

Organic Pollution Monitor (UV Meter)

OPM-1610

The OPM-1610 is one of our latest models, and represents the culmination of more than three decades of product development and field experience. This model is an organic pollution monitor (UV meter) that employs ultraviolet absorptiometry to analyze the organic pollution levels in commercial, industrial, and other types of effluents. The values obtained are correlated with the CODMn, and are then used to calculate the pollution load and other items in accordance with the Total Effluent Control System.

Before using the instrument, make a correlation between the instrument output and the CODMn.

The design of this meter applies the measurement principle and method stipulated in the JIS K 0807 standard, "Ultraviolet photometer for monitoring of water pollution".



Features

Compact and lightweight design

The immersion-type detector included with the instrument, which was highly rated by users of the previous model, has been made approximately 50% smaller and 20% lighter than the original detector, making it much easier to install the instrument. In addition, the installation of the optional sample receiving tank enables measurements to be performed by extracting samples from the process stream.

New optical system

A new highly stable light source ensures that the unit provides stable measurements.

The new optical system employs a power-saving lamp and eliminates the need for a heater to stabilize the light source. These two factors help to significantly reduce the amount of power consumed by the instrument (approximately 80% less than the previous model). Furthermore, additional power savings is also possible by using an immersion-type detector that does not require a sample pump system.

Standard Specifications

Product name	: Organic Pollution Monitor (UV meter)
Model	: OPM-1610
Object measured	: Organic pollution in commercial, industrial, and other types of effluents
Measurement method	: Dual-wavelength absorptiometry (UV 254nm/visible light 660nm)
Measurement range	: UV absorbance; 0~2.5Abs (The transmission output range can be adjusted in 0.1 Abs increments within a range of 0.5~2.5Abs.) The readings can be displayed as absorbance on a 10 mm cell length conversion basis. The displayable absorbance ranges are as follows. 25 mm cell; 0~1.0Abs 10 mm cell; 0~2.5Abs 6 mm cell; 0~4.17Abs
Measurement cell	: Immersed parallel cell (6, 10, or 25mm, as specified by customer)
Cell cleaning	: Wiper system for automatic cleaning Cleaning cycle; 1~9999 minutes (default; 60) No. of cleaning; 0~99 (default; 2)
Sample Condition	: Sample temperature; 0~45°C (no freezing)
Maximum water depth	: 6m
Calibration	: Zero; Pure water Span; Potassium hydrogen phthalate solution (A calibration vessel is supplied as a standard accessory.)

Transmission output : 4~20mADC, load resistance; 600Ω or less, isolated
 Simultaneously output of any three of the following signals; UV-VIS absorbance, UV absorbance, VIS absorbance, COD conversion value, turbidity conversion value, SS concentration conversion value, and sample temperature (non-isolated between transmission outputs).
 The COD conversion value, turbidity conversion value, and SS concentration conversion value are calculated by employing a linear expression to convert the absorbance.

Contact output signals : Power cut-off signal, c contact (NO/NC) output
 Alarm signal, a contact (NO) output (Any three of the following contacts can be selected.)
 Under maintenance
 Under cleaning
 General alarms
 Measured value higher limit alarm
 Lamp error (UV, VIS)
 No sample
 Leakage alarm
 Wiper drive motor error
 Sample temperature error
 In addition to the first three items listed above, any three of the six general alarm items can be assigned to contact outputs 1~3.

Contact input signals : Cleaning start signal; Signal used to remotely control the cleaning program.
 No-voltage contact signal
 ON resistance; 50Ω or less
 Short circuit current; Maximum of 5mA
 Open voltage; 24VDC
 Make time; 0.1sec. or more

Digital communication output (optional feature) : Two selections are available for digital communication output; communication output RS-485 or output to USB memory for data recording.
 Digital communication output; RS-485 interface
 USB memory (data is saved in CSV format)
 Memory data format; date-hour-minute, UV, VIS, and UV-VIS values, COD conversion value, turbidity conversion value, SS concentration conversion value, water temperature (sampling cycle can be set to a length of 1 to 99 minutes)
 An approximately five year block of data can be saved when 1 minute is specified as the sampling cycle.
 If the amount of available free space becomes incredibly low, the unit will be unable to record new data. Make sure to delete old or unnecessary data at regular intervals.

Power requirements: 100~240VAC±10%, 50/60Hz
 Power consumption: Average of approx. 10VA, maximum of approx. 20VA

Mounting : Immersed type, wind-up type, hanging type, and sampling type

Materials : Transmitter; Die-cast aluminum
 Detector; Main body...SUS316, ABS resin
 Cell...Quartz glass
 Wiper...FPM rubber

Surface finish : Transmitter; Metallic silver

Protective construction : Transmitter; IP65

Transmitter cable port : Six cable glands for ø6~12 cable (one of which is for the detector)
 Conduit threads (six G1/2 threads) can be connected when the cable glands are removed.

Extension cable : 1 cable to connect the detector and transmitter
 Standard length; Sampling type...3m.
 Immersed type, wind-up type, and hanging type; Specified by customer
 Maximum length; 30m (optional feature)

Dimensions (see the section "Dimensions" for details) : Transmitter; Approx. 181 (W) x 95 (D) x 180 (H) mm

Detector; Approx. 150 (W) x 95 (D) x 450 (H) mm
 The height (H) of the immersed type varies according to the specification.

