General Specifications
Model FLXA402
4-Wire Converter
GS 12A01F01-01EN

General
The new FLXA402 4-Wire Converter is designed to combine the superior functionality and ease of use from the Yokogawa EXAxt series with the digitization of the future.

The FLXA402 is designed to accept traditional analog or SENCOM 4.0 digital Smart sensors. The FLXA402 offers the possibility of connecting to five sensor measurements at one time.

The modular-designed converter is a multi-parameter instrument offering a wide range of measurement choices; such as: pH/ORP (oxidation-reduction potential), Resistivity/Conductivity (SC), Inductive conductivity (ISC), % Concentration, Dissolved Oxygen (DO) and 4-20 mA input – with the respective sensor module. Multiple sensor measurements offer additional functionalities; calculated data function that can be customized.

The FLXA402 converter includes a color Human Machine Interface (HMI), that offers easy touch screen operation and simple instinctive menu structure in 9 languages. Start up and commission time is minimal. Menus of display, execution and setting are displayed in a selected language.

The FLXA402 offers a variety of communications, mA/HART, Modbus TCP, Modbus RTU/RS485. And FieldMate working on tablet PC can be used as a local display via Bluetooth or RS485.

Features
- Connectable to multiple sensors
- Easily viewable color LCD
- Touch screen operation
- Aluminum alloy cast with corrosion-resistant coating for wide range of industrial environments
- IP66/NEMA Type4X ½ DIN enclosure for field mounting and panel mounting.
- Simple HMI menu structure in 9 languages
- Calculated data from sensor measurements
- Connection of new SENCOM SA Smart Adapter
- Easy maintenance using SD card, Ethernet, RS485 and Bluetooth
- Indication of sensor wellness

FLXA402 Related products and documents

<table>
<thead>
<tr>
<th>Model, Title of document</th>
<th>GS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA11 Smart Adapter</td>
<td>GS 12A06S01-00EN</td>
</tr>
<tr>
<td>BA11 Active Junction Box</td>
<td>GS 12B06W03-01E-E</td>
</tr>
<tr>
<td>WU11</td>
<td>GS 12B06W02-04E-E</td>
</tr>
<tr>
<td>Interconnection/Extension</td>
<td></td>
</tr>
<tr>
<td>Cable for SENCOM Products</td>
<td></td>
</tr>
<tr>
<td>IB100 interface box</td>
<td>GS 12B06J09-01E-E</td>
</tr>
<tr>
<td>pH and ORP Sensors</td>
<td>GS 12B07B02-E</td>
</tr>
<tr>
<td>PH4/OR4 Sensor Series</td>
<td>GS 12B10B00-01EN</td>
</tr>
<tr>
<td>pH and ORP Sensors</td>
<td></td>
</tr>
<tr>
<td>PH20, FU20 and FU24</td>
<td>GS 12B06J03-E-E</td>
</tr>
<tr>
<td>analog 4 in 1 pH sensor</td>
<td></td>
</tr>
<tr>
<td>Conductivity Detectors/</td>
<td></td>
</tr>
<tr>
<td>Sensors</td>
<td>GS 12D08G02-E</td>
</tr>
<tr>
<td>ISC40□:J</td>
<td>GS 12D06B01-01E</td>
</tr>
<tr>
<td>Inductive Conductivity</td>
<td></td>
</tr>
<tr>
<td>Sensors</td>
<td></td>
</tr>
<tr>
<td>ISC40F:□:J Holders and</td>
<td></td>
</tr>
<tr>
<td>Adapters</td>
<td></td>
</tr>
<tr>
<td>ISC40G (S)</td>
<td>GS 12D08J02-E-E</td>
</tr>
<tr>
<td>Inductive Conductivity</td>
<td></td>
</tr>
<tr>
<td>sensor and fittings</td>
<td></td>
</tr>
<tr>
<td>DO30G</td>
<td>GS 12J05D03-01E</td>
</tr>
<tr>
<td>Sensor for Dissolved</td>
<td></td>
</tr>
<tr>
<td>Oxygen Analyzer</td>
<td></td>
</tr>
<tr>
<td>DO30G and FD30/PB30</td>
<td>GS 12J06K04-E-E</td>
</tr>
<tr>
<td>Sensor and fittings for</td>
<td></td>
</tr>
<tr>
<td>Dissolved Oxygen</td>
<td></td>
</tr>
<tr>
<td>DO70G</td>
<td>GS 12J05D04-01E</td>
</tr>
<tr>
<td>Optical Dissolved Oxygen</td>
<td></td>
</tr>
<tr>
<td>Sensor</td>
<td></td>
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<tr>
<td>Sensor Holders</td>
<td>GS 12J05C02-00E</td>
</tr>
<tr>
<td>FSA111 FieldMate</td>
<td>GS 01R01A01-01E</td>
</tr>
</tbody>
</table>

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System Configuration

According to module combination

<table>
<thead>
<tr>
<th>1st Input (Code)</th>
<th>System configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH/ORP, SC, ISC, DO (-P1, -C1, -C5, -D1)</td>
<td>Config. A</td>
</tr>
<tr>
<td>Digital sensor (-D5)</td>
<td></td>
</tr>
<tr>
<td>SENCOM SA (-S5)</td>
<td>Direct connection</td>
</tr>
<tr>
<td></td>
<td>Multiple sensor measurement (*)</td>
</tr>
<tr>
<td></td>
<td>Config. B</td>
</tr>
</tbody>
</table>

(*) Multiple sensor connection with a junction box BA11. When FLXA402 Type (-DD) is selected, multiple sensor connection is not available.

