General Specifications

GS 12A01A02-71E

Model FLXA21
2-Wire Analyzer
FOUNDATION Fieldbus
Communication

■ General

FOUNDATION Fieldbus is the digital communication line for the field instruments, whose signal is internationally standardized by Fieldbus Foundation.

The Fieldbus bi-directional digital communication performance makes possible for the field instruments and the control devices to be a complete on-line system, superseding the existing analog transmission lines.

Vendor-independence and openness allow communication between devices of different manufactures with no special interface adjustment.

FLXA™21 FOUNDATION Fieldbus model offers more flexible instrumentation through a higher level communication capability and proposes the cost reduction by multidrop wirings with fewer cables.

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.

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.

■ Features

- Interoperability
  FOUNDATION Fieldbus specifications grant the interoperability of the field instruments without preparing designated software for the instrument.

- Multi-sensing function
  FLXA21 FOUNDATION Fieldbus model, has three independent AI function blocks.

- Alarm function
  FLXA21 FOUNDATION Fieldbus model securely supports various alarm functions, such as high/low alarm, notice of block error, etc. based on Fieldbus specifications.

- Link master function
  FLXA21 FOUNDATION Fieldbus model support the Link Master function. This function enables backup of network manager and local control only by field devices.

- Self-diagnostic function
  A reliable self-diagnostic function based on the NAMUR NE107 standard detects failures in the hardware of pH/ORP sensor, conductivity sensor, and communications.

- 2 kinds of measurements; pH/ORP, Conductivity (SC)
- Connection of digital FU20F pH/ORP SENCOM Sensor
- Simple HMI menu structure in 12 languages
- Quick setup menu for immediate measurement
- Indication of sensor wellness

- Software download function
  Software download function permits to update FLXA21 software via a FOUNDATION fieldbus. Typical use of this function is to add new features such as function blocks and diagnostics to existing devices

- Supported tools
  DTM for FieldMate™
  FLXA21 FOUNDATION Fieldbus model can be connected with DeltaV/AMS by EMERSON Process Management.
  This device can't be connected with DeltaV 9.3 / AMS 9 and older version of them.
  Version of them are follows:
  DeltaV 10.3 / AMS 10.5
  DeltaV 11.3 / AMS 11.5
  DeltaV 12.3 / AMS 12.5
  DeltaV 13.3 / AMS 13.0

YOKOGAWA

Yokogawa Electric Corporation
2-9-32, Nakacho, Musashino-shi, Tokyo, 180-8750 Japan

GS 12A01A02-71E

7th Edition Mar. 23, 2018

■ General Specifications

1. Basic

■ **Measurement Object/Sensor Type**
- pH/Oxidation-reduction Potential (pH/ORP) (analog sensor)
- Conductivity (SC)
- 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) Sensor module

2. Measurement

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

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

■ **Input Range**
pH: -2 to 16 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
PTC10k: -30 to 140 ºC
NTC 8k55: -10 to 120 ºC
3k Balco: -30 to 140 ºC
PTC500: -30 to 140 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
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)

■ **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 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
Temperature:
Pt1000: -20 to 250 ºC
Pt100: -20 to 200 ºC
Ni100: -20 to 200 ºC
NTC 8k55: -10 to 120 ºC
Pb36(JIS NTC 6k): -20 to 120 ºC

■ **Performance (Accuracy)**
(The specifications are expressed with simulated inputs.)
Conductivity
More than 2 µS x K cm^{-1} to 200 mS x K cm^{-1}
Accuracy: ±0.5% of reading
1 µS x K cm^{-1} to 2 µS x K cm^{-1}
Accuracy: ±1% of reading
Resistivity
0.005kΩ / K cm^{-1} to less than 0.5MΩ /K cm^{-1}
Accuracy: ±0.5% of reading
0.5MΩ / K cm^{-1} to 1MΩ /K cm^{-1}
Accuracy: ±1% of reading
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 (of reading on the display)
Note: "K" means cell constant.
YOKOGAWA provides conductivity sensors of which cell constants are 0.1 to 10 cm^{-1}.

2-3. pH/Oxidation-reduction Potential (pH/ORP) with digital sensor, FU20F pH/ORP SENCOM 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 ºC

3. Electrical

■ **Output Signal**
Digital communication signal based on FOUNDATION Fieldbus protocol.

■ **Communication Requirements:**
Supply Voltage: 9 to 32 V DC
Current Draw: 24 mA (max)
Bus connection and Fieldbus cable type according to recommendation based on IEC 1158-2.

■ **Functional Specifications:**
Functional specifications for Fieldbus communication conform to the standard specifications (H1) of FOUNDATION fieldbus.
DD and CFF: The actual file can be downloaded from www.fieldbus.com

■ **Function Block:**
Three AI blocks

■ **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)
Case color: Silver gray (equivalent to Munsell 3.2PB7.4/1.2)
Window: Polycarbonate (flexible)
Protection: IP66 (except Canada), NEMA Type 4X (USA), CSA 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)
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.
Pin terminal: pin diameter: max. 1.9 mm
Ring and spade terminal: width: max. 7.8 mm

■ **Cable Entry**
3 holes, M20 cable gland x 3 pcs,
Sleeve x 1 pc (for grounding cable line)
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**
144 x 144 x 151 mm (W x H x D) (without cable gland)

■ **Weight**
Approx. 1 kg

■ **Ambient Operating Temperature**
-20 to +55 ºC

■ **Storage Temperature**
-30 to +70 ºC

■ **Humidity**
10 to 90% RH at 40ºC (Non-condensing)

■ **Document**
Following documents are delivered with an analyzer;
Paper copy:
User's Manual for FOUNDATION Fieldbus Communication
written in English
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, EMC and RoHS Compliance

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

EMC: EN 61326-1 Class A,Table 2 (For use in industrial locations)
EN 61326-2-3
EN 61326-2-5
RCM: EN 61326-1 Class A,Table 2
Korea Electromagnetic Conformity Standard Class A 한국 전자파적합성 기준

RoHS: EN 50581: 2012 (Style 3.03 or newer)

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.

