

**H-1series Industrial Turbidity meter
HU-200TB**



Overview

This instrument consists of the HU-200TB converter and the SS-120A flow-through type turbidity detector. It uses a 90-degree light absorption-scattering method to accurately measure a wide range of turbidities from low turbidity to high turbidity. Formazin, Kaolin or Polystyrene Latex (PSL) can be selected as the standard turbidity agent. The SS-120A detector of the HU-200TB industrial turbidity meter uses two LED light sources (660nm) and two photo detectors to cancel out fluctuations in light intensity and changes in the sensitivity of the detector, providing stable measurement of turbidity. The electric wiper cleaning of the SS-120A detector automatically cleans away any impurities on the inside of the cell that may hinder measurement.

Measurement Target

Turbidity in solutions

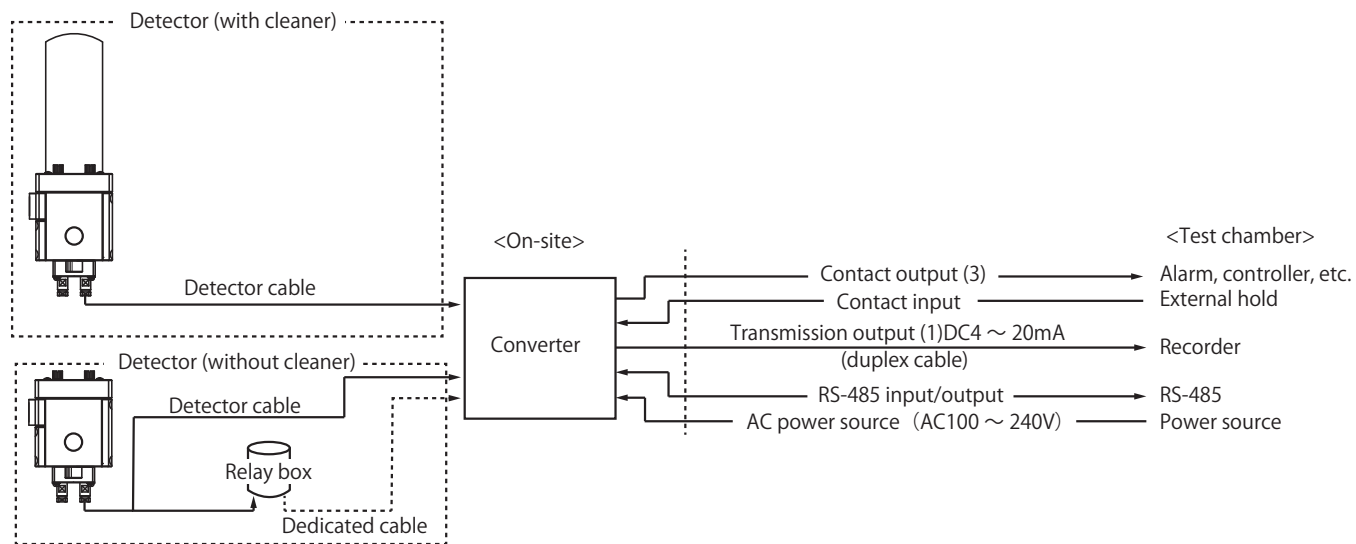
Measuring Principle

90-degree light absorption-scattering method

Use

Control and monitoring of drain water processing and production

System Configuration



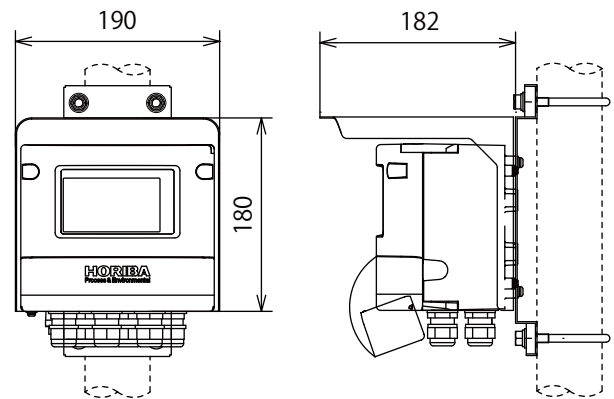
The detector cable can only be extended if the cleaner is not used. A relay box and relay cable are required. The maximum extendable length of the detector cable is 50m (including the detector cable itself.)

HU-200TB Turbidity meter(Overview-1)

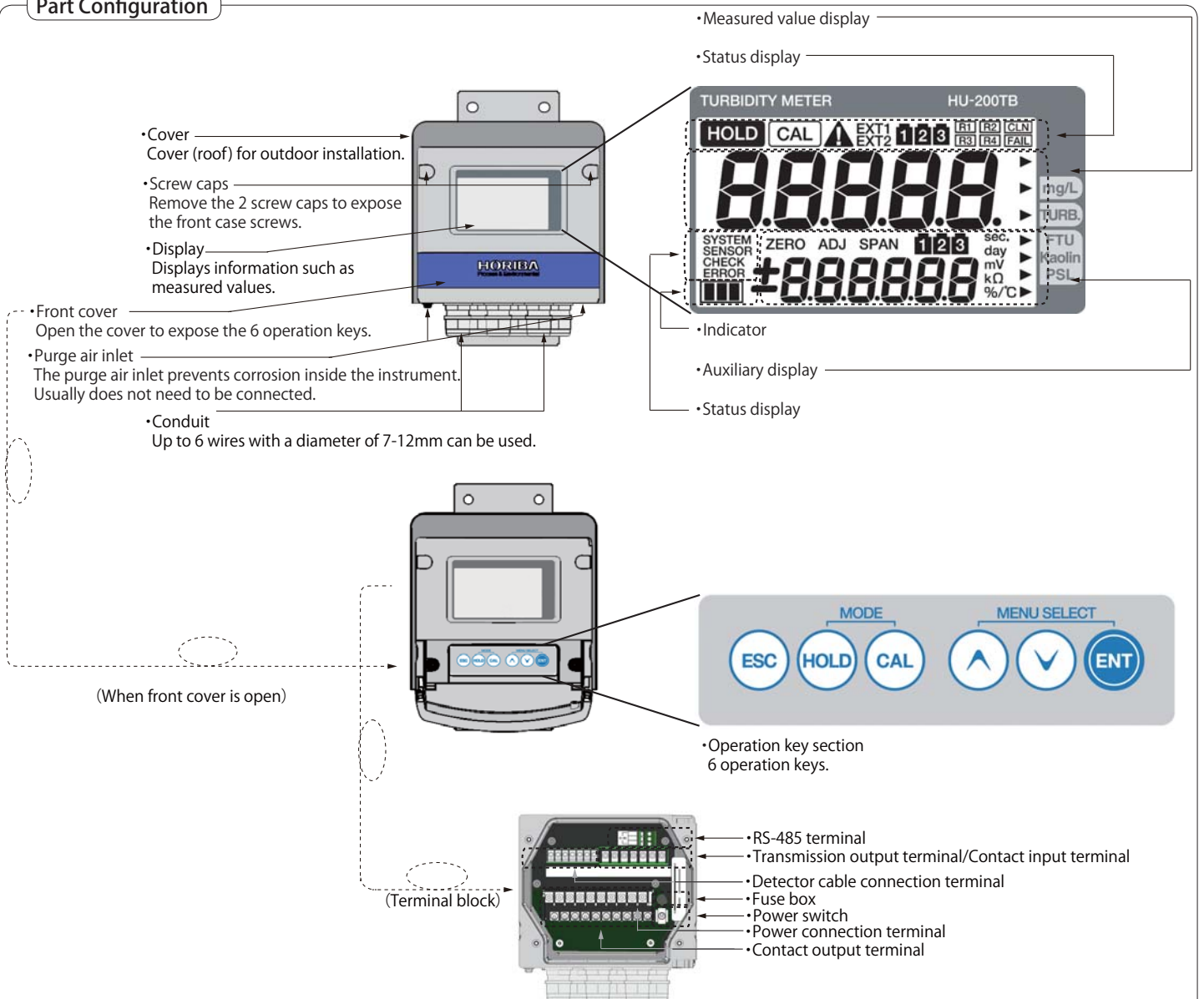
Features

- Rugged aluminum die cast
- Ample wiring space and terminal block that prevents drop-off of screws
- Outdoor installation type (drip-proof structure equivalent to IP65)
- Easily viewable display (150% larger than conventional models)
- All operations can be performed from front screen keys
- Self-diagnosis function and full range of other functions
- Free range settings for transmission output
- Calibration history memory
- The unique data calling of the detector allows measurement without instrumental error
- User-friendly key sheet

External Dimensions



Part Configuration



HU-200TB Turbidity meter(Overview-2)

Power Source

- This instrument has a power switch.
- The power source is a free power source with a rated voltage of AC100-240 V.

Transmission Output

- One transmission output (DC 4-20mA) is included.
- Maximum load resistance 900Ω.

Measuring Principle

Two LED light sources are used. While these flash alternately, the two detectors alternately detect transmitted light and scattered light.

While Light Source L1 flashes, D1 detects transmitted light and D2 detects scattered light. While Light Source L2 flashes, D1 detects scattered light and D2 detects transmitted light.

Flashing the light sources and extracting the difference between the lit and unlit signal cancels out influences from light in the surrounding area.

The obtainable signals are defined as follows.

Signal	Type	Light source	Detector
T1	Transmitted light	L1	D1
S1	Scattered light	L1	D2
T2	Transmitted light	L2	D2
S2	Scattered light	L2	D1

S1/T1 and S2/T2 are calculated from the obtainable signals. These values are then multiplied and the square root of the product is found.

$$S/T = (S1/T1 \times S2/T2)^{1/2}$$

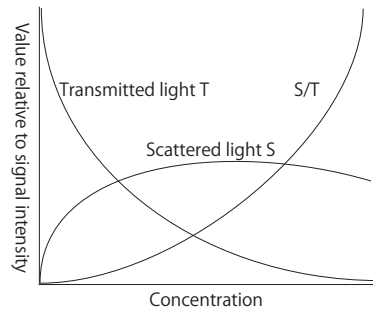
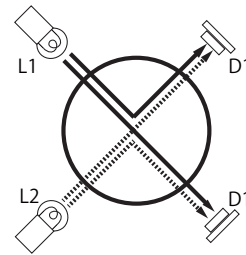
This S/T value cancels out light source fluctuations, detector fluctuations, and light attenuation caused by local impurities.

The S/T value of zero water measurements is remembered as S0/T0.

As (S/T - S0/T0) is a relative value, multiply by factor α to find a standard function value corresponding to the turbidity value when performing span calibration.

Contact Output

- Three contact outputs are included as a standard feature.
- The contact capacity is a maximum resistance value load of AC250V and 3A or DC30V and 3 A.



HU-200TB Turbidity meter(Overview-3)

Calibration

The following is an overview of calibration methods to maintain accuracy.

• Zero calibration

Zero calibration is an operation to make the clear water value zero.

The following calibration methods are recommended according to the level of turbidity.

If measuring water with low turbidity, such as tap water or pool water, it is difficult to store and calibrate zero water due to turbidity caused by air bubbles and deposits on the walls. Therefore, the recommended method is to perform zero calibration with a continuous flow of zero water filtered with an ultra filter.

Continuously run zero water and check that the indication has stabilized, then perform zero calibration when the turbidity value is at its lowest. If measuring water with a turbidity of 10 degrees or higher, such as drain water, water with the quality level of tap water can be used as zero water.

Store the zero water in the turbidity detector and check that the indication is stable, then perform zero calibration. Any impurities on the inside of the detector need to be cleaned off with a sponge, etc.

-Caution-

- Zero calibration cannot be performed with air inside the cell.
- Take care to ensure that air bubbles do not form when running zero water.
- Impurities in the pipeline may cause turbidity to increase.
- If a sample has a high salinity, filtered water with the same salinity may need to be used as zero water.

• Span calibration

A standard turbidity agent needs to be selected before span calibration.

Conventional standard turbidity agents are refined Kaolin powder and Formazin. Polystyrene Latex (PSL) is used for tap water. Purchase these standard turbidity agents commercially or use those supplied as supplementary goods by HORIBA. An optional span calibration bottle is also available for span calibrations. Using the span calibration bottle makes it possible to obtain an alternative signal to standard liquid simply by shaking the bottle firmly before attaching it.

However, it is not possible to perform span calibration simply by placing liquid with a known turbidity in the span calibration bottle and using the known turbidity value for calibration.

If using the span calibration bottle, first calibrate the turbidity meter with a standard turbidity agent before attaching the span calibration bottle. Verify the measured value displayed at this time and perform operations according to this value in subsequent span calibrations.

The liquid in the span calibration bottle consists of refined Kaolin and small amounts of a dispersant (sodium pyrophosphate) and a sterilizing agent (hydrogen peroxide).