Configurable sensors

<table>
<thead>
<tr>
<th>measure sensors *1</th>
<th>pH/ORP</th>
<th>SC</th>
<th>ISC</th>
<th>DO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog sensors *2 (-P1, -C1, -C5, -D1)</td>
<td>FU20</td>
<td>SC4A</td>
<td>ISC4G</td>
<td>DO30G</td>
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<tr>
<td></td>
<td>FU24</td>
<td>SC4C</td>
<td>ISC4S</td>
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<tr>
<td></td>
<td>SM21/SR20</td>
<td>SC42</td>
<td>ISC4Q</td>
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<td></td>
<td>PH20</td>
<td>SC85G</td>
<td>ISC4G</td>
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<td>SC21</td>
<td>SC210G</td>
<td>ISC4G</td>
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<td>SC25V</td>
<td>ISC4G</td>
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<td>SC29C</td>
<td>ISC4G</td>
<td></td>
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<td>PH8E-P</td>
<td>ISC4G</td>
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<td></td>
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<tr>
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<td>PH4-T</td>
<td>ISC4G</td>
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<tr>
<td></td>
<td>OR8E-G</td>
<td>ISC4G</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>OR4-D</td>
<td>ISC4G</td>
<td></td>
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<tr>
<td>Digital sensor (Optical DO Sensor) (-D5)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>DO70G</td>
</tr>
<tr>
<td>Sensor for SENCOM SA (-S5)</td>
<td>FU20-VS</td>
<td>SC4A...VS</td>
<td>ISC4G...VS</td>
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<tr>
<td></td>
<td>PH21</td>
<td>SC42-VS</td>
<td>ISC4G-VS</td>
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<tr>
<td></td>
<td>PH24</td>
<td>ISC4G-VS</td>
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<tr>
<td></td>
<td>PH8E-P...VS</td>
<td>ISC4G...VS</td>
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<td></td>
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<tr>
<td></td>
<td>ISC4G...VS</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*1: Inside parenthesis explain suffix code for 1st (2nd) input
*2: means conventional sensors, not including sensors for SENCOM SA.

Config. A

- 1 sensor connects to 1st (and 2nd) input for each
- 1st input is pH/ORP, SC, ISC, DO, SENCOM SA (-P1, -C1, -C5, -D1, -S5)
- (e.g.) 1st input: pH sensor for SENCOM SA (-S5)
- 2nd input: analog ISC sensor (-C5) (Figure. A)

Config. B

- Multiple sensor measurement with BA11
- When 1st input connects to SENCOM SA (-S5) with BA11, multiple sensor measurement with BA11 can connect up to 4 sensors for SENCOM SA. One sensor can connect to 2nd input.
- (e.g.) 1st input: 4 pH sensors for SENCOM SA with BA11(-S5)
- 2nd input: pH sensor for SENCOM SA (-S5) (Figure. B)

FieldMate FLXA402 4-Wire Converter

WU11 SENCOM cable

SA11 Smart Adapter

Use WE10 extension cable to extend the length between SA11 and sensor

pH/ORP sensor

 ISC sensor

(Figure A) Config. A

(Figure B) Config. B an example of multiple sensor measurement
General Specifications

1. Basic

■ Measurement Object
  • pH/Oxidation-reduction Potential (pH/ORP)
  • Conductivity (SC)
  • Inductive Conductivity (ISC)
  • Dissolved Oxygen (DO)
  Note: The available measurement object depends on a sensor module installed on the converter.

■ Types of Sensor Module
  Analog sensor module for analog sensors
  • PH: for analog pH/ORP
  • SC: for analog Resistivity/Conductivity
  • ISC: for analog Inductive Conductivity
  • DO: for analog Dissolved Oxygen

Digital sensor module
• SENCOM SA: for SA11
• Digital sensor: for optical DO

■ Other Modules
  • IO: mA output, mA input, contact input
  • Relay: SPDT relay
  • Digital communication: Modbus TCP/IP (Ethernet) or Modbus RTU (RS485)

1st sensor module
2nd sensor module
Communication module
Relay module

■ Combination of Sensor Module
There are two sensor module slots; up to Five sensor measurements are available in case of the combination of SENCOM SA module and BA11 junction box.

When FLXA402 (-DD) is selected, multiple sensor measurements are not available.

The combination of two same sensor modules or different type of sensor modules is possible except in the case of Optical DO sensor. Please reference the following combination chart.

