

Immersion Type Liquid Level Transmitter

Model JTL32_ /JTL33_

Overview

The immersion type liquid level transmitter is designed to accurately measure the liquid level in water supply reservoirs, wells, dams, rivers, seawater inlets, wastewater tanks at sewage treatment stations, wastewater pumping wells, sludge storage tanks, and sewage tanks.

Product series configuration

Application	Setting span	
	3–100 kPa (0.3–10 m)	70–700 kPa (7–70 m)
For tap water	JTL320	JTL330
For sludge, wastewater, and sewage	JTL321	JTL331
For seawater	JTL322	JTL332

Features

(1) Easy installation

Simply immersing the Probe in the liquid to be measured completes the installation process. This product can be used for water reservoirs, sludge tanks, sewage tanks, dams, rivers, and seawater inlets.

(2) Self-diagnostic function

Using the self-diagnostic function via a communicator can ascertain the integrity of the device (sensor error, damage to pressure-receiving component, failure in electric circuits, range setting error, etc.).

(3) Excellent lightning countermeasures

Both the Probe and the Junction box are equipped with lightning arrestors to protect against induced lightning surge as standard equipment. The product can be used safely in mountainous regions where many lightning strikes occur.

Specifications (All Models)

Output signal: 4–20 mA DC

Communication method: SFN

Supply voltage / load resistance: 17.9–35 V DC

For communication with the communicator, a load resistance of at least 250 Ω is necessary for the loop. For details about the relationship between the supply voltage and load resistance, refer to Fig. 2.

Waterproof/dust-proof structure

JIS C 0920, compliant with IEC IP66

■ Lightning Surge Characteristics

(1) IEC power superimposition (applicable standard:

IEC 61000-4-5) surge application method: IEC 61326

Surge application location and surge voltage

Between the SIGNAL+ terminal and the ground terminal, and between the SIGNAL- terminal and the ground terminal: ± 4 kV (Level 4)

Between the SIGNAL+ and - terminals: ± 2 kV (Level 4)

Number of applications: 10 times each

Surge waveform:

IEC 61000-4-5 1.2/50 μ s combination waveform

Characteristics: shift during application (after application): ± 0.05 % F.S. or less



(2) IEC voltage surge

Surge application location and surge voltage:

Between SIGNAL terminal (+ or - terminal) and ground terminal: 6 kA

Number of applications: 1

Surge waveform:

IEC 61000-4-5 1.2/50 μ s combination waveform
Characteristics: shift during application (after application): ± 0.05 % F.S. or less

(3) JEC voltage surge (JEC-0202)

Surge application location and surge voltage (peak value):

Between the SIGNAL+ terminal and the ground terminal, and between the SIGNAL- terminal and the ground terminal: ± 200 kV

Between SIGNAL+ and - terminals: ± 200 kV

Number of applications: 10 times each

Surge waveform: 1.2/50 μ s

Characteristics: shift during application (after application): ± 0.05 % F.S. or less

Response time:

Max. 0.085 s (at 25 °C)

Damping time constant:

Settable in ten steps from 0 to 32 s

Output saturation point:

Upper range value: 21.6 mA

Lower range value: 3.6 mA

Vibration characteristics:

Amplitude 1.5 mm, frequency 0–9 Hz

Acceleration 4.9 m/s² (0.5 G), 9–200 Hz

Shock characteristics:

Acceleration 9.8 m/s²

Electrical conduit connection:

G 1/2 internal thread or 1/2 NPT internal thread
(Additional Specification)

Measuring span / setting range

Model	Measuring span	Setting range
JTL320 JTL321 JTL322	3-100 kPa	0-100 kPa
JTL330 JTL331 JTL332	70-700 kPa	0-700 kPa

Accuracy/temperature characteristics

(X: Upper range value (URV) and lower range value (LRV) of calibration range or the largest value of span)

Item	Model	
	JTL320 JTL322	JTL321, JTL322 (Additional Specification 1: P00)
Accuracy	$\pm 0.25\%$ ($12.5 \leq X \leq 100$) $\pm (0.05 + 0.2 \times 12.5/X)\%$ ($3 \leq X < 12.5$)	$\pm 0.5\%$ ($12.5 \leq X \leq 100$) $\pm (0.1 + 0.4 \times 12.5/X)\%$ ($3 \leq X < 12.5$)
Ambient temperature characteristics (30 °C change) (Zero shift)	$\pm (0.15 + 0.8 \times 12.5/X)\%$	$\pm (0.15 + 32 \times 12.5/X)\%$
Ambient temperature characteristics (30 °C change) (Combined shift)	$\pm 1.3\%$ ($12.5 \leq X \leq 100$) $\pm (0.4 + 0.9 \times 12.5/X)\%$ ($3 \leq X < 12.5$)	$\pm (0.4 + 33 \times 12.5/X)\%$

