

### OUTLINE

The **TGF7200** 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.

Thanks to a variety of probe types such as coaxial, single, and twin probes, this continuous level meter can measure various measuring objects such as liquids and slurries in applications such as the measurement of the liquid level and the interface between two liquids.

The keypad operation on the front display allows easy parameter setting including zero-point adjustment and measurement range. This level meter is suitable for level control of buffer and sump tanks, as well as capacity management of storage tanks.

### 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  $-50^{\circ}\text{C}$  to  $-250^{\circ}\text{C}$  and from vacuum to 10.0 MPa
- ❑ Measurements are not affected by changes in temperature, pressure, or density
- ❑ Possible to measure the liquid level and interface (option)
- ❑ 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

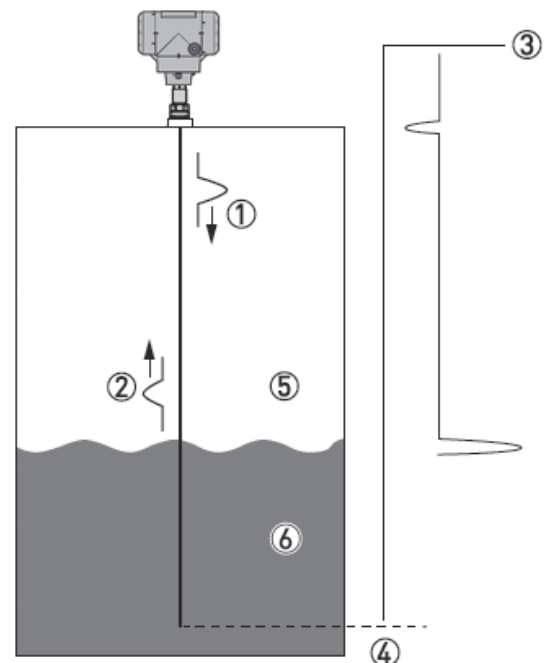
### MEASURING PRINCIPLE

The **TGF7200** 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 liquid, or the interface of two liquids. 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 capacity or mass value from a conversion table, and these values are output as current signals according to the settings of the output range.

The travelling 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 density.



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

## STANDARD SPECIFICATIONS

Object	Item	Description	
Measuring object	Measuring material	Liquid, slurry	
	Measuring principle	Time Domain Reflectometry (TDR)	
	Output variables	Level, distance, volume, mass, interface	
Probe type	TGF7211	Single rod probe: $\phi 8$ mm, $\phi 10$ mm (PTFE coating)	
	TGF7212	Twin rod probe: $\phi 8$ mm $\times$ 2	
	TGF7221	Single cable probe: $\phi 4$ mm	
	TGF7222	Twin cable probe: $\phi 4$ mm $\times$ 2	
	TGF7231	Coaxial probe: $\phi 22$ mm, $\phi 42$ 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	$\pm 3\mu\text{A}$
		Temperature drift	Analog value: 50 ppm/K, digital value: $\pm 15$ mm (maximum specified temperature range)
		Error output	22 mA DC, 3.6 mA DC, fixed (select from parameters)
	Switch output	Load resistance *1	The allowable load resistance varies with the supplied power voltage. See "Power supply voltage."
		Output (option)	Relay (1 contact, normal open)
Accuracy: depend on reference conditions	Accuracy	24 V DC / 6A, 48 V AC / 6A: non-explosionproof, flameproof	
		24 V DC / 1.1 A, 24 V AC / 1.1A: intrinsically safe	
		0.04 to 288 W (VA)	
	Resolution	0.1mm	
Repeatability	$\pm 1$ mm		
Measurement conditions	Process connection temperature	PTFE process seal system (standard)	Ceramic process seal system
		-40 to +150°C (sealing material: FPM / FKM)	-40 to +200°C (sealing material: FPM / FKM)
	Pressure	-50 to +150°C (sealing material: EPDM)	-50 to +150°C (sealing material: EPDM)
		-20 to +150°C (sealing material: Kalrez 6375)	-20 to +250°C (sealing material: Kalrez 7075) *2
	Dielectric constant *3	PTFE process seal system (standard): 0 kPa (abs) to 4.0 MPa	
		Ceramic process seal system: 0 kPa (abs) to 10.0 MPa	
Interface measurement	1.3 or more (coaxial probe)		
Maximum rate of change	1.1 or more: TBF mode		
Level meter specs	Protection class	IEC60529: IP66/IP68 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, switch output with 4 wires	
	Power supply voltage	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)
		Output 2 (4 to 20 mA DC)	Allowable range: 13.5 to 34 V DC: Flameproof (Ex d)
			Rated voltage: 24 V DC
		Output 2 (Switch output)	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)
	Cable entry	M20 $\times$ 1.5 female thread, 1/2" NPT female thread, G1/2 female thread (option)	
Terminal	0.5 to 2.5 mm <sup>2</sup>		
Material	Housing	Aluminum alloy (polyester coating), stainless steel (SS316L)	
	Process connection part	Stainless steel (SS316L), Hastelloy C-22	
	Probe	See "Probe specifications"	
	Seal	PTFE process seal system (standard): FKM / FPM, EPDM, Kalrez 6375 Ceramic process seal system: FKM / FPM, EPDM, Kalrez 7075	
Process connection	Thread	G male thread, NPT male thread	
	Flange	JIS RF flange, ASME RF flange	
Display	Display	LCD 128 $\times$ 64 pixels in 8-step greyscale English, Japanese, others	
	Keypad	4 buttons (right, enter, up, down keys)	

\*1: See "Power supply voltage" for the level meter terminal voltage at 22 mA output.

\*2: Unavailable for the twin cable probe.

\*3: The minimum dielectric constant of measuring objects varies depending on the type of probe. See "Probe specifications." Measurement may not be possible in some measurement conditions.

## PROBE SPECIFICATIONS

Probe type / length	TGF7211	Single rod probe (ø8 mm) / 1.0 to 3.0 m	
		Single rod probe (ø8 mm) segment type / 1.0 to 5.5 m	
		Single rod probe PTFE coating (ø10 mm) / 1.0 to 3.0 m	
	TGF7212	Twin rod probe (ø8 mm × 2) / 1.0 to 3.0 m	
	TGF7221	Single cable probe (ø4 mm) / 1.0 to 60.0 m	
	TGF7222	Twin cable probe (ø4 mm × 2) / 1.0 to 14.0 m	
Minimum dead zone length / non-linearity range	TGF7231	Coaxial probe (ø22 mm) / 0.6 to 3.0 m	
		Coaxial probe (ø22 mm) segment type / 0.6 to 5.5 m	
		Coaxial probe (ø42 mm) / 0.6 to 3.0 m	
	Type	Top dead zone / non-linearity range	Bottom dead zone
	TGF7211: Single rod probe	50 mm (200 mm) / +150 mm	20 mm
	TGF7212: Twin rod probe	50 mm (200 mm) / +100 mm	20 mm
TGF7221: Single cable probe	50 mm (200 mm) / +150 mm	120 mm	
TGF7222: Twin cable probe	50 mm (200 mm) / +100 mm	80 mm	
TGF7231: Coaxial probe	50 mm (50 mm) / 0 mm	20 mm	
Above figures are minimum lengths of dead zone when auto setup is performed. *Figures in parentheses are those when selecting the ceramic seal system. Dead zone length may require more than above depending on measurement conditions. See "MEASUREMENT LIMITS".			
Measurement conditions	Dielectric constant *1	1.6 or more (Single rod probe, single cable probe)	
		1.4 or more (Twin rod probe, twin cable probe)	
		1.3 or more (Coaxial probe)	
Probe materials *2	TGF7211: Single rod probe	Stainless steel (SS316L), Hastelloy C-22 (including gas contact part) *Process connection part: Stainless steel (SS316L), other: PTFE	
	TGF7211: Single rod probe : segment type (assembly type probe)	Stainless steel (SS316L) *Process connection part: Stainless steel (SS316L), other: PTFE	
	TGF7211: Single rod probe PTFE coating	Stainless steel (SS316L) + PTFE coating *Process connection part: PTFE	
	TGF7212: Twin rod probe	Stainless steel (SS316L) *Process connection part: Stainless steel (SS316L), spacer, other: PTFE	
	TGF7221: Single cable probe (ø4 mm)	Stainless steel (SS316) *Process connection part, counter weight: Stainless steel (SS316L), other: PTFE	
	TGF7222: Twin cable probe	Stainless steel (SS316) *Process connection part, counter weight: Stainless steel (SS316L), spacer: FEP, other liquid contact part: PTFE	
	TGF7231: Coaxial probe	Stainless steel (SS316L), Hastelloy C-22 (including gas contact part) *Process connection part: Stainless steel (SS316L), spacer, other: PTFE	
	TGF7231: Coaxial probe : segment type (assembly type probe)	Stainless steel (SS316L) *Process connection part: Stainless steel (SS316L), spacer, other: PTFE	

\*1 The minimum dielectric constant of measuring objects varies depending on the measurement conditions. Measurement may not be possible in some measurement conditions.

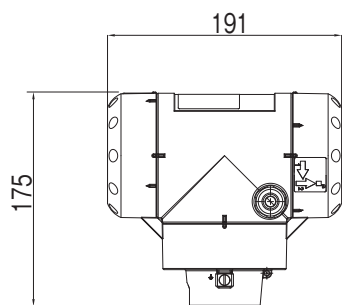
\*2 When using the PTFE process seal system

**DIMENSIONS**

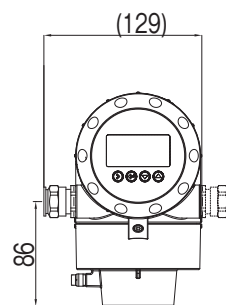
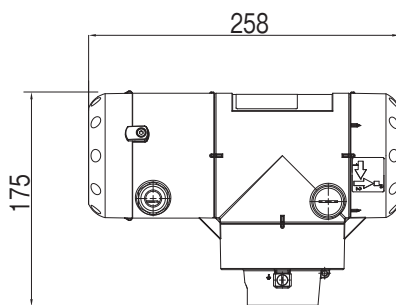
**Housing**

Compact type housing

Non-explosionproof and intrinsically safe 1 output

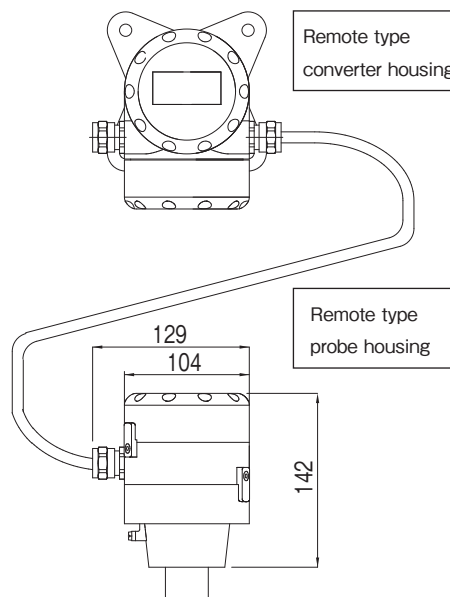
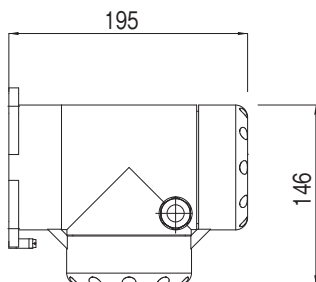
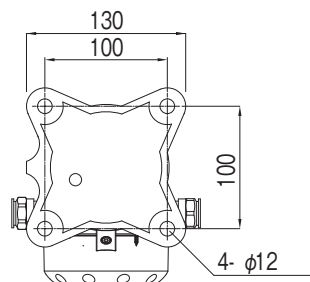


