

# PRODUCT DATA SHEET

Non-contacting Radar Level Gauge

## KRG-10



**TOKYO KEIKI INC.**

OVAL ENGINEERING INC.



## 1. Advanced performance

The measuring principle is based on Time-of-Flight by microwave pulse technology.

- ◆ Non contact measuring
- ◆ Non mechanical moving parts
- ◆ High reliability, Easy maintenance
- ◆ High sensitivity
- ◆ Density, Pressure and Temperature less affected

- ✓ Loop Power System (2-wire)
- ✓ 4-20mA with HART protocol
- ✓ Wide antenna range
- ✓ Interactive Windows-based setup software
- ✓ Built-in display / 4 keys menu driven
- ✓ LCD 90° step rotation for better visibility

## 2. Measuring principle

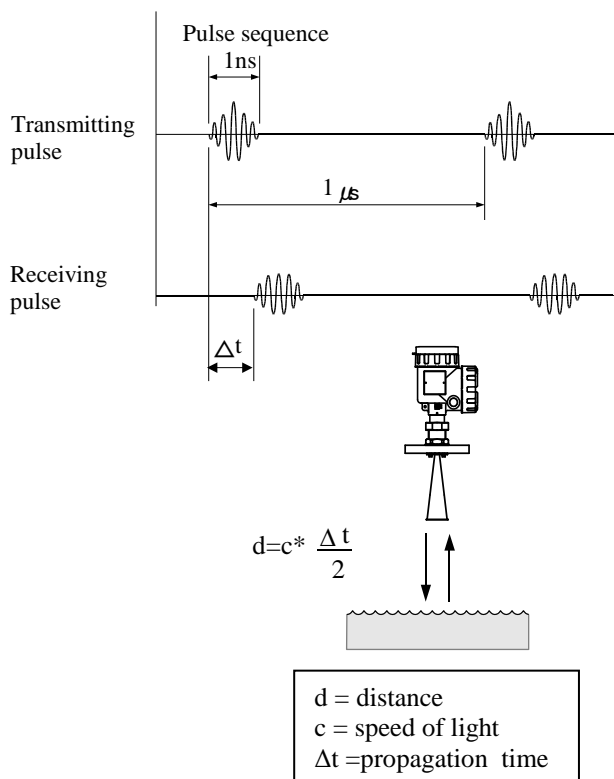
KRG-10 measures liquid levels by transmitting radar pulses towards the liquid surface and receiving the radar echoes. The travel time for the radar pulse is proportional to the distance between the gauge and the surface.

Upon reception, microprocessors and intelligent software in the gauge head analyzes the echoes and transform them into level output data.

The radar pulse is virtually less affected by the tank content and atmosphere, temperature or pressure. Thus, radar measurement is proven to be the most reliable gauging method in the most applications. Furthermore, maintenance requirements are in fact zero that as no part of the gauge is in physical contact with liquid.

And KRG-10 has a function to remove unwanted echo. By using this function, the user can prevent the erroneous recognition of the reflected wave by unwanted echo.

**All this makes KRG-10 very well suited for process tank applications in the chemical and water industry.**



### 3. Features

#### Unique Technology

##### ◆ **±2mm High Accuracy**

TOKYO KEIKI's advanced pulse technologies achieve +/-2mm accuracy. (Rod Antenna : +/-3mm)

##### ◆ **Advanced Echo Processing**

"**Multi-echo Historical-validation**" checks trend continuity to track the echoes from liquid during process operation for smooth measurement. And, "**Auto Noise Table Function**" achieves stable and continuous level measurement on the Reactor tank application.

##### ◆ **Rapid Tracking**

"**Full-range Search Mode**" boosts detection speed and track up to **2m/sec level change**.

##### ◆ **Flow & Volume Calculation**

"**Extended calculation mode**" outputs not only Tank Volume, but also **Open Channel Flow Rate** by weir or flume combination.

##### ◆ **Wide Line-up Antenna**

KRG-10 can be installed for Corrosive, Adhesive and Hygienic applications by various antenna;

**SUS Cone** for 2" (DN50) & 4" (DN100) nozzles

**PTFE Sealing** for 2" (DN50) & 3" (DN80) & 4" (DN100) nozzles

**PFA Rod** for 1" (DN25) nozzle

Details as per page 7 to 12
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##### ◆ **Wide Measuring Range**

Up to **30m Max.** by 4" (DN100) Cone Antenna

#### Stable Measurement

##### ◆ **"Disturbance Noise Elimination"**

Cyclical & Multi-bounce noise echoes are eliminable for stable output. It realizes stable measurement without leap in process tank measurement.

##### ◆ **"Predict Output"**

As the result of echo validation, KRG-10 can output predicted data reasonably.

##### ◆ **Distance Filter Window**

This window is effective for echo searching, and variable ranging available.

##### ◆ **Bottom Echo Handler**

Generally, liquids having low dielectric constant are difficult to be divided surface echo from tank bottom echo when its level is quite low and close to bottom. KRG-10 can deem the level is close to almost bottom without fluctuation.

##### ◆ **Double Bounce Handler**

Delayed echo by multi-bounce between liquid surface and tank ceiling will be eliminated.

## **User-friendly Design**

### ◆ **Easy Configuration**

Graphical HART Configuration on Laptop PC  
Also menu driven 4-keys input (need LCD module)

### ◆ **Rotatable LCD (90° step)**

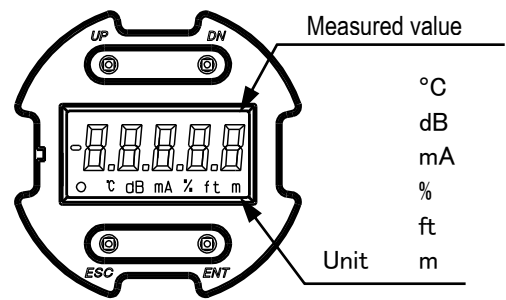
LCD front face can be changed to all four points of the compass.

### ◆ **Sun Shade for LCD protection**

Rubber-made Sun Shade is provided to protect top-mount LCD.

### ◆ **Removable LCD module**

LCD module is removal in case that it is not required. In such case, a blind cover the same as terminal cover will be provided before shipment.



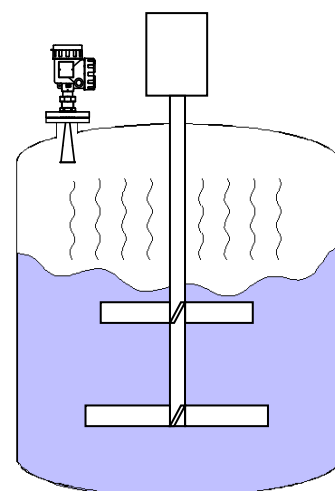
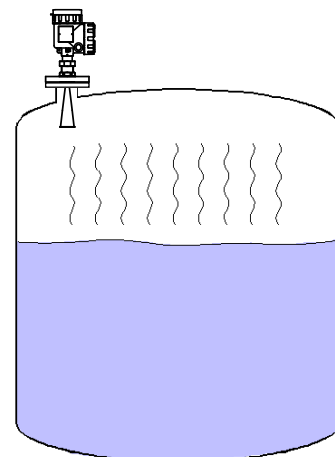
## **4. Applications**

KRG-10 is available to measure both of calm surface liquid such as storage tanks or buffer tanks and ruffled surface liquid such as reactor tanks.

- Chemical and petrochemical
- Refinery
- Pharmacy
- Food and beverage

Also it will be available in Water industrial such as

- River intake gate,
- Process in waterworks,
- Water reservoir,
- Sewage water treatment plant,
- Hydraulic power station,
- River and dam,
- Coolant pit in steel process,
- Discharge outlet for flow metering.