Item	Model	
	JTL330 JTL332	JTL331, JTL332 (with additional specification 1: P00)
Accuracy	$\pm 0.25\%$ ($210 \leq X \leq 700$) $\pm (0.05 + 0.2 \times 210/X)\%$ ($70 \leq X < 210$)	$\pm 0.5\%$ ($210 \leq X \leq 700$) $\pm (\pm (0.1 + 0.4 \times 210/X)\%$ ($70 \leq X < 210$))
Ambient temperature characteristics (30 °C change) (Zero shift)	$\pm (0.15 + 0.2 \times 210/X)\%$	$\pm (0.15 + 1.9 \times 210/X)\%$
Ambient temperature characteristics (30 °C change) (Combined shift)	$\pm 0.7\%$ ($210 \leq X \leq 700$) $\pm (0.4 + 0.3 \times 210/X)\%$ ($70 \leq X < 210$)	$\pm (0.4 + 2 \times 210/X)\%$

Material of major components:

Probe

Wetted parts	JTL320,330	JTL321,331	JTL322,332
Meterbody	SUS304	SUS304	Aluminum bronze
Metallic diaphragm	SUS316L	SUS316L	Alloy C-276
Cover (without rubber diaphragm)	SUS304	--	Aluminum bronze
Housing	SUS304	SUS304	Cupronickel
Rubber diaphragm	--	Nylon cloth inserted chloroprene rubber	Nylon cloth inserted chloroprene rubber (additional specification)
Cover (for rubber diaphragm)	--	SUS304	Aluminum bronze (additional specification)
Ring (for rubber diaphragm)	--	SUS304	Aluminum bronze (additional specification)
Mounting screw (for rubber diaphragm)	--	SUS304	Aluminum bronze (Additional Specification)
O-ring	Chloroprene rubber	Chloroprene rubber	Chloroprene rubber
Shell	SUS304	SUS304	Aluminum bronze

Gland	SUS304	SUS304	Aluminum bronze
Washer	SUS304	SUS304	Aluminum bronze
Gasket	Chloroprene rubber	Chloroprene rubber	Chloroprene rubber
Cover	SUS304	SUS304	Aluminum bronze
Gland (internal)	SUS304	SUS304	SUS304

Other	Common to all models
Sealed liquid	Silicone oil, KF96 10 mm ² /s
Capillary tube for sealing	SUS316
Capillary tube on reference pressure side	SUS316
Seal cap fitting	SUS430F or SUS303
Seal cap	Natural rubber

Junction box

Cover and housing	Common to all models
Housing	ADC-12
Cover	AC4A-T6
Cover mounting screw	SUSXM7
Gasket	Ethylene-propylene
Window glass	Reinforced glass (JIS R 3206)

Hollow cable

	Common to all models
Sheath	Polyethylene
Shield braid	Tin plated annealed copper wire, 0.2 mm, braided wire all around
Lead wire insulation	Cross-linked polyethylene
Lead wire	Tin plated annealed copper twisted wire, 12 pcs. Nominal cross-sectional area 0.3 mm ²
Lead wire resistance	67 Ω/km or less (at 20 °C)
Hollow pipe	High-density hollow polyethylene pipe

Weight (optional)

	Common to all models
Weight assembly	SUS304
Chain	SUS304
Clamp	SUS304
Washer	SUS304
Hexagon head bolt	Stainless steel
Hexagon nut	Stainless steel
Spring washer	SUS304

Cable-retaining flange (optional)

	Common to all models
Flange	SUS F304
Gland	SUS304
Washer	SUS304
Gasket	Chloroprene rubber
Shell	SUS304
O-ring	Chloroprene rubber
Hexagon socket bolt	Stainless steel
Spring washer	SUS304

Mounting bracket

	Common to all models
Mounting bracket	SUS304
U bolt	SUS304
Nut	Stainless steel
Hexagon head bolt	Stainless steel
Spring washer	SUS304

Finish (case, cover):

Corrosion proof paint: urethane finish coat

Coating color: Silver 74, Munsell N-8.2

Meter (analog meter):

Linear scale: 0 to 100 %

Engineering scale: See Table 3 Engineering unit scale correspondence table on page 5.

Burnout indication under abnormal conditions: selectable from the following.

Burnout output indication: none

Upscale: 21.6 mA (110 %) or more

Downscale: 3.6 mA (-2.5 %) or less

Grounding:

Ground the ground terminal with a resistance of less than 100 Ω.

Special hollow cable:

The bending radius should be at least 30 cm.

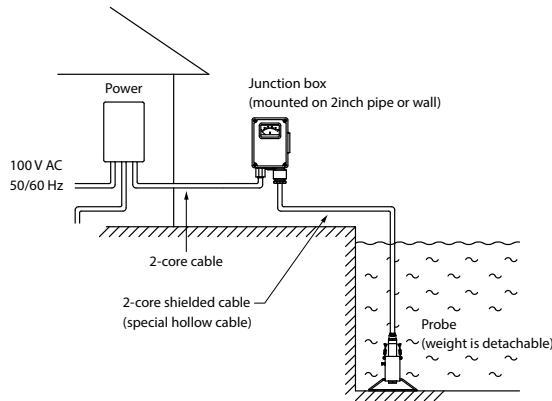
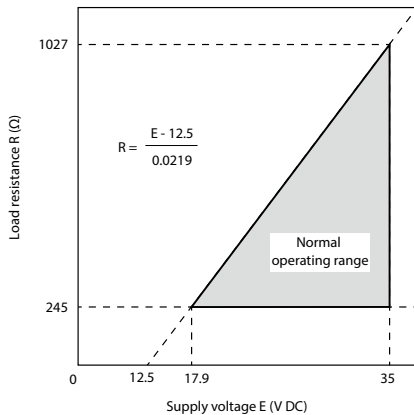


Figure 1. System configuration diagram



Note: For communication with the communicator, a load resistance of at least 250 Ω is needed.

