

1. General

"The HA406 Solid Electrolyte (Xerolyt®) pH sensor with Temperature Element" consists of the HA406-12A Solid Electrolyte (Xerolyt®) pH sensor with Temperature Element, a sensor cable and an adapter for attaching the sensor to a holder (Model PH8HF or Model PH8HS).

2. Applications

The HA406 can be used for pH measurements for the following solutions, for which general-purpose pH sensors are not suitable.

- Solutions containing many electrode-staining components, ○ Emulsions and suspensions
- Waste liquids, ○ Solutions containing protein, ○ High-temperature alkali solutions
- Solutions whose pressures fluctuate greatly

However, the HA406 sensor cannot be used for the following:

- Strong acid solutions with a pH of 2 or less
- Solutions containing chlorine, hydrogen peroxide, hydrogen sulfide, or ammonia (3000 ppm or more, at 25°C)
- Where electrode sterilization with steam is necessary
- Solutions containing organic solvents

3. Specifications

Measuring range: pH 2 to 14

Measuring temperature:

0 to 100°C
(when using holder, see holder spec.)

Measuring pressure:

Atmospheric pressure to 1.6 MPa (Temperature 25 °C)
Atmospheric pressure to 600 kPa (Temperature 100 °C)
(when using holder, see holder spec.)

Internal electrolyte:

Solid polymer including KCl (Xerolyt Extra)

Temperature compensation sensor: Pt1000

Junction: Open port type

Cable connector: VP type

Applicable holder:

Flow-through holder (PH8HF),
Submersion holder (PH8HS)

(An optional adapter is needed)

Ultrasonic cleaning is not available.

Only jet cleaning is available when cleaning is necessary.

Wetted part materials:

Body; Glass
O-ring; Silicon rubber or Daielperfrow rubber
Adapter; Stainless steel (SUS316), polypropylene or rigid polyvinyl chloride

4. Model and Suffix Codes

Model	Suffix Code	Option Code	Description
HA406	Solid electrolyte (Xerolyt) pH sensor with temperature element
Insertion length	-12A	120 mm
Option	For PH200/PH400	/01	Cable length : 1 m (Fork terminal : for PH200/PH400)
	Cable length (*1)	/03	Cable length : 3 m (Fork terminal : for PH200/PH400)
Option	For PH202/FLXA21	/05	Cable length : 5 m (Fork terminal : for PH200/PH400)
		/10	Cable length : 10 m (Fork terminal : for PH200/PH400)
		/15	Cable length : 15 m (Fork terminal : for PH200/PH400)
		/20	Cable length : 20 m (Fork terminal : for PH200/PH400)
		/01E	Cable length : 1 m (Pin terminal : for PH202/FLXA21)
		/03E	Cable length : 3 m (Pin terminal : for PH202/FLXA21)
		/05E	Cable length : 5 m (Pin terminal : for PH202/FLXA21)
		/10E	Cable length : 10 m (Pin terminal : for PH202/FLXA21)
		/15E	Cable length : 15 m (Pin terminal : for PH202/FLXA21)
		/20E	Cable length : 20 m (Pin terminal : for PH202/FLXA21)
Option	FLXA21 (*6)	/01F	Cable length : 1 m (M4 Ring terminal : for FLXA21)
		/03F	Cable length : 3 m (M4 Ring terminal : for FLXA21)
		/05F	Cable length : 5 m (M4 Ring terminal : for FLXA21)
		/10F	Cable length : 10 m (M4 Ring terminal : for FLXA21)
		/15F	Cable length : 15 m (M4 Ring terminal : for FLXA21)
		/20F	Cable length : 20 m (M4 Ring terminal : for FLXA21)
Option	For PH450, PH202/TB (*5)	/01G	Cable length : 1 m (M3 Ring terminal : for PH450, PH202/TB)
		/03G	Cable length : 3 m (M3 Ring terminal : for PH450, PH202/TB)
		/05G	Cable length : 5 m (M3 Ring terminal : for PH450, PH202/TB)
		/10G	Cable length : 10 m (M3 Ring terminal : for PH450, PH202/TB)
		/15G	Cable length : 15 m (M3 Ring terminal : for PH450, PH202/TB)
		/20G	Cable length : 20 m (M3 Ring terminal : for PH450, PH202/TB)
Option	Adaptor (*3)	/S3	SUS316
		/PP	Polypropylene resin
		/PV	Rigid Polyvinyl chloride resin
		/PF	Daielperfrow (*4)
Option	O-ring	/PF	Daielperfrow (*4)

*1 Mark band is shown by mark and fork terminals are used.