## 5. System

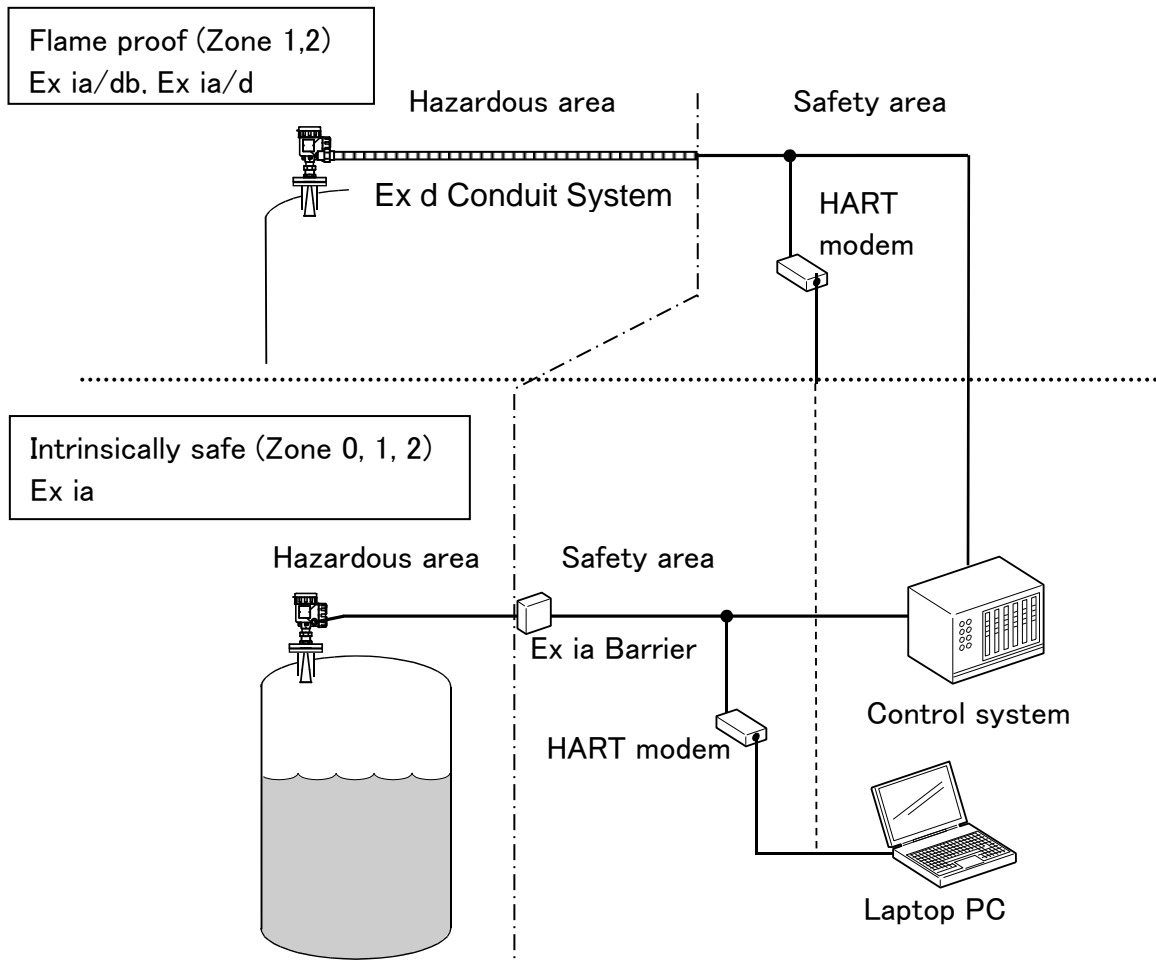
KRG-10 uses 2-wire system, which means both signal and power are available on same wiring.

KRG-10 is certified as both flameproof and intrinsically safety instrument.

If you intend to use KRG-10 in hazard area as intrinsic safety device, intrinsically safe barrier is required.

All of data is displayed by 5-digit LCD display on transmitter head and changed items by 4 configuration buttons easily. Also it is possible to operate Interactive Windows-based setup software on PC.

### Example



## 6. Measuring

Measuring performance will be decided by products character (dielectric constant), surface conditions and antenna size.




In generally, the liquid, which has higher dielectric constant number such as water, is easily to measure, and calm surface liquid is the same.

On the contrary, low dielectric constant liquid, turbulence surface or forming surface and dirty antenna conditions are relatively difficult to measure.

Even so if you choose right antenna, it is possible to measure in most of case.

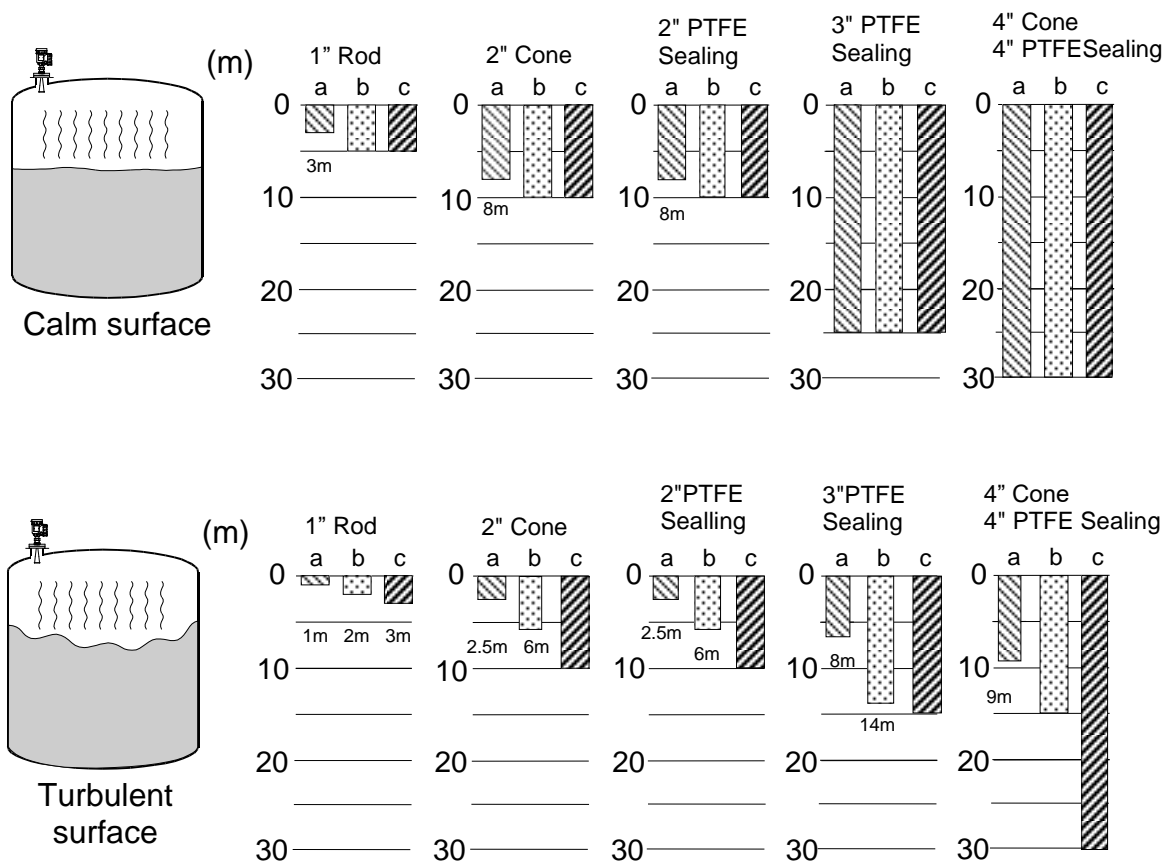
Below table and graphs show suitable antenna, products and range.

Type	Antenna	Targeting
<b>KRG-10-□0□H□</b>	2", 4" Cone	Tank application, Long Distance
<b>KRG-10-□0□P□</b>	2", 3", 4" PTFE Sealing	Hygienic or aggressive liquid application
<b>KRG-10-□01R□</b>	1" Rod	Narrow & longer tank nozzle

-  a: Machine Oil, Gasoline,  
Hydrocarbons, Petroleum ( $\epsilon_r = 1.8 \sim 2.7$ )  
 b: Rapeseed oil, Alcohol,  
Concentrated Acid, Solvent ( $\epsilon_r = 2.7 \sim 10$ )  
 c: Water base liquid ( $\epsilon_r > 10$ )

Almost all of liquid may be classified as below 3 types.

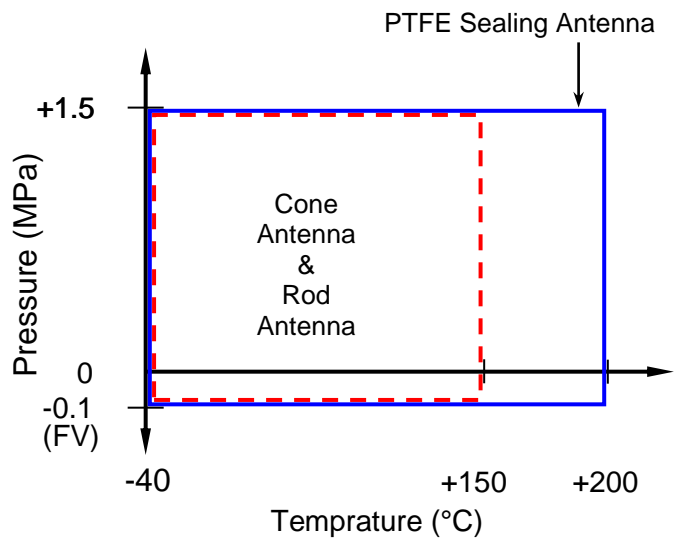
### Antenna Measuring Distance (reference)



## 7. Antenna type

Antenna is only a part, which is exposed in tank inside, and you should choose proper antenna that suits to your demand.

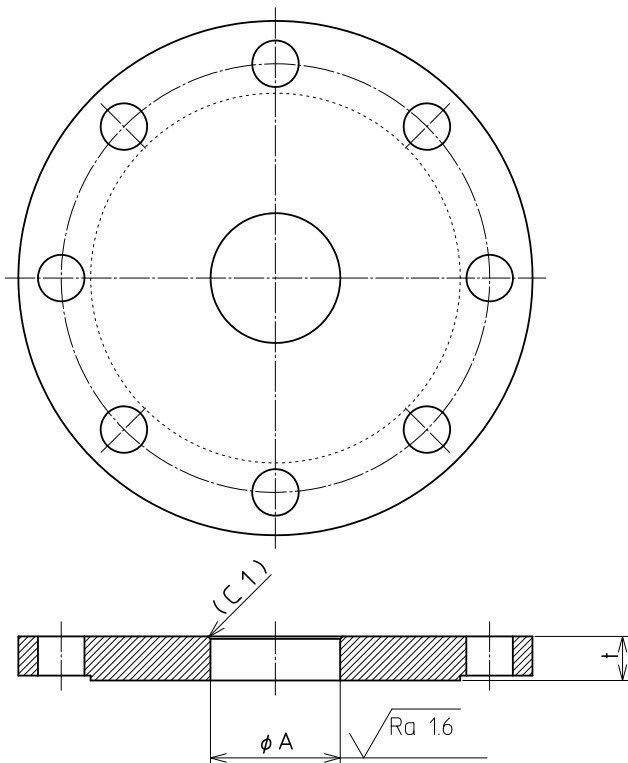
KRG-10 has various antenna line-up depending on materials and size of installed nozzle. However, temperature & pressure range of tank inside conditions are common in spite of antenna type as the right figure.