Figure 2. Supply voltage / load resistance characteristics

Operating pressure range: Refer to Table 1.

Table 1. Operating conditions at maximum working pressure

Model	Maximum working pressure	
	Normal operating conditions	Restricted operating conditions
JTL320	0-100 kPa	150 kPa
JTL321		
JTL322		
JTL330	0-700 kPa	1050 kPa
JTL331		
JTL332		
JTL332		

Operating temperature range:

Reference operating condition, ambient temperature: 25 ± 1 °C

Normal operating conditions, restricted operating conditions, transport/storage conditions

Refer to Table 2.

Table 2. Normal operating conditions, restricted operating conditions, transport/storage conditions

Model No.	Normal operating conditions	Restricted operating conditions	Transport/storage conditions
Probe	-5 to +55 °C	-10 to -5 °C 55 to 60 °C	-40 to +85 °C
Junction box	-5 to +55 °C	-30 to -5 °C 55 to 80 °C	-40 to +85 °C

Temperature range of built-in meter:

Normal operating conditions -10 to +60 °C

Restricted operating conditions -40 to -10 °C, 60 to 80 °C

Transport/storage conditions -40 to +85 °C

Additional Specifications (Optional)

Cable-retaining flange:

This flange holds the hollow cable.

It is not intended to seal pressure.

For mounting a high load resistance onsite meter:

Select this option if the internal resistance of an onsite meter is greater than 10 Ω.

Built-in meter:

Select this option if a meter (0 to 100 % or engineering unit scale) is needed.

Electrical conduit (½ NPT):

One SUS304 adapter for converting the wiring connection from G½ (standard specification) to ½ NPT is supplied with the product.

With rubber diaphragm:

The rubber diaphragm may be attached to protect the pressure-receiving section of the Probe. (The product for sludge is equipped with this rubber diaphragm as standard equipment.)

Buff finish of connection metal section:

Select this option to prevent sludge adhesion and to smoothen the surface roughness of the connection section.

Chain length (with weight):

For a weighted product, specify the length of the accessory chain.

Weight diameter:

Select this option to make the weight diameter smaller.

Weighted product with no legs:

Select when weight is attached and legs are not necessary.

Burnout direction under abnormal conditions:

Select the burnout direction under abnormal conditions.

Oil free:

The product is shipped with oil removed from the wetted parts (except for the cables, chain, bolts, and weights).

Test report:

The test report shows the results of inspection of the appearance, input-output characteristics, insulation resistance, and withstand voltage.

Mill sheet:

Certificates for the material of the wetted parts (except for the cables, chain, bolts, and weights)

Test report (with traceability certificate):

The test report consists of three parts: traceability system diagram, calibration certificate, and test report.

Photo:

A photo of the finished product

Inform our sales department of (1) the method of photographing, and (2) what to write on the nameplate.

Product Handling Precautions

Be sure to note the following points for correct operation of the product in order to maximize the performance of this product. Additionally, before operating this product, be sure to read the user's manual.

Usage Restriction and Notice

This product is developed, designed, and manufactured based on the assumption that it will be used as a general device or as an explosion-proof device. Do not use this product for any application in which its operation may directly endanger human life, or in a radiation-controlled area of a nuclear power application.

In particular,

- Safety devices to protect human body
- Direct control of transportation equipment
- Aircraft
- Equipment used in space

When the product is used for applications like those listed below, for which safety is essential, take into consideration the safety of the entire system and all equipment, by implementing failsafe and redundant design, periodic inspections, etc.

For information about system design, application design, operating methods, and applications, please contact Azbil Corporation. Note that we will not be held responsible for results arising from the operation of this product.

- To help ensure safe use of the product, the following symbols are used in this document.



WARNING


Warnings are indicated when mishandling of the product may result in the death or serious injury of the user.





CAUTION

Cautions are indicated when mishandling of the product may result in minor injury to the user or damage to property.

- In describing the product, the icons and conventions listed below are used.


 Indicates the need for caution when handling.


 Indicates a prohibited action


 Indicates a mandatory action


Installation Precautions


WARNING

 The weight of this product may exceed 10 kg, depending on the model. When transporting or installing this product, wear safety shoes and use a transportation device or have two or more workers carefully carry the product. If the product is raised or dropped carelessly, personal injury or damage to the product may occur.


 Be sure to hold the chain when installing the product with the weight attached. Do not hold the hollow cable, since it is slippery and holding it may result in an accident.


