

General Specifications

Chemical Cleaning pH Measuring System

GS 12B7A1-E

■ General

Process pH measuring systems have played an important role in many fields including the chemical, food, metal, and paper pulp industries. They measure/manage raw materials, control/monitor the reacting conditions in manufacturing processes, and determine the quality of products. They are used in a wide range of operations such as controlling the pH level in wastewater disposal and monitoring the pH level in rivers.

However, pH sensors in general are subject to aging due to their contamination and deterioration, and require periodic cleaning to maintain their performance. Our Chemical Cleaning pH measuring system solves this problem, while facilitating labor savings and eliminating dangerous operations at the job site.

Chemical Cleaning pH Measuring System incorporates a pH sensor with advanced diagnostic functions. This system features automatic chemical cleaning of the pH sensor as well as highly-reliable pH measurement; thus, it successfully meets an increasing need for accurate, reliable, and maintenance-free measurement.

■ Features

- Chemical Cleaning pH Measuring System cleans the pH sensor by immersing it in chemical solutions such as HCl, which air bubbling agitates. This process provides the remove of scaling (e.g., CaCO₃) as efficiently as manual cleaning.
- Chemical Cleaning pH measuring system diagnoses deterioration of electrodes and checks for a decline in a process liquid level.
- Since the sensor holder raises the pH sensor, the driving part does not come into contact with the liquid; thus, reliable operation is ensured for extended periods.
- Output signals are put on hold during cleaning.

■ System Configuration

	Chemical Cleaning pH Measuring System	
	4-wire Converter	2-wire Analyzer
Chemical Cleaning unit	PH8SM3-H	PH8SM3-G or PH8SM3-F
pH analyzer	FLXA402	FLXA202 or FLXA21
Distributor	—	PH201G
pH sensor	PH8EFP-□-TT2 (Note)	
Holder	PH8HS3	

(Note) You can select WTB10 Terminal Box, if necessary.

You need to order each product above separately.



■ Chemical Cleaning Unit

● Standard Specifications

- Model: PH8SM3
- Cleaning Method: Automatic chemical cleaning air bubbling
- Cleaning Intervals: 0.1 to 36.0 hours (to be set in analyzer)
- Cleaning Duration: 0.1 to 10 min (factory setting: 4 min) (to be set in analyzer.)
- Relaxation Time: 0.1 to 10 min (to be set in analyzer.) (factory setting: 0.5 min)
- Bubbling (SV1: On) Time: 0 to 10 min (factory setting: Approx. 2 min)
- Cylinder Failure Time: 0 to 1 min (factory setting: Approx. 0.5 min)
- Structure: Free-standing rack for indoor installation (For the uv protection, when you install the unit outdoor, prepare tank cover and select Fluoropolymer (PTFE) tube.
- Main Components: Chemical solution tank, control box, air-pressure regulator, and power supply unit (only for 4-Wire Converter)
- Chemicals Solution: Acid solution (e.g., hydrochloric acid or diluted sulfuric acid), or alkali solution.
Organic solvents are not allowed.

Note: Select appropriate solution for effective cleaning.
Material, Color, and Finish of Main Components:

Control Box (K9729AN):

Material: Aluminum alloy casting

Colors: Deep sea moss green (Munsell 0.6GY3.1/2.0) and frosty white (Munsell 2.5Y8.4/1.2)

Finish: Baked polyurethane resin coating

Power Supply Unit (only for 4-wire converter):

Material: Carbon steel (body)
Color : Deep sea moss green (Munsell 0.6GY3.1/2.0 or equivalent)

Mounting Rack:

Material: Carbon steel
Color : Deep sea moss green (Munsell 0.6GY3.1/2.0)

Finish : Baked polyurethane resin coating

Chemical Solution Tank:

(20 L tank containing 2 to 10 % of diluted hydrochloric or sulfuric acid; approximately 100 ml is used for each cleaning. Effective capacity: 17 L

Material: Polyethylene resin (for solution tank), hard PVC resin (for internal tank)

Tubing for Solution, Air, or KCl:

Material: Polyethylene resin or Fluoropolymer (PTFE) for tubing, and polypropylene resin or Fluoropolymer (PTFE) for joints

Ambient Temperature: 0 to 45°C(Provide an anti-frost control, if necessary.)

Power Supply: 100 V AC \pm 10%, 50/60Hz \pm 5%

Power Consumption: Approx. 60 VA

Air Supply: 300 to 950 kPa (3 to 9.5 kgf/cm²)

Max. Air Consumption: Approx. 10 NL/min

External Dimensions: 500 (W) x 600 (D) x 1630 (H)mm

Weight: Approx. 50 kg (when the tank is empty.)

Output Contact Signal: Cylinder failure

Contact State: Normally open

Contact Capacity: 24 V DC, 1A

110 V AC, 0.3 A (resistance load)

Output: You can set pH value or temperature freely.

4-Wire Converter:

4 to 20 mA DC 2 terminals (isolated transmission output; maximum load of 600 Ω)

2-Wire Analyzer:

1 to 5 V DC (from PH201G)

Cable Connection: G 1/2 gland packing is supplied.

Terminal Size: M4

Outside Cable Diameter : \varnothing 9 to \varnothing 12 mm

Piping Connection:

Air for Instrumentation: Rc 1/4 female thread

Note 1: Install the KCl reserve tank in an appropriate place at the job site or attach it to the stand for the chemical cleaning unit.