Attach the span calibration bottle in the zero water.

The value of the span calibration bottle needs to be re-verified every year, as it is not constant.

Use a standard liquid with a turbidity of 2 degrees or higher for turbidity span calibrations.

A wide margin of error may occur if the standard liquid is near the zero point.

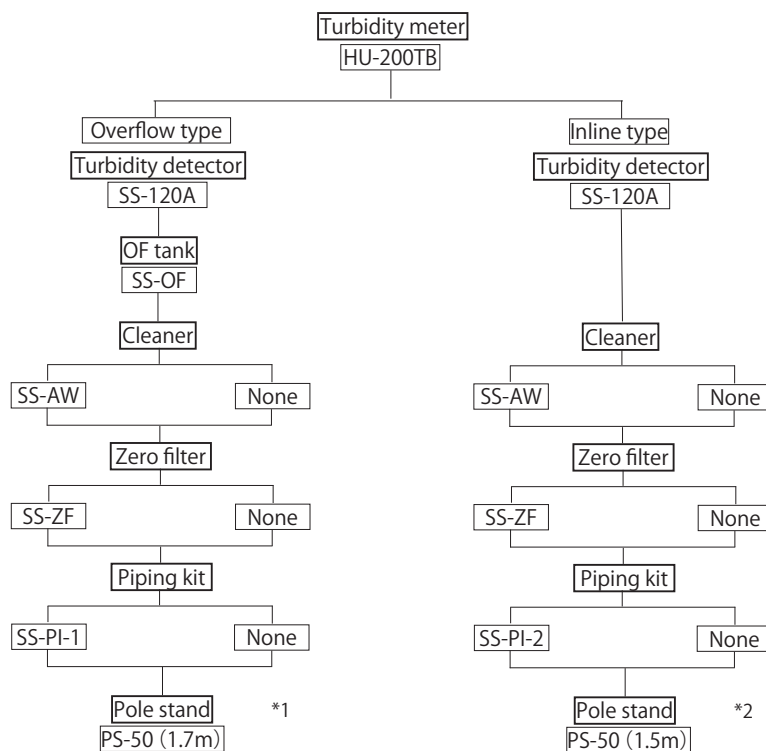
-Caution-

- Attach the span calibration bottle in the middle of the zero water. Calibration is not possible in air.
- The proper turbidity for the span calibration liquid solution is 0.3-0.9x the measurement range.
- Before span calibration, thoroughly clean the inside of the cell and rinse with clean water.

HU-200TB Turbidity meter(Combinations-1)

Below are combinations suitable for the specifications of products such as the converter and detector.
Refer to the section on each product for detailed specifications.

Combinations-1-

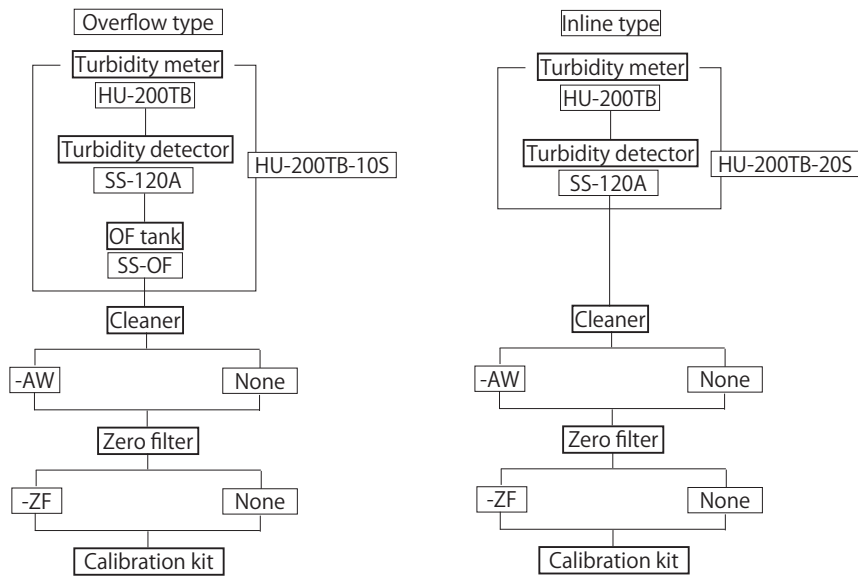


* 1: The length of the pole stand used differs for the overflow type and inline type.

*The instrument cannot be shipped with the products installed.

HU-200TB Turbidity meter(Combinations-2)

Combinations-2- (Stand type)



*: The turbidity meter, turbidity sensor, etc. are attached to the stand before shipping.

*: The required piping between instruments is completed before shipping.

Stand type Code

Overflow type

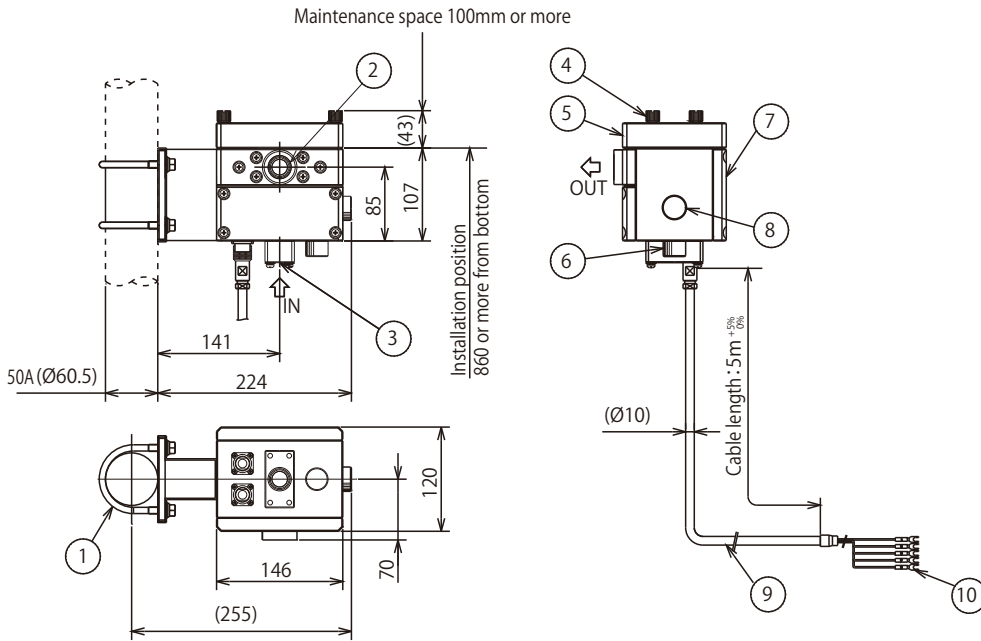
Model	Cleaner	Zero filter	Calibration agent	Notation	Special notes	Specifications
HU-200TB-10S	-AW					Cleaner included
	-0					Cleaner not included
		-ZF				Zero filter included
		-N3				Zero filter not included
			-0			Formazin (0-200)
			-FO			Formazin (special range)
			-KA			Kaolin
			-PSL			PSL
				-		Japanese notations and manual
				-E		English notations and manual
				-	No special specifications	
				-X6	Special notes included	

Inline type

Model	Cleaner	Zero filter	Calibration agent	Notation	Special notes	Specifications
HU-200TB-20S	-AW					Cleaner included
	-0					Cleaner not included
		-ZF				Zero filter included
		-N3				Zero filter not included
			-0			Formazin (0-200)
			-FO			Formazin (special range)
			-KA			Kaolin
			-PSL			PSL
				-		Japanese notations and manual
				-E		English notations and manual
				-	No special specifications	
				-X6	Special notes included	

HU-200TB Turbidity meter (External dimensions-2)

Turbidity detector (SS-120A)



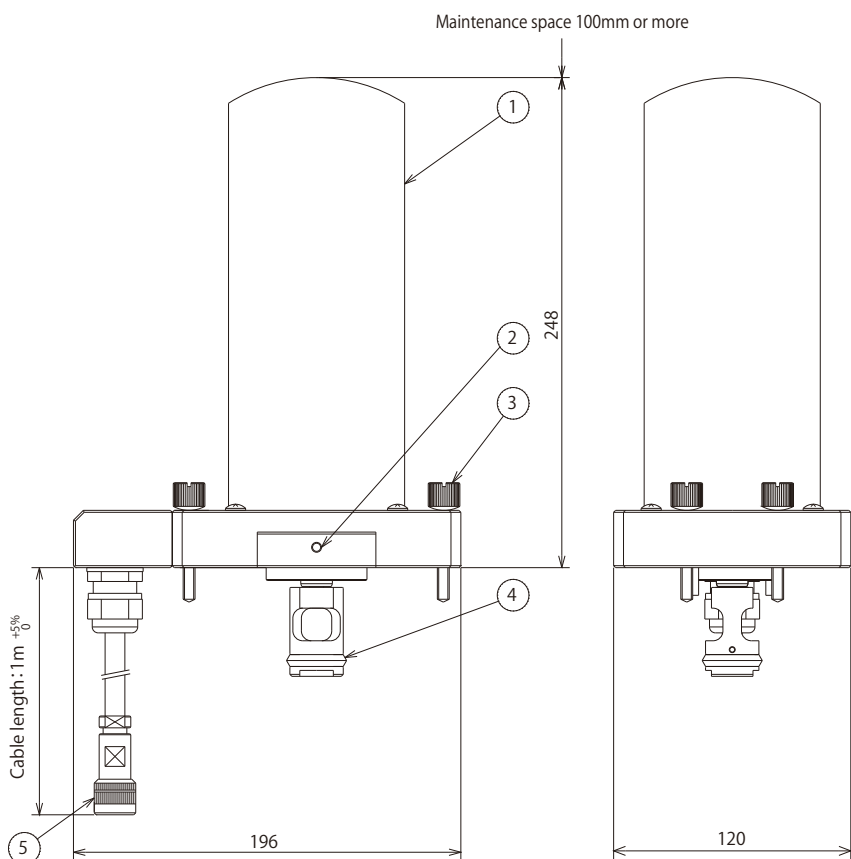
NO.	PARTS NAME	NOTES
1	U Bolt	SUS304 50A M8
2	Sample outlet	Rc3/4
3	Sample inlet	Rc3/4
4	Knurled knob	SUS304 M6
5	Cover	PVC
6	Holder	Desiccant holder
7	Sensor	SS-120A
8	Cover	PVC
9	Cable	PVC
10	Y Terminal	M3用

Specifications

Measuring principle	:2 light recourses, 90-degree transmission-scattering method
Light source	:Red LED 660 nm
Detector	:Silicon photo diode
Detection window	:Inside diameter f30 hard glass tube
Data transfer	:RS-485 (communication with converter)
Measured liquid temperature	: 0 ~ 45°C (no freezing)
Measured liquid pressure	: 0 ~ 0.3MPa
Material of wetted part	:PVC、SUS316、FKM、silicone rubber
Cable length	:5m (Standard)
Installation	:Screw hole diameter Rc3/4
Power source	:DC 12 V supply from HU-200TB converter
External dimensions	:131(W) × 450(H) × 224(D)
Mass	:approx 2.5kg

HU-200TB Turbidity meter (External dimensions-3)

Cleaner (SS-AW)

