

SPECIFICATION SHEET



AUTOMATIC COD ANALYZER

CODR-400

This device is an automatic measuring device for measuring the COD (Chemical Oxygen Demand) of factory effluent, lake water, etc., in compliance with effluent regulations such as total water quality regulations. Designed on the basis of 'automated COD (COD) instrument'.

The measurement principle is based on "17. Oxygen consumption by potassium permanganate at 100°C (CODMn)" of JIS K 0102 Industrial Wastewater Test Method. In the case of samples containing a large amount of chloride ions, such as seawater, a method based on the Sewage Test Method (Appendix) "Oxygen demand by potassium permanganate at alkaline 100°C (CODAlk)" is adopted.



Features

- Reduced reagent consumption by 95%.
(Reagent consumption: 1/20 compared to our conventional model) Reagent replacement is once a month*.
 - Adopting a twin platinum electrode eliminates the need for maintenance of the internal solution of the reference electrode.
 - Easy to operate with an interactive method using a color touch panel.
 - The titration curve can be displayed on the color touch panel.
 - Various log functions allow recording and checking past measured values, titration data, calibration data, alarm data, start / stop data, etc.
 - Equipped as standard with an oxalic acid cleaning function that cleans reaction tanks and electrodes from manganese contamination.
- *. This applies when the optional water purifier is built-in or when pure water is supplied from the outside. The specification with a built-in pure water tank requires pure water supply once every 6 days.

Standard Specifications

Product Name	: Automatic COD Analyzer
Model	: CODR-400
Measurement Object	: COD concentration in water
Measurement Method	: Oxygen consumption (acidic method, alkaline method) by potassium permanganate at 100°C
End point detection method	: Galvanostatic polarization potentiometric titration (double platinum electrode)

Measurement range and flow path (unit: mg/L):

It is recommended to select the measurement range so that the maximum sample concentration is less than 60% of the full scale value.

- (1) Measurement range of 1 flow path 1 range (standard): Any 1 range from 0 to 20 to 0 to 2000
- (2) 1 flow path 2 ranges (automatic range switching)
1st range: any 1 range from 0 to 20 to 0 to 1000
2nd range: any 1 range from 0 to 40 to 0 to 2000 (However, the measurement range is 1st range < 2nd range, and the measurement range ratio is doubled.)
- (3) Measurement range of 2 channels 1 range: any 1 range from 0 to 20 to 0 to 2000 (channel 1 and channel 2 have the same measurement range)
- (4) Measurement range of 2 channels and 2 ranges:
The range of each stream is fixed, and the range of stream 1 < the range of stream 2.

There are no restrictions on the combination of ranges, so select from the following.

- 1st range: Any 1 range from 0 to 20 to 0 to 1000 (1st flow path side)
2nd range: Any 1 range from 0 to 30 to 0 to 2000 (2nd flow path side)

An external diluter is required if the measurement range is greater than 0 to 100.

The external diluter is shared by Range 1 and Range 2, and the dilution factor is set for each range.

When an external diluter is added, the external diluter operates even when Range 1 is 0 to 100 or less, so the external dilution ratio for Range 1 is set to 1 (no dilution).

Measurement cycle	: 1 measurement / 1 hour (1 day measurement schedule can be arbitrarily set in 1 hour units Or measurement start by external start signal)
Load calculation function	: By inputting the flow rate signal of channel 1, the load amount of channel 1 is calculated. Flow path 2 does not perform load amount calculation.
Display / recording method	: Liquid crystal display by touch panel (Select either Japanese / English) Printed records by printer (option) in English items: date, time, measured value, load value, flow rate value, measurement parameter, daily report (daily maximum, minimum, average value, number of measurements), etc.

Repeatability : 0 to 20mg/L range ...within $\pm 1\%$ FS
(In calibration solution) Over 20 to 100mg/L range...Within $\pm 2\%$ FS
Range other than the above ...Within $\pm 5\%$ FS

Stability : Zero drift ...within $\pm 3\%$ FS/ day
(In calibration solution) Span drift 20mg/L range ...within $\pm 3\%$ FS/
day Over 20 to 100mg/L range...Within $\pm 4\%$ FS/day
Range other than the above... Within $\pm 5\%$ FS/ day

Warm-up time : About 2 hours after turning on electricity
and running water

Data memory of main unit : Measured values, flow rate values, and
load values can be displayed for up to one month.

Installation : Indoors / Outdoors inside a cubicle, a place
that is protected from direct sunlight, wind and rain, has little vibration and impact,
and has sufficient maintenance space. Also, there should be no sources of noise
(power equipment, etc.) nearby.
In case of corrosive atmosphere, install ventilation fan etc. in the building and pay
sufficient attention to ventilation.

Ambient temperature / humidity : 2 to 40°C 85%RH or less

Sample water condition : Temperature: 2 to 40°C
Pressure: 0.02 to 0.05 MPa
Flow rate: 1 to 3L/min
Do not contain components or air bubbles that generate corrosive gases (Refer to the
option column for housing air purge.)

