TECHNICAL GUIDANCE

2-wire System Guided Radar Gauge

TGF6200

Micro Pulse Level Meter for Powders and Granules

OUTLINE

The **TGF6200** is a 2-wire continuous level measuring instrument using TDR technology.
The simple and compact design suitable for tank-top installation with no moving parts achieves high cost performance with maintenance-free and low-cost installation.
This continuous level meter can perform continuous level measurement in a wide range of applications including powders and granules using a single probe for the sensor.
The keypad operation on the front display allows easy parameter setting including zero-point adjustment and measurement range.
This level meter is suitable for powder level control and capacity management of silos.

FEATURES

- ❏ Overall cost reduction achieved by the 2-wire system
- ❏ A wide range of applications enabled by the TDR method
- ❏ A broad operating range from -50°C to 200°C and from vacuum to 4.0 MPa
- ❏ Measurements are not affected by changes in temperature, pressure, or density
- ❏ Possible to measure powders and granules
- ❏ Switch output (option) is available in addition to analog output (4 to 20 mA DC)
- ❏ Japanese display is available in addition to English
- ❏ Remote type housing is available in addition to compact type housing to meet a broad range of installation requirements
- ❏ Possible to check and change the parameters without opening the cover
- ❏ Possible to remove and rotate the converter housing without opening the measurement tank
- ❏ Maintenance free as there are no moving parts

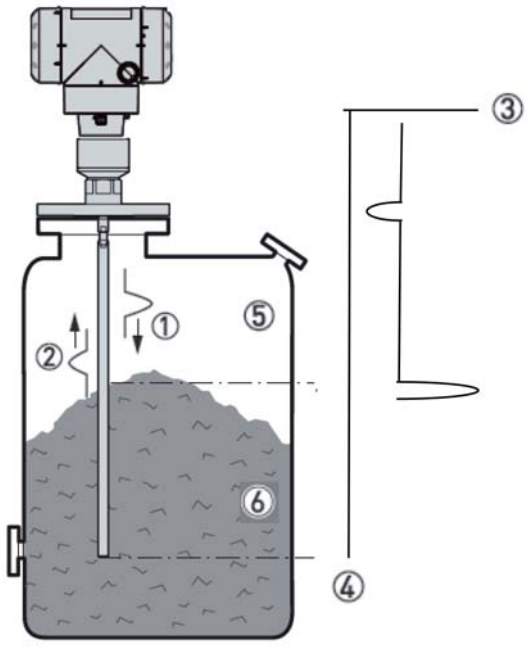
MEASURING PRINCIPLE

The TGF6200 is a continuous level meter using a proven technology called Time Domain Reflectometry (TDR). The level meter intermittently transmits a very low output electromagnetic pulse called a micropulse to the measuring object along a conductor called a probe.
The transmitted micropulse travels at a very high speed along the probe and reflects on the interface of gas and powders, granules, etc. The reflected micropulse travels back along the probe and is received by the level meter.

The time of the micropulse traveling from the level meter to the measurement surface can be obtained by dividing the measured time of the micropulse that is transmitted and received by the level meter by a factor of 2. The spatial distance from the level meter to the measuring object can be calculated from the traveling speed of the micropulse.

The measured spatial distance is converted to a level value from the preset reference point or converted to a mass value from a conversion table, and these values are output as current signals according to the settings of the output range.

The traveling speed of the micropulse is almost constant. The measurement results are affected very little by changes in the temperature or pressure inside the measurement tank, and also are not affected by changes in the temperature of the measuring object, or changes in the dielectric constant or bulk specific gravity.



① Transmitted pulse
② Reflected pulse
③ Signal waveform
④ Measurement range
⑤ Air: $\varepsilon r \fallingdotseq 1$
⑥ Measuring object: Dielectric constant $\varepsilon r > 1.6$ (in direct mode)
$\varepsilon r > 1.1$ (in TBF mode)

TOKYO KEISO CO., LTD.

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STANDARD SPECIFICATIONS

Object	Item		Description
Measuring object	Measuring material		Powders, granules
	Measuring principle		Time Domain Reflectometry (TDR)
	Output variables		Level, distance, mass, volume
Probe type	TGF6221		Single cable probe (ø8 mm)
Output	Current output	Output 1	4 to 20 mA DC or 3.8 to 20.5 mA DC
		Output 2 (option)	4 to 20 mA DC or 3.8 to 20.5 mA DC
		Resolution	±3μA
		Temperature drift	Analog value: 50 ppm/K, digital value: ±15 mm (maximum specified temperature range)
		Error output	22 mA DC, 3.6 mA DC, fixed (select from parameters)
		Load resistance *1	The allowable load resistance varies with the supplied power voltage. See “Power supply voltage.”
	Switch output	Output (option)	Relay (1 contact, normal open)
		Contact capacity	24 V DC / 6 A, 24 V AC / 6 A: non-explosionproof, flameproof 24 V DC / 1.1 A, 24 V AC / 1.1 A: intrinsically safe
			0.04 to 288 W (VA)
Accuracy: depend on reference conditions	Accuracy		±3 mm (less than 10 m), ±0.03 % / R.D. (10 m or more) Reference conditions (at calibration) Temperature: 15°C to 25°C Pressure: 1013 mbar (a) ±50mbar Humidity: 60% ±15% Target: Metal plate
			TBF mode: ±20 mm
	Resolution		0.1 mm
	Repeatability		±1 mm
Measure-ment conditions	Process connection temperature		-40 to +200°C (sealing material: FPM / FKM) -50 to +150°C (sealing material: EPDM) -20 to +200°C (sealing material: Kalrez® 6375)
	Pressure		0 kPa (abs) to 4.0 MPa
	Dielectric constant *2		1.6 or more
			1.1 or more: TBF mode
	Maximum rate of change		100 m/min (dependent on measurement conditions)
Level meter specs	Protection class		IEC60529: IP66 / IP68
			NEMA250: NEMA250: NEMA type 4X/6 (Converter housing), 6P (Probe housing)
	Ambient temperature	Without display	-40 to +80°C
		With display	-20 to +60°C (Display turns off automatically when temperature is out of range)
	Storage temperature		-50 to +85°C (Meter with display: -40°C to +85°C)
Electric connection	Type		2-wire loop powered
	Power supply	Output 1 (4 to 20 mA DC)	Rated voltage: 24 V DC
			Allowable range: 11.5 to 30 V DC: Non-explosionproof, intrinsically safe (Ex i)
			Allowable range: 13.5 to 34 V DC: Flameproof (Ex d)
		Output 2 (4 to 20 mA DC)	Rated voltage: 24 V DC
			Allowable range: 11.5 to 30 V DC: Non-explosionproof, intrinsically safe (Ex i)
			Allowable range: 11.5 to 34 V DC: Flameproof device (Ex d)
		Output 2 (Switch output)	Rated voltage: 24 V DC
			Allowable range: 11.5 to 30 V DC / 30 mA: Intrinsically safe (Ex i)
			Allowable range: 11.5 to 34 V DC / 30 mA: Non-explosionproof, flameproof (Ex d)
	Cable entry		M20 × 1.5 female thread, 1/2” NPT female thread, G1/2 female thread (option)
	Cable outer diameter		Output 1: 6 to 7.5 mm: Non-explosionproof, intrinsically safe (Ex i), 7 to 10 mm: Flameproof device (Ex d) Output 2: 6 to 12 mm: Non-explosionproof, intrinsically safe (Ex i), 7 to 12 mm: Flameproof device (Ex d)
	Terminal		0.5 to 2.5 mm^2
Material	Housing		Aluminum alloy (polyester coating), stainless steel (SS316L)
	Process connection part		Stainless steel (SS316L)
	Probe		See “Probe specifications”
	Seal		FKM / FPM, EPDM, Karlez® 6375
Process connection	Thread		G male thread, NPT male thread
	Flange		JIS RF flange, ASME RF flange
Display	Display		LCD 128 × 64 pixels in 8-step greyscale
			English, Japanese, others
	Keypad		4 buttons (right, enter, up, down keys) Operation by push button or magnet

*1: See “Power supply voltage” for the level meter terminal voltage at 22 mA output.
*2: The minimum dielectric constant of measuring objects varies depending on the measurement conditions.
Measurement may not be possible in some measurement conditions.