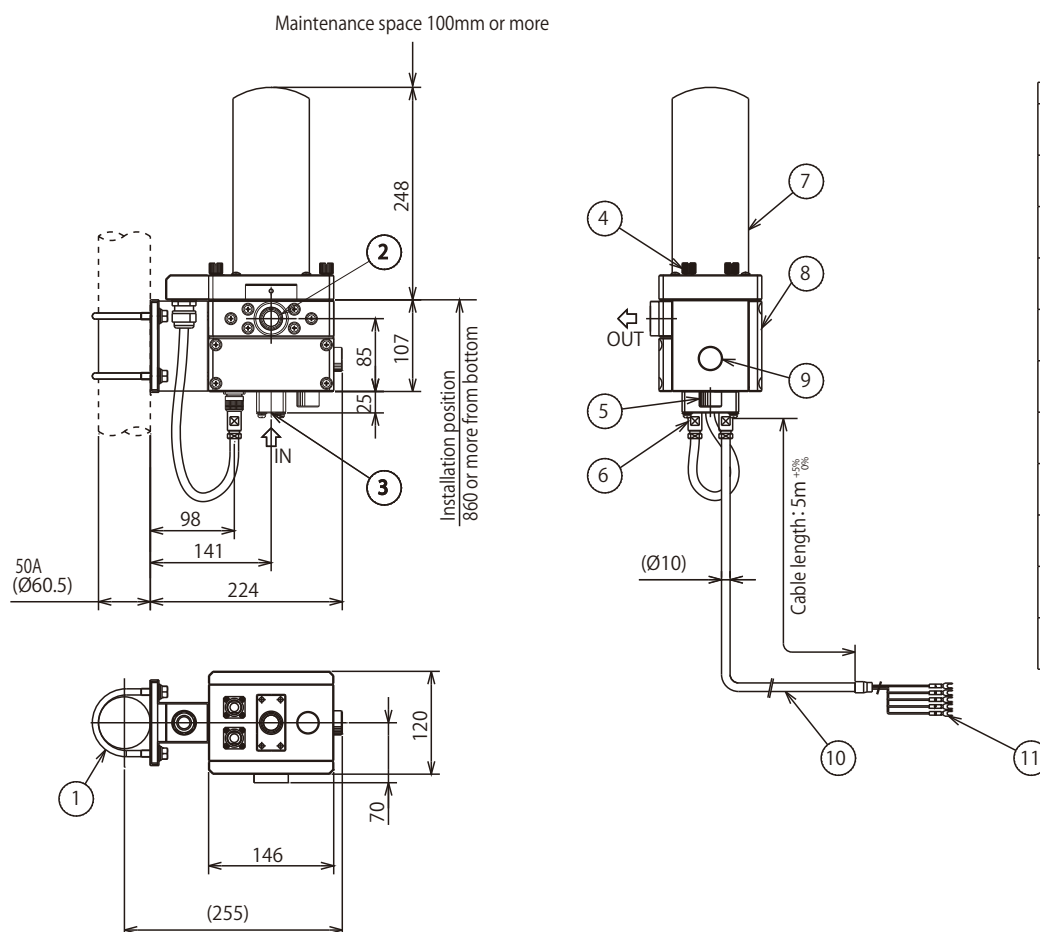


NO.	PARTS NAME	NOTES
1	Cover of the cleaning unit	SUS304
2	Pressure relief hole	
3	Knurled knob	SUS303 M6
4	Wiper blade	Q
5	Connector	Waterproof Connector

Specifications

- Cleaning method :Electric wiper cleaning
- Power source :DC12V 4W supply from HU-200TB converter
- Cleaning operation :Repeated piston motion throughout cleaning time
:Pistons enter standby at highest point after cleaning time has elapsed
- Measured liquid temperature :5 - 45°C (no freezing)
- Measured liquid pressure :0 - 0.3MPa
- Material of wetted part :SUS316, Q, PTFE
- Mass :approx. 2.5kg

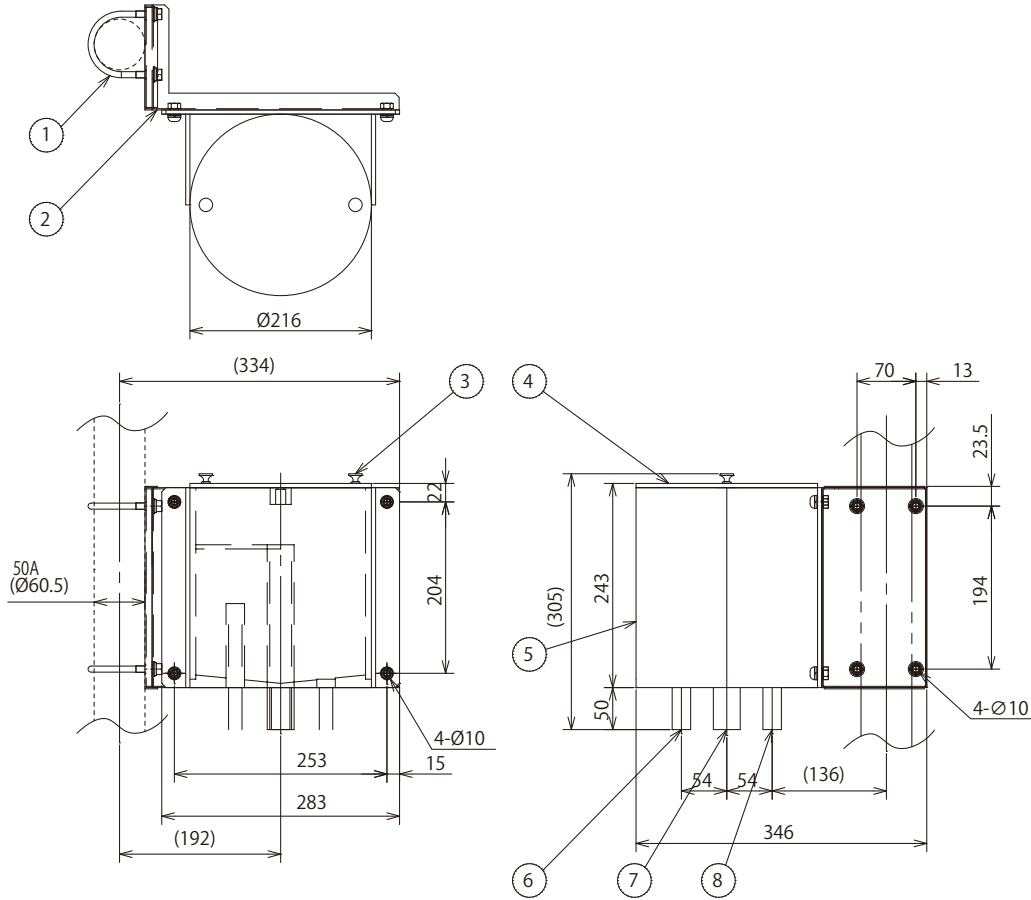
— Combination with Turbidity detector (SS-120A) —



NO.	PARTS NAME	NOTES
1	U-bolt	SUS304 50A M8
2	Sample outlet	PVC Rc3/4
3	Sample inlet	SUS316 Rc3/4
4	Knurled knob	SUS303 M6
5	Desiccant holder	PVC
6	Connector	Waterproof Connector
7	Cleaning unit	SS-AW
8	Sensor	SS-120
9	Cover	PVC
10	Cable	PVC
11	Y Terminal	for M3

HU-200TB Turbidity meter (External dimensions-4)

OF tank (SS-OF)

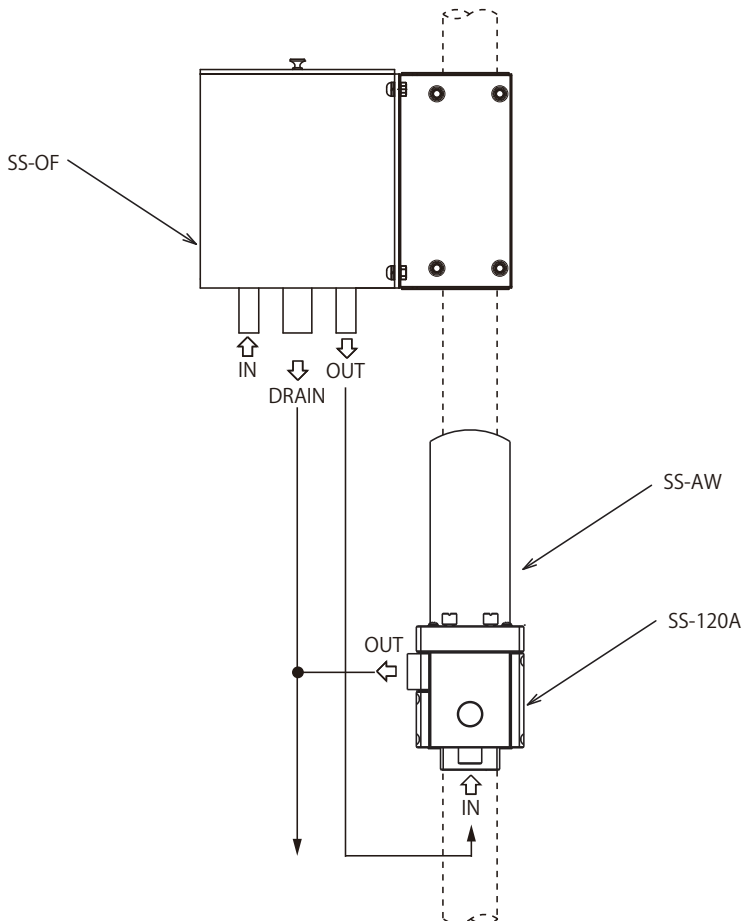


NO.	PARTS NAME	NOTES
1	U-bolt	SUS304 50A M8
2	OF rack	SUS304
3	NYLATCHES	PC
4	Cover	PVC
5	OF Tank	PVC
6	Sample inlet	PVC pipe 16A ($\varnothing 22 \times \varnothing 16$)
7	Sample drain	PVC pipe 25A ($\varnothing 32 \times \varnothing 25$)
8	Sample outlet	PVC pipe 16A ($\varnothing 22 \times \varnothing 16$)

Specifications
 Measured liquid temperature : 0 - 45°C (no freezing)
 Measured liquid pressure : 0.5MPa or less
 Liquid contact material : PVC
 Mass : approx. 2.5kg

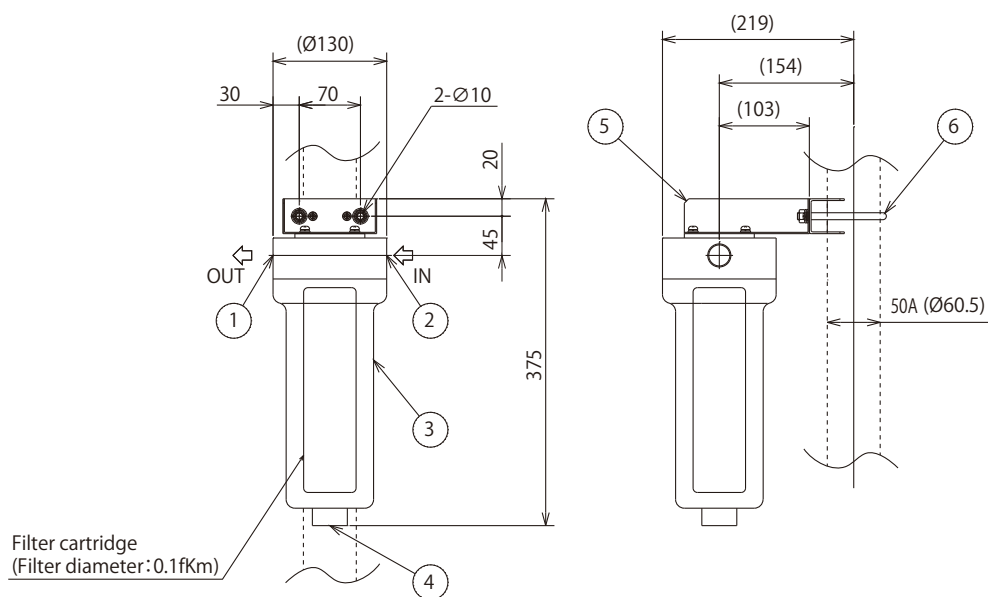
* : Can also be mounted to a wall.

— Combination with Turbidity detector (SS-120A) and Cleaner (SS-AW) —



HU-200TB Turbidity meter (External dimensions-5)

Zero filter — (SS-ZF)

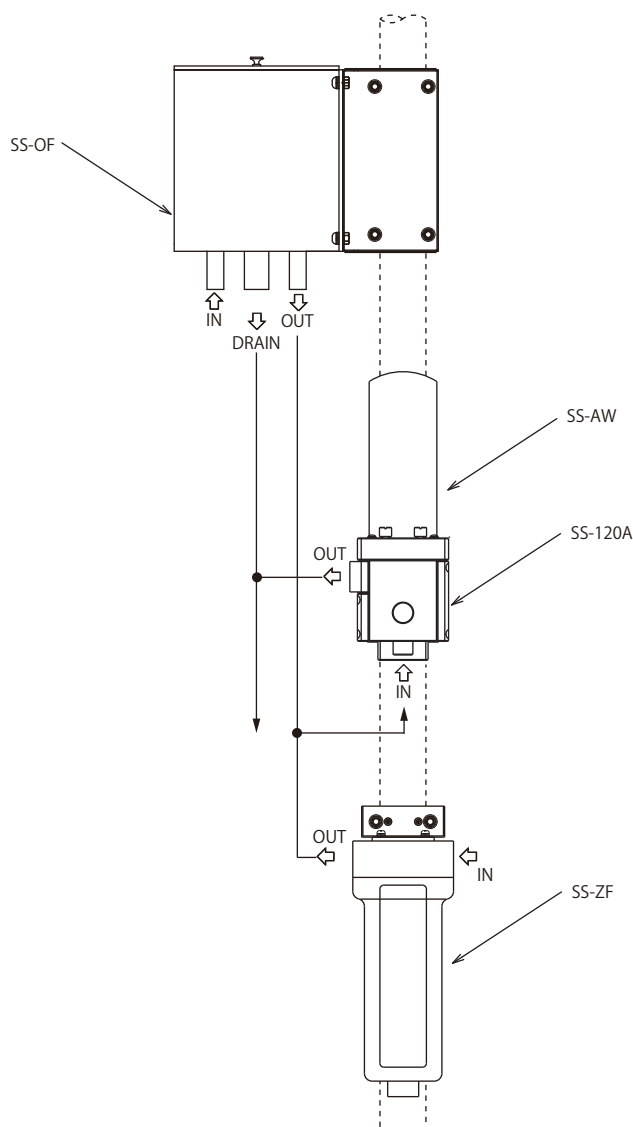


NO.	PARTS NAME	NOTES
1	Zero water outlet	PP Rc3/4
2	Zero water inlet	PP Rc3/4
3	Filter housing	PP,AS
4	Drain screw	PVC
5	Filter rack	SUS304
6	U-bolt	SUS304 50A M8

