PRODUCT DATA SHEET

Non-contacting Radar Level Gauge

KRG-10

intelligent DIGITAL

TOKYO KEIKI

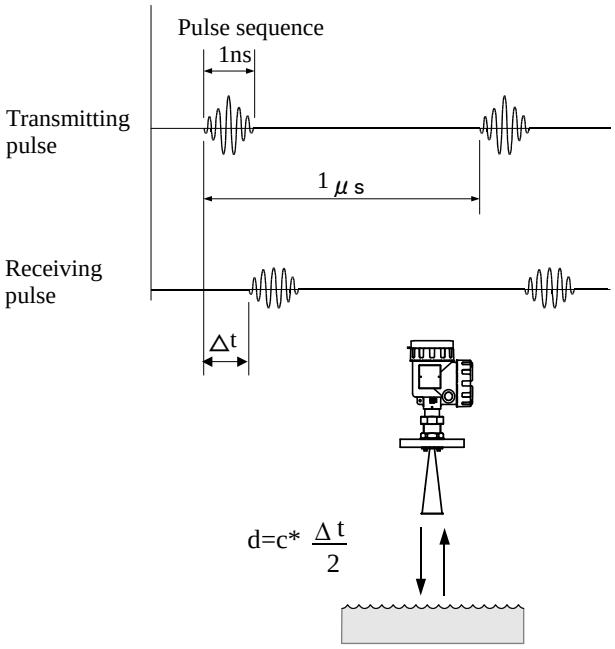
TOKYO KEIKI INC.

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"** is 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) & 4" (DN100) nozzles
PFA Rod for 1" (DN25) nozzle

Details as per page 7 to 11

Furthermore, we will provide special antenna for higher temperature over 200°C or higher pressure over 1.5MPa.

◆ 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.

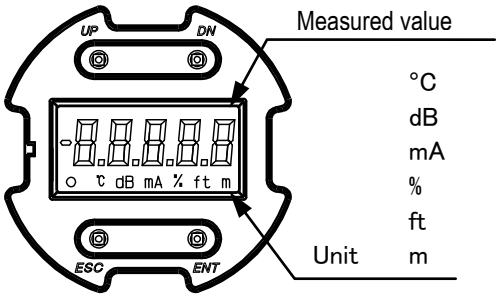
◆ Bottom Echo Handler

Generally, liquids having low dielectric constant are difficult to be divide 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.

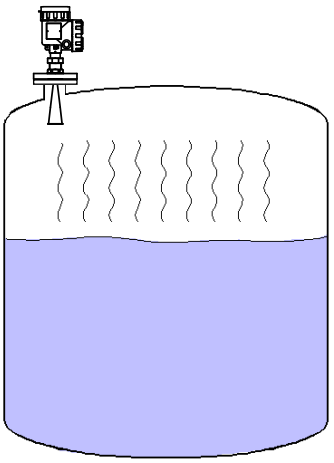
4. Applications

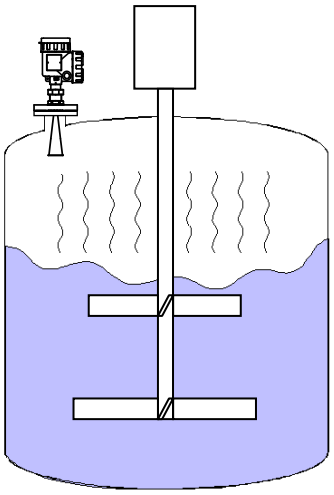
KRG-10 is available to measure both of calm surface liquid such as storage tanks or buffer tanks and ruffled surface liquid such as reactor tanks.

- 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.



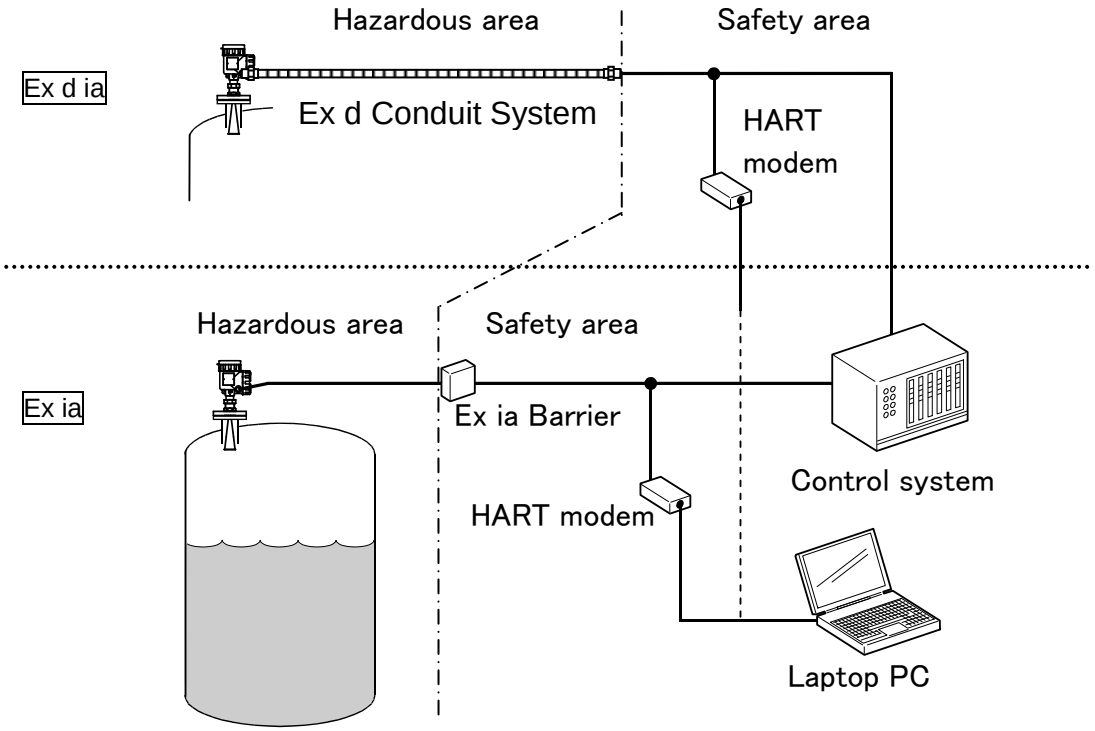


5. System

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
KRG-10-□0□H□	2", 4" Cone	Tank application, Long Distance
KRG-10-□0□P□	2", 4" PTFE Sealing	Hygienic or aggressive liquid application
KRG-10-□01R□	1" Rod	Narrow & longer tank nozzle