 Install this product in a location where the operating conditions (pressure rating, temperature, humidity, voltage, mounting orientation, and ambient atmosphere) are satisfied. Failure to do so may cause a fire or malfunction.


 To help ensure safety, only specialists who are skilled in instrumentation and electrical work should do the installation and wiring work.


 This product is intended for use in an open tank. The cable-retaining flange is for holding the hollow cable. It is not designed to seal the pressure between the hollow cable and the flange. Do not use the product in a closed tank where internal pressure is applied.


CAUTION


 After installing this product, do not use it as a scaffold or put your weight on it. Doing so may damage the product.

 Be careful to avoid impact to the glass part of the display from tools, etc. Otherwise, damage the product or personal injury may result.

 Perform the grounding work in the correct manner in accordance with the instructions in this manual. Incorrect grounding may adversely affect the output or cause a malfunction.


 Do not subject the product to shock or impact. Doing so may damage the device.


 Use a power supply with an overcurrent protection function (overcurrent value: 50 mA or less).

 Do not install the Probe in a location where the water current is strong or where there is vibration. Doing so may cause an output error.


Wiring Precautions


WARNING

 Do not perform the wiring work with wet hands. Doing so may cause an electric shock.

 Before starting the wiring work, be sure to dry your hands or use appropriate gloves, and turn off the power. Failure to do so may cause an electric shock.


CAUTION

 Perform the wiring work correctly while carefully checking the specifications. Incorrect wiring may damage the device or cause an operation error.


 Apply power supply correctly according to the specifications. If the power input is not according to specifications, the device may be damaged.


Maintenance Precautions


WARNING


 If signs of corrosion are found on a pressure-resistant part such as a bolt, nut, or flange, replace the affected part with a new one. Otherwise, the part's performance may be compromised, resulting in a dangerous situation. A damaged part may cause a cut or other injury.


CAUTION


 When moving the Probe up or down, move it slowly while carefully checking the surroundings, and bundle and secure excess cabling. Failure to do so may cause cables to be caught, or objects to be measured may be knocked out of position.


 Replace a damaged seal gasket or O-ring with a new one. If this product is operated with a damaged seal, it may malfunction.

 When work is performed with the Probe in an upright position, be sure to secure it firmly. Failure to do so may cause a personal injury or damage to this product.

 Do not disassemble or modify this product. Doing so may cause the product to malfunction or may cause an electric shock.

 When this product is no longer needed, dispose of it appropriately as industrial waste in accordance with the applicable local regulations. Additionally, do not reuse a part or all of this product.

 Do not open the case of the Junction box in strong wind or rain. Water entering the Junction box can cause a malfunction.

 Do not use SFN communication when the process measured by the liquid level transmitter is under automatic control. Doing so may cause the output to vary, resulting in hazardous operation.

Model Selection

			I	II	-	III	-	IV	
Basic model No.	Measuring span 3-100 kPa (0.3-10 m)	For tap water	JTL320-						
	Measuring span 3-100 kPa (0.3-10 m)	For sludge, wastewater, & sewage	JTL321-						
	Measuring span 3-100 kPa (0.3-10 m)	For seawater	JTL322-						
	Measuring span 70-700 kPa (7-70 m)	For tap water	JTL330-						
	Measuring span 3-100 kPa (0.3-10 m)	For sludge, wastewater, & sewage	JTL331-						
	Measuring span 3-100 kPa (0.3-10 m)	For seawater	JTL332-						
I	Cable length		2 m ^{*1}	02					
			3 m ^{*1}	03					
			4 m ^{*1}	04					
			5 m ^{*1}	05					
			6 m ^{*1}	06					
			7 m	07					
			8 m	08					
			9 m	09					
			10 m	10					
			11 m	11					
			12 m	12					
			13 m	13					
			14 m	14					
			15 m	15					
			16 m	16					
			17 m	17					
			18 m	18					
			19 m	19					
			20 m	20					
			25 m	25					
			30 m	30					
	35 m	35							
	40 m	40							
	50 m	50							
	60 m	60							
	70 m	70							
	80 m	80							
	90 m	90							
II	Mounting method	2inch pipe			T				
		Wall			S				
III	Additional specification 1	None				X00			
		Cable-retaining flange	JIS10K-50A ^{*2}			F05			
		Cable-retaining flange	JIS10K-80A ^{*2}			F08			
		Cable-retaining flange	JIS10K-100A ^{*2}			F10			
		Cable-retaining flange	JIS10K-150A ^{*2}			F15			
		For mounting a high load resistance onsite meter				B07			
		Built-in meter (standard scale (0-100 %))				M00			
		Built-in meter (engineering unit scale) ^{*3}				G00			
		Electrical conduit 1/2 NPT				N00			
		Rubber diaphragm ^{*4}				P00			
		Buff finish of connection metal section ^{*10}				R00			
		Chain length (with weight)	5 m ^{*5 *6}			W05			
			6 m ^{*5 *6}			W06			
			7 m ^{*6}			W07			
			8 m ^{*6}			W08			
			9 m ^{*6}			W09			
			10 m ^{*6}			W10			
			11 m ^{*6}			W11			
			12 m ^{*6}			W12			
			13 m ^{*6}			W13			
			14 m ^{*6}			W14			
			15 m ^{*6}			W15			
			16 m ^{*6}			W16			
			17 m ^{*6}			W17			
			18 m ^{*6}			W18			
			19 m ^{*6}			W19			
			20 m ^{*6}			W20			
			25 m ^{*6}			W25			
			30 m ^{*6}			W30			
			40 m ^{*6}			W40			
			50 m ^{*6}			W50			
			60 m ^{*6}			W60			
			70 m ^{*6}			W70			
	80 m ^{*6}			W80					
	Weight diameter Φ150 ^{*7 *12}			E15					
	Weight diameter Φ200 ^{*7 *12}			E20					
	Weight diameter Φ250 ^{*7 *12}			E25					
	No leg (with weight) ^{*7 *12}			EXX					
IV	Additional specification 2	None (downscale under abnormal conditions)				XX0			
		Upscale under abnormal conditions ^{*11}				A50			
		No burnout indication under abnormal conditions ^{*11}				A60			
		Oil free ^{*8}				D10			
		Test report				T10			
		Mill sheet ^{*9 *10}				T20			
		Test report (with traceability certificate)				T30			
		Photo ^{*13}				T40			