<table>
<thead>
<tr>
<th>1st sensor module (1st input)</th>
<th>2nd sensor module (2nd input)</th>
<th># of Total Inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog pH/ORP (-P1)</td>
<td>Analog pH/ORP (-P1)</td>
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<tr>
<td>Analog SC (-C1)</td>
<td>Analog SC (-C1)</td>
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<tr>
<td>Analog ISC (-C5)</td>
<td>Analog ISC (-C5)</td>
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</tr>
<tr>
<td>Analog DO (-D1)</td>
<td>Analog DO (-D1)</td>
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</tr>
<tr>
<td>SENCOM SA (-S5)</td>
<td>SENCOM SA (-S5)</td>
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</tr>
<tr>
<td>Analog SC (-C1)</td>
<td>Analog pH/ORP (-P1)</td>
<td>2</td>
</tr>
<tr>
<td>Analog SC (-C1)</td>
<td>Analog SC (-C1)</td>
<td>2</td>
</tr>
<tr>
<td>Analog ISC (-C5)</td>
<td>Analog ISC (-C5)</td>
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</tr>
<tr>
<td>Analog DO (-D1)</td>
<td>Analog DO (-D1)</td>
<td>2</td>
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<tr>
<td>SENCOM SA (-S5)</td>
<td>SENCOM SA (-S5)</td>
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</tr>
<tr>
<td>Analog ISC (-C5)</td>
<td>Analog pH/ORP (-P1)</td>
<td>2</td>
</tr>
<tr>
<td>Analog ISC (-C5)</td>
<td>Analog SC (-C1)</td>
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</tr>
<tr>
<td>Analog ISC (-C5)</td>
<td>Analog ISC (-C5)</td>
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</tr>
<tr>
<td>Analog DO (-D1)</td>
<td>Analog DO (-D1)</td>
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<td>SENCOM SA (-S5)</td>
<td>SENCOM SA (-S5)</td>
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<tr>
<td>Analog DO (-D1)</td>
<td>Analog pH/ORP (-P1)</td>
<td>2</td>
</tr>
<tr>
<td>Analog SC (-C1)</td>
<td>Analog SC (-C1)</td>
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<tr>
<td>Analog ISC (-C5)</td>
<td>Analog ISC (-C5)</td>
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<tr>
<td>Analog DO (-D1)</td>
<td>Analog DO (-D1)</td>
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<td>Analog SC (-C1)</td>
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<td>Analog ISC (-C5)</td>
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<td>SENCOM SA (-S5)</td>
<td>Analog DO (-D1)</td>
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<td>SENCOM SA (-S5)</td>
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<tr>
<td>Digital sensor for optical DO (-D5)</td>
<td>Analog pH/ORP (-P1)</td>
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<td>Digital sensor for optical DO (-D5)</td>
<td>Analog SC (-C1)</td>
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<td>Analog ISC (-C5)</td>
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<tr>
<td>Digital sensor for optical DO (-D5)</td>
<td>Analog DO (-D1)</td>
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</tr>
<tr>
<td>Digital sensor for optical DO (-D5)</td>
<td>SENCOM SA (-S5)</td>
<td>2</td>
</tr>
</tbody>
</table>

Digital sensor module (for optical DO):
Combination of two Digital sensor modules isn’t available. Digital sensor module should be in 1st sensor module (1st input).
2. Measurement

2-1. pH/ORP (PH)
When 1st or 2nd input is -P1 (PH)
(when 1st or 2nd input is -S5 (SENCOM SA), see 2-6 SENCOM SA Smart Adapter.)

■ Input Specification
Dual high impedance input (≥10\(^{12}\) Ω)

■ Input Range
\(\text{pH: }-2 \text{ to } 16 \text{ pH (with option }/K: 0 \text{ to } 14 \text{ pH)}\)
\(\text{ORP: }-1500 \text{ to } 1500 \text{ mV}\)
\(\text{rH: }0 \text{ to } 100 \text{ rH}\)
\(\text{Temperature: }\)
\(\text{Pt1000: }-30 \text{ to } 140 \text{ ºC}\)
\(\text{Pt100: }-30 \text{ to } 140 \text{ ºC}\)
\(6k8: \quad -30 \text{ to } 140 \text{ ºC}\)
\(\text{NTC 8k55: }-10 \text{ to } 120 \text{ ºC}\)
\(3k \text{ Balco: }-30 \text{ to } 140 \text{ ºC}\)
\(\text{PTC500: }-30 \text{ to } 140 \text{ ºC}\)

■ Input Range
\(\text{pH: min. span } 1 \text{ pH}\)
\(\text{max. span } 20 \text{ pH}\)
\(\text{ORP: min. span } 100 \text{ mV}\)
\(\text{max. span } 3000 \text{ mV}\)
\(\text{rH: min. span } 2 \text{ rH}\)
\(\text{max. span } 100 \text{ rH}\)
\(\text{Temperature: min. span } 25 \text{ ºC}\)
\(\text{max. span } 170 \text{ ºC}\)

■ Performance (Accuracy)
(The specifications are expressed with simulated inputs.)
\(\text{pH}\)
\(\text{Linearity: }±0.01 \text{ pH}\)
\(\text{Repeatability: }±0.01 \text{ pH}\)
\(\text{Accuracy }±0.01 \text{ pH}\)
\(\text{ORP}\)
\(\text{Linearity: }±1 \text{ mV}\)
\(\text{Repeatability: }±1 \text{ mV}\)
\(\text{Accuracy }±1 \text{ mV}\)
\(\text{Temperature}\)
\(\text{with Pt1000, 6k8, PTC10k, NTC 8k55, 3k Balco, PTC500}\)
\(\text{Linearity: }±0.3 \text{ ºC}\)
\(\text{Repeatability: }±0.1 \text{ ºC}\)
\(\text{Accuracy }±0.3 \text{ ºC}\)
\(\text{with Pt100}\)
\(\text{Linearity: }±0.4 \text{ ºC}\)
\(\text{Repeatability: }±0.1 \text{ ºC}\)
\(\text{Accuracy }±0.4 \text{ ºC}\)

2-2. Conductivity (SC)
When 1st or 2nd input is -C1 (SC)

■ Input Specification
Two or four electrodes measurement with square wave excitation, using max 60m (200 ft) cable (WU40/ WF10) and cell constants from 0.005 to 50.0 cm\(^{-1}\)

■ Input Range
\(\text{Conductivity: }0 \mu\text{S/cm}\)
\(\text{max. span: }200 \text{ mS x (Cell constant)}\)
\(\text{(over range }2000 \text{ mS/cm)}\)
\(\text{Resistivity: }0.005 \text{ kΩ }/ \text{(Cell constant)}\)
\(\text{max. span: }1000 \text{ MΩ x cm}\)

■ Output Range
\(\text{Conductivity: min. span: }100 \mu\text{S/cm}\)
\(\text{max. span: }2000 \text{ mS/cm (max 90% zero suppression)}\)
\(\text{Resistivity: min. span: }1 \text{ MΩ x cm (max 90% zero suppression)}\)
\(\text{Temperature: min. span } 25 \text{ ºC}\)
\(\text{max. span } 270 \text{ ºC}\)

