

SPECIFICATION SHEET



REAGENT-TYPE RESIDUAL CHLORINE METER

CLF-1600

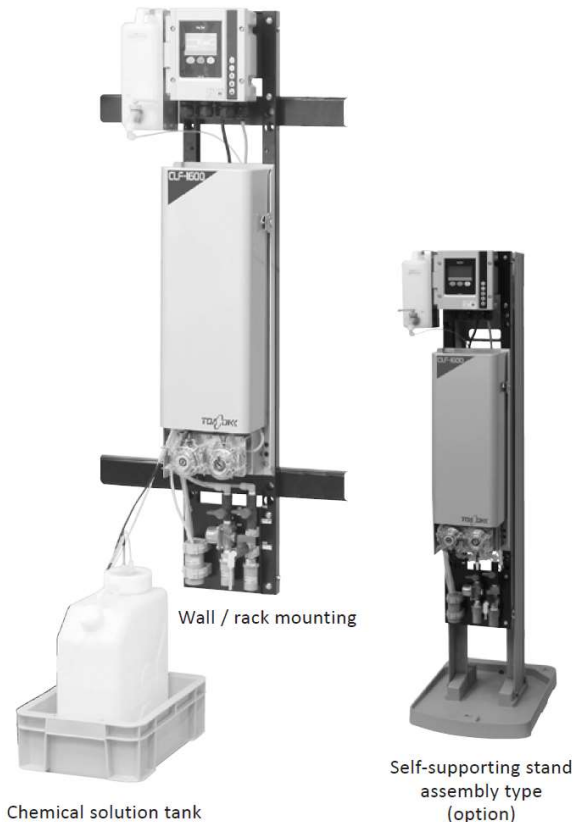
Clean water treatment process Online, a reagent-based residual chlorine meter mainly for measuring raw water, basins, and water distribution.

By using different reagents, the total residual chlorine concentration (free chlorine + bound chlorine) or the free chlorine concentration can be continuously measured.

Raw water sample water may contain a lot of SS. When measuring such a sample, it is recommended to combine it with a sand filtration device (FS-3 type) to remove SS.

Features

- The detector is a non-contact swing rotary polarographic electrode with many achievements. Due to the unique ceramic bead cleaning and rotation speed control method, there is little influence of instructions due to flow rate fluctuations, etc., so stable measurement can be performed for a long period of time.
- The consumption of reagent solution is about 1/5 of the conventional one, which is a reagent-saving design. Therefore, the reagent tank is as small as 10L.
- In addition to the analog output signal DC4 to 20mA, the digital signal RS-485 is standard equipment, so it can be used for new digital instrumentation systems by Modbus communication (exchange of data and information with higher-level DCS, etc.).
- The detector is small and lightweight, and piping, wiring, maintenance operations, etc. can be performed from the front, saving space in the installation location. In addition to the wallmounted / rack-



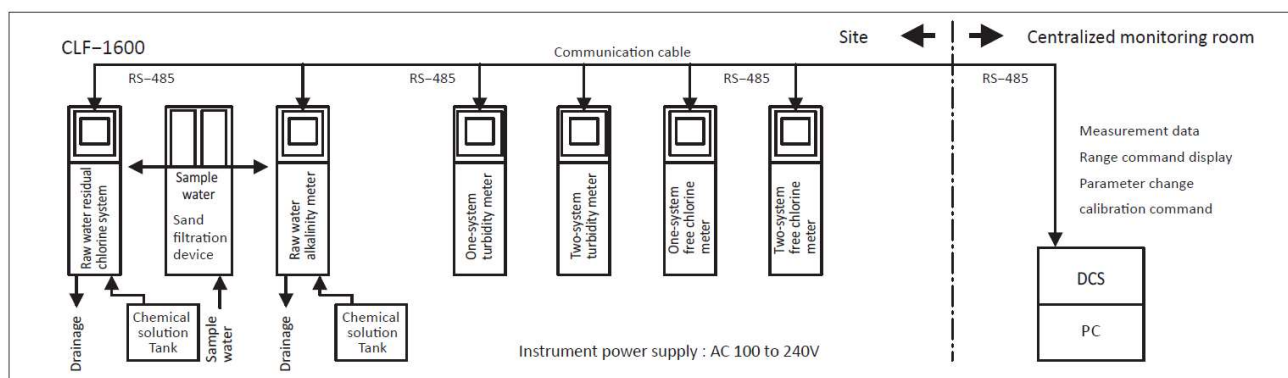
Chemical solution tank

Self-supporting stand assembly type (option)

mounted type, an indoor self-standing stand assembly type and an outdoor cubicle storage type are also available as options.