Information of the WEEE Directive

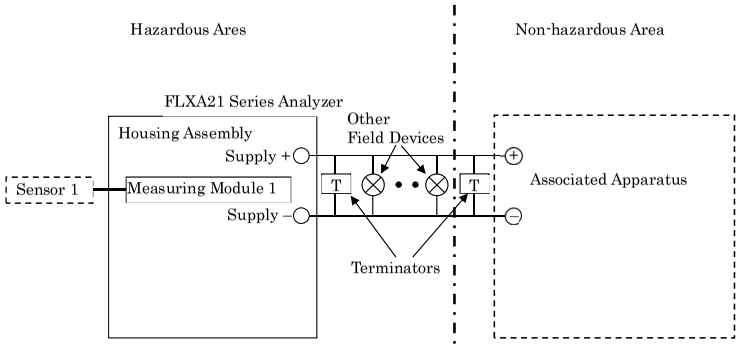
This product is purposely designed to be used in a large scale fixed installations only and, therefore, is out of scope of the WEEE Directive. The WEEE Directive does not apply. The WEEE Directive is only valid in the EU.

■ Explosion Protected Type Compliance

Item	Description	'Type' in MS code
Europe (ATEX)	[Intrinsic safety "ia"] Applicable Standard: EN 60079-0: 2012 + A11: 2013, EN 60079-11: 2012 Certificate No: DEKRA 11ATEX0109X Marking/Rating: Ⓔx II 1 G Ex ia IIC T4 Ga, FISCO field device Ambient Temperature: -20 to 55°C Control Drawing: Refer to (1)	-CB
International (IECEx)	[Intrinsic safety "ia"] Applicable Standard: IEC 60079-0: 2011, IEC 60079-11: 2011 Certificate No: IECEx DEK 11.0044X Marking/Rating: Ex ia IIC T4 Ga, FISCO field device Ambient Temperature: -20 to 55°C Control Drawing: Refer to (1)	
United States (FM)	[Intrinsically safe / Nonincendive] Applicable Standard: Class 3600: 2011, Class 3610: 2010, Class 3611: 2004, Class 3810:2005, NEMA 250: 2014, ANSI/ISA 60079-0: 2013, ANSI/ISA 60079-11: 2014 Certificate No: 3039632 Marking/Rating: IS CL I, DIV 1, GP ABCD CL I, ZN 0, AEx ia IIC NI CL I, DIV 2, GP ABCD CL I, ZN 2 IIC FISCO field device T4: for ambient temperature: -20 to 55°C Enclosure: Type 4X Control Drawing: Refer to (3)	-CD
Canada (CSA)	[Intrinsically safe / Nonincendive] Applicable Standard: C22.2 No.0-10 (R2015), CAN/CSA-C22.2 No.94-M91 (R2011), C22.2 No.213-M1987 (R2013), CAN/CSA-C22.2 No.60079-0:11, CAN/CSA-C22.2 No.60079-11:14, CAN/CSA-C22.2 No.61010-1-12, CAN/CSA-C22.2 No.61010-2-030-12 Certificate No: 2425510 Marking/Rating: Ex ia IIC T4 Ga, FISCO field device Intrinsicaly safe for Class I, Division 1, Groups A, B, C, D, T4 Nonincendive for Class I, Division 2, Groups A, B, C, D, T4 Ambient Temperature: -20 to 55°C Ambient Humidity: 0 – 100% (No Condensation) Enclosure: IP66, NEMA 4X Control Drawing: Refer to (2)	

Item	Description	'Type' in MS code
United States (FM)	[Nonincendive] Applicable Standard: Class 3600: 2011, Class 3611: 2004, Class 3810: 2005, NEMA 250: 2014 Certificate No: 3039632 Marking/Rating: NI CL I, DIV 2, GP ABCD ZN 2 IIC T4: for ambient temperature: -20 to 55°C Enclosure: Type 4X Control Drawing: Refer to (3)	-DD
Canada (CSA)	[Nonincendive] Applicable Standard: C22.2 No.0-10 (R2015), CAN/CSA-C22.2 No.94-M91 (R2011), C22.2 No.213-M1987 (R2013), CAN/CSA-C22.2 No.61010-1-12, CAN/CSA-C22.2 No.61010-2-030-12 Certificate No: 2425510 Marking/Rating: Nonincendive for Class I, Division 2, Groups A, B, C, D, T4 Ambient Temperature: -20 to 55°C Ambient Humidity: 0 – 100% (No Condensation) Enclosure: IP66, NEMA 4X Control Drawing: Refer to (2)	
China (NEPSI)	[Intrinsic safety "ia"] Applicable Standard: GB3836.1-2010, GB3836.4-2010, GB 3836.20-2010 Certificate No: GYJ18.1051X Marking/Rating: Ex ia IIC T4 Ga, FISCO field device Ambient Temperature: -20 to 55°C Control Drawing: Refer to (4)	-CH
Korea (KOSHA)	[Intrinsic safety "ia"] Applicable Standard: Notice of Ministry of Labor No. 2016-54 Certificate No: 15-AV4BO-0160X Marking/Rating: Ex ia IIC T4, FISCO field device Ambient Temperature: -20 to 55°C Control Drawing: Refer to (4)	-EG