### 7-1. Fitting Flange for nozzle installation

KRG-10's antennas are designed for easy mounting by flange. In order to apply various standard's flange on tank nozzles, KRG-10 can use local flanges that machined for a center hole. So the hole size depends on antenna type, please refer the following dimension table and machine locally procured flanges.

#### Required flange dimensions



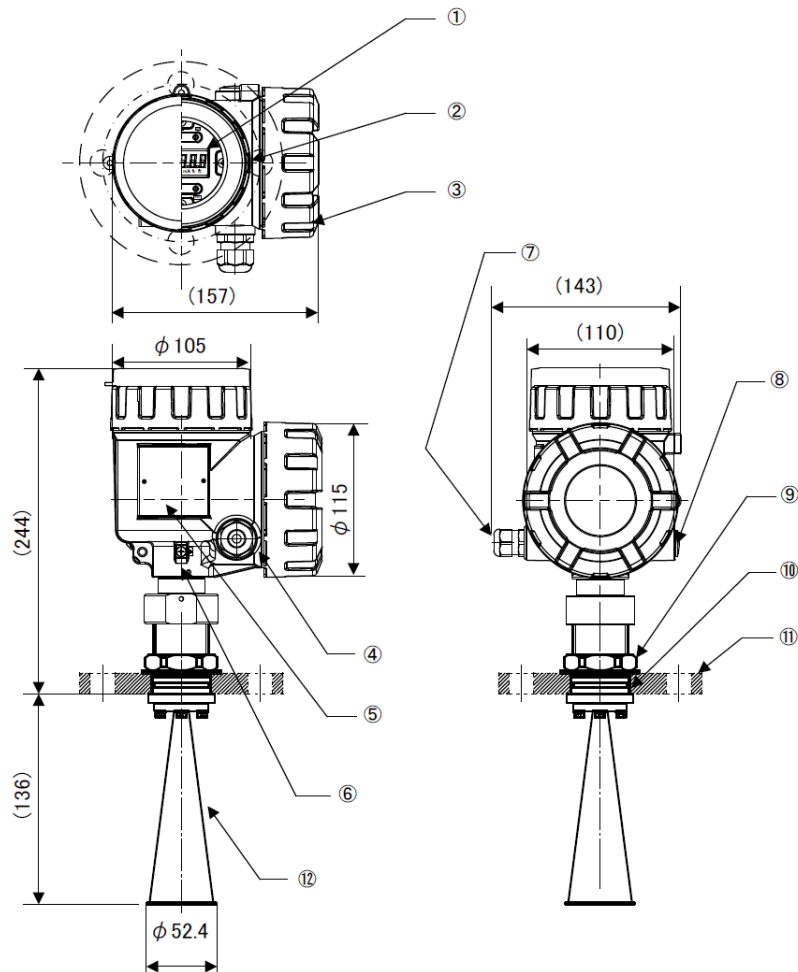
Antenna type	Center Hole		t
	ΦA	Tolerance	
2" & 4" Cone	45	+0.1 0	14 ~ 35
2" PTFE Sealing	50		12 ~ 25
3" PTFE Sealing	75		14 ~ 35
4" PTFE Sealing	80		14 ~ 35
1" Rod	45		11 ~ 35

## 7-2. Cone Antenna

Cone Antenna is available for both liquid tank / vessel and pipe installation. The size of antenna are provided 2 inch or 4 inch, and the only materials which is exposed in tank inside are consisted of SUS316L and PTFE sealing and O rings.

Thanks to KRG-10 unique flange clamp solution, you can use your existing flange as process connection.

### KRG-10 with 2" Cone Antenna



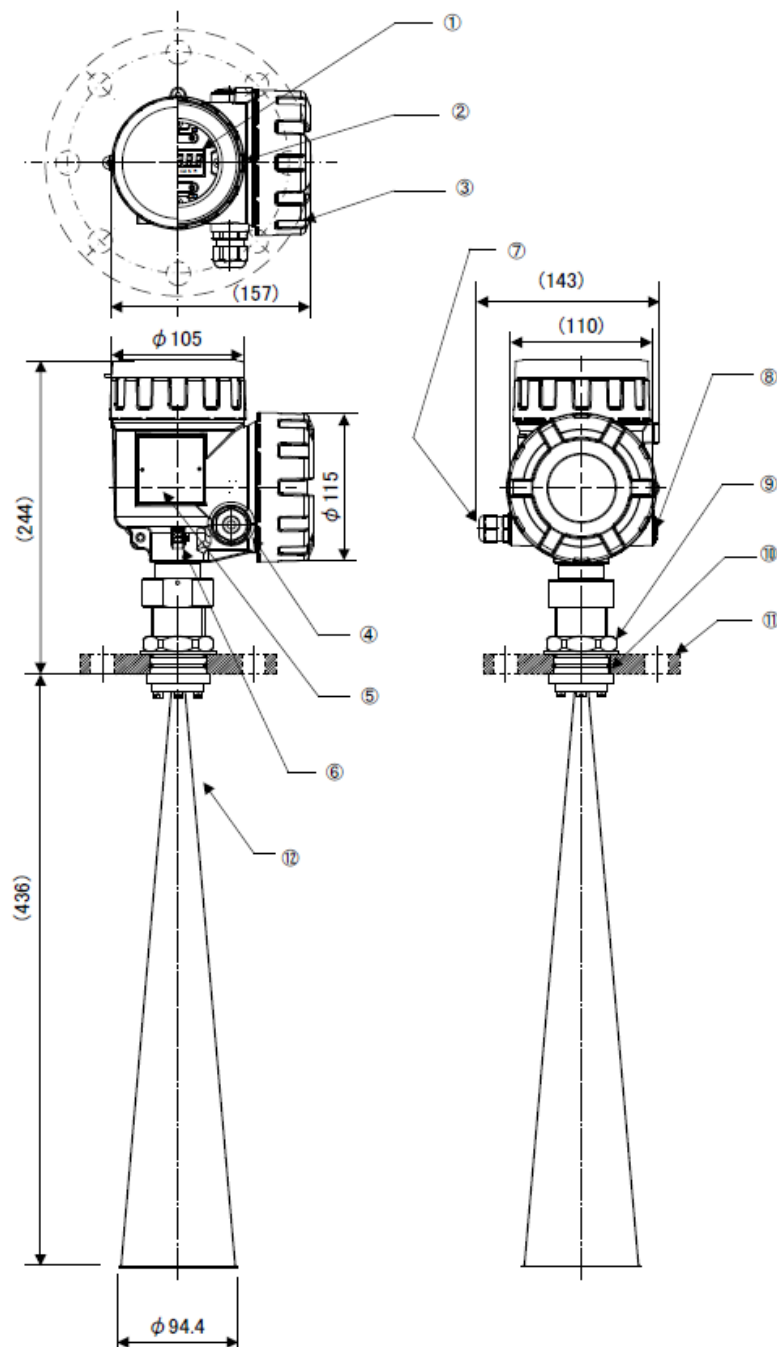
- |  |                               |
|--|-------------------------------|
| 1. Window / Polycarbonate *1             | 7. Plug or Cable gland *2     |
| 2. Cover (display) / AlSi10Mg(Fe)        | 8. Blind Plug *2              |
| 3. Cover (terminal block) / AlSi10Mg(Fe) | 9. Flange lock nut / SUS304   |
| 4. Housing / AlSi10Mg(Fe)                | 10. O-ring                    |
| 5. Label                                 | 11. Flange (option)           |
| 6. Ground terminal (M5) / SUS304         | 12. 2" Cone Antenna / SUS316L |

\*1 = Provided that LCD Module is requested.

\*2 = See Page21



## KRG-10 with 4" Cone Antenna



- |  |                               |
|--|-------------------------------|
| 1. Window / Polycarbonate *1             | 7. Plug or Cable Gland *2     |
| 2. Cover (display) / AlSi10Mg(Fe) *2     | 8. Blind Plug *2              |
| 3. Cover (terminal block) / AlSi10Mg(Fe) | 9. Flange lock nut / SUS304   |
| 4. Housing / Aluminum                    | 10. O-ring                    |
| 5. Label                                 | 11. Flange (option)           |
| 6. Ground terminal (M5) / SUS304         | 12. 4" Cone Antenna / SUS316L |

\*1 = Provided that LCD Module is requested.