Coexisting ingredients : In the acid method, silver nitrate is added
for masking to eliminate the effects of chloride ions in the sample.
The masking limit of chloride ions by silver nitrate is up to 100 times the full-scale
concentration of the measuring range. (Example) Masking for 0 to 20mg/L range
The limit will be 2gCl/L. If the sample contains a large amount of salt, a large
amount of silver chloride precipitates and interferes with the measurement. In such
cases, we recommend using the optional ammonia cleaning to remove the silver
chloride.

Reagent consumption :

- 5mmol/L potassium permanganate solution...about 700mL/month
- 12.5mmol/L sodium oxalate solution Without cleaning with oxalic acid: about
400 mL/month When cleaning with oxalic acid every hour: about 800mL/month
- Sulfuric acid (1+2)...About 400mL/month
- Silver nitrate solution (100g/L)...Approx. 400mL/month
- Sodium hydroxide solution (20g/L)... Approx. 400mL/month.
- 53.5% ammonia water...About 15 mL/ clean once (When the ammonia cleaning
function is provided, the cleaning interval depends on the setting.)

Contact input : 6 inputs No-voltage contact input, ON
resistance 50Ω or less Short-circuit current maximum 9mA, open-circuit voltage
12VDC external start, external calibration pulse input, make time 1 second or longer
Observation station stopped, flow path switched, flowmeter under maintenance,
no water draining...make contact

Input signal : Analog input: channel 1 flow rate signal
DC 4 to 20mA

Output signal : DC 4 to 20mA (load resistance 600 Ω or
less), ground isolation type (but not isolated between channels), channel 1
COD, channel 1 load, channel 2 COD (for 2 channel specifications)

Contact output : Maintenance signal, calibration signal,
power off signal, abnormal measurement 1, 2 signal, Preprocessing control signals 1, 2,

3, instrument error 1 signal, instrument error 2 signal, range signal (flow path
signal), excess load signal
Selection and allocation from the above items except for the power-off signal (8
points)
Non-voltage contact output (contact capacity DC 24V, 0.3A / AC 125V, 0.1A)
: AC 100V $\pm 10\%$ 50/60Hz

Power : Max. approx. 300VA Avg. 150W
(25% less than our conventional model)
Power consumption : Structure: Indoor, floor installation type,
Hard PVC, PFA, PP, silicon rubber, hard glass, acrylic, FKM

Wetted part material : 500 (W) \times 450 (D) \times 1500 (H) mm
(Excluding water tank)

External dimension : Munsell 5 PB8/1 equivalent

Coating color : Aoorix, 95kg (Excluding reagent)

Utility

Tap water condition : Required when the optional water purifier
is installed
Temperature: 2 to 40°C
Pressure: 0.1 to 0.35MPa
Required amount: Approx. 110mL/1
measurement (No external dilution)
Approx. 450mL/1 easurement
(With external dilution)

Option

Alkaline method : Select when the chloride ion concentration
is 100 times or more the full scale of the measurement range.

Ammonia cleaning function : In the case of acid method silver nitrate
addition, it is recommended to equip to remove silver chloride stains.

Line cleaning function : Removes inorganic dirt adhering to the
sample water introduction line. About 0.6% hydrochloric acid is used as the cleaning
solution.

2 range specifications : Details are described in the standard
specifications and measurement range.

2-channel specifiation : Please contact our sales representative.

Water purifier : Instead of using the built-in pure water
tank, the pure water device can be installed inside or separately.

Communication function : RS-485 (communication protocol: Modbus-
RTU) or RS-232C (communication protocol: original)
(For detailed specifications, please contact our sales representative.)

Printer : Fixed print items: year/ (English print,
with winder) printer that records month/
day, time, measured value, load amount,
flow rate, daily report (maximum/
minimum/average value, etc.), abnormality
Information printing

USB Memory : Year/month/day, time, measured value,
flow rate value, load value can be stored for
5 years

Housing air purge : If the sample water or ambient atmosphere
contains sulfur, hydrogen sulfide, or other
corrosive substances, it is recommended to
protect the instrument.
Supply air: instrumentation air (dust-free
and dehumidified air) pressure: 0.1 MPa
Consumption: about 3.5L/min

Adjustment tank : If the sample water is heavily contaminated,
contains many bubbles, or has large
fluctuations in flow rate, a regulating tank
(separately installed) is required before the
instrument receiving tank.

