

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

Model, Title of document	GS
SA11 Smart Adapter	GS 12A06S01-00EN-P
BA11 Active Junction Box	GS 12B06W03-01E-E
WU11 Interconnection/Extension Cable for SENCOM Products	GS 12B06W02-04E-E
IB100 interface box	GS 12B06J09-01E-E
pH and ORP Sensors	GS 12B07B02-E
PH4/OR4 Sensor Series pH and ORP Sensors	GS 12B10B00-01EN
FU20 and FU24 pH/ORP sensor	GS 12B06J03-00EN-P
Conductivity Detectors/Sensors	GS 12D08G02-E
ISC40□J Inductive Conductivity Sensors	GS 12D06B01-01E
ISC40F□J Holders and Adapters	
ISC40G (S) Inductive Conductivity sensor and fittings	GS 12D08J02-E-E
DO30G Sensor for Dissolved Oxygen Analyzer	GS 12J05D03-01E
DO30G and FD30/PB30 Sensor and fittings for Dissolved Oxygen	GS 12J06K04-E-E
DO71, DO72 Optical Dissolved Oxygen Sensors	GS 12J06J01-00EN-P
Sensor Holders	GS 12J05C02-00E
FSA111 FieldMate	GS 01R01A01-01E

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Please select appropriate equipment in accordance with the laws and regulations of the relevant country/region, when it is used in a location where explosive atmospheres may be present.

■ System Configuration

Configuration according to module combination

1st Input (Code)		System configuration
pH/ORP, SC, ISC, DO (-P1, -C1, -C5, -D1)		Config. A
Digital sensor (-D6)		
SENCOM SA (-S5)	Direct connection	
	Multiple sensor measurement (*)	Config. B

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

Configurable sensors

measure ment	pH/ORP	SC	ISC	DO
sensors *1				
Analog sensors *2 (-P1, -C1, -C5, -D1)	FU20 FU24 SM21/SR20 PH20 SC25V SC21 SC29C PH8E□P PH4□ PH4□□ OR8E□G OR4□	SC4A SC42 SX42 SC4AJ SC8SG SC210G	ISC40G ISC40S ISC40GJ ISC40SJ	DO30G
Digital sensor (Optical DO Sensor) (-D6)	—	—	—	DO71 DO72
Sensor for SENCOM SA (-S5)	FU20-VS PH21 FU24 PH8E□P...-V	SC4A...-VS SC42-□V SX42...-□V SC4AJ...-VS SC8SG...-VS	—	—

*1: Inside parenthesis explain suffix code for 1st (2nd) input

*2: means conventional sensors, not including sensors for SENCOM SA.

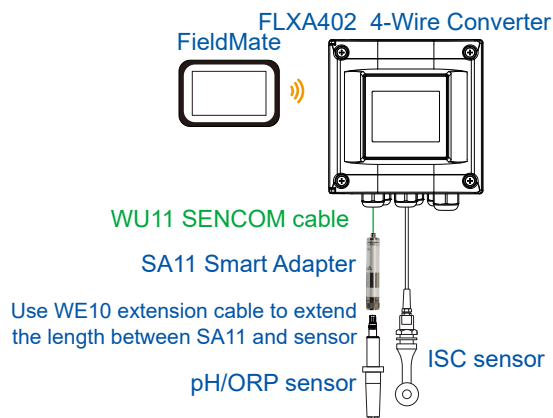
Config. A

- 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 connect to 1st input (-D6)
(e.g.) 1st input: digital sensor (-D6)
2nd input: analog pH sensor (-P1)



(Figure A) Config.A

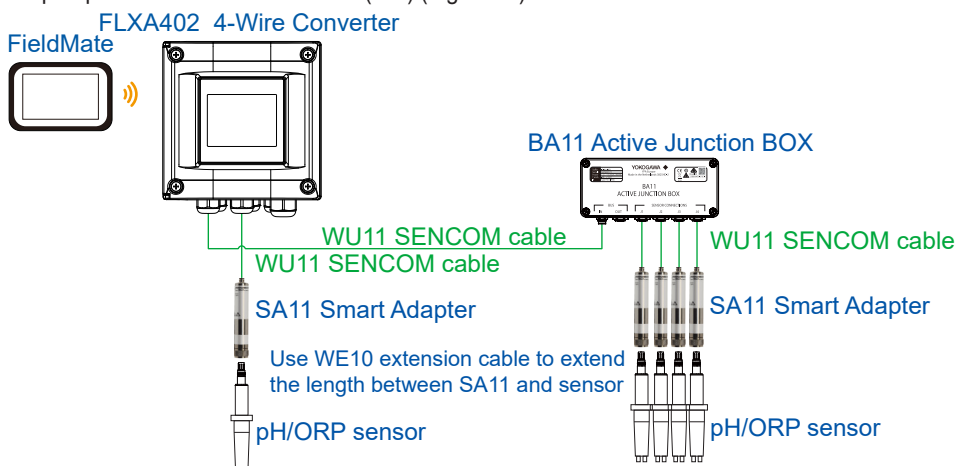
Config. B

- 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.