11.2 Control Drawing (FOUNDATION Fieldbus / PROFIBUS PA Type)



Supply +, Supply –
FISCO field device, or the following parameters
Ui: 24 V
Ii: 250 mA
Pi: 1.2 W
Ci: 2.72 nF
Li: 0 mH

Measuring Module 1

	Type of Measuring Module		
	pH, SC, DO	ISC	SENCOM
Uo	11.76 V	11.76 V	5.36 V
Io	116.5 mA	60.6 mA	106.16 mA
Po	0.3424 W	0.178 W	0.1423 W
Co	100 nF	100 nF	31 µF
Lo	1.7 mH	8 mH	0.45 mH

Specific Conditions of Use

- When operating FLXA21 through the display window or touching the non-metallic part of the enclosure of FLXA21, take following measures to minimize the risk of explosion from electrostatic discharge.
  Also, avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth.

  To avoid electrostatic charge on the operator,
  - Earth the operator through a wrist-strap, or
  - Operate FLXA21 on the conductive floors, wearing anti-static work clothes and electrostatic safety shoes, or
  - Neutralize the operator and FLXA21 by a static elimination bar which has a metal part earthed through resistor from 100kΩ to 100MΩ.

  In case that those measures cannot be taken or static electricity cannot be suppressed, bring a gas detector and make sure there is no ignition capable atmosphere around FLXA21 before the operation.

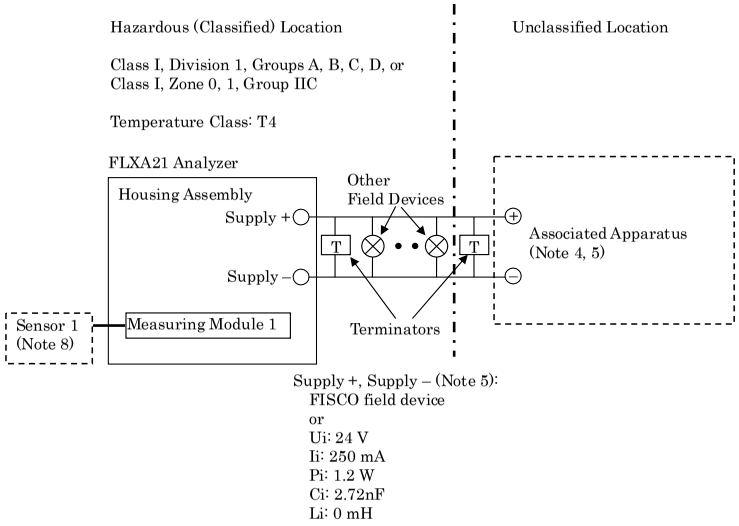
Notes:

1. The associated apparatus must be a linear source or a FISCO power supply.
2. Sensor 1 may be simple apparatus or intrinsically safe apparatus.
3. WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE USER'S MANUAL

Control drawing (FOUNDATION Fieldbus / PROFIBUS PA type)

Installation for Division 1 / Zone 0, 1

Applicable models: FLXA21-D-x-x-CD-xx-xx-F-..., FLXA21-D-x-x-CD-xx-xx-P-...



Supply +, Supply – (Note 5):
FISCO field device
or
Ui: 24 V
Ii: 250 mA
Pi: 1.2 W
Ci: 2.72nF
Li: 0 mH

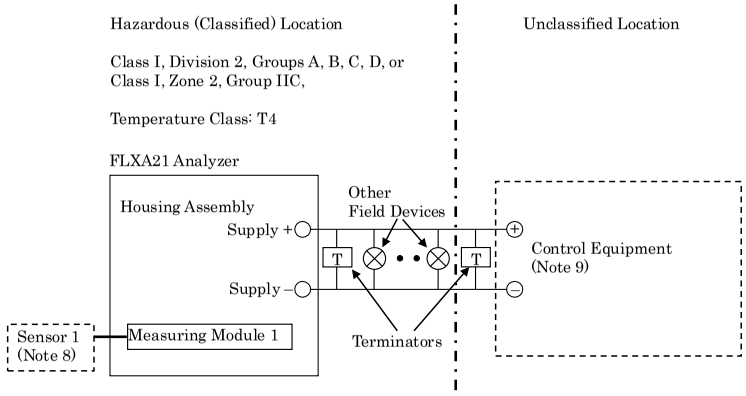
Measuring Module 1 (Note 8):

	Type of Measuring Module		
	pH, SC, DO	ISC	SENCOM
Uo	11.76 V	11.76 V	5.36 V
Io	116.5 mA	60.6 mA	106.16 mA
Po	0.3424 W	0.178 W	0.1423 W
Co	100 nF	100 nF	31 µF
Lo	1.7 mH	8 mH	0.45 mH

Specific condition of use
- Electrostatic charges on the non-metallic or coated parts of the two wire analyzer shall be avoided.

Installation for Division 2 / Zone 2

Applicable models: FLXA21-D-x-x-CD-xx-xx-F-..., FLXA21-D-x-x-CD-xx-xx-P-...
FLXA21-D-x-x-DD-xx-xx-F-..., FLXA21-D-x-x-DD-xx-xx-P-...



Supply +, Supply – (Note 9):
Ui: 24 V
Ci: 2.72 nF
Li: 0 mH

Measuring Module 1 (Note 8):

	Type of Measuring Module		
	pH, SC, DO	ISC	SENCOM
Uo	11.76 V	11.76 V	5.36 V
Io	116.5 mA	60.6 mA	106.16 mA
Po	0.3424 W	0.178 W	0.1423 W
Co	4 µF	4 µF	31 µF
Lo	4.5 mH	19 mH	0.45 mH

Specific condition of use:
- Electrostatic charges on the non-metallic or coated parts of the two wire analyzer shall be avoided.

