

# General Specifications

Model FLXA21  
2-Wire Analyzer

**FLEXA** CE  
**SENCOM**

GS 12A01A02-01E

## ■ General

The model FLXA21<sup>®</sup> 2-Wire Analyzer, one model of FLEXA<sup>®</sup> series, offers single or dual sensor measurement. The modular-designed analyzer offers 4 kinds of measurements – pH/ORP (oxidation-reduction potential), contacting conductivity (SC), inductive conductivity (ISC) or dissolved oxygen (DO) – with the respective sensor module.

For dual sensor measurement, the combination of two same type sensor inputs – pH/ORP and pH/ORP (analog sensor only), SC and SC, and DO and DO – are available with two sensor modules. Dual sensor measurement offers additional functionalities; calculated data function and redundant system.

Variety of calculated data from two measuring parameters is selectable for each measurement. On the redundant system built on two measuring parameters of two sensor inputs, main output parameter is automatically switched over to the second sensor output in case of the main sensor's failure condition.

In addition to conventional analog pH/ORP sensors, the analyzer FLXA21 can be connected to Yokogawa's digital sensor, FU20F pH/ORP SENCOM Sensor.

In the FLXA21 Human Machine Interface (HMI), 2-wire type analyzer FLXA21 offers easy touch screen operation and simple menu structure in 12 languages. Menus of display, execution and setting are displayed in a selected language.

The analyzer FLXA21 automatically recognizes the installed sensor module and prepares the necessary menus for right configuration, even for dual sensor measurement.

For immediate measurement, the FLXA21 offers quick setup functionality. The quick setup screen appears when the analyzer is powered. Only a few setups – date/time, language, basic sensor configurations and output – will start the measurement.

The FLXA21 offers the best accuracy in measurement with temperature compensation functionality and calibration functionality. Sensor diagnostics and sensor wellness indication make measurement reliable. Logbook of events and diagnostic data is a useful information source for maintenance.

For the wide range of industrial environment, the FLXA21 is designed with the enclosure of plastic, stainless steel or stainless steel with corrosion-resistant coating. And, for hazardous location, the FLXA21 has approvals of ATEX, IECEx, FM, CSA and NEPSI.



## ■ Features

- 4 kinds of measurements; pH/ORP, SC, ISC and DO
- Dual sensor measurement on 2-wire type analyzer; pH/ORP and pH/ORP, SC and SC, and DO and DO
- Calculated data from dual sensor measurement
- Redundant system on dual sensor measurement
- Connection of digital FU20F pH/ORP SENCOM Sensor
- Easy touch screen operation on 2-wire type analyzer
- Simple HMI menu structure in 12 languages
- Quick setup menu for immediate measurement
- Indication of sensor wellness
- Enclosure – plastic, stainless steel or stainless steel with corrosion-resistant coating
- Hazardous location approvals – ATEX, IECEx, FM, CSA and NEPSI

## ■ General Specifications

### 1. Basic

#### ■ Measurement Object/Sensor Type

- pH/Oxidation-reduction Potential (pH/ORP) (analog sensor)
- Conductivity (SC)
- Inductive Conductivity (ISC)
- Dissolved Oxygen (DO)
- pH/Oxidation-reduction Potential (pH/ORP) (digital sensor)

Note: The available measurement object depends on a sensor module installed on the analyzer.

#### ■ Analyzer Structure

Module structure

#### ● Composition of Analyzer

- One (1) Housing assembly
- One (1) or two (2) Sensor modules

#### ● Combination of Sensor Module when two modules are installed

- Combinations of two same sensor modules are available;
- pH/ORP and pH/ORP (analog sensor)
  - SC and SC
  - DO and DO

### 2. Measurement

#### 2-1. pH/Oxidation-reduction Potential (pH/ORP) with analog sensors

##### ■ 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:  $\pm 0.01$  pH  
 Repeatability:  $\pm 0.01$  pH  
 Accuracy:  $\pm 0.01$  pH

ORP

Linearity:  $\pm 1$  mV  
 Repeatability:  $\pm 1$  mV  
 Accuracy:  $\pm 1$  mV

Temperature

with Pt1000, 6k8, PTC10k, NTC 8k55, 3k Balco, PTC500

Repeatability:  $\pm 0.1$  °C

Accuracy:  $\pm 0.3$  °C

with Pt100

Linearity:  $\pm 0.4$  °C

Repeatability:  $\pm 0.1$  °C

Accuracy:  $\pm 0.4$  °C

#### 2-2. Conductivity (SC)

##### ■ Input Specification

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

##### ■ Input Range

Conductivity:

min.: 0  $\mu\text{S}/\text{cm}$

max.: 200  $\text{mS} \times (\text{Cell constant})$

(over range 2000  $\text{mS}/\text{cm}$ )

Resistivity:

min.: 0.005  $\text{k}\Omega / (\text{Cell constant})$

max.: 1000  $\text{M}\Omega \times \text{cm}$

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  $\text{mS}/\text{cm}$  (max 90% zero suppression)

Resistivity:

min. 0.001  $\text{k}\Omega \times \text{cm}$

max. 1000  $\text{M}\Omega \times \text{cm}$  (max 90% zero suppression)

Temperature:

min. span 25 °C

max. span 270 °C

##### ■ Performance (Accuracy)

(The specifications are expressed with simulated inputs.)

Conductivity

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

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

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

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

Resistivity

0.005  $\text{k}\Omega / \text{K} \text{cm}^{-1}$  to 0.5  $\text{M}\Omega / \text{K} \text{cm}^{-1}$

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

0.5  $\text{M}\Omega / \text{K} \text{cm}^{-1}$  to 1  $\text{M}\Omega / \text{K} \text{cm}^{-1}$

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

Temperature

with Pt1000, Pb36, Ni100

Accuracy:  $\pm 0.3$  °C

with Pt100, NTC 8k55

Accuracy:  $\pm 0.4$  °C

Temperature compensation

NaCl table:  $\pm 1$  %

Matrix:  $\pm 3$  %

Step response: 90 % (< 2 decades) in 7 seconds

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

"K" means cell constant.

YOKOGAWA provides conductivity sensors of which cell constants are 0.1 to 10  $\text{cm}^{-1}$ .

### 2-3. Inductive Conductivity (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  $\mu$ S/cm

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

Temperature:

min. span 25 °C

max. span 160 °C

#### ■ Performance (Accuracy)

(The specifications are expressed with simulated inputs.)

(Output span is 0-100  $\mu$ S/cm or more)

Conductivity:

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

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

Temperature:  $\pm 0.3$  °C

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

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

### 2-4. Dissolved Oxygen (DO)

#### ■ Input Specification

The FLXA21 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  $\mu$ A for Galvanic sensors and 0 to 1 micro A for Polarographic sensors.

For temperature compensation, the FLXA21 accepts Pt1000 (DO30 sensor) and NTC22k elements (OXYFERM and OXYGOLD sensors).

#### ■ Input Range

DO30 sensor:

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

Temperature: -20 to 150 °C

Note: Process temperature for DO30 is 0 to 40 °C

Hamilton sensors:

Oxyferm:

Measurement range: 10 ppb to 40 ppm

Temperature range: 0 to 130 °C

Oxygold G:

Measurement range: 2 ppb to 40 ppm

Temperature range: 0 to 130 °C

Oxygold B:

Measurement range: 8 ppb to 40 ppm

Temperature range: 0 to 100 °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 °C

max. span 170 °C

#### ■ Performance (Accuracy)

(The specifications are expressed with simulated inputs.)

Performance in ppm mode:

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

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

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

Performance in ppb mode:

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

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

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

Temperature

Linearity:  $\pm 0.3$  °C

Repeatability:  $\pm 0.1$  °C

Accuracy:  $\pm 0.3$  °C

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

### 2-5. pH/Oxidation-reduction Potential (pH/ORP) with digital sensor, FU20F pH/ORP SENCOR Sensor

#### ■ Input Specification

Bi-directional digital communication (RS-485) between FU20F and FLXA21

#### ■ Input Range (depending on FU20F)

pH: 0 to 14 pH

ORP: -1500 to 1500 mV

rH: 0 to 100 rH

Temperature: -10 to 105 °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

### 3. Electrical

#### ■ Output Signal

General: One output of 4-20 mA DC  
 Note: Tolerance:  $\pm 0.02$  mA  
 Bi-directional HART digital communication, superimposed on mA (4-20mA) signal

Output function:

Linear or Non-linear (21-step table)

Burn out function: (NAMUR 43 except ISC)

Without HART/PH201G:

Down: 3.6 mA

(signal: 3.8 to 20.5 mA for pH/ORP, SC and DO)

(signal: 3.9 to 20.5 mA for ISC)

Up: 22mA

With HART/PH201G:

Down: 3.6 mA for pH/ORP, SC and DO

Down: 3.9 mA for ISC

(signal: 3.8 to 20.5 mA for pH/ORP, SC and DO)

(signal: 3.9 to 20.5 mA for ISC)

Up: 22mA

#### ■ Power Supply

Nominal 24 V DC loop powered system

One (1) Sensor module (1 input):

16 to 40V DC (for pH/ORP (analog sensor), SC and DO)

17 to 40V DC (for ISC)

21 to 40V DC (for pH/ORP SENCOM sensor)

Two (2) Sensor modules (2 inputs):

22.8 to 40V DC (for pH/ORP (analog sensor), SC and DO)

Note: When the FLXA21 is used in the multi-drop mode of HART communication, the output signal is changed from 12.5 mA DC to 4 mA DC just after the power is turned on. Enough power supply for the instruments is to be provided.

#### ● Maximum Load Resistance

pH/ORP (analog sensor), SC and DO:

Refer to the Figure 1.

ISC and pH/ORP SENCOM sensor:

Refer to the Figure 2.

#### ■ Display

LCD with a touch screen:

Black/White: 213 x 160 pixels

Contrast adjustment available on the touch screen

Message language:

12 (English, Chinese, Czech, French, German, Italian, Japanese, Korean, Polish, Portuguese, Russian and Spanish)  
 One analyzer has all 12 languages.