Weight : Transmitter; Approx. 2.0kg
 Detector; Approx. 5.3kg(except cable)

Installation : Unit can be installed outdoors
 Ambient temperature; -5~50°C
 Ambient humidity (transmitter); 95% RH or less
 Ensure the unit is not subjected to vibration, shock, and corrosive gases.
 Install the detector at a position in which the sample water can circulate smoothly.
 This will ensure that the readings accurately reflect the sample values.

Related equipment : Load calculator
 The load calculator CALD-2030 is recommended for determining the cumulative load.

Performance

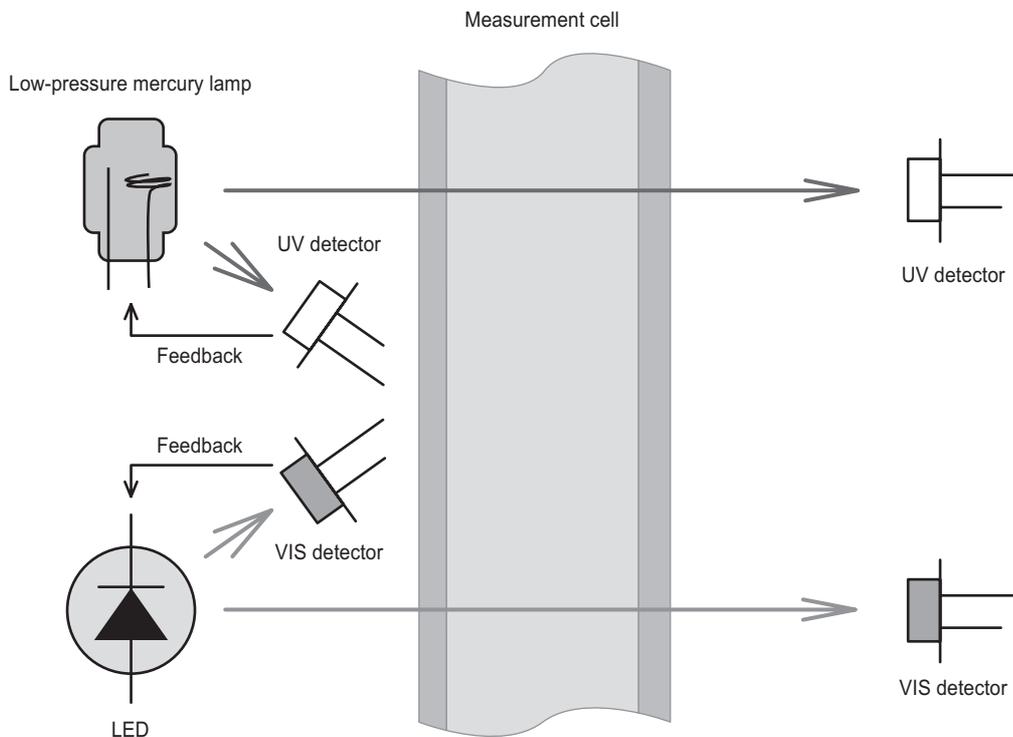
UV absorptiometry linearity : Within $\pm 2\%$ FS
 UV absorptiometry repeatability : Within $\pm 2\%$ FS
 UV absorptiometry zero drift : Within $\pm 2\%$ FS/week
 UV absorptiometry span drift : Within $\pm 2\%$ FS/week
 Response rate : Within 30 sec. for 90% response

Typical COD conversion value by cell length

Cell length	COD value (mg/L)
25mm	0~50
10mm	50~100
6mm	100~500

Immersed parallel cell (6, 10, or 25 mm, as specified by customer)

Operating principle



The OPM-1610 uses the dual wavelength technique to measure pollutants. This technique employs two highly stable sources of light, UV (ultraviolet) and VIS (visual light).

When a UV light source is applied, a 254nm emission line from the ozone-free low pressure mercury lamp is used. In VIS detection, a pulsating 660nm LED is irradiated as the light source.