Specifications

- Measured liquid temperature : 0 - 45°C (no freezing)
- Measured liquid pressure : 0.5MPa or less
- Flow rate : 6L/min
- Liquid contact material : PP, AS resin, PVC, EPDM, polyurethane
- Mass : approx. 2.5kg

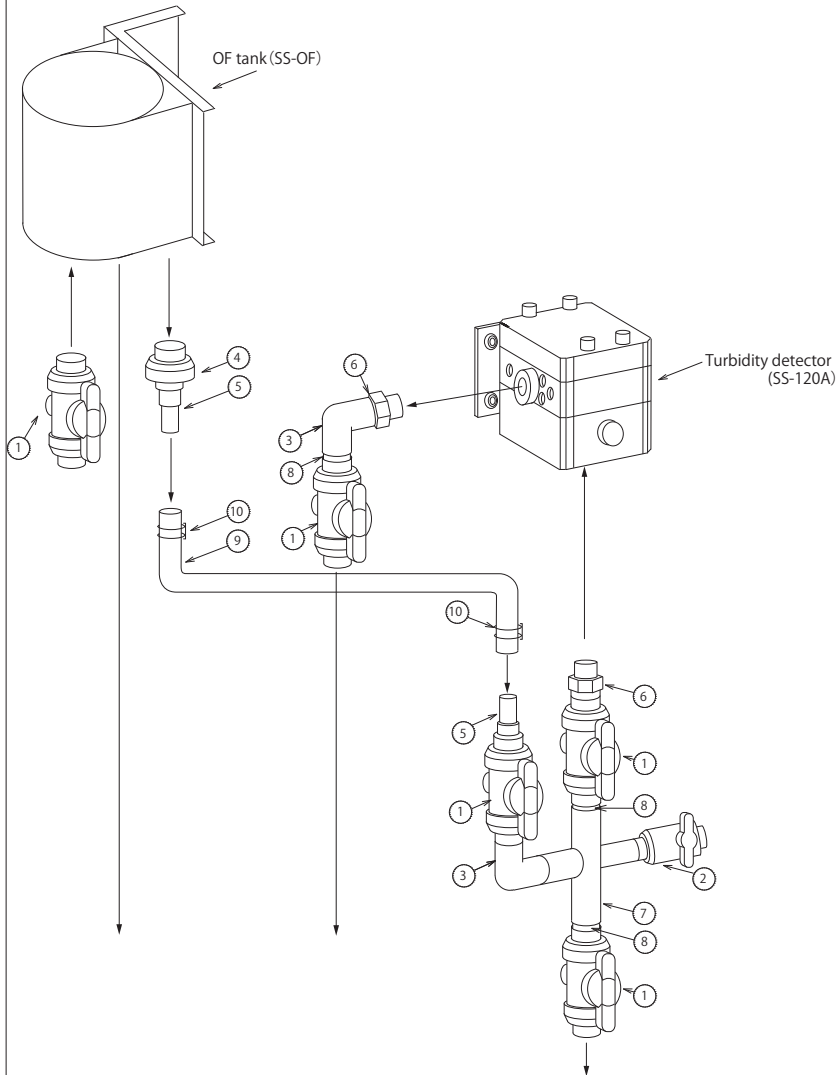
— Combination with Turbidity detector (SS-120A)、Cleaner (SS-AW) and Zero filter (SS-ZF) —



HU-200TB Turbidity meter (External dimensions-6)

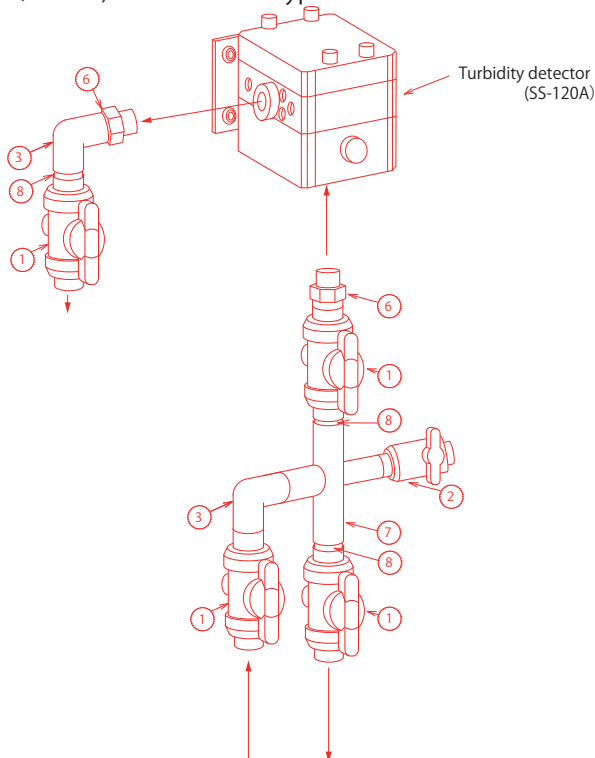
Piping kit (SS-PI-1/SS-PI-2)

— Piping kit (SS-PI-1) — for overflow type



No.	Name	Description	Quantity
1	Ball valve	Nominal diameter: 16A TS socket type	5
2	Ball valve	Nominal diameter: 13A TS socket type	1
3	Elbow	Nominal diameter: 16A Material: PVC	2
4	Prefab joint	PVCNominal diameter: 16A Material: PVC	1
5	Hose nipple	Hose diameter: ϕ 19 Material: PVC	2
6	Pipe socket	Rc3/4 Nominal pipe diameter: 16A Material: PVC	2
7	Tee	Nominal diameter: 16A TS socket type Nominal pipe diameter: 13A Material: PVC	1
8	Pipe	VP 16A (0.5m) Material: PVC	2
9	Blade hose	Hose diameter: ϕ 19*26 Material: PVC	2m
10	Hose band	Wire type Material: SUS304	2

— Piping kit (SS-PI-2) — for Inline Type

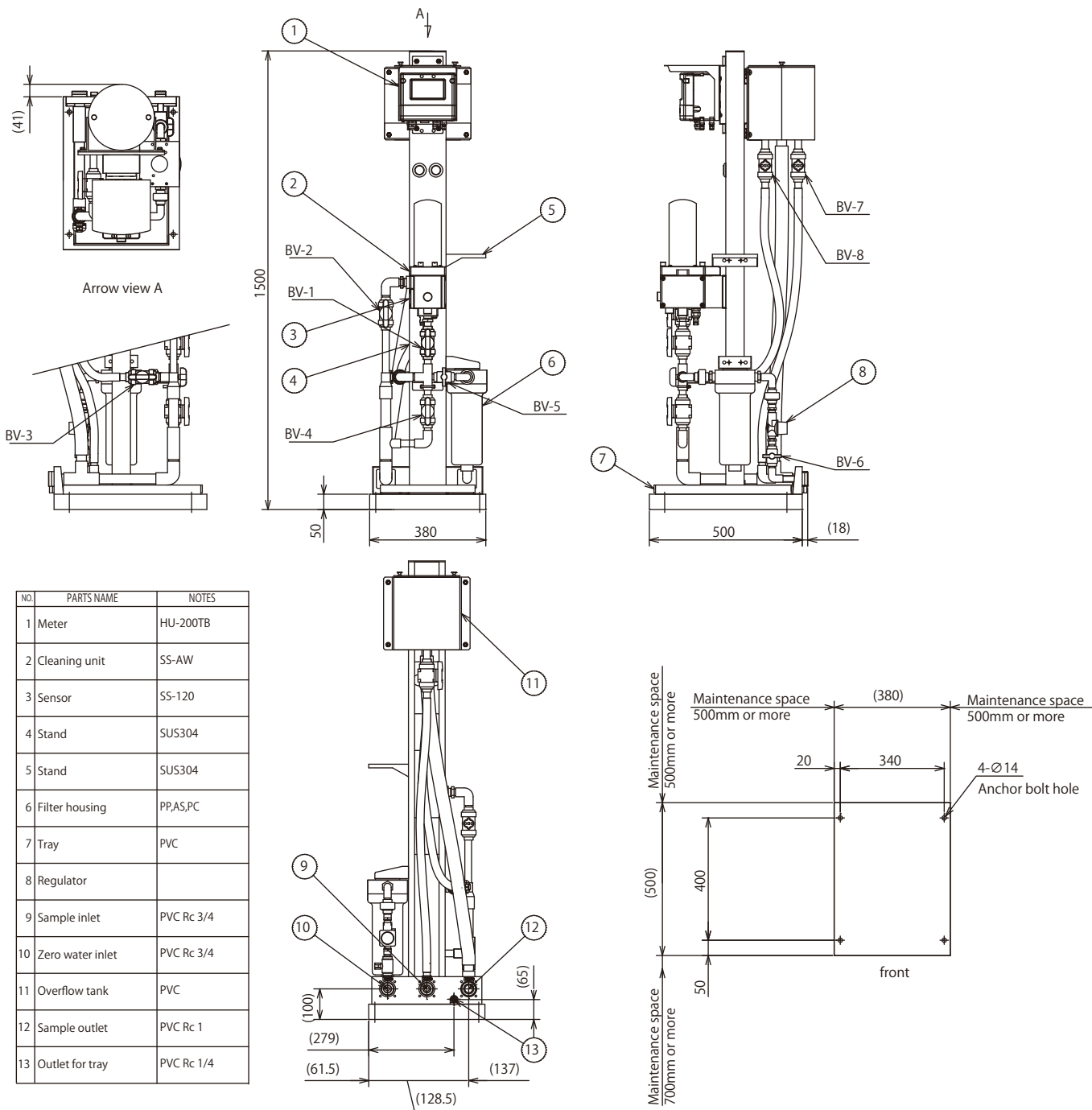


No.	Name	Description	Quantity
1	Ball valve	Nominal diameter: 16A TS socket type	4
2	Ball valve	Nominal diameter: 13A TS socket type	1
3	Elbow	Nominal diameter: 16A Material: PVC	2
6	Prefab joint	PVCNominal diameter: 16A Material: PVC	2
7	Tee	Nominal diameter: 16A TS socket type Nominal pipe diameter: 13A Material: PVC	1
8	Pipe	VP 16A (0.5m) Material: PVC	2

HU-200TB Turbidity meter (External dimensions-6)

Stand type (Overflow type : HU-200TB-10S-AW-ZF-0)

- The converter (HU-200TB), detector (SS-120A) and piping of this instrument type are attached to the stand.
- This sampling flow system measures using the fixed head overflow method.
- An optional automatic cleaner (SS-AW) and zero filter (SS-ZF) can be installed.

