



TECHNICAL GUIDANCE

SIMPLE, RELIABLE, COST EFFECTIVE

FT-1000/FP-1000 FLOAT TYPE TANK GAUGES

GENERAL

FT-1000/FP-1000 is a mechanical float type tank gauge.

Two versions are already available for selection:

FT-1000 is a standard type float-tape tank gauge and the float is normally guided by guide wires.

It has wide applications.

Whereas, FP-1000 is a pipe sealed float type tank gauge and the indicator part is totally isolated from the tank's interior by magnet coupling. Thus, FP-1000 is suitable for pressurized tanks and/or corrosive liquid tanks.

Both for FT-1000 and FP-1000, 1 mm unit local indication is provided. Also, alarm contact(s), pneumatic output, electric output as well as digital BCD code transmitters can be equipped for remote data transmission.

Compared to other principles, these Float type tank gauges are relatively low-cost and reliable, have simple construction, and are easy to maintain.



FEATURES

● SIMPLE CONSTRUCTION

Pure mechanical action. No utilities. Easy installation and maintenance

● COST PERFORMANCE

Compared to other principles, relatively low-cost measurement of liquid level is possible.

● WIDE APPLICATION

FT-1000/FP-1000 covers from atmospheric tanks to pressurized spherical tanks. Also, by selecting appropriate material, they can be used for corrosive liquids.

● TRANSMITTERS AVAILABLE

In addition to local liquid level indication, different types of transmitters, i. e. alarm contact(s), pneumatic, electric, digital serial code, etc, can be provided for remote indication/control.

APPLICATIONS

● GENERAL CONE ROOF TANKS, FLOATING ROOF TANKS FOR CRUDE OIL

From crude oil tanks, intermediate tanks to final product tanks in Oil refining plants.

● HIGH PRESSURE TANKS FOR LPG AND OTHERS

FT-1000 can cover upto 30 kg/cm²G pressure tanks. They are also used for medium pressure cylinder tanks.

● HEAVY OIL TANKS FOR THERMAL POWER STATIONS

Utility tanks, Fire fighting water tanks

● CORROSIVE LIQUID TANKS

Pipe sealed type FP-1000 covers even corrosive liquid tanks.

OPERATION PRINCIPLE

As shown in Fig. 1

The FT-1000 Series Level Gauge consists of a level detecting float, transmitting parts (tape, guide elbow, etc.) and the instrument body. The indicator body comprises the sprocket pulley, tape winding pulley, constant torque spring, gear mechanism, pointer and scale plate. When a transmitter is provided for the level gauge, the transmitter is connected to the sprocket pulley shaft of the indicator body through the coupling mechanism. The float is kept afloat on the surface of the liquid with a constant draft line, and follows any changes in the liquid level. The float is connected to a tape winding pulley-through the stainless steel tape, which is punched at regular intervals. The constant torque spring is

incorporated in the tape winding pulley in order to apply a constant torque in the tape winding direction. This constant torque is balanced with the weight of the float on the surface of the liquid. When the float rises and lowers, according to the change in the liquid level, the tape which is interlocked with the float rotates the sprocket pulley, which in turn is engaged with the punched tape. The rotation corresponds to the upward or downward movement of the float. Thus, any change in the level of the liquid is converted to the change in the rotation angle of the sprocket pulley shaft. This rotation angle of sprocket pulley is transferred to transmitter unit, i. e. Microswitch alarm, pneumatic, electric, digital BCD etc. Through coupling unit for remote data transmission.