Note: Description for a selection of language and language names are written in English.

Note: Only English alphabet and numeric are available for a tag number, an additional description for each value on the display screen and passwords.

Note: Only for message language on the screen, 12 languages are provided.

### 4. Mechanical and others

#### ■ Housing

Case:

- Plastic (Polycarbonate)
- Stainless steel without painting
- Stainless steel with epoxy coating
- Stainless steel with urethane coating
- Stainless steel + high anti-corrosion coating

Case color and finish:

Color: Silver gray (equivalent to Munsell 3.2PB7.4/1.2)  
 (for plastic case, stainless steel cases with coating)

Finish: Electropolishing (for stainless steel case without painting)

Window: Polycarbonate (flexible)

Window frame for stainless steel cases:

Polycarbonate, color: silver gray (equivalent to Munsell 3.2PB7.4/1.2)

Protection: IP66 (except Canada), Type 4X (except Canada), Type 3S/4X (Canada)

#### ■ Plate

Main name plate: inside case cover

Regulation plate:

on the case outside

#### ■ Cable and Terminal

Cable size:

Outer diameter:

6 to 12 mm (suitable for M20 cable gland)

3.4 to 7 mm (grounding cable for plastic case)

Terminal screw size: M4

torque of screw up: 1.2 N·m

Wire terminal:

Pin terminal, ring terminal and spade terminal can be used for analyzer's power supply terminals and sensor terminals.

For the grounding terminal on the stainless steel case, ring terminal should be used.

Pin terminal: pin diameter: max. 1.9 mm

Ring and spade terminal: width: max. 7.8 mm

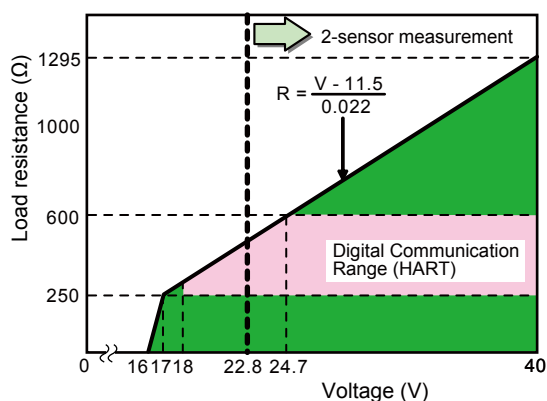


Figure 1 Supply Voltage and Load Resistance for pH/ORP (analog sensor), SC and DO

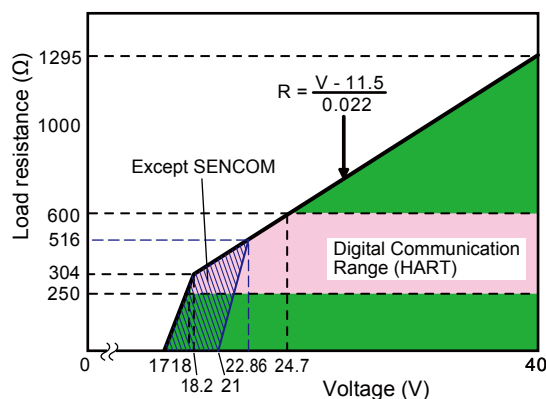


Figure 2 Supply Voltage and Load Resistance for ISC and pH/ORP SENCOM sensor

### ■ Cable Entry

#### Plastic case:

- 1-Sensor measurement:
  - 3 holes,
  - M20 cable gland x 3 pcs,
  - Sleeve x 1 pc (for grounding cable line)

- 2-Sensor measurement:
  - 4 holes,
  - M20 cable gland x 4 pcs,
  - Sleeve x 1 pc (for grounding cable line)

#### Stainless steel case:

- 3 holes,
- M20 cable gland x 3 pcs
- Close up plug x 1 pc

Note: Cable gland and plug are delivered with an analyzer, but not assembled into the analyzer.

### ■ Mounting

#### 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 urethane coating
- Stainless steel with epoxy coating

### ■ Stainless Steel Tag Plate

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 analyzer.

Tag plate is hanging type.

### ■ Conduit Adapter

#### Using optional adapter

- G1/2 (quantity: 4)
- 1/2NPT (quantity: 4)
- M20 x 1.5 (quantity: 4)

These conduit adapters are delivered with an analyzer, but not assembled into the analyzer.

### ■ Size of Housing Case

Plastic: 144 x 144 x 151 mm (L x W x D) (without cable gland)

Stainless steel case:  
165 x 165 x 160 mm (L x W x D) (without cable gland)

### ■ Weight

Approx. 1 kg (Plastic housing)  
Approx. 2 kg (Stainless steel housing)

### ■ Shipping Details

#### Package size:

Approx. 340 x 340 x 370 mm (L x W x H)

### ■ 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 an analyzer:

#### Paper copy:

- Start-up Manual
  - written in English
- Safety Precautions
  - written in English

#### CD-ROM:

- Start-up Manual
  - written in English

#### User's Manual

written in English

#### Safety Regulations Manual

for European region  
written in 25 languages

#### General Specifications

written in English

#### Technical Information

for HART Communication  
written in English

#### User Setting Table

of 5 kinds of measurement/sensor type  
written in English

### ■ Regulatory Compliance

#### Safety:

UL 61010-1  
UL 61010-2-030  
CAN/CSA C22.2 No.61010-1

#### EMC:

EN61326-1 Class A, Table 2 (For use in industrial locations)

EN61326-2-3

AS/NZS CISPR11

Korea Electromagnetic Conformity

Standard Class A 한국 전자파적합성 기준

Installation altitude: 2000 m or less

Category based on IEC 61010: I (Note 1)

Pollution degree based on IEC 61010: 2 (Note 2)

Note 1: Installation category, called over-voltage category, specifies impulse withstand voltage.

Equipment with "Category I" (ex. two wire transmitter) is used for connection to circuits in which measures are taken to limit transient over-voltages to an appropriately low level.

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.

Explosion-proof (Intrinsically safe type and non-incendive) (for suffix code: -EA, -ES):

ATEX Intrinsically safe approval

#### Applicable standard

Explosive Atmospheres

EN 60079-0:2012/A11: 2013 Equipment - General requirements

EN 60079-11:2012 Equipment protection by Intrinsic safety "i"

EN 60079-26:2007 Equipment with equipment protection level (EPL) Ga

EN 60529:1992 Degrees of protection provided by enclosures (IP Code)

#### Type of protection

II 1G Ex ia IIC Ga

Group: II

Category: 1G

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

T6: for ambient temperature: -20 to 40°C (excluding SENCOR module)

Atmosphere pressure: 80kPa (0.8bar) to 110kPa (1.1bar)

Degree of Protection of the

Enclosure: IP66

#### IECEx Intrinsically safe

#### Applicable standard

IEC 60079-0: 2011 Part 0: Equipment - General requirements

IEC 60079-11: 2011 Part 11: Equipment protection by Intrinsic safety "i"

|   |   |
|---|---|
| IEC 60079-26: 2006 Part 26: Equipment with equipment protection level (EPL) Ga  | CSA Intrinsically safe and nonincendive approval  |
| IEC 60529: 2001 Degrees of protection provided by enclosures (IP Code)  | Applicable standard   |
| Type of protection  | CAN/CSA C22.2 No. 94-M1991 Special Purpose Enclosures   |
| Ex ia IIC Ga  | CAN/CSA C22.2 No. 157-92 Intrinsically Safe Equipment for Use in Hazardous Locations                    |
| T4: for ambient temperature: -20 to 55°C  | C22.2 No213-M1987 Non-incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations |
| T6: for ambient temperature: -20 to 40°C (excluding SENCOM module)  | CAN/CSA-E60079-0-07 Electrical apparatus for explosive gas atmospheres - Part 0: General requirements   |
| Atmosphere pressure: 80kPa (0.8bar) to 110kPa (1.1bar)  | CAN/CSA-E60079-11-02 Electrical apparatus for explosive gas atmospheres - Part 11: Intrinsic safety "i" |
| Degree of Protection of the Enclosure: IP66   | IEC 60529:2001 Degrees of protection provided by enclosures (IP Code)                                   |
| FM Intrinsically safe and nonincendive approval   | Type of protection (C22.2)  |
| Applicable standard   | Class I, Division 1, Groups A, B, C and D (Intrinsically Safe)  |
| FM-3600: 2011 Approval Standard for Electric Equipment for use in Hazardous (Classified) Locations General Requirement  | Class I, Division 2, Groups A, B, C and D (Nonincendive)  |
| FM-3610: 2010 Approval Standard for Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations | For all protection type,  |
| FM-3611: 2004 Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2, Hazardous (Classified) Locations                | T4: for ambient temperature: -20 to 55°C  |
| FM-3810: 2005 Electrical Equipment for Measurement, Control and Laboratory Use  | T6: for ambient temperature: -20 to 40°C  |
| NEMA 250:1991 Enclosures for Electrical Equipment (1000 Volts Maximum)  | Atmosphere pressure: 80 kPa (0.8 bar) to 110 kPa (1.1 bar)  |
| ANSI/IEC 60529:2004 Degrees of protection provided by enclosures (IP Code)  | Ambient Humidity: 0 to 100% (No condensation)   |
| ANSI/ISA 60079-0 2009 Part 0: General Requirements  | Degree of Protection of the Enclosure: Type 4X  |
| ANSI/ISA 60079-11 2011 Part 11: Equipment protection by intrinsic safety "i"  | Type of protection (E60079)   |
| Type of protection  | Ex ia IIC   |
| Class I, Division 1, Groups A, B, C and D (Intrinsically Safe)  | T4: for ambient temperature: -20 to 55°C  |
| Class I, Division 2, Groups A, B, C and D (Nonincendive)  | T6: for ambient temperature: -20 to 40°C  |
| Class I, Zone 0, in Hazardous (Classified) Locations (Intrinsically Safe)   | Atmosphere pressure: 80 kPa (0.8 bar) to 110 kPa (1.1 bar)  |
| Class I, Zone 2, Group IIC, in Hazardous (Classified) Locations (Nonincendive)  | Ambient Humidity: 0 to 100% (No condensation)   |
| AEx ia IIC  | Degree of Protection of the Enclosure: IP66   |
| For all protection type,  | NEPSI Intrinsically safe approval   |
| T4: for ambient temperature: -20 to 55°C  | Applicable Standard   |
| T6: for ambient temperature: -20 to 40°C  | GB 3836.1-2010 Explosive atmospheres- Part 1: Equipment - General requirements                          |
| Atmosphere pressure: 80 kPa (0.8 bar) to 110 kPa (1.1 bar)  | GB 3836.4-2010 Explosive atmospheres- Part 4: Equipment protection by intrinsic safety "i"              |
| Degree of Protection of the Enclosure: NEMA Type 4X and IP66  | GB 3836.20-2010 Explosive atmospheres- Part 20: Equipment with equipment protection level (EPL) Ga      |
|   | Type of protection  |
|   | Ex ia IIC Ga  |
|   | T4: for ambient temperature: -20°C to 55°C  |
|   | T6: for ambient temperature: -20°C to 40°C  |
|   | Atmosphere pressure: 80kPa (0.8bar) to 110kPa (1.1bar)  |
|   | Degree of Protection of the Enclosure: IP66   |