Note 2: It is user's responsibility to carry out wiring and piping between the chemical cleaning unit, sensor, KCl reserve tank, and holder.

Note 3: It is user's responsibility to carry out wiring between the switch in the holder and the chemical cleaning unit. The terminal size is M4.

EMC compliance:

Korea Electromagnetic Conformity Standard Class A

한국 전자파적합성 기준

•Model and Suffix Codes

Model	Suffix code	Option code	Specifications
PH8SM3	-----	----	Operating Unit for Chemical Cleaning System
pH measuring system ^{(*)1}	-H	----	4-wire Converter(FLXA402)
	-F	----	2-wire Analyzer(FLXA21)
	-G	----	2-wire Analyzer(FLXA202)
KCl reserve tank	-TT2	----	Medium-pressure reserve tank *2
Pressure regulator for KCl tank	-NN	----	None
	-PR	----	Attached to the stand
Air connection	-JP	----	Rc1/4
	-NP	----	1/4 NPT female thread
Tubing for cleaning chemicals	-L10	----	Polyethylene (Connections: Polypropylene)
	-T10	----	Fluoropolymer (PTFE) (Connections: Fluoropolymer (PTFE))*3
Style code	*C	----	Style C
Option	/H		With hood *4
	/TC		With tank cover *5
	/KC		for Korean Certificate *6

*1: 4-wire converter or 2-wire analyzer is attached to the chemical cleaning operating unit when shipped. Corresponding instrument should be purchased separately.

FLXA402-A-B-□□-P1-NN-A-WR-N-N-□-NN

FLXA21-D-P-D-□□-P1-NN-A-N-LA-□-NN

FLXA202-D-B-D-□□-P1-NN-A-N-LA-□-NN

*2: For PH8EFP sensor, select KCl reserve tank (suffix code "-TT2") with a medium-pressure.

*3: Due to the polyethylene's susceptibility to the ultraviolet rays, specify the Fluoropolymer (PTFE) (-T10) as tube material, when you install PH8HS outdoor. Specify the Fluoropolymer (PTFE) when using the operating unit outdoor, even though you install PH8SM3 unit indoor.

*4: Specified at the outdoor installation. Hood is made of precoated SECC.

*5: Specified at the outdoor installation. The cover is made of non-coated stainless steel.

*6: For FLXA402, FLXA21 or FLXA202, specify the type -AG (for general purpose for KC).

Note: The system must undergo start-up service when the chemical cleaning pH measuring system is installed.

•Accessories

Description	Q'ty	Remarks
6 (OD) x 4 (ID) polyethylene resin or Fluoropolymer (PTFE)	40 m	For tubing *1
Fitting (polyethylene resin or Fluoropolymer (PTFE))	6	3 for joint, 3 for spare parts *2

*1: 1 tube for the control box-the tank assembly
3 tubes for the PH8SM3-PH8HS3
1 tube for the pressure valve-KCl reserve tank, if the operating unit has the pressure reducing valve for KCl.

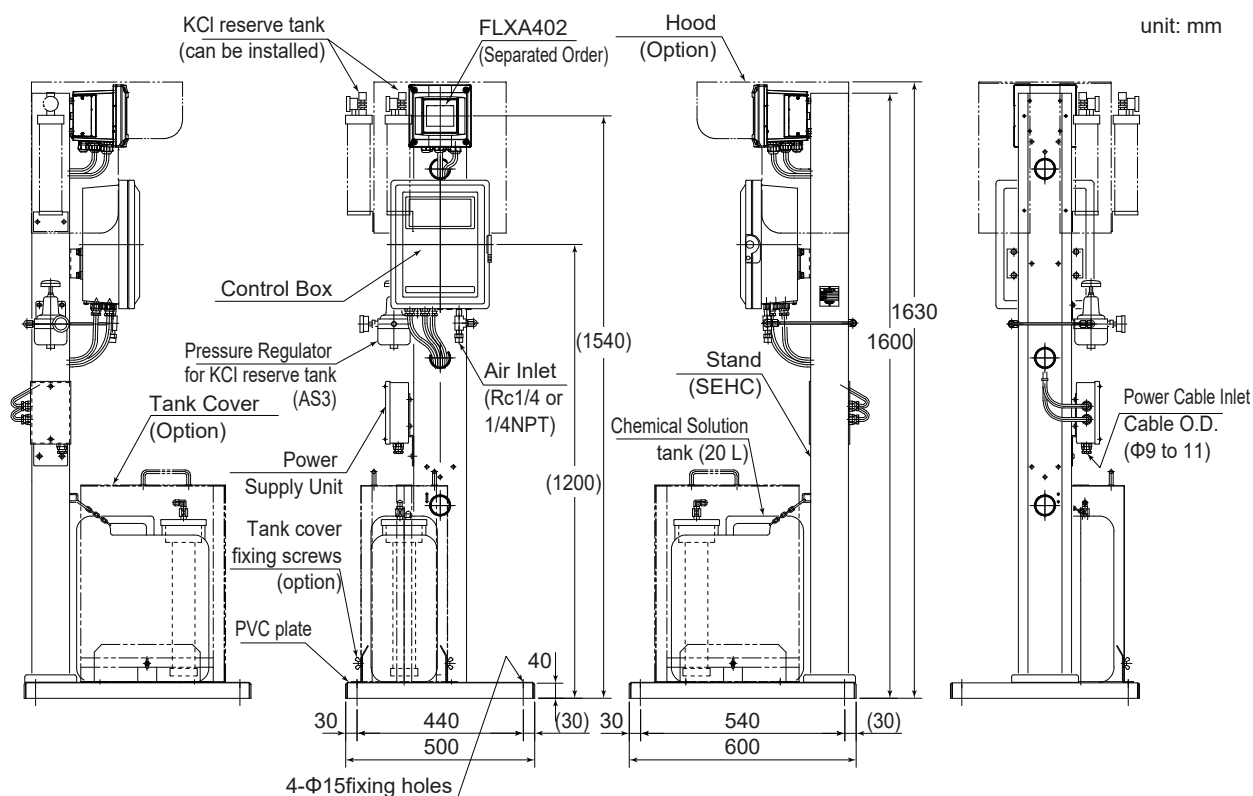
*2: If the operating unit has a pressure-reducing valve that lowers the pressure on the KCl reserve tank, one of these spare fittings is to be used for the piping port of the valve.