There are two ways for converting instrument output to

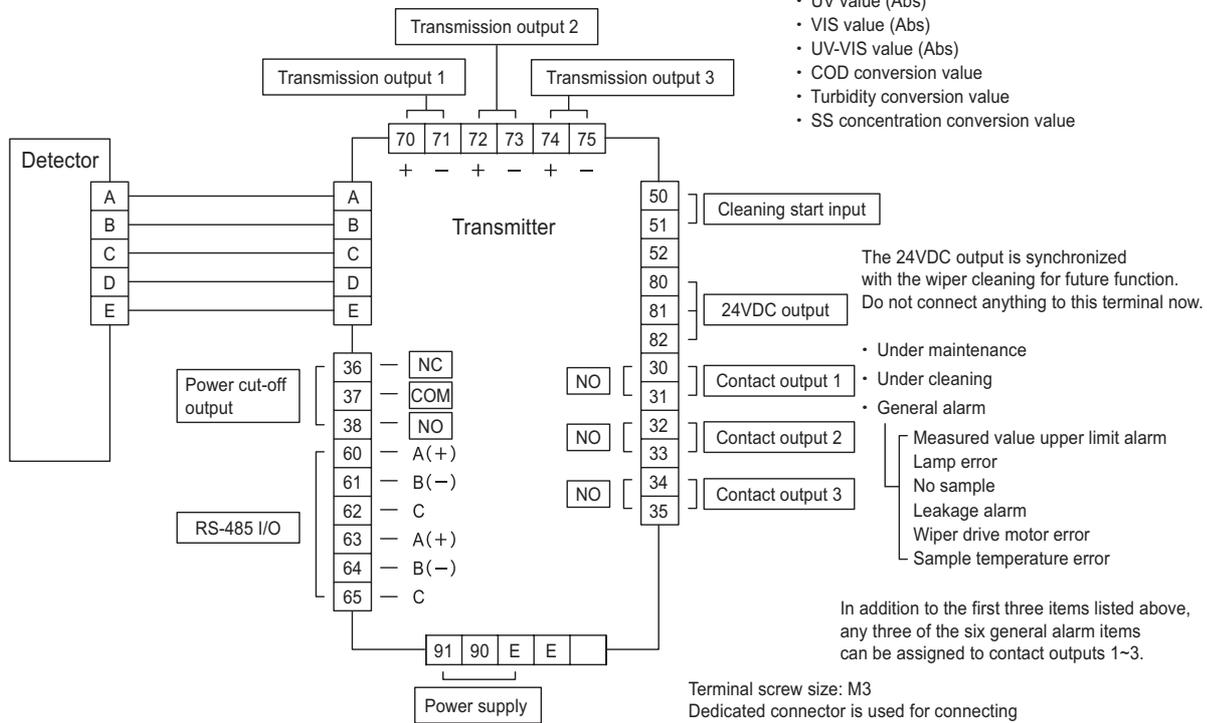
COD values. The first consists of using the correlation between UV absorbance (A_{UV}) and the COD manual analysis value. The second method entails using the correlation between the difference of the "UV absorbance (A_{UV}) minus VIS absorbance (A_{VIS})" (value given by the expression $A_{UV} - a \times A_{VIS}$ to eliminate the effect of suspended solids) and the COD manual analysis value.

a = Correction factor (Freely specified value of 0~9.9. Default value of 1.0.)

Terminal connections

Any three of the following six items can be assigned to contact outputs 1-3:

- UV value (Abs)
- VIS value (Abs)
- UV-VIS value (Abs)
- COD conversion value
- Turbidity conversion value
- SS concentration conversion value



The 24VDC output is synchronized with the wiper cleaning for future function. Do not connect anything to this terminal now.

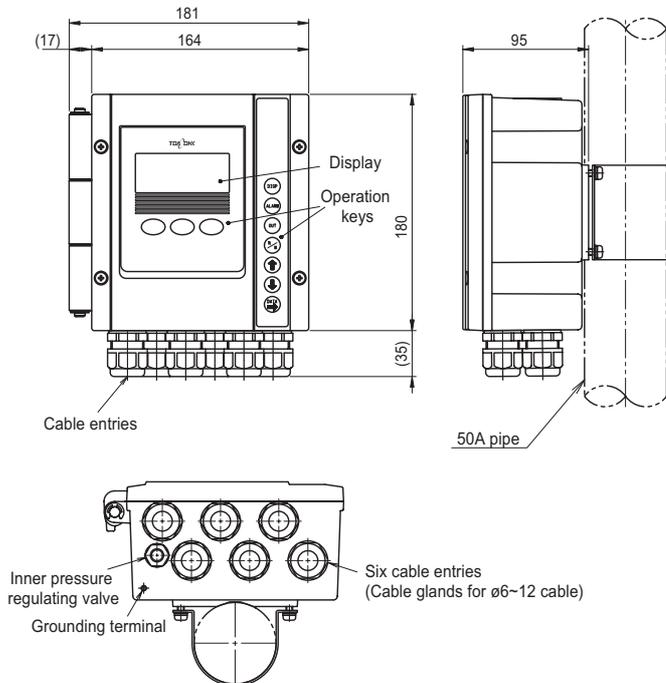
- Under maintenance
- Under cleaning
- General alarm
- Measured value upper limit alarm
- Lamp error
- No sample
- Leakage alarm
- Wiper drive motor error
- Sample temperature error

In addition to the first three items listed above, any three of the six general alarm items can be assigned to contact outputs 1-3.

Terminal screw size: M3
Dedicated connector is used for connecting between the detector and transmitter.

Dimensions Unit : mm

● Mounted on a pole



● Hood (optional)

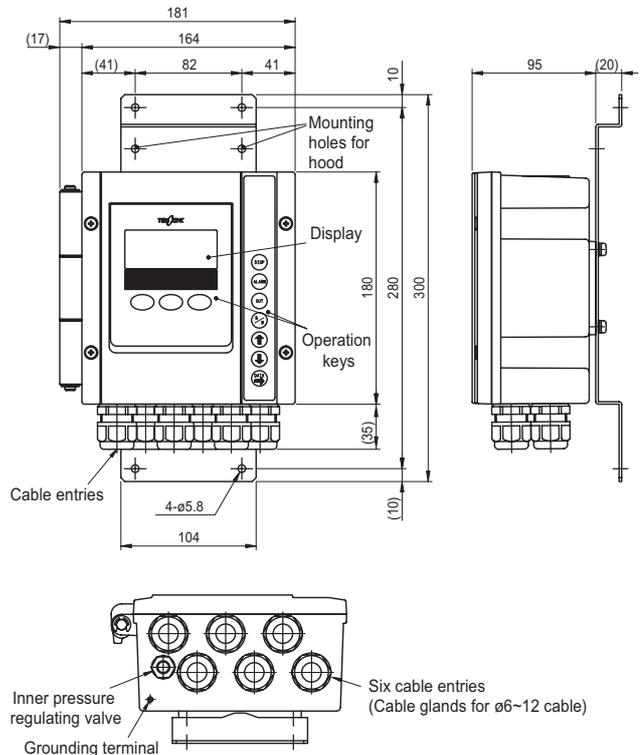
Recommended when installing the instrument outdoors at a location exposed to direct sunlight.

