone. If a sample contains two or more substances, then the corrosion resistance may differ from that given in this table.

◎ Excellent
○ Good
¥ Not so good
× Unusable

Concentration: 100%
Temperature: 20°C
Judgement

		Holder material	Ultrasonic transducer material / pH sensor solution ground tip			Seal O-ring material	pH sensor body material	
		Polypropylene	SUS316	Hastelloy C	Titanium	Viton	Ryton	Remarks
Inorganic acids	Sulfurous acid	100 20 ◎ 80 ◎	6 30 ◎	6 30 ○	6 30 ◎			
	Hydrochloric acid	5 20 ◎	5 30 ×	5 30 ◎	5 30 ◎		5 30 ◎	
		80 ◎ 80 ◎		30	1 b ×		37 60 ○ 37 90 ×	
	Chromic acid	20 20 △ 40 ×	10 b ○	20 30 ○	10 b ◎		20 20 ○	
	Hypochlorous acid	10 20 ◎ 40 ○	14 30 ×	15 43 ◎	20 40 ◎		5 20 ○ 40 ×	
	Hydrobromic acid					Strong acid ◎		
	Nitric acid	10 20 ◎ 80 ◎	10 30 ◎	10 30 ◎	10 100 ○	Weak acid ◎	5 20 ○ 10 60 ×	
	Hydroiodic acid	57 20 ◎ 70 ◎	57 25 ×		57 30 ○			
	Sulfuric acid	3 20 ◎ 3 100 ◎	5 30 ◎ 5 100 ×	5 30 ◎ 5 70 ◎	5 30 ◎ 5 100 ×		90 20 ◎ 30 90 ○	
Alkaly	Phosphoric acid	30 60 ◎ 30 100 △	15 30 ◎ 5 b ◎	5 30 ◎ 5 b ◎	5 30 ◎ 5 60 ○		85 90 ◎	
	Ammonia water	15 80 ◎ 15 100 ○	10 b ◎ 28 65 ◎	10 b ◎ 28 65 ◎	10 b ◎ 28 65 ◎		15 30 ◎	
	Caustic potash		10 b ◎ 25 b ◎	10 b ◎ 25 b ◎	10 b ◎ 25 b ○		10 20 ◎ 10 90 △	
	Caustic soda	20 80 ◎ 20 100 ◎	20 30 ◎ 20 b ◎	20 30 ◎ 20 b ◎	20 30 ◎ 20 b ◎	Strong alkali ×	10 20 ◎ 10 90 △	
	Caustic soda 9 to 11% +Sodium chloride 15%	100 ◎			93 ◎	Weak alkali △	90 ○	
	Potassium carbonate		5 b ◎ 35 b ◎	5 b ◎ 35 b ◎	5 b ◎ 35 b ○		5 b ◎ 35 b ○	
	Sodium carbonate	sat. 100 ◎	25 b ◎	25 b ◎	25 b ◎		25 90 ◎	
Chlorides	Zinc chloride		20 b △	20 b ◎	20 b ◎			
	Aluminum chloride		25 25 × 25 25 ×		10 b ◎ 25 b ×			
	Ammonium chloride	35 40 ◎	25 b △	25 b ◎	25 b ◎		25 90 ◎	
	Potassium chloride		sat. 60 ◎	sat. 60 ◎	sat. 60 ◎		20 90 ◎	
	Calcium chloride	sat. 80 ◎ sat. 100 ◎	25 b ○	25 b ◎	25 b ◎		25 90 ◎	
	Ferric chloride	20 40 ◎ 60 ◎	30 b ×	30 b ×	30 b ◎		20 60 ◎	
	Sodium chloride 20% +Saturated Cl_2 (Electrolysis solution)	100 ◎	90 ×	90 ×	90 ◎		20 △	
	Sea water Magnesium chloride	24 ◎ sat. 80 ◎	24 △ 42 b △	42 b ◎	24 ◎ 40 b ◎		24 ◎ 80 ○	
Sulfates	Ammonium sulfate	5 60 ◎	20 b ◎ sat. 30	20 b ◎ sat. 30 ◎	20 b ◎ sat. 30 ◎		10 90 ◎	Polypropylene may sometimes be eroded by ammonium sulfate crystals.
	Potassium sulfate		10 b ◎	10 b ◎	10 b ◎		10 90 ◎	
	Sodium sulfate	Corrosion resistance is good for usual salts.	20 b ◎	20 b ◎	20 b ◎		10 90 ◎	
Nitrates	Ammonium nitrate		20 b ◎	20 b ◎	20 b ◎		10 90 ◎	
	Sodium nitrate		50 b ◎		50 b ◎			
Others	Sodium sulfite		20 b ◎		20 b ◎			
	Hydrogen peroxide		10 30 ◎		10 30 ◎		10 30 ◎	
	Sodium sulfide	10 90 ◎ 20 80 ◎	2 60-90 ×	2 60-90 △	15 30 ◎		5 90 ◎	
	Potassium bichromate		10 b ◎	10 b ◎	10 b ◎		10 90 ◎	
	Sodium sulfide	60 80 ◎	10 b ◎		10 b ◎		10 90 ◎	
	Sodium bisulfate		10 b △		10 b ◎			
Gases	Wet chlorine gas	20 ○ 40 △ 60 ×	30 ×	30 △	30 ◎		20 ×	
	Sea water + Saturated Cl_2		95 ×	95 △	95 ◎			
	Bromine			30 ◎	30 ◎		10 30 ×	
	Hydrogen sulfide		20 ◎		20 ◎			
	Sulfurous acid gas	80 ◎ 100 ◎			30-90 ◎		80 ◎	

Note: "b" indicates temperatures up to the boiling point.