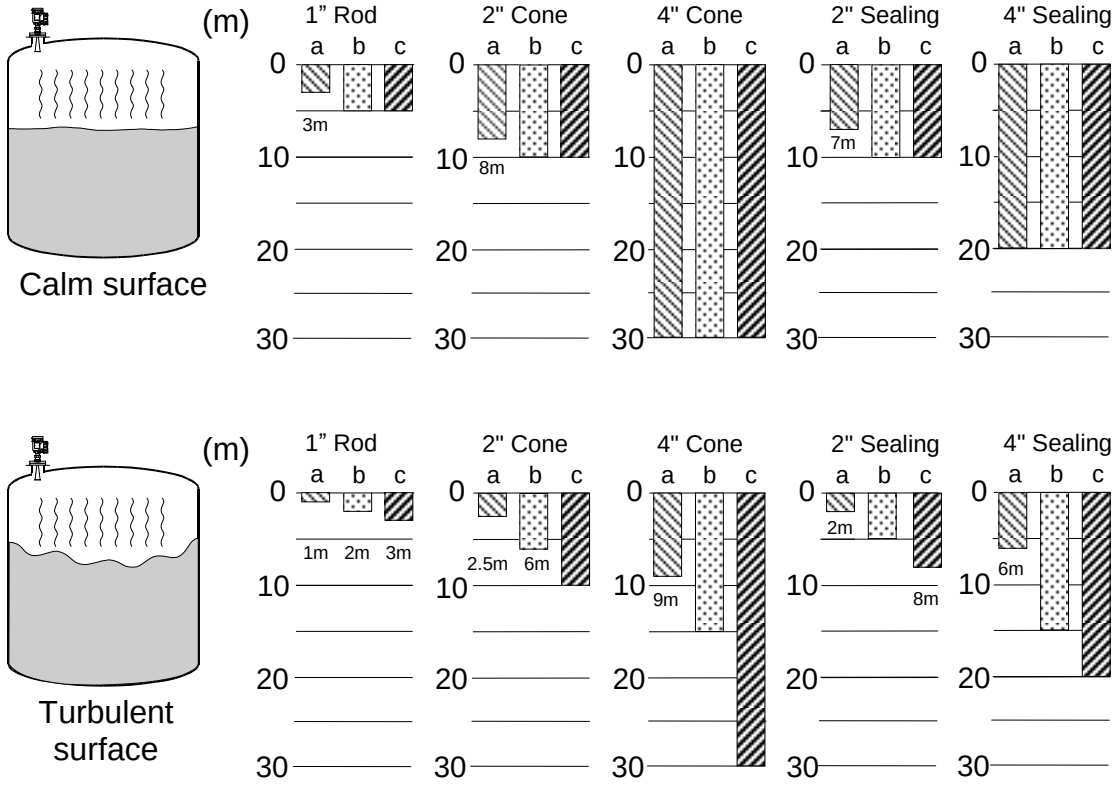
Almost all of liquid may be classified as below 3 types.

a: Oil, Hydraulic carbon,
Mainly petroleum industry (ε_r = 1.8 ~ 4.0)

b: Alcohol, Acid (ε_r = 4.0 ~ 10)

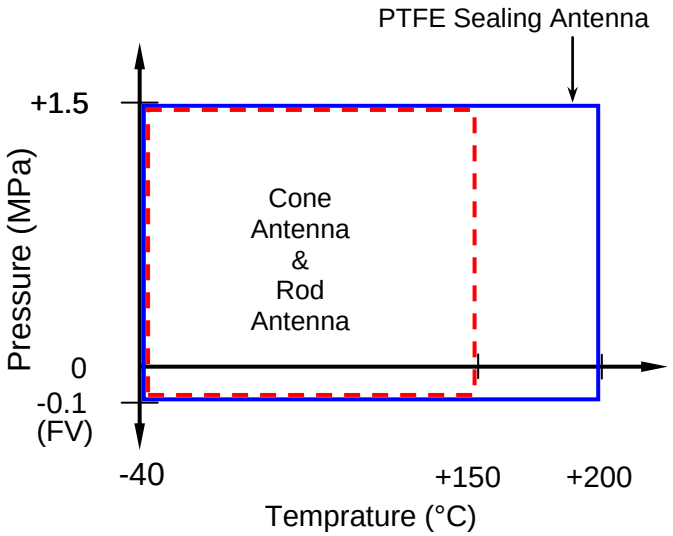
c: Water base liquid (ε_r > 10)