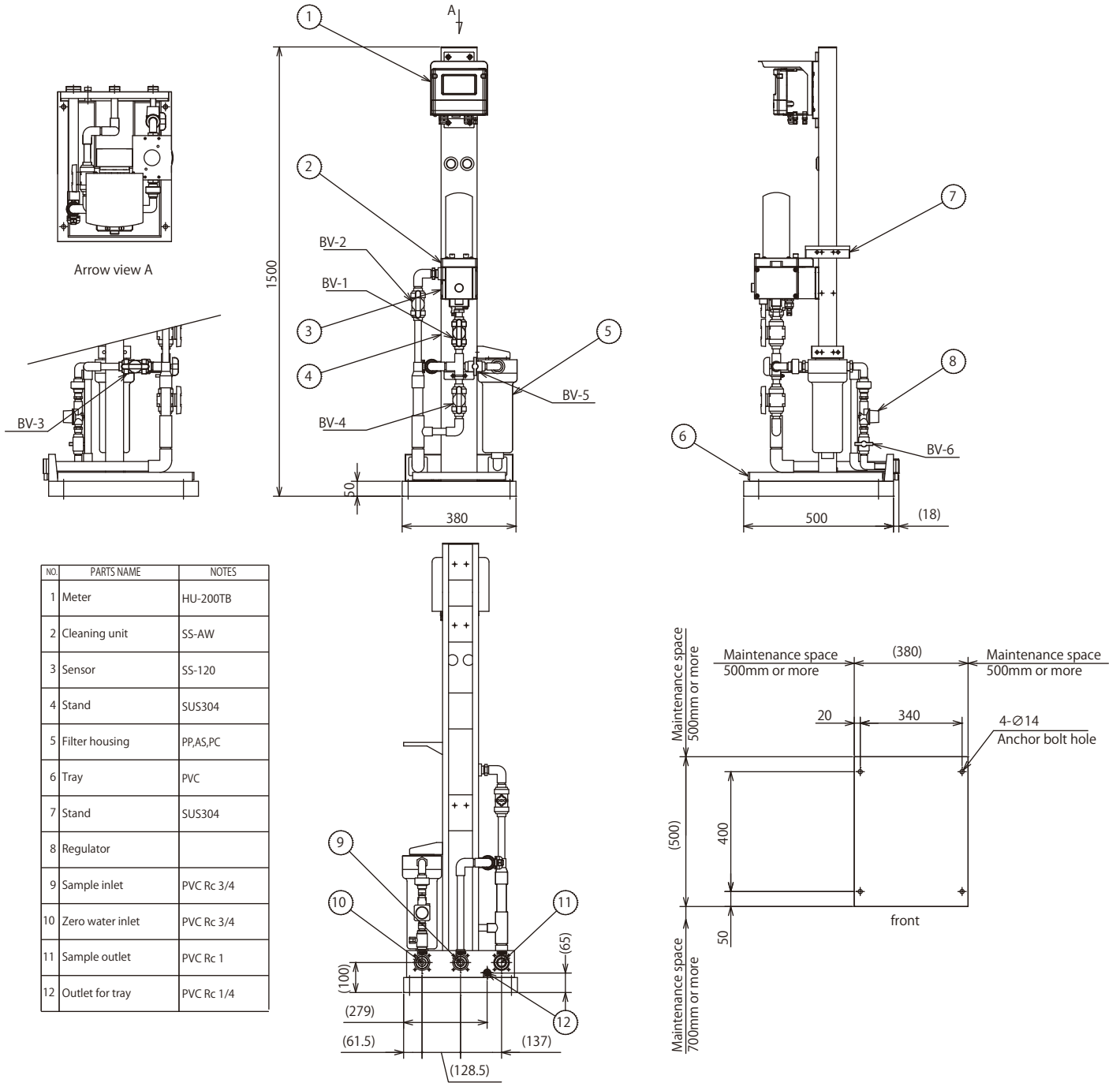


NO.	PARTS NAME	NOTES
1	Meter	HU-200TB
2	Cleaning unit	SS-AW
3	Sensor	SS-120
4	Stand	SUS304
5	Stand	SUS304
6	Filter housing	PP,AS,PC
7	Tray	PVC
8	Regulator	
9	Sample inlet	PVC Rc 3/4
10	Zero water inlet	PVC Rc 3/4
11	Overflow tank	PVC
12	Sample outlet	PVC Rc 1
13	Outlet for tray	PVC Rc 1/4

HU-200TB Turbidity meter (External dimensions-7)

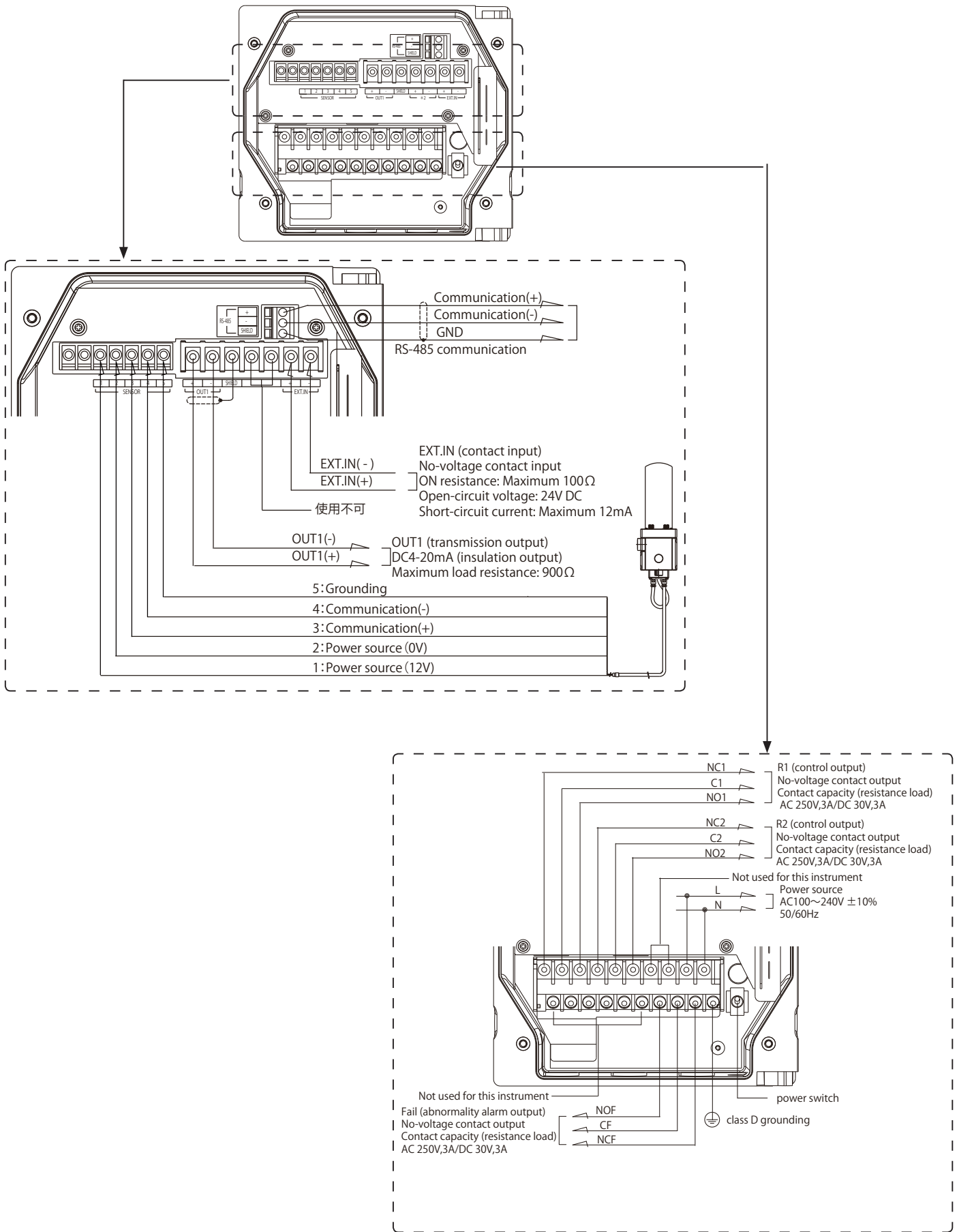
Stand type (Inline type : HU-200TB-20S-AW-ZF-0)

- The converter (HU-200TB), detector (SS-120A) and piping of this instrument type are attached to the stand.
- This sampling flow system measures while applying sample pressure to the detector (SS-120)
- An optional automatic cleaner (SS-AW) and zero filter (SS-ZF) can be installed.



HU-200TB Turbidity meter (External Connection Diagram)

Turbidity meter+Turbidity detector



HU-200TB Turbidity meter(Specifications-1)

Specifications-1- (Meter)

Product name	Industrial turbidity meter		
Converter type	HU-200TB industrial-use turbidity converter		
Detector type	SS-120 turbidity detector		
Measurable range	Kaolin	0 to 500 degrees (Display range: 0 to 1100 degrees)	
	Formazin	0 to 1000 degrees (Display range: 0 to 1100 degrees)	
	PSL	0 to 100 degrees (Display range: 0 to 125 degrees)	
Transmission output setting range	Kaolin	Arbitrary setting within the range from 0 to 1 degrees to 0 to 500	
	Formazin	Arbitrary setting within the range from 0 to 1 degrees to 0 to 1000	
	PSL	Arbitrary setting within the range from 0 to 1 degrees to 0 to 100	
Display resolution	0.01 degree (0 to 10 degree range) 0.1 degree (10 to 100 degree range) 1 degree (100 to 1000 degree range) Decimal point, fixed range or automatic range changeable selectable		
Performance	Repeatability	Within readings $\pm 2\%$ or ± 0.04 degrees, whichever is larger (Depend on span calibration jigs)	
	Linearity	The deviation at the mid-range point of span calibration values is within a calibration value $\pm 2\%$ or ± 0.04 degrees, whichever is larger.	
Transmission output	Number of output points	1	
	Output type	DC 4 to 20 mA, input/output insulation type	
	Load resistance	900 Ω maximum	
	Linearity	Within ± 0.08 mA (for output only)	
	Repeatability	Within ± 0.02 mA (for output only)	
	Error output	With the burnout capability (3.8 mA or 21 mA)	
	Hold capability	Either the last value hold or the arbitrary value hold is to be selected.	
Contact output	Number of output points	3	
	Output type	No-voltage contact output	
	Contact type	Relay contact, SPDT (1c)	
	Contact capacity	250 V AC, 3 A, 30 VDC, 3 A (resistance load)	
	Contact capability	R1, R2	Selectable from upper limit alarm, lower limit alarm, transmission output Hold, and cleaning output. (opened at alarm operation, closed usually, closed at power-off)
		FAIL	Error warning (normally closed; open when an error occurs; open when the power is turned OFF)
Description of alarm	Setting range: Turbidity, within measuring range Delay time: 0 s to 600 s		
Contact input	Number of input points	1	
	Contact type	No-voltage a contact for open collector	
	Condition	ON resistance: 100 Ω maximum Open-circuit voltage: 24 V DC Short-circuit current: 12 mA DC maximum	
	Contact capability	Can be selected from cleaning directives and transmission hold.	
Communication capability	Type	RS-485	
	Signal type	Two-wire input/output insulation type (not insulated from transmission output)	
Calibration	Calibration method	Zero calibration: by filtered clean water Span calibration: Turbidity adjustment method by coefficient input	
	Compatible standardsubstances	Kaolin, Formazin, PSL	
Cleaning function	Cleaning method	Electric wiper type (executes cleaning operation by communications with the converter)	
	Setting	Cleaning frequency	0.1 h to 168.0 h
		Cleaning time	20 s to 600 s
		Hold time	60 s to 600 s
Self-check	Sensor check error	Sensor error	
	Converter error	CPU abnormality, ADC abnormality, memory abnormality	
Operating temperature range	-20°C to 55°C (without freezing)		
Operating humidity range	Relative humidity: 5% to 90% (without due condensation)		
Storage temperature	-25°C to 65°C		
Power source	Power supply voltage range	90 V to 264 V AC, 50/60 Hz	
	Power consumption	35 VA (max.) when an automatic cleaner is connected.	
	Others	With the built-in time lag fuse (250 V,1 A) A power switch for maintenance is incorporated.	

HU-200TB Turbidity meter(Specifications-2)

Specifications-2- (Meter)

Applicable standards	CE marking		EMC Directives (2004/108/EC) EN61326-1:2006	
			Low Voltage Directives (2006/95/EC) EN61010 -1:2001	
	EMC	Immunity Industrial location	Electrostatic discharge	IEC61000-4-2
			Electromagnetic radiation radio frequency field	IEC61000-4-3
			Electric fast transient/burst	IEC61000-4-4
			Serge	IEC61000-4-5 (*1)
			Conduction obstruction induced by radio frequency	IEC61000-4-6
			Voltage dip, short time blackout, voltage variation	IEC61000-4-11
	Emission Class A	Radiation obstruction	CISPR 11 CLASS A	
		Noise terminal voltage	CISPR 11 CLASS A	
low voltage		Pollution degree 2		
FCC rules		Part15 CLASS A		
Structure	Installation		Outdoor installation type	
	Installation method		50 A pole-mounted or wall-mounted	
	Protection class		IP65	
	Material of case		Aluminum alloy (coated with epoxy modified melamine resin)	
	Material of mounting brackets		SUS304	
	Material of hood		SUS304 (epoxy glue degeneration melamine resin painting)	
	Material of display window		Polycarbonate	
Display element		Reflective monochrome LCD		
External dimensions	180 (W) x 155 (H) x 115 (D) mm (excluding brackets)			
Mass	Mainframe: approx. 3.5 kg, hood, bracket: approx. 1 kg			

*1: A surge test specified in EMC Directive for CE Marking shall not apply to the case when a sensor cable, a transmission cable, or a contact input cable is extended for 30 m or longer.

*2: An arrester (electric discharge voltage: 400 V) is provided for transmission output, contact input, and communications. However, incorporate and use an optimal surge absorber on the connected line according to ambient environment, equipment installation situations, and externally connected equipment, etc.