•Spare Parts

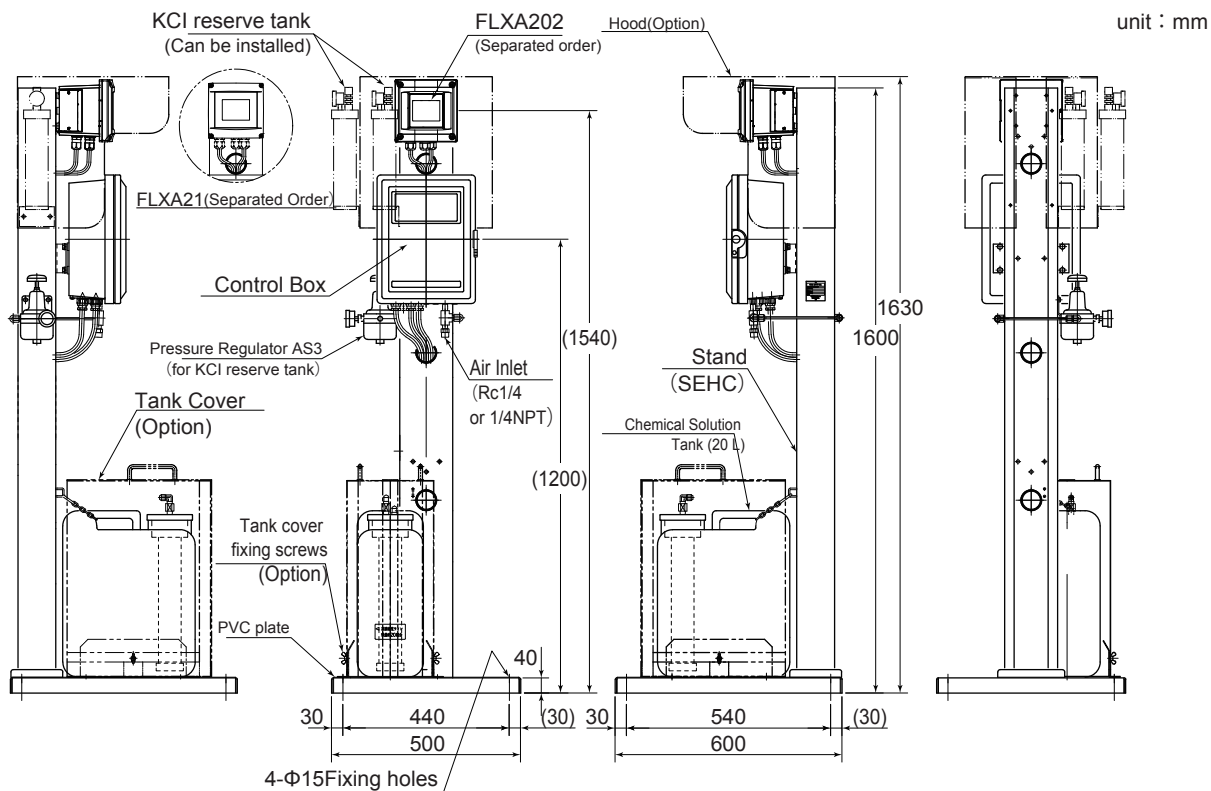
Description	P/N	Remarks
Fuse for power supply box	A1109EF	Rating: 1A (for 4-wire converter only)

External Dimension

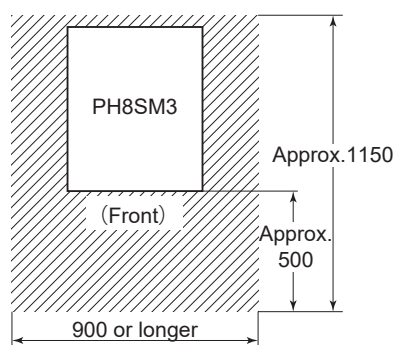
pH/ORP Converter (PH8SM3-H)



2-Wire Analyzer (PH8SM3-G, -F)



Maintenance Space Unit : mm



- (1) The maximum tubes length between the cleaning unit and the sensor holder is 10 m.
- (2) Install the stand at the same level as the sensor holder. If not, you can install the stand a maximum of 2 m below the holder level. Installation above the holder level causes no problem.