- *1. Only JTL32_ can be selected if the length of the cable is less than 7 m. (JTL33_ cannot be selected.)
- *2. Standard for flange: JIS B 2220 (2012)
- *3. Specify details of the engineering unit scale when ordering. For applicable ranges, refer to Table 3.
- *4. Additional specification 1: P00 (rubber diaphragm) can only be selected for JTL3_2 (for seawater). For JTL3_1 (sludge, wastewater, sewage), no selection is needed (selection is disabled) as it is equipped with a rubber diaphragm as standard equipment. For JTL3_0 (for tap water), the selection is disabled.
- *5. Only JTL32_ can be selected if the length of the weight's chain is less than 7 m. (JTL33_ cannot be selected.)
- *6. The selection is disabled as JTL3_2 (for seawater) is not equipped with the weight or chain.
- *7. If E15, E20, E25, or EXX is not specified for additional specification 1, the weight diameter is 300 mm.
- *8. Outer surface treatment of Probe (except for cables, chain, and weight)
- *9. Measures for wetted parts (except for cables, chain, bolts, and weight)
- *10. This option cannot be selected for JTL3_2 (for seawater).
- *11. If either A50 or A60 is not selected, the abnormal burnout direction is the lower limit direction.
- *12. Chain length (with weight) should be selected.
- *13. Inform our sales department of (1) the method of photographing, and (2) what to write on the nameplate.

Table 3. Engineering unit scale correspondence table

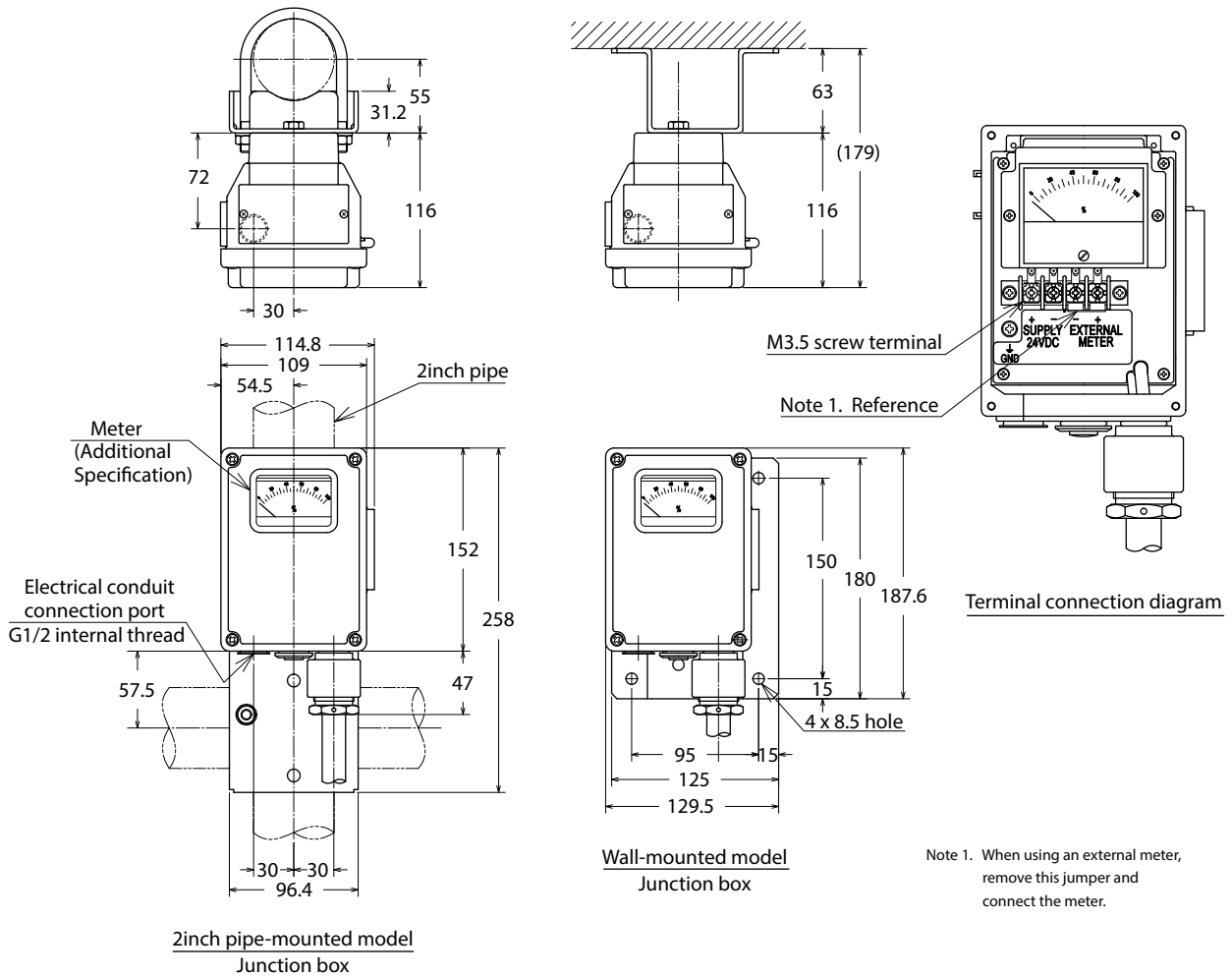
Number of significant digits of scale	3.0 (sign and decimal point are not included)
Sign	For zero or a positive number: unsigned For a negative number: - (minus)
Scale color	Black
Multiple scales	Single
Scale type	Equally divided
Combined use of exponents and multiples of decimal fractions	Possible Example: Exponent (×10, ×10 ² , ×10 ³ , etc.) Multiples of decimal fractions (×0.1, ×0.01, ×0.001, etc.)
Display units	m, cm, mm, m ³ , l, kg, t