Flameproof and 2 outputs

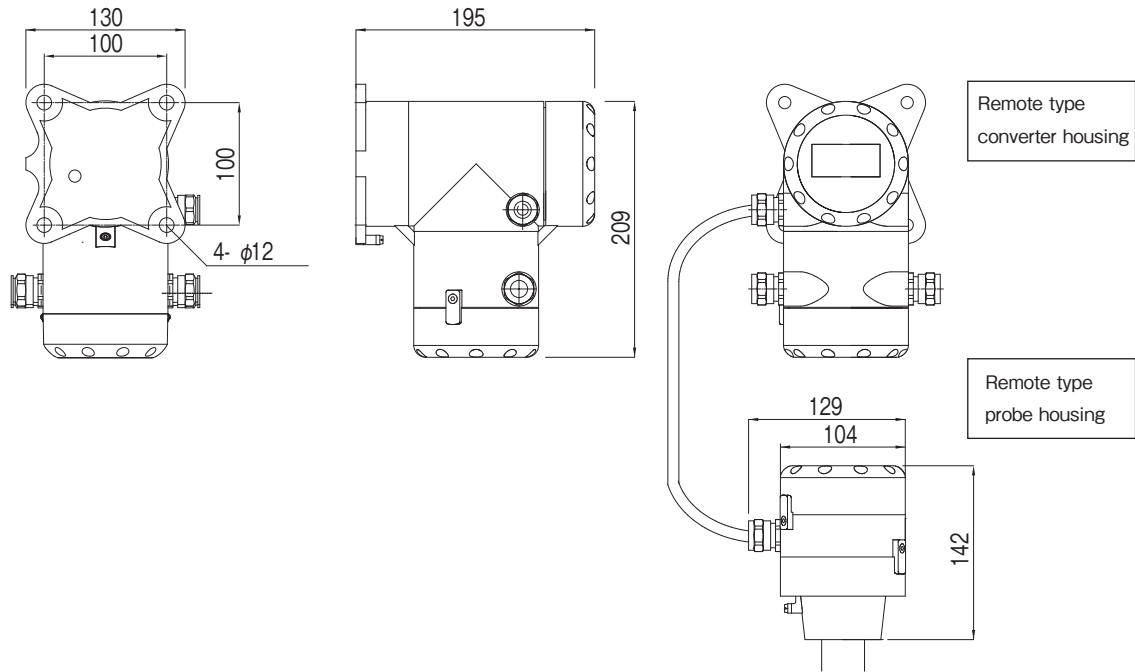


Remote type housing

Non-explosionproof and intrinsically safe 1 output



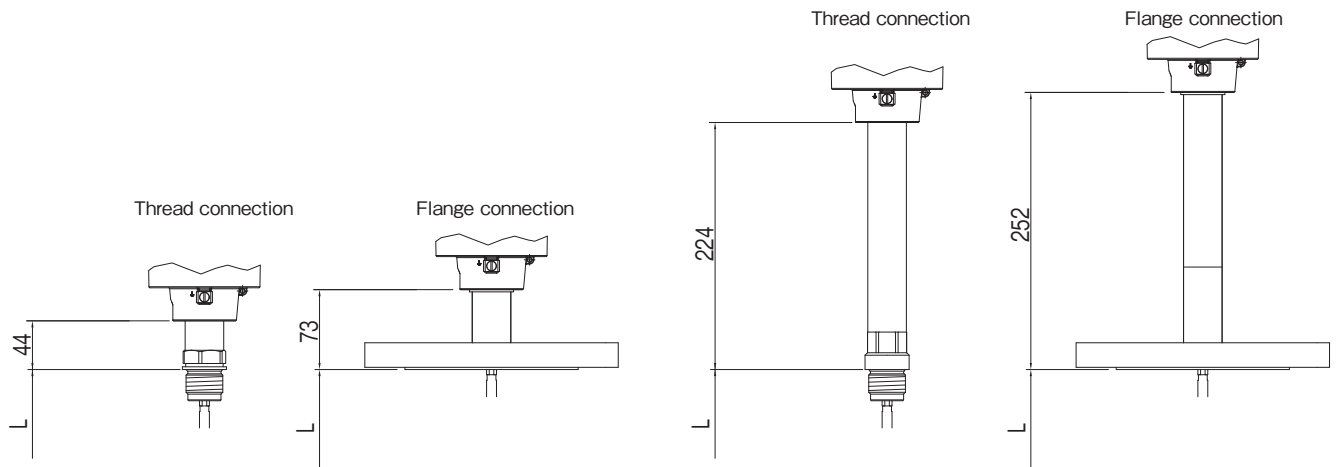
Flameproof and 2 outputs



Process connection part

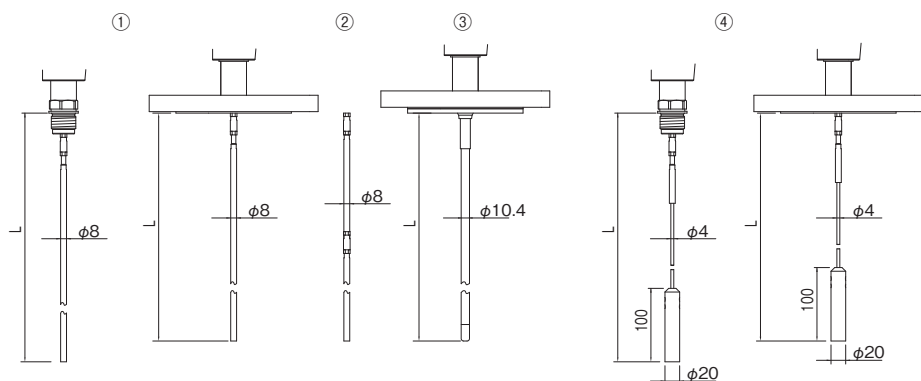
PTFE process seal system (standard)

Ceramic process seal system



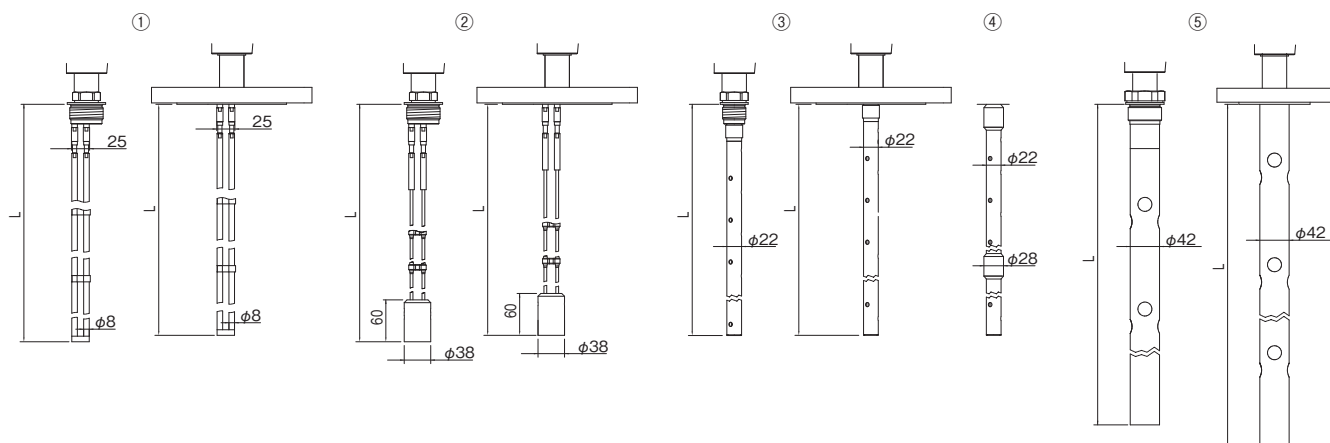
**Probes**

Single probes



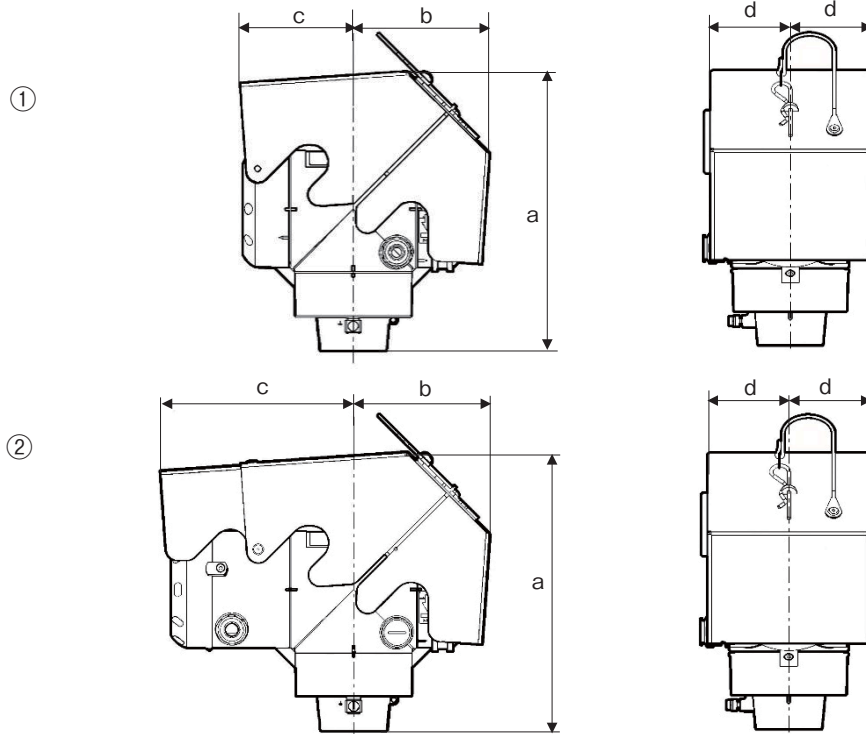
- ① Single rod probe
- ② Single rod probe (segment type)
- ③ Single rod probe PTFE coating
- ④ Single cable probe

Twin probes and coaxial probes



- ① Twin rod probe
- ② Twin cable probe
- ③ Coaxial (φ22 mm) probe
- ④ Coaxial (φ22 mm) probe (segment type)
- ⑤ Coaxial (φ42 mm) probe

**Weather protection**



	Dimension [mm]				Mass [kg]
	a	b	c	d	
① Non-explosionproof and intrinsically safe 1 output	243	118	96	77	1.3
② Flameproof and 2 outputs	243	118	166	77	1.5

**Mass**

**Housing**

Housing type	Mass [kg]	
	Aluminum housing	Stainless steel housing
Non-explosionproof, intrinsically safe 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 housing		
Compact type housing	3.2	7.5
Remote type converter housing	2.9	7.1
Remote type probe housing	1.8	3.9

**Probe**

Probe type	Mass *1 [kg / m]
Single rod probe	0.41
Single rod probe PTFE coating	0.5
ø4 mm single cable probe	0.12
Twin rod probe	0.82
Twin cable probe	0.24
Coaxial ø22 mm probe	0.79
Coaxial ø42 mm probe	3.2

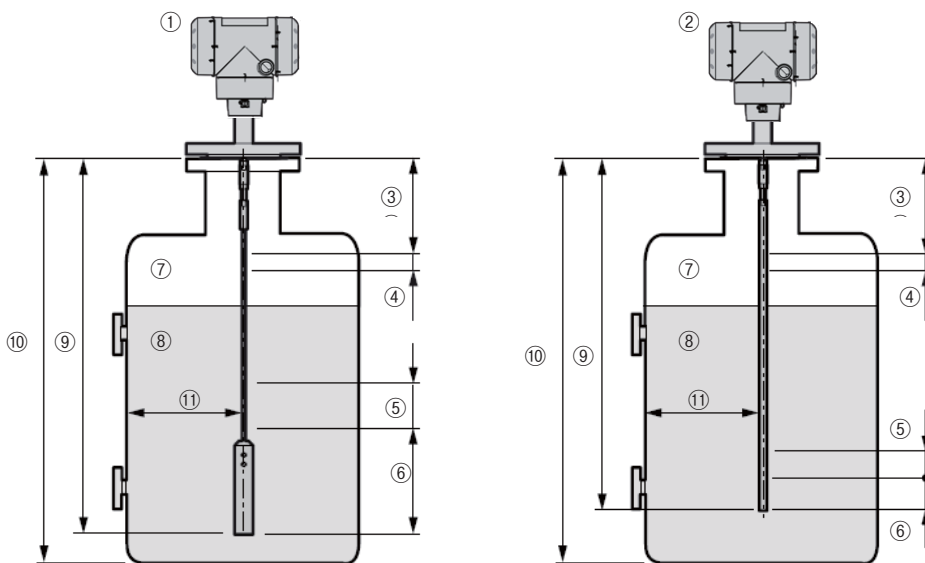
\*1 Counter weight and flange are not included in the mass.