PROBE SPECIFICATIONS

Probe type / length	TGF6221	Single cable probe (Ø8 mm) / 1 to 40 m	
Minimum dead zone length / non-linearity range	Type	Top dead zone / non-linearity range	Bottom dead zone
	TGF6221: Single cable probe with a counter weight of Ø12 × 100 mm	50 mm / +150 mm	20 mm
	TGF6221: Single cable probe with a counter weight of Ø38 × 245 mm	50 mm / +150 mm	270 mm
	Above figures are minimum lengths of dead zone when auto setup is performed. Dead zone length may require more than above depending on measurement conditions. See “MEASUREMENT LIMITS”		
Probe materials	TGF6221: Single cable probe (Ø8 mm)	Stainless steel (SS316) * Process connection part, counter weight: Stainless steel (SS316L), other: PTFE	

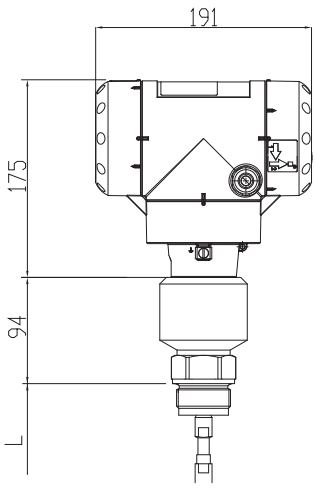
DIMENSIONS

Housing and process connection

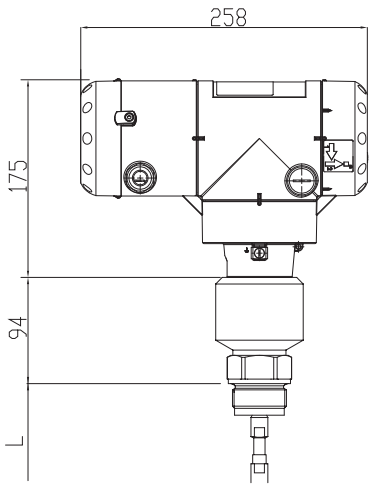
Compact type housing

・Process connection: Thread

Non-explosionproof and intrinsically safe 1 output

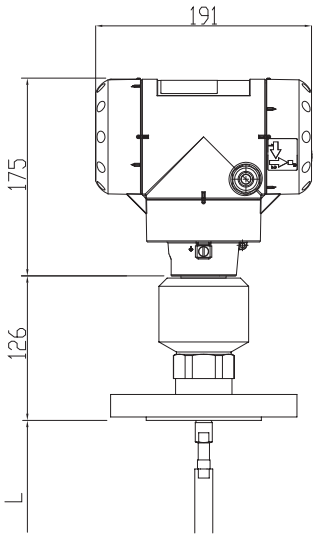


Flameproof and 2 outputs

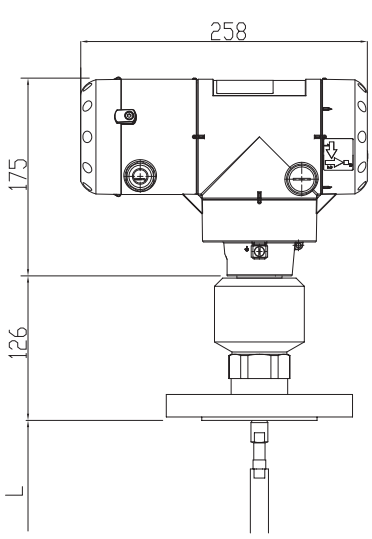


・Process connection: Flange

Non-explosionproof and intrinsically safe 1 output

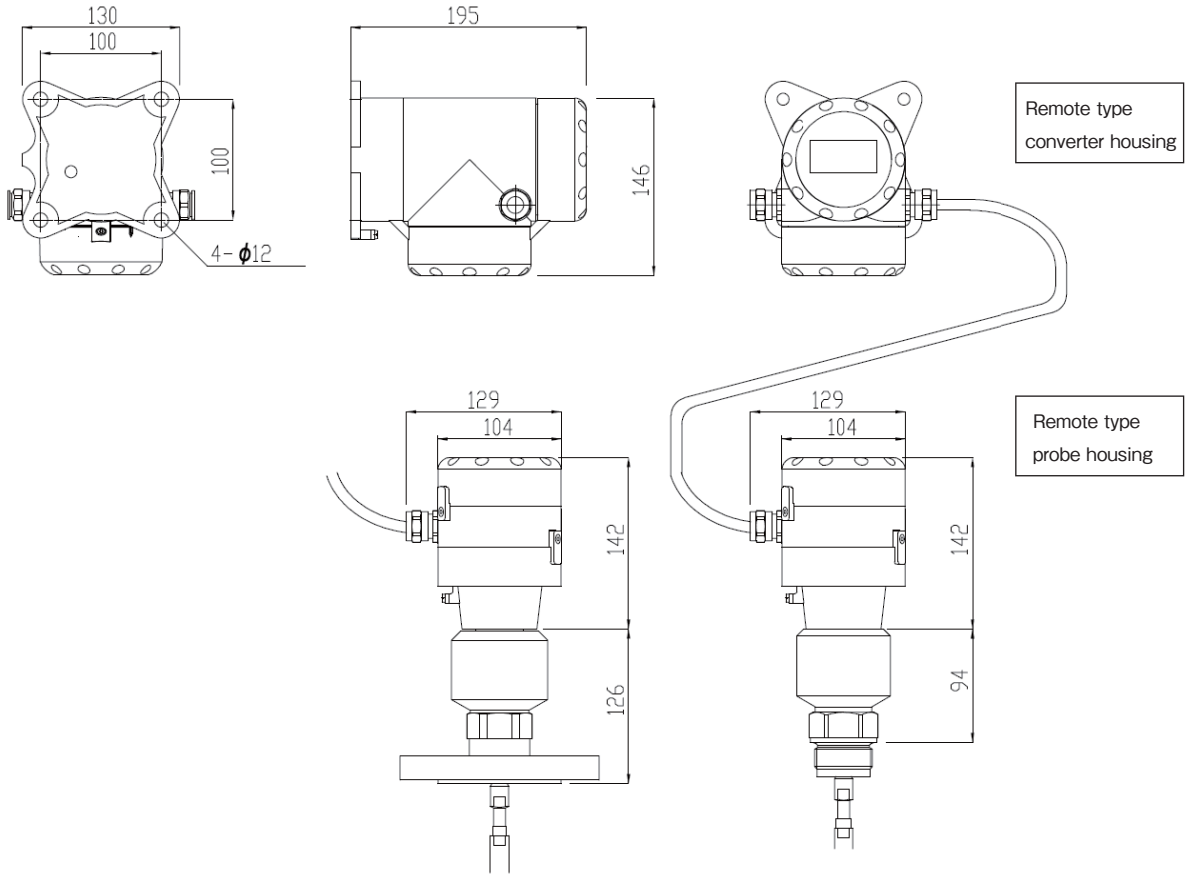


Flameproof and 2 outputs

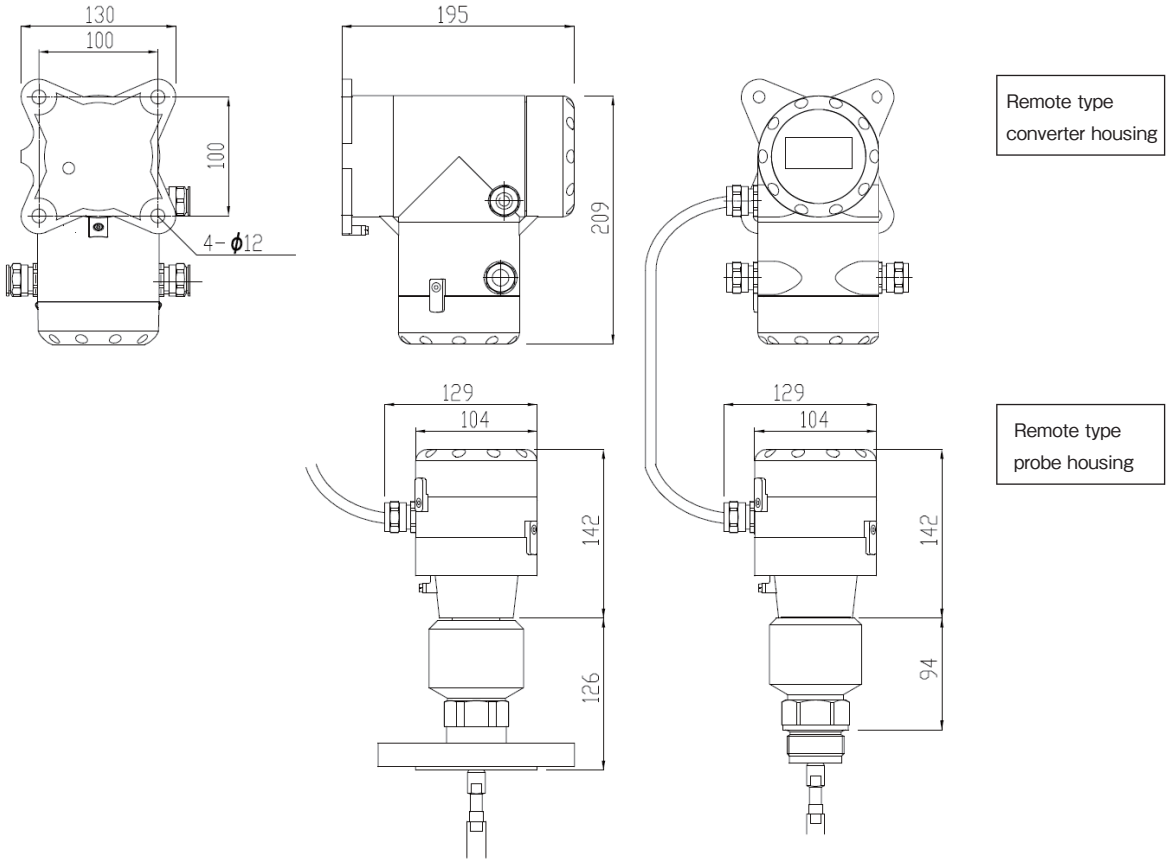


Remote type housing

Non-explosionproof and intrinsically safe 1 output

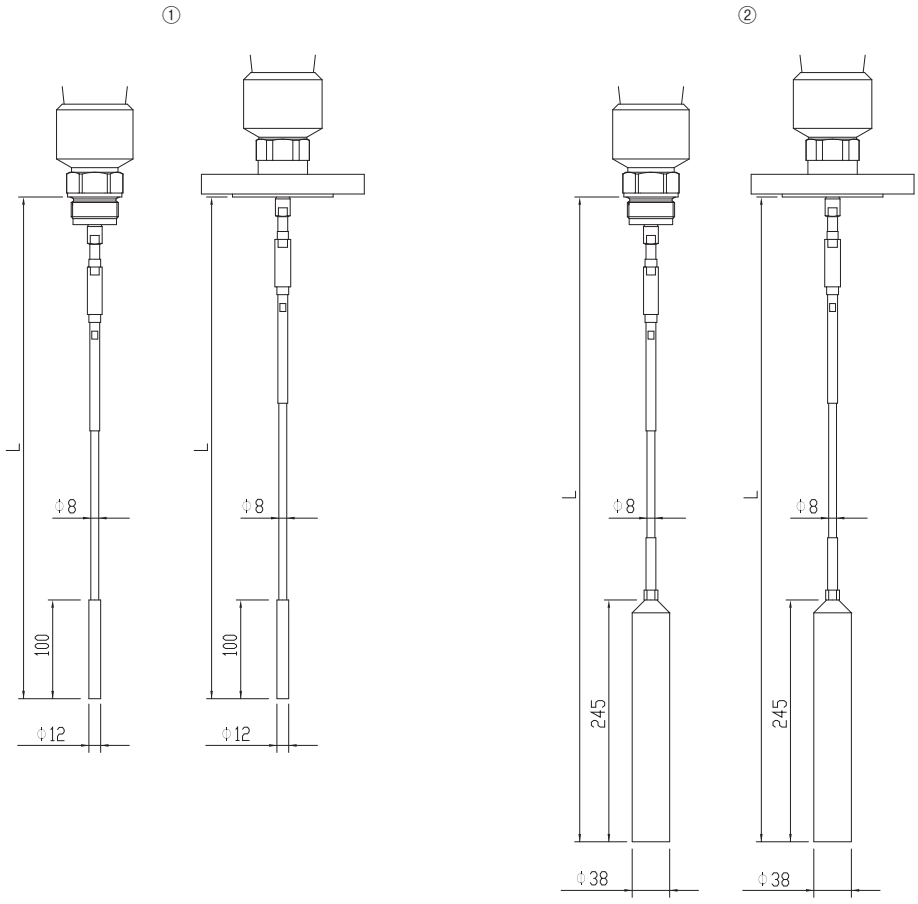


Flameproof and 2 outputs



Probe

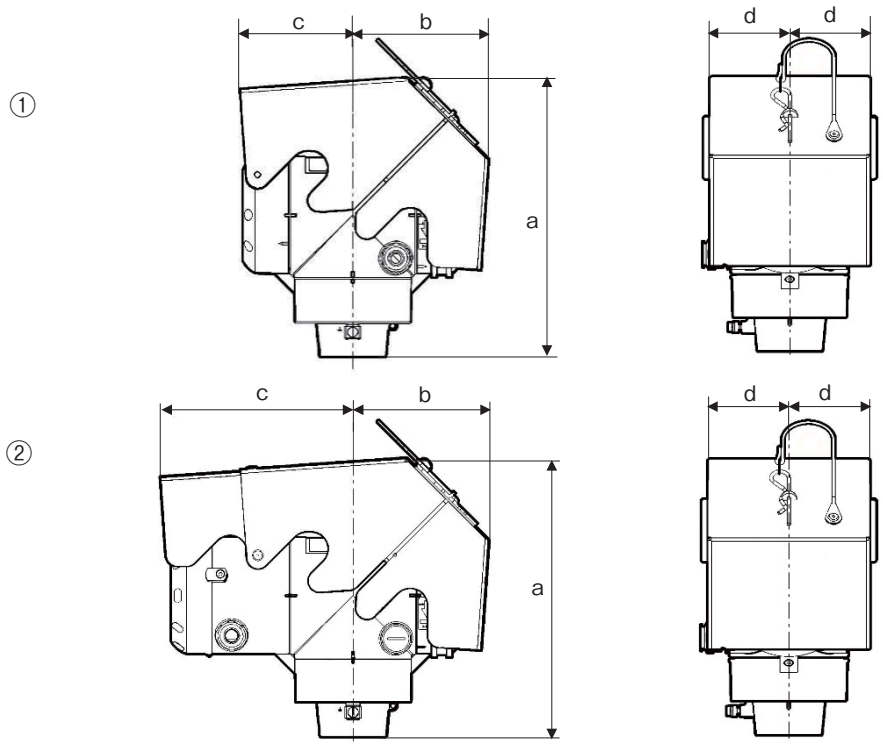
Single cable probe



① Single cable probe
(with a counter weight of ø12 × 100 mm)

② Single cable probe
(with a counter weight of ø38 × 245 mm)

Weather protection



Housing type	Dimension [mm]			
	a	b	c	d
① For non-explosionproof and intrinsically safe 1 output	243	118	96	77
② For flameproof and 2 outputs	243	118	166	77

Mass

Housing

Housing type	Mass [kg]	
	Aluminum housing	Stainless steel housing
Non-explosionproof and intrinsically safe 1 output housing		
Compact type housing	2.8	6.4
Remote type converter housing	2.5	5.9
Remote type probe housing	1.8	3.9
Flameproof, 2 outputs housing		
Compact type housing	3.2	7.5