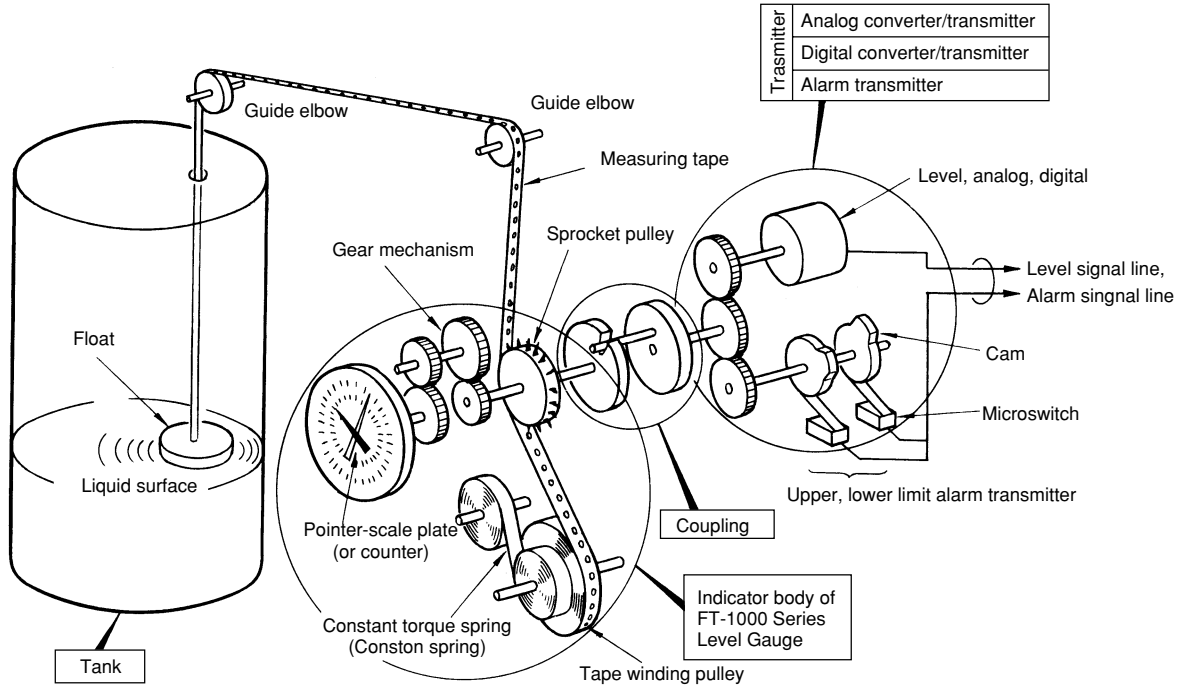


Fig. 1: OPERATION PRINCIPLE OF FT-1000

As shown in Fig. 2

In the FP-1000 Series Level Gauge, the vapor and gas in the tank are sealed with the seal pipe and cannot get into the level gauge. Therefore, the system is not only convenient but suitable to measure the liquid level of tanks that contain a liquid, liquified gas or any other high temperature liquid that can generate poisonous, corrosive or inflammable gases and odor. In addition, the system is excellent in that it is non-corrosive, safe and is easy to maintain. In the FP Series, the indicator body of the FT-1000 level gauge for low pressure is used, and a seal pipe made of a non-magnetic

material is inserted and fixed in the tank. The doughnut-shaped float rises and lowers, with the aid of the seal pipe as guide, according to the change in the liquid level. The float contains a main magnet, and a following magnet with a sliding roller is arranged in the seal pipe. The following magnet is connected to the local level indicator same to FT-1000 level gauge by means of a measuring tape in order to transmit the change in the liquid level; to the level indicator, which indicates the liquid level. If a transmitter is equipped, the liquid level; can be transmitted to a remote control room.

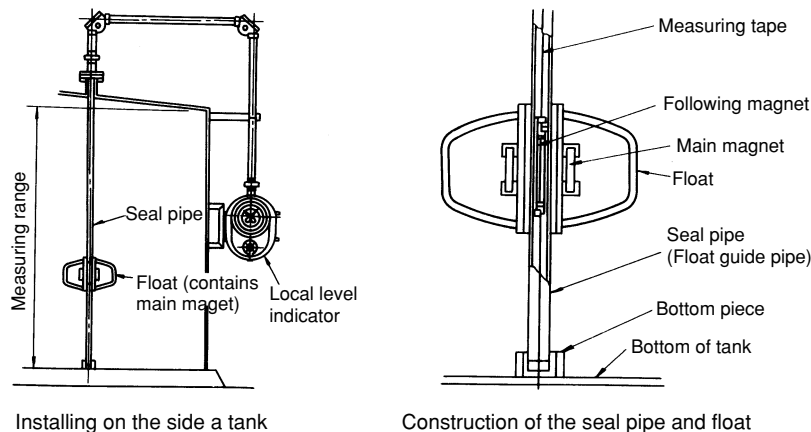


Fig. 2: OPERATION PRINCIPLE OF FP-1000

STANDARD SPECIFICATION

Liquid density : 0.6 ~ 1.9g/cm³

Max. viscosity 600 mPa·s without sticking and crystallization.