■ Performance (Accuracy)
(The specifications are expressed with simulated inputs.)
\(\text{Conductivity}\)
\(2 \mu\text{S x K cm}^{-1} \text{ to } 200 \text{ mS x K cm}^{-1}\)
\(\text{Accuracy: }±0.5\%\text{F.S.}\)
\(1 \mu\text{S x K cm}^{-1} \text{ to } 2 \mu\text{S x K cm}^{-1}\)
\(\text{Accuracy: }±1\%\text{F.S.}\)
\(\text{Resistivity}\)
\(0.005\text{kΩ }/ \text{K cm}^{-1} \text{ to } 0.5\text{MΩ }/\text{K cm}^{-1}\)
\(\text{Accuracy: }±0.5\%\text{F.S.}\)
\(0.5\text{MΩ }/ \text{K cm}^{-1} \text{ to } 1\text{MΩ }/\text{K cm}^{-1}\)
\(\text{Accuracy: }±1\%\text{F.S.}\)
\(\text{Temperature}\)
\(\text{with Pt1000, Pb36, Ni100}\)
\(\text{Accuracy: }±0.3 \text{ ºC}\)
\(\text{with Pt100, NTC 8k55}\)
\(\text{Accuracy: }±0.4 \text{ ºC}\)
\(\text{Temperature compensation}\)
\(\text{NaCl table: }±1 \text{ %}\)
\(\text{Matrix: }±3 \text{ %}\)
\(\text{Step response: 90 % (< 2 decades) in 7 seconds}\)
\(\text{Note: “F.S.” means maximum setting value of convertr output.}\)
\(\text{“K” means cell constant.}\)
\(\text{YOKOGAWA provides conductivity sensors of which cell constants are 0.1 to 10 cm}^{-1}.\)

2-3. Inductive Conductivity (ISC)
When 1st or 2nd input is -C5 (ISC)

■ Input Specification
Compatible with the Yokogawa inductive conductivity ISC40 series with integrated temperature sensor:
NTC30k or Pt1000.

■ Input Range
\(\text{Conductivity: }0 \text{ to } 2000 \text{ mS/cm at }25 \text{ ºC reference temperature.}\)
\(\text{Temperature: }-20 \text{ to } 140 \text{ ºC}\)
\(\text{Cable length: max. }60 \text{ meters total length of fixed sensor cable }+\text{ WF10(J) extension cable.}\)
\(\text{Influence of cable can be adjusted by doing an AIR CAL with the cable connected to a dry cell.}\)

■ Output Range
\(\text{Conductivity: min. span: }100 \mu\text{S/cm}\)
\(\text{max. span: }2000 \text{ mS/cm (max 90% zero suppression)}\)
\(\text{Temperature: min. span } 25 \text{ ºC}\)
\(\text{max. span } 160 \text{ ºC}\)
2-4. Dissolved Oxygen (DO)

When 1st or 2nd input is -D1 (DO)

When 1st input is -D5 (Digital sensor), see 2-5.

Digital Sensor.

Note: When Type is -DD (NI for FM), -D1 (DO) cannot be selected.

Input Specification

The FLXA402 accepts output from membrane covered Dissolved Oxygen sensors. These sensors can be Galvanic type, where the sensor generates its own driving voltage or Polarographic type, where the sensor uses external driving voltage from the converter.

The input range is 0 to 50 µA for Galvanic sensors and 0 to 1 micro A for Polarographic sensors.

For temperature compensation, the FLXA402 accepts Pt1000 (DO30 sensor) and NTC22k elements (OXYFERM and OXYGOLD sensors).

Input Range

DO30G sensor:

Dissolved Oxygen: 0 to 50 mg/l (ppm)

Temperature: -20 to 150 ºC

Note: Process temperature for DO30 is 0 to 40 ºC

Hamilton sensors:

Oxyferm:

Measurement range: 10 ppb to 40 ppm

Temperature range: 0 to 130 ºC

Oxygold G:

Measurement range: 2 ppb to 40 ppm

Temperature range: 0 to 130 ºC

Oxygold B:

Measurement range: 8 ppb to 40 ppm

Temperature range: 0 to 100 ºC

Output Range

DO concentration:

mg/l (ppm):

min.: 1 mg/l (ppm)

max.: 50 mg/l (ppm)

ppb:

min.: 1 ppb

max.: 9999 ppb

% saturation:

min.: 10 %

max.: 600 %

Temperature:

min. span 25 ºC

max. span 170 ºC

Performance (Accuracy)

(The specifications are expressed with simulated inputs.)

Performance in ppm mode:

Linearity: ±0.05 ppm or ±0.8% F.S., whichever is greater

Repeatability: ±0.05 ppm or ±0.8% F.S., whichever is greater

Accuracy: ±0.05 ppm or ±0.8% F.S., whichever is greater

Performance in ppb mode:

Linearity: ±1 ppb or ±0.8% F.S., whichever is greater

Repeatability: ±1 ppb or ±0.8% F.S., whichever is greater

Accuracy: ±1 ppb or ±0.8% F.S., whichever is greater

Temperature

Linearity: ±0.3 ºC

Repeatability: ±0.1 ºC

Accuracy: ±0.3 ºC

Note: "F.S." means maximum setting value of converter output.

2-5. Digital Sensor

When 1st input is -D5 (Digital sensor)

Measurement with the digital sensor DO70G Optical Dissolved Oxygen Sensor.

See GS 12J05D04-01E for information on DO70G.

Note: When Type is -DD (NI for FM), -D5 (Digital Sensor) cannot be selected.

2-6. SENCOM SA Smart Adapter

When 1st or 2nd input is -S5 (SENCOM SA)

Measurement with digital adapter SA11 SENCOM Smart Adapter.

See GS 12A01F00-01E for information on SA11.

Note: When Type is -DD (NI for FM), -S5 (SENCOM SA) cannot be selected.