Note: The number of decimal places of the range lower and upper limits must be the same. However, if the lower limit is 0 (one character), this restriction does not apply, and a value with decimal places (X.XX or XX.X) can be used for the upper limit.

External Dimensions

■ **Junction box**

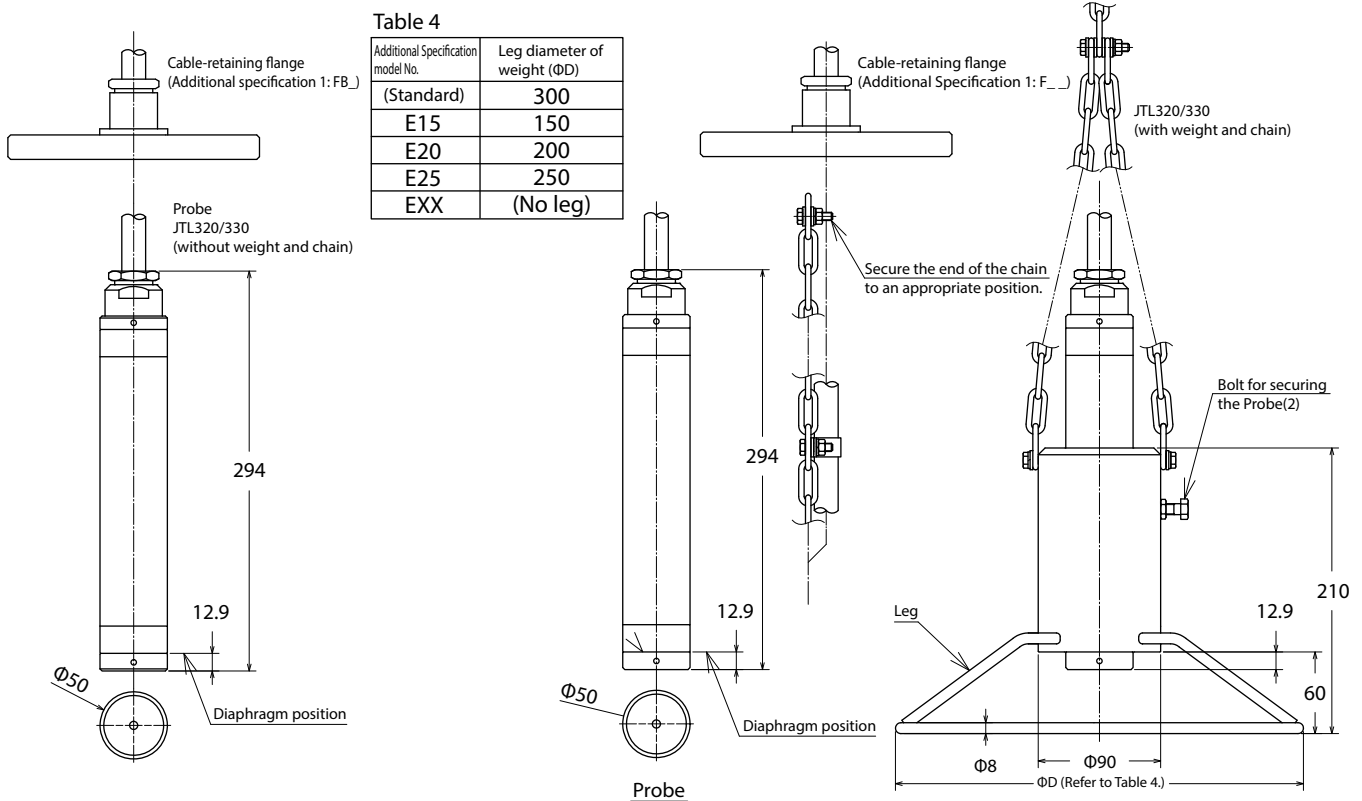
(Unit: mm)