Material : SUS304

Mounting : 50A pipe or wall

Code number : 7049930K

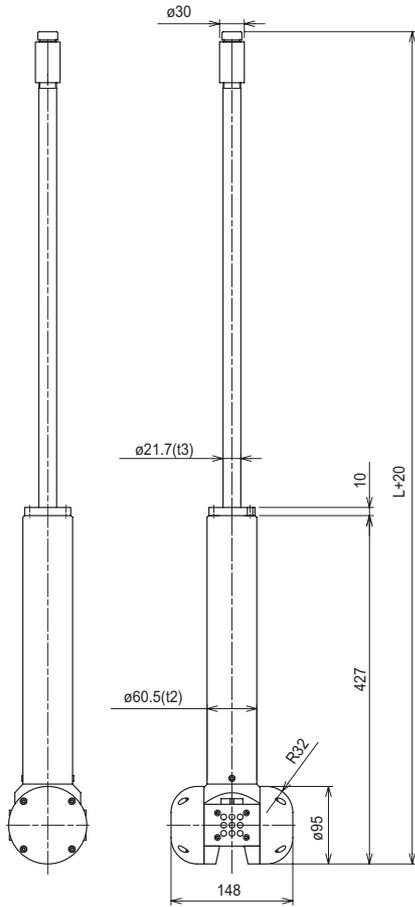
● Mounted on a wall or rack



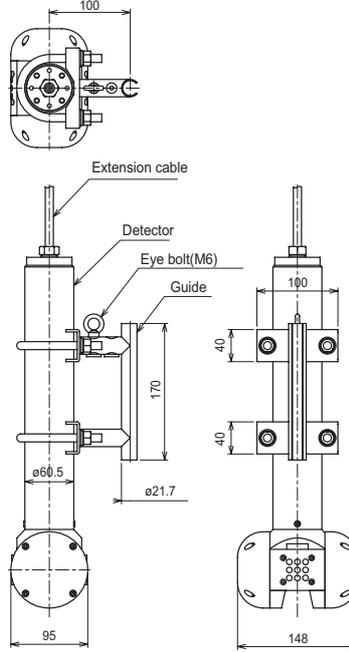
Dimensions

Unit : mm

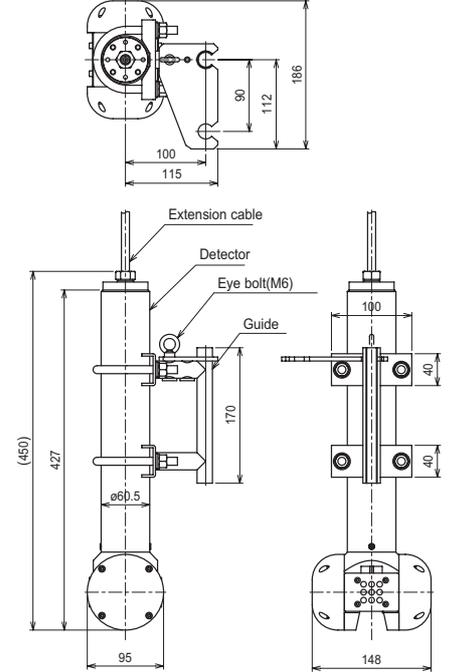
● Immersed type detector



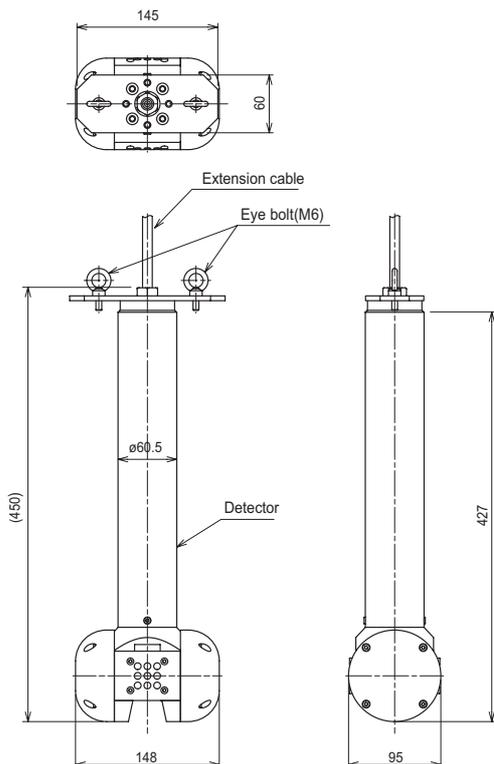
● Wind-up type detector
(1 guide pipe system)



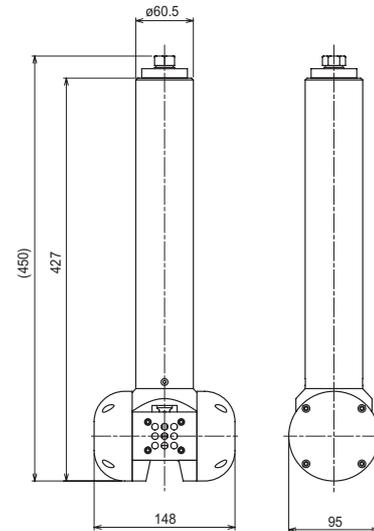
(2 guide pipe system)