■ pH Analyzer

Select either 4-wire Converter FLXA402 or 2-wire analyzer: (FLXA202 + PH201G, or FLXA 21 + PH201G)

Refer to GS 12A01F01-01EN, GS 12A01A02-01E, GS 12A01A03-01EN for further information.

■ Distributor

The distributor PH201G designed exclusively for use with the 2-wire analyzer, supplies drive power to the 2-wire analyzer while simultaneously receiving 4 to 20 mA DC current signal from the analyzer and converting it to 1 to 5 V DC voltage signal; it also simultaneously receives a digital signal superimposed on 4 to 20 mA DC signal, and provides contact outputs during hold, failure, and/or cleaning. A current limiter function is built into the distributor so it can continue to operate properly even with a short circuit on the transmitter side.

●Standard Specifications

<Input/Output Signal Specifications>

Number of input points

(Number of transmitter units connectable): 1 point

Output signal: 1 to 5 V DC (2 points)

Load resistance: 2 kΩ or less (1 to 5 V DC Output)

Isolation system: Loop isolation type

<Mounting/Form>

Mounting method: Indoor rack mounting

Connection method:

External signal connection; M4 screw terminal connection

Power supply/Ground connection:

100 V: JIS C8303 ground type 2 plug connection

220 V: CEE 7VII

(European electrical device standard) plug connection

Cable length: 300 mm

External dimensions: 180H x 48W x 300D mm

Weight: Approx. 1.7 kg (Including rack and case)

<Standard Specifications>

Accuracy: ± 0.2 % of span

Analyzer supply voltage: 26.5 ± 1.5 V DC

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

<Operating Specifications>

Ambient temperature: 0 to 50 °C

Ambient humidity: 5 to 90 % RH (Non-condensing)

Power supply: 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

Maximum current and power consumption

24 V DC: Approx. 200 mA

100 V AC: Approx. 7 VA

220 V AC: Approx. 11 VA

<Contact Output>

Contact rating: 250 V AC, maximum 100 VA 220 V DC, maximum 50 VA

Hold contact output: 1 contact, Normally energized
Contact closes when power is off or during maintenance.

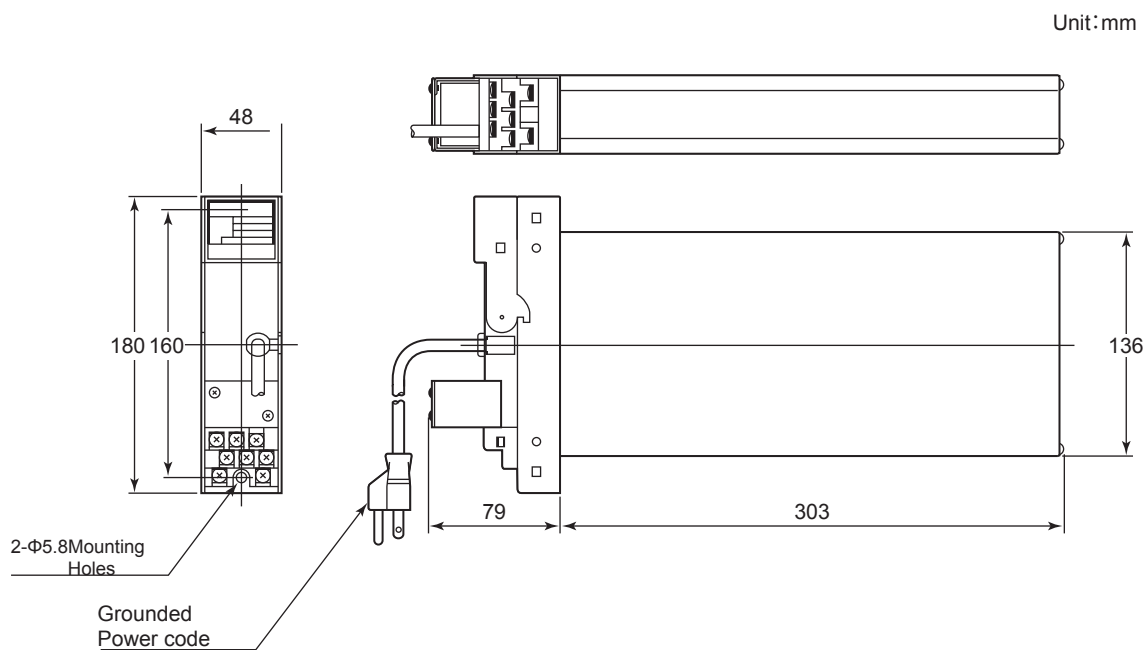
Failure contact output: 1 contact, Normally energized
Contact will close when power is off or during the failure.

Cleaning contact output: Close during cleaning only
Used as drive contact for solenoid valve for cleaning.