Remote type converter housing	2.9	7.1
Remote type probe housin	1.8	3.9

Weather protection

Housing type	Mass [kg]
Non-explosionproof and intrinsically safe 1 output housing	1.3
Flameproof and 2 outputs housing	1.5

Probe

Probe type	Mass *1 [kg/m]
Single cable probe Ø8 mm	0.4

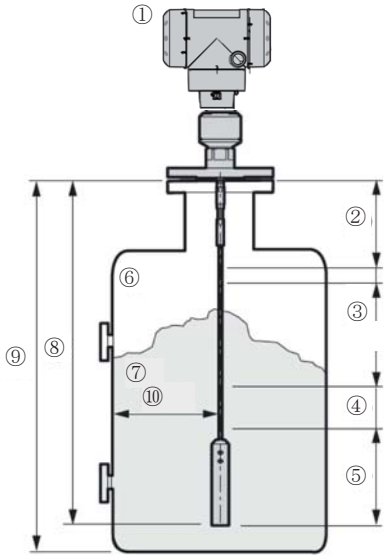
*1 Counter weight and flange are not included in the mass.

Process connection part

Process connection part	Mass [kg]
Thread connection	2.5
Flange connection	4 to 36.5

MEASUREMENT LIMITS

Single probes



① Single cable probe
② Top dead zone: Top part of the probe where measurement is not possible
③ Top non-linearity zone: Top part of the probe where accuracy is out of guaranteed range
④ Bottom non-linearity zone: Bottom part of the probe where accuracy is out of guaranteed range
⑤ Bottom dead zone: Bottom part of the probe where measurement is not possible
⑥ Gas phase
⑦ Measuring object
⑧ Probe length
⑨ Measurement tank height
⑩ Required minimum distance (from the probe to a tank wall): 300 mm

Dead zone and non-linearity zone

Dielectric constant of measuring object (εr)	>40		≤40	
Dead zone	Top ②	Bottom ⑤	Top ②	Bottom ⑤
Single cable probe ø8 mm (with a counter weight of ø12 × 100 mm)	50	20	50	60
Single cable probe ø8 mm (with a counter weight of ø38 × 245 mm)	50	270	50	370

(mm)

Dielectric constant of measuring object (εr)	>40		≤40	
Non-linearity zone	Top ③	Bottom ④	Top ③	Bottom ④
Single cable probe ø8 mm (with a counter weight of ø12 × 100 mm)	150	0	150	0
Single cable probe ø8 mm (with a counter weight of ø38 × 245 mm)	150	0	150	0

(mm)

Note: Values are those when auto setup is performed. When auto setup is not performed, the values in the dead zone and non-linearity zone will increase.

WIRING

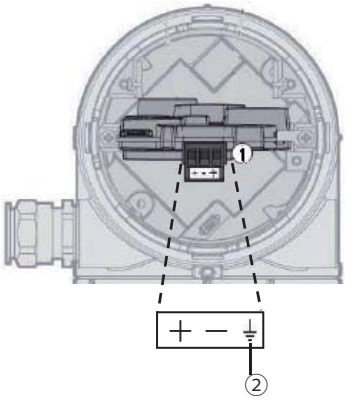
Terminals

Compact type converter housing

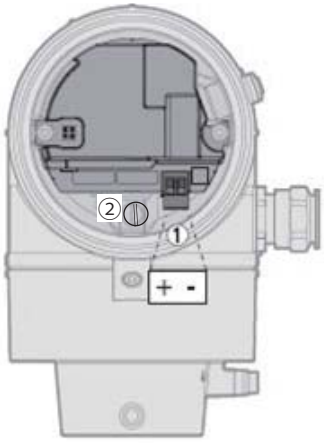
Current output (1 output)

① Power supply terminal (for level meter operation and current output 1)
② Grounding terminal inside housing (for shielded signal cable)
③ Grounding terminal (at the lower part of the converter housing)

