

General Specifications

Model FC400G Free Available Chlorine Analyzer (Non-reagent Type)

EXA FC

GS 12F5A1-E

GENERAL

Free chlorine contained in tap water from faucets in fresh water distribution is specified to be 0.1mg / l or more by the regulations of the Water Supply Law. However, the presence of excessive free available chlorine results in lack of tap water freshness and even the presence of more than 1 mg / l of free chlorine is reported to be harmful to the human body. Therefore, the measuring and monitoring of the concentration of free chlorine in water supplies, using free chlorine analyzers is increasingly important in recent years.

The FC400G non-reagent free chlorine analyzer adopts the polarographic method using rotating electrode to continuously measure on-line the concentration of free available chlorine.

FC400G is a microprocessor-based, true intelligent free chlorine analyzer developed based on YOKOGAWA's long experience with residual chlorine analysis.

Commercialization of the FC400G is based on the main features of maintenance-free and no reagent use. This model has the following usage restrictions in comparison with residual chlorine analyzers (model RC400G) that use reagent.

Main Differences in Service Condition between Reagent and Non-Reagent Types

Service conditions	Non-reagent type free chlorine analyzer (FC400G)	Reagent residual analyze (RC400G)
Measured object	Free chlorine	Free chlorine or total chlorine
Sample pH range	pH6.5 to 7.5	pH3 to 9
Sample SS (Suspended Solid) range	10mg/l or less	500mg/l or less
Sample conductivity range	100 to 300 μ S/cm	No particular limit range
Effects of combined chlorine in free chlorine measurement	Large effects (Note)	Almost no effects
When measuring high accuracy is required	Not suitable	Suitable
Measuring point	Water purification, water supply, and faucets	Each process from receiving well to water purification, and water supply

Note) Problem does not practically arise since almost no combined chlorine exists in water purification, water supply, and faucets.

T01.EPS



FEATURES

Microprocessor-Loaded Intelligent Converter

- One-touch simple calibration
In calibration, the sensor is automatically analyzed (zero point, slope, and response).
- Output range can be arbitrarily set in the range of from 0-1 mg/l to 0-3 mg/l in the field.
- Line segment output is available for output signals.
- Easy confirmation of inter-electrode applied voltage/ current characteristic (plateau characteristic). This allows understanding of the detailed sensor characteristics in the application.
- Enhanced display and contact output functions
- Operation panel with superior operability

Experience-Based, Upgraded Detector

- Rotating electrode/ceramic bead cleaning has been improved to realize further effective and continuous automatic cleaning.
- Adoption of reliable-sliding contact for probe
- Easy-to-maintain (-clean) cell construction

STANDARD SPECIFICATIONS

1. Free Chlorine Analyzer (Non-Reagent Type)

Measured Object: Free chlorine in tap water

Measuring System: Polarographic method using rotating electrode

Measuring Range: 0 to 3mg / l

Output Range: Can switch between arbitrary ranges (each between 0 to 1 mg/l and 0 to 3 mg/l). Default ranges at shipping time are:

Range 1: 0 to 2 mg/l, Range 2: 0 to 3 mg/l

Output Signal: 4 to 20mA DC (load resistance : 550Ω or less) or 1 to 5V DC (output resistance : 300Ω or less) isolated

Display Method: Digital (3 1/2 digit LCD) display

Contact Input:

Open circuit voltage: 10 V

Closed circuit current: 150 mA

Remote range switching: Switching between 2 preset ranges (range 1 and range 2)

Contact open: Range 1

Contact closed: Range 2

Contact Output: Dry contact

Contact capacity:

250 V AC max., 1 A max., 125 VA max. (resistance load)

220 V DC max., 1 A max., 60 W max. (resistance load)

Contact Output in Event of Error: Excessive diffusion current value, measured temperature error, applied voltage error, converter error, and temperature compensation range over

Contact Output at Maintenance: Any modes other than measurement (MEAS) mode

	Main unit power OFF	Main unit power ON	
	-	During non-operation	In operation
Contact in event of error	Open	Closed	Open
Contact at maintenance	Closed	Open	Closed

T02.EPS

Sample Conditions

Temperature: 0 to 50 °C (Temperature compensation range 0 to 40 °C)

pH: 6.5 to 7.5 (see Figure 1)