### Electrical Parameters (Ex ia)

Each housing assembly (base module) and each sensor module are respectively certificated. Input parameters of sensor module meet output parameters of housing assembly.

#### Housing assembly

|                   |  |
|-------------------|--|
| Input parameters  | Supply and output circuit (terminals + and -):<br>$U_i, V_{max} = 30\text{ V}$<br>$I_i, I_{max} = 100\text{ mA}$<br>$P_i, P_{max} = 0.75\text{ W}$<br>$C_i = 13\text{ nF}$<br>$L_i = 0\text{ mH}$<br>(Linear source)       |
| Output parameters | Measuring module input circuit (CN2 or CN3 on Back board)<br>$U_o, V_t, V_{oc} = 13.65\text{ V}$<br>$I_o, I_t, I_{sc} = 50\text{ mA}$<br>$P_o = 0.372\text{ W}$<br>$C_o, C_a = 80\text{ nF}$<br>$L_o, L_a = 7.7\text{ mH}$ |

#### pH/ORP module, SC module, and DO module

|                   |  |
|-------------------|--|
| Input parameters  | $U_i, V_{max} = 13.92\text{ V}$<br>$I_i, I_{max} = 50\text{ mA}$<br>$P_i, P_{max} = 0.374\text{ W}$<br>$C_i = 40\text{ nF}$<br>$L_i = 2.9\text{ mH}$   |
| Output parameters | Sensor input circuit (pH: terminals 11 through 19, SC: terminals 11 through 16, DO: terminals 11 through 18)<br>$U_o, V_t, V_{oc} = 11.76\text{ V}$<br>$I_o, I_t, I_{sc} = 116.5\text{ mA}$<br>$P_o = 0.3424\text{ W}$<br>$C_o, C_a = 100\text{ nF}$<br>$L_o, L_a = 1.7\text{ mH}$ |

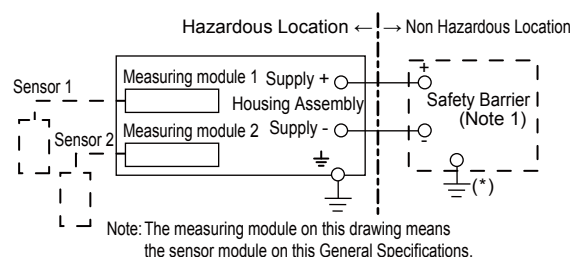
#### ISC module

|                   |  |
|-------------------|--|
| Input parameters  | $U_i, V_{max} = 13.92\text{ V}$<br>$I_i, I_{max} = 50\text{ mA}$<br>$P_i, P_{max} = 0.374\text{ W}$<br>$C_i = 40\text{ nF}$<br>$L_i = 7.7\text{ mH}$   |
| Output parameters | Sensor input circuit (terminals 11 through 17)<br>$U_o, V_t, V_{oc} = 11.76\text{ V}$<br>$I_o, I_t, I_{sc} = 60.6\text{ mA}$<br>$P_o = 0.178\text{ W}$<br>$C_o, C_a = 100\text{ nF}$<br>$L_o, L_a = 8\text{ mH}$ |

#### SENCOM Sensor module

|                   |   |
|-------------------|---|
| Input parameters  | $U_i, V_{max} = 13.92\text{ V}$<br>$I_i, I_{max} = 50\text{ mA}$<br>$P_i, P_{max} = 0.374\text{ W}$<br>$C_i = 40\text{ nF}$<br>$L_i = 7.2\text{ mH}$  |
| Output parameters | Sensor input circuit (terminals 82, 83, 84, 86 and 87)<br>$U_o, V_t, V_{oc} = 5.36\text{ V}$<br>$I_o, I_t, I_{sc} = 106.16\text{ mA}$<br>$P_o = 0.1423\text{ W}$<br>$C_o, C_a = 31\text{ }\mu\text{F}$<br>$L_o, L_a = 0.45\text{ mH}$ |

### Control Drawing (ATEX and IECEx types)



Electrical data are as follows;

Supply and output circuit (Terminals Supply + and -):

Maximum Voltage ( $U_i$ ) = 30V  
 Maximum Current ( $I_i$ ) = 100mA  
 Maximum Power ( $P_i$ ) = 0.75W  
 Internal Capacitance ( $C_i$ ) = 13nF  
 Internal Inductance ( $L_i$ ) = 0mH

Sensor input circuit (pH: terminals 11 through 19, SC: terminals 11 through 16, DO: terminals 11 through 18, ISC: terminals 11 through 17, SENCOM: terminals 82, 83, 84, 86 and 87):

| Type of Measuring Module       | pH, SC and DO | ISC     | SENCOM           |
|--------------------------------|---------------|---------|------------------|
| Maximum Voltage ( $U_o$ )      | 11.76 V       | 11.76 V | 5.36 V           |
| Maximum Current ( $I_o$ )      | 116.5 mA      | 60.6 mA | 106.6 mA         |
| Maximum Power ( $P_o$ )        | 0.3424 W      | 0.178 W | 0.1423 W         |
| External Capacitance ( $C_o$ ) | 100 nF        | 100 nF  | 31 $\mu\text{F}$ |
| External Inductance ( $L_o$ )  | 1.7 mH        | 8 mH    | 0.45 mH          |

Note 1: In any safety barrier used, the output current must be limited by a resistor "R" such that  $I_{maxout} = U_z/R$ .

Note 2: The safety barrier shall be certified by notify body EU as ATEX.

Note 3: When using non isolation barrier connect (\*1) to IS earthing system.

Note 4: Sensor 1 and Sensor 2 shall be of passive types to be regarded as 'simple apparatus' or the ones individually certified with relevant parameters.

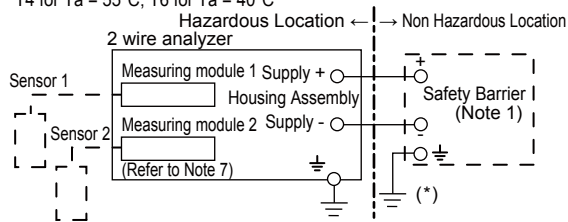
Note 5: Measuring module 2 may not mounted. As for ISC module and SENCOM module, only one can be mounted.

Note 6: Measuring module is placed in an enclosure with IP20 and over.

## Control Drawing (FM type)

Following contents refer "DOC. No. IKE039-A12"

Class I, Division 1, Groups A, B, C, and D  
Class I, Zone 0 and 1, Group IIC  
T4 for Ta = 55°C, T6 for Ta = 40°C



Note: The measuring module on this drawing means the sensor module on this General Specifications.

Electrical data are as follows:

Input Maximum Input Voltage ( $U_i$ ) = 30V  
Maximum Current ( $I_i$ ) = 100mA  
Maximum Power ( $P_i$ ) = 0.75W  
Internal Capacitance ( $C_i$ ) = 13nF  
Internal Inductance ( $L_i$ ) = 0mH

Sensor Input Circuit

| Type of Measuring Module            | pH, SC and DO | ISC     |
|-------------------------------------|---------------|---------|
| Maximum Voltage ( $U_o$ )           | 11.76 V       | 11.76 V |
| Maximum Current ( $I_o$ )           | 116.5 mA      | 60.6 mA |
| Maximum Power ( $P_o$ )             | 0.3424 W      | 0.178 W |
| External Capacitance ( $C_a, C_o$ ) | 100 nF        | 100 nF  |
| External Inductance ( $L_a, L_o$ )  | 1.7 mH        | 8 mH    |

Note 1: In any safety barrier used, the output current must be limited by a resistor "R" such that  $I_{maxout} = U_z/R$ .

Note 2: The safety barrier shall be FM Entity-Approved associated apparatus / barrier where :

Barrier  $V_{oc}, U_o \leq 30V$ ;  
Barrier  $I_{sc}, I_o \leq 100 \text{ mA}$ ;  
Barrier  $P_o \leq 0.75W$ ;  
Barrier  $C_a, C_o \geq 13 \text{ nF} + C_{cable}$ ;  
Barrier  $L_a, L_o \geq L_{cable}$

Note 3: When using non isolation barrier connect (\*) to IS earthing system.

Note 4: pH and SC Sensor(s) are of a passive type to be regarded as 'simple apparatus' same as 06ATEX0218X, 06ATEX0219, IECEx KEM 06.0052X, FM3028779, 06ATEX0220X, 06ATEX0221, IECEx KEM 06.0053X or the one individually certified with relevant parameters.

Note 5: ISC Sensor(s) are ISC40S of 00ATEX1067X or the one individually certified with relevant parameters.