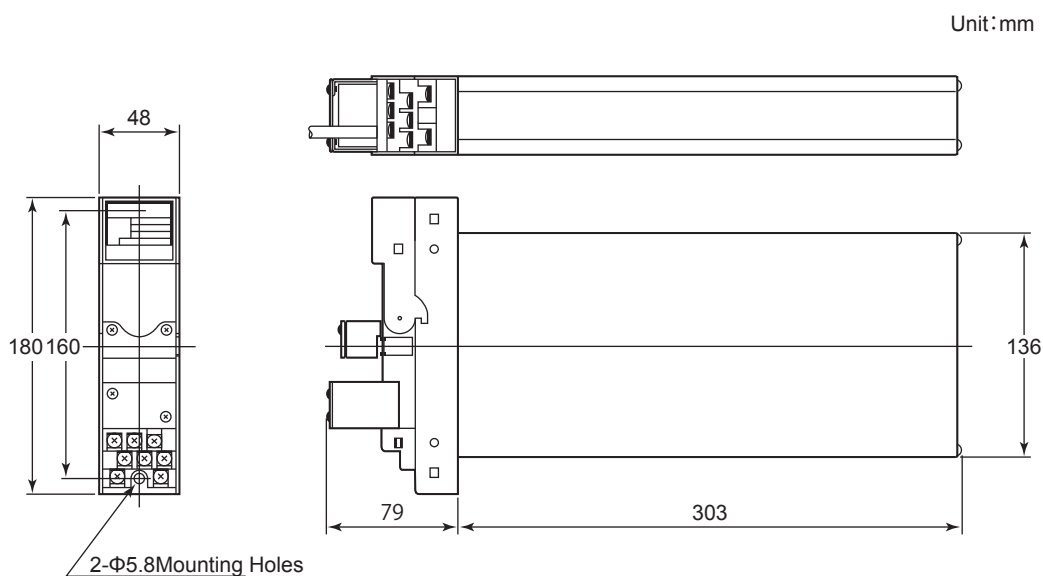
●Model and Suffix Codes

Model	Suffix Code	Option Code	Specification
PH201G	-----	-----	Distributor
Power Supply	-A1 -A2	-----	100V AC 220V AC
—	*B	-----	Style B
Option		/TB	Terminal for power connection

●External Dimension



TB with power terminal



■ pH sensor

For the pH sensor in the system, specify the PH8EFP-□-TT2 model (KCl-filling medium-pressure reserve tank, such as PH8EFP-03-TN-TT2-N-G*A).

The length of each sensor cable must be longer than or equal to the sum of the twice the length of the holder movement and the distance from the pH sensor to pH analyzer.

Purchase the accessory (PH8AX) if necessary. For further details, refer to GS 12B07B02-E.

■ Holder

●Standard Specifications

Model: PH8HS3

Functions: Moves the pH sensor up or down using an air cylinder, and provides facilities for chemical cleaning.

Structure: Constructed for indoor use. Install a cylinder cover for outdoor use.

Max. External Dimensions:

190 (W) x 170 (D) x Approx. 830 to 2030 (H) mm (when the sensor is raised)

Mounting: Mounted on a 50A vertical pipe (outside diameter: 60.5 mm). Two mounting brackets are supplied.

pH Sensor Up/Down Movement (nominal): 300 mm, 600 mm, 1000 mm, 1500 mm

Weight: Approx. 8 kg (holder with 300 mm movement)

Approx. 10 kg (holder with 600 mm movement)

Approx. 12 kg (holder with 1000 mm movement)

Approx. 15 kg (holder with 1500 mm movement)

Materials:

Frame: Baking finish over stainless steel

Bottom Cover Pull-up Mechanism:

Rod (PPS resin) and screws (PEEK)

Mounting bracket: stainless steel

Holder: Polypropylene and hard PVC (for part of a holder)

Solution Chamber: Hard PVC

O-ring: Fluororubber

Solution Temperature Range: -5 to 80°C

Ambient Temperature: 0 to 45°C

Flow Speed: 2 m/s or less

Use only with adequate ventilation due to the hazardous chemical for cleaning.

●Model and Suffix Codes

Model	Suffix code	Option code	Specifications
PH8HS3	-----	----	Holder for Chemical Cleaning
Material	-PP	----	Polypropylene
Movement	-03	----	300 mm (with 2 mounting brackets)
	-06	----	600 mm (with 2 mounting brackets)
	-10	----	1000 mm (with 2 mounting brackets)
	-15	----	1500 mm (with 2 mounting brackets)
pH measuring system	-C	----	4 Wire Type pH Meter
	-T	----	2 Wire Type pH Meter
Cleaning system	-YP	----	Acid or alkali solutions can be used.
	*C	----	Style C
Option		/SC	Cylinder cover for outdoor use *1

*1: For outdoor installation, select Cylinder cover /SC as Option.

