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 11 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 11 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

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<td>GS 01R01A01-01E</td>
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System Configuration

Configuration according to module combination

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<th>1st Input (Code)</th>
<th>System configuration</th>
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<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>
</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>measurement 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>ISC40G</td>
<td>DO30G</td>
</tr>
<tr>
<td></td>
<td>FU24</td>
<td>SC4C</td>
<td>ISC40S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SM21/SR20</td>
<td>SC4J</td>
<td>ISC40GJ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PH20</td>
<td>SC25G</td>
<td>ISC40SJ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SC21</td>
<td>SC29C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SC21</td>
<td>PH6E:P</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PH4:H</td>
<td>PH4:T</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ORB:E:G</td>
<td>OR4:G</td>
<td></td>
<td></td>
</tr>
<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>ISC40□</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PH21</td>
<td>SC4C...VS</td>
<td>ISC40□</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FU24</td>
<td>SC4J...VS</td>
<td>ISC40□</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PH6E:P...V</td>
<td>SC8SG...VS</td>
<td></td>
<td></td>
</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
  When 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)
- 1st input connects to Digital sensor
  When Digital sensors connects to 1st input (-D5) (e.g.)
  1st input: digital sensor (-D5)
  2nd input: analog pH sensor (-P1)

Config. B

- Multiple sensor measurement with BA11
  When 1st input connects to SENCOM SA (-S5) with BA11- multiple sensor measurement-
  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)

(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)

2. 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>
<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>
<td>2</td>
</tr>
<tr>
<td>Analog DO (-D1)</td>
<td>Analog DO (-D1)</td>
<td>2</td>
</tr>
<tr>
<td>SENCOM SA (-S5)</td>
<td>SENCOM SA (-S5)</td>
<td>2</td>
</tr>
<tr>
<td>Analog SC (-C1)</td>
<td>Analog pH/ORP (-P1)</td>
<td>2</td>
</tr>
<tr>
<td>Analog ISC (-C5)</td>
<td>Analog SC (-C1)</td>
<td>2</td>
</tr>
<tr>
<td>Analog DO (-D1)</td>
<td>Analog ISC (-C5)</td>
<td>2</td>
</tr>
<tr>
<td>SENCOM SA (-S5)</td>
<td>Analog DO (-D1)</td>
<td>2</td>
</tr>
<tr>
<td>Analog ISC (-C5)</td>
<td>Analog DO (-D1)</td>
<td>2</td>
</tr>
<tr>
<td>SENCOM SA (-S5)</td>
<td>SENCOM SA (-S5)</td>
<td>2</td>
</tr>
<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>
<td>2</td>
</tr>
<tr>
<td>Analog ISC (-C5)</td>
<td>Analog ISC (-C5)</td>
<td>2</td>
</tr>
<tr>
<td>Analog DO (-D1)</td>
<td>Analog DO (-D1)</td>
<td>2</td>
</tr>
<tr>
<td>SENCOM SA (-S5)</td>
<td>SENCOM SA (-S5)</td>
<td>2</td>
</tr>
<tr>
<td>Digital sensor for optical DO (-D5)</td>
<td>Analog pH/ORP (-P1)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Analog SC (-C1)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Analog ISC (-C5)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Analog DO (-D1)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>SENCOM SA (-S5)</td>
<td>5</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} \Omega)

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

   ■ Output Range
   pH: min. span 1 pH
   max. span 20 pH
   ORP: min. span 100 mV
   max. span 3000 mV
   rH: min. span 2 rH
   max. span 100 rH
   Temperature: min. span 25 ºC
   max. span 170 ºC

   ■ Performance (Accuracy)
   (The specifications are expressed with simulated inputs.)
   pH
   Linearity: ±0.01 pH
   Repeatability: ±0.01 pH
   Accuracy ±0.01 pH
   ORP
   Linearity: ±1 mV
   Repeatability: ±1 mV
   Accuracy ±1 mV
   Temperature
   with Pt1000, 6k8, PTC10k, NTC 8k55, 3k Balco, PTC500
   Linearity: ±0.3 ºC
   Repeatability: ±0.1 ºC
   Accuracy ±0.3 ºC
   with Pt100
   Linearity: ±0.4 ºC
   Repeatability: ±0.1 ºC
   Accuracy ±0.4 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
   Conductivity:
   min.: 0 µS/cm
   max.: 200 mS x (Cell constant)
   (over range 2000 mS/cm)
   Resistivity:
   min.: 0.005 kΩ / (Cell constant)
   max.: 1000 MΩ x cm