GS 12A01A02-71E Jan. 11, 2019-01

Notes:

1. No revision to this drawing without prior approval of FM.
2. Installation must be in accordance with the National Electric Code (NFPA 70), ANSI/ISA-RP12.06.01 and relevant local codes.
3. FISCO installation must be in accordance with ANSI/UL-60079-25.
4. The associated apparatus must be FM-approved.
5. The associated apparatus must be a FISCO power supply or a linear source meeting the following conditions.

   Uo (or Voc) ≤ Ui
   Io (or Isc) ≤ Ii
   Po ≤ Pi
   Co (or Ca) ≥ Ci + Ccable
   Lo (or La) ≥ Li + Lcable

6. Control equipment connected to the associated apparatus must not use or generate a voltage which exceeds Um of the associated apparatus.
7. The control drawing of the associated apparatus must be followed when installing the equipment.
8. When installed in Division 1, Zone 0 or Zone 1, Sensor 1 may be a simple apparatus or an intrinsically safe apparatus meeting the conditions below.
   When installed in Division 2 or Zone 2, Sensor 1 may be a simple apparatus or a nonincendive field wiring apparatus meeting the conditions below, or alternatively, it may be equipment suitable for Division 2 or Zone 2 respectively, if a suitable wiring method other than nonincendive field wiring is employed.

   Ui (or Vmax) ≥ Uo
   Ii (or Imax) ≥ Io
   Pi ≥ Po
   Ci ≤ Co – Ccable
   Li ≤ Lo – Lcable

9. The control equipment must be an FM-approved FISCO power supply, FNICO power supply or an associated nonincendive field wiring apparatus meeting the conditions below. Alternatively, it may be general-purpose equipment, if a suitable wiring method other than nonincendive field wiring is employed.

   Uo (or Voc) ≤ Ui
   Co (or Ca) ≥ Ci + Ccable
   Lo (or La) ≥ Li + Lcable

10. WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD – WHEN THE EQUIPMENT IS USED IN HAZARDOUS LOCATIONS, AVOID ANY ACTION WHICH GENERATE ELECTROSTATIC DISCHARGE SUCH AS RUBBING WITH A DRY CLOTH.

11. WARNING – IN THE CASE WHERE THE ENCLOSURE OF THE ANALYZER IS MADE OF ALUMINUM, IF IT IS MOUNTED IN ZONE 0, IT MUST BE INSTALLED SUCH THAT, EVEN IN THE EVENT OF RARE INCIDENTS, IGNITION SOURCES DUE TO IMPACT AND FRICTION SPARKS ARE EXCLUDED

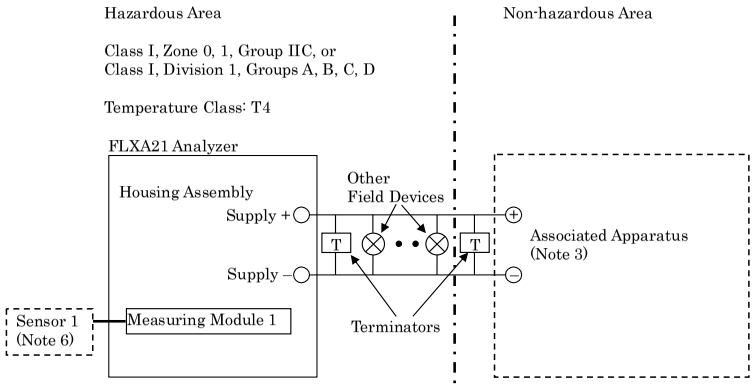
12. WARNING – SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY AND SUITABITLITY FOR DIVISION 2 / ZONE 2.

GS 12A01A02-71E Mar. 23, 2018-00

Control drawing (FOUNDATION Fieldbus / PROFIBUS PA type)

Installation for Zone 0, 1 / Division 1

Applicable models: FLXA21-D-x-x-CD-xx-xx-F-..., FLXA21-D-x-x-CD-xx-xx-P-...



Supply +, Supply – (Note 3):
FISCO field device
or
Ui: 24 V
Ii: 250 mA
Pi: 1.2 W
Ci: 2.72nF
Li: 0 mH

Measuring Module 1 (Note 6):

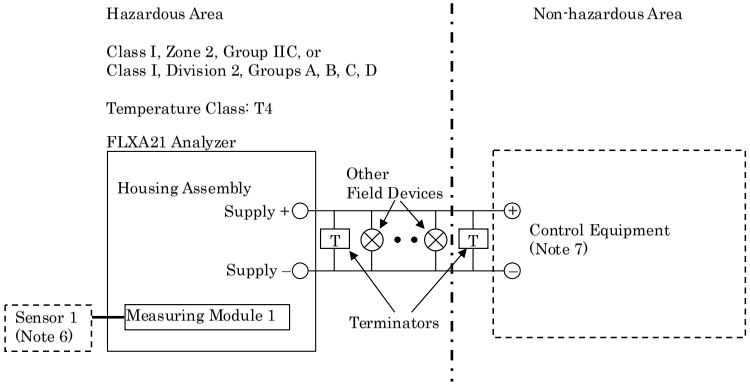
	Type of Measuring Module		
	pH, SC, DO	ISC	SENCOM
Uo	11.76 V	11.76 V	5.36 V
Io	116.5 mA	60.6 mA	106.16 mA
Po	0.3424 W	0.178 W	0.1423 W
Co	100 nF	100 nF	31 µF
Lo	1.7 mH	8 mH	0.45 mH

Specific condition of use
- Electrostatic charges on the non-metallic or coated parts of the two wire analyzer shall be avoided.