Flow Rate: 0.1 to 2.5 l/min

Pressure: 1 to 150 kPa
100 to 750 kPa
(for the case where dedicated sampling unit ST401G is provided)

Conductivity: 100 to 300 μS/cm (see Figure 2)

SS (Suspend Solid): 10 mg/l or less

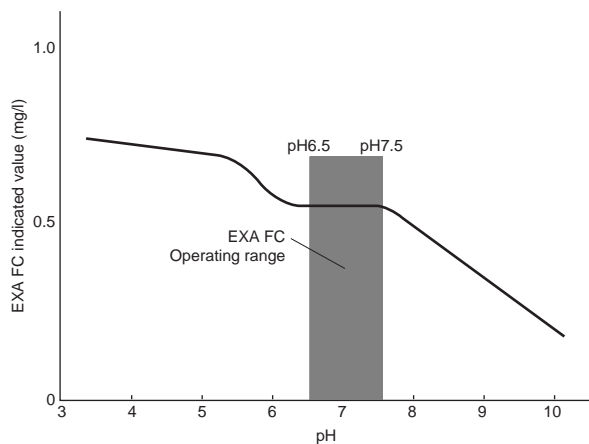


Figure 1 Sensitivity characteristics of diffusion current by pH value

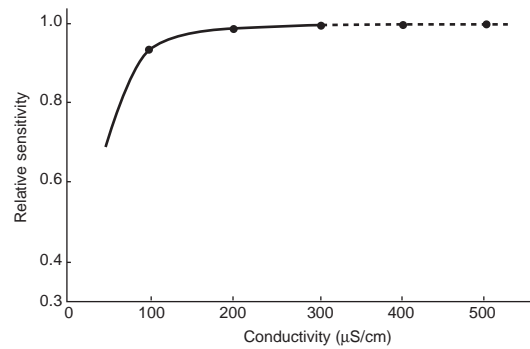


Figure 2 Sensitivity characteristics of diffusion current by conductivity

Note: If conductivity exceeds 300 μS/cm, default value of applied voltage should be changed.

Electrode: Indicator electrode; Rotating gold electrode
Counter electrode; Silver electrode (with Pt 1000 RTD installed)

The combined chlorine insensitive version uses a gold alloy indicator electrode, and silver counter electrode containing Pt1000 RTD.

Electrode Cleaning: Ceramic bead cleaning

The combined insensitive version uses glass beads.

Converter Functions:

Display function:

Concentration, water temperature, applied voltage, diffusion current, output signal %, zero point, slope, error display, interactive message, and key operation request display

Diagnostic function:

Excessive diffusion current value, measured temperature error, applied voltage error, converter error, temperature compensation range over, zero point error, slope abnormality, and response error

Functions settable/executable during operation level:

- One-touch calibration
- Selection of message area display content
- Hold setting/release
- Cell motor ON/OFF selection

Functions settable/executable in setting level:

- Output range setting
- Hold parameter setting: Hold yes/no selection, selection of immediately-before value hold/preset value hold, and preset value setting
- One-touch plateau characteristic collection

Service level code entry Functions settable/executable during service level:

- Switching of °C/°F, temperature compensation range over check ON/OFF, Burnout ON/OFF, burn up/down selection, response time checking determination parameter setting, straight line/two line-segment output selection, applied voltage setting, and applied voltage compensation rate setting

Main Wetted Part Materials:
 Measuring tank: Acrylic resin
 Piping: Flexible PVC and hard PVC
 Color: Muncell 0.6GY3.1 / 2.0 and
 Muncell 2.5Y8.4 / 1.2
 Painting Finish: Baked polyurethane resin coating
 Service Conditions:
 Ambient temperature: -10 to 55°C
 Ambient humidity: 5 to 95% RH (no dew condensation allowed)
 Storage Temperature: -30 to 70°C
 Installation: Indoor (Outdoor use separately requires rainproof measures.) (Direct sunlight must be avoided.)
 Utility:
 Power supply: 100 V AC ±10% 50/60 Hz
 110 V AC ±10% 50/60 Hz
 200 V AC ±10% 50/60 Hz
 220 V AC ±10% 50/60 Hz
 Power consumption: Approx. 15 VA
 Mounting: 2B pipe mounting or wall mounting
 Weight: Approx. 6 kg

2. Dedicated Sampling Unit for (Non-Reagent Type) Free Chlorine Analyzer

Function: Used for application having high pressure and large flow rate. Refer to GS 12A00V02-01E.