\*2 = See Page21

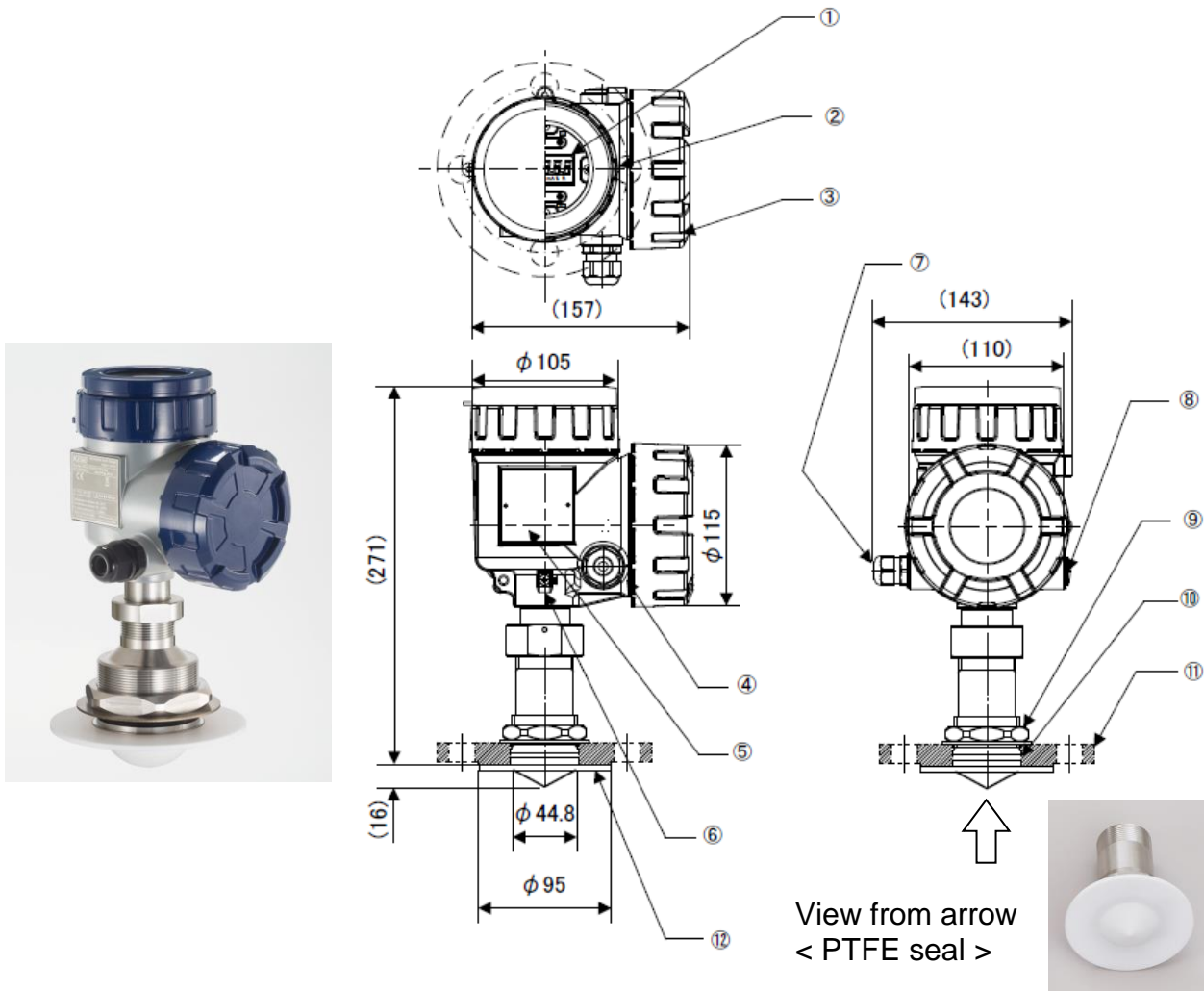
### 7-3. Sealing Antenna

Sealing Antenna is available for hygienic nozzle on liquid tank / vessel.

The size of antenna are provided 2 inch or 4 inch, and the only materials which is exposed in tank inside are consisted of PTFE sealing only.

Thanks to KRG-10 unique flange clamp solution, you can use your existing flange as process connection.

#### KRG-10 with 2" PTFE Sealing Antenna

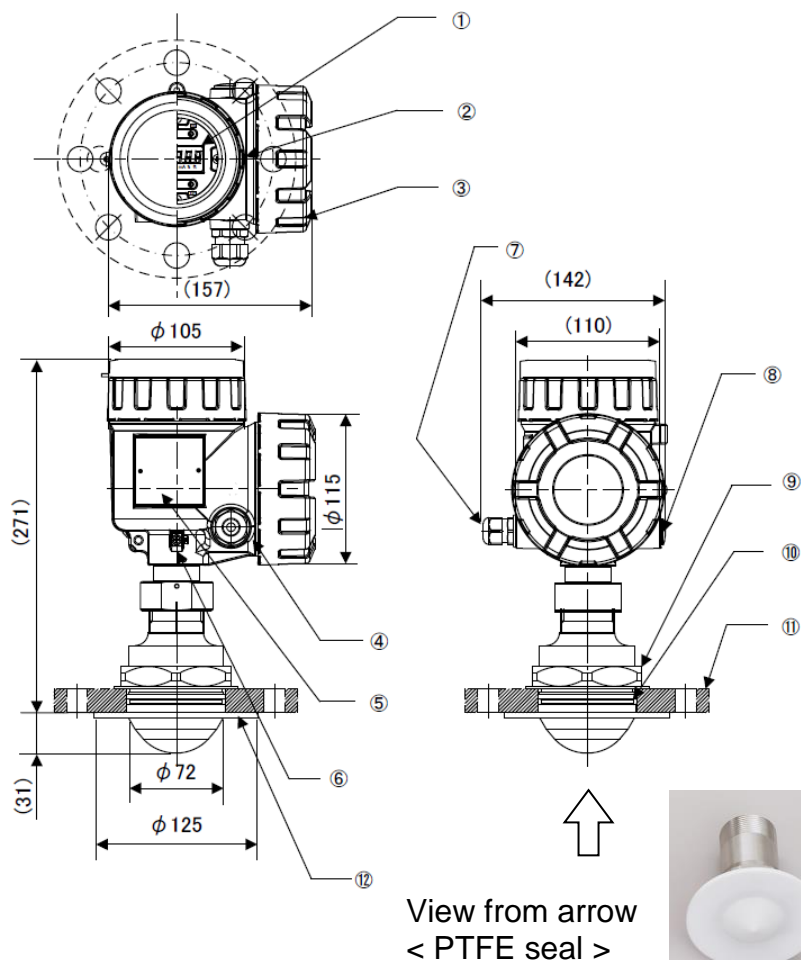


- |  |                             |
|--|-----------------------------|
| 1. Window / Polycarbonate *1             | 7. Plug or Cable Gland *2   |
| 2. Cover (display) / AlSi10Mg(Fe)        | 8. Plug *2                  |
| 3. Cover (terminal block) / AlSi10Mg(Fe) | 9. Flange lock nut / SUS304 |
| 4. Housing / AlSi10Mg(Fe)                | 10. O-ring                  |
| 5. Label                                 | 11. Flange (option)         |
| 6. Ground terminal (M5) / SUS304         | 12. 2" PTFE Sealing Antenna |

\*1 = Provided that LCD Module is requested.

\*2 = See Page21

## KRG-10 with 3" PTFE Sealing Antenna



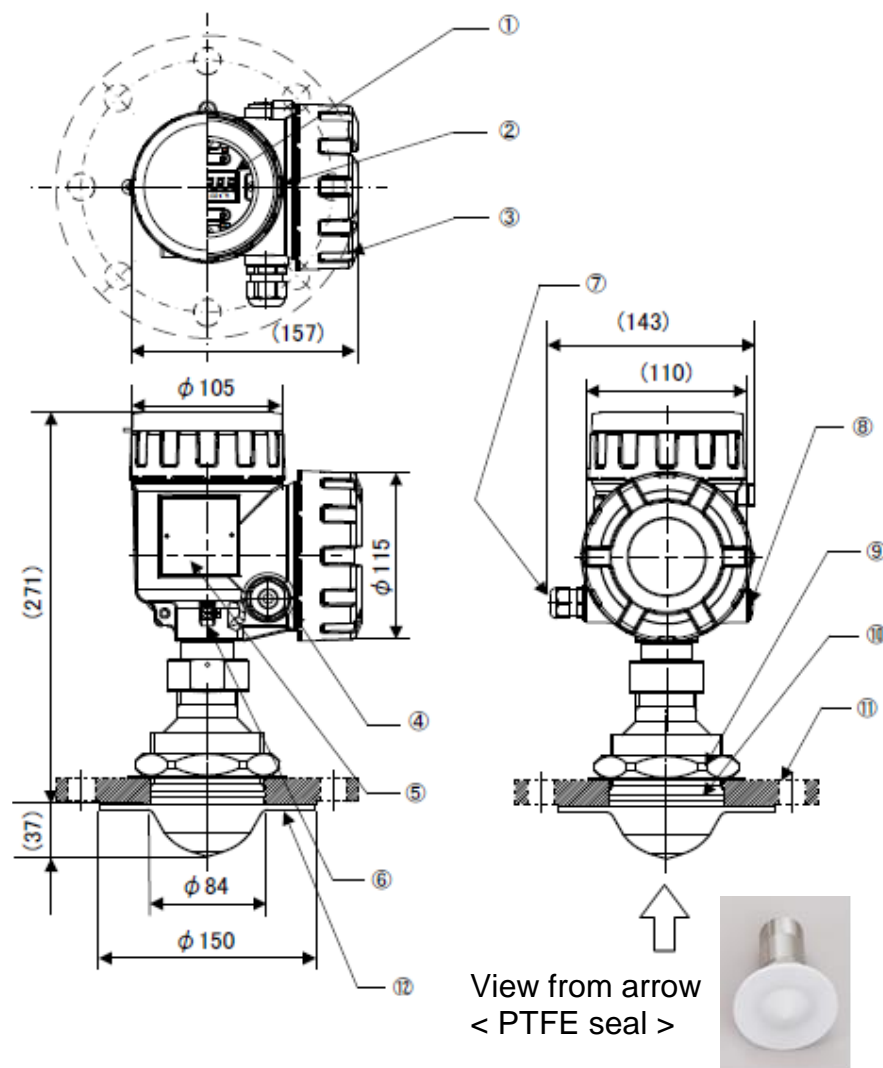
1. Window / Polycarbonate \*1
2. Cover (display) / AlSi10Mg(Fe)
3. Cover (terminal block) / AlSi10Mg(Fe)
4. Housing / AlSi10Mg(Fe)
5. Label
6. Ground terminal (M5) / SUS304