		Holder material	Ultrasonic transducer material pH sensor solution ground tip			Seal O-ring material	pH sensor body material	
		Polypropylene	SUS316	Hastelloy C	Titanium	Viton	Ryton	Remarks
Organic substance	Acetaldehyde	20 ◎	100 30 ◎				100 20 ○	
	Acetone	100 20 ○	50 25 ◎ 100 110 ○			100 25 ×	100 b ○	
	Aniline	100 20 ◎ 100 70 ○ 100 100 △	100 25 ◎				100 90 ○	
	Ether	100 20 △	100 25 ◎				100 20 ◎	
	Ethylene glycol	100 70 ◎ 100 100 ◎	100 25 ◎					
	Ethyl alcohol	96 70 ◎	100 b ◎				100 90 ◎	
	Methyl chloride	100 20 ×	100 25 ◎					
	Glacial acetic acid	100 70 ◎ 100 100 ○				100 24 ×	100 20 ◎	
	Glycerin	100 70 ◎ 100 100 ◎	100 25 ◎					
	Chlorophenol	100 20 ◎ 100 70 △ 100 100 ×					100 20 ◎	
	Xylene	100 20 ×					100 20 ○	
	Chlorobezene	100 20 × 100 100 ×						
	Chloroform	100 20 ×	100 b ◎	100 b ◎	100 b ◎		100 90 △	
	Dioxane	100 20 ○ 100 70 △ 100 100 × 100 20 △					100 90 ◎	
	Dichloroethane	100 70 ×						
	Ethyl acetate	100 20 ◎ 100 △	100 105 ◎				100 90 ○	
	Carbon tetrachloride	100 20 ×	99 b △		99 b ◎	100 24 ×		
	Trichloroethylene	100 20 ×	100 b ○	100 b ◎	100 b ◎		100 90 ×	
	Toluene	100 20 ×			145 ◎		100 90 ◎	
	Benzophenone							
	Benzaldehyde	100 20 ◎ 100 70 ○ 100 100 ×					100 20 △ 100 90 ×	
	Benzyl alcohol, benzene	100 20 △	100 30 ◎		100 30 ◎	100 25 ○	100 90 ◎	
	Fomaldehyde	10 70 ◎ 10 100 ◎	37 b ◎	37 b ◎	37 b ◎			
	Methylnaphthelene							
	Methyl ethyl ketone	100 20 ○ 100 70 △					100 90 ◎	
	Methyl alcohol	100 20 ◎	100 25 ◎				100 25 ◎	
	Nitrobenzene	100 20 ◎ 100 70 ○ 100 100 ×					100 90 ×	
	Lactic acid	100 20 ◎ 100 70 △ 100 100 ×	10 b ◎		10 b ◎			
	Phenol	100 20 ◎ 100 20 ◎ 100 100 ○	95 30 ◎	95 30 ○	95 30 ◎		100 90 △	
	Benzoic acid							
	Motor oil	100 20 ◎ 100 70 ○ 100 100 △					100 20 ◎	
	Petroleum ether	100 20			181 ◎		100 20 ○	
	Kerosene	100 20 ○ 100 70 ×			181 ◎		100 20 ○	
	Tartaric acid	10 40 ◎ 10 60 ○ 10 80 △	50 100 △	50 100 △	50 100 ◎			
	Oils and fats	100 70 ◎	100 25 ◎	100 180 ◎	100 180 ◎			
	Carbon disulfide	100 20 ×	100 25 ◎			100 25 ◎		

Note: "b" indicates temperatures up to the boiling point.

INQUIRY SHEET

1. General Informations

Customer ; _____

Application ; _____

Measurement location ; _____

Object ; ☐ Indication, ☐ Record, ☐ Alarm, ☐ Control

Power supply ; _____V AC

2. Process Conditions

(1) Sample temperature ; _____, Nor. _____ [°C]

(2) Sample pressure ; _____, Nor. _____ [kg/cm²G]

(3) Flow rate ; _____, Nor. _____ [ℓ/min]

(4) Flow speed ; _____, Nor. _____ [m/sec]

(5) Slurry or contaminants? ; ☐ No, ☐ Yes _____

(6) Name ; _____

(7) Constituent ; _____

(8) Others ; _____

3. Site

(1) Ambient temperature ; _____

(2) Site ; ☐ Outdoor, ☐ Indoor _____

(3) Others ; _____

4. Required Specifications

(1) Measurement range ; ☐ pH0 to 14, ☐

(2) Transmission output ; ☐ Sensor, ☐ Holder, ☐ pH Controller, ☐ Terminal Box, ☐ Accessories

(3) Sensor cable length ; ☐ 3 m, ☐ 5 m, ☐ m

(4) Sensor operating pressure ; ☐ 0.1 kg/cm² maximum, ☐ 0.1 kg/cm² minimum

(5) Holder ; ☐ Guide-pipe, ☐ Submersion type, ☐ Flow-through type

(6) Measurement liquid temperature ; ☐ −5 to 105°C, ☐ −5 to 100°C, ☐ −5 to 80°C

(7) Others ;