Characteristics (% display shows value relative to the upper limit of a range.)

Repeatability: 2 %
 Linearity: ±5 %
 Drift: Zero drift; ±1 % / month or less
 Span drift; -10 % / month or less
 Response time: Approx. 2 min (90% response time)
 Temperature compensation error (water temperature): ±3% or less
 (Temperature compensation range : 0 to 40°C)
 Ambient temperature effects: ±0.5% / 10°C
 Power variation effects: ±0.5% / 10% of rated voltage
 Combined chlorine effects: Approx. 30% of combined chlorine concentration

ACCESSORIES

Name	Q'ty	Remarks
Abrasive	1 Bottle	For cleaning of rotating gold electrode
Ceramic beads (Note1)	1	For start-up and spare (2 bags)
Fuse	4	2A (spare)
Allen wrench	1 Set	Nominal size : 1.5 mm, 2 mm

Note1: Glass beads is used in case of combined chlorine insensitive version.

MODEL AND MS CODES

(1) Free Chlorine Analyzer (Non-Reagent Type)

Model	Suffix Code	Option Code	Specifications
FC400G	.....	.....	Free available chlorine analyzer (non-reagent type)
Output signal	- 5	.....	1 to 5V DC
	- 6	.....	4 to 20 mA DC
Power supply	1	.....	200 V AC±10%, 50 Hz
	2	.....	200 V AC±10%, 60 Hz
	3	.....	220 V AC±10%, 50 Hz
	4	.....	220 V AC±10%, 60 Hz
	5	.....	100 V AC±10%, 50 Hz
	6	.....	100 V AC±10%, 60 Hz
	7	.....	110 V AC±10%, 50 Hz
	8	.....	110 V AC±10%, 60 Hz
—	*A	.....	Style A
Optional specifications		/PPM	Units in PPM
		/SCT	With Tag Plate
		/ST	With ST401G Sampling system (Note 1)
		/SPS	With Teflon-coated screws for protection from salt corrosion
		/CC	Combined chlorine insensitive version

(Note 1) Specified /ST to use with sampling system.

(2) Sampling Unit for (Non-Reagent Type) Free Chlorine Analyzer (Example)

Model	Suffix code	Option code	Specification
ST401G	-----	-----	Sampling system
System	- FC4	-----	With free available chlorine analyzer
	- PF4	-----	With free available chlorine analyzer and pH converter
Ultrasonic Oscillator (for pH converter)	- N	-----	Not supplied
	- U	-----	Supplied
-----	- A	-----	Always -A
Option	/ R		The connectors for piping are at the back.
	/ AN		The converter is not built in stanchion.
	/ S		With stainless steel stand (note 1)
	/ ARS		With arrestor (power and signal lines only) (note 2)
	/ AZC1		With auto zero calibration for 100V AC
	/ AZC2		With auto zero calibration for 110V AC
	/ AZC3		With auto zero calibration for 200V AC
	/ AZC4		With auto zero calibration for 220V AC
	/ RR		With remote range switching (note 3)
/ SCT		With stainless tag plate	

ST401G doesn't include any converters, sensors, holders, etc.

Note 1 : Specify if needed instead of the standard stanchion made of carbon steel.

Note 2 : Available only when the sampling system incorporates one detector.

Note 3 : Available when free available chlorine analyzer is specified singly by suffix code, "-FC4".