* When selecting type "-DD" (NI for FM), BA11-multiple sensor measurement is not available. Only one sensor can connect. 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 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

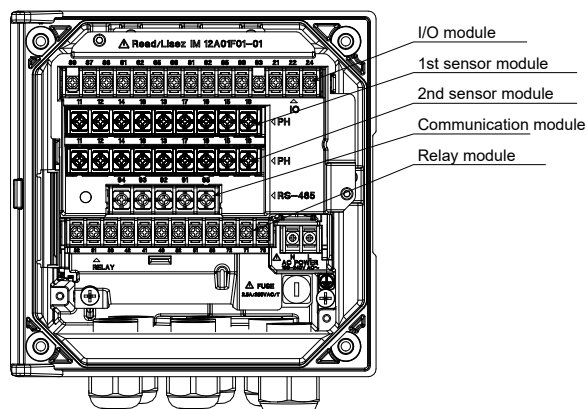
- PH: for analog pH/ORP
- SC: for analog Resistivity/ Conductivity
- ISC: for analog Inductive Conductivity
- DO: for analog Dissolved Oxygen

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)



● 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.

1st sensor module (1st input)	2nd sensor module (2nd input)	# of Total Inputs
Analog pH/ORP (-P1)	Analog pH/ORP (-P1)	2
	Analog SC (-C1)	2
	Analog ISC (-C5)	2
	Analog DO (-D1)	2
	SENCOM SA (-S5)	2
Analog SC (-C1)	Analog pH/ORP (-P1)	2
	Analog SC (-C1)	2
	Analog ISC (-C5)	2
	Analog DO (-D1)	2
	SENCOM SA (-S5)	2
Analog ISC (-C5)	Analog pH/ORP (-P1)	2
	Analog SC (-C1)	2
	Analog ISC (-C5)	2
	Analog DO (-D1)	2
	SENCOM SA (-S5)	2
Analog DO (-D1)	Analog pH/ORP (-P1)	2
	Analog SC (-C1)	2
	Analog ISC (-C5)	2
	Analog DO (-D1)	2
	SENCOM SA (-S5)	2
SENCOM SA (-S5)	Analog pH/ORP (-P1)	5
	Analog SC (-C1)	5
	Analog ISC (-C5)	5
	Analog DO (-D1)	5
	SENCOM SA (-S5)	5
Digital sensor for optical DO (-D6)	Analog pH/ORP (-P1)	2
	Analog SC (-C1)	2
	Analog ISC (-C5)	2
	Analog DO (-D1)	2
	SENCOM SA (-S5)	2

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 ($\geq 10^{12} \Omega$)

■ 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 °C

Pt100: -30 to 140 °C

6k8: -30 to 140 °C

PTC10k: -30 to 140 °C

NTC 8k55: -10 to 120 °C

3k Balco: -30 to 140 °C

PTC500: -30 to 140 °C

■ 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 °C

max. span 170 °C

■ 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 °C

Repeatability: ± 0.1 °C

Accuracy: ± 0.3 °C

with Pt100

Linearity: ± 0.4 °C

Repeatability: ± 0.1 °C

Accuracy: ± 0.4 °C

■ 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.

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 $\mu\text{S}/\text{cm}$

max.: 200 mS x (Cell constant)
(over range 2000 mS/cm)

Resistivity:

min.: 0.005 k Ω / (Cell constant)

max.: 1000 M Ω x cm

Temperature:

Pt1000: -20 to 250 °C

Pt100: -20 to 200 °C

Ni100: -20 to 200 °C

NTC 8k55: -10 to 120 °C

Pb36(JIS NTC 6k): -20 to 120 °C

■ Output Range

Conductivity:

min. 0.01 $\mu\text{S}/\text{cm}$

max. 2000 mS/cm (max 90% zero suppression)

Resistivity:

min. 0.001 k Ω x cm

max. 1000 M Ω x cm (max 90% zero suppression)

Temperature:

min. span 25 °C

max. span 270 °C

■ Performance (Accuracy)

(The specifications are expressed with simulated inputs.)

Conductivity

2 $\mu\text{S} \times \text{K cm}^{-1}$ to 200 mS x K cm^{-1}

Accuracy: $\pm 0.5\%$ F.S.

1 $\mu\text{S} \times \text{K cm}^{-1}$ to 2 $\mu\text{S} \times \text{K cm}^{-1}$

Accuracy: $\pm 1\%$ F.S.

Resistivity

0.005k Ω / K cm^{-1} to 0.5M Ω /K cm^{-1}

Accuracy: $\pm 0.5\%$ F.S.

0.5M Ω / K cm^{-1} to 1M Ω /K cm^{-1}

Accuracy: $\pm 1\%$ F.S.

Temperature

with Pt1000, Pb36, Ni100

Accuracy: ± 0.3 °C

with Pt100, NTC 8k55

Accuracy: ± 0.4 °C

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 °C reference temperature.

Temperature: -20 to 140 °C

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 μ S/cm

max. span: 2000 mS/cm (max 90% zero suppression)

Temperature:

min. span 25 $^{\circ}$ C

max. span 160 $^{\circ}$ C

■ Performance (Accuracy)

(The specifications are expressed with simulated inputs.)