*2 Mark band is shown by numeral and pin terminals are used.

*3 This is needed when using submersion type holder or flow-through type holder.

*4 Use Daielperfrow when this is used in organic solvent, high alkali or high temperature alkaline solution.

*5 Mark band is shown by numeral and M3 ring terminals are used. When terminal box is used, select WTB10-PH3.

*6 Mark band is shown by numeral and M4 ring terminals are used. When terminal box is used, select WTB10-PH5.

Note: The cables for the HA405 is not compatible with the cables for the HA406. Purchase the dedicated cables.

CAUTION ON USE:

This sensor cannot be used outdoors, even when using with a holder, this sensor cannot be used outdoors due to exposure to rain or due to condensation at a high humid place.

This sensor cannot be used with a guide-pipe holder.

The sensor must be installed in a vertical position. It can not be installed from below and in a horizontal position, either.

The sensor may not stand a long-term use in solutions containing organic solvents because of the erosion of its internal electrolyte polymer.

5. How to Use the pH Sensor**5.1 Note on Handling Solid Electrolyte pH Sensor**

- Do not let the sensing glass membrane dry out. If the sensor is stored, place it in liquid (about 3.3 mol/l KCl solution).

Note : If the sensor is stored with the cap mounted on the electrode tip, drying out can be prevented.

If pH response becomes slow due to drying out, place the electrode in liquid (about 3.3 mol/l KCl solution) for several hours.

In addition, the sensing glass membrane of the pH sensor gradually deteriorates during storage.

A virgin pH sensor may become unusable because of its deterioration. Avoid storing the sensor for a long time (Use within a year is recommended.)

- If a Xerolyt sensor is subjected to ultrasonic cleaning, the solid electrolyte will be damaged or destroyed. If electrode cleaning is required, use a holder with a jet cleaner.
- If the sensor is installed outdoors, take rainproof measures.
- The pH sensor should be mounted at least 15 degrees below horizontal, with the sensor tip (sensing glass membrane) facing down. Do not mount it in a horizontal position or with the sensor tip facing upward. Air space may be created in the tip of the glass electrode, thus interfering with accurate measurement.

5.2 Procedure for Assembling Sensor in Holder

(1) After removing the cap (for transportation or storage) covering the Xerolyt electrode tip, attach the sensor to the adapter. Fully screw the sensor into the adapter so that no solution leakage occurs from the O-ring.

(2) Remove the cap (for transportation or storage) covering the sensor connector. Fit the sensor connector into the cable connector, and lock the screw connecting part.

(3) Mount the pH sensor prepared in steps (1) and (2) to the holder.

<For use of the model PH8HF flow-through holder>

For more details, refer to Instruction Manual attached to the holder (No. IM12B07N01-01E).

- Remove the nut for fixing the sensor to the adapter.
- Pass the cable through the nut.
- Attach the O-ring attached inside the holder, to the adapter. (Refer to the O-ring position in Section 6.)
- Put the sensor into the holder, and fix the adapter by screwing the nut.

<For use of the model PH8HS submersion holder>

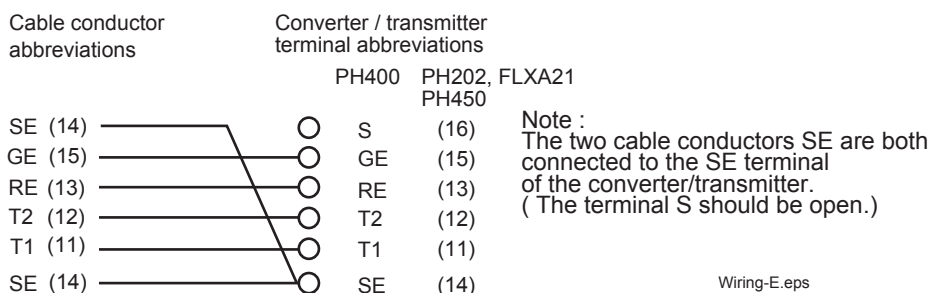
For more details, refer to Instruction Manual attached to the holder (No. IM12B07M01-01E).