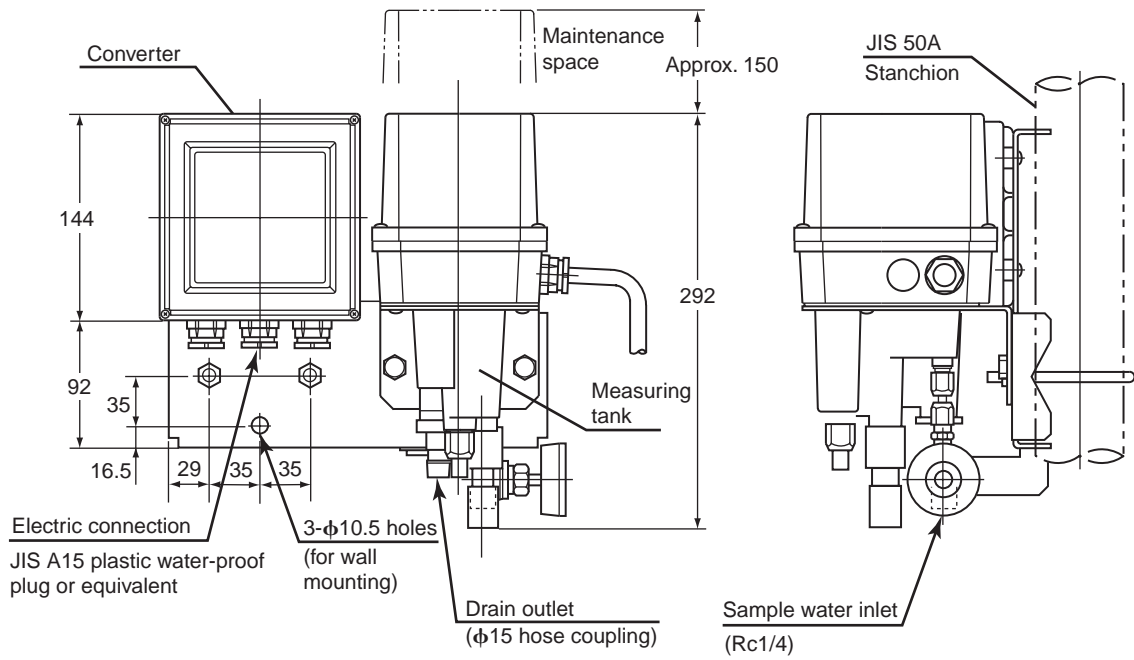
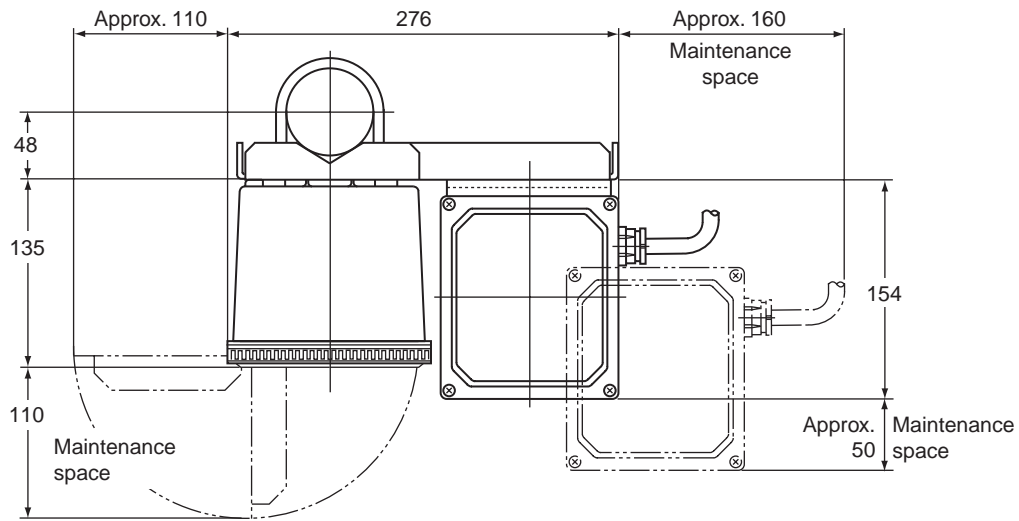
An arrestor is supplied automatically with this option.