   ■ Output Range
   Conductivity:
   min. span: 0.01 µS/cm
   max. span: 2000 mS/cm (max 90% zero suppression)
   Resistivity:
   min. span: 0.001 kΩ x cm
   max. span: 1000 MΩ x cm (max 90% zero suppression)
   Temperature:
   min. span 25 ºC
   max. span 270 ºC

   ■ Performance (Accuracy)
   (The specifications are expressed with simulated inputs.)
   Conductivity
   2 µS x K cm^{-1} to 200 mS x K cm^{-1}
   Accuracy: ±0.5%F.S.
   1 µS x K cm^{-1} to 2 µS x K cm^{-1}
   Accuracy: ±1%F.S.
   Resistivity
   0.05kΩ / K cm^{-1} to 0.5MΩ /K cm^{-1}
   Accuracy: ±0.5%F.S.
   0.5MΩ / K cm^{-1} to 1MΩ /K cm^{-1}
   Accuracy: ±1%F.S.
   Temperature
   with Pt1000, Pb36, Ni100
   Accuracy: ±0.3 ºC
   with Pt100, NTC 8k55
   Accuracy: ±0.4 ºC
   Temperature compensation
   NaCl table: ±1 %
   Matrix: ±3 %
   Step response: 90 % (< 2 decades) in 7 seconds
   Note: “F.S.” means maximum setting value of converter output.
   “K” means cell constant.
   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
   Conductivity: 0 to 2000 mS/cm at 25 ºC reference
   temperature.
   Temperature: -20 to 140 ºC
   Cable length:
   max. 60 meters total length of fixed sensor
   cable + WF10(J) extension cable. Influence of cable can be adjusted
   by doing an AIR CAL with the cable
   connected to a dry cell.

   ■ Output Range
   Conductivity:
   min. span: 100 µS/cm
   max. span: 2000 mS/cm (max 90% zero suppression)
   Temperature:
   min. span 25 ºC
   max. span 160 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 µA for Polarographic sensors.
For temperature compensation, the FLXA402 accepts Pt1000 (DO30 sensor) and NTC22k elements (OXYFERM and OXYGOLD sensors).

Input Range
Dissolved Oxygen: 0 to 50 mg/l (ppm)
Temperature: -20 to 150 ºC
DO30G sensor:
Measurement range: 0 to 20 mg/l (ppm)
Temperature: 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: 11 (English, Chinese, Czech, French, German, Italian, Japanese, Korean, Portuguese, Russian, 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 a 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 a 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
FCC15C
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>Spec restriction</th>
<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></td>
<td>T4</td>
<td>AC version</td>
<td>2</td>
<td>-30 to +55°C</td>
<td>MAX. 5A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DC version</td>
<td>4</td>
<td>-30 to +40°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T6</td>
<td>AC version</td>
<td>2</td>
<td>MAX. 5A</td>
<td></td>
</tr>
<tr>
<td></td>
<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 Code (NFPA 70, ANSI/NEA 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 HAZARD. DO NOT OPEN WHILE THE EQUIPMENT IS ENERGIZED OR WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT.**
5. **WARNING—EXPLOSION HAZARD. 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.**