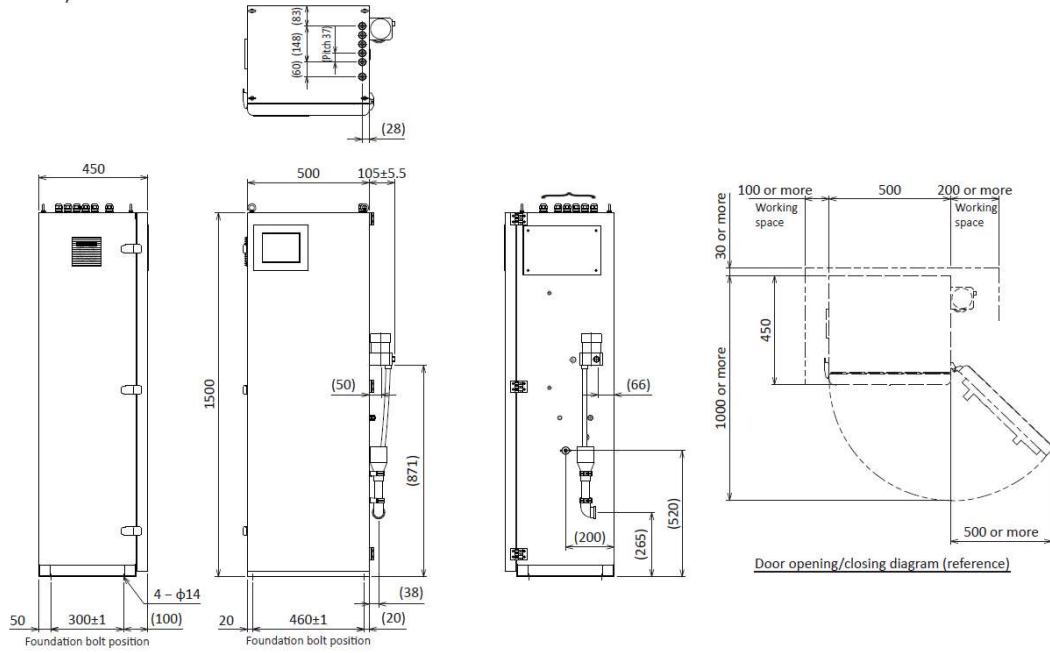
Door locking mechanism : Please select if necessary for management
of chemicals such as operating reagents.

<1 channel (standard) dimensional drawing, flow sheet, installation procedure drawing>

Dimensions

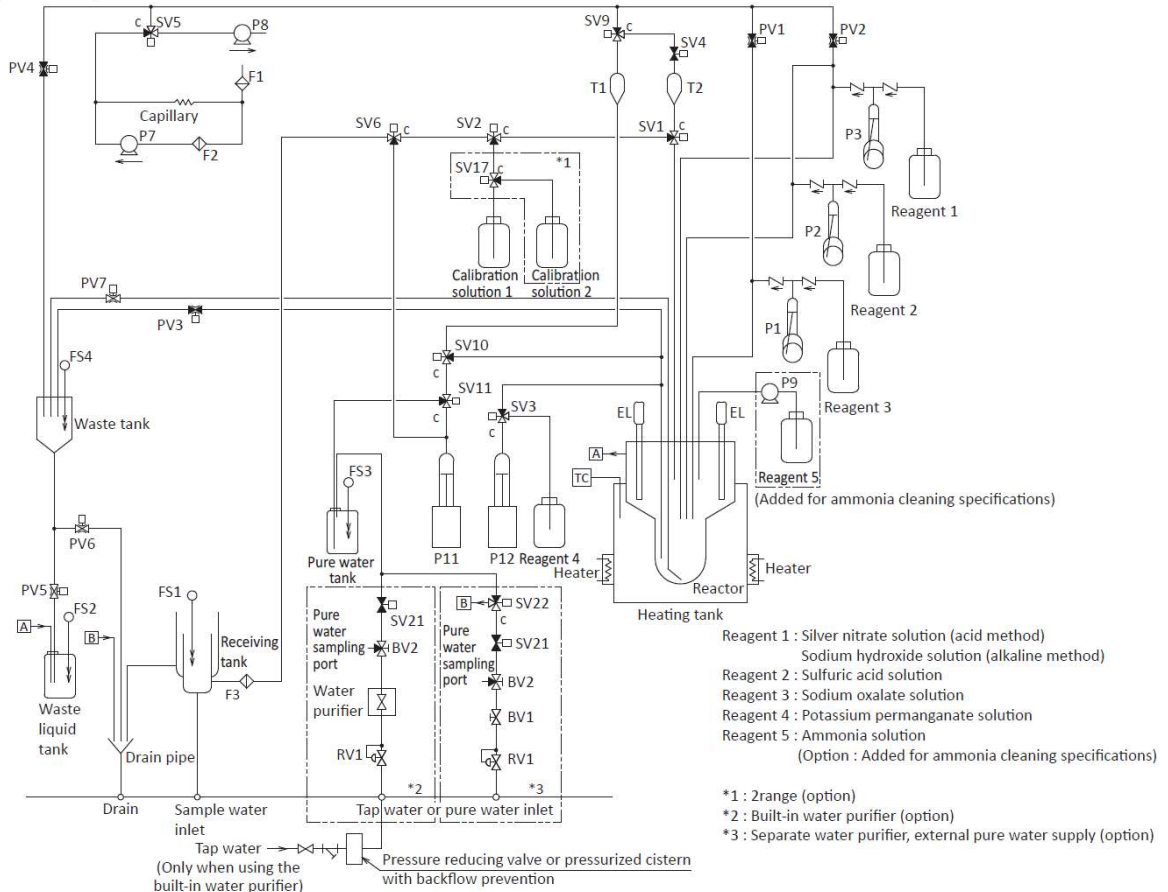
Unit : mm

● 1 Channel (Standard)