● Hanging type detector



● Sampling type detector



Product code

● Immersed type

OPM1610-0-	□	□	□	□	□	□	□	
	1							Transmitter mounting
	3							50A pipe
								Wall
								Digital output
	0							None
	1							RS-485
	2							USB memory
								Arrester (power line/transmission line)
	0							None
	1							Included
								Hood for transmitter (sun shade)
	A							None (standard)
	B							Equipped
								Detector cell length
	1							25mm
	2							10mm
	3							6mm
								Installation
	0							No pole stand
	1							Pole stand (ZB1-1-B2: SUS304)
								Detector mounting *1
	A							Immersed type, 1.0m-length (one set of mounting brackets included)
	B							Immersed type, 1.5m-length (one set of mounting brackets included)
	C							Immersed type, 2.0m-length (two sets of mounting brackets included) *2
	D							Immersed type, 2.5m-length (two sets of mounting brackets included) *2
								Cable length (between transmitter and detector)
	2							5m
	3							10m
	8							Custom spec. (max. 30m)
								Markings
	1							Japanese (standard)
	2							English

Custom specification code:
 Numeric digit: 9
 Alphabet: Z

- *1. The condition of the sample water flow velocity for the immersed type must be 0.75m/sec or less. Make sure the length between the bottom of the mounting bracket and the top of the detector does not exceed 1.5m. In this case, use two sets of brackets to secure the detector.
 When the sample water flow velocity is 0.5m/sec or less, make sure the length between the bottom of the mounting bracket and the top of the detector does not exceed 2.0m. This case also requires the use of two sets of brackets to secure the detector.
 When the sample water flow velocity exceeds 0.75m/sec, install a dam or similar obstacle in the stream to lower the flow velocity.
- *2. When the detector length is 2.0m or more, use two sets of mounting brackets.

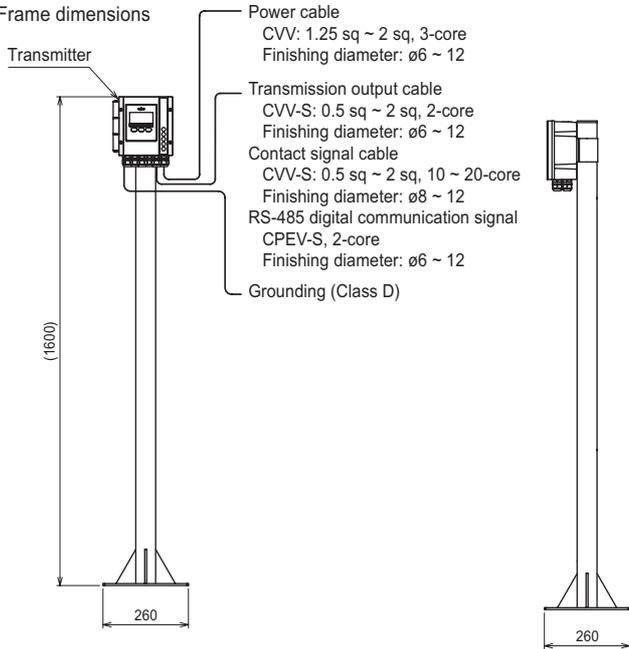
Notes

- 1: The transmission output range can be adjusted in 0.1Abs increments within a range of 0.5~2.5Abs.
 In the default factory configuration, the output signals for 0~1.0Abs are output at between 4~20mA, regardless of the cell length.
- 2: The user can select whether the absorbance is "Displayed" or "Not displayed" on a 10mm cell length conversion basis.
 In the factory default configuration, the absorbance is "Not displayed" on a 10 mm cell length conversion basis.
- 3: The unit is powered by an adjustable-voltage 100~240VAC power supply.
- 4: Any three of the following output signals can be selected: UV-VIS absorbance, UV absorbance, VIS absorbance, COD conversion value, turbidity conversion value, SS concentration conversion value, and sample temperature (4~20mADC).
- 5: When you replace existing equipment, the specifications for alarm contact output and other items for this unit might differ from the old unit. For details, please contact one of our sales representatives.