3. Electrical

■ Transmission Signals

General:

Isolated outputs: 4-20 mA DC

Accuracy: +/- 0.02 mA

Repeatability: +/- 0.02 mA

Linearity: +/- 0.02 mA

Maximum load: 600 ohm

Bi-directional HART digital communication (HART 7 protocol) superimposed on mA1 (4-20mA) signal

Number of outputs: selectable by suffix code.

2 isolated outputs: -A2

4 isolated outputs: -A4

Output function:

Linear or Non-linear (21-step table) for available signals

Signal: 3.8 to 20.5 mA

Burn out function:

Burn up (22.0 mA) or burn down (2.2 mA) to signal failure according to NAMUR NE43.

Hold:

The mA-outputs are frozen to the last/fixed value during calibration/commissioning.

■ Analog Input (mA Output type; -A4)

It is used for pressure compensation (only DO) and temperature compensation (pH, SC, ISC, DO).

General:

Isolated input: 4-20 mA DC

Accuracy: +/- 0.02 mA

Number of input: 1
■ Contact Outputs
Note: When selecting Type -DD (NI for FM), check the condition of Control Drawing.

General:
Four SPDT relay contacts with display indicators. Contacts are dry, not powered.

Switch capacity:
Maximum values: 100 VA, 250 VAC, 5 Amps.
Maximum values: 50 Watts, 24 VDC, 5 Amps.

Note: When contact output current is more than 4 Amps, ambient temperature should be less than 40 °C.

Status:
High/Low process alarms, selected from available signals. Configurable delay time and hysteresis.

Warning/Failure annunciation

Fail
Contact S4 is programmed as fail-safe contact.

Control function:
On/Off
Wash:
Contact can be used to start manual or interval time wash cycles.

Hold:
Contact can be used to signal the Hold situation.

■ Contact Inputs
Contact input controls starting WASH CYCLE or changing RANGE of 4-20 mA output (programmable) each for pH/ORP, SC, ISC and DO.

General:
Isolated input
Close: less than 200Ω
Open: more than 100kΩ

Voltage-free contact (do not apply voltage)

■ Digital communication (Option)
• Ethernet (Modbus TCP): 10/100Mbps
  Cable length: Max. 100m
• RS-485 (Modbus RTU):
  115200/38400/9600bps
  Cable length: 115200bps: Max 600m
  38400bps, 9600bps: Max 1200m

■ Bluetooth
Communication distance:
Approx. 10 m (depends on the operating environment.) (Class2)

■ Temperature compensation
Function:
Automatic or manual. Compensation to Nernst equation. Process compensation by configurable temperature coefficient, NEN6411 for water or strong acids/bases or programmable matrix.

■ Calibration
Semi-automatic 1, 2 or 3 point calibration using pre-configured NIST, US, DIN buffer tables 4, 7 & 9, or with user defined buffer tables, with automatic stability check. Manual adjustment.

■ Logbook
Software record of important events and diagnostic data readily available in the display.

■ Display
QVGA color LCD with a touch screen.
Message language: 9 (English, Chinese, Czech, French, German, Japanese, Korean, Portuguese, and Spanish)

■ Refresh interval of data
0.5 s: number of measurement = 1
1 s: number of measurement >= 2

■ Power supply
Note: When selecting Type -DD (NI for FM), check the condition of Control Drawing.

FLXA402-A
Ratings: 100-240 V AC
Acceptable range: 90 to 264 V AC
Ratings: 50/60 Hz
Acceptable range: 50 Hz ±5%, 60 Hz ±5%

Power Consumption: 35 VA

FLXA402-D
Ratings: 12-24 V DC
Acceptable range: 10.8 to 26.4 V DC

Power Consumption: 15 W

4. Mechanical and others

■ Housing
Case color and finish
Color: Silver gray
Finish: chemically resistant coating or high anti-corrosion coating

Window
Polycarbonate (flexible)
Protection
NEMA Type4X (USA), Type4X (Canada), IP66

■ Cable and Terminal
Cable size:
Outer diameter: 6 to 12 mm (suitable for M20 cable gland)

Terminal screw size: M3 (Power/Earth terminal: M4)

■ Cable Entry
8 holes
M20 cable gland x 8 pcs
Note: Cable gland and plug are delivered with an converter, but not assembled into the converter.

■ Mounting hardware (option)
• Universal mounting kit (Note)
• Pipe and wall mounting hardware
• Panel mounting hardware
Note: This kit contains the pipe and wall mounting hardware and the panel mounting hardware.

■ Hood (option)
• Stainless steel
• Stainless steel with chemically resistant coating

■ Stainless Steel Tag Plate (option)
When the additional code “/SCT” with a tag number is specified, the tag plate on which the tag number is inscribed is delivered with the converter. Tag plate is hanging type.

■ Conduit adapter (option)
Using optional adapter
• G1/2 (quantity: 8)
• 1/2NPT (quantity: 8)
• M20 x 1.5 (quantity: 8)
These conduit adapters are delivered with an converter, but not assembled into the converter.

■ Size of Housing Case
165 x 165 x 168.5 mm (W x H x D) (without cable gland)

■ Weight
Max. 3.0 kg

■ Warm up time
Approx. 30 min.
■ Ambient Operating Temperature
-20 to +55 °C

■ Storage Temperature
-30 to +70 °C

■ Humidity
10 to 90% RH at 40°C (Non-condensing)

■ Document
Following documents are delivered with a converter;
Paper copy:
Start-up Manual and Safety Precautions
Other documents are to be downloaded from website:
User’s Manual
Safety Regulations Manual,
User Setting Table of measurement / sensor type

■ Regulatory Compliance
Safety:
EN 61010-1
EN 61010-2-030
UL 61010-1
UL 61010-2-030
CAN/CSA-C22.2 No.61010-1
CAN/CSA-C22.2 No.61010-2-030
GB30439

Installation altitude: 2000 m or less
Category based on IEC 61010: I (DC model)
Category based on IEC 61010: II (AC model) (Note1)
Pollution degree based on IEC 61010: 2 (Note2)

Note1: Installation category, called over-voltage category, specifies impulse withstand voltage.
Equipment with “Category I” is used for connection to circuit in which measures are taken to limit transient over-voltage to an appropriately low level. Category II is energy-consuming equipment to be supplied from the fixed installation.