(3) Spare Parts

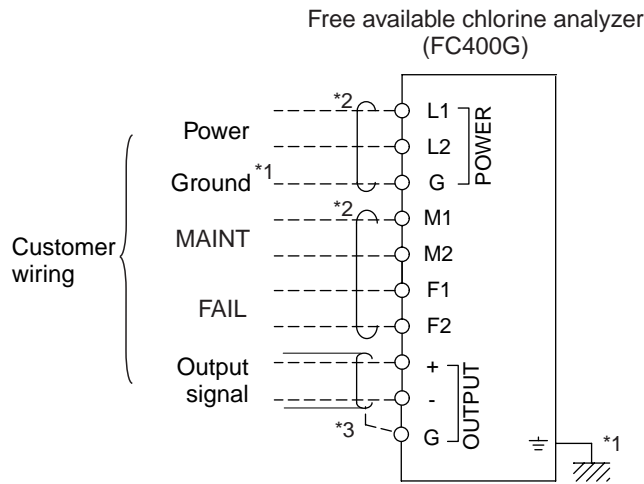
Part name	Part No.	Description
Electrode (indicator electrode)	K9332MB	Rotating electrode for general type
Electrode (indicator electrode)	K9334JP	Rotating electrode for anti combined chlorine type
Electrode (counter electrode)	K9332MK	Counter electrode
Ceramic beads	K9332ZP	For cleaning general type electrode (indicator electrode) (2 bags)
Glass beads	K9332ZJ	For cleaning anti combined chlorine type electrode (indicator electrode) (2 bags)
Polishing powder	K9088PE	For polishing electrode (indicator electrode)
Brush	K9332JX	Part for electrode mechanism
Slip ring	K9332JZ	Part for electrode mechanism
Fuse	A1111EF	Fuse (2A)

EXTERNAL DIMENSIONS

Unit: mm



WIRING DIAGRAMS

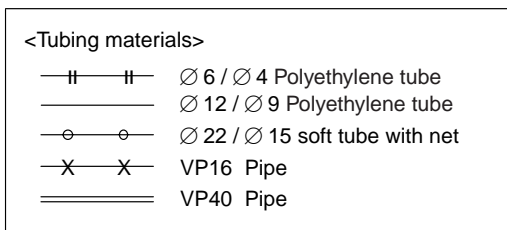


*1: Be sure to ground the case ground terminal, or if this is not possible then connect to G of power wiring. Avoid two-point ground. (Case is connected to signal ground inside converter).

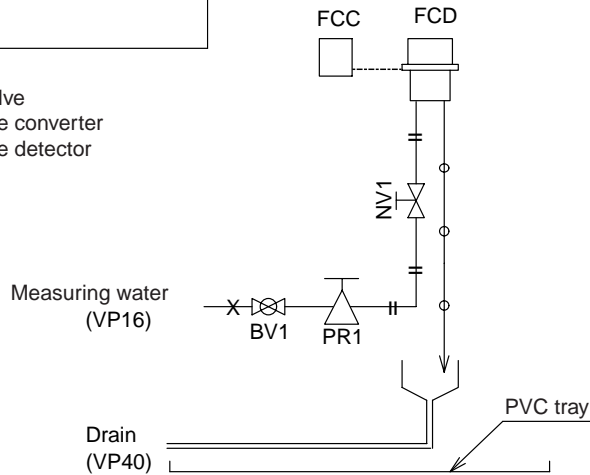
*2: Use cable with 9 to 12 mm OD.

*3: Use two-core shielded cable with 9-12 mm OD. To avoid two-point ground, connect shield to ground at converter only.

Flow of Dedicated Sampling Unit for (Non Reagent Type) Free Chlorine Analyzer (Example)



- PR1 : Pressure-reducing valve
- FCC : Free available chlorine converter
- FCD : Free available chlorine detector
- NV1 : Needle valve
- BV1 : Ball valve



Inquiry Sheets for Model FC400G Free Available Chlorine Analyzer

1. General Information;

Name of your company; _____
Person in charge; _____ Belongs to: _____ (TEL. _____)
Name of Plant; _____
Measuring point; _____
Purpose of use; Indication, Record, Alarm, Control
Power supply; _____ V AC, _____ Hz

2. Measuring Conditions

(1) Liquid temperature; _____ to _____ , Normal _____ [°C]
(2) Liquid Pressure; _____ to _____ , Normal _____ [kPa]
(3) Flow rate; _____ to _____ , Normal _____ [l/min]
(4) Ammoniacal Contaminants; No, Yes
(5) Slurry or soiling components; No, Yes
(6) Name of measured liquid; _____
(7) Composition of measured liquid; _____
(8) Other; _____

3. Installation location

(1) Ambient temperature; _____
(2) Installation location; Indoors _____
(3) Other; _____

4. User requirements

(1) Measuring range; _____ to _____ mg/l
(2) Transmission output; 4 to 20mA DC 1 to 5V DC
(3) Selection of component instruments; Free Chlorine Analyzer Sampling unit Accessories
(4) Other Combined chlorine insensitive version
 Remote range control
 Auto zero calibration system