Standard(Non-Ex)/Intrinsically safe

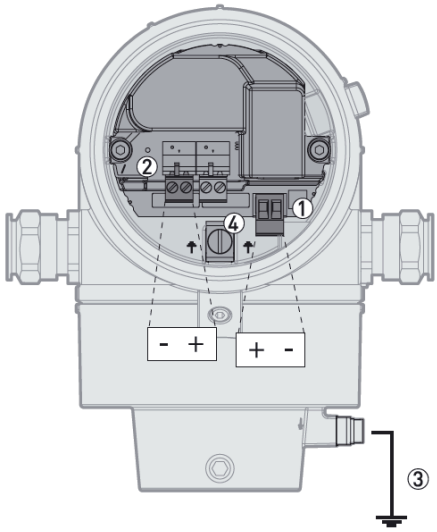


Flameproof



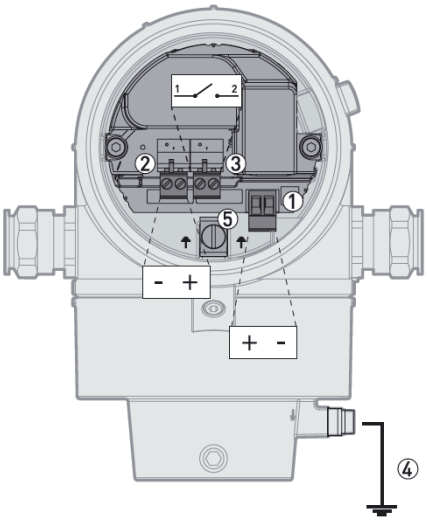
Current output (2 outputs)

① Power supply terminal (for level meter operation and current output 1)
② Power supply terminal (for current output 2)
③ Grounding terminal (at the lower part of the converter housing)
④ Grounding terminal inside housing (used shielded signal cable)



Current output (1 output) + switch output

① Power supply terminal (for level meter operation and current output 1)
② Power supply terminal (for switch output)
③ Switch output terminal
④ Grounding terminal (at the lower part of the converter housing)
⑤ Grounding terminal inside housing (for shielded signal cable)

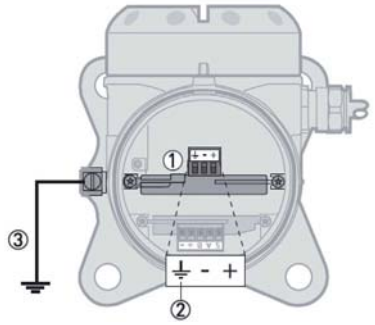


Remote type converter housing

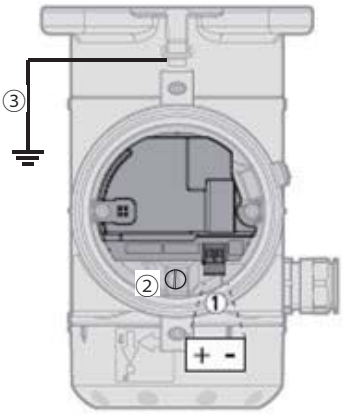
Current output (1 output)

① Power supply terminal (for level meter operation and current output 1)
② Grounding terminal inside housing (for shielded signal cable)
③ Grounding terminal (for mount support)

Standard(Non-Ex)/Intrinsically safe

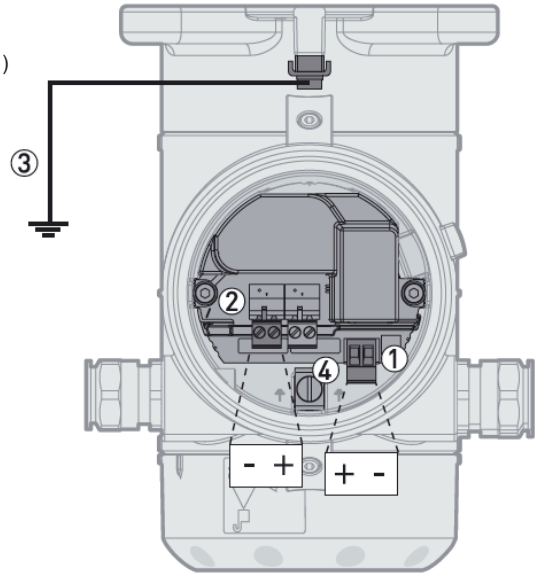


Flameproof



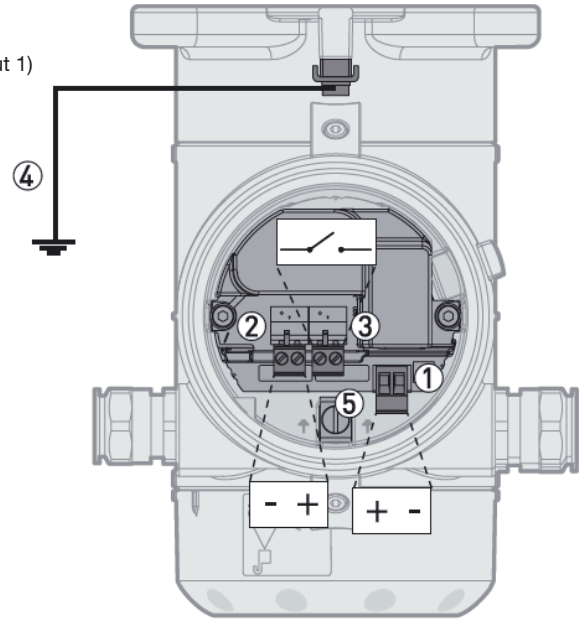
Current output (2 outputs)

① Power supply terminal (for level meter operation and current output 1)
② Power supply terminal (for current output 2)
③ Grounding terminal (for mount support)
④ Grounding terminal inside housing (for shielded signal cable)

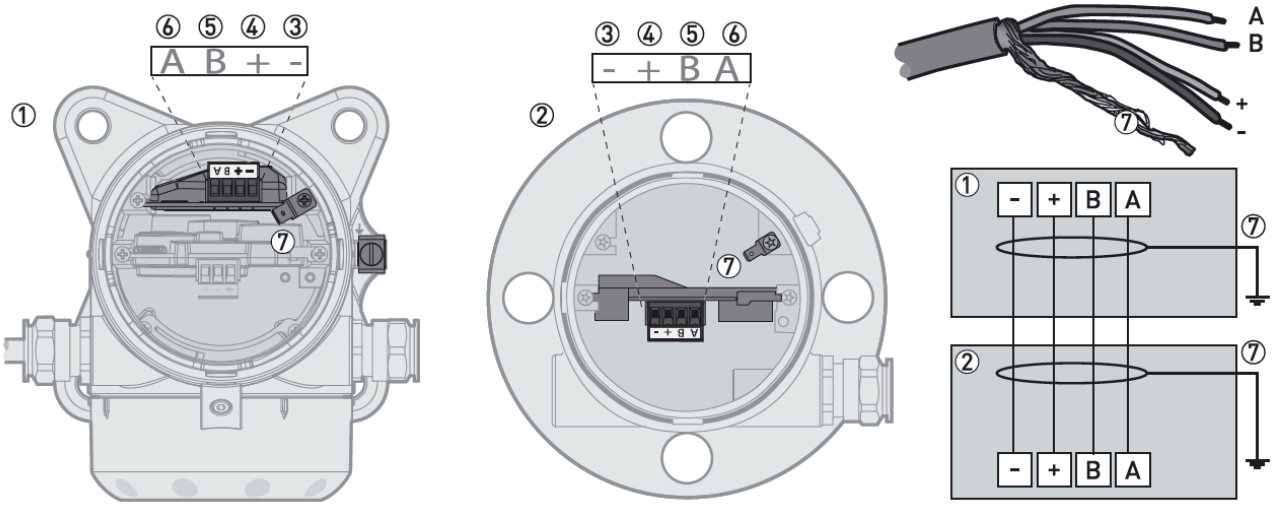


Current output (1 output) + switch output

① Power supply terminal (for level meter operation and current output 1)
② Power supply terminal (for switch output)
③ Switch output terminal
④ Grounding terminal (for mount support)
⑤ Grounding terminal inside housing (for shielded signal cable)



Wiring connection between remote type converter and probe

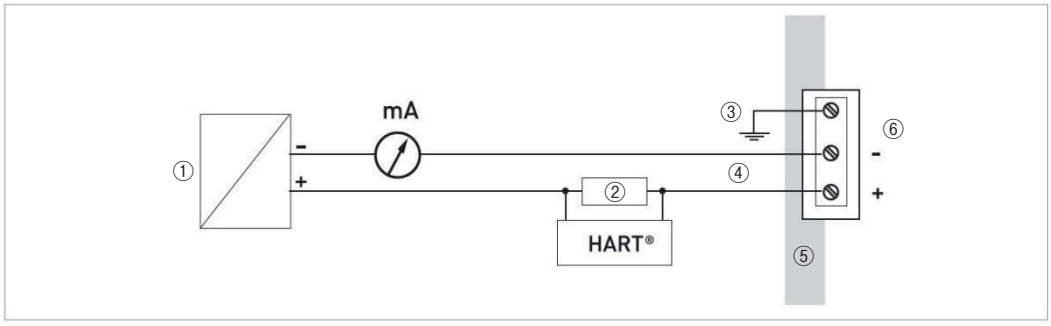


① Remote type converter housing
② Remote type probe housing
③ Power supply cable (–)
④ Power supply cable (+)
⑤ Digital communication cable (B)
⑥ Digital communication cable (A)
⑦ Shielded wire connected to the grounding terminals inside converter housing and probe housing