Model: FLXA21 / FLXA202 Date: May 29, 2017

Installation for Zone 2 / Division 2

Applicable models: FLXA21-D-x-x-CD-xx-xx-F-..., FLXA21-D-x-x-CD-xx-xx-P-...
FLXA21-D-x-x-DD-xx-xx-F-..., FLXA21-D-x-x-DD-xx-xx-P-...



Supply +, Supply – (Note 7):
Ui: 24 V
Ci: 2.72 nF
Li: 0 mH

Measuring Module 1 (Note 6):

	Type of Measuring Module		
	pH, SC, DO	ISC	SENCOM
Uo	11.76 V	11.76 V	5.36 V
Io	116.5 mA	60.6 mA	106.16 mA
Po	0.3424 W	0.178 W	0.1423 W
Co	100 nF	100 nF	31 µF
Lo	1.7 mH	8 mH	0.45 mH

Specific condition of use
- Electrostatic charges on the non-metallic or coated parts of the two wire analyzer shall be avoided.

Model: FLXA21 / FLXA202 Date: May 29, 2017

Notes:

1. Installation must be in accordance with the Canadian Electric Code Part I (C22.1), ANSI/ISA-RP12.06.01 and relevant local codes.
2. FISCO installation must be in accordance with CAN/CSA-C22.2 No. 60079-25.
3. The associated apparatus must be a FISCO power supply or a linear source meeting the following conditions.

   U_o (or V_{oc}) ≤ U_i
   I_o (or I_{sc}) ≤ I_i
   P_o ≤ P_i
   C_o (or C_a) ≥ C_i + C_{cable}
   L_o (or L_a) ≥ L_i + L_{cable}

4. Control equipment connected to the associated apparatus must not use or generate a voltage which exceeds Um of the associated apparatus.
5. The control drawing of the associated apparatus must be followed when installing the equipment.
6. When installed in Zone 0 or 1, or Division 1, Sensor 1 may be a simple apparatus or an intrinsically safe apparatus meeting the conditions below.
   When installed in Zone 2 or Division 2, Sensor 1 may be a simple apparatus or a non-incendive field wiring apparatus meeting the conditions below, or alternatively, it may be equipment suitable for Zone 2 or Division 2 respectively, if a suitable wiring method other than non-incendive field wiring is employed.

   U_i (or V_{max}) ≥ U_o
   I_i (or I_{max}) ≥ I_o
   P_i ≥ P_o
   C_i ≤ C_o – C_{cable}
   L_i ≤ L_o – L_{cable}

7. The control equipment must be a FISCO power supply, FNICO power supply or an associated non-incendive field wiring apparatus meeting the conditions below.
   Alternatively, it may be general-purpose equipment, if a suitable wiring method other than non-incendive field wiring is employed.

   U_o (or V_{oc}) ≤ U_i
   C_o (or C_a) ≥ C_i + C_{cable}
   L_o (or L_a) ≥ L_i + L_{cable}

8. WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD
   AVERTISSEMENT – DANGER POTENTIEL DE CHARGES ÉLECTROSTATIQUES
9. WARNING – SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY
   AVERTISSEMENT – LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SÉCURITÉ INTRINSÈQUE.
10. WARNING – SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR ZONE 2 / DIVISION 2.
    AVERTISSEMENT –LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATÉRIEL INACCEPTABLE POUR LES EMPLACEMENTS DE ZONE 2 / DIVISION 2.

Rev. Doc. No.: ICS032-A72 P.3

Yokogawa Electric Corporation

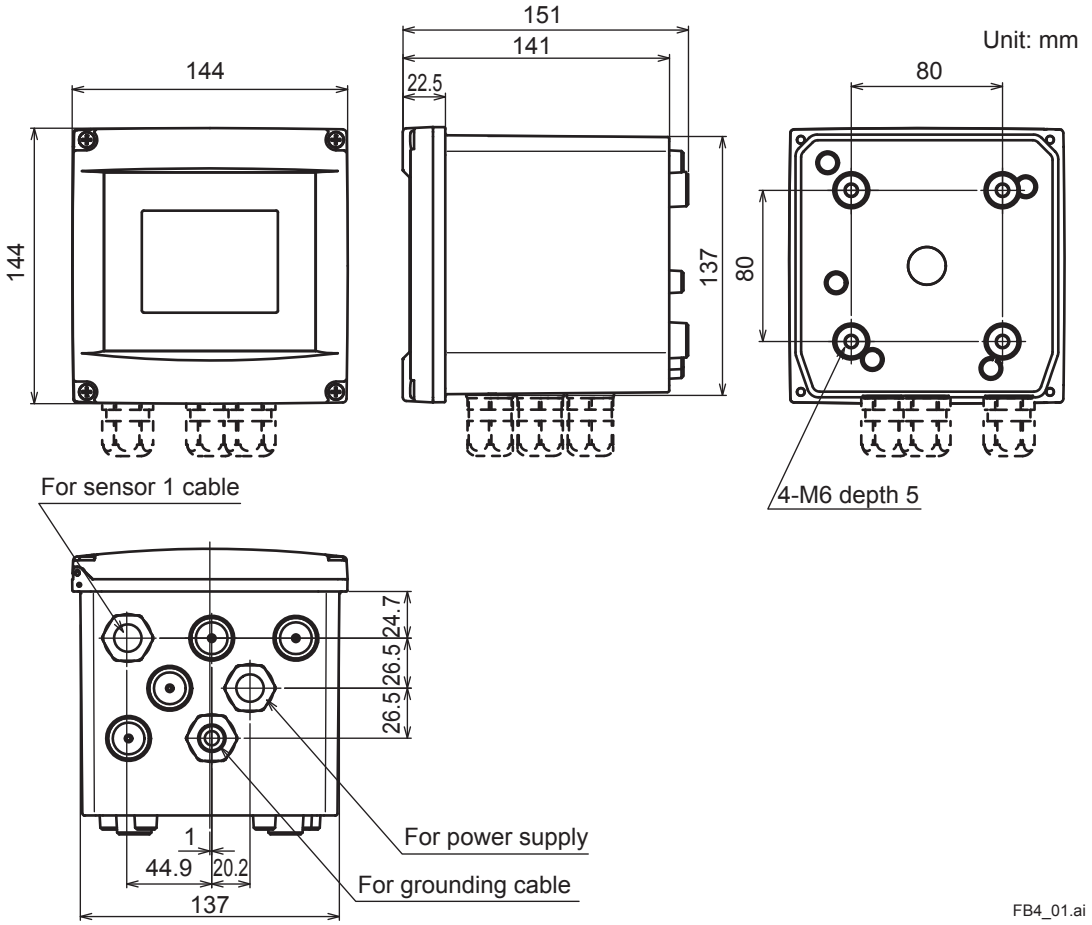
(4) NEPSI and KOSHA Intrinsic safety “ia”
(Refer to App. (1) ATEX and IECEx Control Drawing)