(Output span is 0-100 μ S/cm or more)

Conductivity:

Linearity: $\pm(0.4 \% \text{F.S.} + 0.3 \mu\text{S/cm})$

Repeatability: $\pm(0.4 \% \text{F.S.} + 0.3 \mu\text{S/cm})$

Temperature: $\pm 0.3^{\circ}\text{C}$

Step response: 90 % (< 2 decades) in 8 seconds

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

2-4. Dissolved Oxygen (DO)

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

When 1st input is -D6 (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 μ A for Galvanic sensors and 0 to 1 μ A 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 $^{\circ}$ C

DO30G sensor:

Measurement range: 0 to 20 mg/l (ppm)

Temperature: 0 to 40 $^{\circ}$ C

Hamilton sensors:

Oxyferm:

Measurement range: 10 ppb to 40 ppm

Temperature range: 0 to 130 $^{\circ}$ C

Oxygold G:

Measurement range: 2 ppb to 40 ppm

Temperature range: 0 to 130 $^{\circ}$ C

Oxygold B:

Measurement range: 8 ppb to 40 ppm

Temperature range: 0 to 100 $^{\circ}$ C

■ 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 $^{\circ}$ C

max. span 170 $^{\circ}$ C

■ Performance (Accuracy)

(The specifications are expressed with simulated inputs.)

Performance in ppm mode:

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

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

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

Performance in ppb mode:

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

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

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

Temperature

Linearity: $\pm 0.3^{\circ}\text{C}$

Repeatability: $\pm 0.1^{\circ}\text{C}$

Accuracy: $\pm 0.3^{\circ}\text{C}$

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

2-5. Digital Sensor

When 1st input is -D6 (Digital sensor)

Measurement with the digital sensor DO71, DO72

Optical Dissolved Oxygen Sensor.

See GS 12J06J00-00EN-P for information on DO71, DO72.

Note: When Type is -DD (NI for FM), -D6 (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.

2-7. Common Function

■ Logbook

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

■ Arithmetic by multiple sensors

The arithmetic is carried out by processing the corresponding value of limited two sensors.

Differential: Sensor 1 - Sensor 2

Average: (sensor 1 + Sensor 2) / 2

Ratio: Sensor 1 / Sensor 2 ^(*)

Passage (%): Sensor 2 / Sensor 1 x 100 ^(*)

Reflection (%): (Sensor 1 - Sensor 2) / Sensor 1 x 100 ^(*)

Deviation (%): (Sensor 2 - Sensor 1) / Sensor 1 x 100 ^(*)

pH calb. (VGB): pH = 8.6 + log (Sensor 1 - Sensor 2 / 3) ^(*)⁽²⁾

^(*) When the measuring object is conductivity, the arithmetic is performed.

⁽²⁾ Only when SC sensors are connected, pH calb. (VGB) is carried out.

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 A
 (The product of Voltage by Current is 100 VA or less.)
 Maximum values: 50 W, 50 VDC, 5 A
 (The product of Voltage by Current is 50 W or less.)
 Note: This is for mA input/output "-A2". In the case of "-A4", the contact output switch allowable current is 4A.

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)

■ 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 $\pm 5\%$, 60 Hz $\pm 5\%$
 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)
- 1/2 NPT (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,

General Specifications,

User Setting Table of measurement / sensor type

■ Regulatory Compliance

Safety:

EN 61010-1

EN IEC 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

NM EN 61010 1, NM EN 61010 2 030

GB30439

TR CU 004/2011

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, EN IEC 61000-3-2

EN61000-3-3

NM EN 61326 1, NM EN 61326 2 3,

NM EN 61000 3 2, NM EN 61000 3 3,

NM EN 55011,

NM EN 62479

RCM: EN61326-1 Class A

Korea Electromagnetic Conformity Standard ClassA

Russian: TR CU 020/2011

Bluetooth

Compliant standard: Bluetooth Ver 3.0 Class2

Applicable countries / regions; (regulations)

Japan, USA, Canada, Australia,

New Zealand

FCC15C

ICES-003

AS/NZS4268, AS/NZS2772.2

Environmental regulation:

RoHS: EN IEC 63000 (Style 1.06 and later)

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

Marking/Rating: Nonincendive for Class I, Division 2, Groups A, B, C and D.

T6 : for ambient temperature : -20°C to +40°C

T4 : for ambient temperature : -20°C to +55°C

Enclosure : Type 4X

Control drawing : NFM038-A81 (refer to next page)

Control Drawings

FM Nonincendive

Yokogawa Electric Corporation				Model		FLXA402	
Control drawing							
Title							
No.	NFM038-A81	Page	02	Revision	0	Date	2018-06-29

Spec. restriction							
Temp. class	Power supply	Number of Output	Ambient Temperature		Switch capacity of Contact Output		
			-20 to +55°C	-20 to +40°C	MAX. 5A	MAX. 4A	
T4	AC version 100-240V AC	2	✓	✓	✓	✓	✓
	DC version 12-24V DC	4	✓	✓	✓	✓	✓
	AC version 100-120V AC	2	✓	✓	✓	✓	✓
T6	DC version N/A	4	✓	✓	✓	✓	✓