**Process connection part**

Process connection part	Mass [kg]
Thread connection	0.6 to 2.5
Flange connection	1.6 to 36

## MEASURABLE RANGE

### Single probes



- ① Single cable probe    ③ Top dead zone: Top part of the probe where measurement is not possible
- ② Single rod probe    ④ Top non-linearity zone: Top part of the probe where accuracy is out of guaranteed range
- ⑤ Bottom non-linearity zone: Bottom part of the probe where accuracy is out of guaranteed range
- ⑥ Bottom dead zone: Bottom part of the probe where measurement is not possible
- ⑦ Gas phase
- ⑧ Measuring object
- ⑨ Probe length
- ⑩ Measurement tank height
- ⑪ Required minimum distance (from the probe to a tank wall): 300 mm

### Dead zone and non-linearity zone

Dielectric constant of measuring object ( $\epsilon_r$ )	>40		$\leq 40$	
	Top ③	Bottom ⑥	Top ③	Bottom ⑥
① Single cable probe with a counter weight of $\phi 20 \text{ mm} \times 100 \text{ mm}$	50 (200)	120	50 (200)	200
② Single rod probe	50 (200)	20	50 (200)	60

(mm)

Dielectric constant of measuring object ( $\epsilon_r$ )	>40		$\leq 40$	
	Top ④	Bottom ⑤	Top ④	Bottom ⑤
① Single cable probe with a counter weight of $\phi 20 \text{ mm} \times 100 \text{ mm}$	150	0	150	0
② Single rod probe	150	0	150	0

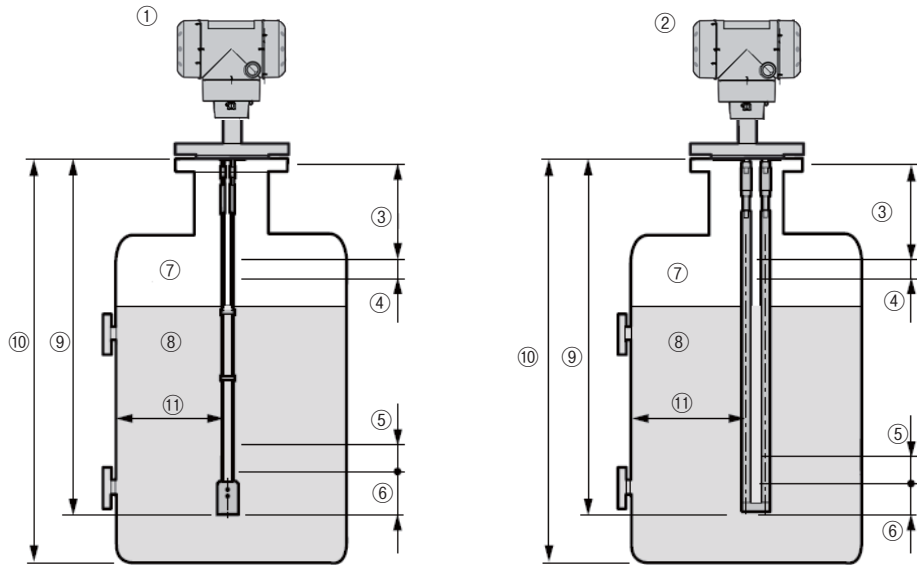
(mm)

\* Figures in parentheses of the top dead zones are those when using the ceramic process seal system.

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.



**Twin probes**



- ① Twin cable probe    ③ Top dead zone: Top part of the probe where measurement is not possible
- ② Twin rod probe    ④ Top non-linearity zone: Top part of the probe where accuracy is out of guaranteed range
- ⑤ Bottom non-linearity zone: Bottom part of the probe where accuracy is out of guaranteed range
- ⑥ Bottom dead zone: Bottom part of the probe where measurement is not possible
- ⑦ Gas phase
- ⑧ Measuring object
- ⑨ Probe length
- ⑩ Measurement tank height
- ⑪ Required minimum distance (from the probe to a tank wall): 100 mm

**Dead zone and non-linearity zone**

Dielectric constant of measuring object (εr)	>40		≤40	
	Top ③	Bottom ⑥	Top ③	Bottom ⑥
① Twin cable probe with a counter weight of ø38 mm × 60 mm	50 (200)	80	50 (200)	120
② Twin rod probe	50 (200)	20	50 (200)	60

(mm)

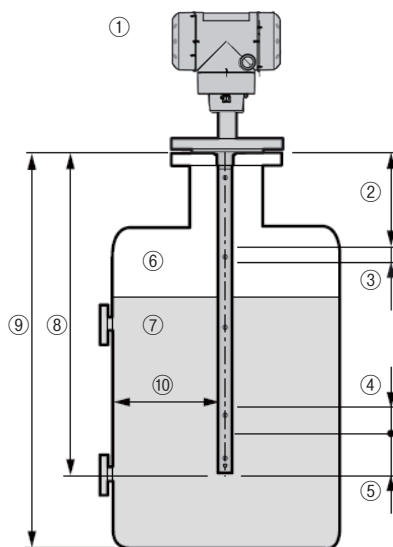
Dielectric constant of measuring object (εr)	>40		≤40	
	Top ④	Bottom ⑤	Top ④	Bottom ⑤
① Twin cable probe with a counter weight of ø38 mm × 60 mm	100	0	100	0
② Twin rod probe	100	0	100	0

(mm)

\* Figures in parentheses of the top dead zones are those when using the ceramic process seal system.

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.

Coaxial probe



- ① Coaxial 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): 0 mm

Dead zone and non-linearity zone

Dielectric constant of measuring object (εr)	>40		≤40	
	Top ②	Bottom ⑤	Top ②	Bottom ⑤
Dead zone				
① Coaxial probe (ø22 mm)	50	20	50	20
① Coaxial probe (ø42 mm)	50	20	50	20

(mm)

Dielectric constant of measuring object (εr)	>40		≤40	
	Top ③	Bottom ④	Top ③	Bottom ④
Non-linearity zone				
① Coaxial probe (ø22 mm)	0 (80)	0	0 (80)	0
① Coaxial probe (ø42 mm)	0 (80)	0	0 (80)	0

(mm)

\* Figures in parentheses of the top dead zones are those when using the ceramic process seal system.

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.

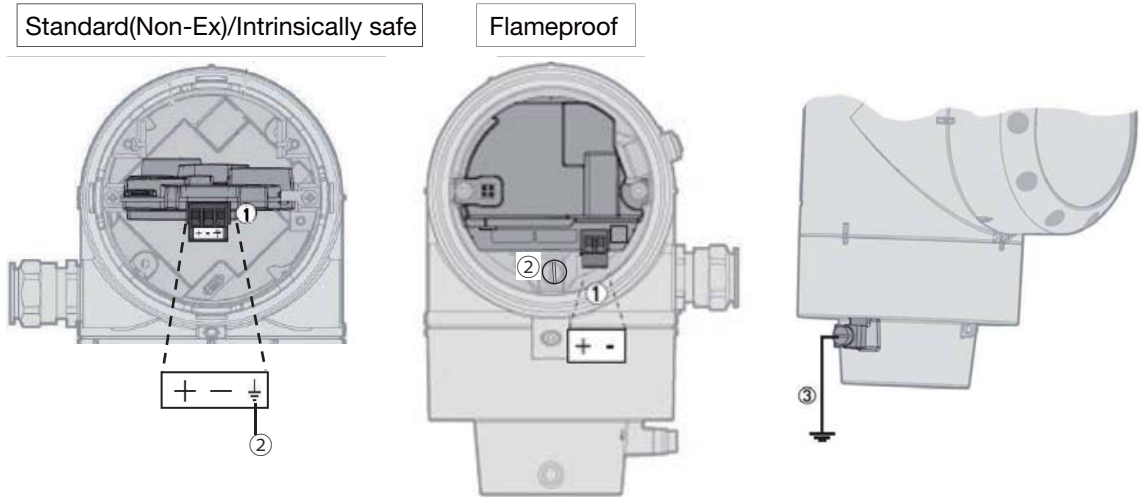
## WIRING

### Terminals

#### Compact type converter housing

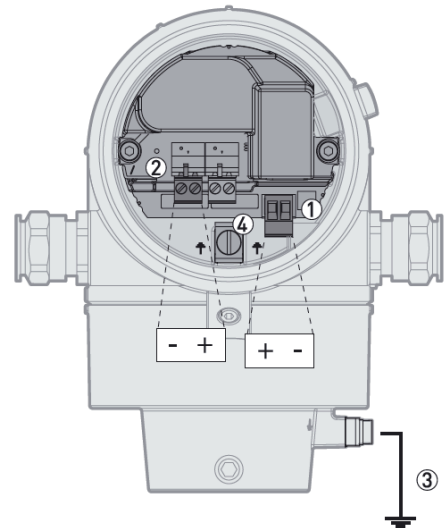
##### Current output (1 output)

- 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)



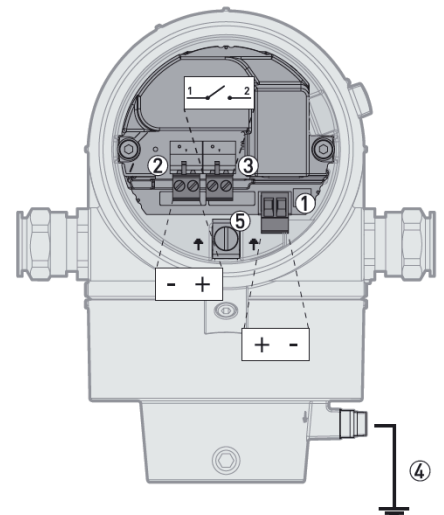
##### Current output (2 outputs)