Wiring

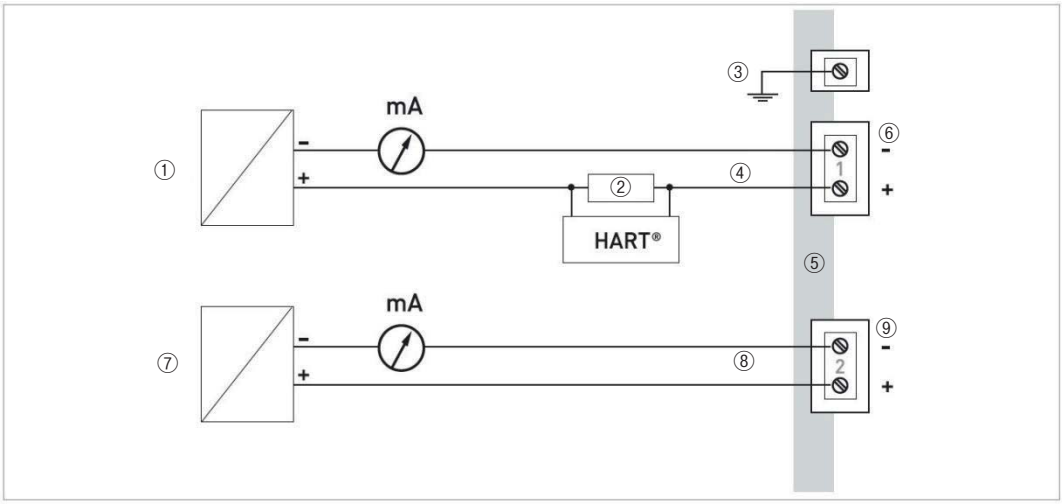
- Use a 0.5 to 2.5 mm2 stranded cable for the signal cable.
- Strip the cable sheath 5 to 7 mm and insert it into the terminal.
- Lay the signal cable away from power cables.
- Separate the power supply from the power supply of other devices.
- We recommend to use a shielded cable.

When using with current output (1 output)



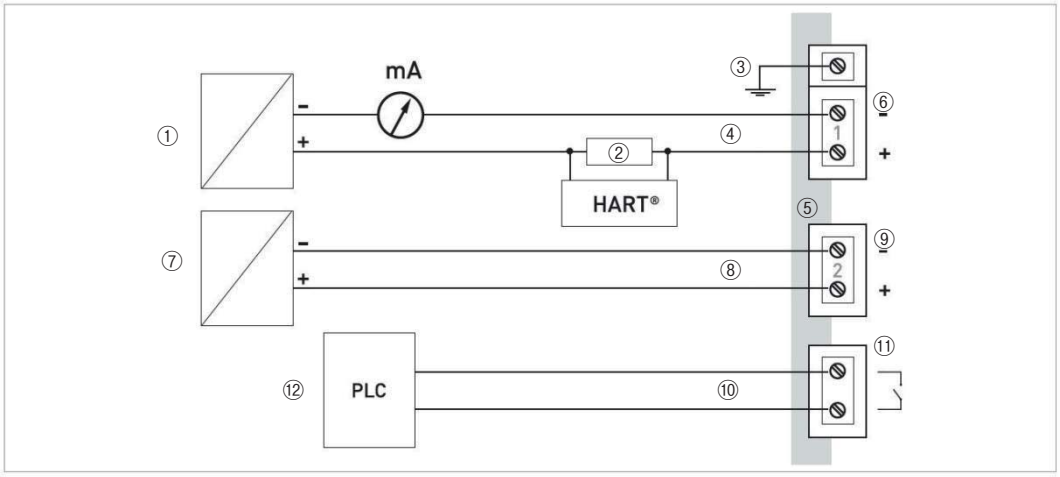
① Power supply for level meter operation and output 1
② Resistance for HART communication (required when using the HART communication)
③ Grounding
④ Level meter operation power supply and output 1 cables: 2-wire loop powered system (supplying 24 V DC and outputting 4 to 20 mA DC)
⑤ Level meter terminals
⑥ Level meter operation power supply and output 1 terminal

When using with current output (2 outputs)



① Power supply for level meter operation and output 1
② Resistance for HART communication (required when using the HART communication)
③ Grounding
④ Level meter operation power supply and output 1 cables: 2-wire loop powered system (supplying 24 V DC and outputting 4 to 20 mA DC)
⑤ Level meter terminals
⑥ Level meter operation power supply and output 1 terminal
⑦ Power supply for output 2
⑧ Output 2 cable: 2-wire loop powered system (supplying 24 V DC and outputting 4 to 20 mA DC)
⑨ Output 2 terminal

When using with current output (1 output) + switch output



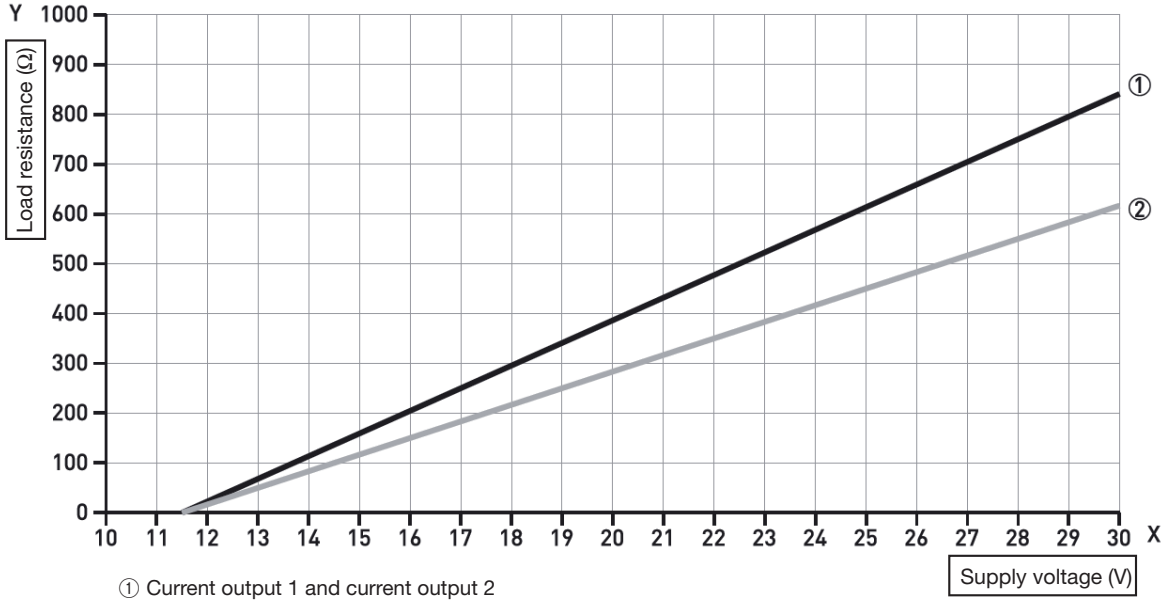
① Power supply for level meter operation and output 1
② Resistance for HART communication (required when using the HART communication)
③ Grounding
④ Level meter operation power supply and output 1 cables: 2-wire loop powered system (supplying 24 V DC and outputting 4 to 20 mA DC)
⑤ Level meter terminals
⑥ Level meter operation power supply and output 1 terminal
⑦ Switch output power supply
⑧ Switch output power supply cable: Supplying 24 V DC
⑨ Switch output power supply terminal
⑩ Switch output cable
⑪ Switch output terminal
⑫ PLC, sequencer, etc.

POWER SUPPLY

The following graph shows the minimum supply voltage when a load resistance is included in the loop.
*: Minimum required voltage at a current output of 22 mA (and switch output of 30 mA) at the level meter terminals

Non-explosionproof and intrinsically safe level meter

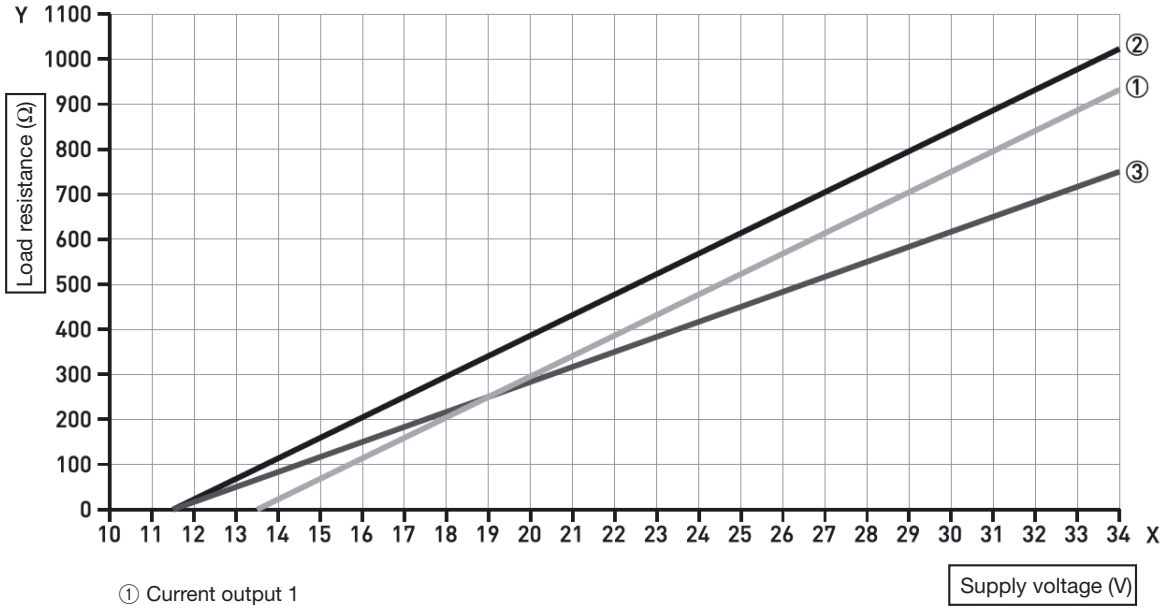
Supply voltage: 11.5 to 30 V DC



① Current output 1 and current output 2
② Switch output

Flameproof level meter

Supply voltage: 13.5 to 34 V DC (11.5 to 34 V DC)