Note 6: DO Sensor(s) are of a passive type to be regarded as 'simple apparatus' or the one individually certified with relevant parameters.

Note 7: Measuring module 2 may not be mounted. As for ISC module, only one can be mounted.

Note 8: Install per the National Electrical Code (NFPA 70)

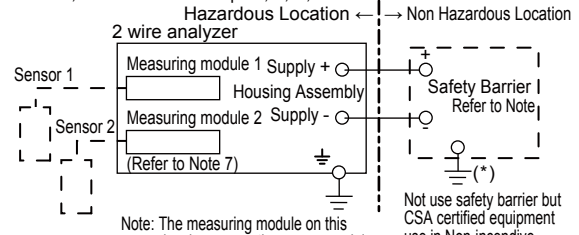
Note 9: WARNING - Potential electrostatic charging hazard  
Electrostatic charge may cause an explosion hazard. Avoid any actions that cause the generation of electrostatic charge, e.g., rubbing with a dry cloth.

Note 10: As an alternative to installing the FLXA21 in Division 2 using Class I, Division 2 wiring methods, the FLXA21 may be installed in Division 2 using nonincendive field wiring in accordance with the National Electrical Code (NFPA 70) using the same parameters identified for intrinsically safe entity installations. The Associated Nonincendive Apparatus shall have nonincendive field wiring connections which are FM Approved for use in the Class I, Division 2 location.

## Control Drawing (CSA type)

Intrinsically Safe  
Group IIC, Zone 0  
Class I, Division 1

Non-incendive  
Class I, Division 2,  
Groups A, B, C, D



Note: The measuring module on this drawing means the sensor module on this General Specifications.

Not use safety barrier but CSA certified equipment use in Non-incendive

Electrical parameters (Intrinsically safe)

Housing Assembly

Supply and output circuit (terminals + and -)

$U_i(V_{max})=30V, I_i(I_{max})=100mA,$   
 $P_i(P_{max})=0.75W, C_i=13nF, L_i=0mH$

Measuring module input circuit (CN2 or CN3 on Back board)

$U_o(V_t, V_{oc})=13.65V, I_o(I_t, I_{sc})=50mA,$   
 $P_o=0.372W, C_o(C_a)=80nF,$   
 $L_o(L_a)=7.7mH$

pH module, SC module and DO module

$U_i(V_{max})=13.92V, I_i(I_{max})=50mA,$   
 $P_i(P_{max})=0.374W, C_i=40nF, L_i=2.9mH$

Sensor input circuit (terminals 11 through 19)

$U_o(V_t, V_{oc})=11.76V, I_o(I_t, I_{sc})=116.5mA,$   
 $P_o=0.3424W, C_o(C_a)=100nF,$   
 $L_o(L_a)=1.7mH$

ISC module

$U_i(V_{max})=13.92V, I_i(I_{max})=50mA,$   
 $P_i(P_{max})=0.374W, C_i=40nF, L_i=7.7mH$

Sensor input circuit (terminals 11 through 17)

$U_o(V_t, V_{oc})=11.76V, I_o(I_t, I_{sc})=60.6mA,$   
 $P_o=0.178W, C_o(C_a)=100nF,$   
 $L_o(L_a)=8mH$

Installation requirements between housing assembly and safety barrier

$U_o \leq U_i, I_o \leq I_i, P_o \leq P_i, C_o \geq C_i + C_{cable}, L_o \geq L_i + L_{cable}$   
 $V_{oc} \leq V_{max}, I_{sc} \leq I_{max}, C_a \geq C_i + C_{cable}, L_a \geq L_i + L_{cable}$   
 $U_o, I_o, P_o, C_o, L_o, V_{oc}, I_{sc}, C_a$  and  $L_a$  are parameters of barrier.

Electrical Parameters (Nonincendive)

Housing Assembly

Supply and output circuit (terminals + and -)

$U_i(V_{max})=30V, C_i=13nF, L_i=0mH$

Measuring module input circuit (CN2 or CN3 on Back board)

$U_o(V_t, V_{oc})=13.65V, I_o(I_t, I_{sc})=50mA,$   
 $C_o(C_a)=80nF, L_o(L_a)=7.7mH$

pH module, SC module and DO module

$U_i(V_{max})=13.92V, C_i=40nF, L_i=2.9mH$

Sensor input circuit (terminals 11 through 19)

$U_o(V_t, V_{oc})=11.76V, I_o(I_t, I_{sc})=116.5mA,$   
 $C_o(C_a)=4\mu F, L_o(L_a)=4.5mH$

ISC module

$U_i(V_{max})=13.92V, C_i=40nF, L_i=7.7mH$

Sensor input circuit (terminals 11 through 17)

$U_o(V_t, V_{oc})=11.76V, I_o(I_t, I_{sc})=60.6mA,$   
 $C_o(C_a)=4\mu F, L_o(L_a)=19mH$

Note for Intrinsically Safe Installation:

- In any safety barrier used, the output current must be limited by a resistor "R" such that  $I_o = U_o/R$  or  $I_{sc} = V_{oc}/R$ .
- The safety barrier must be CSA certified.

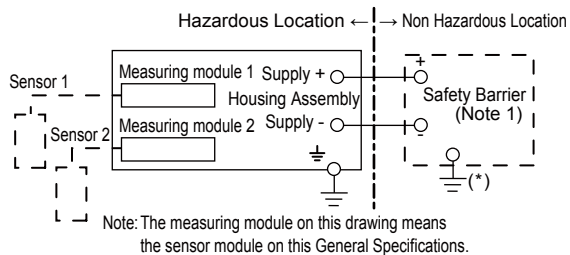


- 3: Input voltage of the safety barrier must be less than 250Vrms/Vdc
- 4: When using non isolation barrier connect (\*) to IS earthing system.
- 5: pH and SC Sensor(s) are of a passive type to be regarded as 'simple apparatus' same as 06ATEX0218X, 06ATEX0219, IECEx KEM 06.0052X, FM3028779, 06ATEX0220X, 06ATEX0221, IECEx KEM 06.0053X or the one individually certified with relevant parameters.
- 6: ISC Sensor(s) are ISC40S of 00ATEX1067X or the one individually certified with relevant parameters.
- 7: DO Sensor(s) are of a passive type to be regarded as 'simple apparatus' or the one individually certified with relevant parameters.
- 8: Measuring module 2 may not mounted. As for ISC module, only one can be mounted.
- 9: Installation should be in accordance with Canadian Electrical Code Part I and Local Electrical Code.
- 10: Do not alter drawing without authorization from CSA.

Note for Nonincendive Installation:

- 1: The parameter for sensor input circuit must be taken into account when installed.
- 2: Installation should be in accordance with Canadian Electrical Code Part I and Local Electrical Code.
- 3: Do not alter drawing without authorization from CSA.

### Control Drawing (NEPSI types)



Electrical data are as follows;

Maximum Voltage ( $U_i$ ) = 30V  
 Maximum Current ( $I_i$ ) = 100mA  
 Maximum Power ( $P_i$ ) = 0.75W  
 Internal Capacitance ( $C_i$ ) = 13nF  
 Internal Inductance ( $L_i$ ) = 0mH

- Note 1: The output current must be limited by a resistor "R" such that  $I_{maxout} = U_z/R$  (linear source).
- Note 2: Safety barrier certified by NEPSI should be used.
- Note 3: When using non isolation barrier, connect (\*) to IS earthing system.
- Note 4: Measuring module 2 is installed when required. When measuring inductive conductivity, only one module can be installed.

## 5. Digital Communication

### ■ Kind of Digital Communication

- HART or PH201G dedicated distributor  
 Note: Only one kind of digital communication is available for one analyzer.

### ■ Output Value Parameter (HART)

- Four value parameters (measured values) are available for one digital communication.
- For 1-sensor measurement, these parameters are measured values.
  - For 2-sensor measurement, refer to the next item.

### ■ Digital Communication of 2-Sensor Measurement (HART)

Even when two sensor modules are installed, only one digital communication is available for 2-sensor measurement.

Four value parameters can be selected from the followings;

- Measured values of two sensors
- Calculated data of 2-sensor measurement
- Redundant system output

### ■ Specific Contact Output with dedicated distributor, model PH201G (Style B)

The distributor, model PH201G, is designed to connect with the 2-Wire Analyzer.

This distributor supplies drive power to the analyzer and receives simultaneously 4-20 mA DC signal from the analyzer.

This signal is converted to 1-5 V DC signal in the distributor.

This distributor also receives digital signals superimposed on the 4-20 mA DC signal, and provides contact outputs

Input/Output signal:

- Number of available drive/signal point: 1
- Output signal: 1-5 V DC (2 points) (Note)
- Load resistance: 2 kΩ or less (1-5 V DC output)
- Isolation system: Loop isolation type
- Note: Two output signals for one analyzer's analog output are provided. Two 1-5 V DC output signals are same.

Contact output:

- Contact rating:
  - 250 V AC, maximum 100 VA
  - 220 V DC, maximum 50 VA
- Hold contact output:
  - NC contact, normally energized
  - Contact closes when power is off or during Hold situation.
- Fail contact output:
  - NC contact, normally energized
  - Contact closes when power is off or during Fail/Warning conditions.
- Wash contact output:
  - NO contact
  - Contact closes during wash cycles.