Flow sheet

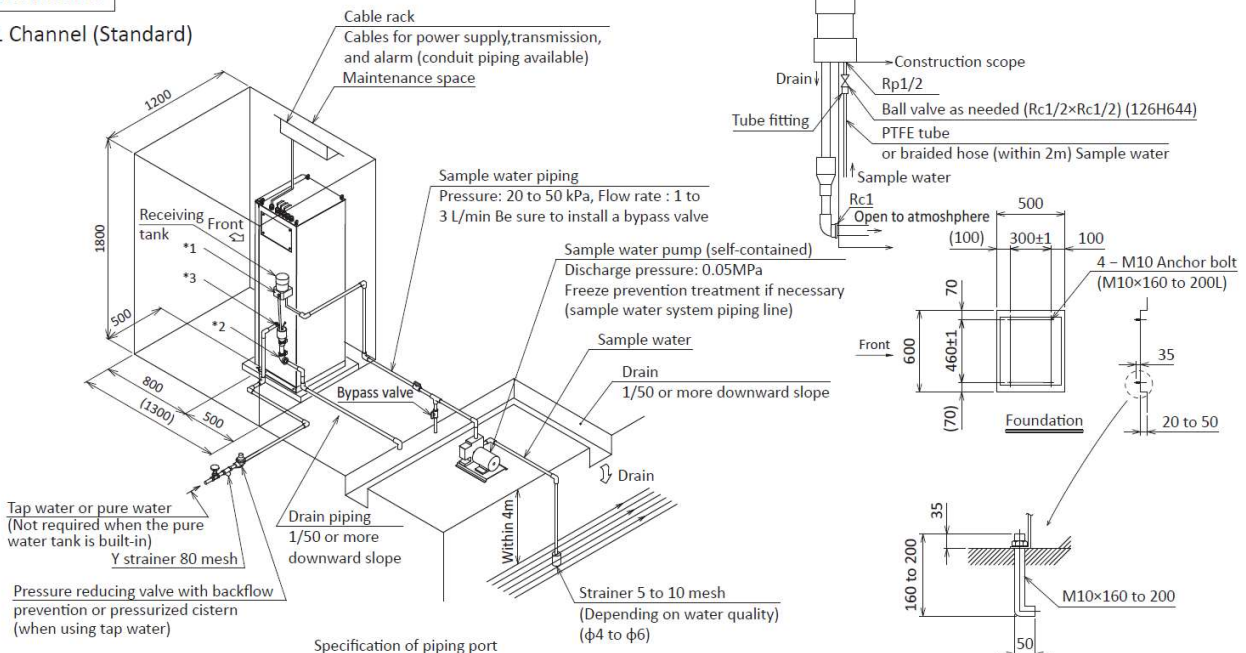
● 1 Channel (Standard)



<1 channel (standard) dimensional drawing, flow sheet, installation procedure drawing>

Installation

● 1 Channel (Standard)



Note Be sure to install a strainer (80 mesh) on the tap water pipe as shown in the figure. Also, thoroughly flush the inside of the pipe to remove dust before connecting it to the instrument. If there is dust, the solenoid valve will be clogged.

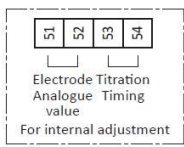
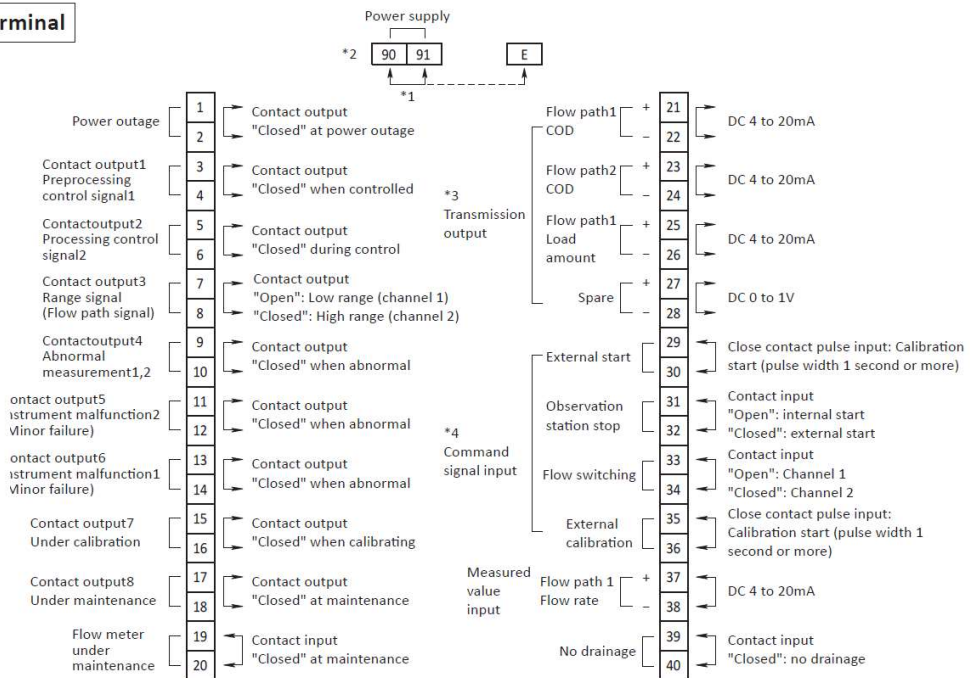
<Common to all specifications External connection terminal>