<table>
<thead>
<tr>
<th>Measuring Module 1, 2</th>
<th>NFW parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Measuring Module</td>
<td>PH</td>
</tr>
<tr>
<td>Uo</td>
<td>11.76V</td>
</tr>
<tr>
<td>Io</td>
<td>116.5mA</td>
</tr>
<tr>
<td>Po</td>
<td>0.342kW</td>
</tr>
<tr>
<td>C0</td>
<td>4μF</td>
</tr>
<tr>
<td>Lo</td>
<td>4.5mH</td>
</tr>
</tbody>
</table>
### 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>-A</td>
<td>-NN</td>
<td>4-Wire Converter</td>
</tr>
<tr>
<td></td>
<td>-D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>-B</td>
<td>-A</td>
<td>AC version</td>
</tr>
<tr>
<td></td>
<td>-D</td>
<td>-D</td>
<td>DC version</td>
</tr>
<tr>
<td>Housing (*1)</td>
<td>-AB</td>
<td></td>
<td>General purpose for CE, RCM, China standard</td>
</tr>
<tr>
<td></td>
<td>-AD</td>
<td>-D</td>
<td>General purpose for CSA</td>
</tr>
<tr>
<td></td>
<td>-AG</td>
<td>-D</td>
<td>General purpose for KC</td>
</tr>
<tr>
<td></td>
<td>-AJ</td>
<td>-D</td>
<td>General purpose</td>
</tr>
<tr>
<td></td>
<td>-DD</td>
<td></td>
<td>Nl for FM (*8)</td>
</tr>
<tr>
<td>Type</td>
<td>-P1</td>
<td></td>
<td>pH/ORP (PH)</td>
</tr>
<tr>
<td>1st input</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>-D5</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>-NN</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></td>
<td></td>
<td>/U</td>
<td>Pipe and wall mounting hardware</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/PM</td>
<td>Panel mounting hardware</td>
</tr>
<tr>
<td></td>
<td>Hood</td>
<td>/H6</td>
<td>Hood, stainless steel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/H7</td>
<td>Hood, stainless steel + urethane coating</td>
</tr>
<tr>
<td></td>
<td>Tag plate</td>
<td>/SCT</td>
<td>Stainless steel tag plate</td>
</tr>
<tr>
<td></td>
<td>Conduit adapter (*7)</td>
<td>/CB4</td>
<td>G1/2 x 4 pcs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/CD4</td>
<td>1/2NPT x 4 pcs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/CF4</td>
<td>M20 x 1.5 x 4 pcs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/CB6</td>
<td>G1/2 x 3 pcs + G 1/2 for Ethernet x 1 pcs (*6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/CD6</td>
<td>1/2NPT x 3 pcs + 1/2 NPT for Ethernet x 1 pcs (*6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/CF6</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.

<table>
<thead>
<tr>
<th>Spec.</th>
<th>Power</th>
<th>1st input</th>
<th>2nd input</th>
<th>mA output/input</th>
<th>Contact Outputs</th>
<th>Digital Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>All</td>
<td>All</td>
<td>-NN</td>
<td>the others</td>
<td>-A2</td>
<td>-A4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-WR</td>
<td>-NR</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-N</td>
<td>-E</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-R</td>
<td></td>
</tr>
<tr>
<td>Required No. of cable entry holes</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

*: Conduit exclusively for Ethernet
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 for pipe, wall mounting (stainless)</td>
<td>K9703SS</td>
<td>1 set</td>
<td>same as Option code /U</td>
</tr>
<tr>
<td>Mounting hardware 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>K9699WK</td>
<td>1 set</td>
<td>same as Option code /H6</td>
</tr>
<tr>
<td>Sun shade hood stainless + urethane</td>
<td>K9699WL</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

- **Dimensions**
- **Unit:** mm

![Dimensions Diagram]

- **For Sensor modules**
- **For IO module**
- **For Communication module**
- **For power supply**
- **For Relay module**

**Weight:** max. 3.0 kg

**Conduit adaptor (ICB4, /CD4, /CF4/, /CB6, /CD6, /CF6)**

- **Case**
- **Cable gland for adapter**
- **G1/2 (ICB4, /CB6) 1/2NPT (/CD4, /CD6) M20x1.5 (/CF4, /CF6)**

- **Approx. 55 (2.17)**

- **Case**
- **Adapter**
- **Cable gland for Ethernet**
- **G1/2 (ICB6) 1/2NPT (/CD6) M20x1.5 (/CF6)**

- **Approx. 45 (1.77)**
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

Spacing panel cutout:

- 4-M6 *

Unit: mm

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

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

For wall mounting, 3-ø10 holes

Unit: mm

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

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

Pipe 50A (ø60.5)

M8 U-bolt

4-M6 *
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
                   □ Modbus TCP/IP
                   □ Without Digital communication
                   □ Modbus RTU (RS-485)