- 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

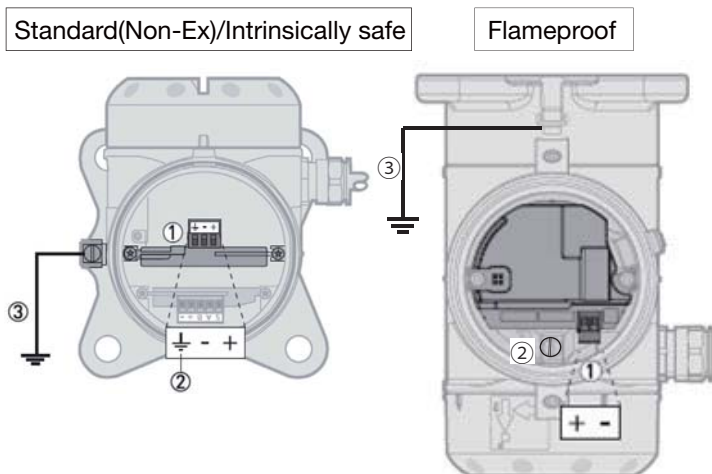
- ① Power supply terminal (for level meter operation and current output 1)
- ② Power supply terminal (for switch output)
- ③ Switch output terminal
- ④ Grounding terminal (at the lower part of the converter housing)
- ⑤ Grounding terminal inside housing (for shielded signal cable)



Remote type converter housing

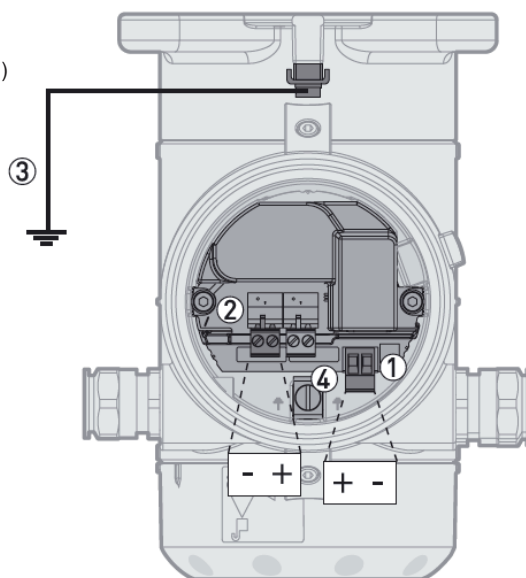
Current output (1 output)

- 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)



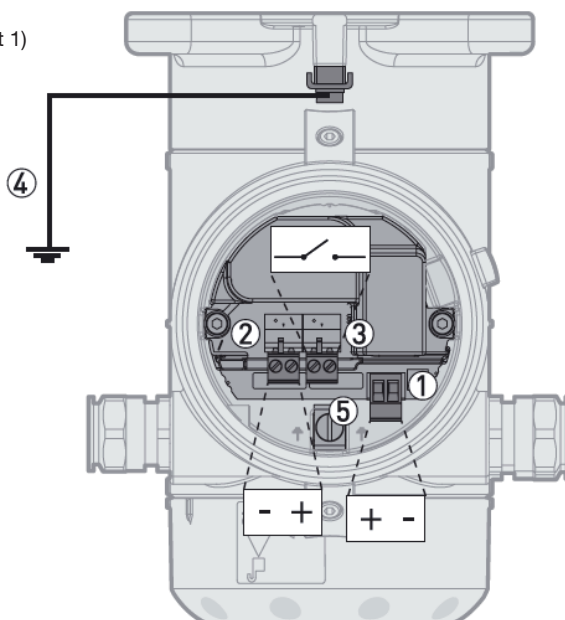
Current output (2 outputs)

- 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)

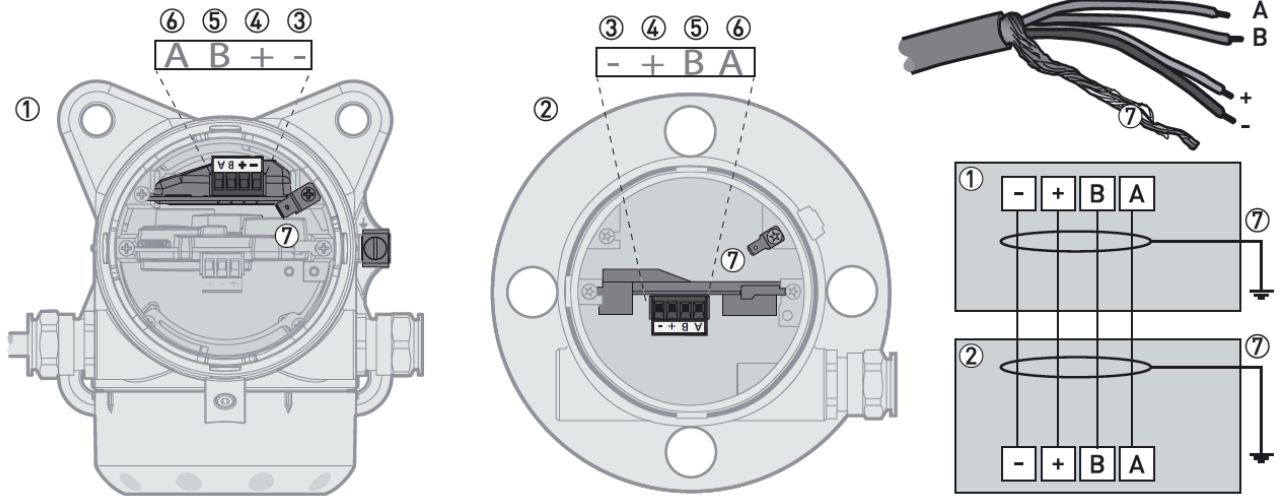


Current output (1 output) + switch output

- 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

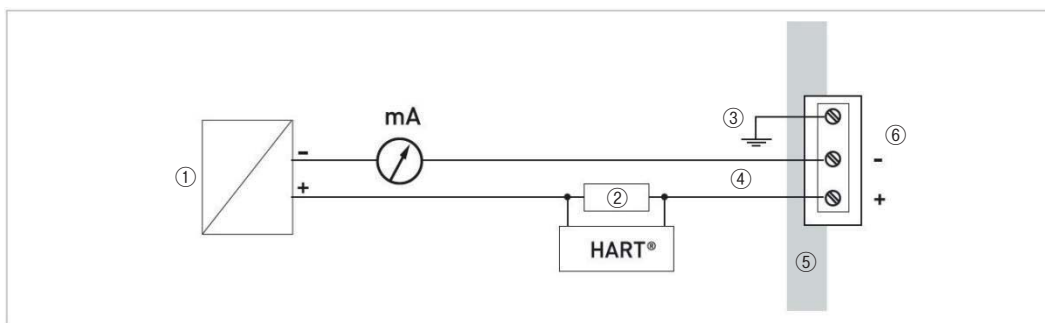


- ① Remote type converter housing
- ② Remote type probe housing
- ③ Power supply cable (-)
- ④ Power supply cable (+)
- ⑤ Digital communication cable (B)
- ⑥ Digital communication cable (A)
- ⑦ Shielded wire connected to the grounding terminals inside converter housing and probe housing

Wiring

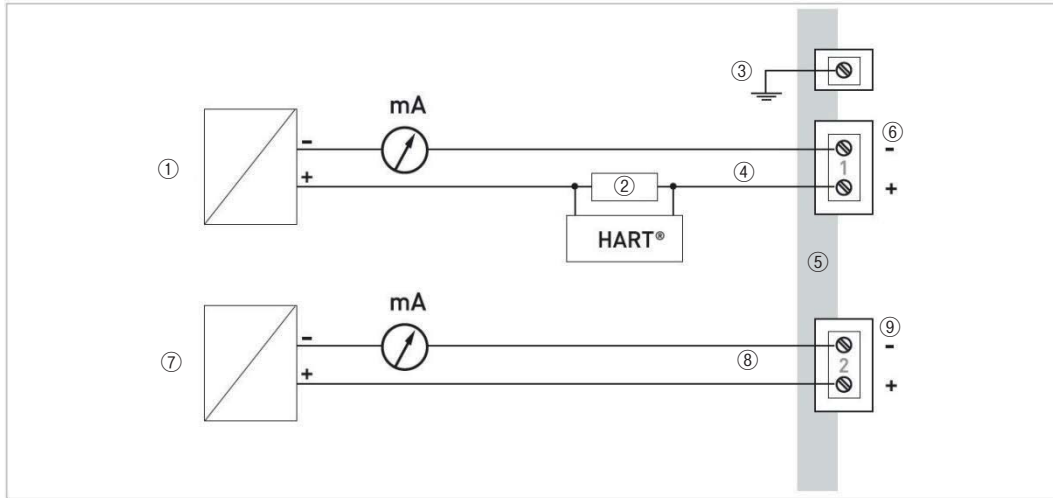
Use a 0.5 to 2.5 mm<sup>2</sup> stranded cable for the signal cable.  
 Strip the cable sheath 5 to 7 mm and insert it into the terminal.  
 Lay the signal cable away from power cables.  
 Separate the power supply from the power supply of other devices.  
 We recommend to use a shielded cable.

When using for current output (1 output)



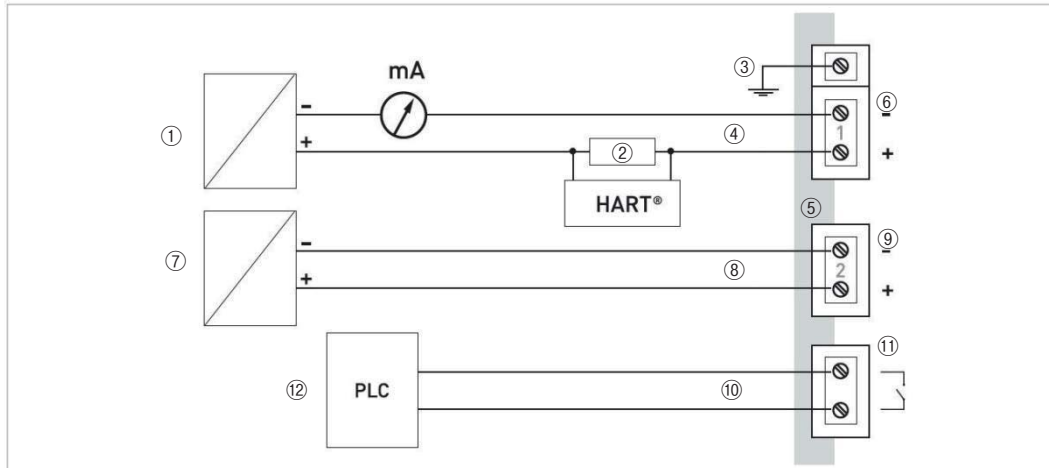
- ① Power supply for level meter operation and output 1
- ② Resistance for HART communication (required when using the HART communication)
- ③ Grounding
- ④ Level meter operation power supply and output 1 cables: 2-wire loop powered system (supplying 24 V DC and outputting 4 to 20 mA DC)
- ⑤ Level meter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

When using for 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 terminals
- 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 for 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 terminals
- 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.