The sample water can be supplied in a wide pressure range of 0.02 to 0.3 MPa from the head pressure supply from the sand filter or water tank to the direct connection to the process line.

Modbus Communication system Sample



Standard Specifications

Product name : Reagent-type residual chlorine meter
Model : CLF-1600
Measurement target : Free effective chlorine in chlorinated water (FREE)
 Total residual chlorine in chlorinated water (TOTAL)
Measurement method : Polarograph method using eccentric rotating micro-electrodes
Measurement range : 0 to 10
Measurement unit : mg/L or ppm
Display method : LCD (liquid crystal) Digital
Minimum display : 0.01
Transmission output range : 0 to 1/2, 0 to 2/5, 0 to 3/6, 0 to 5/10, 0 to 0.5/1.0 (Only TOTAL)
 2range manual or remote switching
Transmission signal output : DC 4 to 20mA (Insulated type)
 resistance load 600Ω or less
Contact signal output : Upper limit of concentration/Lower limit alarm
 Under maintenance...ST-BY mode
 During automatic cleaning and calibration (optional)
 Instrument abnormality...Sample water cutoff, reagent cutoff, flow rate abnormality, span calibration abnormality, hardware abnormality
 Power supply cutoff (closed or open when cut off)
 Range display (Open for low range, closed for high range)
 (Contact capacity; DC 30V 0.1A resistance load)
Contact signal input : Range switching command...Low range at open
 High range at close
 Cleaning start...Automatic cleaning start
 Calibration start...Automatic calibration start
 (Non-voltage contacts with a width of 100mS or more)
External output port : RS-485compliance 1point (max cable length 100m)
 Protocol; Modbus/RTU address; 8 × n (n=1 to 30)
 Use 3 consecutive addresses
 Terminal block; 2 sets (For parallel connection)
Analog signal input : DC 4 to 20mA
 Converts the DC 4 to 20mA input to a preset scale.
 Number of inputs; 1 point
 Concentration conversion; 4 significant digits, fixed decimal point position
Power pressure : AC 100 to 240V±10% 50/60Hz
Power supply : Approx. 40VA, with automatic cleaning / calibration approx. 60VA

Sample water conditions : No water stagnation or stagnation
 Temperature...0 to 40°C (No freezing)
 Pressure...0.02 to 0.3MPa
 Amount used...1 to 3L/min
 Detector inflow...20mL/min
 pH range...No buffering capacity in the range of pH5.8 to 8.6
Reagent : Free Chlorine (FREE) Measurement composition (in 10L)

| Reagent | Measurement range 0 to 10 |
|--------------------------|---------------------------|
| Potassium bromide | 600g |
| Anhydrous sodium acetate | 200g |
| Acetic acid | 200mL |

Composition of Residual Chlorine (TOTAL) measurement (in 10L)

| Reagent | Measurement range | |
|--------------------------|-------------------|---------|
| | 0 to 5 | 0 to 10 |
| Potassium iodide | 100g | 200g |
| Anhydrous sodium acetate | 25g | 50g |
| Acetic acid | 200mL | 400mL |

Flow velocity...Approx.0.2mL/min
 Amount used...Approx.0.3L/day
 Approx.10L/month

Tank capacity...10L (with level sensor)
 Tank material...Polyethylene (with receiver)

Structure : Indoor installation type (Rainproof measures required outdoors)
 Transmitter IP65
 Detector (Electric unit) IP52

Mounting method : Wall, or rack mounting

Material : Transmitter...aluminum die cast
 Detector...Aluminum plate

Coating color : Metallic silver

Material of wetted part : PVC, PFA, PP, acrylic

Piping connection port : Sample water inlet...socket nominal diameter 16
 Drainage...socket nominal diameter 25
 Cleaning water inlet...socket nominal diameter 16 (optional)