Installation diagram Unit : mm

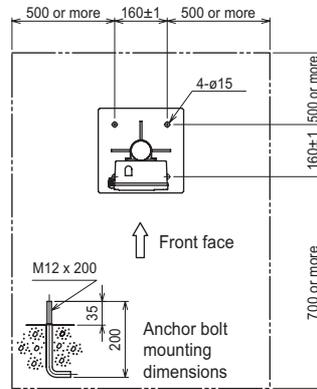
● **Wind-up type/Hanging type**

1. Frame dimensions



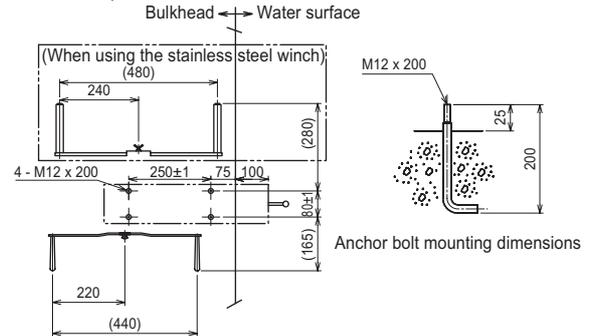
2. Frame mounting dimensions

Maintenance clearance and anchor bolt positions



3. Wind-up device mounting dimensions

Anchor bolt position

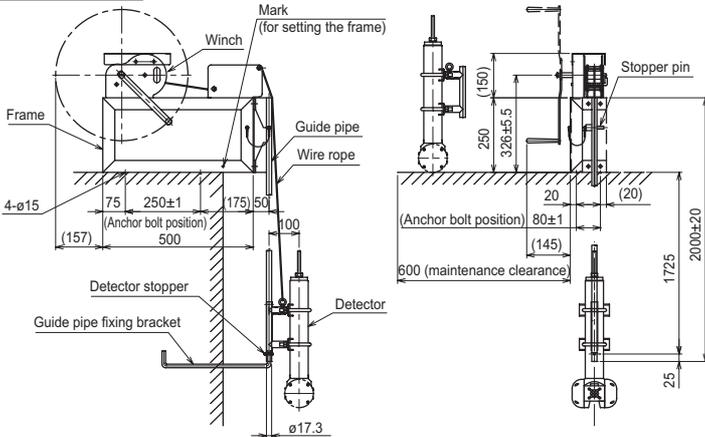


● **Wind-up device**

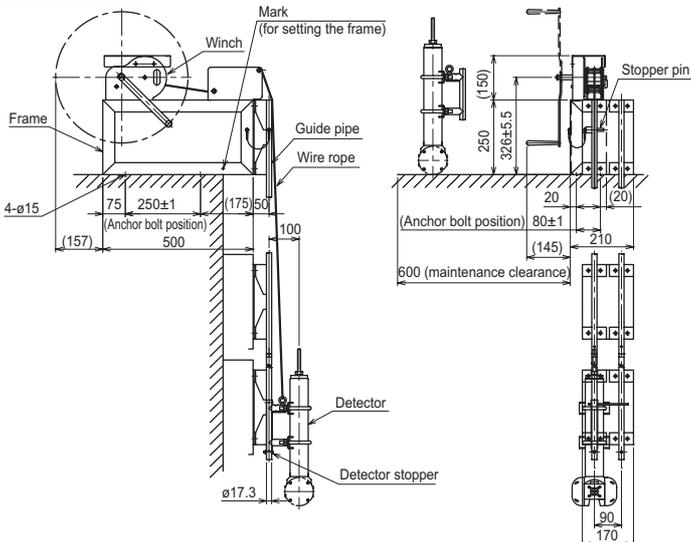
Wind-up device dimensions

(Example: Using 2m guide pipe
Notes: When using the stainless steel winch,
the handle and fixing positions are symmetric.)

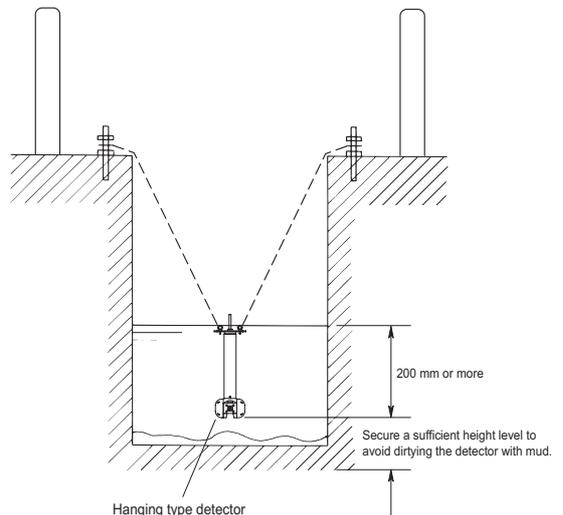
(1-guide pipe system)



(2-guide pipe system)



● **Hanging type**



Product code

● Wind-up type/Hanging type

OPM1610-0-	□	□	□	□	□	□	□	
	1							Transmitter mounting
	2							50A pipe
								Wall
								Digital output
	0							None
	1							RS-485
	2							USB memory
								Arrester (power line/transmission line)
	0							None
	1							Included
								Hood for transmitter (sun shade)
		A						None (standard)
		B						Equipped
								Detector cell length
			1					25 mm
			2					10 mm
			3					6 mm
								Installation
	0							No pole stand
	1							Pole stand (ZB1-1-B2: SUS304)
								Detector mounting *1
Custom specification code:								Wind-up device (1 guide pipe system), 2m *1
Numeric digit: 9								Wind-up device (1 guide pipe system), 3m *1
Alphabet: Z								Wind-up device (1 guide pipe system), 4m *1
								Wind-up device (2 guide pipe system), 2m *2
								Wind-up device (2 guide pipe system), 3m *2
								Wind-up device (2 guide pipe system), 4m *2
								Wind-up device (2 guide pipe system), 5m *2
								Wind-up device (2 guide pipe system), 6m *2
								Use existing wind-up device (1 guide pipe system) *3
								Use existing wind-up device (2 guide pipe system) *3
								Hanging type (two 3.5m chains included) *4
								Cable length (between transmitter and detector)
							2	5m
							3	10m
							8	Custom spec. (max. 30m)
								Markings
							1	Japanese (standard)
							2	English