7. Plug or Cable Gland \*2
8. Plug \*2
9. Flange lock nut / SUS304
10. O-ring
11. Flange (option)
12. 3" PTFE Sealing Antenna

\*1 = Provided that LCD Module is requested.

\*2 = See Page21

## KRG-10 with 4" PTFE Sealing Antenna



1. Window / Polycarbonate \*1
2. Cover (display) / AlSi10Mg(Fe)
3. Cover (terminal block) / AlSi10Mg(Fe)
4. Housing / AlSi10Mg(Fe)
5. Label
6. Ground terminal (M5) / SUS304

7. Plug or Cable Gland \*2
8. Plug \*2
9. Flange lock nut / SUS304
10. O-ring
11. Flange (option)
12. 4" PTFE Sealing Antenna

\*1 = Provided that LCD Module is requested.

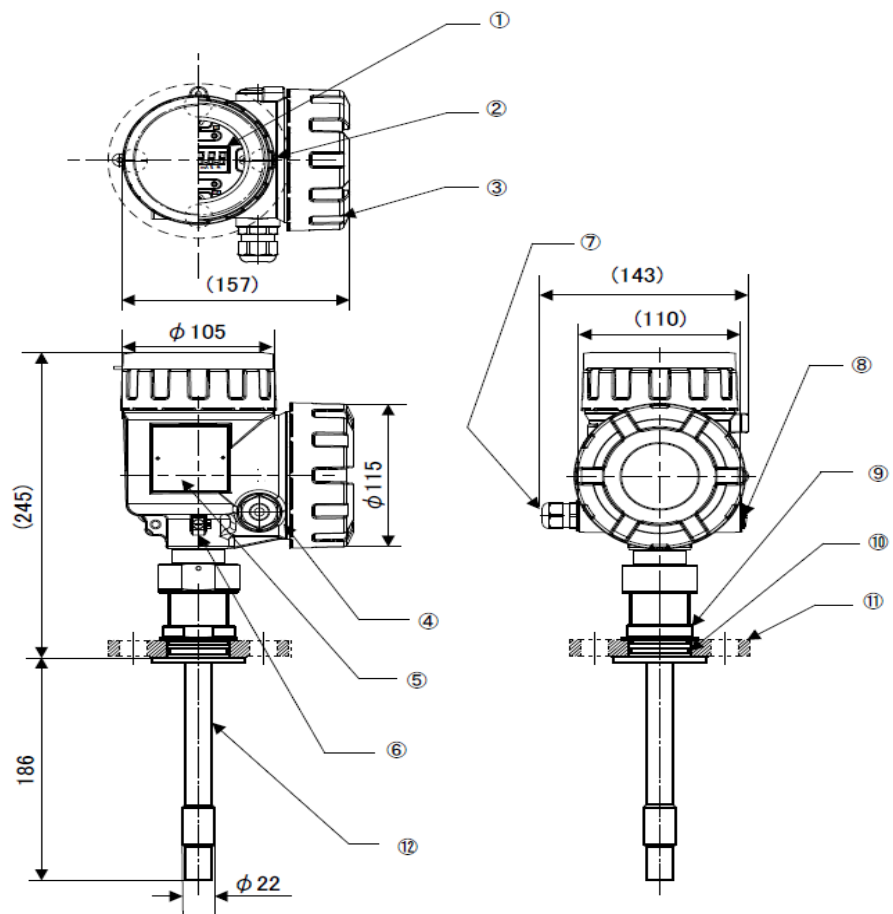
\*2 = See Page21

## 7-4. Rod Antenna

The Rod Antenna is made of fluororesin (PFA), which makes it easy to clean and resistant to aggressive chemicals and conditions. It has inactive length of 150mm to ensure that measurements are unaffected by the mounting nozzle or thick flower (Sublimed).

Thanks to KRG-10 unique flange clamp solution, you can use your existing flange as process connection.

### KRG-10 with 1" Rod Antenna



- |  |                             |
|--|-----------------------------|
| 1. Window / Polycarbonate *1             | 7. Plug or Cable Gland *2   |
| 2. Cover (display) / AlSi10Mg(Fe)        | 8. Plug *2                  |
| 3. Cover (terminal block) / AlSi10Mg(Fe) | 9. Flange lock nut / SUS304 |
| 4. Housing / AlSi10Mg(Fe)                | 10. O-ring                  |
| 5. Label                                 | 11. Flange (option)         |
| 6. Ground terminal (M5) / SUS304         | 12. 1" Rod Antenna / PFA    |

\*1 = Provided that LCD Module is requested.

\*2 = See Page21

## 8. Mechanical Installation

KRG-10 shall be mounted on tank nozzle or pipe easily. To ensure performance you should install gauge properly as bellow.

Antenna should be kept horizontally.  
Inside of microwave transmitting area might be clear.

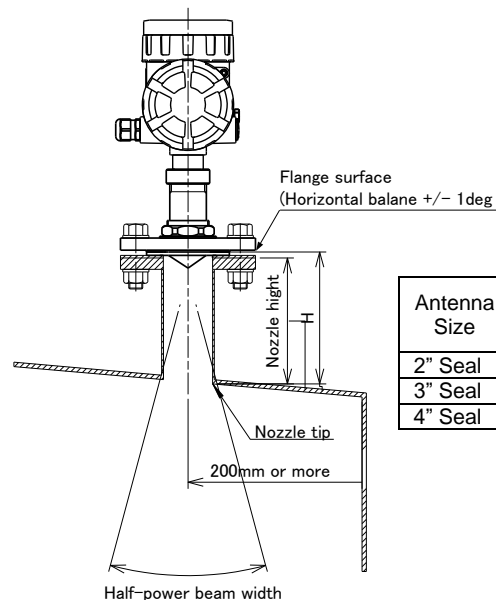
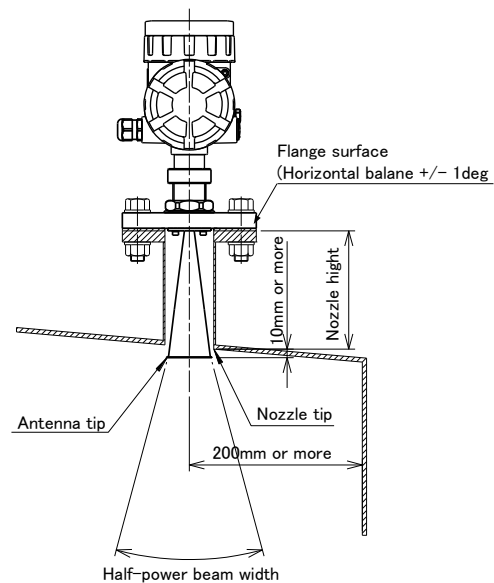
Set the gauge to keep away from tank wall as recommended dimension in the measuring ranges.  
To choose bigger size antenna as you can because big size antenna will be better to gain weak microwave echo in bad conditions.