Wiring port : 6 glands for φ6 to 12 cable
 When removed, screw for connecting electric conduit G1/2 appears

Ambient temperature : -5 to 50°C (Do not freeze)

Humidity : 85% RH or less (Do not freeze)

Wight : Approx...17kg
 (Self-supporting stand assembly type is about 32kg)

Performance

Straightness : Within $\pm 3\%$ FS (0 to 0.5mg/L range within ± 0.03 mg/L)
Repeatability : Within $\pm 2\%$ FS (0 to 0.5mg/ range within ± 0.02 mg/L)
Temperature compensation range : 0 to 40°C
Stability : Zero drift: within $\pm 1\%$ FS/month (With ion-exchanged water)
 Span drift: Within $\pm 5\%$ FS/month (With chlorine standard solution)
 Response time: 90% response within 3 mins. (From the standard liquid inlet)

Calibration method

Zero calibration : Calibrate with ion-exchanged water or dechlorinated water
Span calibration : Sample water is collected and calibrated to the concentration determined by the DPD colorimetric method. Alternatively, prepare a hypochlorous acid solution and calibrate it.

Operating principle

The sample water is supplied at a pressure of 0.02 to 0.3MPa, and the flow rate is adjusted to about 1L/min with BV1 to enter the measuring water tank. The measuring water tank is automatically controlled to a constant flow rate, and at the same time, the sample water is defoamed and filtered by a filter, and the excess is drained from the overflow. The sample water stored in the measuring water tank is introduced into the measurement cell at a constant flow rate (20mL/min) by the constant flow pump P1.

On the other hand, the reagent solution is introduced into the measurement cell at a constant flow rate (0.2mL/min) by the constant flow pump P2. The

sample water and the reagent solution mix and react to release bromine or iodine depending on the chlorine concentration. This free bromine or iodine is electrolytically reduced by the detector to become bromine ion or iodine ion. At this time, the reduction current flowing between the detection electrode and the counter electrode is detected and converted to the concentration of total residual chlorine or free chlorine. (Polarograph method)

Since the surface of the detection electrode is constantly polished and cleaned with ceramic beads, the surface is kept clean and stable measurement is possible for a long period of time.

Connection terminal

| | | | | | |
|----|----|----|----|----|----|
| 74 | 75 | 76 | 77 | 78 | 79 |
| A | B | C | A | B | C |

RS-485/1

RS-485/2

To other instrument

| | | | | | |
|---|---|----|----|----|----|
| 1 | 2 | 70 | 71 | 72 | 73 |
| + | - | + | - | + | - |

Input

Output 1

Output 2

DC 4 to 20mA

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|--------|-------|----|----|----|----|-----------|-----------|-----------|-----------|-----------|-----------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 50 | 51 | 52 | 53 | 54 | 55 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 60 | 61 | 62 | 63 | 93 | 92 | E2 | E1 | 91 | 90 |
| Pulse | Status | Pulse | NO | C | NC | - | a contact | a contact | a contact | a contact | a contact | Internal wiring | | | | | | | | | | | | | | E | N | L | |