① Current output 1
② Current output 2
③ Switch output

EXPLOSIONPROOF SPECIFICATIONS

Japan explosionproof (TGF6200C-JEx, TGF6200F-JEx)
Certificate No.: CML 22JPN2442X
Marking:

Compact type (C) or remote type sensor (probe) housing (S)	
Ex ia IIC T6...T3 Ga/Gb Ex ia/db IIC T6...T3 Ga/Gb	Ex ia IIIC T85°C...T*°C Da/Db Ex ia/tb IIIC T85°C...T*°C Da/Db

Remote type converter housing (F) or remote type converter housing + remote type sensor (probe) housing (D)	
Converter housing	
Ex ia [ia Ga] IIC T6...T4 Gb Ex db ia [ia Ga] IIC T6...T4 Gb	Ex ia [ia Da] IIIC T85°C...T135°C Db Ex ia tb [ia Da] IIIC T85°C...T135°C Db
Sensor (probe) housing	
Ex ia IIC T6...T3 Ga/Gb	Ex ia IIIC T85°C...T*°C Da/Db

T*°C = T150°C or T200°C

ATEX explosionproof
Certificate No.: CSANe 22ATEX1038X
Marking:

Compact type (C) or remote type sensor (probe) housing (S)			
II 1/2 G	Ex ia IIC T6...T3 Ga/Gb Ex ia/db IIC T6...T3 Ga/Gb	II 1/2 D	Ex ia IIIC T85°C...T*°C Da/Db Ex ia/tb IIIC T85°C...T*°C Da/Db

Remote type converter housing (F) or remote type converter housing + remote type sensor (probe) housing (D)			
Converter housing			
II 2 (1) G	Ex ia [ia Ga] IIC T6...T4 Gb Ex db ia [ia Ga] IIC T6...T4 Gb	II 2 (1) D II 1/2 D	Ex ia[ia Da] IIIC T85°C...T135°C Db Ex ia tb[ia Da] IIIC T85°C...T135°C Db
Sensor (probe) housing			
II 1/2 G	Ex ia IIC T6...T3 Ga/Gb	II 1/2 D	Ex ia IIIC T85°C...T*°C Da/Db

T*°C = T150°C or T200°C

IECEx explosionproof
Certificate No.: IECEx CSAE 22.0026X
Marking:

Compact type (C) or remote type sensor (probe) housing (S)	
Ex ia IIC T6...T3 Ga/Gb Ex ia/db IIC T6...T3 Ga/Gb	Ex ia IIIC T85°C...T*°C Da/Db Ex ia/tb IIIC T85°C...T*°C Da/Db

Remote type converter housing (F) or remote type converter housing + remote type sensor (probe) housing (D)	
Converter housing	
Ex ia [ia Ga] IIC T6...T4 Gb Ex db ia [ia Ga] IIC T6...T4 Gb	Ex ia [ia Da] IIIC T85°C...T135°C Db Ex ia tb [ia Da] IIIC T85°C...T135°C Db
Sensor (probe) housing	
Ex ia IIC T6...T3 Ga/Gb	Ex ia IIIC T85°C...T*°C Da/Db

T*°C = T150°C or T200°C

TGF6200C compact type housing

Temperature class	Maximum surface temperature	Maximum process temperature or maximum process connection part temperature	Maximum ambient temperature	
			Aluminum housing	Stainless steel housing
T6	T85°C	+60°C	+54°C	+54°C
		+85°C	+52°C	+52°C
T5	T100°C	+75°C	+69°C	+69°C
		+100°C	+67°C	+67°C
T4	T135°C	+110°C	+78°C [+70°C *2]	+76°C [+70°C *2]
		+135°C	+71°C [+70°C *2]	+67°C
T3	T200°C	+150°C	+66°C	+62°C
		+180°C *1	+58°C	+51°C
		+200°C *1	+53°C	+44°C

*1: Maximum process connection part temperature is +150°C when sealing material is EPDM.
*2: Values in parentheses are with optional explosionproof cable glands

Temperature class	Maximum surface temperature	Minimum process temperature or minimum process connection part temperature	Minimum ambient temperature	
			Aluminum housing	Stainless steel housing
All	All	–40°C *3	–40°C	–40°C
		–50°C *3	–37°C	–36°C

*3: Minimum process connection part temperature is -20°C when sealing material is Kalrez.
Minimum process connection part temperature is -40°C when sealing material is FKM/FPM.

TGF6200F remote type converter housing

Temperature class	Maximum surface temperature	Maximum process temperature or maximum process connection part temperature	Maximum ambient temperature	
			Aluminum housing	Stainless steel housing
T6	T85°C	+60°C	+50°C	+50°C
		+85°C	+45°C	+44°C
T5	T100°C	+75°C	+65°C	+65°C
		+100°C	+60°C	+59°C
T4	T135°C	+110°C	+77°C [+70°C *2]	+74°C [+70°C *2]
		+135°C	+69°C	+63°C
T3	T200°C	+150°C	+65°C	+56°C
		+180°C *1	+56°C	+43°C
		+200°C *1	+50°C	+35°C

*1: Maximum process connection part temperature is +150°C when sealing material is EPDM.
*2: Values in parentheses are with optional explosionproof cable glands

Temperature class	Maximum surface temperature	Minimum process temperature or minimum process connection part temperature	Minimum ambient temperature	
			Aluminum housing	Stainless steel housing
All	All	–40°C *3	–40°C	–40°C
		–50°C *3	–36°C	–35°C

*3: Minimum process connection part temperature is -20°C when sealing material is Kalrez.
Minimum process connection part temperature is -40°C when sealing material is FKM/FPM.

When using an intrinsically safe [ia] level meter with 4 to 20 mA output, strictly observe the following rated circuit values as maximum values.

	Ui (V)	Ii (mA)	Pi (W)	Ci (nF)	Li (μH)
Power supply / 4 to 20 mA circuit (Output 1 terminal)	30	300	1	7	18
Power supply / 4 to 20 mA circuit (Output 2 terminal)	30	300	0.75	5	2
Switch output circuit	24	1100	25 (VA)	0	0

When using a flameproof level meter, strictly observe the following rated values.

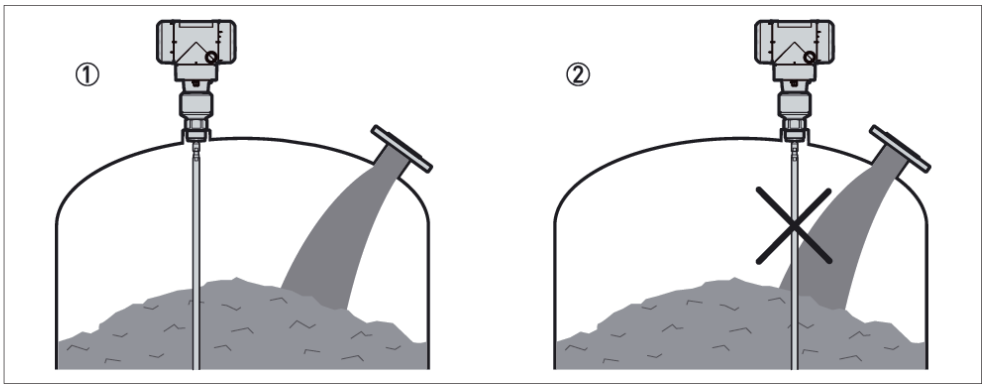
Power supply / 4 to 20 mA circuit (Output 1 terminal)	Max. 34Vdc/22mA
Power supply / 4 to 20 mA circuit (Output 2 terminal)	Max. 34Vdc/30mA
Switch output circuit	Max. 24Vdc/6A or 48Vac/6A

- Use an intrinsically safe barrier when using the TGF6200 in a hazardous area as an intrinsically safe level meter.
- Observe the specifications and instructions in “EXPLOSIONPROOF SPECIFICATIONS” when using the TGF6200 as an explosionproof level meter.
- When using an isolation barrier, check the required power supply of the barrier.

PRECAUTIONS FOR INSTALLING AND USING TGF6200

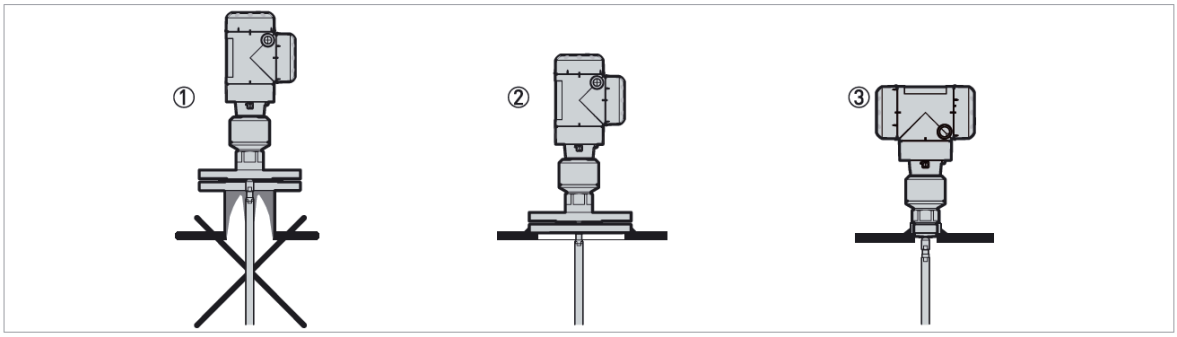
Observe the following instructions when installing and using the TGF6200 level meter.