### Size of microwave beam area

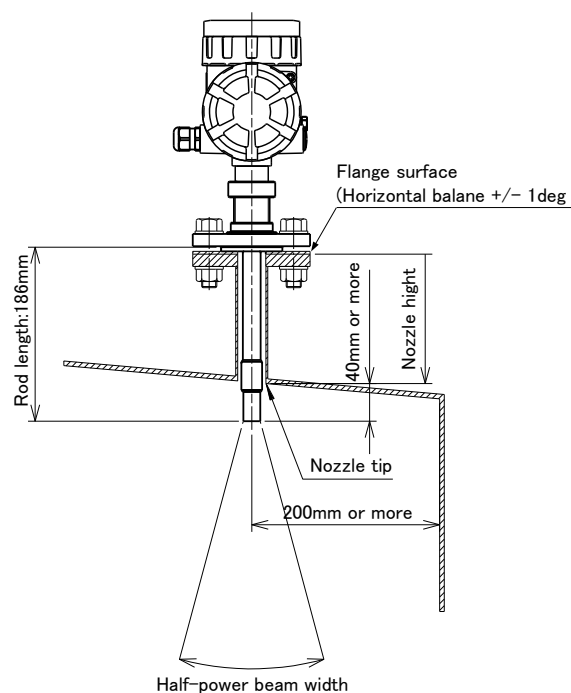
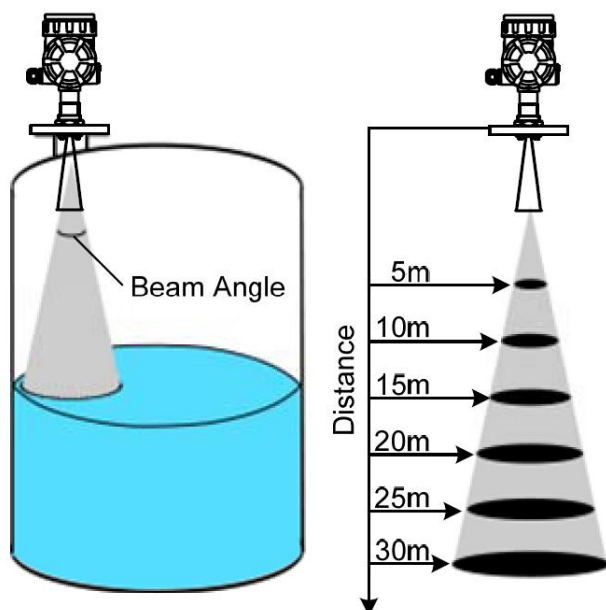
Beam area : Diameter of radiated area

Beam angle: Half-power beam width (degree)

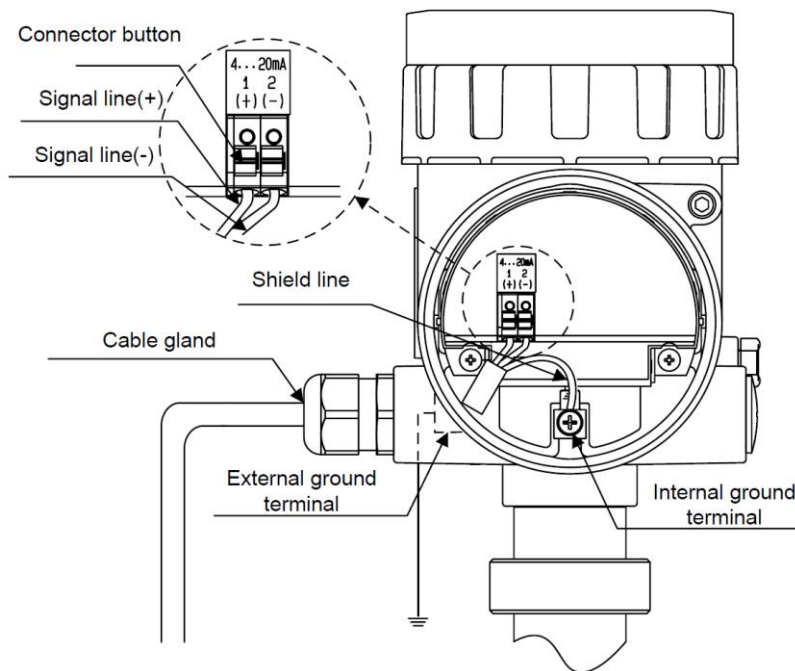
Antenna type	2" Cone 2" Sealing	3" Sealing	4" Cone 4" Sealing	1" Rod
Beam angle	18°	12°	8°	25°
Distance (m)	Diameter (m)			
5	1.6	1.1	0.7	2.2
10	3.2	2.1	1.4	-
15	-	3.2	2.1	-
20	-	4.2	2.8	-
25	-	5.3	3.5	-
30	-	-	4.2	-



Antenna Size	Max. Nozzle Height
2" Seal	150mm
3" Seal	500mm
4" Seal	500mm



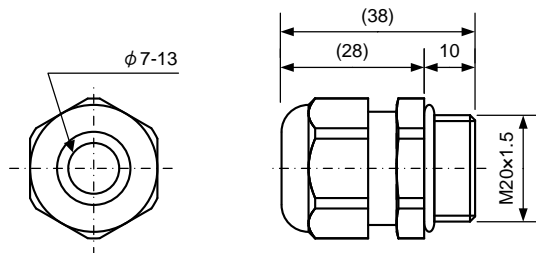
## 9. Electrical Installation



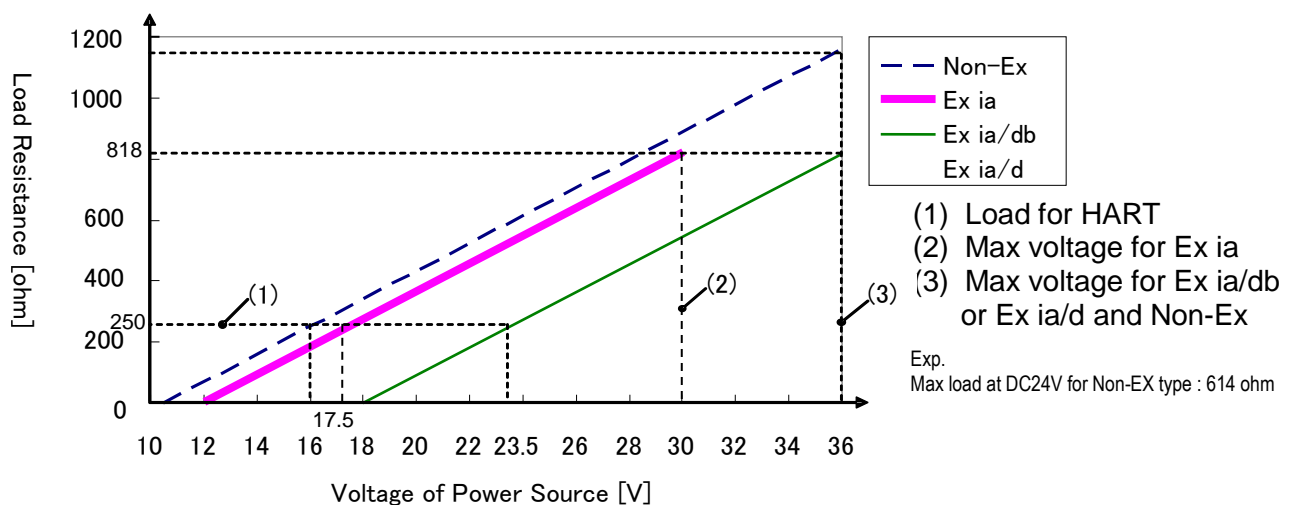
KRG-10 is 2-wire system, which means both signal and power are available on same wiring. The power source voltage is 10.5~36VDC in non-hazardous area, and 12~30VDC (Ex ia) or 18~36VDC (Ex ia/db) in hazardous area might be available. For application twisted and sealed cable is recommended.

KRG-10 is certified as flameproof and intrinsically safe instrument. Then if you intend to use it in hazardous area as intrinsically safe instrument, you should use with intrinsically safe isolator. In that case please refer the electrical parameters in next page.

### Cable gland (for Non-Explosion proof)



### Correlation between Power Voltage and Load Resistance



## 10. Technical Specifications

### 10-1. General specifications

Measurement principle	The time-of-flight measurement principle with microwave pulses			
Medium	Measurement object	Liquid		
	Relative permittivity	$\epsilon_r \geq 1.8$		
	Process temperature	Non-Ex		
		Cone Antenna	FKM O-ring ; -10°C ~ +150°C Kalrez O-ring ; -20°C ~ +150°C VMQ O-ring ; -40°C ~ +150°C	
		PTFE Sealing Antenna	FKM O-ring ; -10°C ~ +200°C VMQ O-ring ; -40°C ~ +180°C	
		Rod Antenna	VMQ O-ring ; -40°C ~ +150°C	
		Intrinsically Safe(GAS) Flame Proof(GAS)		
		Cone Antenna	FKM O-ring ; -10°C ~ +150°C Kalrez O-ring ; -20°C ~ +150°C VMQ O-ring ; -40°C ~ +150°C	
		PTFE Sealing Antenna	FKM O-ring ; -10°C ~ +200°C VMQ O-ring ; -40°C ~ +180°C	
		Rod Antenna	VMQ O-ring ; -40°C ~ +150°C	
		Intrinsically Safe(DUST)		
		Cone Antenna	FKM O-ring ; -10°C ~ +135°C Kalrez O-ring ; -20°C ~ +135°C VMQ O-ring ; -40°C ~ +135°C	
		PTFE Sealing Antenna	FKM O-ring ; -10°C ~ +135°C VMQ O-ring ; -40°C ~ +135°C	
		Rod Antenna	VMQ O-ring ; -40°C ~ +135°C	
		NOTE: ▪Cone antenna temperature range differs depending on the O-ring material. ▪FKM(Fluorine-containing rubber) ▪Kalrez(Kalrez6375) ▪VMQ(Silicone rubber) ▪The maximum temperature of Ex-types is due to temperature class and ambient temperature of Ex.		
		Process pressure	Cone Antenna	-0.1MPa ~ +1.5MPa
			PTFE Sealing Antenna	-0.1MPa ~ +1.5MPa
	Rod Antenna		-0.1MPa ~ +1.5MPa	
Max. measuring range	4" Cone Antenna	30m		
	2" Cone Antenna	10m		
	4" PTFE Sealing Antenna	30m		
	3" PTFE Sealing Antenna	25m		
	2" PTFE Sealing Antenna	10m		
	1" Rod Antenna	5m		
	NOTE: It is a consequence in our environment. It may vary depending on the installation environment and the measurement object.			
Measuring cycle time		1sec.		