Automatic calibration start signal
100mS or more width

Range switching command signal
Low range at open
High range at close

Automatic cleaning start signal
100mS or more width

Power disconnection contact output

Instrument abnormal contact output

Under maintenance, calibration, cleaning contact output

Concentration lower limit alarm contact output

Concentration lower limit alarm contact output

Range display contact output
Low range at open
High range at close

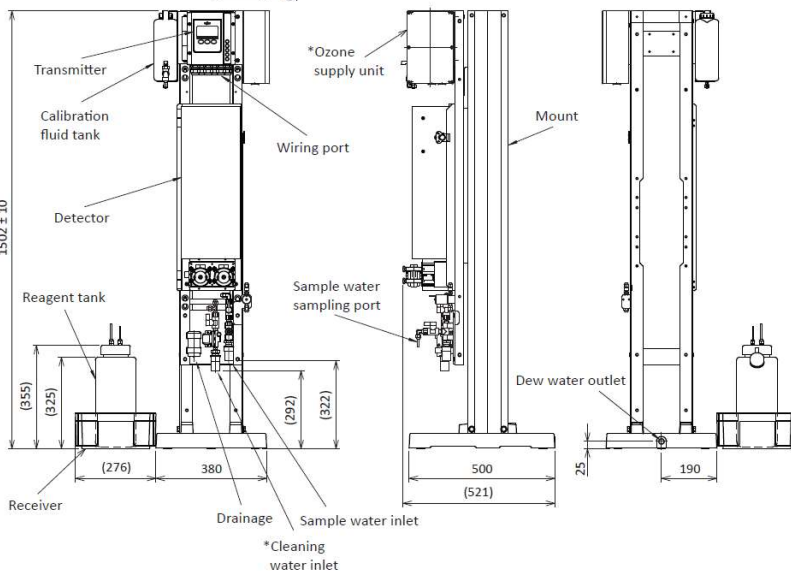
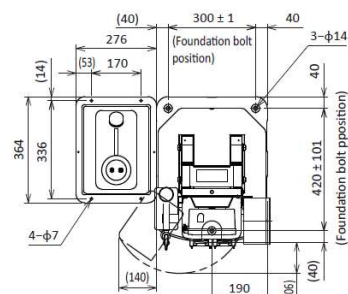
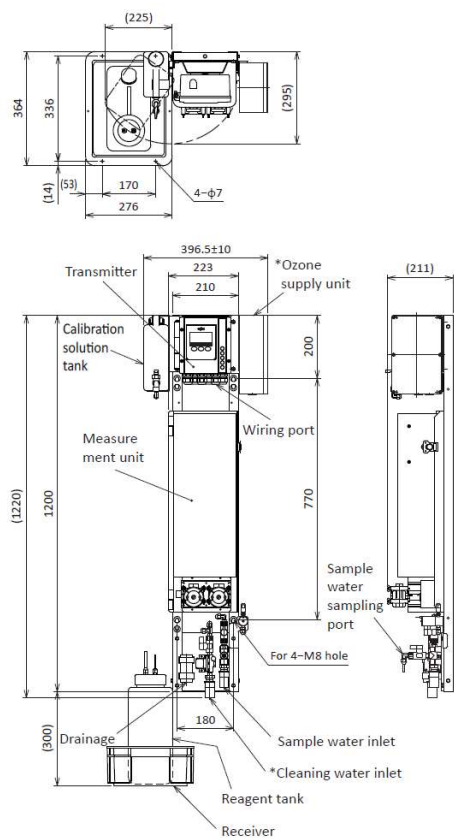
D type ground

Power supply AC 100 to 240V 50/60Hz

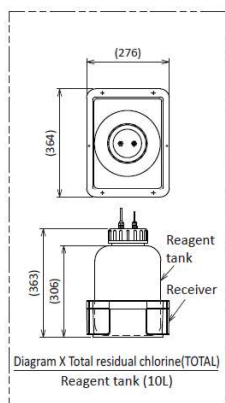
Dimensions Unit : mm

● Wall hanging · Rack mounting type

● Self-supporting stand assembly type (optional)