- Install the level meter in a location with an ambient temperature range of -40 to + 80°C (-20 to + 60°C for a level meter with display) around the housing.
- Provide weather protection or the like when using the level meter outdoors.
- In particular, provide weather protection or the like in a location exposed to direct sunshine or harsh weather conditions.
- Do not install the level meter in a location exposed to strong vibration.
- Determine the installation location, height, and measurement zone considering the dead zone (non-measurable zone) of the level meter. The dead zone varies depending on the counter weight to be used and measurement conditions. See “MEASUREMENT LIMITS”
- When installing multiple level meters on the same tank, install them far enough apart from each other to prevent the cable probes from becoming entangled due to the movement of particles or granules. Install them at least 1 m apart from each other.
- In order to prevent the cable from slackening when using the cable probe, keep the counter weight at a level above the tank bottom.
- Consider the shape and location of the nozzle so the probe does not contact the nozzle or tank wall.
- The tensile load is dependent on the height and diameter of the silo, type of measuring object, and particle size and density. Do not apply a load exceeding 46.69 kN to the cable probe because doing so may damage or break it. Also make sure that the roof the silo is resistant to deformation by high loads.
- There is a risk of electrostatic discharge (ESD). The TGF6200 can withstand up to 30 Kv of ESD. Nevertheless, implement electrostatic discharge measures. Be sure to ground the housing of the level meter.
- Install the level meter in a location where the probe is not affected by the particles or granules introduced into the tank. Otherwise, a malfunction will occur.
- If you cannot change the installation location of the level meter and the probe is affected by the particles or granules, take necessary measures such as changing the direction of the flow of the particles or granules.



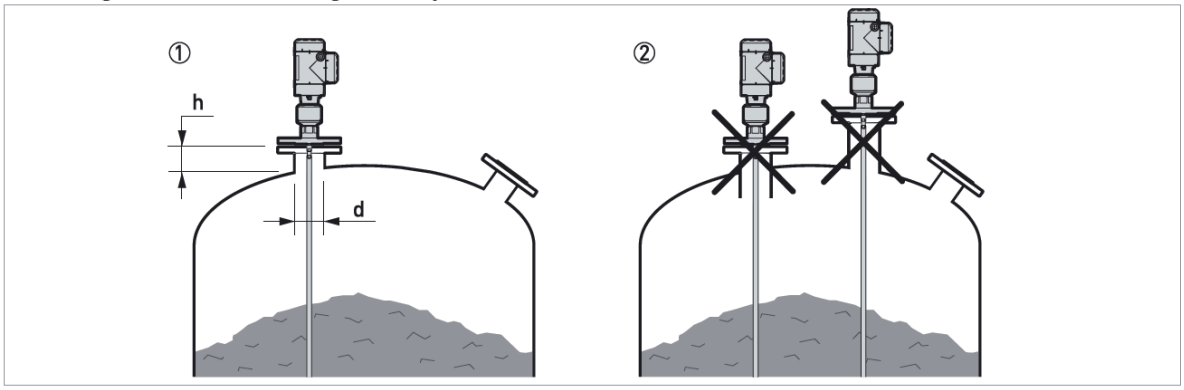
① Install the level meter in a location where the probe is not affected by the particles or granules introduced into the tank.
② If you install the probe in a location where the probe is affected by the particles or granules introduced into the tank, proper measurement will not be possible.
If the installation location of the level meter is near the inlet, take necessary measures such as changing the direction of the flow of the particles or granules to prevent the particles or granules from affecting the probe.

We recommend to install the level meter on the roof of the tank.
When measuring sticky substances, make sure that the substance does not stick to the inside of the nozzle.



① When measuring sticky substances, install the level meter in such a way that the substance does not stick to the inside of the installed nozzle.
② When installing the level meter on a flange, we recommend to install the flange on the roof of the tank without installing a nozzle.
③ We recommend to install a socket on the roof of the tank and then install the level meter by threading it into the socket.

When installing the level meter on the installed nozzle, make sure that the nozzle is not long and thin, and the lower end of the probe does not protrude into the inside of the tank.



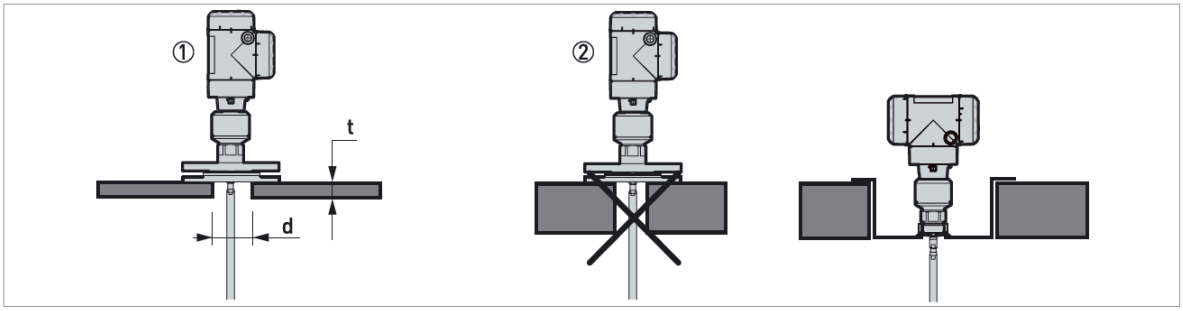
① When installing the level meter on a flanged nozzle, make sure that the nozzle length is 150 mm or less, or the nozzle diameter (d) is equal to or larger than the nozzle height (h).
If this requirement is not met, the minimum required length of the dead zone will start with the lower end of the nozzle so the dead zone may be longer, or a malfunction may result.
② Make sure that the lower end of the nozzle does not protrude into the inside of the tank.

We recommend to install the level meter by threading it into the socket.

① We recommend to install the level meter using a socket.
② Make sure that the lower end of the socket does not protrude into the inside of the tank.

Installing a probe on the concrete roof

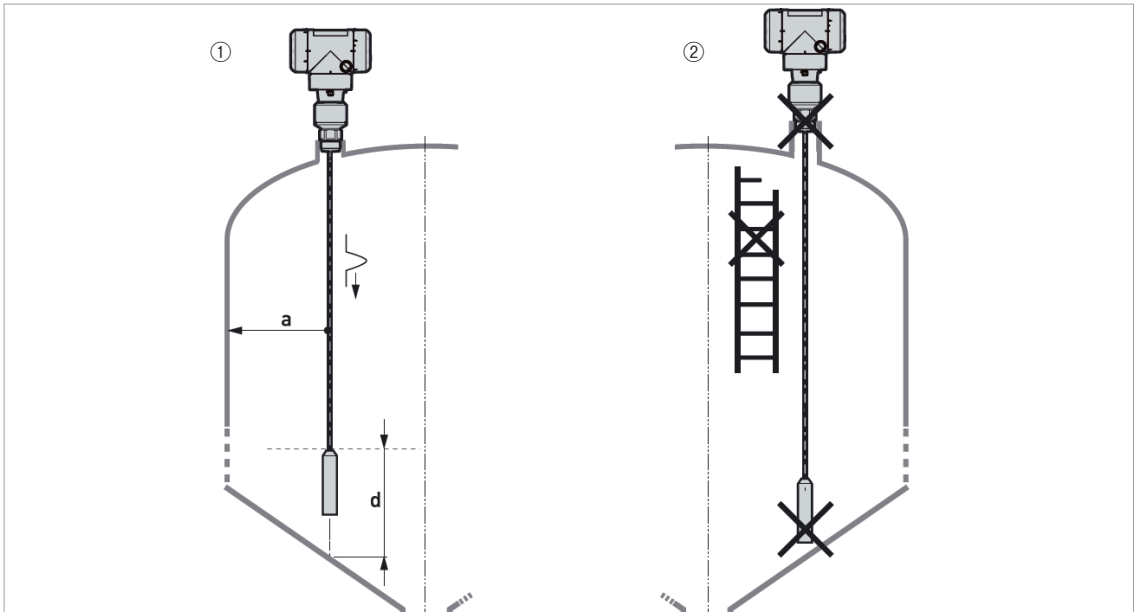
① When installing a probe on the concrete roof, make sure that the concrete hole diameter (d) is larger than the concrete thickness (t) (+ installed nozzle).
Make sure that the hole inner surface is smooth.
② When the concrete thickness (t) is larger than the hole diameter (d), do not install the probe on the concrete but enlarge the hole and then install the probe on a metal pedestal.



① Make sure that the hole diameter (d) is larger than or equal to the concrete thickness (t).
② When the concrete thickness (t) is larger than the hole diameter (d), enlarge the hole diameter and then install the probe.
If you cannot enlarge the hole diameter, extend the top dead zone to a position of 200 mm from below the concrete (slab).

Precautions for installation

When installing a TGF6200 level meter on the tank, do not install it near obstacles in the tank but install it in a location at a distance from the obstacles.



① Make sure that there is no obstacle in the impact range of micropulse around the probe. Make sure that the probe is always straight and not slack inside the pipe.
We recommend that the spatial distance (d) between the top of the counter weight of the probe terminal and the bottom of the tank is d or larger (300 mm + counter weight length).
② The distance required between the probe and obstacles is 300 mm or more.
If introducing or discharging powder is expected to move the probe, place it a distance away from the obstacles in consideration also of that amount of movement so that it will not become entangled.
Install the probe so the probe terminal does not contact the tank (silo) bottom.