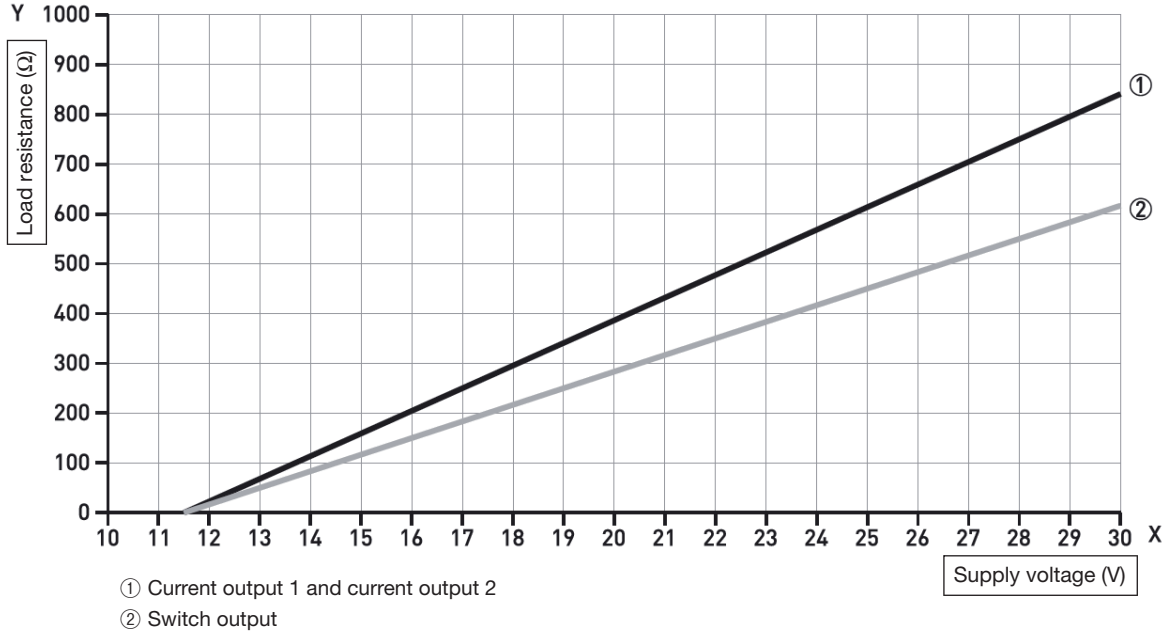
## POWER SUPPLY

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

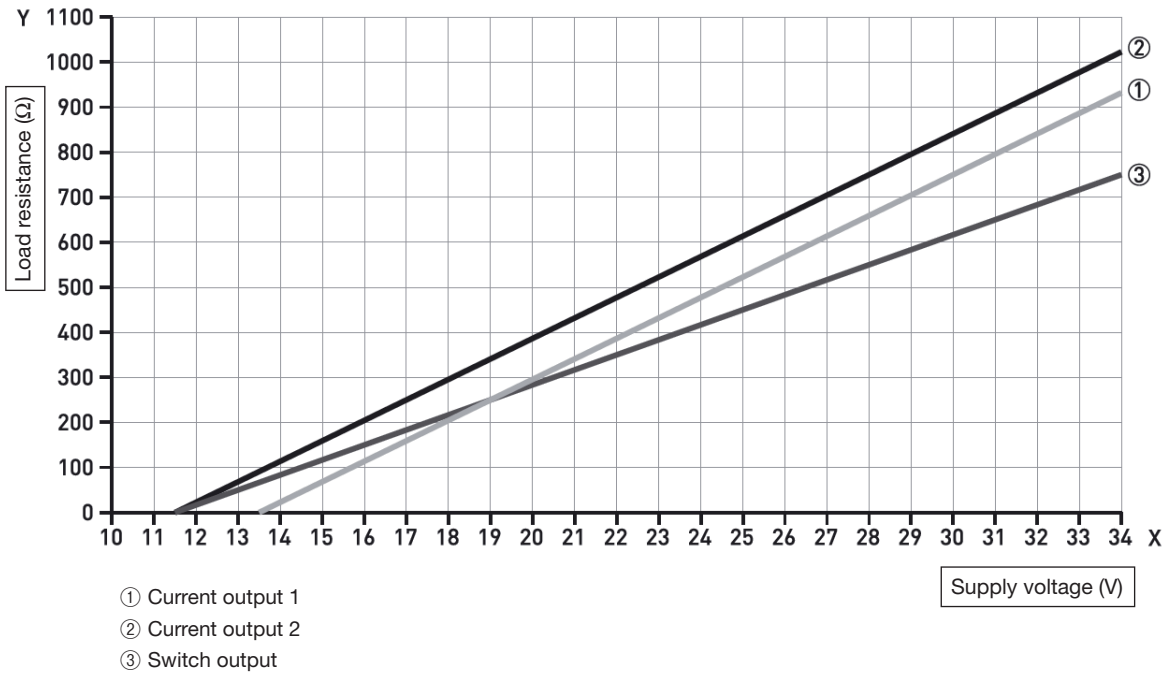
### Non-explosionproof and intrinsically safe level meter

Supply voltage: 11.5 to 30 V DC



### Flameproof level meter

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



### EXPLOSIONPROOF SPECIFICATIONS

Japan explosionproof  
(TGF7200C-JEx, TGF7200F-JEx, TGF7200S-JEx, TGF7200D-JEx)  
Certificate No. : CML 22JPN2442X  
Marking:

Compact type (C) or remote type sensor (probe) housing (S)	
Ex ia IIC T6...T* Ga/Gb	Ex ia IIIC T85°C...T* °C Da/Db
Ex ia/db IIC T6...T* Ga/Gb	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 ia [ia Da] IIIC T85°C...T135°C Db
Ex db ia [ia Ga] IIC T6...T4 Gb	Ex ia/tb [ia Da] IIIC T85°C...T135°C Db
Sensor (probe) housing	
Ex ia IIC T6...T* Ga/Gb	Ex ia IIIC T85°C...T* °C Da/Db

T\* = T3 or T2, T\* °C = T150°C or T200°C or T250°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...T* Ga/Gb	II 1/2 D	Ex ia IIIC T85°C...T* °C Da/Db
	Ex ia/db IIC T6...T* Ga/Gb		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	II 2 (1) D	Ex ia [ia Da] IIIC T85°C...T135°C Db
	Ex db ia [ia Ga] IIC T6...T4 Gb	II 1/2 D	Ex ia/tb [ia Da] IIIC T85°C...T135°C Db
Sensor (probe) housing			
II 1/2 G	Ex ia IIC T6...T* Ga/Gb	II 1/2 D	Ex ia IIIC T85°C...T* °C Da/Db

T\* = T3 or T2, T\* °C = T150°C or T200°C or T250°C

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

Compact type (C) or remote type sensor (probe) housing (S)	
Ex ia IIC T6...T* Ga/Gb	Ex ia IIIC T85°C...T* °C Da/Db
Ex ia/db IIC T6...T* Ga/Gb	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 ia [ia Da] IIIC T85°C...T135°C Db
Ex db ia [ia Ga] IIC T6...T4 Gb	Ex ia/tb [ia Da] IIIC T85°C...T135°C Db
Sensor (probe) housing	
Ex ia IIC T6...T* Ga/Gb	Ex ia IIIC T85°C...T* °C Da/Db

T\* = T3 or T2, T\* °C = T150°C or T200°C or T250°C

### TGF7200C compact type housing

Single PTFE process seal system

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	+51°C	+50°C
T5	T100°C	+75°C	+69°C	+69°C
		+100°C	+66°C	+65°C
T4	T135°C	+110°C	+76°C [+70°C] *2	+70°C
		+135°C	+68°C	+60°C [+50°C] *1
T3	T150°C	+150°C	+63°C	+52°C [+46°C] *1

\*1: Temperature in parentheses is that for ø2 mm single cable probe

\*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	-38°C	-38°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. Minimum process connection part temperature is -30°C when sealing material is metaglas.

Single ceramic process seal system

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	+80°C [+70°C] *2	+80°C [+70°C] *2
		+135°C	+77°C [+70°C] *2	+76°C [+70°C] *2
T3	T200°C	+150°C	+75°C [+70°C] *2	+74°C [+70°C] *2
		+180°C *1	+71°C [+70°C] *2	+69°C
T2	T250°C	+200°C *1	+68°C	+65°C
		+250°C *1	+60°C	+57°C

\*1: Maximum process connection part temperature is +150°C when sealing material is EPDM. Maximum process connection part temperature is +200°C when sealing material is FKM/FPM.

\*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	-38°C	-38°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.



**TGF7200F remote type converter housing**

Single PTFE process seal system

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	+48°C	+48°C
		+85°C	+43°C [+38°C] *1	+42°C [+35°C] *1
T5	T100°C	+75°C	+63°C	+63°C
		+100°C	+58°C [+53°C] *1	+57°C [+50°C] *1
T4	T135°C	+110°C	+76°C [+72°C] *1 [+70°C] *2	+71°C [+65°C] *1 [+70°C] *2
		+135°C	+67°C [+59°C] *1	+58°C [+46°C] *1
T3	T150°C	+150°C	+62°C [+51°C] *1	+50°C [+34°C] *1

\*1: Temperature in parentheses is that for ø2 mm single cable probe  
\*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	-35°C	-33°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.  
Minimum process connection part temperature is -30°C when sealing material is metaglas.

Single ceramic process seal system

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	+47°C	+47°C
T5	T100°C	+75°C	+65°C	+65°C
		+100°C	+62°C	+62°C
T4	T135°C	+110°C	+80°C [+70°C] *2	+80°C [+70°C] *2
		+135°C	+77°C [+70°C] *2	+75°C [+70°C] *2
T3	T200°C	+150°C	+74°C [+70°C] *2	+72°C [+70°C] *2
		+180°C *1	+69°C	+67°C
T2	T250°C	+200°C *1	+66°C	+63°C
		+250°C *1	+58°C	+54°C

\*1: Maximum process connection part temperature is +150°C when sealing material is EPDM.  
Maximum process connection part temperature is +200°C when sealing material is FKM/FPM.

\*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	-38°C	-38°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.  
Minimum process connection part temperature is -30°C when sealing material is metaglas.

**TGF7200S remote type sensor (probe) housing**

Single PTFE process seal system

Temperature class	Maximum surface temperature	Maximum process temperature or maximum process connection part temperature	Maximum ambient temperature
T6	T85°C	+60°C	+55°C
		+85°C	+55°C
T5	T100°C	+75°C	+70°C
		+100°C	+70°C
T4	T135°C	+110°C	+80°C [+70°C] *1
		+135°C	+80°C [+70°C] *1
T3	T150°C	+150°C	+80°C [+70°C] *1

\*1: Values in parentheses are with optional explosionproof cable glands

Minimum ambient temperature: -40°C

Single ceramic process seal system

Temperature class	Maximum surface temperature	Maximum process temperature or maximum process connection part temperature	Maximum ambient temperature
T6	T85°C	+60°C	+55°C
		+85°C	+55°C
T5	T100°C	+75°C	+70°C
		+100°C	+70°C
T4	T135°C	+110°C	+80°C [+70°C] *2
		+135°C	+80°C [+70°C] *2
T3	T200°C	+150°C	+80°C [+70°C] *2
		+180°C *1	+80°C [+70°C] *2
T2	T250°C	+200°C *1	+80°C [+70°C] *2
		+250°C *1	+80°C [+70°C] *2

\*1: Maximum process connection part temperature is +150°C when sealing material is EPDM.  
Maximum process connection part temperature is +200°C when sealing material is FKM/FPM.

\*2: Values in parentheses are with optional explosionproof cable glands

Minimum ambient temperature: -40°C

TGF7200D remote type converter housing + remote type sensor (probe) housing

Single PTFE process seal system

Temperature class	Maximum surface temperature	Maximum process temperature or maximum process connection part temperature	Maximum ambient temperature
T6	T85°C	+60°C	+52°C
		+85°C	+52°C
T5	T100°C	+75°C	+67°C
		+100°C	+67°C
T4	T135°C	+110°C	+80°C [+70°C] *1
		+135°C	+80°C [+70°C] *1
T3	T150°C	+150°C	+80°C [+70°C] *1

\*1: Values in parentheses are with optional explosionproof cable glands

Minimum ambient temperature: -40°C

Single ceramic process seal system

Temperature class	Maximum surface temperature	Maximum process temperature or maximum process connection part temperature	Maximum ambient temperature
T6	T85°C	+60°C	+52°C
		+85°C	+52°C
T5	T100°C	+75°C	+67°C
		+100°C	+67°C
T4	T135°C	+110°C	+80°C [+70°C] *2
		+135°C	+80°C [+70°C] *2
T3	T200°C	+150°C	+80°C [+70°C] *2
		+180°C *1	+80°C [+70°C] *2
		+200°C *1	+80°C [+70°C] *2
T2	T250°C	+250°C *1	+80°C [+70°C] *2

\*1: Maximum process connection part temperature is +150°C when sealing material is EPDM.  
Maximum process connection part temperature is +200°C when sealing material is FKM/FPM.