- Measuring range : 0 ~ 3m
0 ~ 5m
0 ~ 10m
0 ~ 15m
0 ~ 20m
0 ~ 25m
(Max. 0 ~ 10m for FP-1000 pipe seal type)

- Local indication : ① 2 pointer dial (m and mm unit) or
② Digital counter with vernier dial for mm unit or
③ Special graduation
①, ② : Min. indication unit ; 1mm

- Indication accuracy* : FT-1000: ± 3 mm
FP-1000: ± 10 mm
* The above data have been obtained by our test equipment (MAX.3m) under the following conditions.
Installation : Tank Top
Float dia. : φ 400
Transmitter : N/A
Temperature : Normal temp.
Pressure : Atmospheric pressure
Liquid : Water

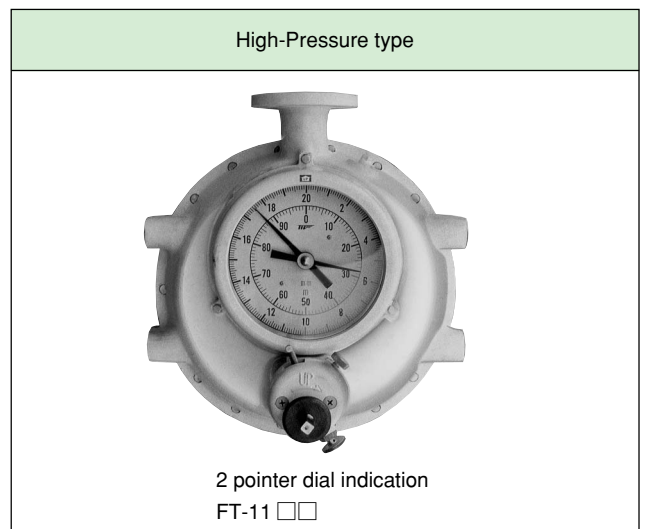
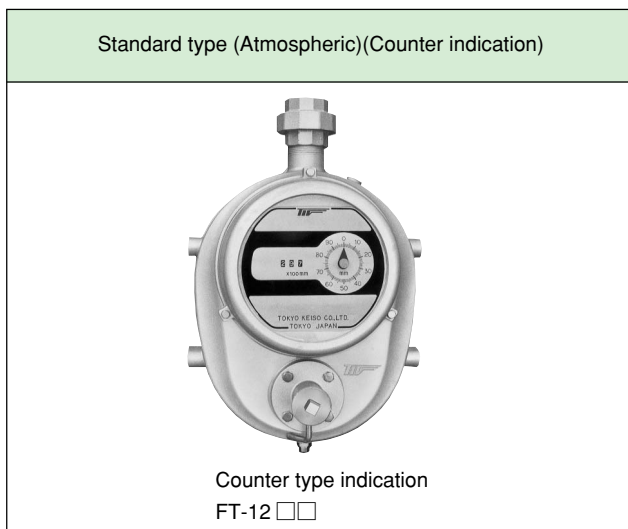
- Operating pressure : ① Atmospheric
② Medium Press. (Max.1MPa)
③ High Press. (Max.2MPa)
④ High Press. (Max.3MPa)
- Liquid temp. : FT-1000 -196 + 400°C
FP-1000 0 ~ + 150°C
- Installation onto tanks: Standard By 40mm (1-1/2") screw or flange*
*1) Flanges only for guide pipes of FP-1000
*2) 50mm (2") or larger flanges for PVC guide pipe version
- Indicator enclosure : Water tight (IP54)
- Finish : Silver (std.)
- Float operation : Winding up mechanism is provided as standard. It can be used for repeatability checking.

MODEL CODE

		-	1				DESCRIPTION
TYPE	FT	-	1				Float-tape type
	FP	-	1				Pipe-seal type
INDICATION				1			2 pointer dial
				2			Digital counter with vernier dial
				3			Special graduation
TRANSMITTER				0			No transmitter provided
				1			Transmitter provided
				2			Transmitter fitting provided
PRESS, RATING, CONNECTION				1			Atmospheric, Screw connection
				2			Atmospheric, Flange connection
				3			Medium Press., Flange connection (Max. 1MPa)
				4			High Press., Flange connection (Max. 2MPa)
				5			High Press., Flange connection (Max. 3MPa)