●Accessories of PH8HS3

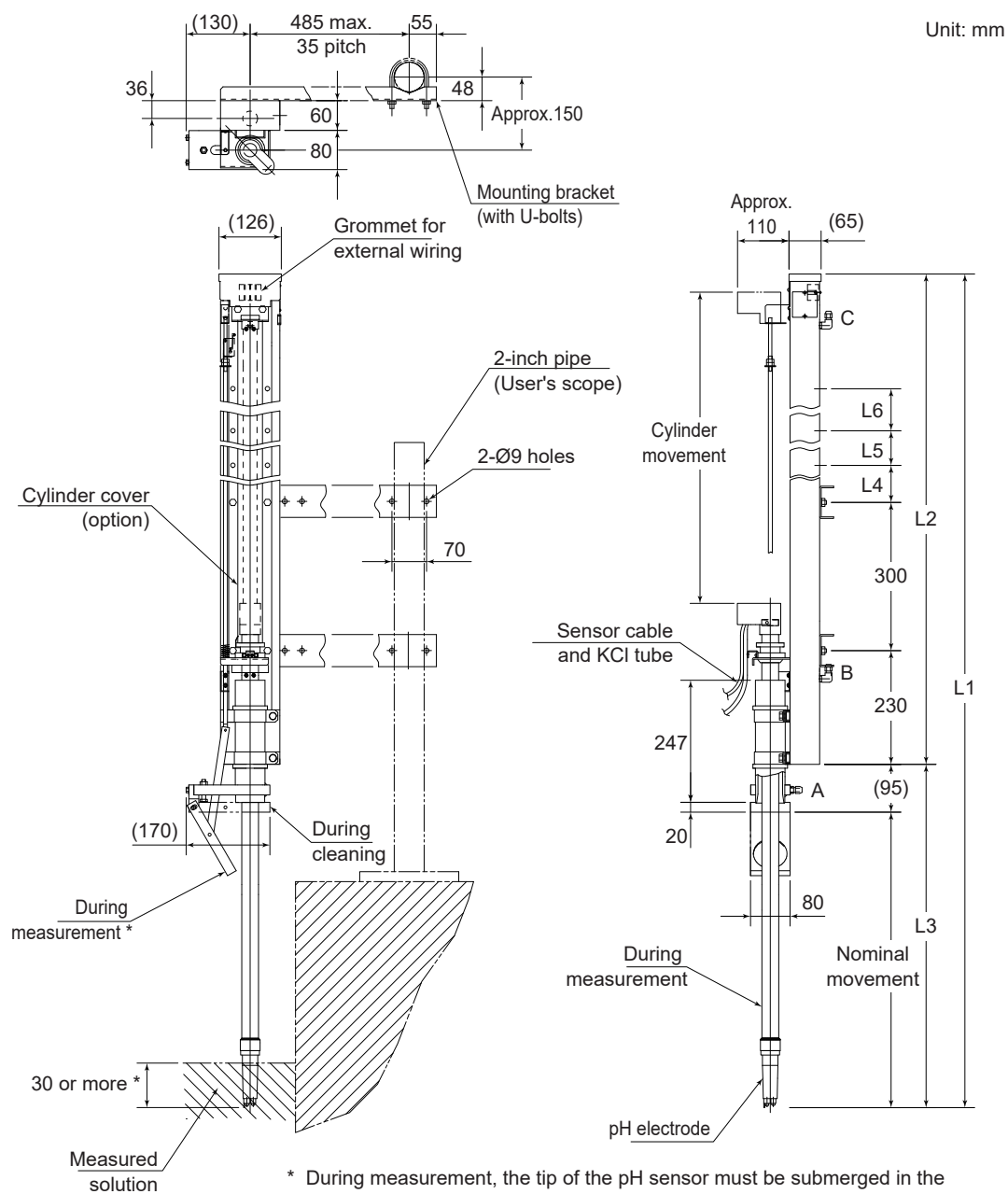
(other than mounting brackets and sensor holder)

Description	Q'ty	Remarks
M8 x 16 mm bolts and nut Washers	4/pkg 8	Parts for mounting brackets (used to mount to the holder)
U bolts (M8) Washers and nuts	2 4/pkg	Parts for mounting brackets (used to mount to 2-inch pipe)
Rubber sheet (19 x 40 mm)	1	Parts for sensor holder (used to fix sensor cable)
Plate	1	
Clamp M4, 16mm screw	1	
Piping fitting (polypropylene)	3	Parts for PH8HS3 holder (used for piping port)
Cable tie	5	For KCl supply tube/sensor cable
Spare gaskets (P/N: K9729WJ)	1	Parts for cleaning chamber of PH8HS3 holder

●Spare Parts

Description	P/N	Q'ty	Remarks
Gasket	K9729WJ	1	Material : EPDM
O-rings	K9729YK	2	1p/pkg. Replace both of the two rings at the same time.

External Dimension



Tubing Connections

- A : Chemical solution inlet (Ø6/Ø4 tube joint)
 B : Lower air inlet of cylinder (Ø6/Ø4 tube joint)
 C : Upper air inlet of cylinder (Ø6/Ø4 tube joint)