Note 2: Pollution degree indicates the degree of existence of solid, liquid, gas or other inclusions which may reduce dielectric strength. Degree 2 is the normal indoor environment.

EMC:
EN61326-1 Class A, Table 2
(For use in industrial locations)
EN61326-2-3
EN61000-3-2
EN61000-3-3
RCM: EN 55011 Class A, Group 1
Korea Electromagnetic Conformity Standard

Bluetooth
Compliant standard: Bluetooth Ver 3.0
Applicable countries / regions; (regulations)
Japan, EU, USA, Canada, Australia, New Zealand, Singapore
EN 301 489-1
EN 301 489-17
EN 300 328
EN 62479
FCC 15C
ICES-003
AS/NZS4268, AS/NZS2772.2
IMDA TS SRD

Environmental regulation:
RoHS: EN50581
REACH: Regulation EC 1907/2006

Information of the WEEE Directive
This product is purposely designed to be used in a large scale fixed installations only and, therefore, is out of scope of the WEEE Directive. The WEEE Directive does not apply.
The WEEE Directive is only valid in the EU.
NAMUR: NE43, 107

FM nonincendive approval (suffix code Type : -DD)
Applicable Standard
FM Class 3600
FM Class 3611
FM Class 3810
ANSI/UL 1121201
ANSI/UL 61010-1
ANSI/UL 61010-2-030
ANSI/NEMA 250
Certificate No. FM18US0281
Class I, Div. 2, GP ABCD