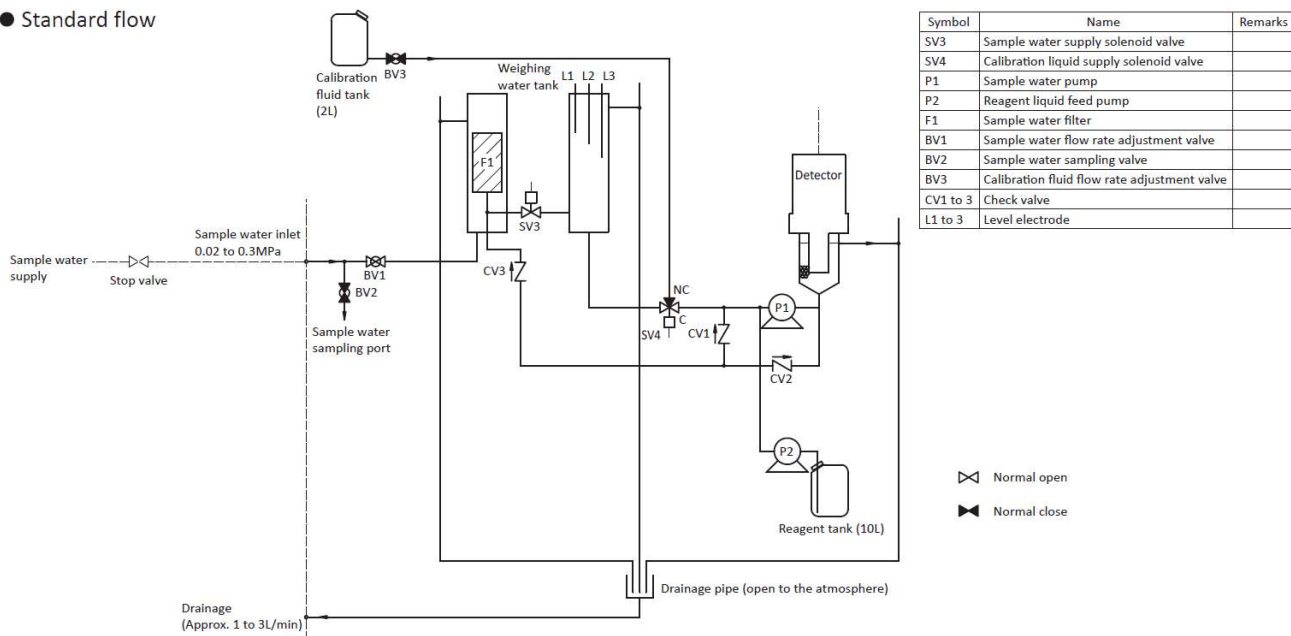
*...Optional



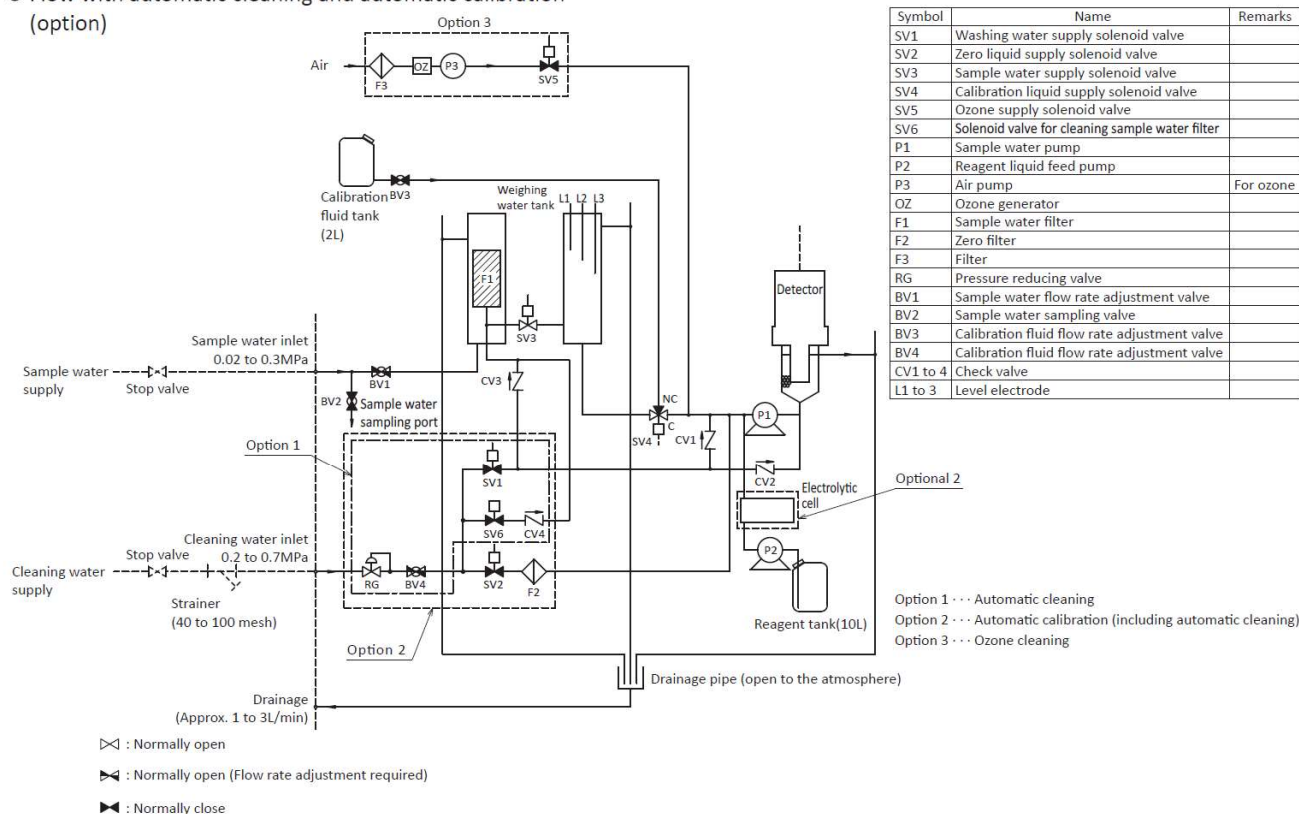
Use a round light-shielding reagent tank to measure total residual chlorine (TOTAL).