External connection terminal

● 1 Channel (Standard)

● 1 Channel with external diluter

● 2 Channel with external diluter



The contents of contact outputs 1 to 8 can be changed by setting. When the load is exceeded and the start of measurement can be output by setting, each item can be assigned to a single contact. Cannot output one item to multiple contacts

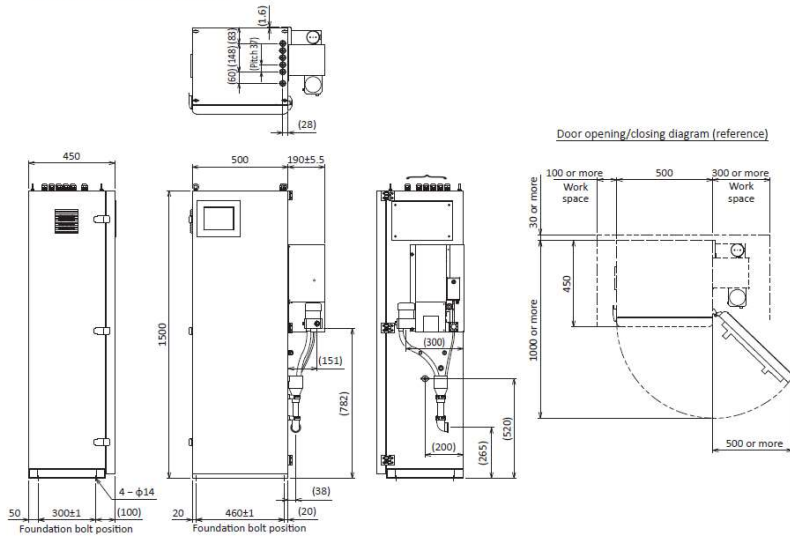
*1 Please refer to the specification sheet.
*2 Side terminals
*3 Transmission output is nonisolated between each channel
*4 The even-numbered terminals for command signal input are wired inside the circuit.

