General Specifications

Chemical Cleaning pH Measuring System

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

<table>
<thead>
<tr>
<th>Chemical Cleaning pH Measuring System</th>
<th>4-wire Converter</th>
<th>2-wire Analyzer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Cleaning Unit</td>
<td>PH8SM3-H</td>
<td>PH8SM3-G or PH8SM3-F</td>
</tr>
<tr>
<td>pH analyzer</td>
<td>FLXA402</td>
<td>FLXA202 or FLXA21</td>
</tr>
<tr>
<td>Distributor</td>
<td>—</td>
<td>PH201G</td>
</tr>
<tr>
<td>pH sensor</td>
<td>PH8EFP-□-TT2 (Note)</td>
<td></td>
</tr>
<tr>
<td>Holder</td>
<td>PH8HS3</td>
<td></td>
</tr>
</tbody>
</table>

(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): 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 cleaning. Effective capacity: 17 L)
- Material: Polyethylene resin (for solution tank), hard PVC resin (for internal tank)
- Tubing for Solution, Air, or KCl:
  - Tubing for cleaning: Fluoropolymer (PTFE)
  - Chemical Solution Tank: Polyethylene resin (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 ± 10%, 50/60Hz ± 5%
- Power Consumption: Approx. 60 VA
- Air Supply: 300 to 950 kPa (3 to 9.5 kgf/cm²)
- Weight: Approx. 50 kg (when the tank is empty.)
- External Dimensions: 500 (W) x 600 (D) x 1630 (H)mm
- Max. Air Consumption: Approx. 10 NL/min
- Output Contact Signal: Cylinder failure
- Output: You can set pH value or temperature freely.

Chemical Cleaning System:
- 601 chemical cleaning unit. The terminal size is M4.
- EMC compliance: Korea Electromagnetic Conformity Standard Class A
- Korea Electromagnetic Conformity Class A

Model and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix code</th>
<th>Option code</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH8SM3</td>
<td>-</td>
<td>-</td>
<td>Operating Unit for Chemical Cleaning System</td>
</tr>
<tr>
<td>pH measuring system</td>
<td>-H</td>
<td>-</td>
<td>4-wire Converter (FLXA402)</td>
</tr>
<tr>
<td></td>
<td>-F</td>
<td>-</td>
<td>2-wire Analyzer (FLXA21)</td>
</tr>
<tr>
<td></td>
<td>-G</td>
<td>-</td>
<td>2-wire Analyzer (FLXA202)</td>
</tr>
<tr>
<td>KCI reserve tank</td>
<td>-TT2</td>
<td>-</td>
<td>Medium-pressure reserve tank</td>
</tr>
<tr>
<td>Pressure regulator for KCI tank</td>
<td>-NN</td>
<td>-</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>-PR</td>
<td>-</td>
<td>Attached to the stand</td>
</tr>
<tr>
<td>Air connection</td>
<td>-JP</td>
<td>-</td>
<td>Rc1/4</td>
</tr>
<tr>
<td></td>
<td>-NP</td>
<td>-</td>
<td>1/4 NPT female thread</td>
</tr>
<tr>
<td>Tubing for cleaning chemicals</td>
<td>-L10</td>
<td>-T10</td>
<td>Polyethylene (Connections: Polypropylene) Fluoropolymer (PTFE) (Connections: Fluoropolymer (PTFE))</td>
</tr>
<tr>
<td>Style code</td>
<td>°C</td>
<td>-</td>
<td>Style C</td>
</tr>
</tbody>
</table>

Option
- /H: With hood *4
- /TC: With tank cover *5
- /KC: for Korean Certificate *6

Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Q’ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 (OD) x 4 (ID) polyethylene resin or Fluoropolymer (PTFE)</td>
<td>40 m</td>
<td>For tubing *1</td>
</tr>
<tr>
<td>Fitting (polyethylene resin or Fluoropolymer (PTFE))</td>
<td>6</td>
<td>3 for joint, 3 for spare parts *2</td>
</tr>
</tbody>
</table>

Spare Parts

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuse for power supply box</td>
<td>A1109EF</td>
<td>1A (for 4-wire converter only)</td>
</tr>
</tbody>
</table>
**External Dimension**

pH/ORP Converter (PHSM3-H)

- KCl reserve tank (can be installed)
- FLXA402
- Hood (Option)
- Pressure Regulator for KCl reserve tank (AS3)
- Air Inlet (Rc1/4 or 1/4NPT)
- Chemical Solution tank (20 L)
- Stand (SEHC)
- Hood (Option)
- Power Supply Unit
- 4-Φ15 fixing holes
- FLXA202 (Separated order)
- Control Box
- Tank cover fixing screws (Option)
- PVC plate
- FLXA21 (Separated order)
- Power Cable Inlet (Φ9 to 11)