Specifications (Detector)

Product name	Industrial-use turbidity detector
Model	SS-120
Measuring principle	2 light sources, 90-degree transmission-scattering method
Light source	Light source
Detector	Silicon photo diode
Detection window	Inside diameter: 30 mm, hard glass tube
Data transfer	RS-485 (communication with converter)
Measured liquid	
temperature	5° C to 45° C (without freezing)
Measured liquid	
pressure	0 MPa to 0.3 MPa
Material of wetted part	PVC SUS316 FKM silicone rubber hard glass EPDM
Cable length	Standard attachment cable: 5 m
Installation	Screwing in bore size: Rc3/4
Power source	12 V DC supplied from HU-200TB converter
External dimensions	131 (W) mm × 450 (H) mm × 224 (D) mm
Mass	Mainframe: approx. 3.5 kg cleaner: 2.5 kg

Specifications (Cleaner)

Product name	Automatic cleaner
Cleaning method	Electric wiper
Power source	12 V DC, 4 W supplied from HU-200TB converter
Cleaning operation	Repeats the piston operation during cleaning time. Stands by at the uppermost point after cleaning time.
Cleaning directive	Operates by directives from the converter through communications.

*3: The cleaning time required for one cleaning changes depending on the pressure of the sample water. The cleaning time is about 30 s under the conditions of ambient air relief on the outlet side without pressure of sample water.

HU-200TB Turbidity meter(Specifications-3)

Power Source

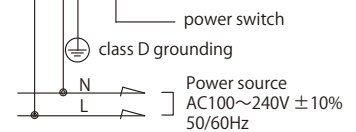
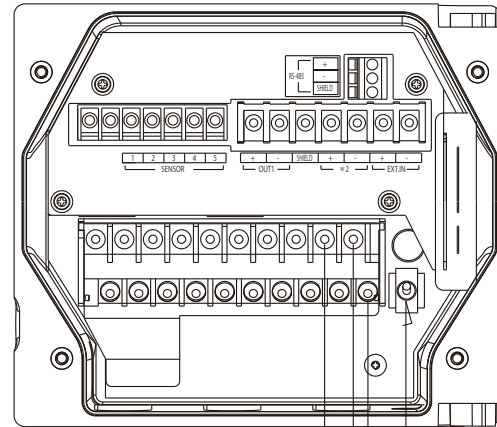
- The power source is a free power source with a rated voltage of AC100-240 V.
- Check the voltage of the power source, as operating at a voltage outside the rated range causes malfunction.
- Also, check that the range of fluctuations in supply voltage does not exceed $\pm 10\%$.
- This instrument has a power switch

Main Specifications

- The contact output terminal screws are M4 screws.
- The wire size is 0.75-5.5 mm² (AWG18-10).

Crimping	Wire size	Torque
	5.5mm ² /MAX (AWG10)	1.2~1.8 N·m

- Install the power switch near the instrument and ensure that the power source can be turned on and off.
- Install arresters on the output side and receiving instrument side of the instrument if there is a risk that it will be struck by lightning.
- For safety reasons, be sure to ground the earth terminal (class D grounding).
- Ground separately from electrical equipment such as the motor.



Main Specifications	
Power Source	AC100~240V 50/60Hz
Power consumption	35VA(Max)
Terminal screws	M4
Wire size	0.75~5.5mm ² (AWG18~10)

Transmission Output

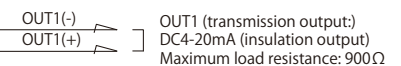
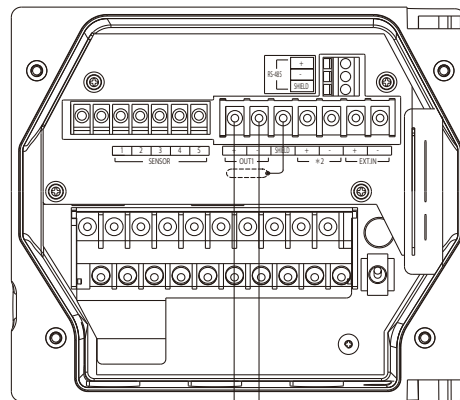
- One transmission output (DC 4-20mA) is included.
- If desired, a full-scale transmission output range can be set, as long as it is within the full scale setting range of the measured values.
- Also, set a burnout (transmission output: 3.8mA or 21mA). It is possible to set whether to temporarily hold the output value at the last value or a preset value when holding the transmission output during an external signal.

Main Specifications

- The transmission output terminal screws are M3.5 screws.
- The wire size is 2mm² (AWG14) max.

Crimping	Wire size	Torque
	2mm ² /MAX (AWG14)	0.8~1.2 N·m

- Use a twist pair shielded cable.
- Install arresters on the output side and receiving instrument side of the instrument if there is a risk that it will be struck by lightning.
- Make sure that the maximum resistance of the contact input is 100 Ω or less.



Main Specifications	
Transmission Output	DC 4 ~ 20mA
Maximum load resistance	900 Ω
Terminal screws	M3.5
Wire size	2mm ² (AWG14)

HU-200TB Turbidity meter(Specifications-4)

Contact Output

- Three contact outputs are included as a standard feature.
- The instrument includes contact outputs such as upper and lower limit alarms, error warnings and transmission output holds.

Main Specifications

- The contact capacity is a maximum resistance value load of AC250V and 3A or DC30V and 3A.
- The contact output terminal screws are M4 screws.
- The wire size is 0.75-5.5 mm² (AWG18-10).

Crimping	Wire size	Torque
	5.5mm ² /MAX (AWG10)	1.2~1.8 N·m

- Use a varistor or noise killer if noise occurs in the load.
- The NO and NC arrangement is reversed only in the case of fail output. For normal (non-fail) output, the CF-NOF contact is open and the CF-NCF contact is shorted. The C-NOF contact is shorted when the power is off.
- If connecting a load higher than the contact capacity or an inductive load (such as a motor or pump), be sure to connect the load through a power relay with a rating higher than that of the load.
- Take care when connecting a load, as the C-NC contact of R1-R2 is shorted when the power source of this instrument is off.

Main Specifications	
Contact capacity	Maximum of AC250V and 3A or DC30V and 3 A.
Alarm types	<ul style="list-style-type: none"> • Concentration alarm output • Hold output • Fail output, CLu output
Terminal screws	M4
Wire size	0.75~5.5mm ² (AWG18~10)

AL: Alarm output

This is output (turned on) and an alarm is activated after a delay period when the measured value is higher than the set value. The output immediately stops (is turned off) and the alarm is canceled when the measured value falls below the set value. The output delay time can be configured (0-600 seconds). (The above refers to upper limit operation. The reverse occurs in lower limit operation.)

HoLd: Holding output

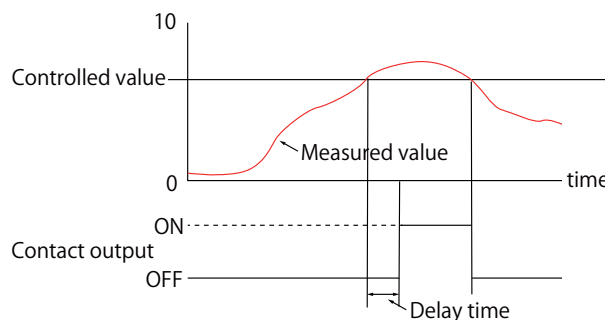
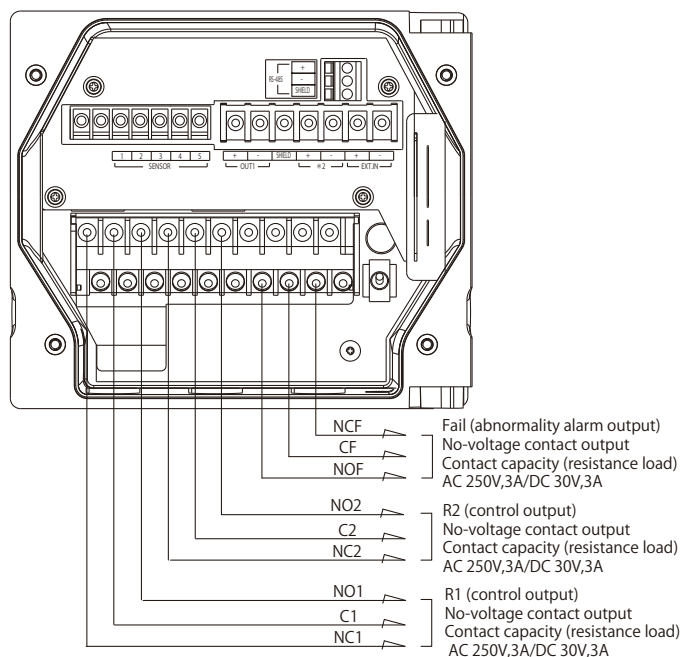
This is output (turned on) after a delay period when the measured value is held. The output immediately stops (is turned off) when the hold is released. The output delay time can be configured (0-600 seconds).

CLn: Cleaning output

A five-second contact signal is output (turned on) when the cleaner is in operation and when it stops.

FAIL: Fail output

Output when over full scale or in the event of a system error. Activated in cases such as an error in the instrument.



HU-200TB Turbidity meter(Specifications-5)

Contact Input

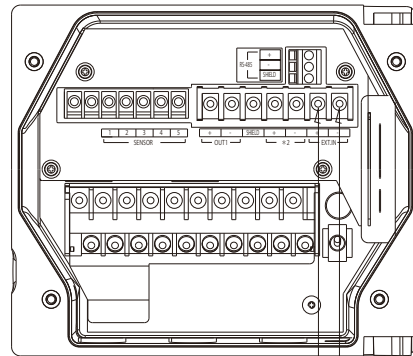
A contact input is included as a standard feature. The cleaner can be operated by an external signal.

Main Specifications

- The contact input terminal screws are M3.5 screws.
- The wire size is 0.14-2.5mm (AWG 26-AWG 14).

Crimping	Wire size	Torque
	2mm ² /MAX (AWG14)	0.8~1.2 N·m

- Use a twist pair shielded cable. Install arresters on the output side and receiving instrument side of the instrument if there is a risk that it will be struck by lightning.
- Make sure that the maximum resistance of the contact input is 100 Ω or less.



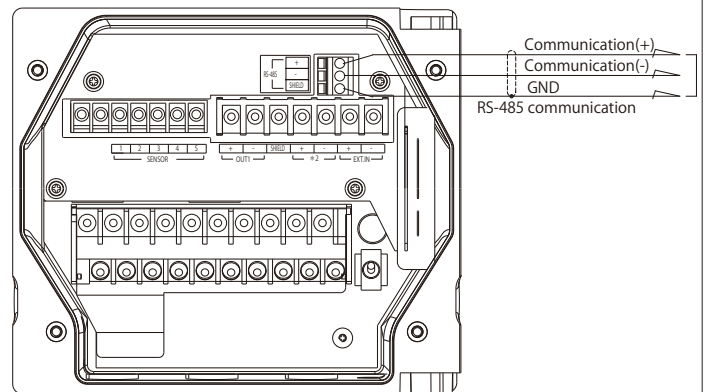
EXT.IN (contact input)
 No-voltage contact input
 ON resistance: Maximum 100Ω
 Open-circuit voltage: 24V DC
 Short-circuit current: Maximum 12mA

Main Specifications	
Contact input resistance	100 Ω or less
Terminal screws	M3.5
Wire size	0.14~2.5mm ² (AWG26~14)

RS-485

- This instrument includes the RS-485 communication terminal. Connect the wiring before using.
- The wire size is 0.14-2.5mm (AWG 26-14).
- Use a twist pair shielded cable for the communication output cable.
- Up to 32 terminals can be connected including the host computer. Set an address.
- The maximum cable length of the communication cable is 500 m.
- Provide termination resistance (Rt: 120 Ω) for instrument that is the terminus of the RS-485 communication line.

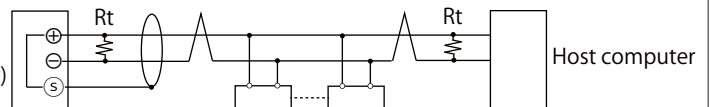
Crimping	Wire size	Torque
	0.14~2.5mm ² (AWG26~14)	0.5~0.6 N·m



RS-485 communication conditions	Baud rate	19200bps
	Character length	8bit
	Parity	non
	Stop bit	1bit

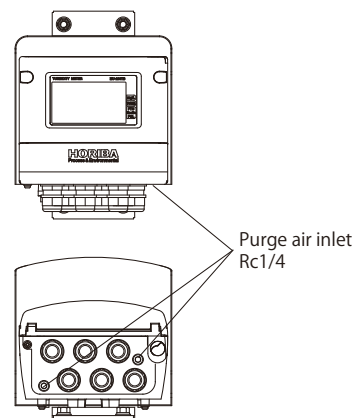
Example of external communication connection

This instrument: RS-485 (communication output)



Air Purge

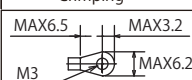
- There is a purge air inlet to prevent internal corrosion. If using in an environment with corrosive gas, instrumentation air is constantly passed through the instrument, preventing the corrosive gas from entering the instrument.