MODEL AND SPECIFICATION CODES

TGF6200 cable probes

Spec. code	TGF6200	4	4	W		0							0			0				0	0		/						Description
Approval					0																								Standard (Non-Ex)
					1																								ATEX: Intrinsic safety II 1/2 G Ex ia IIC T6...T3 Ga/Gb, II 1/2 D Ex ia IIIC T85°C...T*°C Da/Db
					2																								ATEX: Flameproof enclosure / Dust ingnition protection II 1/2 G Ex ia/db IIC T6...T3 Ga/Gb, II 1/2 D Ex ia/tb IIIC T85°C...T*°C Da/Db
					K																								IECEx: Intrinsic safety Ex ia IIC T6...T3 Ga/Gb, Ex ia IIIC T85°C...T*°C Da/Db
					L																								IECEx: Flameproof enclosure / Dust ingnition protection Ex ia/db IIC T6...T3 Ga/Gb, Ex ia/tb IIIC T85°C...T*°C Da/Db
					U																								JPN Ex: Intrinsic safety（TGF6200C-JEx or TGF6200F-JEx） Ex ia IIC T6...T3 Ga/Gb, Ex ia IIIC T85°C...T*°C Da/Db
					W																								JPN Ex: Flameproof enclosure / Dust ingnition protection（TGF6200C-JEx or TGF6200F-JEx） Ex ia/db IIC T6...T3 Ga/Gb, II 1/2 D Ex ia/tb IIIC T85°C...T*°C Da/Db
Fixed code						0																								Allways 0
Other approval							0																							Without
							3																							NACE MR0175 (ISO 15156), MR0103 (ISO 17945)
Housing type / material								2																						Compact type（Alminum）
								3																						Compact type（Stainless steel）
								7																						Remote type（Alminum）※1
								8																						Remote type（Stainless steel）※1
Output									1																					2-wire / 4-20mA passive (HART)×1output
									2																					2×2-wire / 4-20mA passive (HART) + 4-20mA passive
									3																					2-wire + 4-wire / 4-20mA passive (HART) + switch output - Relay
Cable entry / cable gland										1																				M20×1.5 / without （Cable entry: For G 1/2 female thread, select M20×G 1/2 adapter as an option.） （For JPN Ex of flameproof / dust ingnition, select the Flameproof cable gland (G 1/2) as an option.）
										2																				M20×1.5 / 1×Plastic (ATEX/IECEx：Not for Ex d ia)
										3																				M20×1.5 / 1×Nickel-plated brass
										4																				M20×1.5 / 1×Stainless steel
										6																				M20×1.5 / 2×Plastic（2 output）(ATEX/IECEx：Not for Ex d ia)
										7																				M20×1.5 / 2×Nickel-plated brass（2 output）
										8																				M20×1.5 / 2×Stainless steel（2 output）
										D																				1/2"NPT / 1×Nickel-plated brass
										F																				1/2"NPT / 2×Nickel-plated brass（2 output）
Display / Housing orientation											4																			Display for Remote type
											6																			Display for Compact type
Display / Language												1																		English
												7																		Japanese
Fixed code													0																	Allways 0
Process seal：Material / Temp. / Press.														1																FKM/FPM / –40...+200°C / 0kPa (abs) ... 4MPa
														2																Karlez® 6375 / –20...+200°C / 0kPa (abs) ... 4MPa
														3																EPDM / –50...+150°C / 0kPa (abs) ... 4MPa
Probe type / Material / Length															6															Single cable - ø8 mm, Weight ø12×100mm / SS316 (1.4401) / 1...40 m
															7															Single Cable - ø8 mm, Weight ø38×245mm / SS316 (1.4401) / 1...40 m
Fixed code																0														Allways 0
Process connection						Threaded											G	P	0											G 1-1/2 A
																	G	A	0											1-1/2 NPT
						Flanged - ASME											G	1	A											1-1/2" 150lb RF
																	H	1	A											2" 150lb RF
																	L	1	A											3" 150lb RF
																	M	1	A											4" 150lb RF
																	P	1	A											6" 150lb RF
																	R	1	A											8" 150lb RF
						Flanged - JIS											H	U	P											50A JIS10K RF
																	L	U	P											80A JIS10K RF
																	M	U	P											100A JIS10K RF
Fixed code																				0	0									Allways 00
Installation location																						0								Indoor: Without weather protection
																						1								Outdoor: With weather protection
Probe length																							/							cm (Specify the length in the unit of cm) ※2
Special specification																													blank	None
																													/Z	For special requirements ※3

※1：When selecting a remote converter housing,
specify the signal cable length (1 m to 100 m) between the probe housing and the converter housing.

Signal (RS485) cable length（1 m...100 m）	m

※2：Specify the length of probe in integer of 4 digits in the unit of cm.
For example : Specify as "0258" cm for the length of 2580 mm and "1258" cm for 12.58 m.
The smaller length than 1 cm is not allowed.

※3：Special requirements not included in the above coding system should be designated by adding "/Z" at the end of the code.
Consult us for the availability of such requirements before ordering.

STANDARD ACCESSORIES

- Parameter sheet : 1
- Instruction manual : 1
- Strap wrench : 1

OPTION

- M20×G1/2 female adapter: [GA]
  1 output: Female adapter×1, plug×1
  2 outputs: Female adapter×2
- Explosionproof cable gland (G1/2): [DG]
  Service temperature -40°C to +80°C
  1 output: Cable gland×1, plug×1
  2 outputs: Cable gland×2
- Output range individual data configuration: [DS]

ORDERING INSTRUCTIONS

1. Model and spec code
   Example) Model: TGF6221
   Spec code: TGF620044W0002116701601MUP001/0500
2. Probe length Specify the length in centimeters.
3. Option (if required)
   Enter a symbol (see OPTION).
4. Special feature (if required)
   Describe the special feature you need.
   Please consult with us about the availability beforehand.

* Intrinsically safe barrier (sold separately)
Isolation barrier: KFD2-STC4-Ex1 (mounted on a DIN rail)
This barrier is required when using the TGF6200 in a hazardous location as an intrinsically safe level meter.

ORDERING INFORMATION

Measuring object

Substance name: ( )
Dielectric constant : εr ( )
Bulk specific gravity : ( )
Substance property : ☐ Powder (particle size: mm) ☐ Granule (particle size: mm)
Corrosion property : ☐ No ☐ Slightly corrosive ☐ Heavily corrosive
Adhesive property : ☐ No ☐ Slightly adhesive ☐ Heavily adhesive
Crystalline property : ☐ No ☐ Slightly crystalline ☐ Heavily crystallinee

Operating conditions

Operating environment : ☐ Outdoors ☐ Indoors
Measuring object temperature : ( ) °C
Ambient temperature : ( ) °C
Pressure : ( ) MPa
Explosionproof : ☐ Not require ☐ Required

Tank conditions

Shape : ☐ Silo ☐ Tank ☐ Other
Height : ( )
Diameter or width : ( )
Obstacles inside tank : ☐ No ☐ Yes ☐ Thermometer ☐ Level switch ☐ Reinforcement or stay ☐ Ladder ☐ Other
Tank material : ☐ Metal ( ) Coating: ☐ Yes ☐ No
☐ Non-metal ( )
Transport method : ☐ Belt conveyor ☐ Bucket conveyor ☐ Belt conveyor ☐ Screw feeder
☐ Air pressure feeder ☐ Direct introduction ☐ Bag filter ☐ Cyclone
☐ Other ( )

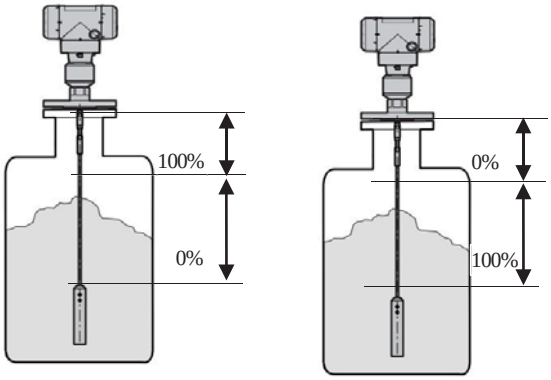
Installation conditions

Location : Distance from tank wall ( ) mm
Distance from inlet ( ) mm
Distance from obstacle ( ) mm
Nozzle : Diameter ( ) mm
Length ( ) mm

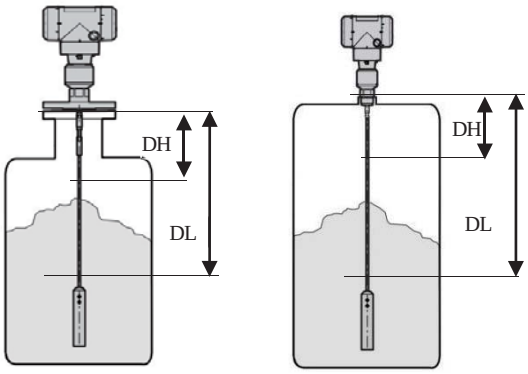
Measurement conditions

Measurement method:

☐ Level measurement ☐ Distance measurement



Measurement range: Distance from process connection part to minimum level
DL: ( ) mm
Distance from process connection part to maximum level
DH: ( ) mm



☐ Flange connection
Baseline position
(flange bottom surface)

☐ Thread connection (threaded flange)
Baseline position (thread top)

* Specification is subject to change without notice.

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