■ Model & Suffix Codes

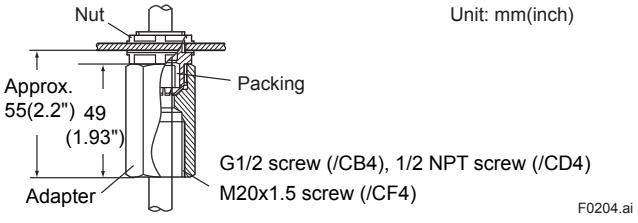
Model	Suffix code	Option code	Description
FLXA21	·····	·····	2-Wire Analyzer
Power supply	**-D**	·····	Always -D
Housing	**-P**	·····	Plastic
Display	**-D**	·····	Anti-glare LCD
Type	**-AB**	·····	General purpose for CE, RCM
	-AD	·····	General purpose for CSA
	-AG	·····	General purpose for KC
	-CB	·····	IS for ATEX, IECEx (Note 5) (Note 7)
	-CD	·····	IS for FM, CSA (Note 5)
	-CH	·····	IS for NEPSI (Note 5)
	-EG	·····	IS for KOSHA (Note 5)
	-DD	·····	NI for FM, CSA (Note 6)
1st input	**-P1**	·····	pH/ORP (Note 3)
	-C1	·····	Conductivity (SC)
	-S1	·····	pH/ORP (SENCOM sensor)
2nd input	**-NN**	·····	Without input
Output (Note 1)	**-F**	·····	**FOUNDATION Fieldbus**
—	**-N**	·····	Always -N
Language set (Note 2)	**-LA**	·····	English and 11 languages
Country	**-N**	·····	Global except Japan
—	**-NN**	·····	Always -NN
Option	Mounting hardware	**/UM**	Universal mounting kit (Note 4)
		/U	Pipe and wall mounting hardware
		/PM	Panel mounting hardware
	Hood	**/H6**	Hood, stainless steel
		/H7	Hood, stainless steel + urethane coating
		/H8	Hood, stainless steel + epoxy coating
	Tag plate	**/SCT**	Stainless steel tag plate
	Conduit adapter	**/CB4**	Conduit adapter (G1/2 x 4 pcs)
		/CD4	Conduit adapter (1/2NPT x 4 pcs)
		/CF4	Conduit adapter (M20 x 1.5 x 4 pcs)

Notes:
1: The FLXA21 has another output type of “4-20 mA + HART” (suffix code: -A). Refer to GS 12A01A02-01E.
2: 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.
3: This input is to be come from an analog pH/ORP sensor.
4: The universal mounting kit contains the pipe and wall mounting hardware (/U) and the panel mounting hardware (/PM).
5: Type “-CB”, “-CD”, “-CH”, “-EG” are intrinsic safety (IS).
6: Type “-DD” is nonincendive (NI).
7: Product registration is done by Yokogawa Taiwan Corporation as an importer in Taiwan.

■ Dimensions and Mounting



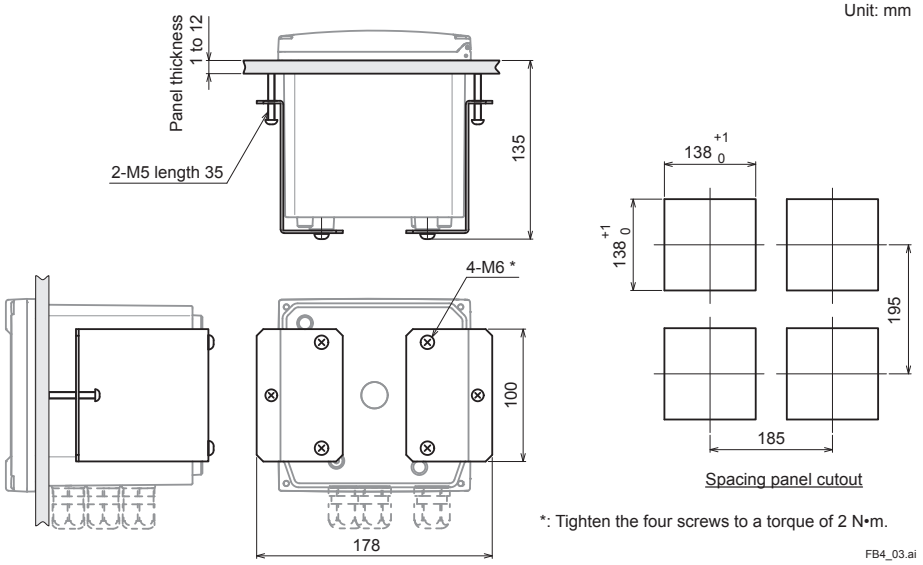
Conduit Adapter (Option code: ☐/CB4, ☐/CD4, ☐/CF4)