Flow sheet

● Standard flow



● Flow with automatic cleaning and automatic calibration (option)



Option

● Automatic cleaning unit

Water or water + ozone is periodically introduced into the measurement path to automatically clean the detector and other parts.

Started by an internal timer or an external start signal

| | |
|-----------------------------|---|
| Cycle setting | ...1 to 24h (Initial setting 12h) (When set to 0h, an external start signal is accepted.) |
| Cleaning time | ...Water cleaning 6min, Water / ozone cleaning 11min |
| Condition of cleaning water | ...Equivalent to tap water Water cleaning approx. 6L / time Water / ozone cleaning approx. 9L / time Pressure: 0.2 to 0.7MPa Temperature: 2 to 30°C |

● Independent stand for indoor use

Assemble to an aluminum self-standing stand. Secure the gantry base with anchor bolts.

● Sand filtration device FS-3

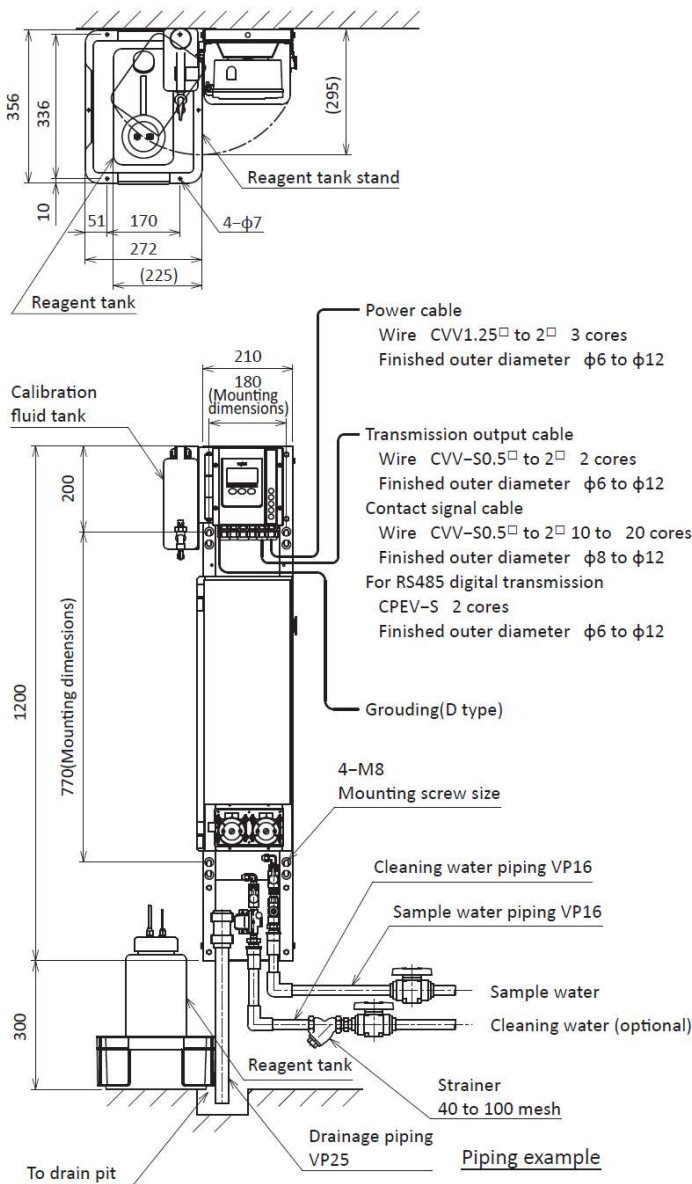
● Automatic calibration unit

Tap water is filtered with a zero filter, zero calibration is performed, and then bromine or iodine is quantitatively generated from the reagent solution by an electrolytic cell, and span calibration is performed.

It is started by an internal timer or an external start signal. Automatic calibration is added at the same time as the above automatic cleaning.

| | |
|------------------|--|
| Cycle setting | ...1 to 31days (initial setting 10days) (If set to 0day, an external start signal will be accepted) |
| Calibration time | ...Approximately 60min (fixed) |
| Standby time | ...0 to 30 min (initial setting 20min) |

Installation



1. Instrument installation conditions

Install it in a place that meets the following conditions.

- A place that is not exposed to rain, wind, or direct sunlight.
- A place where the temperature and pressure of the sample water can supply water quality that meets the standard "sample water conditions".
- Where there is no vibration
- Where there is no device that causes electrical noise in the surrounding area