<Options External dimensions, flow sheet, installation procedure diagram>

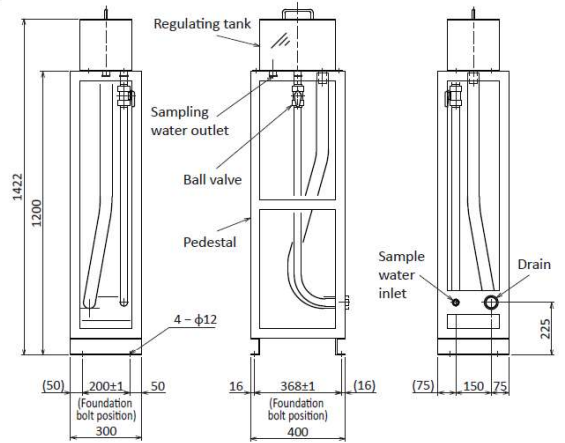
Dimensions

Unit : mm

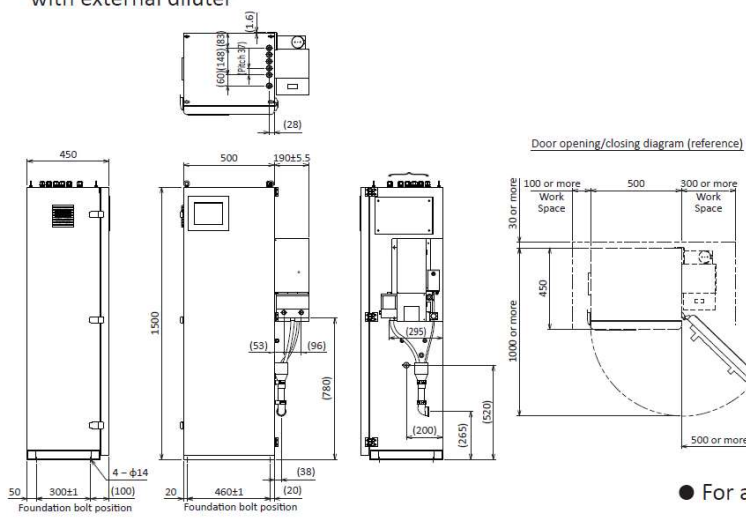
- 1 Channel with external diluter



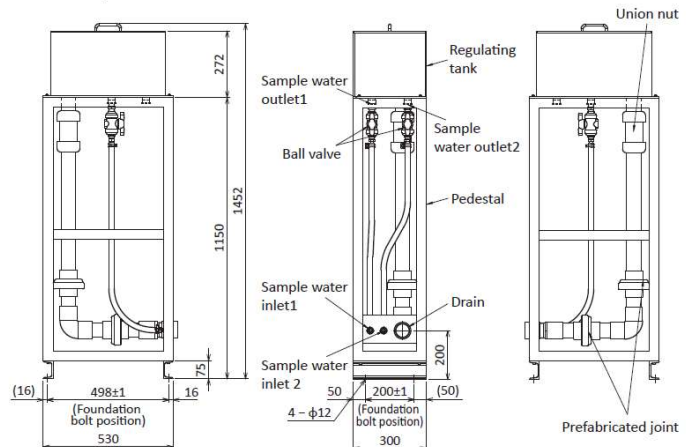
- For adjustment tank 1 channel



- 2 Channel with external diluter