Regulatory Compliance

Korea Electromagnetic Conformity Standard Class A  
 한국 전자과적합성 기준

## 6. Model & Suffix Codes

| Model                 | Suffix code  | Option code   | Description  |
|-----------------------|--|---|--|
| FLXA21                | .....  | .....   | 2-Wire Analyzer  |
| Power supply          | -D   | .....   | Always -D  |
| Housing               | -P<br>-S<br>-U<br>-E<br>-W   | .....   | Plastic<br>Stainless steel<br>Stainless steel + urethane coating<br>Stainless steel + epoxy coating<br>Stainless steel + high anti-corrosion coating (Note 11)   |
| Display               | -D   | .....   | Anti-glare LCD   |
| Type                  | -AA<br>-EA<br>-ES<br>-EG<br>-AQ<br>-AR<br>-EQ<br>-ER                         | .....   | General purpose<br>ATEX, IECEx, FM, CSA, NEPSI (Note 5)<br>ATEX, IECEx for SENCOM sensor (Note 9)<br>KOSHA (Note 12)<br>General purpose for EAC with PA (Note 13)<br>General purpose for EAC (Note 14)<br>EACEx with PA (Note 15)<br>EACEx (Note 16)   |
| 1st input             | -P1<br>-C1<br>-C5<br>-D1<br>-S1  | .....   | pH/ORP (Note 7)<br>Conductivity (SC)<br>Inductive conductivity (ISC)<br>Dissolved oxygen (DO)<br>pH/ORP (SENCOM sensor) (Note 8)   |
| 2nd input (Note 1)    | -NN<br>-P1<br>-C1<br>-D1   | .....   | Without input<br>pH/ORP (Note 7)<br>Conductivity (SC)<br>Dissolved oxygen (DO)   |
| Output (Note 10)      | -A   | .....   | 4-20 mA + HART   |
| —                     | -N   | .....   | Always -N  |
| Language set (Note 2) | -LA  | .....   | English and 11 languages   |
| Country (Note 3)      | -N<br>-J   | .....   | Global except Japan<br>Japan   |
| —                     | -NN  | .....   | Always -NN   |
| Option                | Mounting hardware<br>Hood<br>Tag plate<br>Conduit adapter<br>Measurement law | /UM<br>/U<br>/PM<br>/H6<br>/H7<br>/H8<br>/SCT<br>/CB4<br>/CD4<br>/CF4<br>/K | Universal mounting kit (Note 4)<br>Pipe and wall mounting hardware<br>Panel mounting hardware<br>Hood, stainless steel<br>Hood, stainless steel + urethane coating<br>Hood, stainless steel + epoxy coating<br>Stainless steel tag plate<br>Conduit adapter (G1/2 x 4 pcs)<br>Conduit adapter (1/2NPT x 4 pcs)<br>Conduit adapter (M20 x 1.5 x 4 pcs)<br>With Measurement Law certificate (Note 6) |

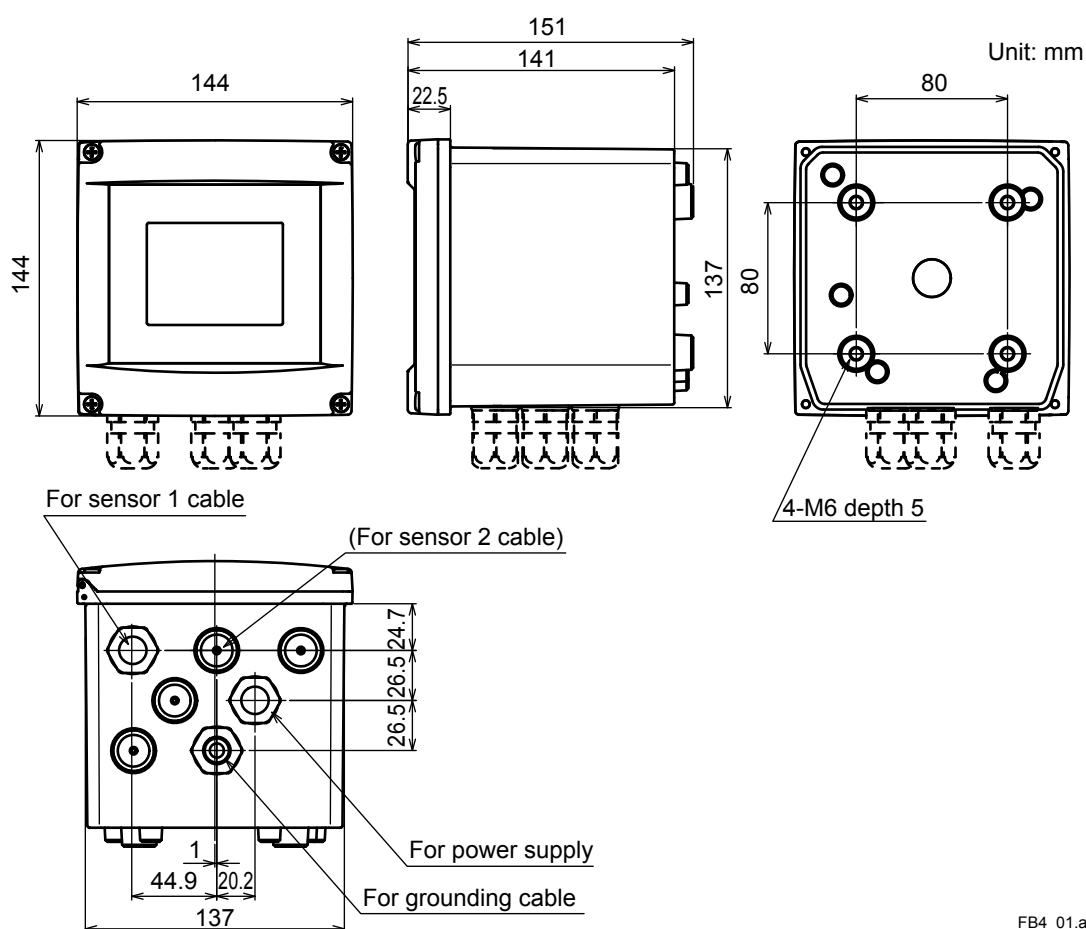
### Notes:

- When a 2nd input is selected, only the same kind of the 1st input is available.  
For example, when a 1st input is “-P1”, the 2nd input must be the same “-P1”.  
The combination of ISC and ISC is not available. And, the combination of SENCOM sensor and SENCOM sensor is not available, either.
- These languages are message languages on the analyzer’s display.  
One analyzer has English and 11 languages.  
All languages are as follows; English, Chinese, Czech, French, German, Italian, Japanese, Korean, Polish, Portuguese, Russian and Spanish.
- When an analyzer is used in Japan, it must meet the Japanese Measurement Law.  
Only SI units must be used on the analyzer and its documents in Japan.
- The universal mounting kit contains the pipe and wall mounting hardware (/U) and the panel mounting hardware (/PM).
- The type “-EA” is intrinsically safe type of ATEX, IECEx, FM, CSA and NEPSI, and non-incendive of FM and CSA. Temperature classes are T4 and T6. The type “-EA” cannot be used with SENCOM sensor. For SENCOM sensor, select “-ES”.
- The analyzer with Japanese Measurement Law certificate is available only for the following model;  
FLXA21-D-[Housing code]-D-AA-P1-NN-A-N-LA-J-NN/[option code except /K]/K  
Only one pH measurement with an analog sensor is certified. The output signal of 4 - 20 mA is certified. HART communication is not certified.
- This input is to be come from an analog pH/ORP sensor.

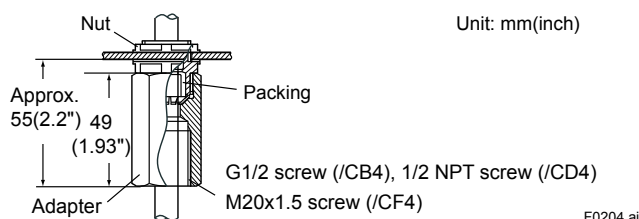
- 8: When the analyzer is connected with the digital sensor, FU20F pH/ORP SENCOM Sensor, only the following model is available;  
 Type: General purpose (-AA) and explosion-proof (-ES).  
 Explosion-proof (-ES) is available only for ATEX and IECEx  
 2nd input: Without input (-NN)  
 Option: except "K"
- 9: The type "-ES" is intrinsically safe type of ATEX, IECEx for SENCOM sensor. Temperature class is T4.
- 10: The FLXA21 has other output types of "FOUNDATION Fieldbus" communication (suffix code: -F) and "PROFIBUS PA" communication (suffix code: -P). Refer to GS 12A01A02-71E and GS 12A01A02-72E.
- 11: The housing with stainless steel + high anti-corrosion coating is available for the type "-AA" and "-ES".
- 12: The type "-EG" intrinsically safe type of KOSHA for Korea. Temperature class is T4.
- 13: The type "-AQ" is General purpose type of EAC with Pattan Approval for Russia.
- 14: The type "-AR" is General purpose type of EAC for Kazakhstan and Belarus.
- 15: The type "-EQ" intrinsically safe type of EAC with Pattan Approval for Russia. Temperature class is T4.  
 The type "-EQ" cannot be used with SENCOM sensor.
- 16: The type "-ER" intrinsically safe type of EAC for Kazakhstan and Belarus. Temperature class is T4.  
 The type "-ER" cannot be used with SENCOM sensor.