Tracking rate for Level change		Max. 2m/sec. (R>3.0m)	
Repeatability		≤ ±1mm	
Temperature drift		10mm <sub>p-p</sub> or less than ±3mm/10K	
Maximum measured error	2" Cone Antenna 4" Cone Antenna 2" PTFE Sealing Antenna 3" PTFE Sealing Antenna 4" PTFE Sealing Antenna	±2mm	
	1" Rod Antenna	±3mm	
	NOTE: ·If the measurement distance is below 0.5m, the measured error is ±10mm. ·It is a consequence in our environment. It may vary depending on the installation environment and the measurement object. ·Deviation by strong, high frequency electromagnetic fields within EN 61326, ≤±50mm		
Type of explosion proof	Selectable from Non-Ex, Intrinsically safe, Flame Proof		
	Intrinsic safty parameters : Ui=30V, li=93mA, Pi=700mW, Ci=negligible, Li=negligible Associated apparatus parameter : Um=250V AC		
Ex approval	ATEX	EN60079-0:2018 EN60079-1:2014 EN60079-11:2012 EN60079-26:2015 EN60529:1991 +A1:2000+A2:2013	Intrinsically Safe FM13ATEX0069X
			II 1 G Ex ia IIC T4 Ga Ta = -40°C to +60°C, IP66 II 1 D Ex ia IIIC T135°C Da Ta = -40°C to +60°C, IP66
			Flame Proof FM13ATEX0069X
			II 1/2 G Ex ia/db IIC T4 Ga / Gb Ta = -40°C to +60°C, IP66
	IECEX	IEC 60079-0:2017 IEC 60079-1:2014-06 IEC 60079-11:2011 IEC 60079-26:2014-10	Intrinsically Safe IECEX FMG 13.0039X
			Ex ia IIC T4 Ga Ta = -40°C to +60°C, IP66 Ex ia IIIC T135°C Da Ta = -40°C to +60°C, IP66
			Flame Proof IECEX FMG 13.0039X
			Ex ia/db IIC T4 Ga / Gb Ta = -40°C to +60°C, IP66
	KCs	IEC 60079-0:2011 IEC 60079-1:2007 IEC 60079-11:2011 IEC 60529:2011 IEC 60079-26:2014	Flame Proof Ex ia/d IIC T4 Ga/Gb
EMC directive		EN61326-1:2013	
Low voltage directive		EN61010-1:2010	
RE directive		EN302372:2016	

## 10-2. Transmitter specifications

Microwave	Operating frequency	26GHz	
	Transmitting power	< 5μW	
Power supply	Non-Ex	DC 10.5 ~ 36V	
	Ex ia	DC 12 ~ 30V	
	Ex ia/db, Ex ia/d	DC 18 ~ 36V	
Analog output	Current output	4-20mA, 4mA(HART multidrop mode)	
	Output variable	Level (m or Ft), Distance (m or Ft), Volume (%), Flow rate (%), Signal strength (dB)	
	Resolution	0.4μA	
	Alarm output	Hold, 3.6mA, 22mA	
	Temperature drift	±0.05%FS / 10K (16mA) or ±0.5%FS	
	Response Time	2 sec. until statically determinate	
Digital output	HART specification	HART 7	
	Resolution	1mm	
	Fastest output cycle	1s	
Operating and display module (option)	Display	5 digits LCD <Displayed parameters> (Alternative) Level (m or Ft)      Distance (m or Ft) Volume (value or %) Flow rate (value or %) Current (mA)      Signal strength (dB) Max. volume      Max. flow rate Electronic temperature (°C)	
	Method of Operation	4 keys operation	
Surge immunity	Non-Ex	COM 4kV / Dif 2kV	
	Ex ia	COM 1kV / Dif 30V	
	Ex ia/db. Ex ia/d	COM 1kV / Dif 250V	
Ambient temperature	Non-Ex (Without LCD display)	-40 ~ +70°C	
	Non-Ex (With LCD display)	-20 ~ +70°C	
	Ex ia, Ex ia/db, Ex ia/d (Without display)	-40 ~ +60°C	
	Ex ia, Ex ia/db, Ex ia/d (With display)	-20 ~ +60°C	
humidity		≤95% (Non-condensing)	
Storage & transport temperature		-40 ~ +85°C	
Vibration resistance (Resonance Point)		1G at 9 ~ 200 Hz	
Wiring port	Standard of screw (number of screw holes)	M20 x 1.5 (x 2)	
	Plug and cable gland -- attached accessories -- (number of parts)	Non-Ex	Non-Ex Blind plug (1), cable gland (1)
		Ex ia	Non-Ex Blind plug (1), Ex Blind plug (1)
		Ex ia/db, Ex ia/d	Non-Ex Blind plug (1), Ex Blind plug (1)
	Connection cable outer diameter	Φ7 ~ 13mm (in case of standard cable gland for Non-Ex)	
	Connection cable core	Stranded wire	0.5 ~ 2.5mm <sup>2</sup> (AWG20~12)
		Single wire	0.8 ~ 2.0mm <sup>2</sup> (AWG20~12)
Material	Housing	Die-cast aluminum (powder coating)	
	Stainless steel parts	SUS304	
	Seal	VMQ (silicone rubber)	
	Window	Polycarbonate (Only in case of "with LCD module")	
Structure	Aluminum housing with double chamber		

Waterproof standard	IP66/IP67 NOTE: • For Rod antenna and PTFE sealing antenna, it must be used with flange(optional), seal gasket (optional) and O-ring (accessory), to satisfy protection class IP66 or IP67.	
Dimensions	Without display	H187 x W110 x L157
	With display	H193 x W110 x L157

### 10-3. Antenna specifications

#### *Cone Antenna*

Antenna type	Cone	Diameter	2": (half-power beam width: 18°) 4": (half-power beam width: 8°)
		Material	SUS316L, PTFE
Operating conditions	Process temperature	Non-Ex	
		FKM O-ring:-10 to +150 °C Kalrez O-ring:-20 to +150 °C VMQ O-ring:-40 to +150 °C	
		Intrinsically Safe(GAS) Flame Proof(GAS)	
		FKM O-ring:-10 to +150 °C Kalrez O-ring:-20 to +150 °C VMQ O-ring:-40 to +150 °C	
		Intrinsically Safe(DUST)	
		FKM O-ring:-10 to +135 °C Kalrez O-ring:-20 to +135 °C VMQ O-ring:-40 to +135 °C	
		NOTE:The maximum temperature is valid by temperature class of explosion proof.	
	Process pressure	-0.1 ~ 1.5MPa	
Process fitting	Flange <sup>1)</sup> (JIS B2220, DIN 1092-1, ANSI B16.5 etc)		

1) Option

#### *PTFE Sealing Antenna*

Antenna type	PTFE Sealing	Diameter	2": (half-power beam width: 18°) 3": (half-power beam width: 12°) 4": (half-power beam width: 8° )
		Material	SUS304, PTFE
Operating conditions	Process temperature	Non-Ex	
		FKM O-ring:-10 to +200 °C VMQ O-ring:-40 to +180 °C	
		Intrinsically Safe(GAS) Flame Proof(GAS)	
		FKM O-ring:-10 to +200 °C VMQ O-ring:-40 to +180 °C	
		Intrinsically Safe(DUST)	
		FKM O-ring:-10 to +135 °C VMQ O-ring:-40 to +135 °C	
		NOTE:The maximum temperature is valid by temperature class of explosion proof.	
	Process pressure	-0.1 ~ 1.5MPa	
Process fitting	Flange <sup>1)</sup> (JIS B2220, DIN 1092-1, ANSI B16.5 etc)		

1) Option

## Rod Antenna

Antenna type	Rod	Diameter	1": (half-power beam width: 25°)
		Material	SUS304, PTFE(or PFA)
Operating conditions	Process temperature	Non-Ex	
		VMQ O-ring:-40 to +150 °C	
		Intrinsically Safe(GAS)	
		Flame Proof(GAS)	
		VMQ O-ring:-40 to +150 °C	
		Intrinsically Safe(DUST)	
		VMQ O-ring:-40 to +135 °C	
		NOTE:The maximum temperature is valid by temperature class of explosion proof.	
	Process pressure	-0.1 ~ 1.5MPa	
Process fitting	Flange <sup>1)</sup> (JIS B2220, DIN 1092-1, ANSI B16.5 etc)		