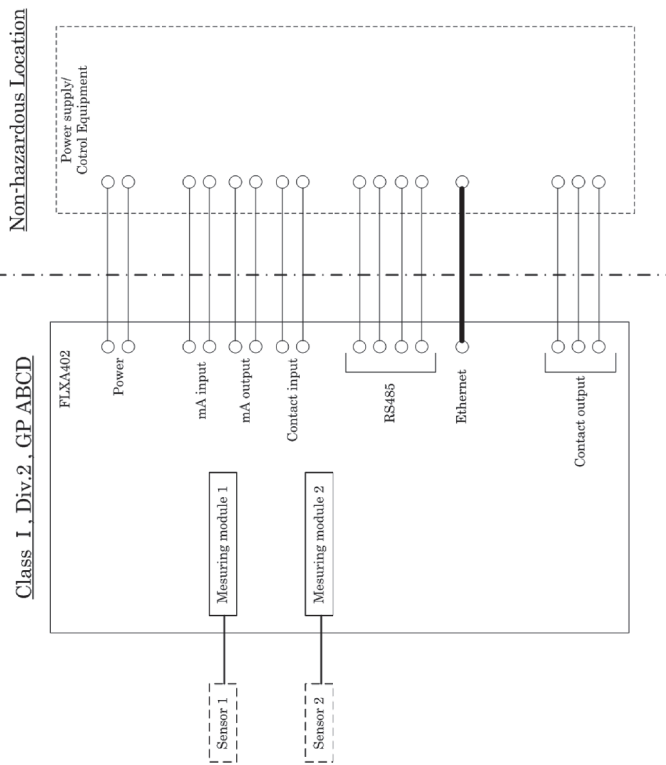
Notes:

- No revision to this drawing without prior approval of FM.
- Installation must be in accordance with the National Electrical Code (NFPA 70), ANSI/ISA-RP12.06.01 and relevant local codes.
- 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.

$$\begin{aligned}
 U_i &\geq U_o \\
 I_i &\geq I_o \\
 P_i &\geq P_o \\
 C_i &\leq C_o - \text{Cable} \\
 L_i &\leq L_o - \text{Leable}
 \end{aligned}$$

- WARNING—EXPLOSION HAZARD. DO NOT OPEN WHILE THE EQUIPMENT IS ENERGIZED OR WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT.
- WARNING—EXPLOSION HAZARD. DO NOT REMOVE OR REPLACE THE FUSE WHILE THE EQUIPMENT IS ENERGIZED OR WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT.
- WARNING—SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR DIVISION 2.

Yokogawa Electric Corporation				Model		FLXA402	
Title				Control drawing			
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Measuring Module 1, 2 NIFW parameter

		Type of Measuring Module			
		PH	SC	ISC	SENCOM SA
U_o	11.76V	11.76V	11.76V	11.76V	5.36V
I_o	116.5mA	116.5mA	60.6mA	106.16mA	
P_o	0.3424W	0.3424W	0.178W	0.1423W	
C_o	4μF	4μF	4μF	4μF	31μF
L_o	4.5mH	4.5mH	19mH	0.45mH	

■ Model & Suffix Codes

Model	Suffix code	Option code	Description
FLXA402	.....	.....	4-Wire Converter
Power supply	-A -D	..... .....	AC version DC version
Housing (*1)	-B -D	..... .....	Aluminum alloy cast + urethane coating Aluminum alloy cast + high anti-corrosion coating
Type	-AB -AD -AG -AJ -AQ -AR -DD	..... ..... ..... ..... ..... ..... .....	General purpose for CE, RCM, China standard (*2) General purpose for CSA General purpose for KC General purpose General purpose for EAC with PA for Russia (*3) (*4) General purpose for EAC (*3) (*5) NI for FM (*6)
1st input (*7)	-P1 -C1 -C5 -D1 -D6 -S5	..... ..... ..... ..... ..... .....	pH/ORP (PH) Conductivity (SC) Inductive conductivity (ISC) Dissolved oxygen (DO) Digital sensor (DO71, DO72) SENCOM SA (*8)
2nd input (*7)	-NN -P1 -C1 -C5 -D1 -S5	..... ..... ..... ..... ..... .....	Without input pH/ORP (PH) Conductivity (SC) Inductive conductivity (ISC) Dissolved oxygen (DO) SENCOM SA (*9)
mA Output/Input	-A2 -A4	..... .....	2 x 4-20 mA Output + 1 x Contact Input (mA1 output: with HART) 4 x 4-20 mA Output + 2 x Contact Input + 1 x 4-20 mA Input (mA1 output: with HART)
Contact Outputs	-WR -NR	..... .....	Contact outputs (Wash and Fail contact outputs) Without Contact outputs (without Wash and Fail contact outputs)
Bluetooth	-N -B	..... .....	Without Bluetooth Bluetooth
Digital Communication	-N -E -R	..... ..... .....	Without Digital communication Modbus TCP/IP Modbus RTU (RS-485)
Country (*10)	-N -J	..... .....	Global except Japan Japan
—	-NN	.....	Always -NN
Option	Mounting hardware	/UM /U /PM	Universal mounting kit (*11) Pipe and wall mounting hardware Panel mounting hardware
	Hood	/H6 /H7	Hood, stainless steel Hood, stainless steel + urethane coating
	Tag plate	/SCT	Stainless steel tag plate
	Conduit adapter (*12)	/CB4 /CD4 /CF4 /CB6 /CD6 /CF6	G1/2 x 4 pcs 1/2 NPT x 4 pcs M20 x 1.5 x 4 pcs G1/2 x 3 pcs + G1/2 for Ethernet x 1 pcs (*13) 1/2 NPT x 3 pcs + 1/2 NPT for Ethernet x 1 pcs (*13) M20 x 1.5 x 3 pcs + M20 for Ethernet x 1 pcs (*13)