## ■ Dimensions and Mounting

### Plastic Housing

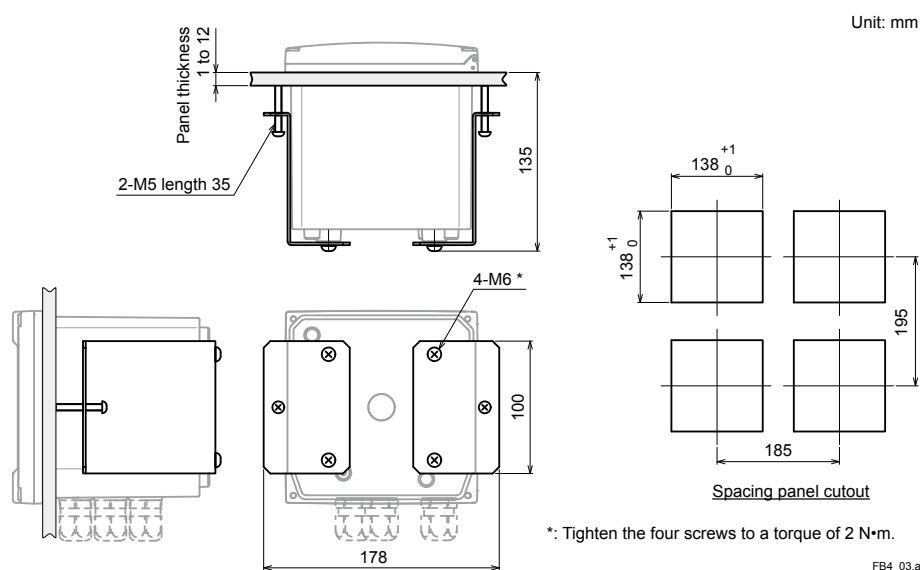


### Conduit Adapter (Option code: □/CB4, □/CD4, □/CF4)

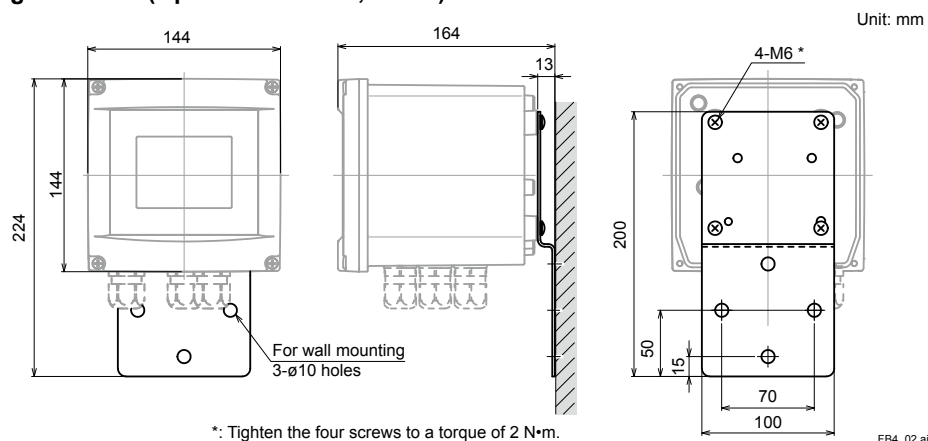


(Note) The universal mounting kit (/UM) contains the pipe and wall mounting hardware (/U) and the panel mounting hardware (/PM).

**Panel mounting hardware (Option code: □/PM, □/UM)**

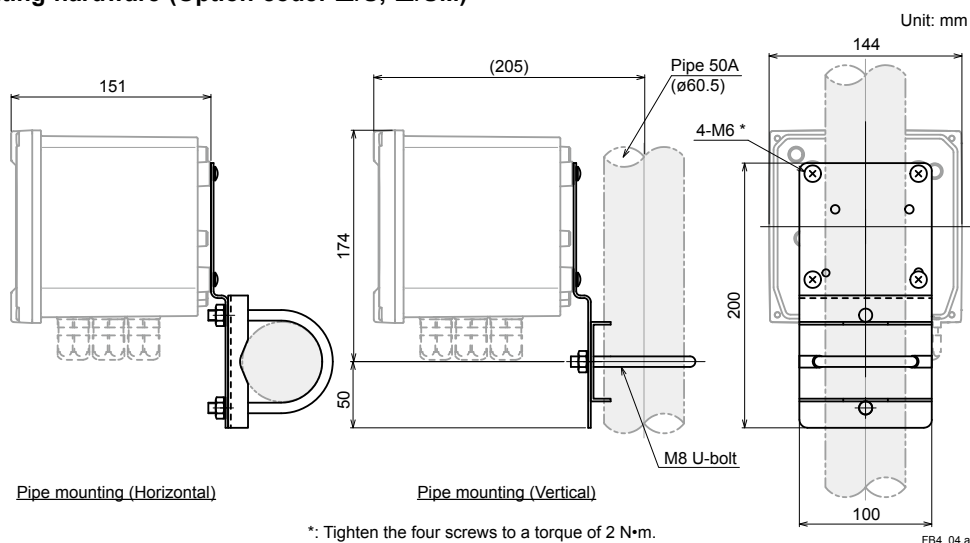


**Wall mounting hardware (Option code: □/U, □/UM)**

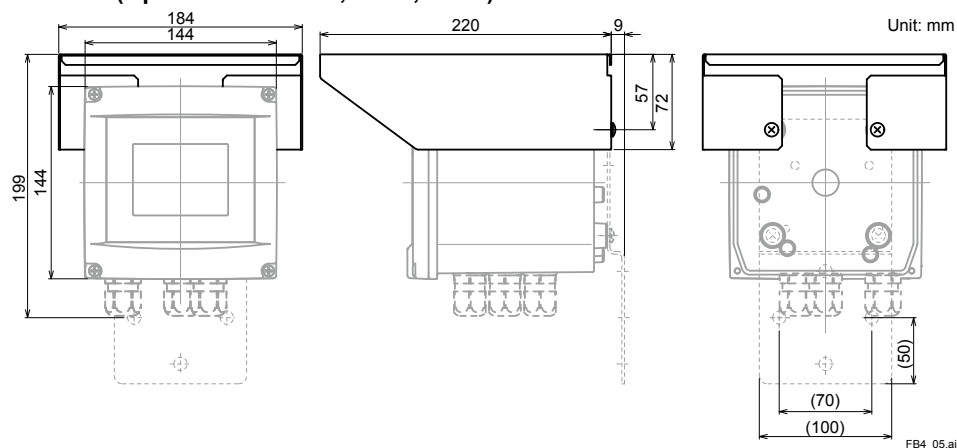


Note: The wall on which the analyzer is mounted should be strong enough to bear the weight of more than 8 kg.

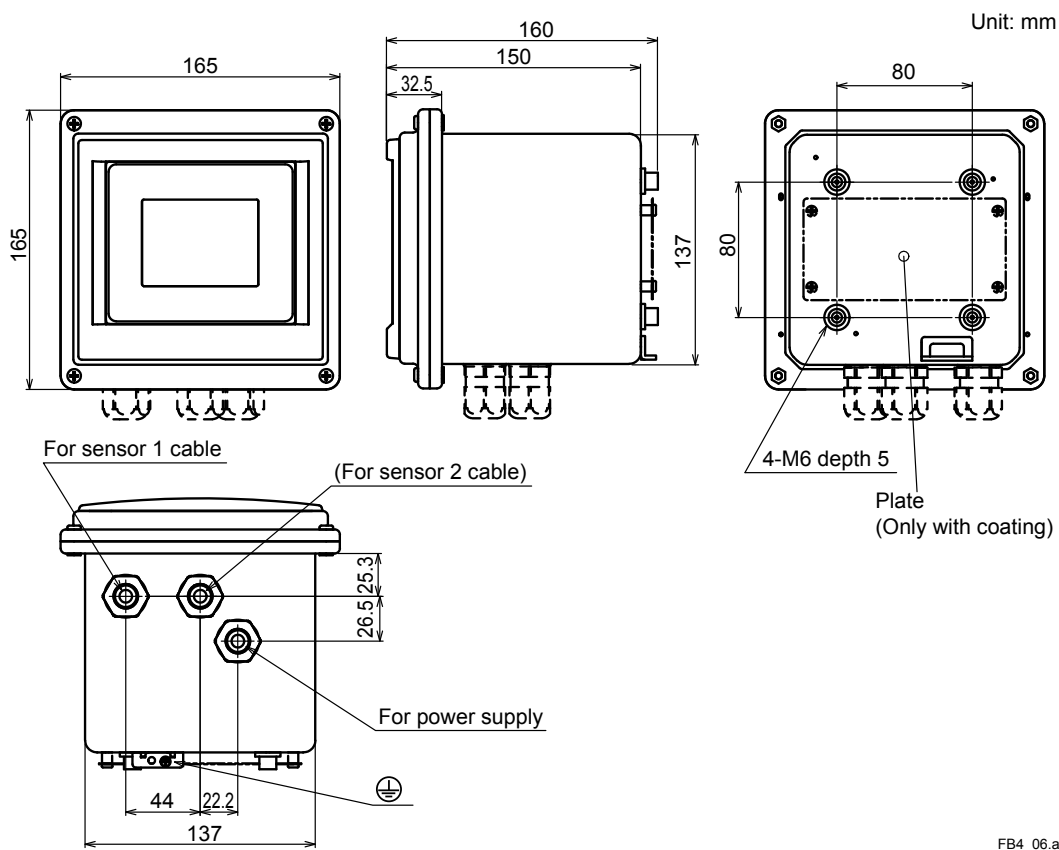
**Pipe mounting hardware (Option code: □/U, □/UM)**



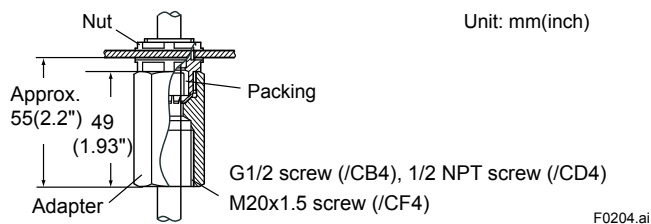
**Stainless steel hood (Option code: □/H6, □/H7, □/H8)**