<u>Antenna Measuring Distance (reference)</u>



7. Antenna type

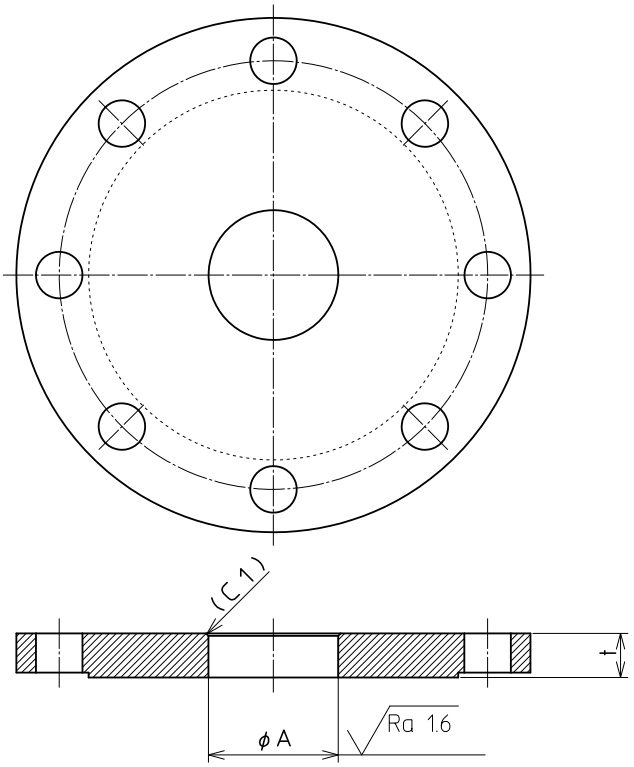
Antenna is only a part, which is exposed in tank inside, and you should choose proper antenna that suits to your demand.
KRG-10 has various antenna line-up depending on materials and size of installed nozzle.
However, temperature & pressure range of tank inside conditions are common in spite of antenna 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

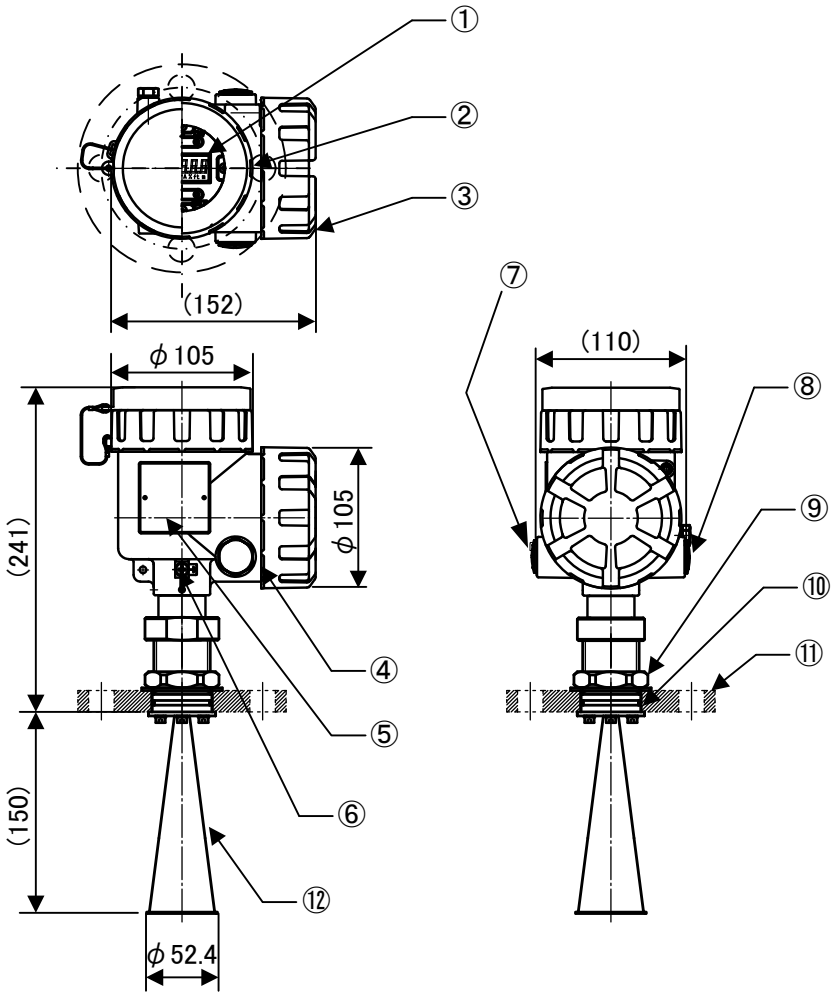


Antenna type	Center Hole		t
	ΦA	Tolerance	
2" & 4" Cone	45	+0.1 0	13 ~ 35
2" PTFE Sealing	50		12 ~ 25
4" PTFE Sealing	80		13 ~ 35
1" Rod	45		10 ~ 35

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.