- Maintenance space can be secured and work can be done easily.

2. Installation

Standard specifications are wall-mounted or rackmounted. Make four holes for M8 in the mounting part in advance, and mount the instrument vertically.

Instrument mass: Approx. 17kg

Use the supplied reagent tank and install it next to the device (within 1 m from the device body).

Install the reagent tank stand with M6 foundation bolts.

Connect the piping tube and wiring that came with the reagent tank to the main body of the device.

3. Sample water supply piping

a) Install a stop valve as shown in the figure.

Also, insert a union, etc. near the device so that the piping can be removed (separated) from the device.

The flow rate required for the instrument is approximately 1 to 3 L / min.

b) Use a material with good corrosion resistance such as hard PVC (VP16) or PVC pressure resistant hose (diameter equivalent to VP16).

4. Drain piping

a) Drain to a pit, etc. with an open-to-atmosphere descent pipe.

b) Piping material is rigid PVC (VP25) or PVC pressure resistant hose

Use a material with good corrosion resistance such as (diameter equivalent to VP25).

5. Cleaning water piping (optional)

If it is equipped with automatic cleaning, pipe it to the cleaning water inlet together with a stop valve / strainer (40 to 100 mesh). Also, insert a union, etc. near the device so that the piping can be removed (separated) from the device.

For wash water, supply water that meets the standard "wash water conditions".

6. Wiring

a) Refer to the standard in the figure for each cable.

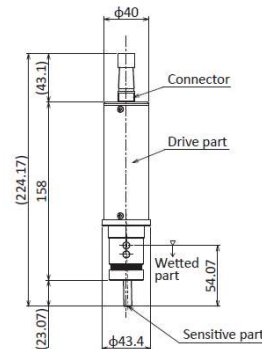
b) To ground the instrument, perform class D work (grounding resistance 100Ω or less) from the ground screw on the bottom of the converter or the E terminal of the internal terminal block.

c) Isolate the signal cable from the power line.

d) When using conduit piping (conduit pipe), remove the cable gland and connect it to the G1/2 screw.