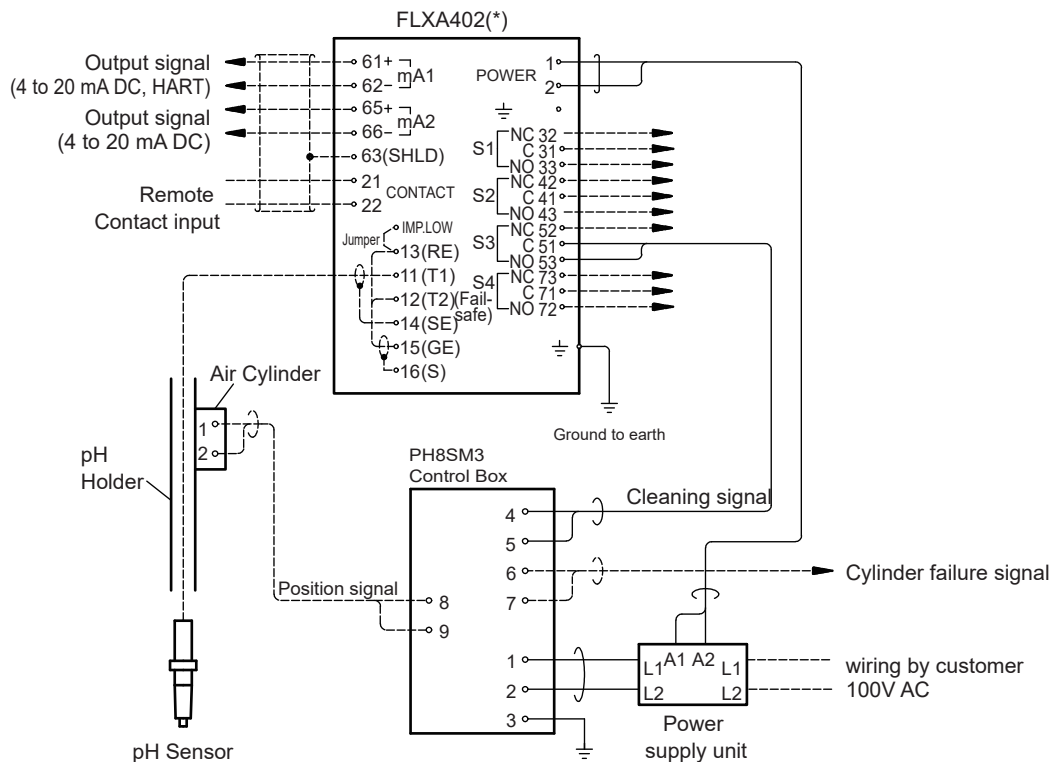
Nominal movement	Actual movement	L1	L2	L3	L4	L5	L6
300mm	340mm	1107	712	395	—	—	—
600mm	640mm	1707	1012	695	300	—	—
1000mm	1040mm	2507	1412	1095	300	300	—
1500mm	1540mm	3507	1912	1595	300	300	300

Note: Specify the nominal movement when ordering.

L4, L5, and L6 designate the movable position for the pipe mounting bracket.

■ Wiring Diagram

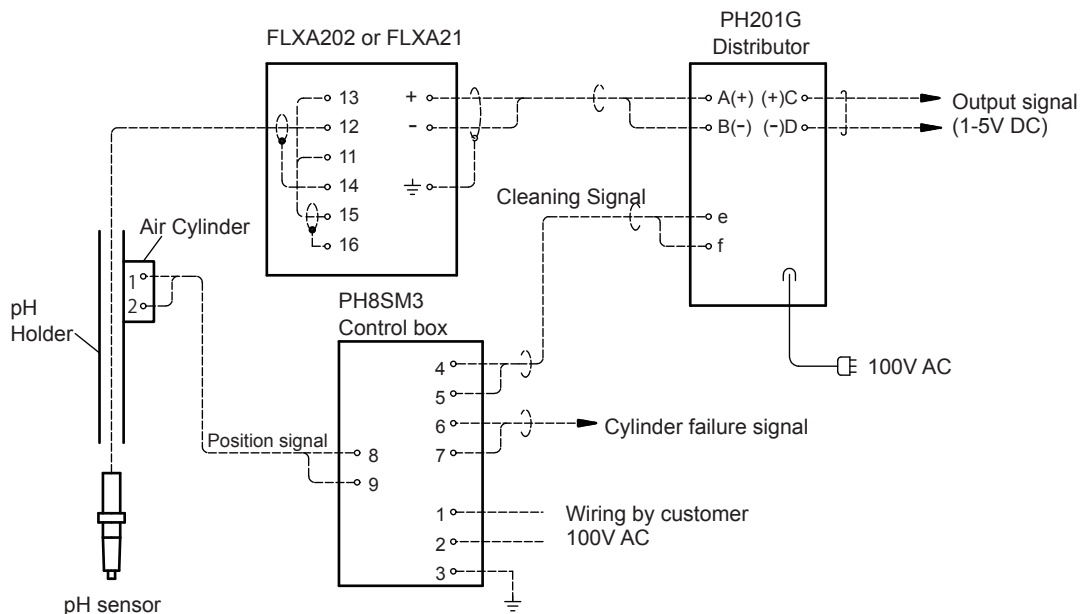
4-wire converter (PH8SM3-H)



*: Refer to the User's manual of FLXA402 for details of wiring.