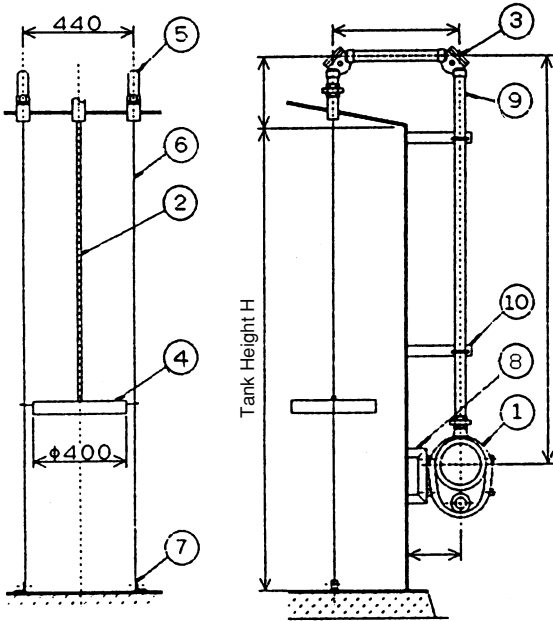
*1 : Volume graduation and others on request

*2 : FP-1000 (Pipe sealing type) is flange connection only.



SCOPE OF SUPPLY, INSTALATION EXAMPLE, DIMENSIONS

① For General Cone Roof Tanks (FT-1000)



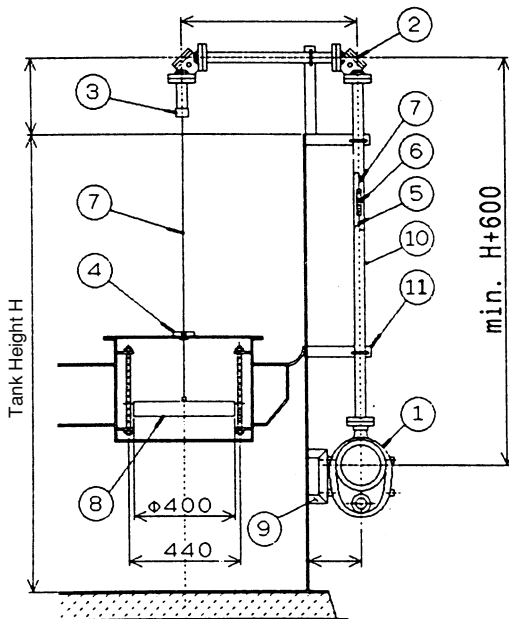
No	Part Description	Q'ty	Standard material	Optionally available material	Remarks
①	Indicator	1	ADC12	SCS13 *1,SCS14 *1	
②	Measuring tape	1	SUS316	—	
③	90° guide elbow	2	ADC12 *2	SCS13,SCS14	
④	Float	1	SUS304	SUS316,SCS316L,PVC	Standard φ 400mm
⑤	Guide wire knob	2	FC250/SUS304	SUS304/SUS304,SUS316/SUS316	
⑥	Guide wire	2	SUS304	SUS316,FEP covered	φ3mm(7X7Stranded)
⑦	Bottom piece	2	SUS304	SUS316,SUS316L	
⑧	Indicator support	—	—	—	Customer's scope *3
⑨	Tape protection pipe	—	—	—	Customer's scope *3
⑩	Pipe support	—	—	—	Customer's scope *3

*1 : Shape of indicator may differ for cast stainless steel versions.

*2 : FC250 (iron casting) for flange connection versions

*3 : Available on request

② For floating Roof Tanks (FT-1000)