- *1. Urethane coating is for acid resistance. For high anti-corrosion coating, urethane coating and epoxy coating which is for alkali resistance are applied.
- *2. When selecting Bluetooth “-B”, this combination will not comply with CE marking.
- *3. When selecting Type “-AQ” or “-AR” (General purpose for EAC with PA or EAC), “-D6” on 1st input are not available.
- *4. The sales area is limited to Russia.
- *5. The sales area is limited to Belarus and Kazakhstan without any pattern approval.
- *6. When selecting Type “-DD” (Nonincendive for FM), “-D1”, “-D6” on 1st/2nd input are not available.
When selecting “-S5” as 1st/2nd input, select SA11 “-CD” (IS for FM-US, FM-Canada). Please check Control Drawing about the other conditions.
- *7. When you select both 1st and 2nd inputs, prepare a sensor for each input. If you do not connect the sensor, an alarm will occur.
- *8. On 1st input, with a connection to BA11 Junction Box, up to 4 sensors equipped with SA11 can be connected except when type “-DD” (NI for FM) is selected. When Type “-DD” (NI for FM) is selected, only 1 sensor equipped with SA11 can be connected. BA11 cannot be used.
- *9. On 2nd input, only 1 sensor equipped with SA11 can be connected.
- *10. Select only “-J” if you use the converter in Japan. Only SI unit (International System of Units) applies.
- *11. Universal mounting kit contains pipe, wall mounting hardware (/U) and panel mounting hardware (/PM).

- *12. There are 8 cable entry holes. Check the table below. If you need, purchase the adapters additionally to comply with requirements in the specification.

Spec. Code	Power	1st input	2nd input	mA output/input		Contact Outputs		Digital Communication		
	All	All	-NN the others	-A2	-A4	-WR	-NR	-N	-E	-R
Required No. of cable entry holes	1	1	0	1	2	2	0	0	1*	1

*: Conduit exclusively for Ethernet

- *13. Available only when “-E” (Modbus TCP/IP) via digital communication is selected.

Following is the specification restriction by combination

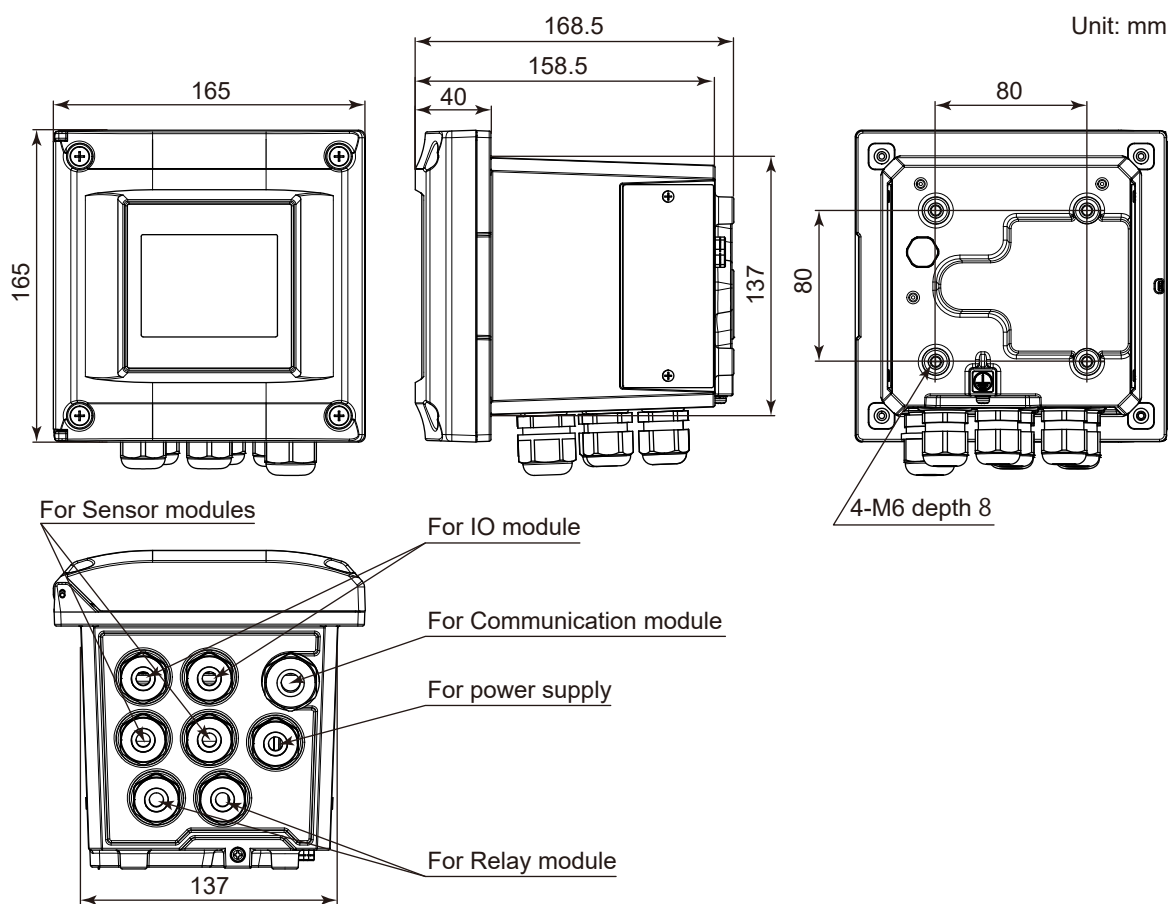
■ Conduit adapter (need to be purchased additionally)