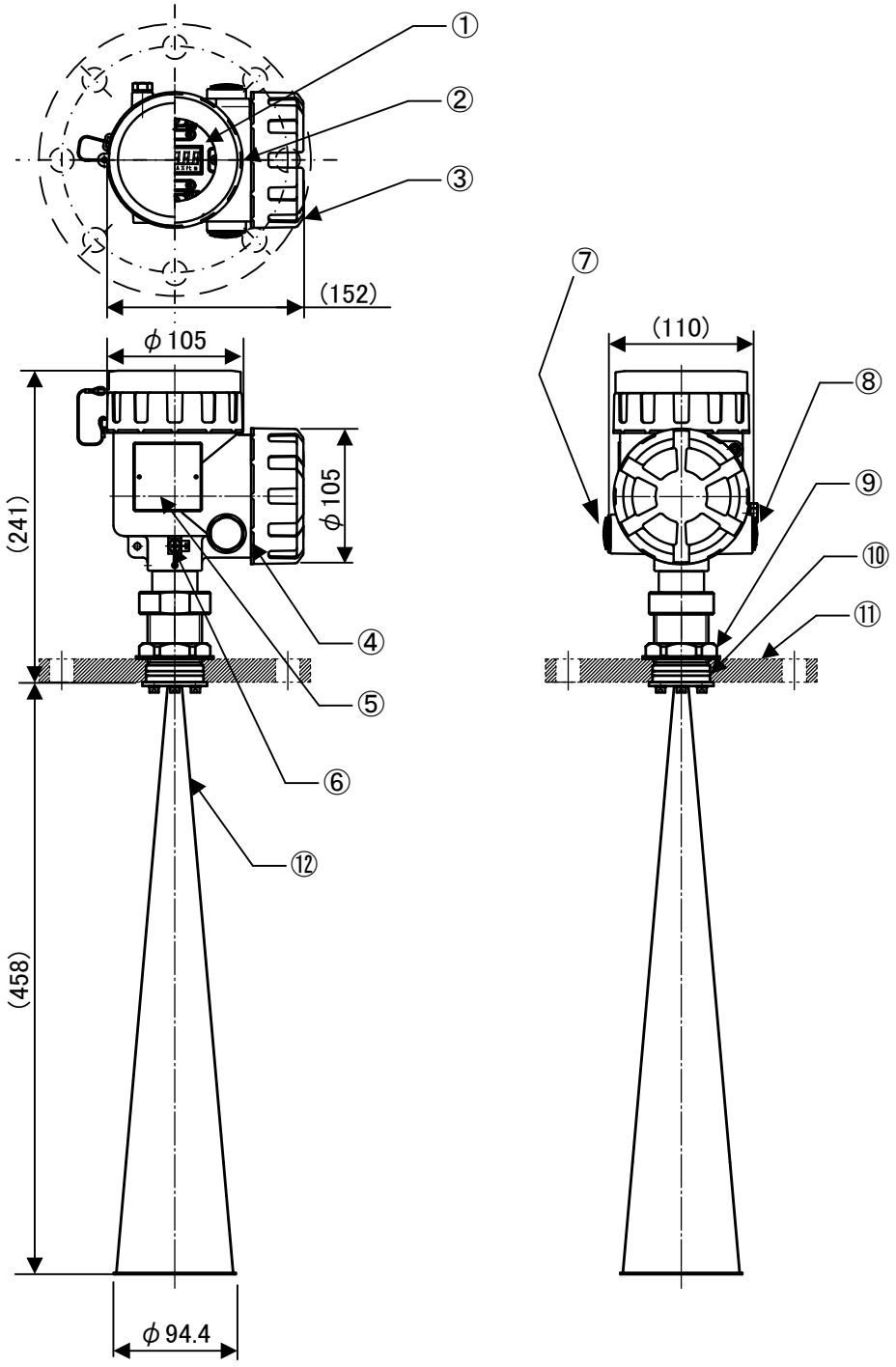
KRG-10 with 2" Cone Antenna



1. Window / Polycarbonate *1
2. Cover (display) / Aluminum
3. Cover (terminal block) / Aluminum
4. Housing / Aluminum
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. 2" Cone Antenna / SUS316L

*1 = Provided that LCD Module is requested.
*2 = See Page16

KRG-10 with 4" Cone Antenna



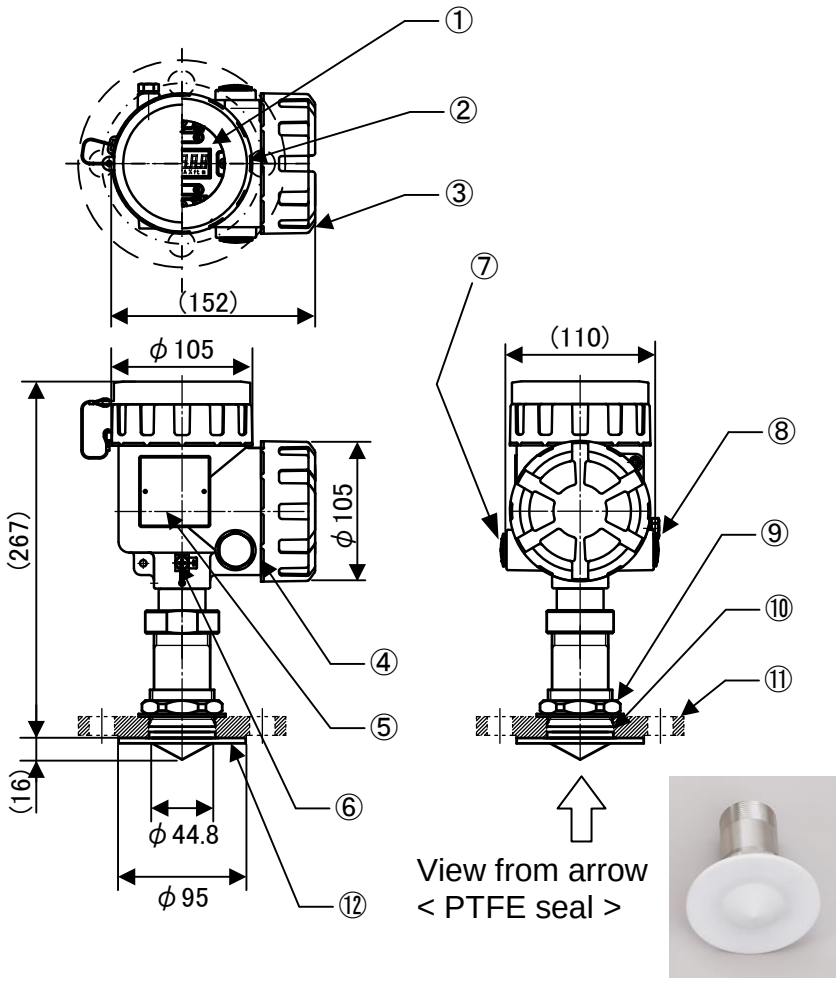
1. Window / Polycarbonate *1
2. Cover (display) / Aluminum
3. Cover (terminal block) / Aluminum
4. Housing / Aluminum
5. Label
6. Ground terminal (M5) / SUS304
7. Plug or Cable Gland *2
8. Plug *2
9. Flange lock nut / SUS304
10. O-ring
11. Flange (option)
12. 4" Cone Antenna / SUS316L

*1 = Provided that LCD Module is requested.
*2 = See Page16

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.