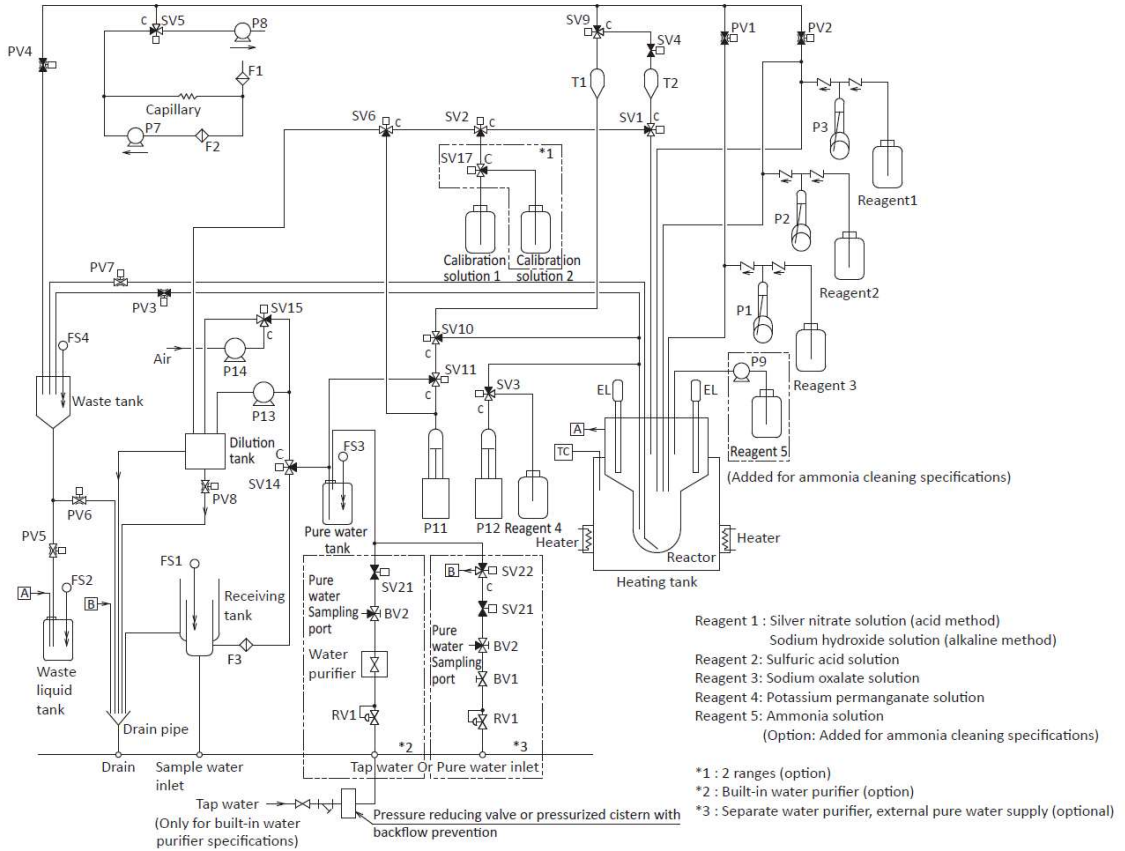
- For adjustment tank 2 channels



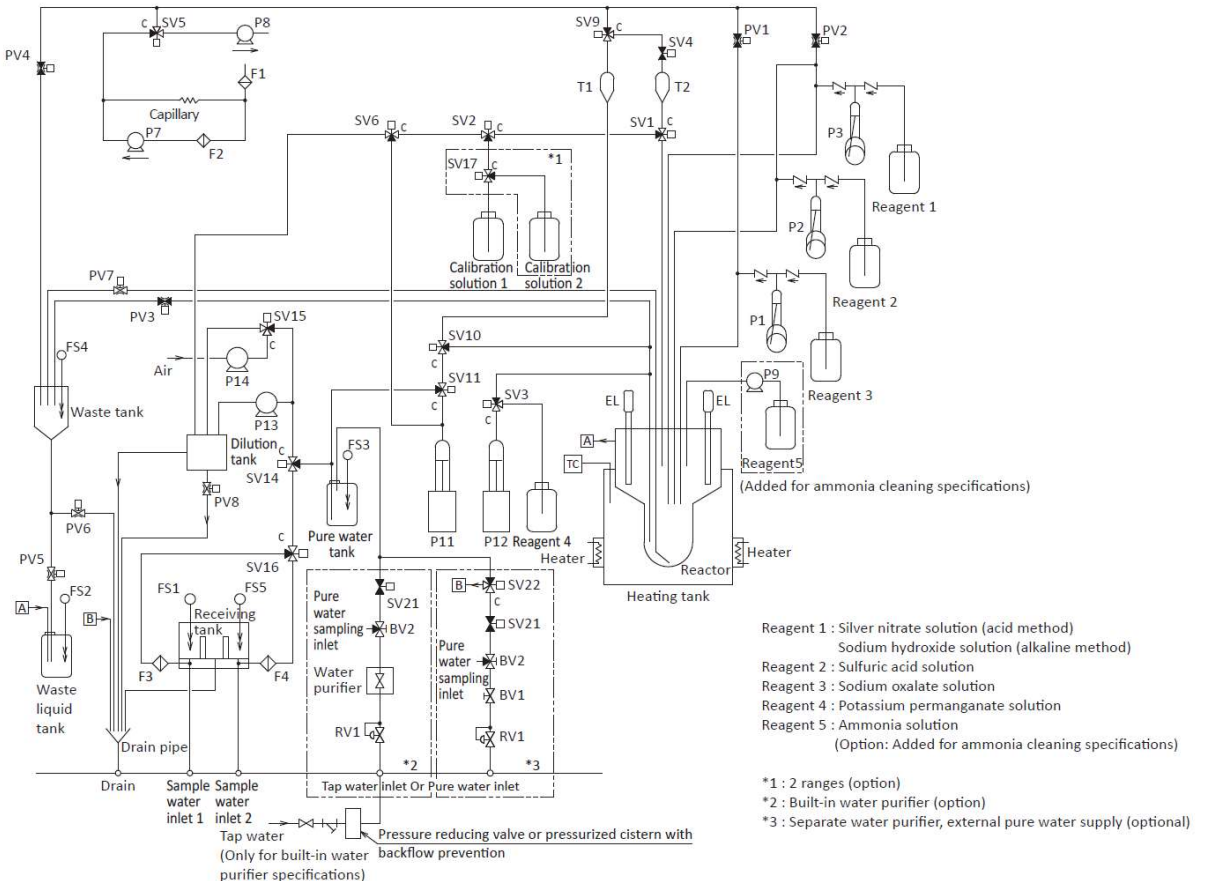
<Option External dimensions, flow sheet, installation procedure>

Flow sheet

● 1 channel with external dilution device



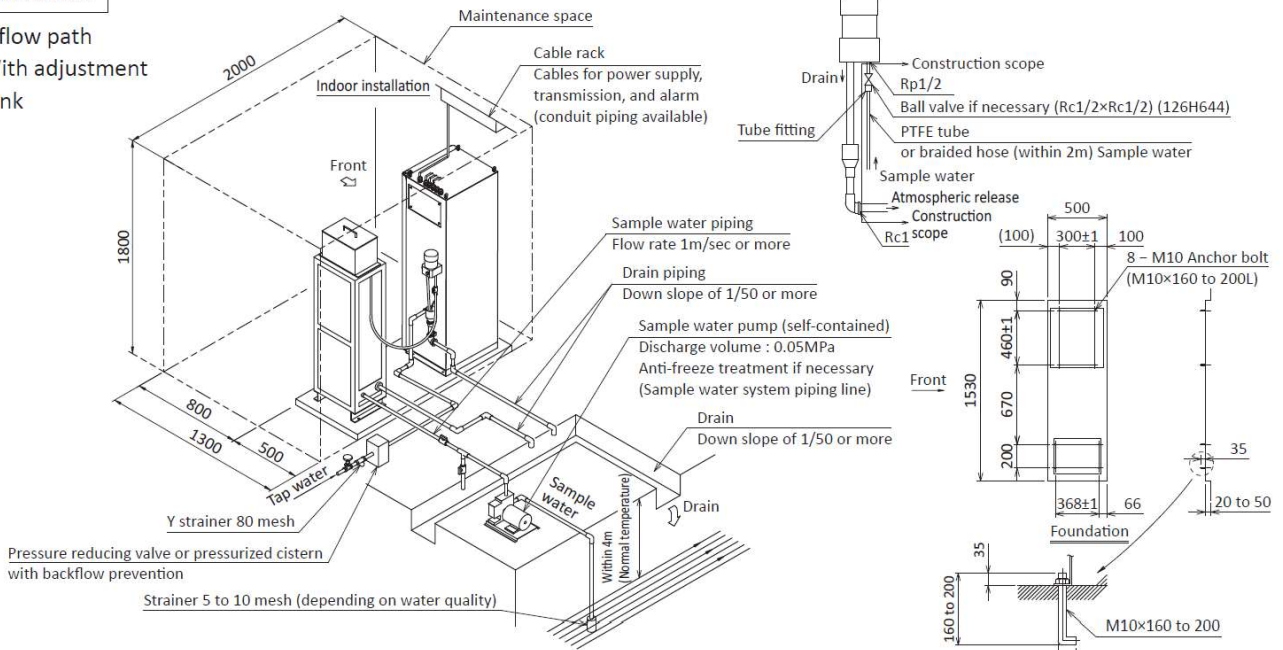
● 2 With flow path and external dilution device