Type	Parts number	Quantity	Remark
G 1/2 (Cable gland for adapter + adapter)	K9703WF	4 set	for Option code /CB
1/2 NPT (Cable gland for adapter + adapter)	K9703WG	4 set	for Option code /CD□
M 20 x 1.5 (Cable gland for adapter + adapter)	K9703WH	4 set	for Option code /CF□

■ Optional parts

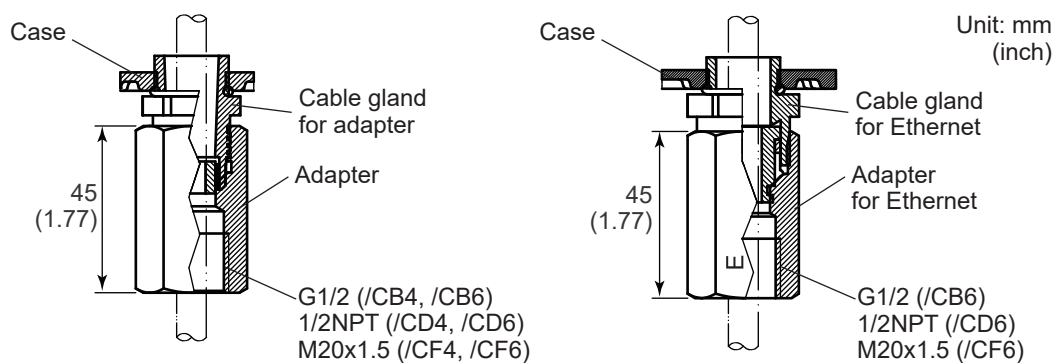
Name		Parts number	Quantity	Remark
Mounting hardware	for pipe, wall mounting (stainless)	K9703SS	1 set	same as Option code /U
	for panel mounting (stainless)	K9703ZD	1 set	same as Option code /PM
Sun shade hood	Stainless	K9698WK	1 set	same as Option code /H6
	stainless + urethane	K9698WL	1 set	same as Option code /H7
Rubber plug attachment		K9334CN	1 pcs	for Cable gland
Fuse		A1633EF	1 pcs	250V/2.5A (minimum 5 pcs)
SD card		A1004NL	1 pcs	1 GB industrial SD card Customers can provide the cards with spec: Type: SD, SDHC

■ Dimensions



Weight: max. 3.0 kg

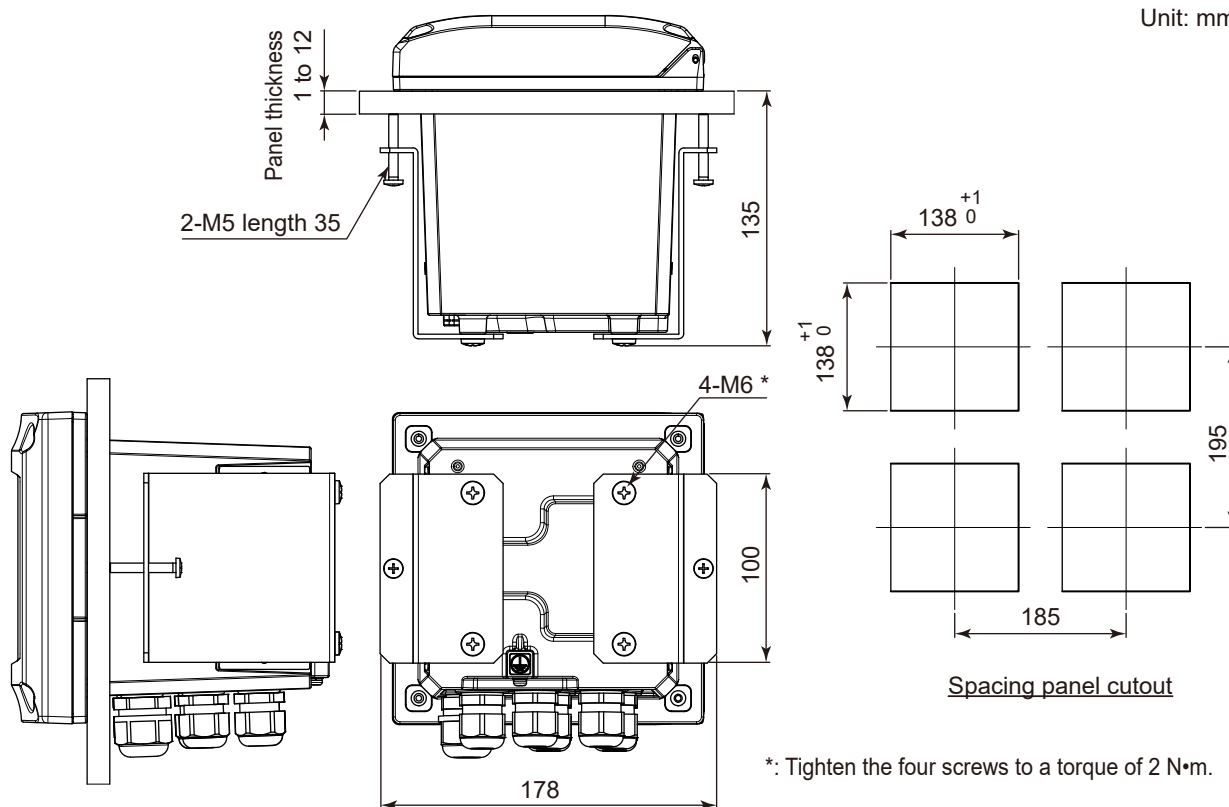
Conduit adaptor (/CB4, /CD4, /CF4/, /CB6, /CD6, /CF6)