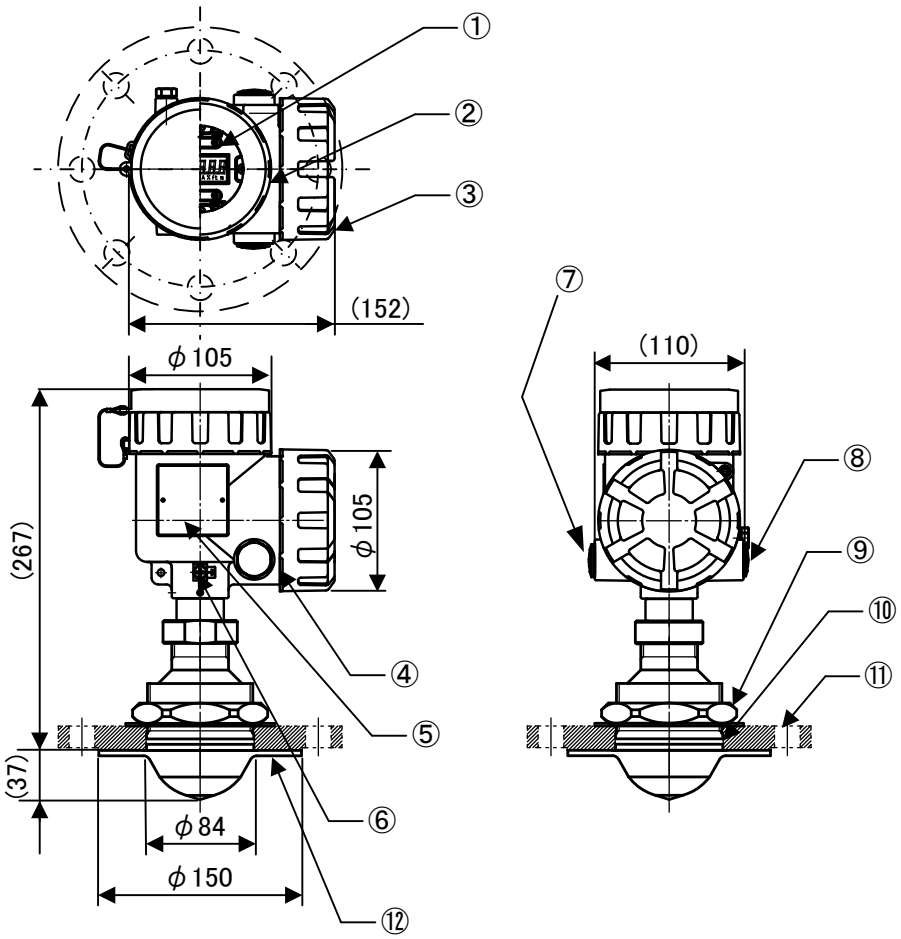
KRG-10 with 2" PTFE Sealing Antenna



1. Window / Polycarbonate *1
2. Cover (display) / Aluminum
3. Cover (terminal block) / Aluminum
4. Housing / Aluminum
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. 2" PTFE Sealing Antenna

*1 = Provided that LCD Module is requested.
*2 = See Page16

KRG-10 with 4" PTFE Sealing Antenna



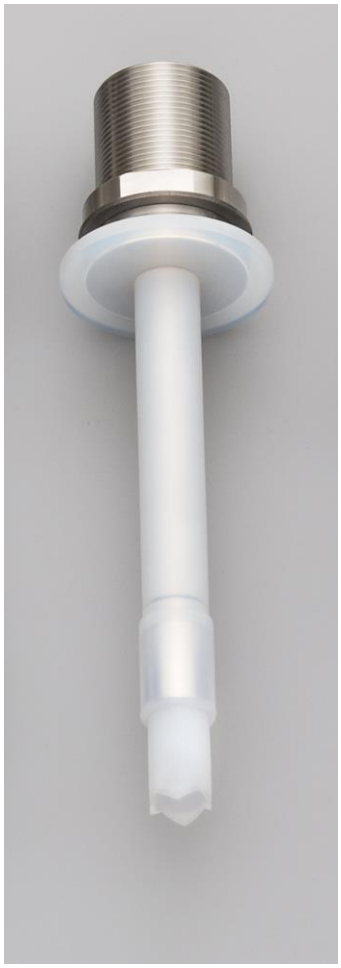
1. Window / Polycarbonate *1
2. Cover (display) / Aluminum
3. Cover (terminal block) / Aluminum
4. Housing / Aluminum
5. Label
6. Ground terminal (M5) / SUS304
7. Plug or Cable Gland *2
8. Plug *2
9. Flange lock nut / SUS304
10. O-ring
11. Flange (option)
12. 4" PTFE Sealing Antenna