(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)

Unit: mm

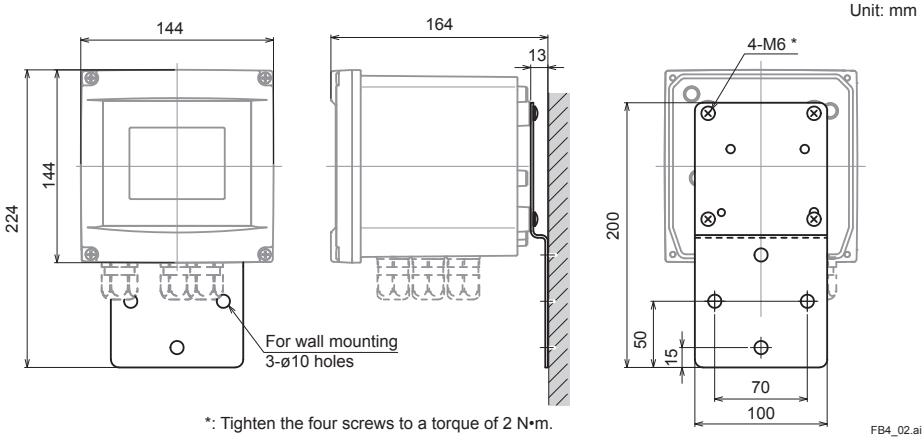


*: Tighten the four screws to a torque of 2 N•m.

FB4_03.ai

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

Unit: mm



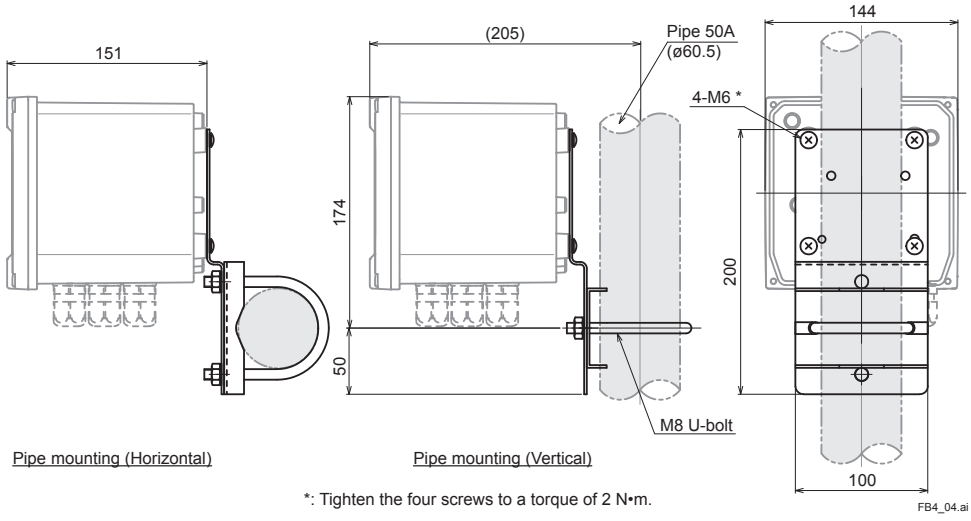
*: Tighten the four screws to a torque of 2 N•m.

FB4_02.ai

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)