Non-hazardous Location

<table>
<thead>
<tr>
<th>Temp. class</th>
<th>Power supply</th>
<th>Number of mA Output</th>
<th>Ambient Temperature</th>
<th>Switch capacity of Contact Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>T4</td>
<td>AC version</td>
<td>2</td>
<td>-20 to +55°C</td>
<td>MAX: 5A</td>
</tr>
<tr>
<td></td>
<td>DC version</td>
<td>4</td>
<td>-20 to +40°C</td>
<td></td>
</tr>
<tr>
<td>T6</td>
<td>AC version</td>
<td>2</td>
<td>MAX: 4A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DC version</td>
<td>4</td>
<td>MAX: 4A</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. No revision to this drawing without prior approval of FM.
2. Installation must be in accordance with the National Electrical Codes (NFPA 70, ANSI/ISA- RP12.06.01 and relevant local codes.
3. When installed in Division 2, Sensor 1 and Sensor 2 may be simple apparatus or nonincendive field wiring apparatus meeting the conditions below, or alternatively, they may be equipment suitable for Division 2 respectively, if a suitable wiring method other than nonincendive field wiring is employed.
4. WARNING—EXPLOSION HAZAERD. DO NOT OPEN WHILE THE EQUIPMENT IS ENERGIZED OR WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT.
5. WARNING—EXPLOSION HAZAERD. DO NOT REMOVE OR REPLACE THE FUSE WHILE THE EQUIPMENT IS ENERGIZED OR WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT.
6. WARNING—SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR DIVISION 2.
### Model & Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix code</th>
<th>Option code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLXA402</td>
<td></td>
<td></td>
<td>4-Wire Converter</td>
</tr>
<tr>
<td>Power supply</td>
<td>-A</td>
<td>-D</td>
<td>AC version</td>
</tr>
<tr>
<td></td>
<td>-B</td>
<td>-D</td>
<td>DC version</td>
</tr>
<tr>
<td>Housing (*1)</td>
<td>-AB</td>
<td>-D</td>
<td>Aluminum alloy cast + urethane coating</td>
</tr>
<tr>
<td></td>
<td>-AD</td>
<td></td>
<td>Aluminum alloy cast + high anti-corrosion coating</td>
</tr>
<tr>
<td>Type</td>
<td>-AG</td>
<td></td>
<td>General purpose for CE, RCM, China standard</td>
</tr>
<tr>
<td></td>
<td>-AJ</td>
<td></td>
<td>General purpose for CSA</td>
</tr>
<tr>
<td></td>
<td>-DD</td>
<td></td>
<td>General purpose</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>NI for FM (*8)</td>
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<tr>
<td>1st input</td>
<td>-P1</td>
<td></td>
<td>pH/ORP (PH)</td>
</tr>
<tr>
<td></td>
<td>-C1</td>
<td></td>
<td>Conductivity (SC)</td>
</tr>
<tr>
<td></td>
<td>-C5</td>
<td></td>
<td>Inductive conductivity (ISC)</td>
</tr>
<tr>
<td></td>
<td>-D1</td>
<td></td>
<td>Dissolved oxygen (DO)</td>
</tr>
<tr>
<td></td>
<td>-D5</td>
<td></td>
<td>Digital sensor</td>
</tr>
<tr>
<td></td>
<td>-S5</td>
<td></td>
<td>SENCOM SA (*2)</td>
</tr>
<tr>
<td>2nd input</td>
<td>-NN</td>
<td></td>
<td>Without input</td>
</tr>
<tr>
<td></td>
<td>-P1</td>
<td></td>
<td>pH/ORP (PH)</td>
</tr>
<tr>
<td></td>
<td>-C1</td>
<td></td>
<td>Conductivity (SC)</td>
</tr>
<tr>
<td></td>
<td>-C5</td>
<td></td>
<td>Inductive conductivity (ISC)</td>
</tr>
<tr>
<td></td>
<td>-D1</td>
<td></td>
<td>Dissolved oxygen (DO)</td>
</tr>
<tr>
<td></td>
<td>-S5</td>
<td></td>
<td>SENCOM SA (*3)</td>
</tr>
<tr>
<td>mA Output/Input</td>
<td>-A2</td>
<td></td>
<td>2 x 4-20 mA Output + 1 x Contact Input (mA1 output: with HART)</td>
</tr>
<tr>
<td></td>
<td>-A4</td>
<td></td>
<td>4 x 4-20 mA Output + 2 x Contact Input + 1 x 4-20 mA Input (mA1 output: with HART)</td>
</tr>
<tr>
<td>Contact Outputs</td>
<td>-WR</td>
<td></td>
<td>Contact outputs</td>
</tr>
<tr>
<td></td>
<td>-NR</td>
<td></td>
<td>Without Contact outputs</td>
</tr>
<tr>
<td>Bluetooth</td>
<td>-N</td>
<td></td>
<td>Without Bluetooth</td>
</tr>
<tr>
<td></td>
<td>-B</td>
<td></td>
<td>Bluetooth</td>
</tr>
<tr>
<td>Digital Communication</td>
<td>-N</td>
<td></td>
<td>Without Digital communication</td>
</tr>
<tr>
<td></td>
<td>-E</td>
<td></td>
<td>Modbus TCP/IP</td>
</tr>
<tr>
<td></td>
<td>-R</td>
<td></td>
<td>Modbus RTU (RS-485)</td>
</tr>
<tr>
<td>Country (*4)</td>
<td>-N</td>
<td></td>
<td>Global except Japan</td>
</tr>
<tr>
<td></td>
<td>-J</td>
<td></td>
<td>Japan</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Always -NN</td>
</tr>
<tr>
<td>Option</td>
<td>Mounting hardware</td>
<td>/UM</td>
<td>Universal mounting kit (*5)</td>
</tr>
<tr>
<td>Hood</td>
<td>/U</td>
<td></td>
<td>Pipe and wall mounting hardware</td>
</tr>
<tr>
<td></td>
<td>/PM</td>
<td></td>
<td>Panel mounting hardware</td>
</tr>
<tr>
<td>Tag plate</td>
<td>/H6</td>
<td></td>
<td>Hood, stainless steel</td>
</tr>
<tr>
<td></td>
<td>/H7</td>
<td></td>
<td>Hood, stainless steel + urethane coating</td>
</tr>
<tr>
<td></td>
<td>/SCT</td>
<td></td>
<td>Stainless steel tag plate</td>
</tr>
<tr>
<td>Conduit adapter (*7)</td>
<td>/CB4</td>
<td></td>
<td>G1/2 x 4 pcs</td>
</tr>
<tr>
<td></td>
<td>/CD4</td>
<td></td>
<td>1/2NPT x 4 pcs</td>
</tr>
<tr>
<td></td>
<td>/CF4</td>
<td></td>
<td>M20 x 1.5 x 4 pcs</td>
</tr>
<tr>
<td></td>
<td>/CB6</td>
<td></td>
<td>G1/2 x 2 pcs + G 1/2 for Ethernet x 1 pcs (*6)</td>
</tr>
<tr>
<td></td>
<td>/CD6</td>
<td></td>
<td>1/2NPT x 3 pcs + 1/2 NPT for Ethernet x 1 pcs (*6)</td>
</tr>
<tr>
<td></td>
<td>/CF6</td>
<td></td>
<td>M20 x 1.5 x 3 pcs + M20 for Ethernet x 1 pcs (*6)</td>
</tr>
</tbody>
</table>

**Notes:**

*1. Urethane coating is acid resistant.
*2. On 1st input, with a connection to BA11 Junction Box, up to 4 sensors equipped with SA11 can be connected.
*3. On 2nd input, only 1 sensor equipped with SA11 can be connected.
*4. Select only "-J" if you use the converter in Japan. Only SI unit (International System of Units) applies.
*5. Universal mounting kit contains pipe, wall mounting hardware (/U) and panel mounting hardware (/PM).
*6. Available only when "-E" (Modbus TCP/IP) via digital communication is selected.
*7. There are 8 cable entry holes. Check the table below. If you need, purchase the adapters additionally to comply with requirements in the specification.
*8. When selecting Type "-DD" (Nonincendive for FM), "-D1" "-D5" "-S5" on 1st/2nd input are not available. Please check Control Drawing about the other conditions.
Following is the specification restriction by combination

- **Conduit adapter (need to be purchased additionally)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Parts number</th>
<th>Quantity</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 1/2 (Cable gland for adapter + adapter)</td>
<td>K9703WF</td>
<td>4 set</td>
<td>for Option code /CB</td>
</tr>
<tr>
<td>1/2 NPT (Cable gland for adapter + adapter)</td>
<td>K9703WG</td>
<td>4 set</td>
<td>for Option code /CD</td>
</tr>
<tr>
<td>M 20 x 1.5 (Cable gland for adapter + adapter)</td>
<td>K9703WH</td>
<td>4 set</td>
<td>for Option code /CF</td>
</tr>
</tbody>
</table>