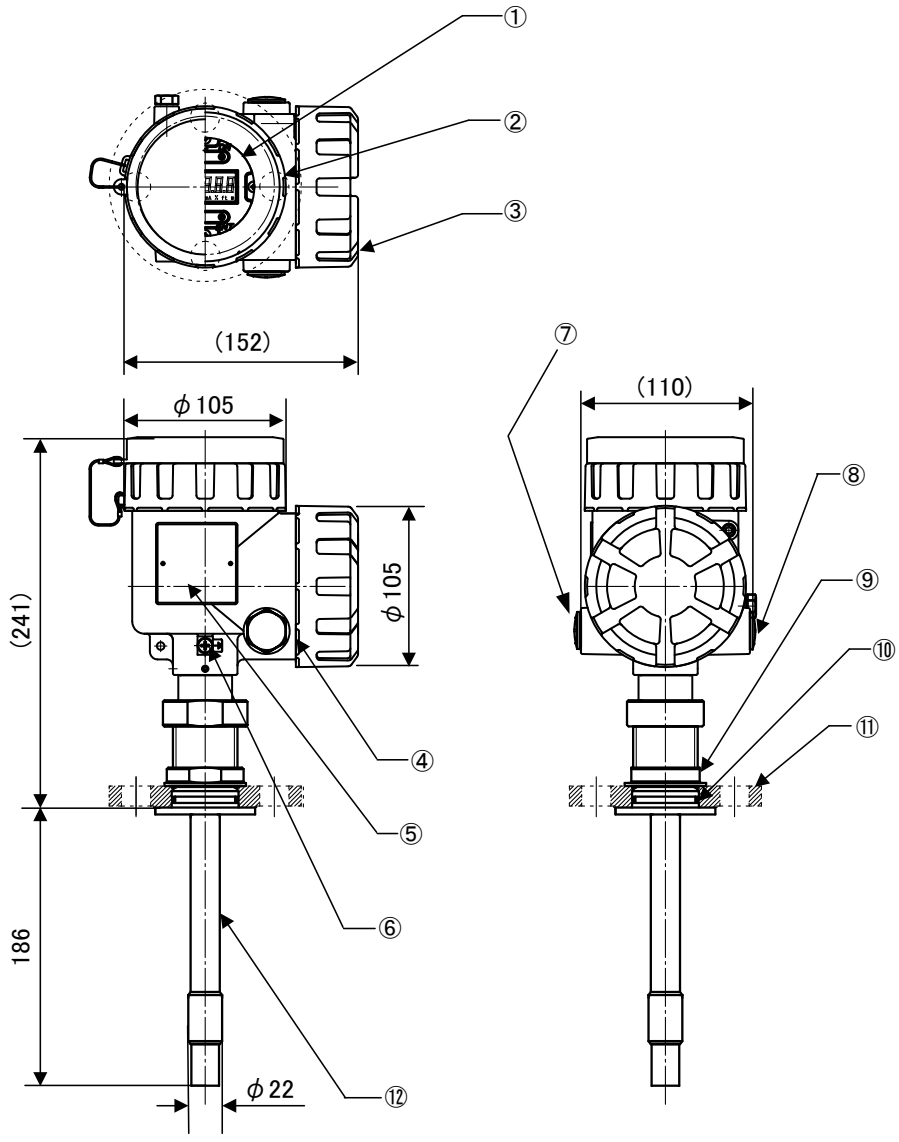
*1 = Provided that LCD Module is requested.
*2 = See Page16

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





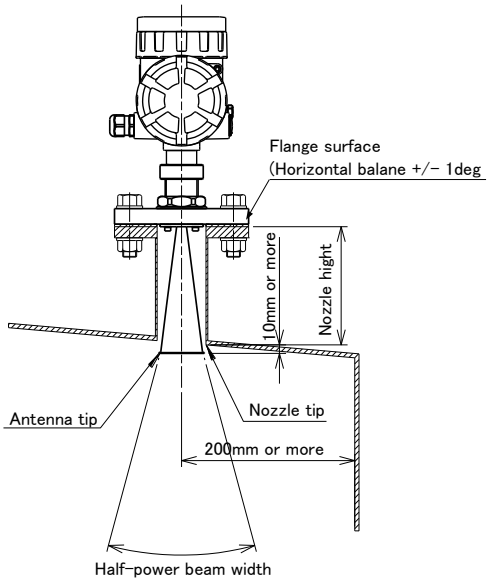
1. Window / Polycarbonate *1
2. Cover (display) / Aluminum
3. Cover (terminal block) / Aluminum
4. Housing / Aluminum
5. Label
6. Ground terminal (M5) / SUS304
7. Plug or Cable Gland *2
8. Plug *2
9. Flange lock nut / SUS304
10. O-ring
11. Flange (option)
12. 1" Rod Antenna / PFA

*1 = Provided that LCD Module is requested.
*2 = See Page16

8. Mechanical Installation

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

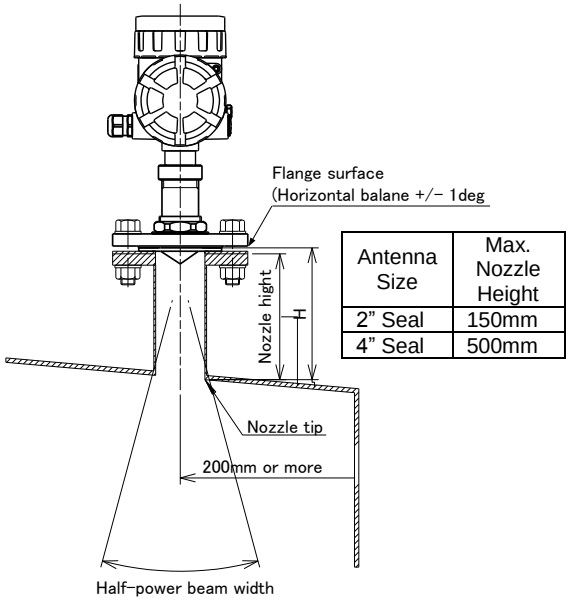
Antenna should be kept horizontally.
Inside of microwave transmitting area might be clear.
Set the gauge to keep away from tank wall as recommended dimension in the measuring ranges.
To choose bigger size antenna as you can because big size antenna will be better to gain weak microwave echo in bad conditions.