■ **Probe**

● **JTL320/330**

(Unit: mm)

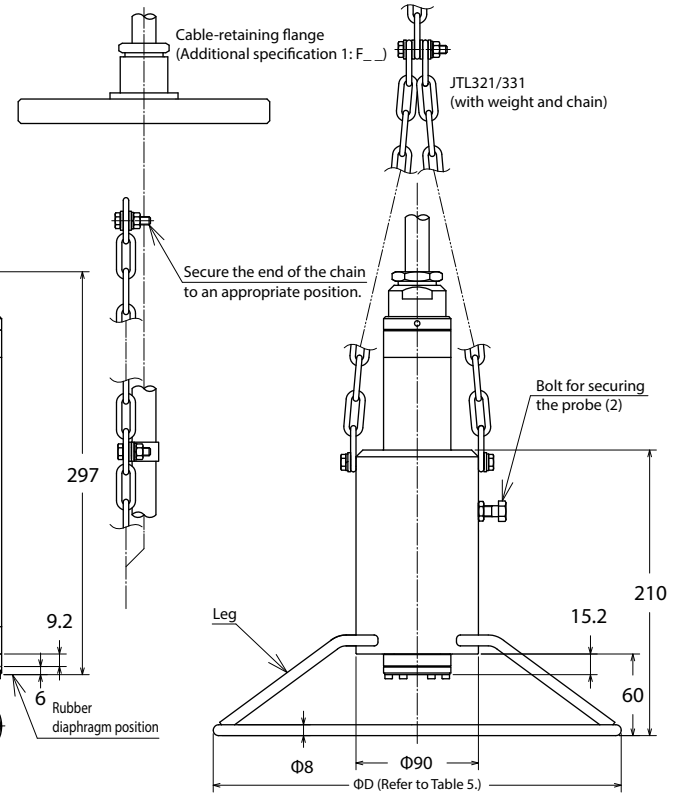
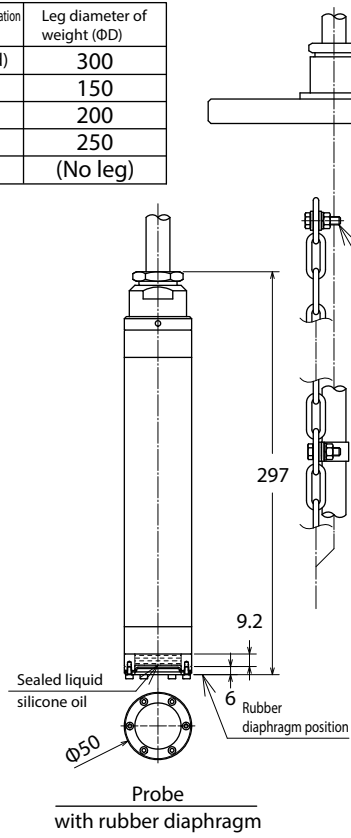
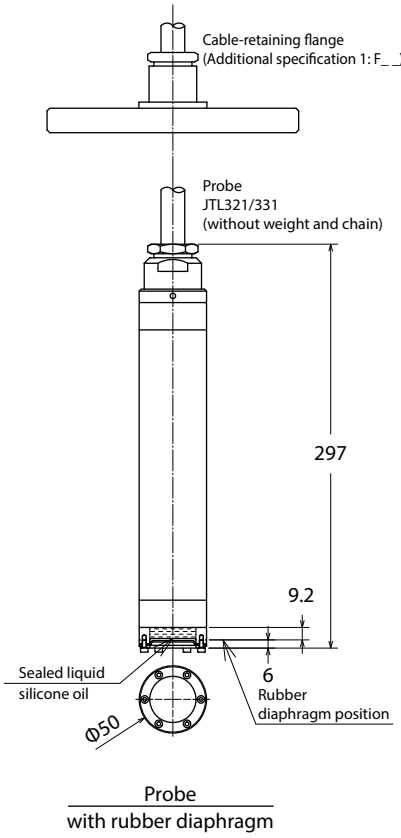


● JTL321/331

(Unit: mm)