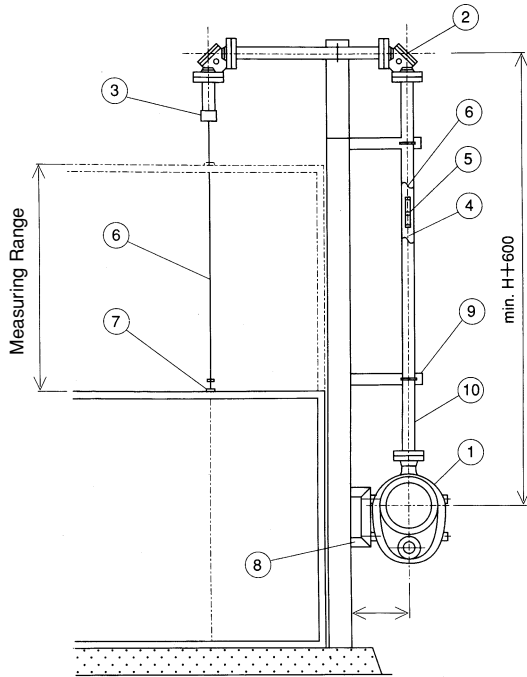
No	Part Description	Q'ty	Standard material	Optionally available material	Remarks
①	Indicator	1	ADC12	SCS13,SCS14 *1	
②	90° guide elbow	2	FC250*2	SCS13,SCS14	
③	Wire guide	1	SS400/PVC	SUS304/PVC,SUS316/PVC	
④	Guide bush	1	SUS304/PTFE	SUS316/PTFE	
⑤	Measuring tape	1	SUS316	—	
⑥	Tape-wire joint	1	SCS13	SCS14	
⑦	Measuring wire	1	SUS316	—	
⑧	Float	1	SUS304	SUS316,SUS316L	Standard φ 400mm
⑨	Indicator support	—	—	—	Customer's scope *3
⑩	Tape protection pipe	—	—	—	Customer's scope *3
⑪	Pipe support	—	—	—	Customer's scope *3

*1 : Shape of indicator may differ for cast stainless steel versions.

*2 : ADC12 (aluminum casting) for screw connection versions

*3 : Available on request

③ For Gas Holder Tanks (FT-1000)



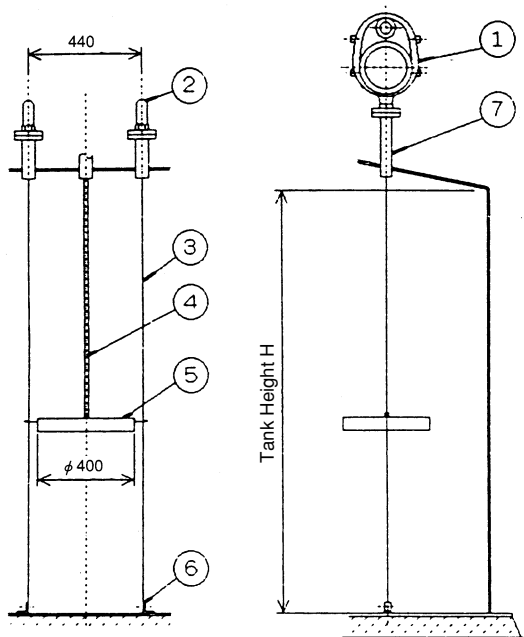
No	Part Description	Q'ty	Standard material	Optionally available material	Remarks
①	Indicator	1	ADC12	SCS13,SCS14 *1	
②	90° guide elbow	2	FC250 *2	SCS13,SCS14	
③	Wire guide	1	SS400/PVC	SUS304/PVC,SUS316/PVC	
④	Measuring tape	1	SUS316	—	
⑤	Tape-wire joint	1	SCS13	SCS14	
⑥	Measuring wire	1	SUS316	—	
⑦	Wire joint	1	SUS304	SUS316	
⑧	Indicator support	—	—	—	Customer's scope *3
⑨	Tape protection pipe	—	—	—	Customer's scope *3
⑩	Pipe support	—	—	—	Customer's scope *3

*1 : Shape of indicator may differ for cast stainless steel versions.

*2 : ADC12 (aluminum casting) for screw connection versions

*3 : Available on request

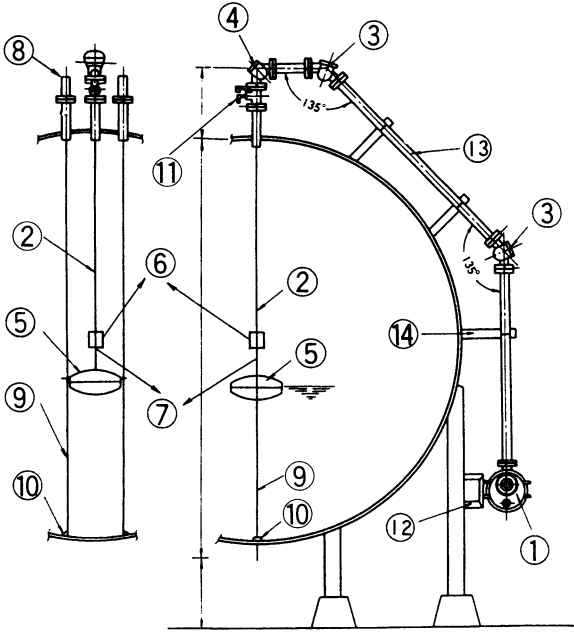
④ For Tank Top Installation (FT-1000)