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**2-Wire Analyzer (PHSM3-G, -F)**

- KCl reserve tank (Can be installed)
- FLXA21 (Separated Order)
- Control Box
- Pressure Regulator AS3 (for KCl reserve tank)
- Air Inlet (Rc1/4 or 1/4NPT)
- Chemical Solution Tank (20 L)
- Stand (SEHC)
- Hood (Option)
- FLXA21 (Separated Order)
- Tank cover fixing screws (Option)
- PVC plate
- Air Inlet (Rc1/4 or 1/4NPT)
- Power Supply Unit
- 4-Φ15 fixing holes

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(1) The maximum tubes length between the cleaning unit and the sensor holder is 10 m. 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**
  - Number of input points: 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)
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.

**pH sensor**
### 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

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

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

### Accessories of PH8HS3

(Other than mounting brackets and sensor holder)

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

### Spare Parts

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N</th>
<th>Q’ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasket</td>
<td>K9729WJ</td>
<td>1</td>
<td>Material : EPDM</td>
</tr>
<tr>
<td>O-rings</td>
<td>K9729YK</td>
<td>2</td>
<td>1/pkg. Replace both of the two rings at the same time.</td>
</tr>
</tbody>
</table>

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GS 12B7A1-E 2019.10.01-00
**External Dimension**

- **Unit:** mm

<table>
<thead>
<tr>
<th>Nominal movement</th>
<th>Actual movement</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
</tr>
</thead>
<tbody>
<tr>
<td>300mm</td>
<td>340mm</td>
<td>1107</td>
<td>712</td>
<td>395</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>600mm</td>
<td>640mm</td>
<td>1707</td>
<td>1012</td>
<td>695</td>
<td>300</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1000mm</td>
<td>1040mm</td>
<td>2507</td>
<td>1412</td>
<td>1095</td>
<td>300</td>
<td>300</td>
<td>–</td>
</tr>
<tr>
<td>1500mm</td>
<td>1540mm</td>
<td>3507</td>
<td>1912</td>
<td>1595</td>
<td>300</td>
<td>300</td>
<td>300</td>
</tr>
</tbody>
</table>

**Note:** Specify the nominal movement when ordering. L4, L5, and L6 designate the movable position for the pipe mounting bracket.

During measurement, the tip of the pH sensor must be submerged in the measured solution. The bottom plate of the holder's cleaning chamber must not become wet with the measured solution.
### Wiring Diagram

#### 4-wire converter (PH8SM3-H)

![Wiring Diagram](image)

- **Output signal** (4 to 20 mA DC, HART)
- **Output signal** (4 to 20 mA DC)
- **Remote Contact input**

- **Power supply unit**
- **L1**
- **L2**

- **pH Sensor**
- **wiring by customer**
- **100V AC**

- **pH Holder**
- **Position signal**
- **FLXA402(*)**

- **Air Cylinder**
- **Cleaning signal**

- **Contact input**
- **FLXA202 or FLXA21**
- **PH8SM3 Control Box**
- **Output signal** (1-5V DC)
- **Cylinder failure signal**
- **Power supply unit**
- **100V AC**

- **Output signal** (1-5V DC, HART)
- **Remote Contact input**

- **FLXA202 or FLXA21**
- **PH201G Distributor**
- **Output signal** (1-5V DC)
- **Cleaning Signal**

- **pH Sensor**
- **Position signal**
- **Wiring by customer**
- **100V AC**

*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)

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GS 12B7A1-E 2019.10.09-01
**Piping Diagrams**

PH8SM3 Operating unit for chemical cleaning system

AS1: Pressure regulator valve for forced feeding of chemical solution
AS2: Pressure regulator valve for actuating cylinder
AS3: Pressure regulator valve for pressurizing the KCI tank
PG1: Pressure gauge PG2: Pressure gauge PG3: Pressure gauge *
SV1: 2-way solenoid valve (N,C) SV2: 4-way solenoid valve

**<Piping>**
A: Air source connection Rc 1/4 (JP) or 1/4NPT (NP)
B-F: Pneumatic line for forced feeding of chemical solution
C-J: Pneumatic line to raise the sensor holder
D-K: Pneumatic line to lower the sensor holder
G-H: Line for forced feeding of chemical solution


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

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.