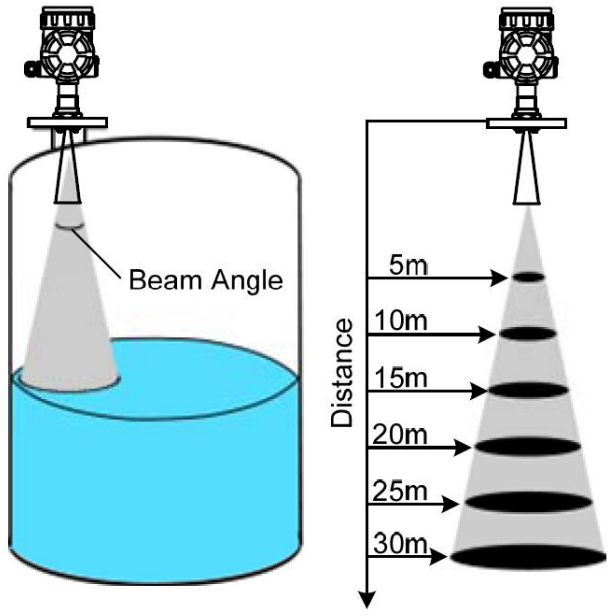
Size of microwave beam area

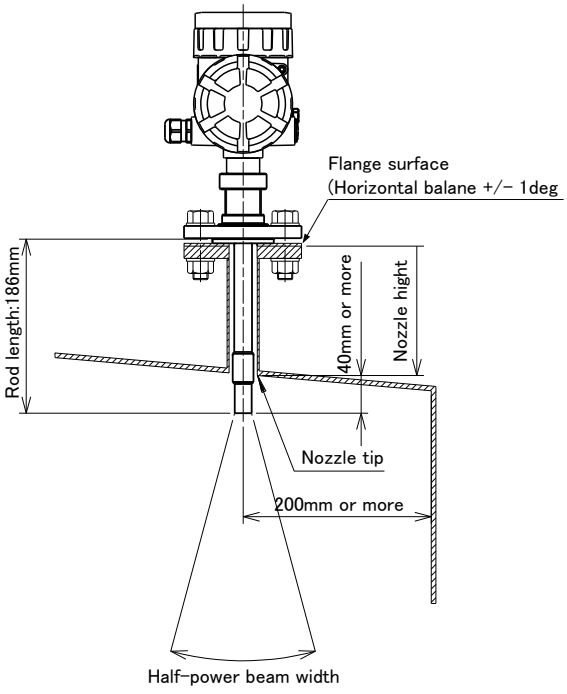
Beam area : Diameter of radiated area
Beam angle: Half-power beam width (degree)

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

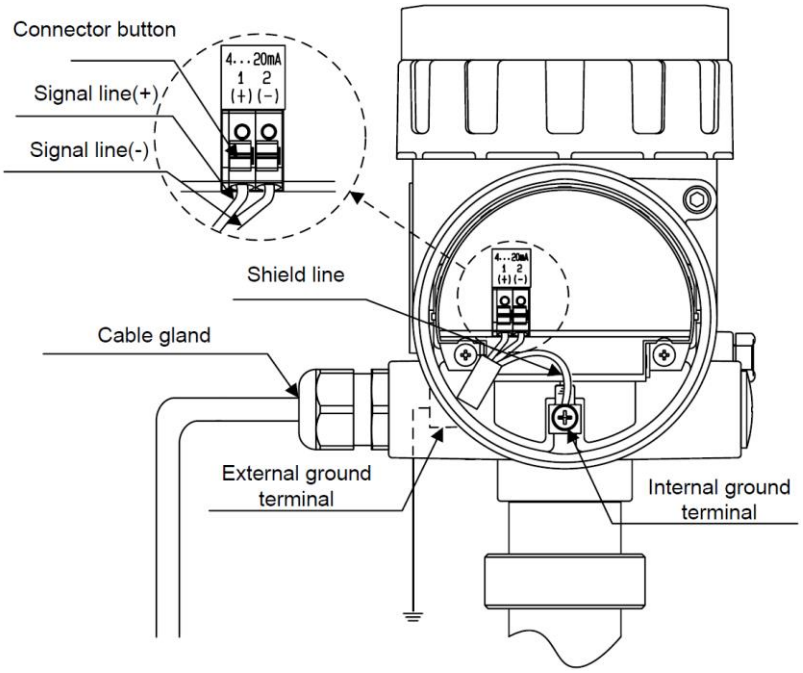


Antenna Size	Max. Nozzle Height
2" Seal	150mm
4" Seal	500mm





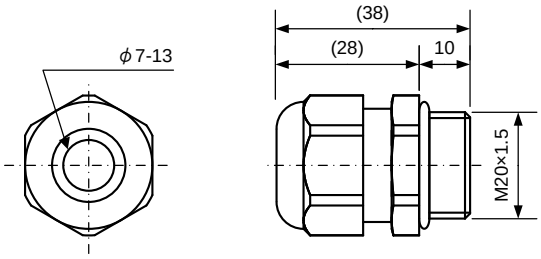
9. Electrical Installation



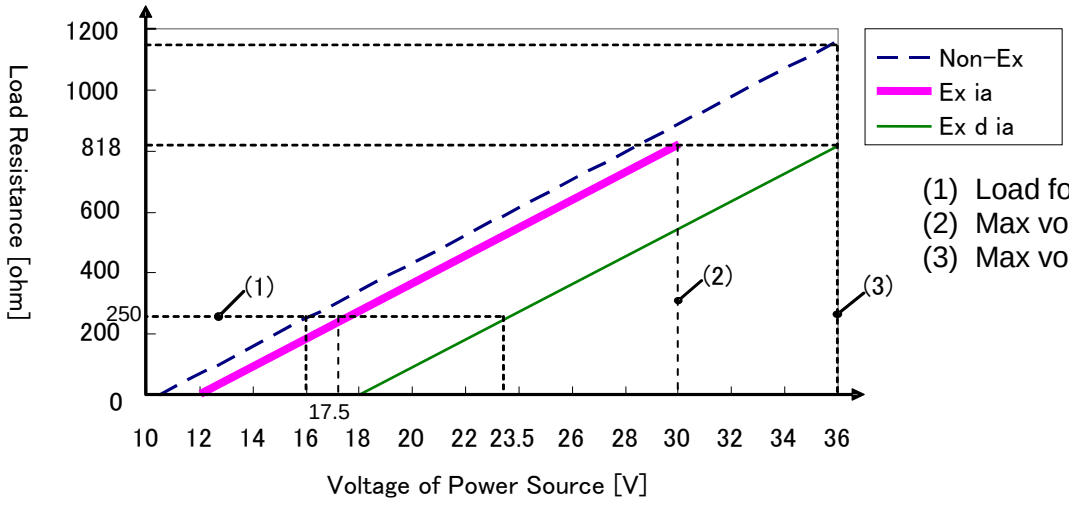
KRG-10 is 2-wire system, which means both signal and power are available on same wiring. The power source voltage is 10.5~36VDC in non-hazardous area, and 12~30VDC (Ex ia) or 18~36VDC (Ex d ia) in hazardous area might be available. For application twisted and sealed cable is recommended.