- Remove the protector and piece of foam rubber. This rubber is for transportation.
- Pass the O-ring through the cable, and mount it to the upper side of the adapter. (Refer to the O-ring position in Section 6.)
- Pass the cable through the holder from the protector attachment side, and fix the sensor by the protector.
- Fix the sensor cable to the holder.

5.3 Wiring

Connect the cable to the terminal of the PH400G/PH450G pH converter, or the PH202, FLXA21 pH transmitter.

When connecting the PH202, FLXA21, PH450G cable connection numbers and terminal numbers should agree.



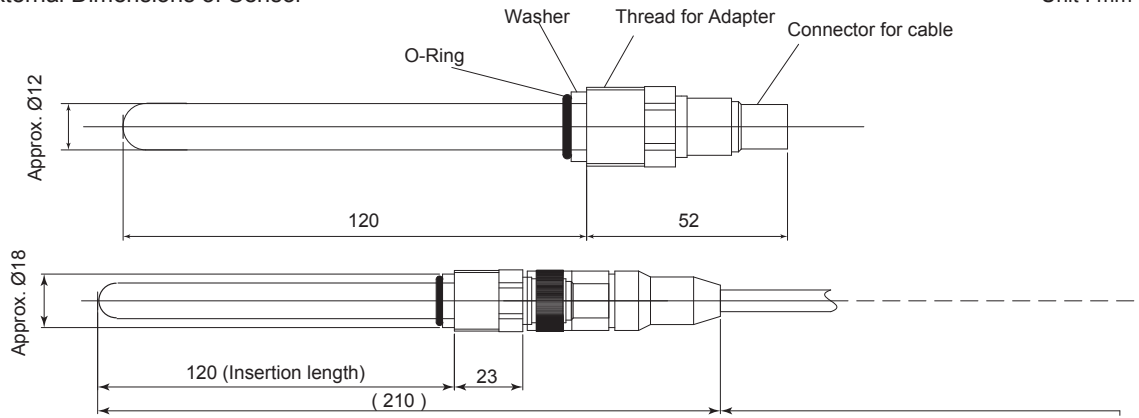
5.4 Maintenance of the HA406 sensor

- (1) When the performance of the HA406 sensor become lower due to dirt, wash or clean the sensor with a detergent or a dilute HCl aqueous solution (about 3-5%). Do not use htdrofluoric acid because it can deteriorate glass.
- (2) Do not clean the glass sensing membrane by ultrasonic cleaning because internal gel can be deformed.
- (3) Not necessary to replenish internal electrolyte.

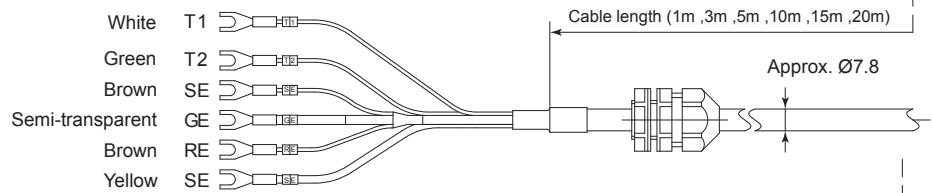
6. Configuration and Dimensions of the HA406