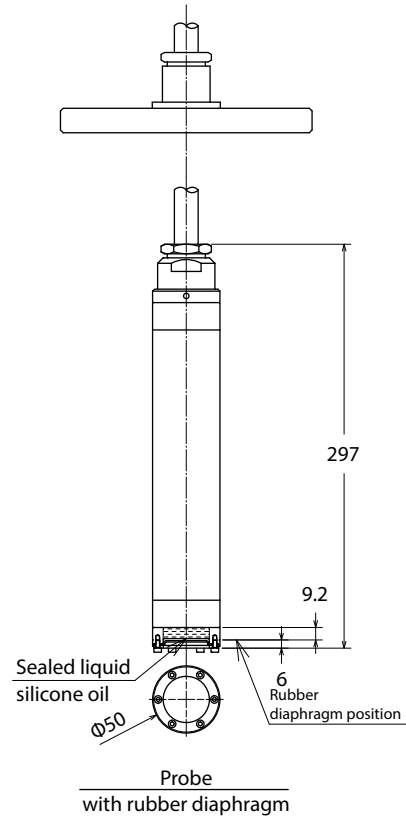
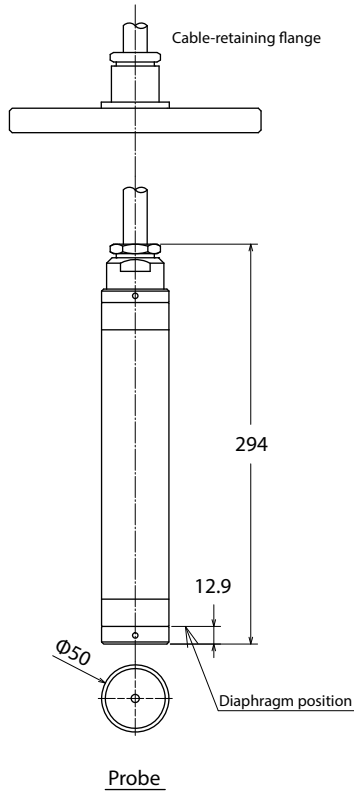
Table 5

Additional Specification model No.	Leg diameter of weight (ΦD)
(Standard)	300
E15	150
E20	200
E25	250
EXX	(No leg)



● JTL322/332

(Unit: mm)



● Cable-retaining flange

(Unit: mm)

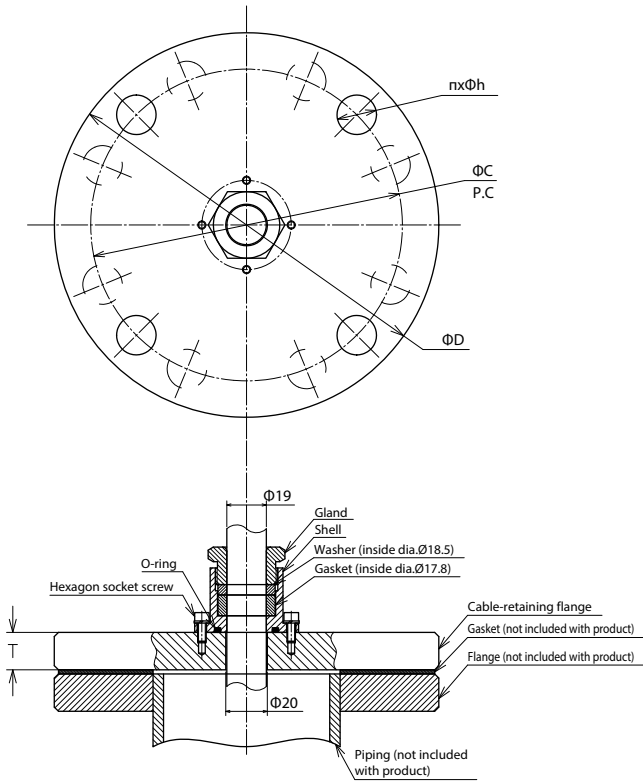


Table 6

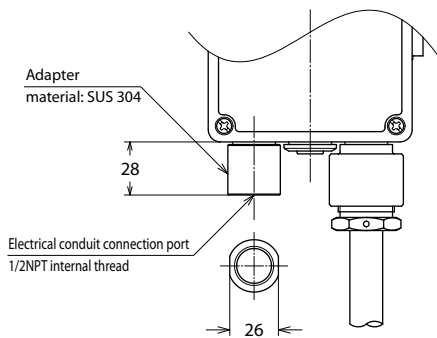
Add'l model No.	Flange rating	ΦD	T	ΦC	n	Φh
F05	JIS10K 50A	155	16	120	4	19
F08	JIS10K 80A	185	18	150	8	19
F10	JIS10K 100A	210	18	175	8	19
F15	JIS10K 150A	280	22	240	8	23

Material: Gasket and O-ring: Chloroprene rubber
Other: SUS304

Note: The cable-retaining flange is for holding the hollow cable.
It is not intended to seal pressure.

● Electrical Conduit 1/2 NPT
(Additional Specification 1: N00)

(Unit: mm)



Please read "Terms and Conditions" from the following URL before ordering and use.
<https://www.azbil.com/products/factory/order.html>

Specifications are subject to change without notice.

azbil

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