**Stainless Steel Housing**

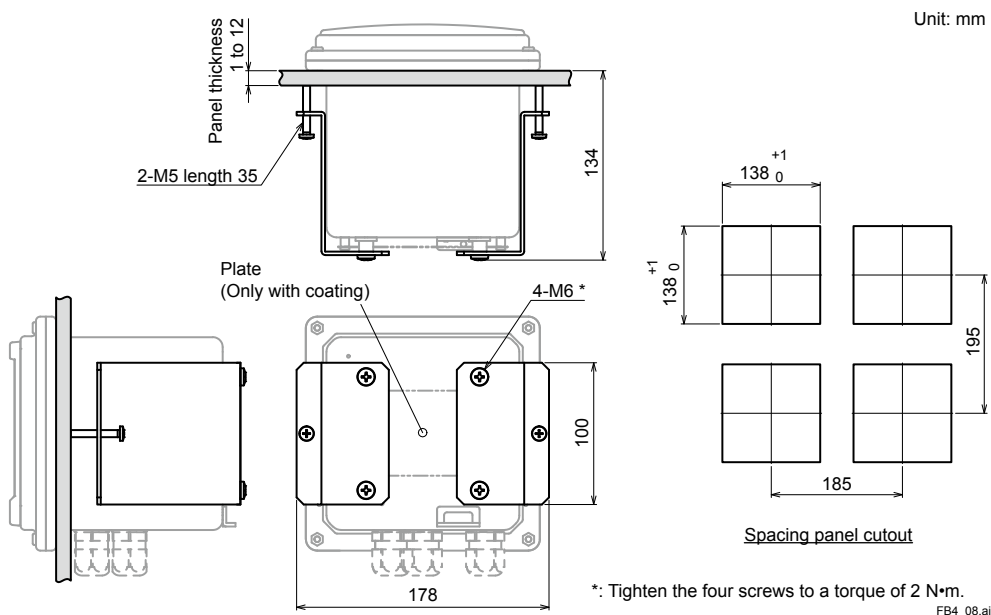


**Conduit Adapter (Option code: □/CB4, □/CD4, □/CF4)**

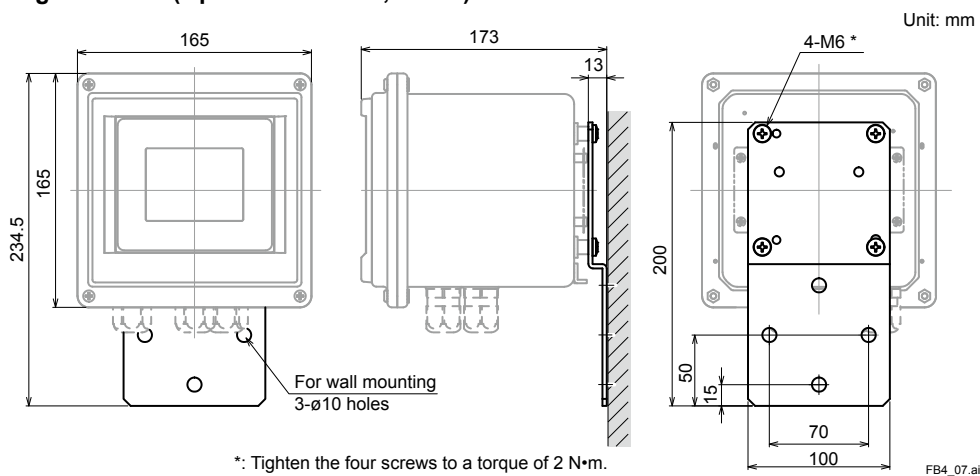


(Note) The universal mounting kit (/UM) contains the pipe and wall mounting hardware (/U) and the panel mounting hardware (/PM).

**Panel mounting hardware (Option code: □/PM, □/UM)**

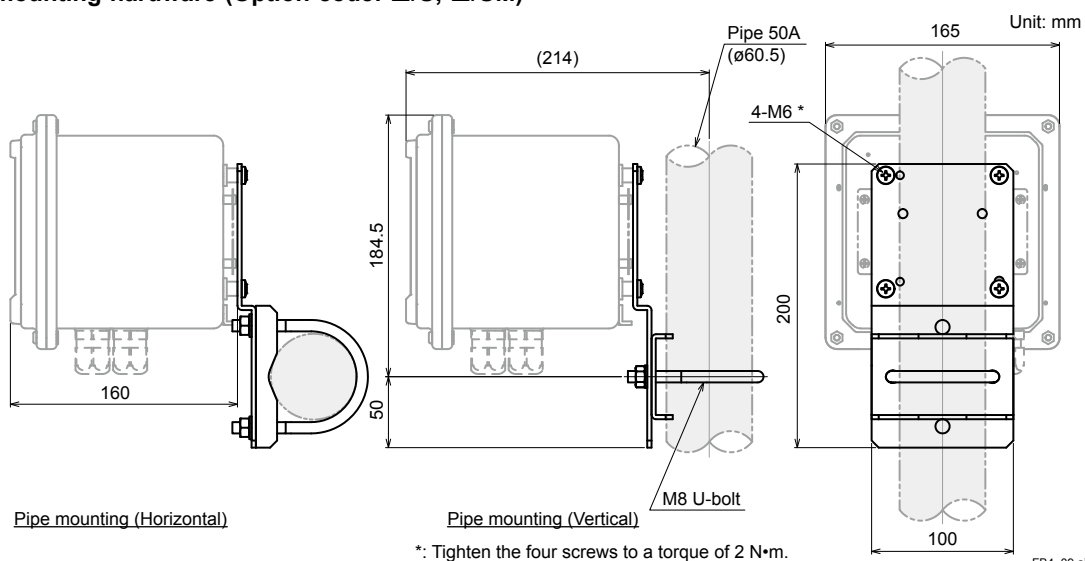


**Wall mounting hardware (Option code: □/U, □/UM)**

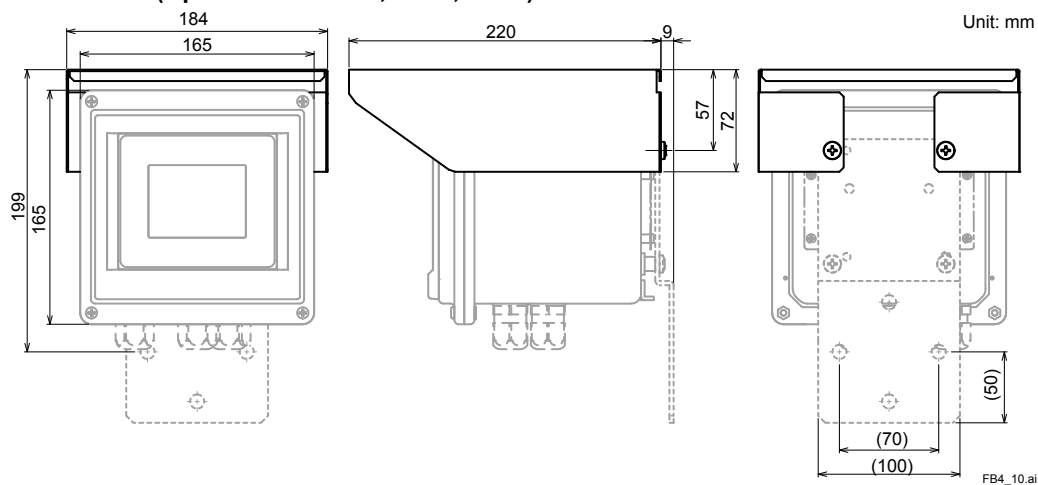


Note: The wall on which the analyzer is mounted should be strong enough to bear the weight of more than 8 kg.

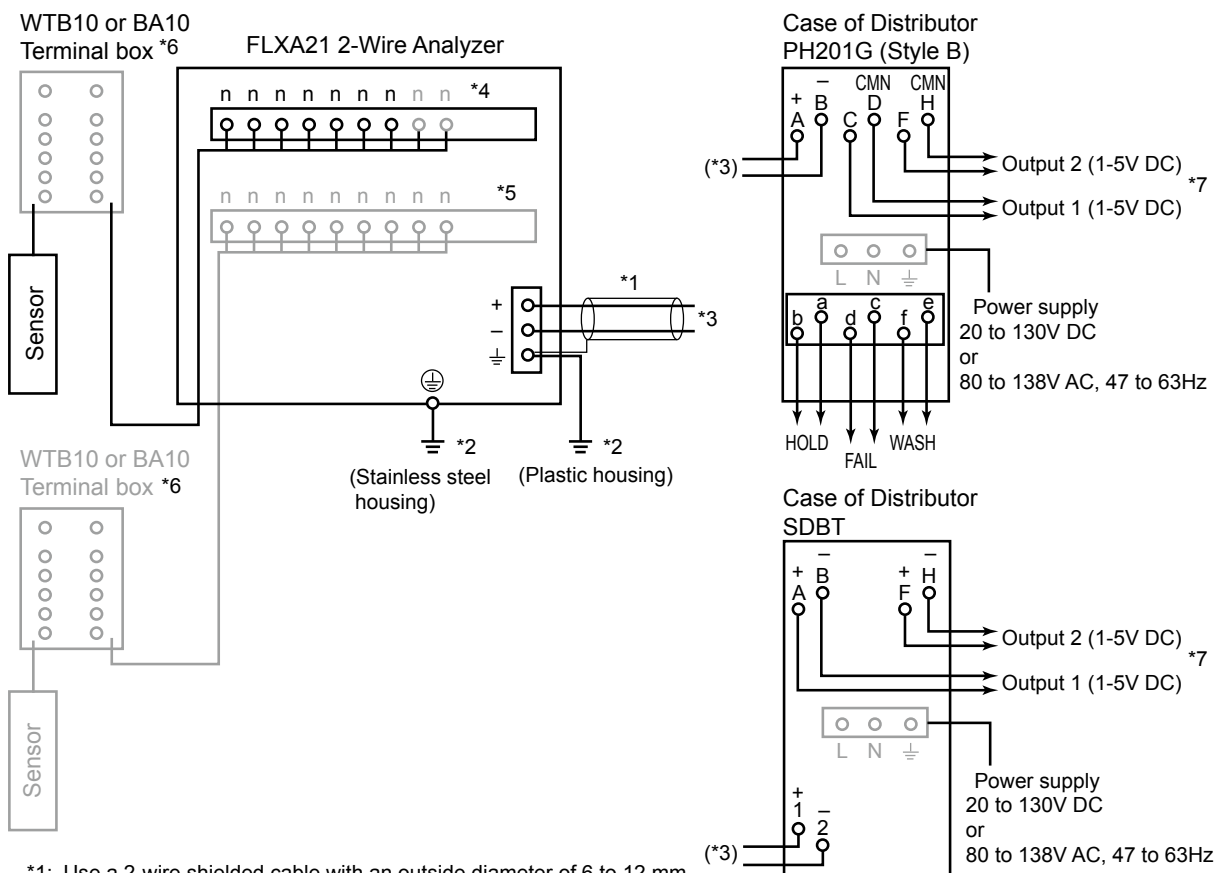
**Pipe mounting hardware (Option code: □/U, □/UM)**