\*2: Values in parentheses are with optional explosionproof cable glands

Minimum ambient temperature: -40°C

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.

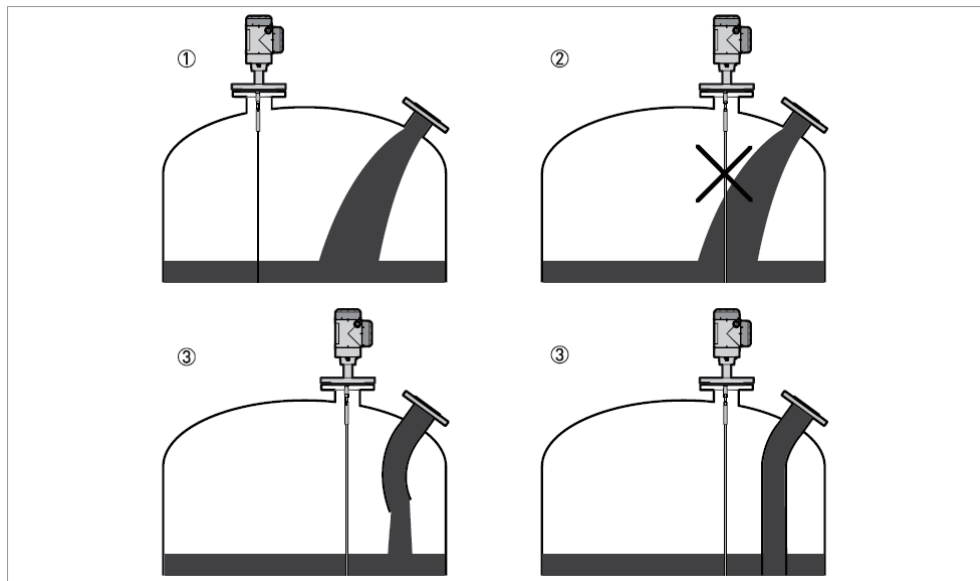
Power supply / 4 to 20 mA circuit (Output 1 terminal)	Max. 34 V dc / 22 mA
Power supply / 4 to 20 mA circuit (Output 2 terminal)	Max. 34 V dc / 30 mA
Switch output circuit	Max. 24 V dc / 6 A or 48 V ac / 6 A

- Use an intrinsically safe barrier when using the TGF7200 in a hazardous area as an intrinsically safe level meter.
- Observe the specifications and instructions in "EXPLOSIONPROOF SPECIFICATIONS" when using the TGF7200 as an explosionproof level meter.
- When using an isolation barrier, check the required power supply of the barrier.

## PRECAUTIONS FOR INSTALLING AND USING TGF7200

Observe the following instructions when installing and using the TGF7200 level meter.

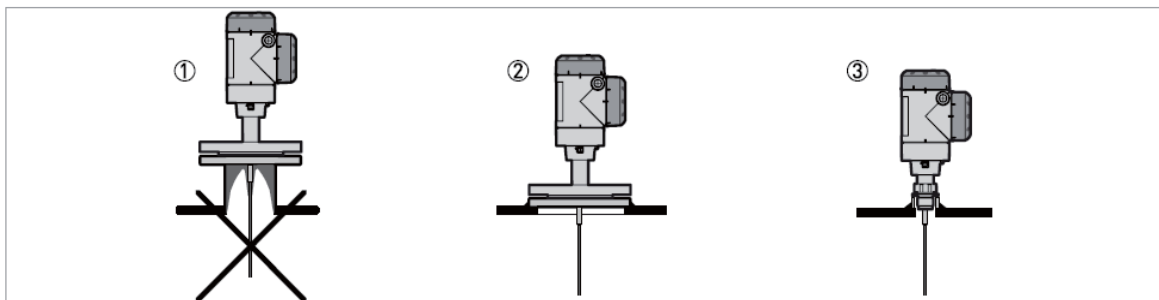
- Install the level meter in a location with an ambient temperature range of -40 to + 80°C (-20 to + 60°C for a level meter with display) around the housing.
- Provide weather protection or the like when using the level meter outdoors.  
In particular, make sure that the level meter display is not exposed to direct sunshine and harsh weather conditions.
- Do not install the level meter in a location exposed to strong vibration.
- Determine the installation location and height considering the dead zone (non-measurable zone) of the level meter. The dead zone varies depending on the probe to be used and measurement conditions. See "MEASUREMENT LIMITS."
- When installing multiple level meters on the same tank, 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, or fix the counter weight while maintaining tension on the cable.
- Consider the shape and location of the nozzle so the probe does not contact the nozzle or tank wall.
- Prevent the entry or adhesion of foreign matter to the pipe of the coaxial probe.
- Fasten the probe end to prevent it from swinging when the liquid flow is turbulent in the tank.
- Install the level meter at a sufficient distance from the agitator (if available), or fix the probe end to prevent it from getting entangled with the agitator blades.
- You may fix the probe at its end position, but do not fix it at any other position (this does not apply to the coaxial probe). If you fix the probe at an intermediate position using a swing prevention tool, measurement of the area below that position is not possible.
- When securing the coaxial probe at its intermediate or end position, do not apply an excessive force to prevent the probe from being bent.
- Install the level meter in a location where the probe is not affected by the liquid 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 liquid, take necessary measures such as changing the direction of the flow of the liquid.



- ① Install the level meter in a location where the probe is not affected by the liquid introduced into the tank.
- ② If you install the probe in a location where the probe is affected by the liquid introduced into the tank, proper measurement will not be possible.
- ③ If the installation location of the level meter is near the fluid inlet, take necessary measures such as changing the direction of the flow of the liquid to prevent the liquid from affecting the probe.

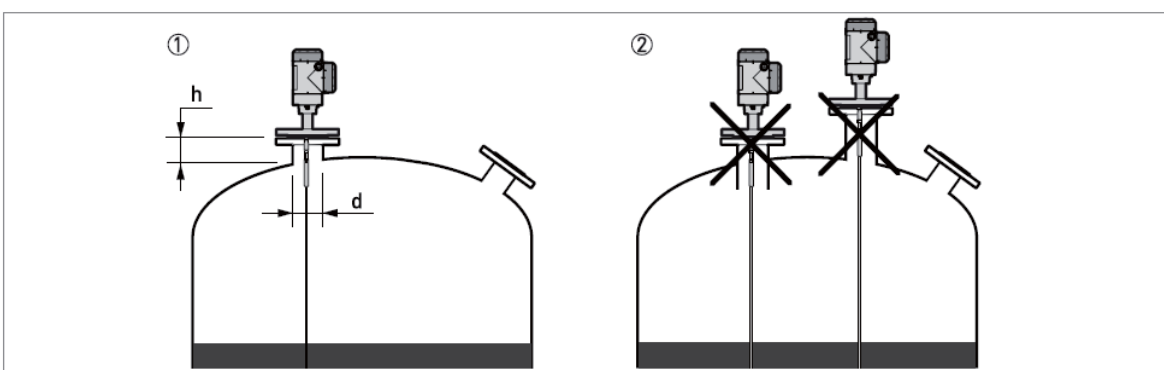
We recommend to install the level meter on the roof of the tank.

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.



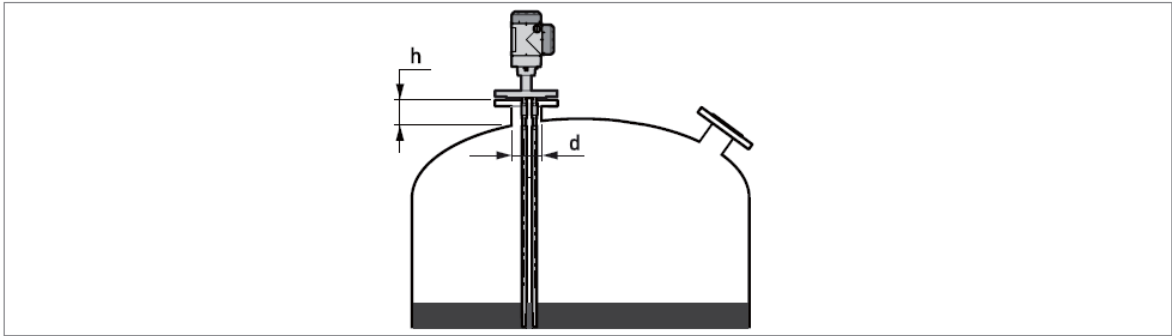
- ① When installing the level meter on a flanged nozzle, make sure that the nozzle length is 150 mm or less, or the nozzle diameter (d) is equal to or larger than the nozzle height (h). If this requirement is not met, the minimum required length of the dead zone will start with the lower end of the nozzle 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 twin cable probe or twin rod probe



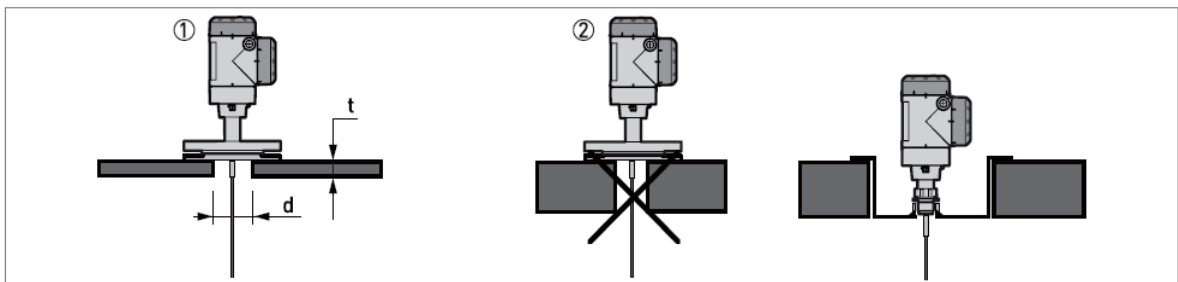
When installing a twin cable probe or twin rod probe on the nozzle, make sure that the nozzle diameter ( $d$ ) is larger or equal to 50 mm. Make sure that the nozzle height ( $h$ ) is as short as possible.

### Installing a coaxial probe

When installing a coaxial probe, the nozzle diameter and height have no impact on the measurement result.