External Dimensions of Sensor

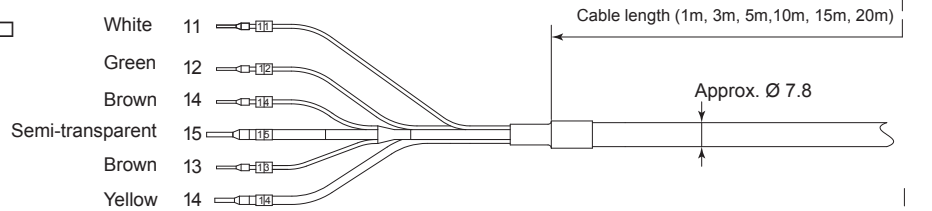
Unit : mm



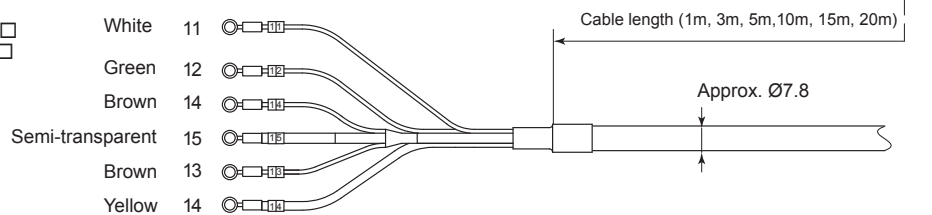
HA406 - 12A /□□ /□□



HA406 - 12A /□□E /□□

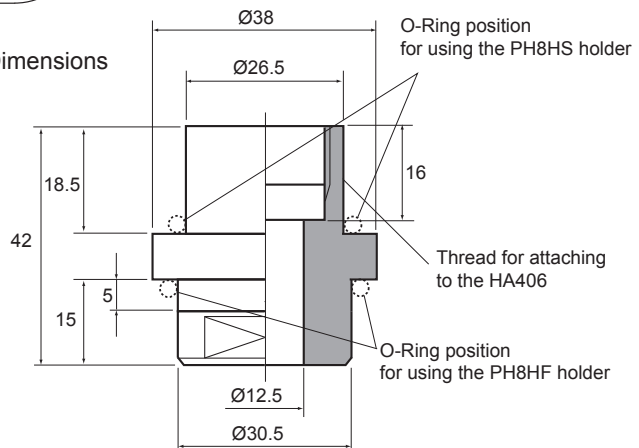


HA406 - 12A /□□G /□□
HA406 - 12A /□□F /□□



Option code	L (Cable length)
/01□	Approx. 1000
/03□	Approx. 3000
/05□	Approx. 5000
/10□	Approx. 10000
/15□	Approx. 15000
/20□	Approx. 20000

External Dimensions of Adapter



7. Method of attaching/detaching the sensor cable

(1) Attachment Method

- Rotating the sensor connector so that its recessed portions will agree with the salient portions inside the cable connector, insert the sensor connector into the cable connector.

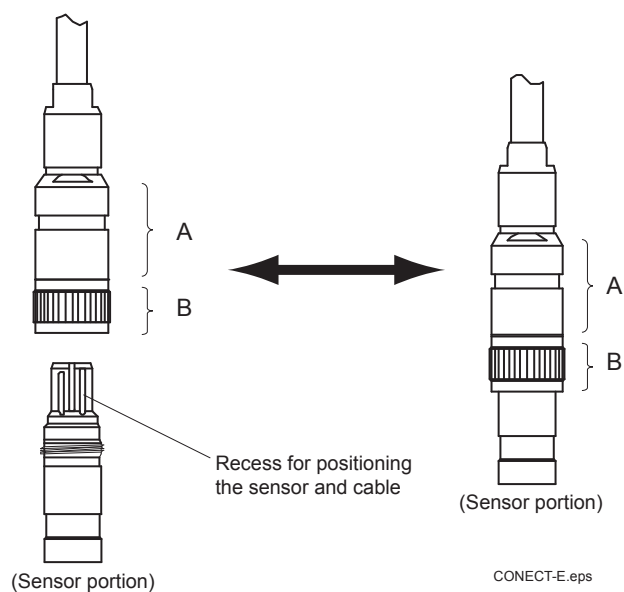
Note: A weak pressure is sufficient for inserting it. If a strong pressure is needed to insert it, the connection position will be incorrect. Check the position and re-try.

- After inserting the sensor connector completely, grip the portion "A", and rotate the cap nut ("B" portion) clockwise until the nut cannot rotate.

(2) Detachment Method

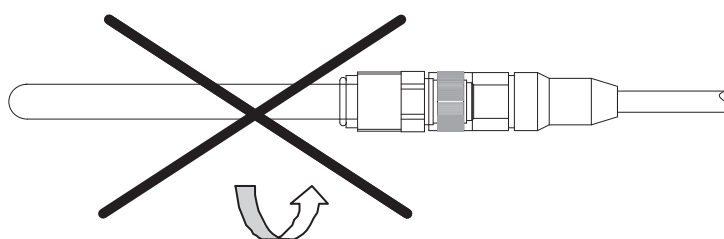
- Gripping the portion "A", and rotate the cap nut ("B" portion) un-clockwise.

- After loosening the nut completely, grip and pull the plastic portion of the sensor from the cable connector.



CAUTION

Do not use (grip or rotate etc.) the glass body of the HA406, but the plastic body of the connector.
If the glass body is gripped, the sensor may be broken.



CAUTION

Since the pH sensor may need to be removed during periodic maintenance (washing and calibration), the sensor cable is normally not installed in conduit. If conduit is used, the metal part of the cable connector should not be in contact with metal parts of the conduit. If the metal part of the cable connector is in contact with other metal parts, this may cause measurement errors.