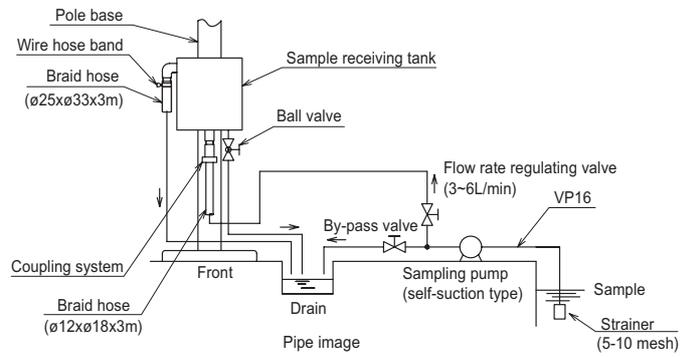
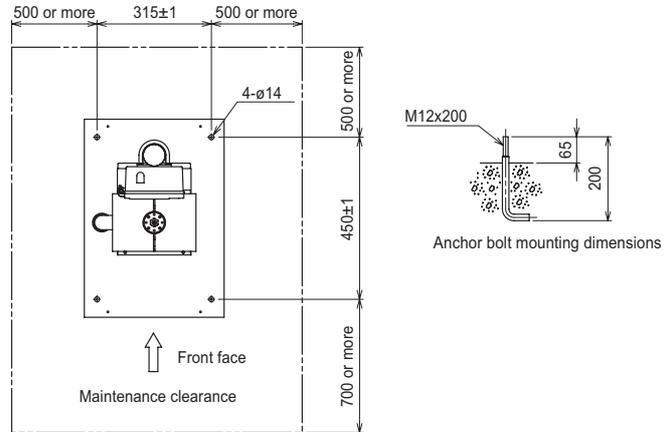
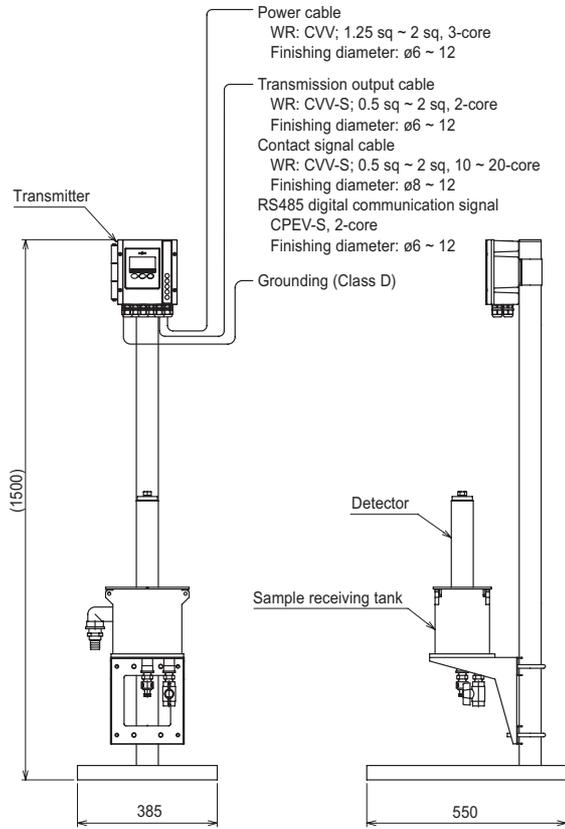
- *1. The condition of the sample water flow velocity for the wind-up device (1 guide pipe system) must be 0.75 m/sec or less. When the flow velocity exceeds 0.3m/sec, make sure to secure the lower end of the guide pipe before using the device. (See the installation diagram.)
- *2. The wind-up device (2 guide pipe system) must be used at a flow velocity of 1.0m/sec or less. Make sure to secure the guide pipes at multiple points along the pipes and at the lower end before using the device.
The frame of the wind-up device is made of SUS304 (coated). In custom specifications, a winch made of SUS can be selected. However, the position of the handle is reversed left to right. (Same for *1 and *2)
- *3. The existing wind-up device for OPM-410 / OPM-410A is used for mounting the detector.
- *4. The recommended method for simple installation is using two 3.5m chains to lower the detector. (Two eye bolts are supplied with the detector when this method is used.)
The flow velocity must be 0.75m/sec or less.