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

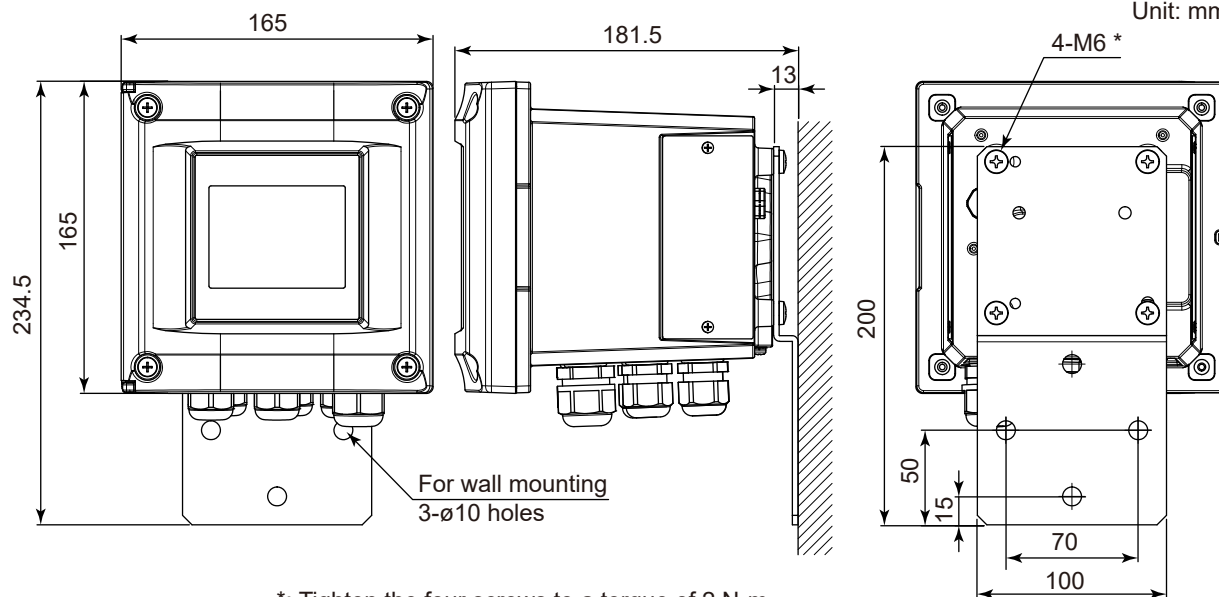
Panel mounting hardware (/PM, /UM)

Unit: mm



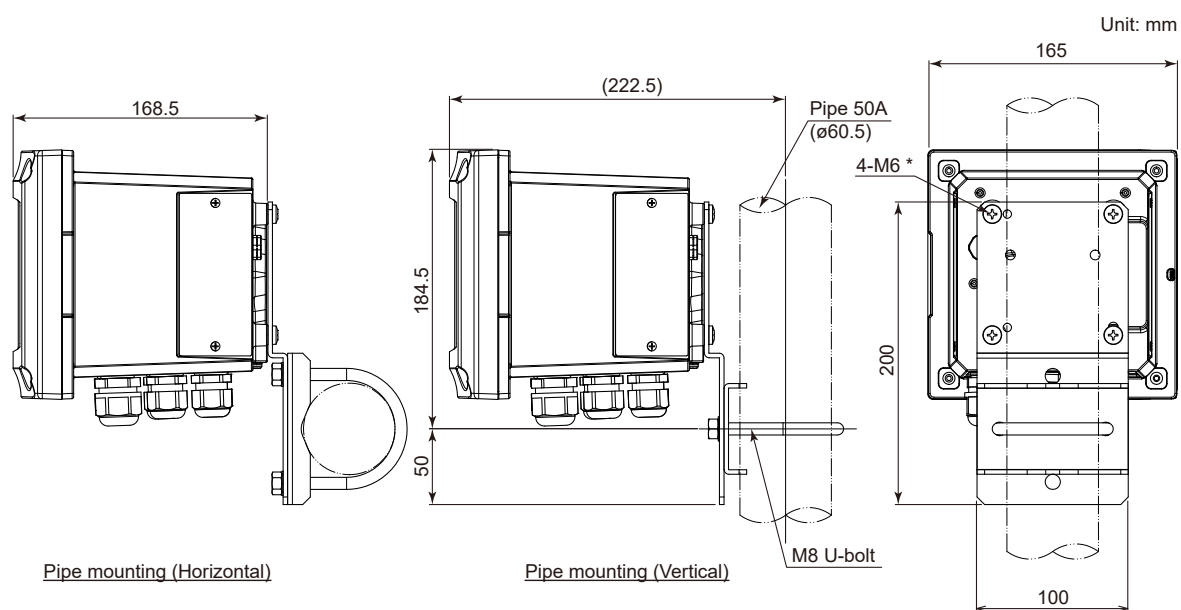
Wall mounting hardware (/U, /UM)