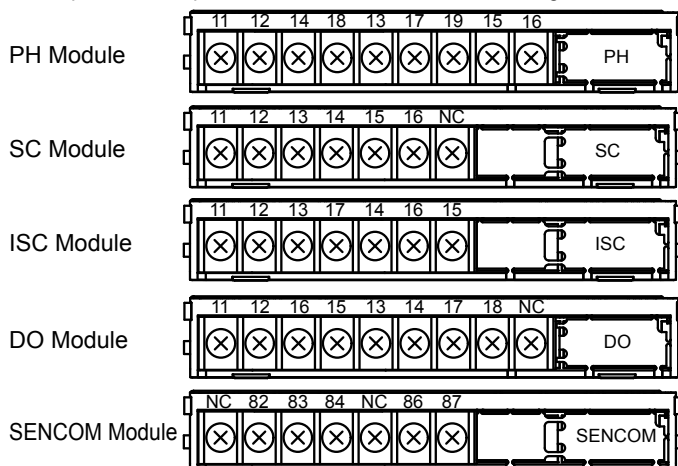
**Stainless steel hood (Option code: □/H6, □/H7, □/H8)**



## ■ Wiring Diagrams



- \*1: Use a 2-wire shielded cable with an outside diameter of 6 to 12 mm.
- \*2: Connect the analyzer to ground. (Class D ground: 100 ohm or less)  
The way of connecting the grounding cable varies depending on the plastic housing and stainless steel housing.  
In the case of the plastic housing, connect the grounding cable to the  $\perp$  terminal of the power module inside, and in the case of the stainless steel housing, connect the grounding cable to the  $\oplus$  terminal of the housing. Use a cable with an outside diameter of 3.4 to 7 mm for the grounding line of the plastic housing. Although, on the stainless steel housing, the ground terminal symbol is  $\oplus$  (protective ground), the ground is really functional ground.
- \*3: This line is connected to a distributor or 24V DC power supply.
- \*4: Terminal numbers for each sensor module are shown below.
- \*5: Two modules of the same kind of measurement/sensor type can be installed. When measuring inductive conductivity or pH/ORP with the SENCOM sensor, only one module can be installed.
- \*6: The terminal box may be necessary depending on the sensor cable length and the distance between the analyzer and the sensor.  
The SENCOM sensor is to be connected directly to the analyzer without a terminal box.
- \*7: Two outputs, output 1 and output2, of PH201G or SDBT are same signals.





## ■ Inquiry Specifications Sheet for FLXA21 2-Wire Analyzer

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 (analog sensor)  Conductivity (SC)  Inductive conductivity (ISC)  
 Dissolved oxygen (DO)  pH/ORP (digital sensor, FU20F)  
 2nd Input;  With (same as 1st Input)  Without

#### 4.1 pH/ORP (analog sensor)

##### 1st Input

- (1) Measuring range;  pH 0 to 14  ORP \_\_\_\_\_ to \_\_\_\_\_ mV  \_\_\_\_\_  
 (2) Transmission output;  4 to 20 mA DC  pH  ORP  Temperature  
 (3) System configuration selection;  Electrode,  Holder,  pH Converter,  Cleaning system,  Terminal box,  
 Accessories  
 (4) Electrode cable length;  3m,  5m,  7m,  10m,  15m,  20m,  \_\_\_\_\_m  
 (5) Electrode operating pressure;  10 kPa or less,  More than 10 kPa  
 (6) Type of holder;  Guide pipe,  Submersion,  Flow-through,  Suspension,  Angled floating ball,  
 Vertical floating ball  
 (7) Cleaning method;  No cleaning,  Ultrasonic cleaning,  Jet cleaning,  Brush cleaning  
 (8) Sample temperature;  -5 to 105°C,  -5 to 100°C,  -5 to 80°C  
 (9) Others;

##### 2nd Input

- (1) Measuring range;  pH 0 to 14  ORP \_\_\_\_\_ to \_\_\_\_\_ mV  \_\_\_\_\_  
 (2) Transmission output;  4 to 20 mA DC  pH  ORP  Temperature  
 (3) System configuration selection;  Electrode,  Holder,  pH Converter,  Cleaning system,  Terminal box,  
 Accessories  
 (4) Electrode cable length;  3m,  5m,  7m,  10m,  15m,  20m,  \_\_\_\_\_m  
 (5) Electrode operating pressure;  10 kPa or less,  More than 10 kPa  
 (6) Type of holder;  Guide pipe,  Submersion,  Flow-through,  Suspension,  Angled floating ball,  
 Vertical floating ball  
 (7) Cleaning method;  No cleaning,  Ultrasonic cleaning,  Jet cleaning,  Brush cleaning  
 (8) Sample temperature;  -5 to 105°C,  -5 to 100°C,  -5 to 80°C  
 (9) Others;

## 4.2 Conductivity

### 1st Input

- (1) Measuring range; \_\_\_\_\_
- (2) Transmission output; 4 to 20 mA DC
- (3) Detector/sensor; SC4AJ  Two electrode system (0.02 cm<sup>-1</sup>)  Two electrode system (0.1 cm<sup>-1</sup>)  
 SC8SG  Two electrode system (0.01 cm<sup>-1</sup>)  Two electrode system (10 cm<sup>-1</sup>),  
 Four electrode system (10 cm<sup>-1</sup>)  
 SC210G  Two electrode system (0.05 cm<sup>-1</sup>)  Two electrode system (5 cm<sup>-1</sup>)
- (4) Detector/sensor mounting method;  
 SC4AJ  Adapter mounting,  Welding socket,  Welding clamp  
 SC8SG  Screw-in,  Flow-through  
 SC210G  Screw-in,  Flange,  Flow-through,  Screw-in with gate valve
- (5) Electrode cable length; SC4AJ  3m,  5m,  10m,  20m  
 SC8SG  5.5m,  10m,  20m  
 SC210G  3m,  5m,  10m,  15m,  20m
- (6) Others;

### 2nd Input

- (1) Measuring range; \_\_\_\_\_
- (2) Transmission output; 4 to 20 mA DC
- (3) Detector/sensor; SC4AJ  Two electrode system (0.02 cm<sup>-1</sup>)  Two electrode system (0.1 cm<sup>-1</sup>)  
 SC8SG  Two electrode system (0.01 cm<sup>-1</sup>)  Two electrode system (10 cm<sup>-1</sup>),  
 Four electrode system (10 cm<sup>-1</sup>)  
 SC210G  Two electrode system (0.05 cm<sup>-1</sup>)  Two electrode system (5 cm<sup>-1</sup>)
- (4) Detector/sensor mounting method;  
 SC4AJ  Adapter mounting,  Welding socket,  Welding clamp  
 SC8SG  Screw-in,  Flow-through  
 SC210G  Screw-in,  Flange,  Flow-through,  Screw-in with gate valve
- (5) Electrode cable length; SC4AJ  3m,  5m,  10m,  20m  
 SC8SG  5.5m,  10m,  20m  
 SC210G  3m,  5m,  10m,  15m,  20m
- (6) Others;

## 4.3 Inductive conductivity

- (1) Measuring range; \_\_\_\_\_
- (2) Transmission output; 4 to 20 mA DC
- (3) System configuration selection;  ISC40GJ Sensor,  Holder,  Converter,  BA20 Terminal box,  
 WF10J Extension cable
- (4) Sensor mounting method;  ISC40FDJ Immersion holder,  ISC40FFJ Flow-through holder,  
 ISC40FSJ Direct insertion adapter
- (5) ISC40GJ Sensor cable length;  5m,  10m,  15m,  20m
- (6) WF10J Extension cable length;  5m,  10m,  20m,  30m,  40m
- (7) Others;

#### 4.4 Dissolved oxygen

##### 1st Input

- (1) Measuring range;  0 to 50 mg/L  \_\_\_\_\_
- (2) Transmission output; 4 to 20 mA DC
- (3) System configuration selection;  Electrode,  Holder,  Converter,  Cleaning system,  
 Terminal box,  Maintenance parts set,  Calibration set
- (4) Electrode cable length;  3m,  5m,  10m,  15m,  20m
- (5) Type of holder;  Guide pipe,  Submersion,  Flow-through,  Suspension,  
 Angled floating ball,  Vertical floating ball
- (6) Cleaning method;  No cleaning,  Jet cleaning
- (7) Others;

##### 2nd Input

- (1) Measuring range;  0 to 50 mg/L  \_\_\_\_\_
- (2) Transmission output; 4 to 20 mA DC
- (3) System configuration selection;  Electrode,  Holder,  Converter,  Cleaning system,  
 Terminal box,  Maintenance parts set,  Calibration set
- (4) Electrode cable length;  3m,  5m,  10m,  15m,  20m
- (5) Type of holder;  Guide pipe,  Submersion,  Flow-through,  Suspension,  
 Angled floating ball,  Vertical floating ball
- (6) Cleaning method;  No cleaning,  Jet cleaning
- (7) Others;

#### 4.5 pH/ORP (digital sensor, FU20F)

- (1) Measuring range;  pH 0 to 14  ORP \_\_\_\_\_ to \_\_\_\_\_ mV  \_\_\_\_\_
- (2) Transmission output;  4 to 20 mA DC  pH  ORP  Temperature
- (3) System configuration selection;  Electrode,  Holder,  pH Converter,  Cleaning system,  Accessories
- (4) Electrode cable length;  3m,  5m,  10m,  20m,  \_\_\_\_\_m
- (5) Electrode operating pressure;  10 kPa or less,  More than 10 kPa
- (6) Type of holder;  Guide pipe,  Submersion,  Flow-through,  Suspension,  Angled floating ball,  
 Vertical floating ball
- (7) Cleaning method;  No cleaning,  Jet cleaning
- (8) Sample temperature;  -5 to 105°C,  -5 to 100°C,  -5 to 80°C
- (9) Others;