Notes

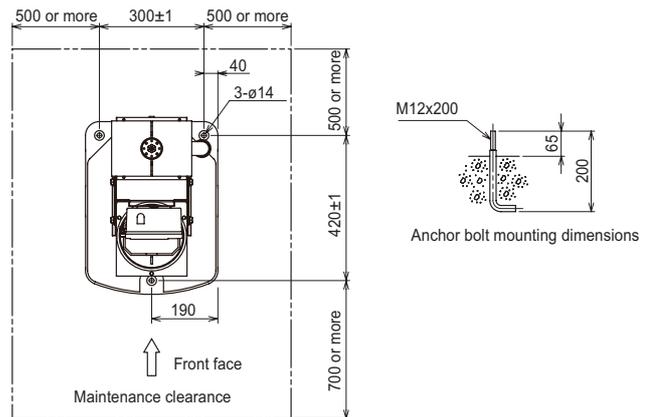
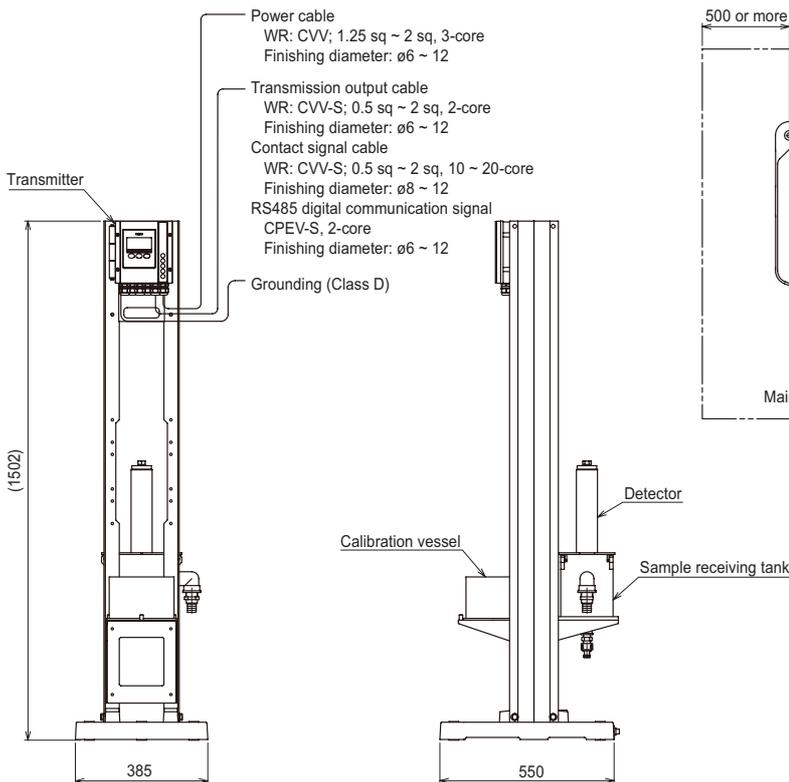
- 1: The transmission output range can be adjusted in 0.1Abs increments within a range of 0.5~2.5Abs.
In the default factory configuration, the output signals for 0~1.0Abs are output at between 4~20mA, regardless of the cell length.
- 2: The user can select whether the absorbance is "Displayed" or "Not displayed" on a 10mm cell length conversion basis.
In the factory default configuration, the absorbance is "Not displayed" on a 10mm cell length conversion basis.
- 3: The unit is powered by an adjustable-voltage 100~240VAC power supply.
- 4: Any three of the following output signals can be selected: UV-VIS absorbance, UV absorbance, VIS absorbance, COD conversion value, turbidity conversion value, SS concentration conversion value, and sample temperature (4~20mADC).
- 5: When you replace existing equipment, the specifications for alarm contact output and other items for this unit might differ from the old unit. For details, please contact one of our sales representatives.

Installation diagram Unit : mm

● Sampling type (mounted on pole stand)

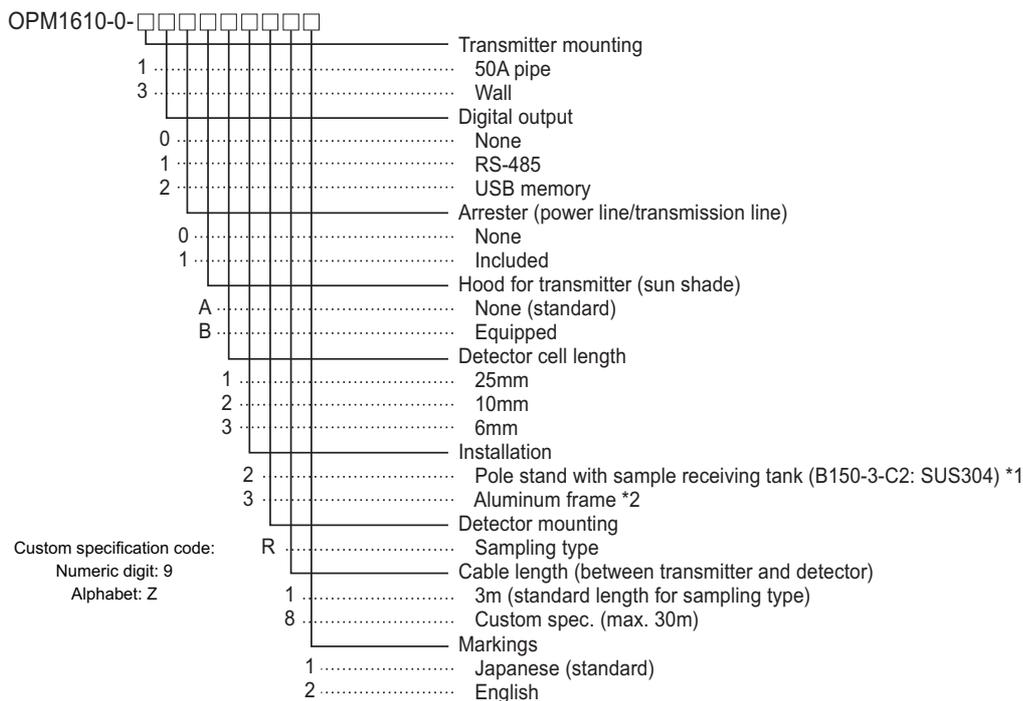


● Sampling type (mounted on aluminum frame)



Product code

● Sampling type



*1. A calibration vessel is equipped as a standard.

*2. The aluminum frame has the same dimensions as the base of our previous models (OPM-410 and OPM-410A). Thus, the frame of a previously released instrument can be used to replace the frame of this new instrument.

Notes

- 1: The transmission output range can be adjusted in 0.1 Abs increments within a range of 0.5~2.5Abs. In the default factory configuration, the output signals for 0~1.0 Abs are output at between 4~20mA, regardless of the cell length.
- 2: The user can select whether the absorbance is "Displayed" or "Not displayed" on a 10mm cell length conversion basis. In the factory default configuration, the absorbance is "Not displayed" on a 10mm cell length conversion basis.
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CAUTION

Do not operate products before consulting instruction manual.