1) Option

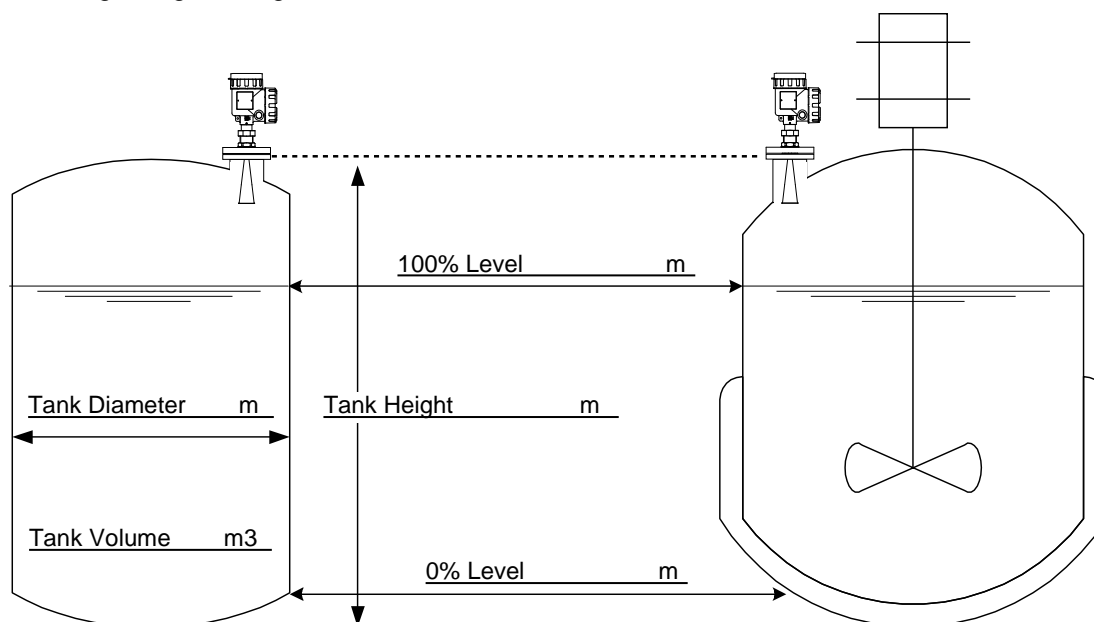
## 10-4. Weights

Weight	Transmitter Head	approx. 3 kg (with LCD module) approx. 2.9 kg (without LCD module)
	2" Cone Antenna	approx. 1 kg
	4" Cone Antenna	approx. 1.4 kg
	2" PTFE Sealing Antenna	approx. 1.2 kg
	3" PTFE Sealing Antenna	Approx. 2.0 kg
	4" PTFE Sealing Antenna	approx. 2.5 kg
	1" Rod Antenna	approx. 1 kg

## 11. Required parameters for Inquiry

### AA. Tank Information

- 1) Tank Name : \_\_\_\_\_
- 2) Tank Quantity : \_\_\_\_\_ tank(s)
- 3) Tank Dimension : If possible, send us DWG of tank.  
 Tank Shape : Spherical, Cylindrical, Horizontal, Other ( \_\_\_\_\_ )  
 Tank Volume : \_\_\_\_\_ m<sup>3</sup> or \_\_\_\_\_ L  
 Tank Height : \_\_\_\_\_ m Tank Diameter : \_\_\_\_\_ m  
 0% Position : LV \_\_\_\_\_ m (=4mA) 100% Position : LV \_\_\_\_\_ m (=20mA)
- 4) Agitator Type : \_\_\_\_\_
- 5) Inner Obstruction : Heater coil / Baffles / Pipes / or others ( \_\_\_\_\_ )
- 6) Mounting Flange Rating : \_\_\_\_\_



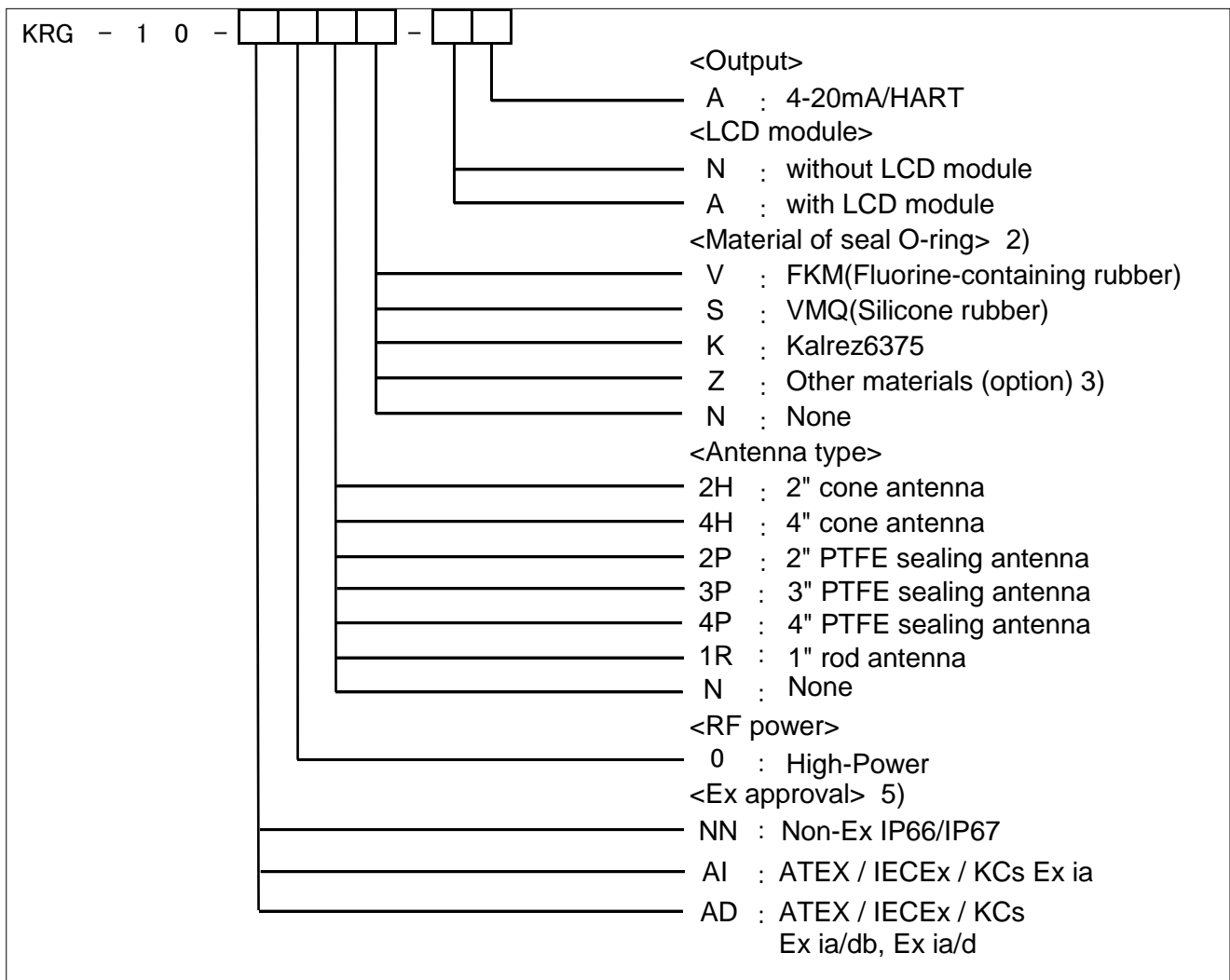
### BB. Liquid Information

- 1) Liquid Name : \_\_\_\_\_ (main component)
- 2) Dielectric Constant :  $\epsilon$  = \_\_\_\_\_ (if possible)
- 3) Temperature : \_\_\_\_\_ C deg. ~ \_\_\_\_\_ C deg.
- 4) Pressure : \_\_\_\_\_ MPa ~ \_\_\_\_\_ MPa
- 5) Corrosive Requirement : SUS316L / PFA/PTFE only
- 6) Surface Condition : Calm / Foamy / Turbulent

### CC. Extra Information

- 1) Purpose of process : \_\_\_\_\_
- 2) Existing Level instruments : (if any) \_\_\_\_\_
- 3) Any other problems at Level : \_\_\_\_\_

## 12. Product Code



### NOTE1:

Required cable gland depends on type of explosion protection ATEX, IECEx, and KCs. Each Ex ia & Ex ia/db(ATEX, IECEx) & Ex ia/d(KCs) transmitter should use proper cable gland for explosion proof usage and the attached blind plug. The cable gland for explosion proof shall be prepared as local portion in accordance with safety regulation in each region. And then, The described code of explosion-proof on name plate is different depending on this selection.

### NOTE2:

If you select the PTFE sealing antenna, Material of seal O-ring is FKM or VMQ.

If you select the rod antenna, Material of seal O-ring is VMQ.

### NOTE3:

If you need to apply other material for the seal, please consult us.

### NOTE4:

Flange is an option. Please refer to Chapter 7-1 Required flange dimensions.

### NOTE5:

Please refer to the safety instructions to know the IP code for the type of explosion protection.

### NOTE6:

The KC mark model is only the following seven models.

KRG-10-AD02HV-AA, KRG-10-AD04HV-AA, KRG-10-AD04HS-AA,

KRG-10-AD02PV-AA, KRG-10-AD02PS-AA, KRG-10-AD03PV-AA, KRG-10-AD02PS-AA

[                      ]

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Phone : 031-379-3030

Fax     : 031-379-3033

[www.ovaleng.com](http://www.ovaleng.com)

## **TOKYO KEIKI INC.**

2-16-46, Minami-kamata, Ohta-ku,  
Tokyo 144-8551  
Japan

**Measurement Systems Company**

Phone : +81-(0)3-3737-8664

Fax     : +81-(0)3-3737-8665

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