- **Optional parts**

<table>
<thead>
<tr>
<th>Name</th>
<th>Parts number</th>
<th>Quantity</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting hardware</td>
<td>K9703SS</td>
<td>1 set</td>
<td>same as Option code /U</td>
</tr>
<tr>
<td>for pipe, wall mounting (stainless)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>for panel mounting (stainless)</td>
<td>K9703ZD</td>
<td>1 set</td>
<td>same as Option code /PM</td>
</tr>
<tr>
<td>Sun shade hood Stainless</td>
<td>K9698WK</td>
<td>1 set</td>
<td>same as Option code /H6</td>
</tr>
<tr>
<td>stainless + urethane</td>
<td>K9698WL</td>
<td>1 set</td>
<td>same as Option code /H7</td>
</tr>
<tr>
<td>Rubber plug attachment</td>
<td>K9334CN</td>
<td>1 pcs</td>
<td>for Cable gland</td>
</tr>
<tr>
<td>Fuse</td>
<td>A1633EF</td>
<td>1 pcs</td>
<td>250V/2.5A (minimum 5 pcs)</td>
</tr>
<tr>
<td>SD card</td>
<td>A1005NL</td>
<td>1 pcs</td>
<td>2 GB industrial SD card (with power failure recovery) Customers can provide the cards with spec: Storage capacity: 128 MB or greater Type: SD, SDHC</td>
</tr>
</tbody>
</table>
## Dimensions

<table>
<thead>
<tr>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>165 x 137 x 80</td>
</tr>
</tbody>
</table>

**For Sensor modules**
- G1/2 (CB6)/ 1/2NPT (CD6) M20x1.5 (CF6)
- Unit: mm (2.17)
- Approx. 55 (2.17)

**For Communication module**
- G1/2 (CB6)/ 1/2NPT (CD6) M20x1.5 (CF6)
- Unit: mm (2.17)
- Approx. 55 (2.17)

**For Power supply**
- G1/2 (CB4, CB6)/ 1/2NPT (CD4, CD6) M20x1.5 (CF4, CF6)
- Unit: mm (2.17)
- Approx. 55 (2.17)

**For IO module**
- G1/2 (CB4, CB6)/ 1/2NPT (CD4, CD6) M20x1.5 (CF4, CF6)
- Unit: mm (2.17)
- Approx. 55 (2.17)

**For Relay module**
- G1/2 (CB4, CB6)/ 1/2NPT (CD4, CD6) M20x1.5 (CF4, CF6)
- Unit: mm (2.17)
- Approx. 55 (2.17)

**Unit: mm**

**Conduit adapter** (ICB4, ICD4, ICF4, /CB6, /CD6, /CF6)

- G1/2 (CB4, CB6)/ 1/2NPT (CD4, CD6) M20x1.5 (CF4, CF6)
- Unit: mm (inch)
- Approx. 55 (2.17)

**Weight:** max. 3.0 kg
Note: Universal Mounting kit (/UM) contains pipe, wall mounting hardware (/U) and panel mounting hardware (/PM).

**Panel mounting hardware (/PM, /UM)**

- Panel thickness: 1 to 12
- 2-M5 length: 35

**Wall mounting hardware (/U, /UM)**

- 3-ø10 holes
- 4-M6

Unit: mm

*: Tighten the four screws to a torque of 2 N•m.

Note: For wall mounting, the wall should be strong enough to bear the weight of 8 kg or more.
Pipe mounting hardware (/U, /UM)

Pipe mounting (Horizontal)

Pipe mounting (Vertical)

*: Tighten the four screws to a torque of 2 N•m.

Hood Stainless steel (/H6, /H7)

Unit: mm

*: Tighten the four screws to a torque of 2 N•m.
Wiring

FLXA402

Sensor

Contact output (-WR)

Power (-A, -D)

Analog output (-A2, -A4)

mA1 61(+) 62(-)

mA2 65(+) 66(-)

mA3 81(+) 82(-)

mA4 85(+) 86(-)

63(SHLD)

21 22 24

Contact input (-A2, -A4)

Analog output (-A4)

87(+) 88(-)

89(SHLD)

RS485 (-R)

Ethernet (-E)

Sensor

1(N, +) 2(N, -)

mA1 61(+) 62(-)

mA2 65(+) 66(-)

mA3 81(+) 82(-)

mA4 85(+) 86(-)

S4

S3

S2

S1

32(NC) 31(C) 33(NO)

42(NC) 41(C) 43(NO)

52(NC) 51(C) 53(NO)

72(NO) 71(C) 73(NC)

91(A+) 92(B-) 93(GND) 94(SHLD)

95(termination)

81(A2, -A4)

82(-)

83(-)

84(-)

85(-)

86(-)

87(+)

88(-)

89(SHLD)

100(termination)
Inquiry Specifications Sheet for FLXA402 4-Wire Converter

Make inquiries by placing checkmarks (✓) in the pertinent boxes and filling in the blanks.

1. General Information
Company name: __________________________
Contact Person: __________________________
Department: ____________________________
Plant name: ____________________________
Measurement location: ____________________________

Purpose of use: □ Indication, □ Recording, □ Alarm, □ Control

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; ______ to ______[°C]
(2) Location; □ Outdoors, □ Indoors
(3) Others;

4. Requirements
1st Input; □ pH/ORP (PH)
   □ Conductivity (SC) □ Inductive conductivity (ISC)
   □ Dissolved oxygen (DO) □ Digital sensor □ SENCOM SA (pH/ORP)
2nd Input; □ Without input □ pH/ORP (PH) □ Conductivity (SC)
   □ Inductive conductivity (ISC) □ Dissolved oxygen (DO) □ SENCOM SA (pH/ORP)
mA output; □ 2 x 4-20 mA Output + 1 x Contact Input
   □ 4 x 4-20 mA Output + 2 x Contact Input + 1 x 4-20 mA Input)
Contact Outputs; □ Contact outputs □ Without Contact outputs
   □ Bluetooth □ Without Bluetooth
   □ Digital Communication □ Without Digital communication
   □ Modbus TCP/IP (Ethernet) □ Modbus RTU (RS-485)
   □ Others; __________________________
   __________________________
   __________________________
(8) Others;