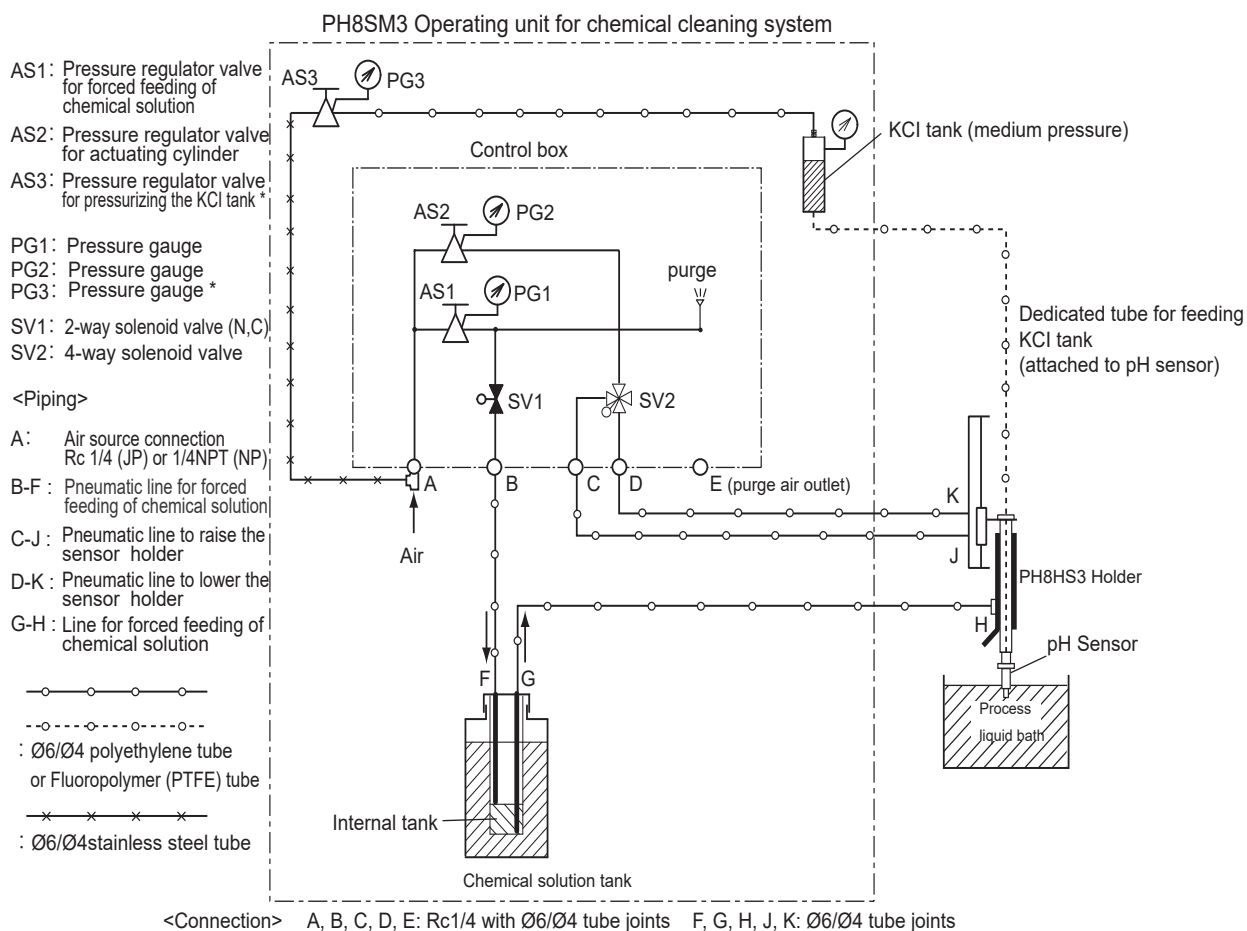
Electrical connections on the control box : Watertight plastic gland equivalent to JIS A15 (outside diameter : 9 to 12mm)

2-wire analyzer (PH8SM3-G, -F)



Electrical connections on the control box : Watertight plastic gland equivalent to JIS A15 (outside diameter : 9 to 12mm)

■ Piping Diagrams



* : Items marked with * are added when Pressure regulator for KCl tank (-PR : Attached to the stand) is specified.

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Note 1: For the piping between the cleaning unit and the sensor holder, a 40 m tube including joints are provided with the product. Cut the tube to required length for use. The maximum length is 10 m to pipe between the cleaning unit and the sensor.

Note 2: The tubes and joints are made of polyethylene resin or Fluoropolymer (PTFE). They should be replaced approximately once a year, although the intervals may vary depending on the chemicals used.

Inquiry Specification

Thank you for your inquiry on our Chemical Cleaning pH Measuring System.
Please tick (v) the appropriate box and fill in the blank.

1. General Information

Company name; _____
Contact Person; _____ Department; _____
Plant name; _____
Measurement location; _____
Purpose of use; Indication, Recording, Alarm, Control
Power supply; _____ V AC _____ Hz

2. Measurement Conditions

(1) Process temperature; _____ to _____ Normally _____ [°C]
(2) Process pressure; _____ to _____ Normally _____ [kPa]
(3) Flow rate; _____ to _____ Normally _____ [l/min]
(4) Flow speed; _____ to _____ Normally _____ [m/s]
(5) Slurry or contaminants; No, Yes _____
(6) Name of process fluid; _____
(7) Components of process fluid; _____
(8) Others; _____

3. Installation Site

(1) Ambient temperature; _____
(2) Location; Outdoors, Indoors _____
(3) Others; _____

4. Requirements

(1) Measuring range; pH 0 to 14, _____
(2) Transmission output; 4 to 20 mA DC
(3) System configuration selection; pH Converter (4-wire, 2-wire)
 Accessories
(4) Electrode cable length; 3 m, 5 m, _____ m
(5) Holder movement; 300 mm, 600 mm, 1000 mm, 1500 mm
(6) Others; _____

Note: The system must undergo start-up service when the chemical cleaning pH measuring system is installed.