### 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 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.



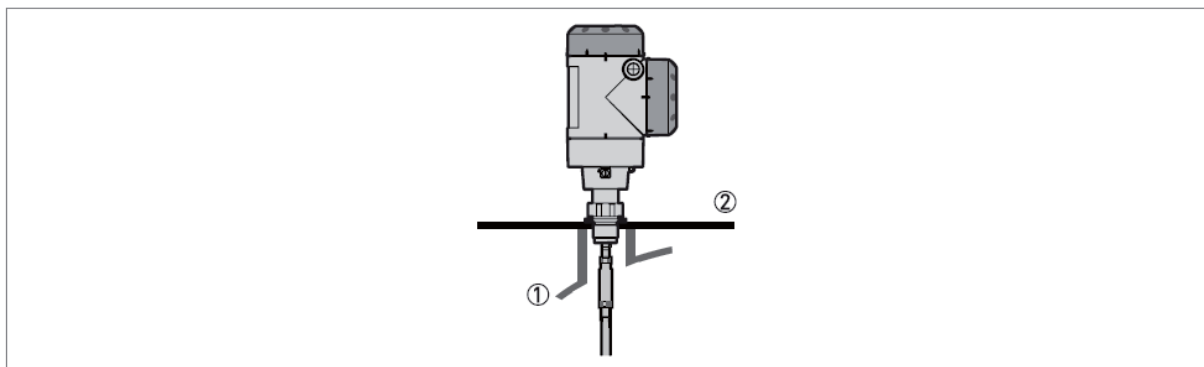
- ① Make sure that the hole diameter ( $d$ ) is larger than or equal to the concrete thickness ( $t$ ).
- ② When the concrete thickness ( $t$ ) is larger than the hole diameter ( $d$ ), enlarge the hole diameter and then install the probe. If you cannot enlarge the hole diameter, extend the top dead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

### Installing a probe on a non-metal tank

Observe the following when installing a single rod probe or single cable probe with thread connection.

- Insert a metal sheet between the level meter and the process connection seat.
- Make sure that the diameter of the metal sheet is 200 mm or larger.
- Make sure that the metal sheet is fully screwed into the process connection thread.
- If you cannot install a metal sheet, we recommend to use a flange with a diameter of 200 mm or larger.

When using a twin rod probe, twin cable probe, or coaxial probe, you can ignore these instructions.

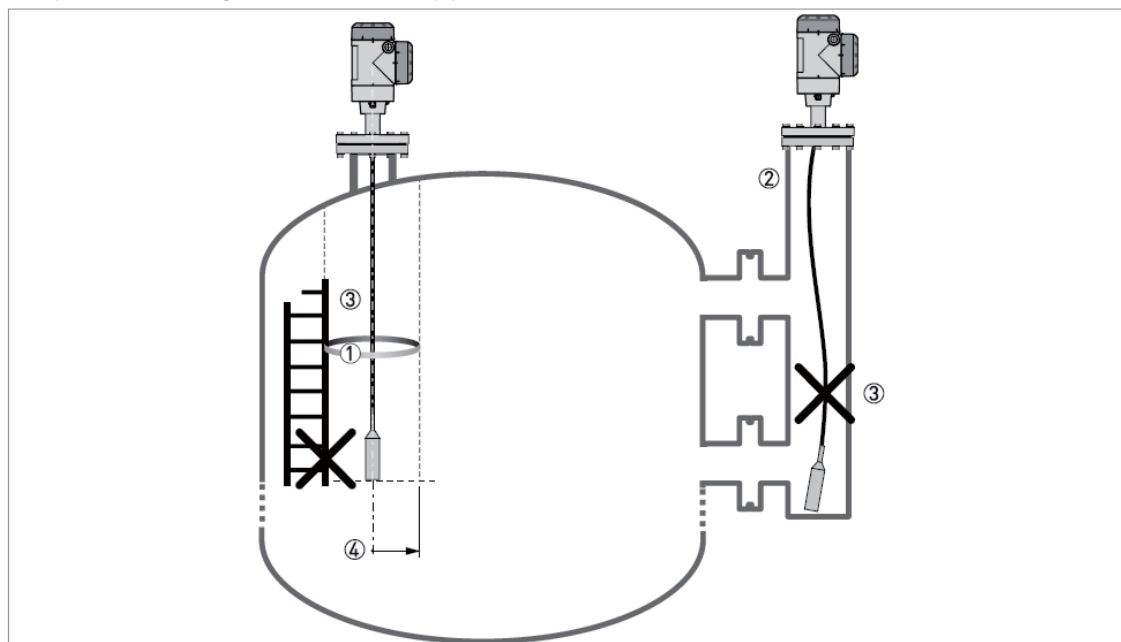


- ① Non-metal tank or sump tank
- ② Metal sheet of 200 mm or larger in diameter

### Precautions for installation

When installing a TGF7200 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.

When installing the level meter inside the pipe of a stilling well or bypass chamber, make sure that the probe is at the center of the pipe to prevent the probe from coming into contact with the pipe.



- ① Make sure that there is no obstacle in the impact range of micropulse around the probe. The impact range of micropulse varies with the type of probe. See the table below.
- ② If there are many obstacles, provide a stilling well or bypass chamber and make measurements inside the pipe to prevent the impact of obstacles.
- ③ Make sure that the probe is always straight and not slack inside the pipe. If the probe contacts the pipe, a measurement failure occurs. In this case, change the probe length to prevent contact.
- ④ The required distance between the probe and obstacles varies with the type of the probe. See the table below.

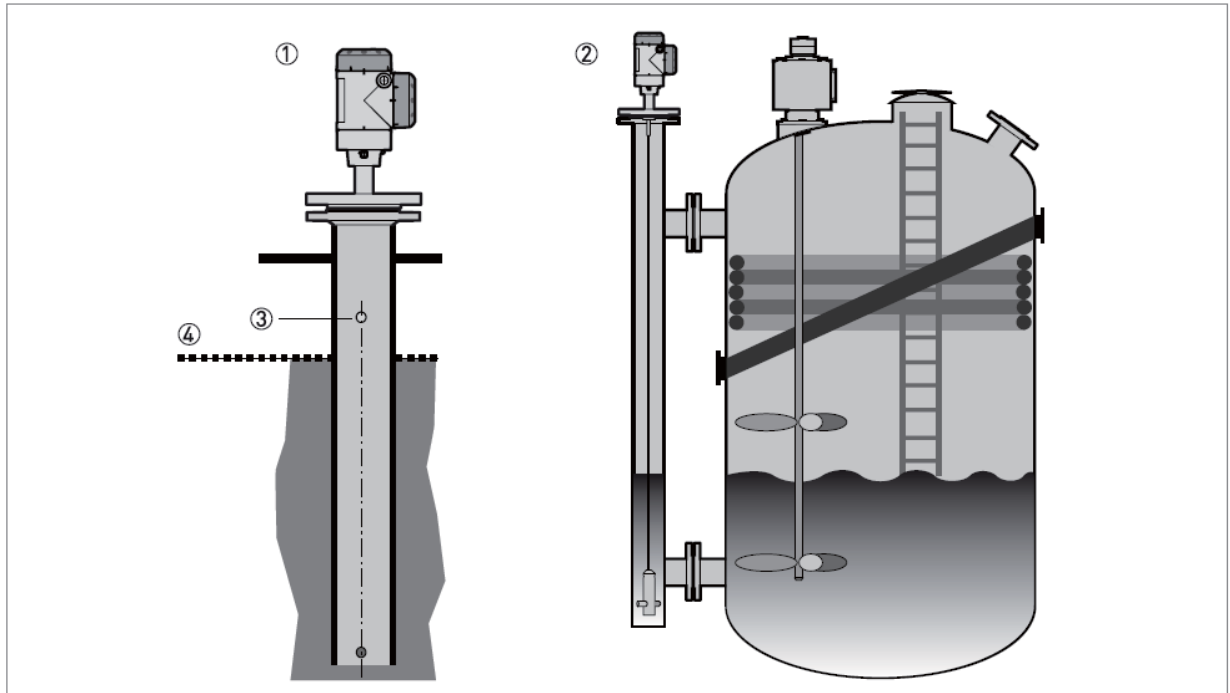
Type of probe	Spatial distance around probe
Coaxial probe	0.0 m
Twin rod probe, twin cable probe	0.1 m or more
Single rod probe, single cable probe	0.3 m or more

## Measurements inside pipe

### Installing the level meter in a stilling well or bypass chamber

When installing the level meter near a tank wall, or near obstacles such as a structure, agitator or liquid inlet disturbing the measurement, or when the liquid flow is turbulent or bubbles occur, you can provide a stilling well or bypass chamber to reduce an impact disturbing the measurement.

In these cases, we recommend to install a stilling well or bypass chamber to make measurements inside the pipe.



- ① Stilling well
- ② Bypass chamber
- ③ Vent hole
- ④ Maximum liquid level

### Requirements for making pipes

- Make sure that the stilling well or bypass chamber pipe is made of an electrically conductive material (metal).
- If the pipe is not made of metal but materials such as resin, use a pipe with a diameter large enough to provide the required spatial distance for the probe.
- Make sure that the inside surface of the pipe is straight and smooth with a surface roughness of 0.1 mm or less.
- The allowable variation in inside pipe diameter is 1 mm or less.
- Make sure that the vent hole of the stilling well is provided at a position above the maximum liquid level.
- When making measurements by installing a cable probe inside the pipe, provide sufficient clearance between the counter weight of the probe and the inside diameter of the pipe so that the flow of the liquid will not be disrupted and the liquid will flow smoothly.
- Install the pipe vertically.

### Precautions for measurements inside pipe

- When making measurements inside the pipe, install the probe at the center of the pipe.
- When making measurements in a bypass chamber, make sure that the maximum level is below the position of the upper horizontal pipe and the minimum level is above the position of the lower horizontal pipe.
- Make sure that the liquid flows into and out of the measurement pipe smoothly.
- Make sure that adhesion or corrosion does not occur inside the pipe.
- Make sure that foreign matter does not enter the inside of the pipe.
- When making measurements in a stilling well, measurement is not possible if the probe is installed at a position lower than the pipe.

## PROBE SELECTION GUIDE

Model	TGF7211	TGF7212	TGF7231		TGF7222	TGF7221
	Single rod probe	Twin rod probe	Coaxial probe		Twin cable probe	Single cable probe
Probe type			ø22mm	ø42mm		
Probe length (max.)	3 m 5.5 m (segment type))	3 m	3 m 5.5 m (segment type)	3 m	14 m	60 m
Measuring object						
Dielectric constant	> 1.6	> 1.4	> 1.3	> 1.3	> 1.4	> 1.6
Low dielectric constant liquid	△	○	○	○	○	△
High dielectric constant liquid	○	○	○	○	○	○
Viscosity	< 10,000 m Pa.s *1	< 5,000 m Pa.s *1	< 500 m Pa.s *1	< 2,000 m Pa.s *1	< 5,000 m Pa.s *1	< 10,000 m Pa.s *1
Slurry	○	△	△	△	△	○
Crystalline liquid	○	×	×	×	×	○
Interface	○	○	○	○	○	○
Installation method						
Storage tank	○	○	○	○	○	○
Sump tank	○	○	○	○	○	○
Bypass chamber	○	○	○	○	○	○
Stilling well	○	○	○	○	○	○
Tank with agitator	○ (Fix end of probe)	○	○	○	○ (Fix end of probe)	○ (Fix end of probe)
Small-diameter nozzle, long and thin nozzle	△	○	○	○	○	△
Small tank	△	○	○	○	○	×
Tank with obstacles	△	○	○	○	○	×
Process connection						
G 3/4, 3/4" NPT	○	—	○	—	—	○
G 1, 1" NPT	○	—	○	—	—	○
G 1-1/2, 1-1/2" NPT	○	○	○	—	○	○
JIS10k 40A	○	—	—	—	—	○
JIS 10k 50A	○	○	○	○	○	○
JIS 10k 80A	○	○	○	○	○	○
JIS 10k 100A	○	○	○	○	○	○
JIS 10k 150A	○	○	○	○	○	○
ASME 1"	○	—	○	—	—	○
ASME 1-1/2 "	○	—	○	—	—	○
ASME 2"	○	○	○	○	○	○
ASME 3"	○	○	○	○	○	○
ASME 4"	○	○	○	○	○	○
ASME 6"	○	○	○	○	○	○
ASME 8"	○	○	○	○	○	○

\*1: A general guide to select the probe

○ : Applicable  
△ : Not suitable  
× : Not usable  
— : Not applicable



MODEL AND SPECIFICATION CODES

TGF7200 (Rod probe)

Table with columns for Spec. code, TGF7200, 4, 4, W, 0, 0, 0, 0, /, and Description. It details various specifications for the TGF7200 rod probe, including approval codes, housing types, output options, cable entry configurations, display orientations, enhanced functions, process seals, probe types, process connections, installation locations, probe lengths, and special specifications.