Detector

| | |
|---------------------|--|
| Model | : CLR-160 |
| Measurement method | : Swing rotary type rotation speed control method |
| Cleaning method | : Rotational motion of detection electrodes and continuous cleaning with ceramic beads |
| Structure | : Detection electrode: Au Opposite pole; Pt Temperature compensation sensor: Pt 1000Ω |
| Detection electrode | : 2132 (Replacement tip) |
| Lead wire | : 118N0 60 (Code No.) Length 55cm |

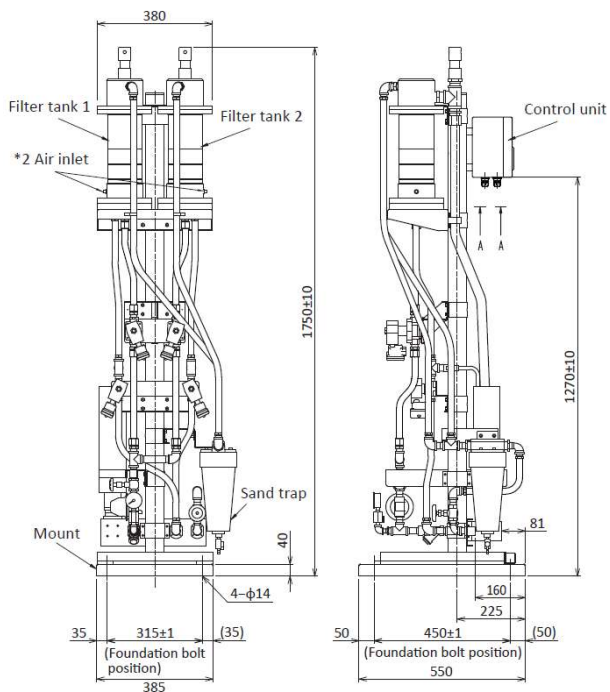


Related instruments

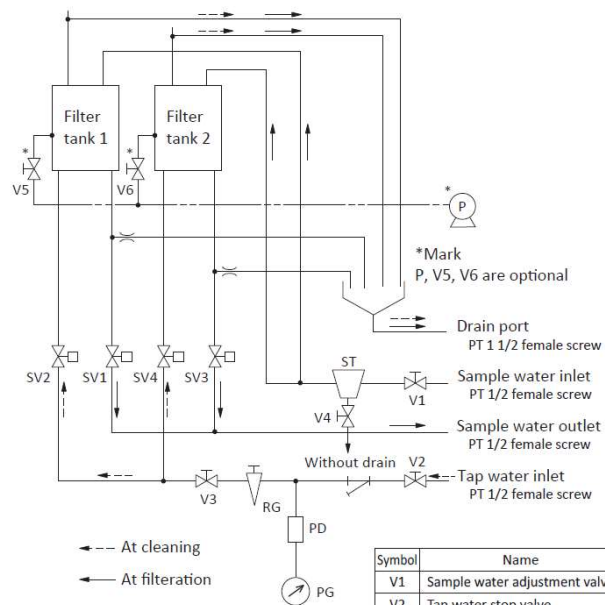
● Sand filtration device

| | |
|----------------------------------|--|
| Model | : FS-3 |
| Usage | : Removal of SS in sample water to be introduced into the water quality analyzer |
| Method | : 2-cylinder continuous sand filtration (alternate automatic reversal) |
| Filter material | : Sand (particle size 0.8 and 1.0mm) |
| Filtration water sampling amount | : 1 to 6L/min (depending on the turbid mass of the sample water) |
| Power | : AC 100V 50/60Hz |

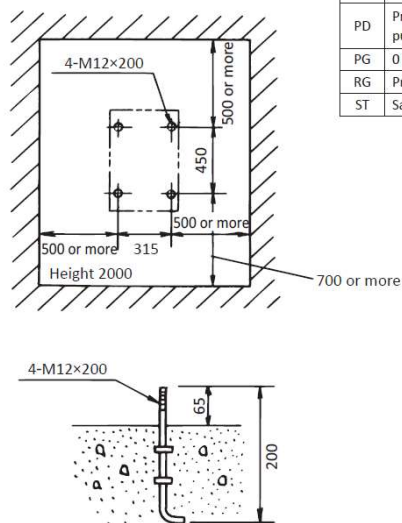
● External dimensions



● Flow sheet



● Maintenance space



DKK-TOA CORPORATION

Overseas Sales Division:
 DKK-TOA Corporation
 29-10, 1-Chome, Takadanobaba, Shinjuku-ku,
 Tokyo 169-8648 Japan
 Tel : +81-3-3202-0225 Fax : +81-3-3202-5685
 E-mail : intsales@dkktoa.com



Please read the operation manual carefully before using products.