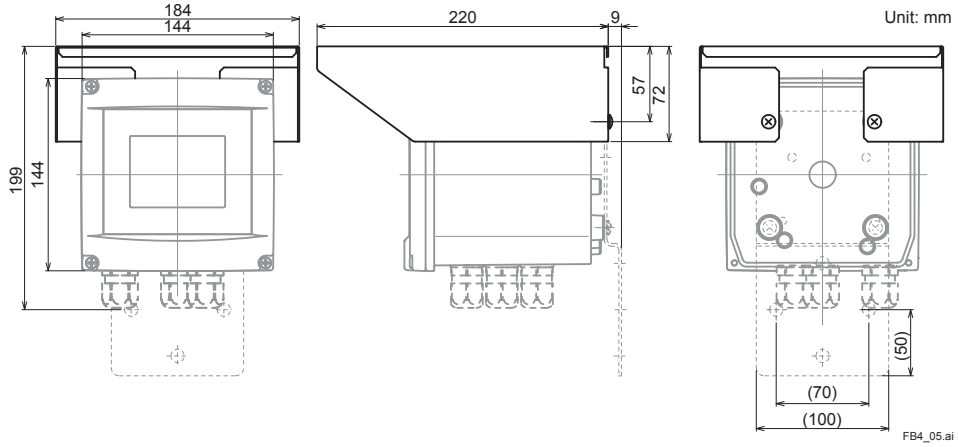
Unit: mm



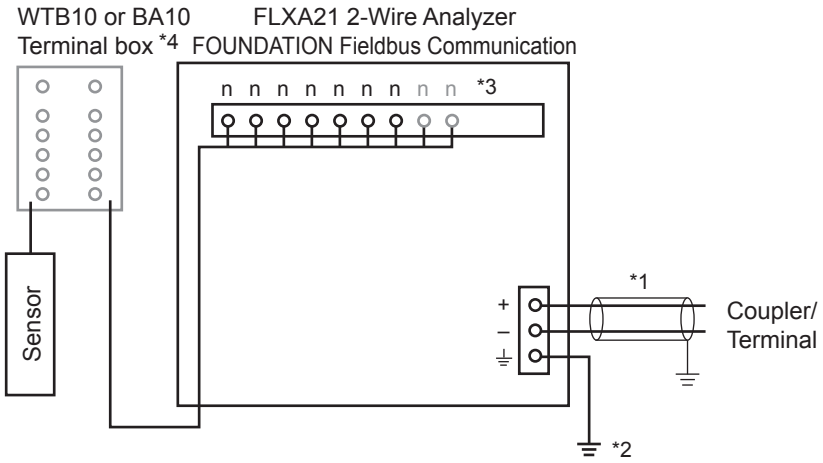
*: Tighten the four screws to a torque of 2 N•m.

FB4_04.ai

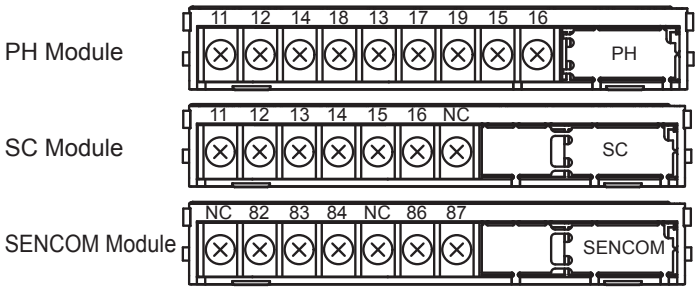
Stainless steel hood (Option code: ☐/H6, ☐/H7, ☐/H8)



■ Wiring Diagrams



*1: Use a 2-wire shielded cable with an outside diameter of 6 to 12 mm.
*2: Connect the analyzer to gland. (Class D ground: 100 ohm or less)
Connect the grounding cable to the ⏚ terminal of the power module inside.
Use a cable with an outside diameter of 3.4 to 7 mm for the grounding line of the plastic housing.
The minimum cross sectional area of the protective grounding cable should be 0.75 mm^2.
*3: Terminal numbers for each sensor module are shown below.
*4: 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.



■ Inquiry Specifications Sheet for FLXA21 2-Wire Analyzer (FOUNDATION Fieldbus Communication)

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) ☐ pH/ORP (digital sensor, FU20F)

2nd Input; ■ Without

4.1 pH/ORP (analog sensor)

(1) Measuring range; ☐ pH 0 to 14 ☐ ORP _____to_____mV ☐ _____

(2) System configuration selection; ☐ Electrode, ☐ Holder, ☐ pH Converter, ☐ Cleaning system, ☐ Terminal box, ☐ Accessories

(3) Electrode cable length; ☐ 3m, ☐ 5m, ☐ 7m, ☐ 10m, ☐ 15m, ☐ 20m, ☐____m

(4) Electrode operating pressure; ☐10 kPa or less, ☐ More than 10 kPa

(5) Type of holder; ☐ Guide pipe, ☐ Submersion, ☐ Flow-through, ☐ Suspension, ☐ Angled floating ball, ☐ Vertical floating ball

(6) Cleaning method; ☐ No cleaning, ☐ Ultrasonic cleaning, ☐ Jet cleaning, ☐ Brush cleaning

(7) Sample temperature; ☐ -5 to 105°C, ☐ -5 to 100°C, ☐ -5 to 80°C

(8) Others;

4.2 Conductivity

(1) Measuring range; _____

(2) Detector/sensor; SC4AJ ☐ Two electrode system (0.02 cm^{-1}) ☐ Two electrode system (0.1 cm^{-1})
SC8SG ☐ Two electrode system (0.01 cm^{-1}) ☐ Two electrode system (10 cm^{-1}), ☐ Four electrode system (10 cm^{-1})
SC210G ☐ Two electrode system (0.05 cm^{-1}) ☐ Two electrode system (5 cm^{-1})

(3) 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

(4) Electrode cable length; SC4AJ☐ 3m, ☐ 5m, ☐ 10m, ☐ 20m
SC8SG ☐ 5.5m, ☐ 10m, ☐ 20m
SC210G ☐ 3m, ☐ 5m, ☐ 10m, ☐ 15m, ☐ 20m

(5) Others;

4.3 pH/ORP (digital sensor, FU20F)

(1) Measuring range; ☐ pH 0 to 14 ☐ ORP _____to_____mV ☐ _____

(2) System configuration selection; ☐ Electrode, ☐ Holder, ☐ pH Converter, ☐ Cleaning system, ☐ Accessories

(3) Electrode cable length; ☐ 3m, ☐ 5m, ☐ 10m, ☐ 20m, ☐____m

(4) Electrode operating pressure; ☐10 kPa or less, ☐ More than 10 kPa

(5) Type of holder; ☐ Guide pipe, ☐ Submersion, ☐ Flow-through, ☐ Suspension, ☐ Angled floating ball, ☐ Vertical floating ball

(6) Cleaning method; ☐ No cleaning, ☐ Jet cleaning

(7) Sample temperature; ☐ -5 to 105°C, ☐ -5 to 100°C, ☐ -5 to 80°C

(8) Others;