No	Part Description	Q'ty	Standard material	Optionally available material	Remarks
①	Indicator	1	ADC12	SCS13,SCS14 *1	
②	Guide wire knob	2	FC250/SUS304	SUS304/SUS304,SUS316/SUS316	
③	Guide wire	2	SUS304	SU316,FEP Covered	φ 3mm(7X7stranded)
④	Measuring tape	1	SUS316	—	
⑤	Float	1	SUS304	SUS316,SCS316L,PVC	Standard φ 400mm
⑥	Bottom piece	2	SUS304	SUS316,SUS316L	

*1 : Shape of indicator may differ for cast stainless steel versions.

⑤ For High-Pressure, Spherical Tanks (FT-1000)

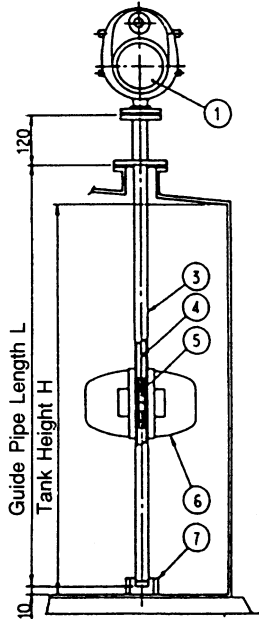


No	Part Description	Q'ty	Standard material	Optionally available material	Remarks
①	Indicator	1	SC480	SCS13,SCS14	
②	Measuring tape	1	SUS316	—	
③	135° guide elbow	2	SC480	SCS13,SCS14	
④	90° guide elbow	1	SC480	SCS13,SCS14	
⑤	Float	1	SUS304	SUS316,SUS316L	Standard φ 400mm
⑥	Tape-wire joint	1	SCS13	—	
⑦	Measuring wire	1	SUS316	—	φ 1.6mmstranded
⑧	Guide wire knob	2	STPG370	SUS304,SUS316	
⑨	Guide wire	2	SUS304	SUS316	φ 3mm(7X7stranded)
⑩	Bottom piece	2	SUS304	SUS316,SUS316L	
⑪	Shut-Off valve	1	SCS13	SCS14	
⑫	Indicator support	—	—	—	Customer's scope *1
⑬	Tape protection pipe	—	—	—	Customer's scope *1
⑭	Pipe support	—	—	—	Customer's scope *1

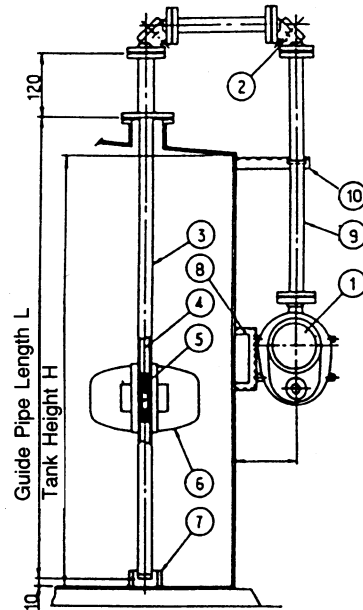
*1 : Available on request

⑥ Pipe Sealing type (FP-1000)

6-1 Tank top installation



6-2 Tank side installation



No.	Part Description	Q'ty		Standard material	Optionally available material	Remarks
		(Tank top)	(Tank side)			
①	Indicator	1	1	ADC12	—	
②	90° guide elbow	—	2	FC250 *1	—	
③	Guide pipe ass'y	1	1	SUS304	SUS316,SUS316L,PVC	
④	Measuring tape	1	1	SUS316	—	
⑤	Following magnet	1	1	—	—	
⑥	Float	1	1	SUS304	SUS316,SUS316L,PVC	Standard φ 400mm
⑦	Bottom piece	1	1	SUS304	SUS316,SUS316L,PVC	
⑧	Indicator support	—	—	—	—	Customer's scope *2
⑨	Tape protection pipe	—	—	—	—	Customer's scope *2
⑩	Pipe support	—	—	—	—	Customer's scope *2

*1 : ADC12 (aluminum casting) for screw connection versions.

*2 : Available on request