Unit: mm



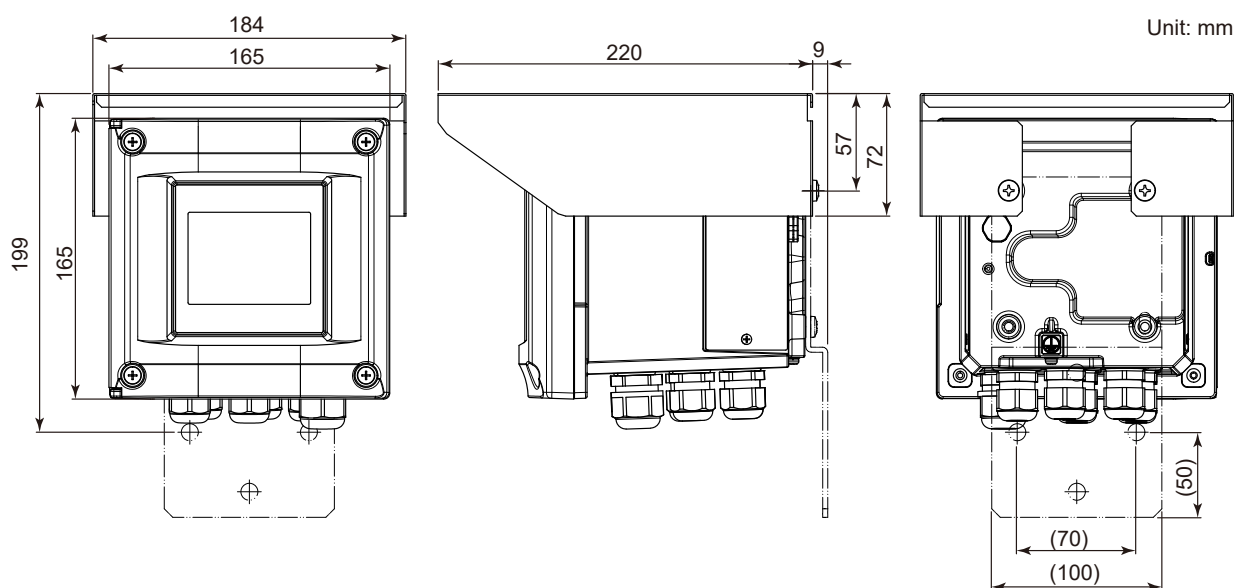
Note: For wall mounting, the wall should be strong enough to bear the weight of 8 kg or more.

Pipe mounting hardware (/U, /UM)

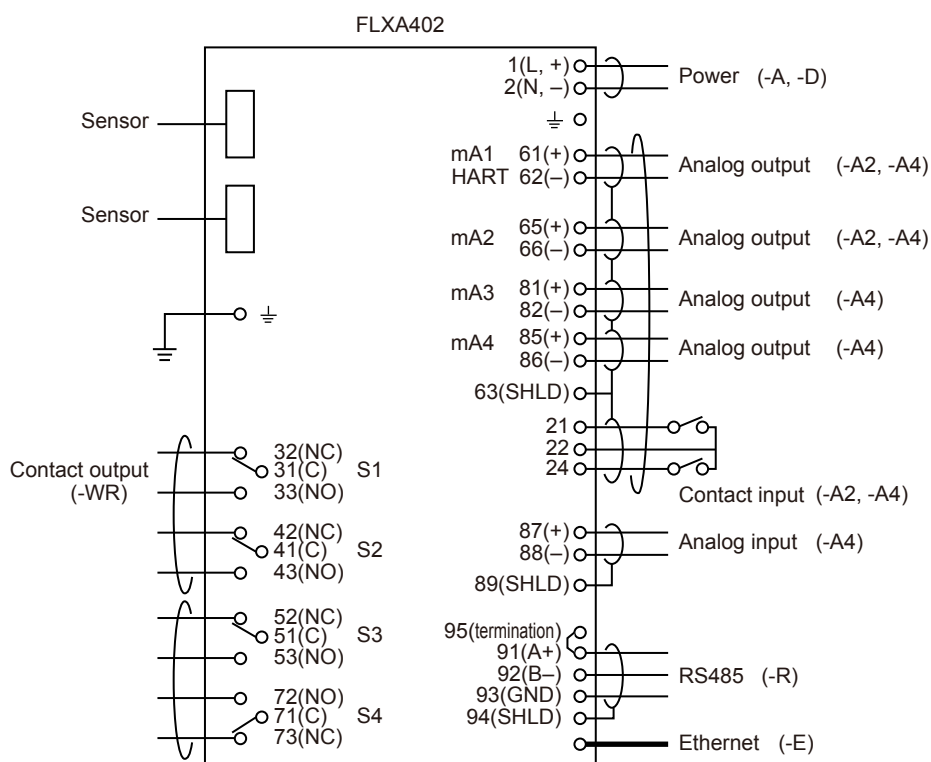


*: Tighten the four screws to a torque of 2 N•m.

Hood Stainless steel (/H6, /H7)



■ Wiring



■ 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 ☐ Bluetooth
 Digital Communication; ☐ Without Digital communication
☐ Modbus TCP/IP (Ethernet) ☐ Modbus RTU (RS-485)
 Others; _____