<Option External dimensions, flow sheet, installation procedure>

Installation

- 1 flow path
With adjustment tank

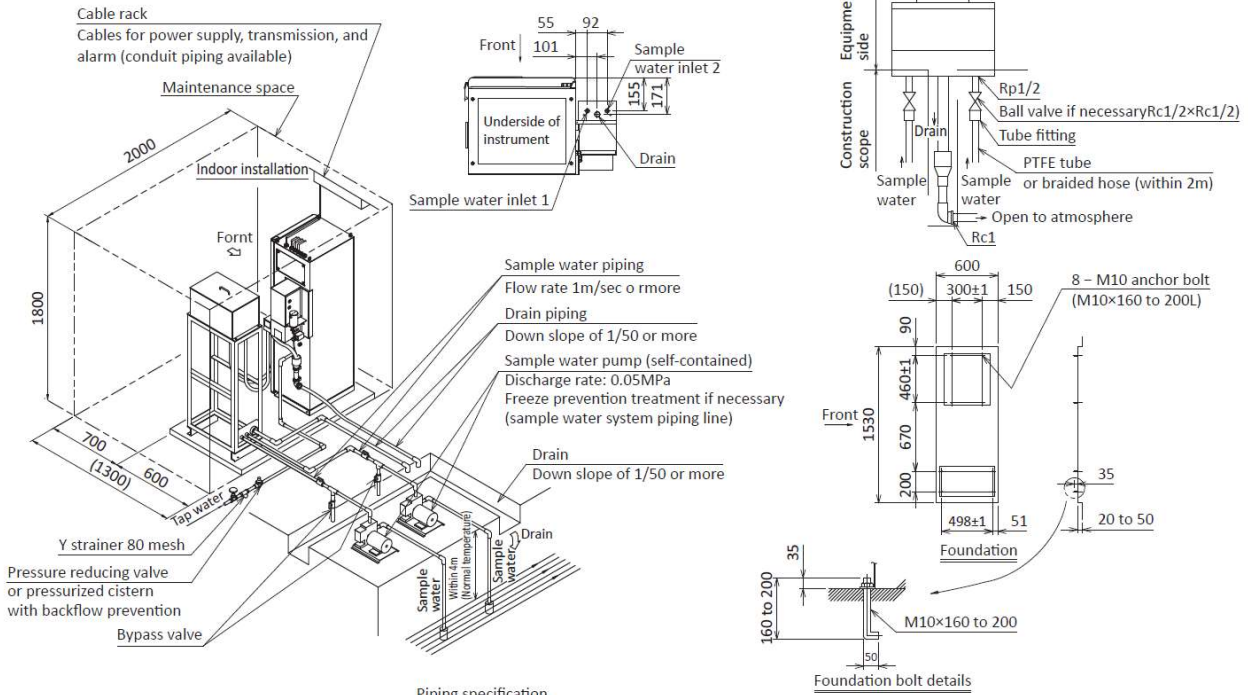


Specification of piping port

Piping	Connection	Material	Remarks
Sample water inlet	Rp1/2	PTFE tube, Braided hose, etc. (outer diameter $\phi 6$ to 10 mm)	Open to atmosphere (tube end)
Drain	Rc1	Rigid vinyl chloride pipe (VP20 or more)	
Tap water inlet	Rc1/2	Rigid vinyl chloride pipe (VP13 or more)	

- Note**
- Be sure to install a strainer (80 mesh) on the tap water pipe as shown in the figure.
 - Before connecting the pipe to the instrument, thoroughly flush the inside of the pipe to remove dust, etc. If there is dust, the solenoid valve will be clogged.

- 2 Flow path
With external dilution device and adjustment tank



Piping specification

Piping	Connection	Material	Remark
Sample water inlet 1,2 (instrument)	Rp1/2	PTFE tube, braided hose, etc. (Outer diameter $\phi 6$ to 10mm)	
Sample water inlet 1,2 (Adjustment tank)	Rc1/2	PTFE tube, braided hose, etc. (Outer diameter $\phi 6$ to 10mm)	
Drain (Instrument)	Rc1	Rigid vinyl chloride pipe (VP20 or more)	Open to atmosphere (tube end)
Drain (Adjustment tank)	Rc2	Rigid vinyl chloride pipe (VP20 or more)	Open to atmosphere (tube end)
Tap water inlet	Rc1/2	Rigid vinyl chloride pipe (VP13 or more)	

- Note**
- Be sure to install a strainer (80 mesh) on the tap water pipe as shown in the figure.
 - Before connecting the pipe to the instrument, thoroughly flush the inside of the pipe to remove dust, etc. please give me. If there is dust, the solenoid valve will be clogged.



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Please read the operation manual carefully
before using products.

<https://www.toadkk.com/english/>

Information and specifications are subject to change without notice.