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

Table with 2 columns: Signal cable length (1 m to 100 m) and 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.

※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.



TGF7200 (Coaxial probe)

Spec. code	TGF7200	4	4	W	0	0	0	0	0	0	0	0	0	/	Description	
Approval	0														Standard (Non-Ex)	
	1														ATEX: Intrinsic safety II 1/2 G Ex ia IIC T6...T° Ga/Gb, II 1/2 D Ex ia IIIC T85°C...T° °C Da/Db	
	2														ATEX: Flameproof enclosure / Dust ignition protection II 1/2 G Ex ia/db IIC T6...T° Ga/Gb, II 1/2 D Ex ia/tb IIIC T85°C...T° °C Da/Db	
	K														IECEx: Intrinsic safety Ex ia IIC T6...T° Ga/Gb, Ex ia IIIC T85°C...T° °C Da/Db	
	L														IECEx: Flameproof enclosure / Dust ignition protection Ex ia/db IIC T6...T° Ga/Gb, Ex ia/tb IIIC T85°C...T° °C Da/Db	
	U														JPN Ex: Intrinsic safety (TGF7200C-JEx or TGF7200F-JEx) Ex ia IIC T6...T° Ga/Gb, Ex ia IIIC T85°C...T° °C Da/Db	
W														JPN Ex: Flameproof enclosure / Dust ignition protection (TGF7200C-JEx or TGF7200F-JEx) Ex ia/db IIC T6...T° Ga/Gb, II 1/2 D Ex ia/tb IIIC T85°C...T° °C Da/Db		
Fixed code	0														Always 0	
Other approval	0														Without	
	3														NACE MR0175 (ISO 15156), MR0103 (ISO 17945)	
	2														Compact type (Aluminum)	
Housing type / material	3														Compact type (Stainless steel)	
	7														Remote type (Aluminum) ※1	
	8														Remote type (Stainless steel) ※1	
															2-wire / 4-20mA passive (HART) × 1 output	
Output	2														2x 2-wire / 4-20mA passive (HART) + 4-20mA passive	
	3														2-wire + 4-wire / 4-20mA passive (HART) + switch output - Relay	
	1														M20×1.5 / without (Cable entry : For G 1/2 female thread, select M20 x G 1/2 adapter as an option. (For JPN Ex of flameproof / dust ignition, select the Flameproof cable gland (G 1/2) as an option.)	
Cable entry / cable gland	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	
Enhanced function	0														Without	
	1														Interface	
Process seal : Material / Temp. / Press.	1														FKM/FPM, PTFE process seal / -40 ... +150°C / 0 kPa (abs) ... 4 MPa	
	2														Kalrez® 6375, PTFE process seal / -20 ... +150°C / 0 kPa (abs) ... 4 MPa	
	3														EPDM, PTFE process seal / -50 ... +150°C / 0 kPa (abs) ... 4 MPa	
	K														FKM/FPM, Ceramic process seal / -40 ... +200°C / 0 kPa (abs) ... 10 MPa	
	L														Kalrez® 7075, Ceramic process seal / -20 ... +250°C / 0 kPa (abs) ... 10 MPa	
	M														EPDM, Ceramic process seal / -50 ... +150°C / 0 kPa (abs) ... 10 MPa	
Probe type / Material / Length	K														Coaxial - ø22 mm / SS316L (1.4404) / 0.6 ... 3 m	
	L														Coaxial - ø22 mm segmented / SS316L (1.4404) / 0.6 ... 5.5 m	
	N														Coaxial - ø22 mm / Hastelloy C22 / 0.6 ... 3 m	
	P														Coaxial - ø42 mm / SS316L (1.4404) / 0.6 ... 3 m	
	R														Coaxial - ø42 mm / Hastelloy C22 / 0.6 ... 3 m	
Fixed code	0														Always 00	
Process connection	Threaded	D P 0													G 3/4 A (Not for ø42 coaxial, Not for process seal code "K","L","M")	
		E P 0													G 1A (Not for ø42 coaxial)	
		G P 0													G 1-1/2A	
		D A 0													3/4 NPT (Not for ø42 coaxial, Not for process seal code "K","L","M")	
		E A 0													1 NPT (Not for ø42 coaxial)	
		G A 0													1-1/2 NPT (Not for ø42 coaxial)	
	Flanged - ASME	E 1 A														1" 150lb RF (Not for ø42 coaxial)
		E 2 A														1" 300lb RF (Not for ø42 coaxial)
		G 1 A														1-1/2" 150lb RF (Not for ø42 coaxial)
		G 2 A														1-1/2" 300lb RF (Not for ø42 coaxial)
		H 1 A														2" 150lb RF
		H 2 A														2" 300lb RF
		L 1 A														3" 150lb RF
		L 2 A														3" 300lb RF
		M 1 A														4" 150lb RF
		M 2 A														4" 300lb RF
		P 1 A														6" 150lb RF
		P 2 A														6" 300lb RF
	Flanged - JIS	R 1 A														8" 150lb RF
		G U P														40A JIS10K RF (Not for ø42 coaxial)
		H U P														50A JIS10K RF
		L U P														80A JIS10K RF
		M U P														100A JIS10K RF
		P U P														150A JIS10K RF
Fixed code	0 0														Always 00	
Installation location	0														Indoors: Without weather protection	
	1														Outdoors: 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 (1m to 100m) between the probe housing and the converter housing.

Signal cable length (1 m to 100 m)	m
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※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.

※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: TGF7211  
Spec code: TGF720044W000211670110LUP001/0210
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 TGF7200 in a hazardous location as an intrinsically safe level meter.

**ORDERING INFORMATION****Measuring object**

Level measurement:

Substance name: ( )  
 Dielectric constant :  $\epsilon_r$  ( )  
 Substance property :  Liquid  Slurry  
 Corrosion property :  No  Slightly corrosive  Heavily corrosive  
 Adhesive property :  No  Slightly adhesive  Heavily adhesive  
 Crystalline property :  No  Slightly crystalline  Heavily crystalline  
 Bubbling property :  No  Slightly bubbling  Heavily bubbling  
 Occurrence of bubbles :  No  Occasionally  Frequently

Interface measurement:

Top liquid:  
 Substance name: ( )  
 Dielectric constant :  $\epsilon_r$  ( )  
 Substance property :  Liquid  Slurry  
 Corrosion property :  No  Slightly corrosive  Heavily corrosive  
 Adhesive property :  No  Slightly adhesive  Heavily adhesive  
 Crystalline property :  No  Slightly crystalline  Heavily crystalline  
 Bubbling property :  No  Slightly bubbling  Heavily bubbling  
 Occurrence of bubbles :  No  Occasionally  Frequently

Bottom liquid:  
 Substance name: ( )  
 Dielectric constant :  $\epsilon_r$  ( )  
 Substance property :  Liquid  Slurry  
 Corrosion property :  No  Slightly corrosive  Heavily corrosive  
 Adhesive property :  No  Slightly adhesive  Heavily adhesive  
 Crystalline property :  No  Slightly crystalline  Heavily crystalline

**Operating conditions**

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

**Tank conditions**

Shape :  Ground  Underground  Closed sump tank  Open sump tank  Other  
 Height : ( )  
 Diameter or width : ( )  
 Obstacles inside tank :  No  
                            Yes :  Agitator (shape: )  Thermometer  Level switch  Reinforcement or stay  
                            Ladder  Other  
 Tank material :  Metal ( )  Non-metal ( )  
 Coating :  Yes  No

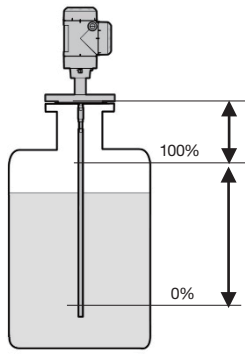
**Installation conditions**

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

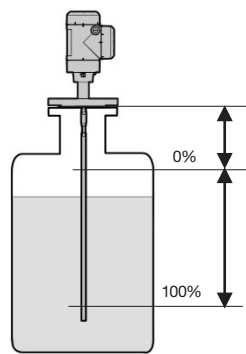
**Measurement conditions**

Measurement method:

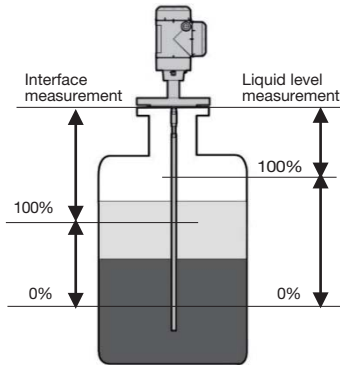
Level measurement



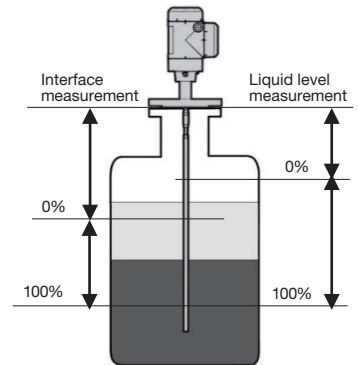
Distance measurement



Interface measurement (level output)



Interface measurement (distance output)



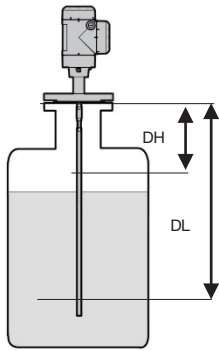
Measuring range:

Distance from process connection part to minimum level

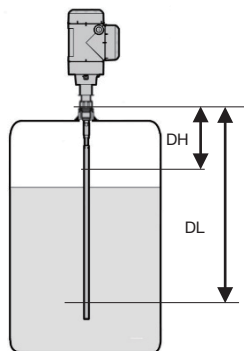
DL : ( )mm

Distance from process connection part to maximum level

DH : ( )mm



Flange connection  
Baseline position  
(flange bottom surface)



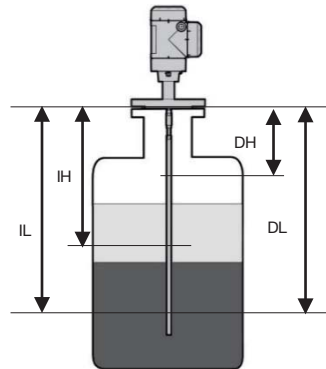
Thread connection  
(threaded flange)  
Baseline position (thread top)

Distance from process connection part to minimum interface level

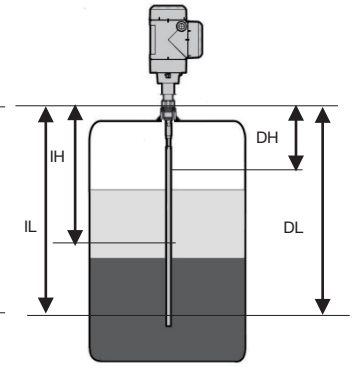
IL : ( )mm

Distance from process connection part to maximum interface level

IH : ( )mm



Flange connection  
Baseline position  
(flange bottom surface)



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

\* Specification is subject to change without notice.

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