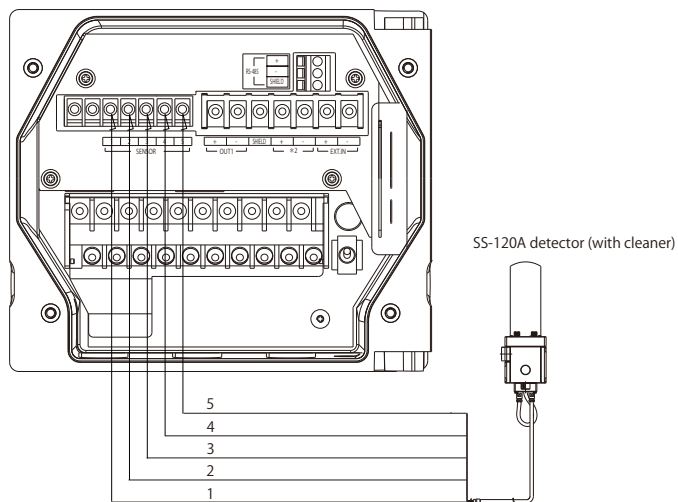


HU-200TB Turbidity meter(Specifications-6)

Detector

- Do not allow the detector cable terminal and terminal block to come into contact with liquids such as water or soil them with finger marks or oil from hands. This decreases insulation. A decrease in insulation causes indication to become unstable. Be sure to keep dry and clean. If soiled, wipe with alcohol etc. and dry well.
- Do not wire the detector cable or relay cable near equipment that supplies induction to parts such as the motor or the power cable of this equipment.

Crimping	Wire size	Torque
	1.25mm ² /MAX (AWG16)	0.8N·m



Detector	1 : Power terminal (+12V)
	2 : Power terminal (0V)
	3 : Communication terminal (+)
	4 : Communication terminal (-)
	5 : Grounding

Turbidity Detector Specifications

Product name	Industrial-use turbidity detector
Model	SS-120A
Measuring principle	2 light recourses, 90-degree transmission-scattering method
Light source	Red LED 660 nm
Detector	Silicon photo diode
Detection window	Inside diameter f30 hard glass tube
Data transfer	RS-485 (communication with converter)
Measured liquid temperature	5 - 45°C (no freezing)
Measured liquid pressure	0-0.3 MPa
Material of wetted part	PVC SUS316 FKM silicone rubber
Cable length	Standard provided cable:5 m
Installation	Screw hole diameter:Rc3/4
Power source	DC 12 V supply from HU-200TB converter
External dimensions	131(W) × 450(H) × 224(D)
Mass	Main unit: approx. 3.5kg

Cleaner Specifications

Product name	Cleaning unit for detector of industrial turbidity meter
Model	SS-AW
Cleaning method	Electric wiper cleaning
Power source	DC12V 4W supply from HU-200TB converter
Cleaning operation	Repeated piston motion throughout cleaning time Pistons enter standby at highest point after cleaning time has elapsed
Measured liquid temperature	5 - 45°C (no freezing)
Mass	Main unit: approx. 2.5kg

HU-200TB Turbidity meter(Installation-1)

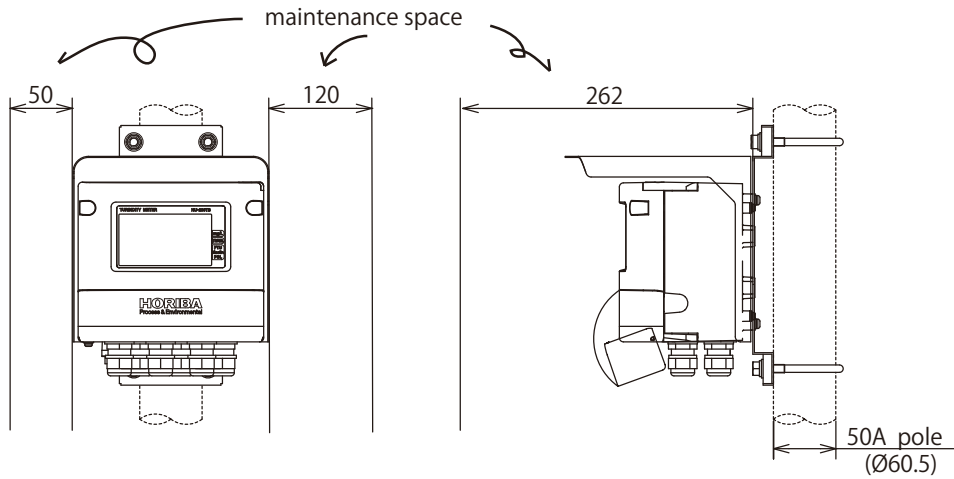
Converter

The following installation (mounting) uses the standard specifications.

- The main unit can be mounted to a pole or a wall.

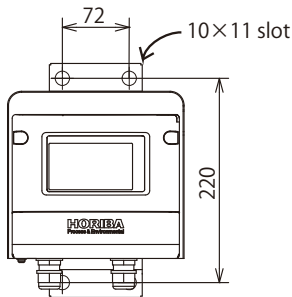
-mounted to a pole-

Consider maintenance space when installing.



-mounted to a pole or a wall-

Consider maintenance space when installing.



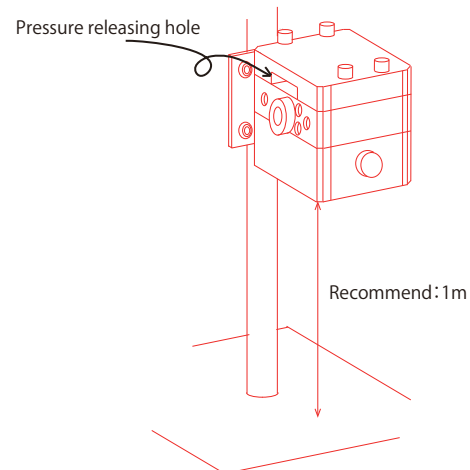
Detector

Mount to a 2 inch (50 A) pipe using the supplied U-bolt.
Can also be mounted to a wall.)

Installing the detector (SS-120A) at a height of approximately 1 m makes operation easier.

Mount the (optional) stand for temporarily placing the (optional) cleaner when it is removed at the top of the same pipe.

Small droplets will fall from the pressure releasing hole of the cleaner. Guide these to a suitable place using a tube.

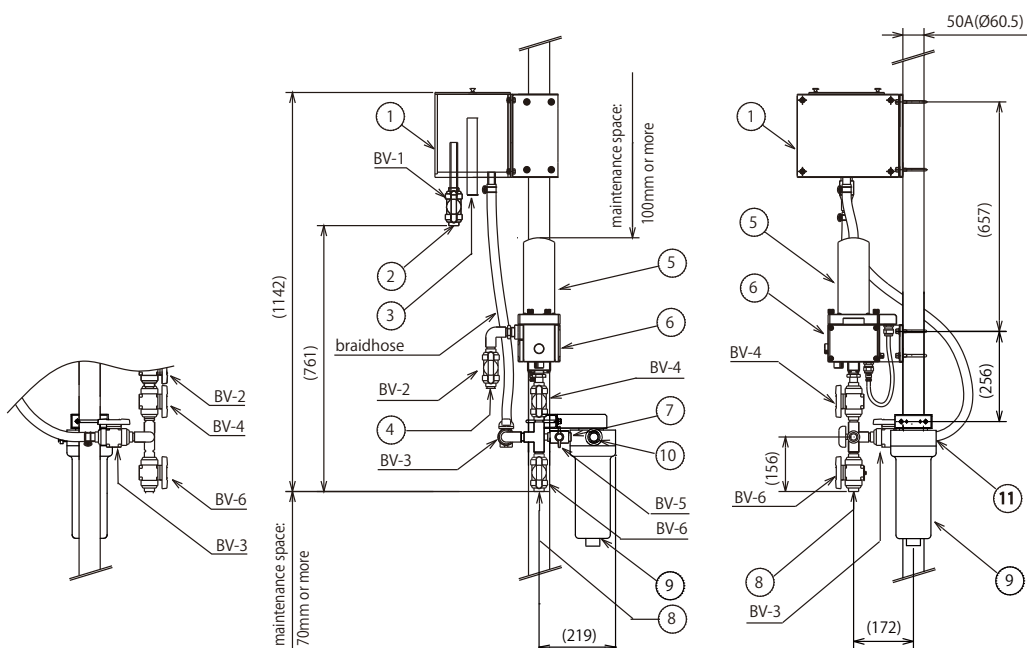


HU-200TB Turbidity meter(Installation-2)

Overflow type

This sampling flow system measures using the fixed head overflow method.

- Zero calibration can be performed by stopping the sample water and running zero water (tap water) to the detector (SS-120A).
- If using tap water (as zero water), directly supplying tap water from the water supply is prohibited by the Supply Act. Insulate from the general supply pipe using equipment such as a tank unit for cleaning sensors. Also, use a heat-insulated pipe if there is a risk that the tap water will freeze.
- If there is a large number of air bubbles in the sample water line, install the piping so that the flow rate at the outlet of the sample line can be restricted.
- Tightening the valve on the sample water inlet side creates small air bubbles in the sample. Caution is required.
- Avoid installing in an area with large amounts of vibration.



NO.	PARTS NAME	NOTES
1	OF tank	SS-OF
2	Sample inlet	
3	Sample drain	
4	Sample outlet	
5	Cleaning unit	SS-AW
6	Sensor	SS-120A
7	Zero water inlet	
8	Sample / Zero water drain	
9	Filter	SS-ZF
10	Zero water outlet	
11	other tap water inlet	

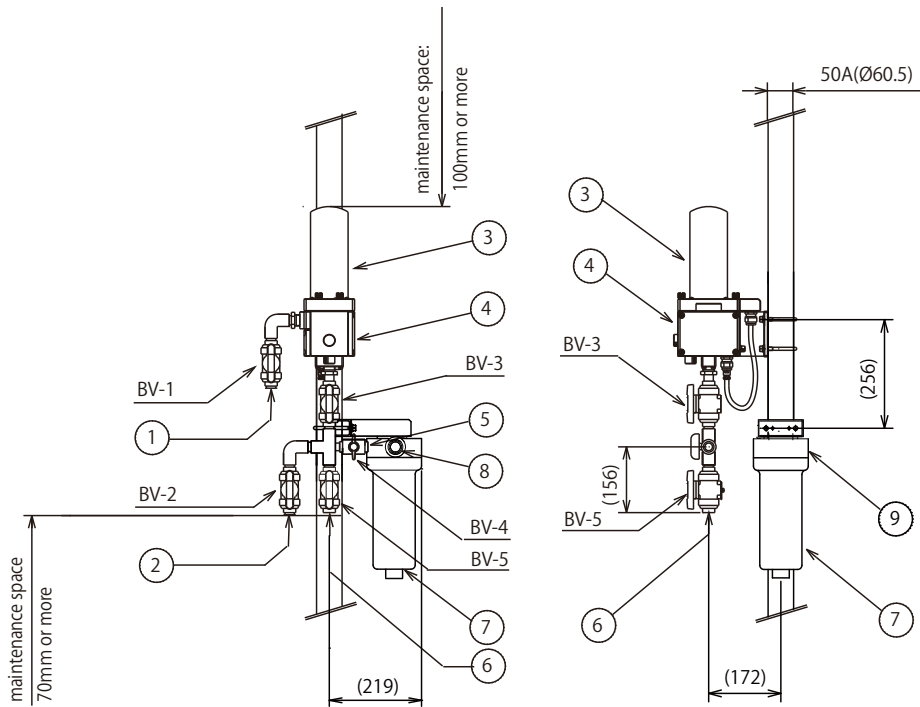
NO.	PARTS NAME	NOTES
BV-1	Sample inlet	Prefab joint PVC TS 16A
BV-2	Sample outlet	
BV-3	OF tank	
BV-4	Sample / Zero water	
BV-5	Zero water inlet	Compact ball valve PVC TS 13A
BV-6	Sample / Zero water drain	Prefab joint PVC TS 16A

HU-200TB Turbidity meter(Installation-3)

Inline type

This sampling flow system measures while applying sample pressure to the detector (SS-120A)

- Zero calibration can be performed by stopping the sample water and running zero water (tap water) to the detector (SS-120A).
- If using tap water (as zero water), directly supplying tap water from the water supply is prohibited by the Supply Act. Insulate from the general supply pipe using equipment such as a tank unit for cleaning sensors. Also, use a heat-insulated pipe if there is a risk that the tap water will freeze.
- If there is a large number of air bubbles in the sample water line, install the piping so that the flow rate at the outlet of the sample line can be restricted.
- Tightening the valve on the sample water inlet side creates small air bubbles in the sample. Caution is required.
- Avoid installing in an area with large amounts of vibration.



NO.	PARTS NAME	NOTES
1	Sample outlet	
2	Sample inlet	
3	Cleaning unit	SS-AW
4	Sensor	SS-120A
5	Zero water inlet	
6	Sample / Zero water drain	
7	Filter	SS-ZF
8	Zero water outlet	
9	other tap water inlet	

NO.	PARTS NAME	NOTES
BV-1	Sample / Zero water outlet	Prefab joint PVC TS 16A
BV-2	Sample inlet	
BV-3	Sample / Zero water inlet	
BV-4	Zero water inlet	Compact ball valve PVC TS 13A
BV-5	Sample / Zero water drain	Prefab joint PVC TS 16A


HU-200TB Turbidity meter(Installation-4)

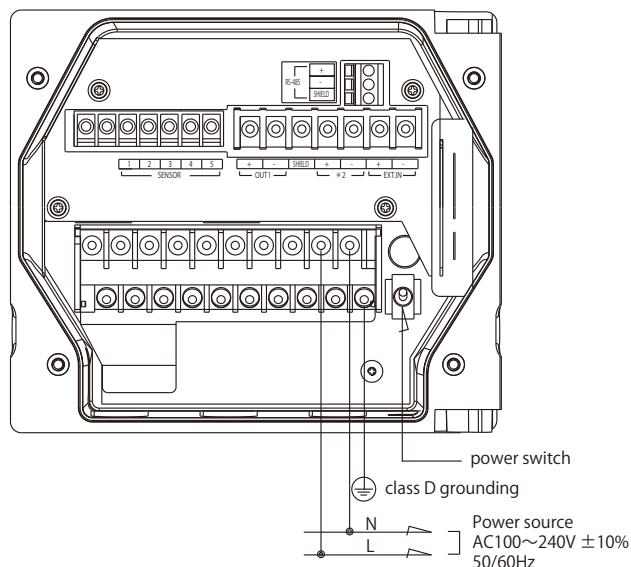
Power Source

- The power source is a free power source with a rated voltage of AC100-240 V.
- Check the voltage of the power source, as operating at a voltage outside the rated range causes malfunction.
- Also, check that the range of fluctuations in supply voltage does not exceed $\pm 10\%$.
- This instrument has a power switch

Main Specifications

- The contact output terminal screws are M4 screws.
- The wire size is 0.75-5.5 mm² (AWG18-10).
- Install the power switch near the instrument and ensure that the power source can be turned on and off.
- Install arresters on the output side and receiving instrument side of the instrument if there is a risk that it will be struck by lightning.
- For safety reasons, be sure to ground the earth terminal (class D grounding).
- Ground separately from electrical equipment such as the motor.

Crimping	Wire size	Torque
	5.5mm ² /MAX (AWG10)	1.2~1.8 N·m

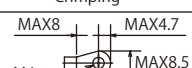


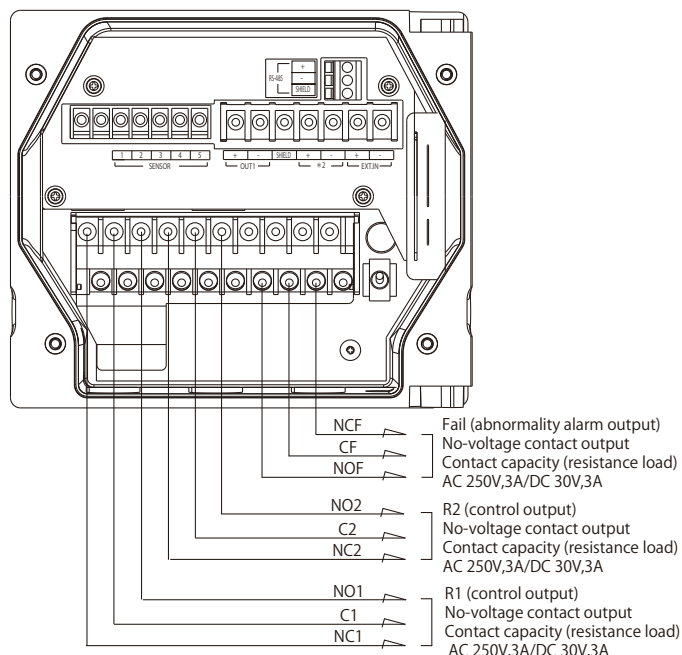
Contact Output

- Three contact outputs are included as a standard feature.
- The instrument includes contact outputs such as upper and lower limit alarms, error warnings and transmission output holds.

Main Specifications

- The contact capacity is a maximum resistance value load of AC250V and 3A or DC30V and 3A.
- The contact output terminal screws are M4 screws.
- The wire size is 0.75-5.5 mm² (AWG18-10).
- Use a varistor or noise killer if noise occurs in the load.
- The NO and NC arrangement is reversed only in the case of fail output. For normal (non-fail) output, the CF-NOF contact is open and the CF-NCF contact is shorted. The C-NOF contact is shorted when the power is off.
- If connecting a load higher than the contact capacity or an inductive load (such as a motor or pump), be sure to connect the load through a power relay with a rating higher than that of the load.
- Take care when connecting a load, as the C-NC contact of R1-R2 is shorted when the power source of this instrument is off.

Crimping	Wire size	Torque
	5.5mm ² /MAX (AWG10)	1.2~1.8 N·m



HU-200TB Turbidity meter(Installation-5)

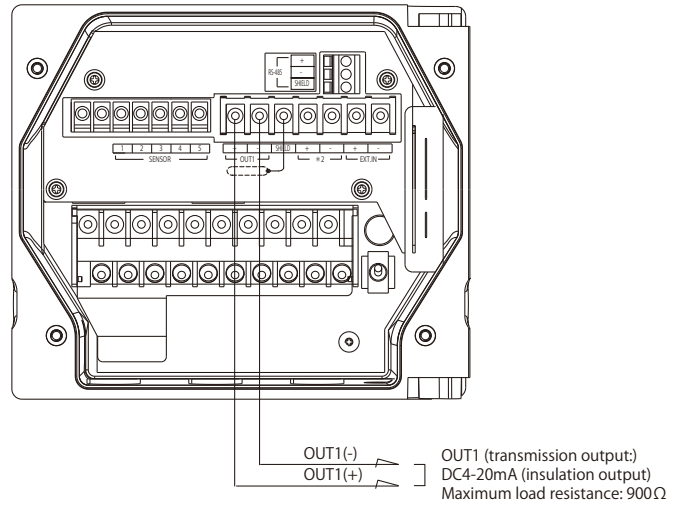
Transmission Output

- One transmission output (DC 4-20mA) is included.
- If desired, a full-scale transmission output range can be set, as long as it is within the full scale setting range of the measured values.
- Also, set a burnout (transmission output: 3.8mA or 21mA). It is possible to set whether to temporarily hold the output value at the last value or a preset value when holding the transmission output during an external signal.

Main Specifications

- The transmission output terminal screws are M3.5 screws.
- The wire size is 2mm² (AWG14) max.
- Use a twist pair shielded cable.
- Install arresters on the output side and receiving instrument side of the instrument if there is a risk that it will be struck by lightning.
- Make sure that the maximum resistance of the contact input is 100 Ω or less.

Crimping	Wire size	Torque
	2mm ² /MAX (AWG14)	0.8~1.2 N·m



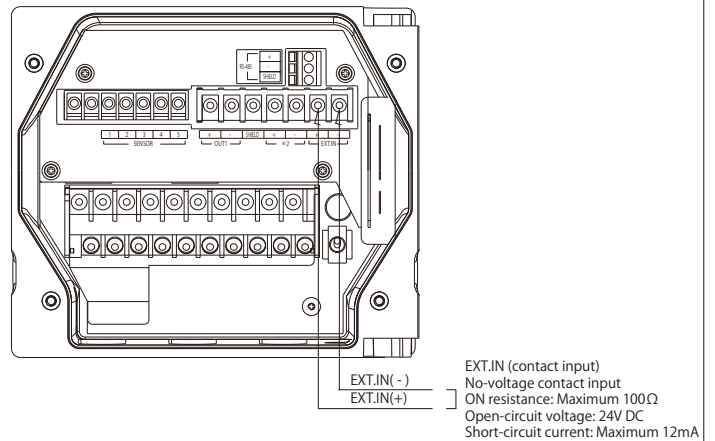
Contact Input

A contact input is included as a standard feature. The cleaner can be operated by an external signal.

Main Specifications

- The contact input terminal screws are M3.5 screws.
- The wire size is 0.14-2.5mm (AWG 26-AWG 14).
- Use a twist pair shielded cable. Install arresters on the output side and receiving instrument side of the instrument if there is a risk that it will be struck by lightning.
- Make sure that the maximum resistance of the contact input is 100 Ω or less.

Crimping	Wire size	Torque
	2mm ² /MAX (AWG14)	0.8~1.2 N·m



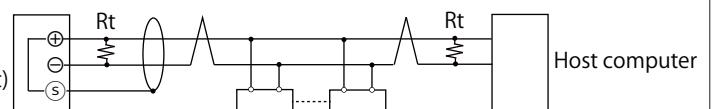
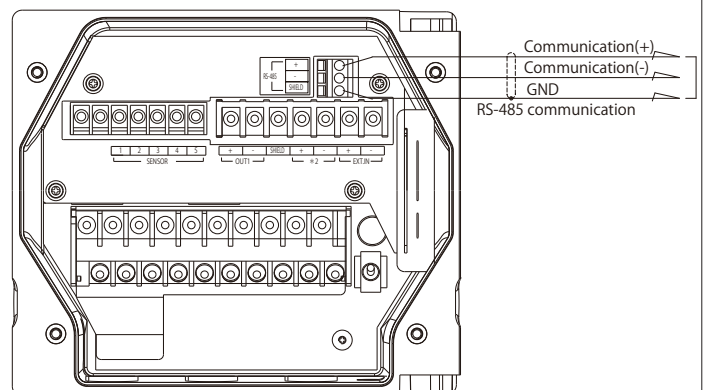
RS-485

- This instrument includes the RS-485 communication terminal. Connect the wiring before using.
- The wire size is 0.14-2.5mm (AWG 26-14).
- Use a twist pair shielded cable for the communication output cable.
- Up to 32 terminals can be connected including the host computer. Set an address.
- The maximum cable length of the communication cable is 500 m.
- Provide termination resistance (Rt: 120 Ω) for instrument that is the terminus of the RS-485 communication line.

Crimping	Wire size	Torque
	0.14~2.5mm ² (AWG26~14)	0.5~0.6 N·m

Example of external communication connection

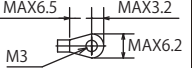
This instrument: RS-485 (communication output)

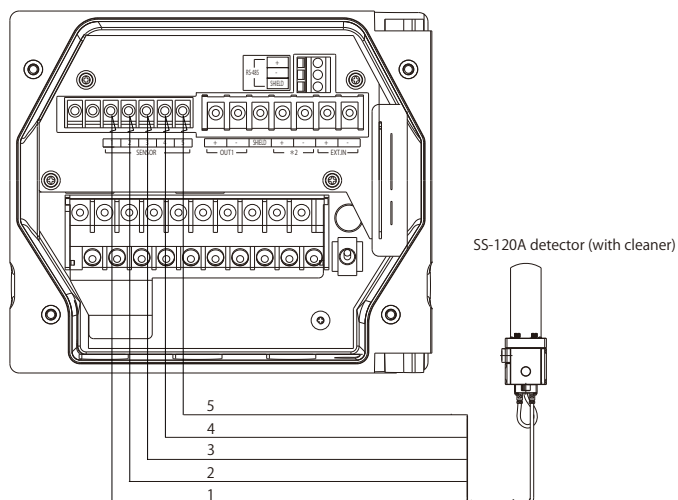


HU-200TB Turbidity meter(Installation-6)

Detector

- Do not allow the detector cable terminal and terminal block to come into contact with liquids such as water or soil them with finger marks or oil from hands.This decreases insulation.
A decrease in insulation causes indication to become unstable, Be sure to keep dry and clean.If soiled, wipe with alcohol etc. and dry well.
- Do not wire the detector cable or relay cable near equipment that supplies induction to parts such as the motor or the power cable of this equipment.

Crimping	Wire size	Torque
	1.25mm ² /MAX (AWG16)	0.8N·m



Detector	1 : Power terminal (+12V)
	2 : Power terminal (0V)
	3 : Communication terminal (+)
	4 : Communication terminal (-)
	5 : Grounding