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



(1) Load for HART
(2) Max voltage for Ex ia
(3) Max voltage for Ex d ia and Non-Ex

10. Technical Specifications

10-1. General specifications

<table>
<tr><td>Measurement principle</td><td colspan="3">The time-of-flight measurement principle with microwave pulses</td></tr>
<tr><td rowspan="20">Application area</td><td>Measurement object</td><td colspan="2">Liquid</td></tr>
<tr><td>Relative permittivity</td><td colspan="2">ε_r ≥1.8</td></tr>
<tr><td rowspan="19">Process temperature</td><td colspan="2">Non-Ex</td></tr>
<tr><td>Cone Antenna</td><td>FKM O-ring ; -10°C ~ +150°C
Kalrez O-ring ; -20°C ~ +150°C
VMQ O-ring ; -40°C ~ +150°C</td></tr>
<tr><td>PTFE Sealing Antenna</td><td>FKM O-ring ; -10°C ~ +200°C
VMQ O-ring ; -40°C ~ +180°C</td></tr>
<tr><td>Rod Antenna</td><td>VMQ O-ring ; -40°C ~ +150°C</td></tr>
<tr><td colspan="2">ATEX, IECEx :Ex ia 1G
ATEX, IECEx :Ex d ia 1/2G, 2G
TIIS :Ex d ia</td></tr>
<tr><td>Cone Antenna</td><td>FKM O-ring ; -10°C ~ +130°C
Kalrez O-ring ; -20°C ~ +130°C
VMQ O-ring ; -40°C ~ +130°C</td></tr>
<tr><td>PTFE Sealing Antenna</td><td>FKM O-ring ; -10°C ~ +180°C
VMQ O-ring ; -40°C ~ +180°C</td></tr>
<tr><td>Rod Antenna</td><td>VMQ O-ring ; -40°C ~ +150°C</td></tr>
<tr><td colspan="2">ATEX, IECEx :Ex ia 1D</td></tr>
<tr><td>Cone Antenna</td><td>FKM O-ring ; -10°C ~ +130°C
Kalrez O-ring ; -20°C ~ +130°C
VMQ O-ring ; -40°C ~ +130°C</td></tr>
<tr><td>PTFE Sealing Antenna</td><td>FKM O-ring ; -10°C ~ +135°C
VMQ O-ring ; -40°C ~ +135°C</td></tr>
<tr><td>Rod Antenna</td><td>VMQ O-ring ; -40°C ~ +130°C</td></tr>
<tr><td colspan="2">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.</td></tr>
<tr><td rowspan="3">Process pressure</td><td>Cone Antenna</td><td>-0.1MPa ~ +1.5MPa</td></tr>
<tr><td>PTFE Sealing Antenna</td><td>-0.1MPa ~ +1.5MPa</td></tr>
<tr><td>Rod Antenna</td><td>-0.1MPa ~ +1.5MPa</td></tr>
<tr><td rowspan="6">Max. measuring range</td><td>4" Cone Antenna</td><td colspan="2">30m</td></tr>
<tr><td>2" Cone Antenna</td><td colspan="2">10m</td></tr>
<tr><td>4" PTFE Sealing Antenna</td><td colspan="2">20m</td></tr>
<tr><td>2" PTFE Sealing Antenna</td><td colspan="2">10m</td></tr>
<tr><td>1" Rod Antenna</td><td colspan="2">5m</td></tr>
<tr><td colspan="3">NOTE: It is a consequence in our environment. It may vary depending on the installation environment and the measurement object.</td></tr>
<tr><td colspan="2">Measuring cycle time</td><td colspan="2">1sec.</td></tr>
<tr><td colspan="2">Tracking rate for Level change</td><td colspan="2">Max. 2m/sec. (R>3.0m)</td></tr>
<tr><td colspan="2">Repeatability</td><td colspan="2">≤ ±1mm</td></tr>
<tr><td colspan="2">Temperature drift</td><td colspan="2">$10mm_{p-p}$ or less than ±3mm/10K</td></tr>
</table>

<table>
<tr><td rowspan="3">Maximum measured error</td><td colspan="2">2" Cone Antenna
4" Cone Antenna
2" PTFE Sealing Antenna
4" PTFE Sealing Antenna</td><td colspan="2">±2mm</td></tr>
<tr><td colspan="2">1" Rod Antenna</td><td colspan="2">±3mm</td></tr>
<tr><td colspan="4">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</td></tr>
<tr><td rowspan="2">Type of explosion proof</td><td colspan="4">Selectable form Non-Ex, Ex ia and Ex d ia</td></tr>
<tr><td colspan="4">Ex ia parameters : Ui=30V, Ii=93mA, Pi=700mW, Ci≈0, Li≈0
Um=250V AC</td></tr>
<tr><td rowspan="8">Ex approval</td><td rowspan="4">ATEX</td><td rowspan="4">EN60079-0:2012
EN60079-1:2007
EN60079-11:2012
EN60079-26:2007
EN60079-31:2009</td><td colspan="2">Ex ia</td></tr>
<tr><td colspan="2">II 1G Ex ia IIC T4 Ga Ta = -40°C to +60°C, IP66
II 1D Ex ia IIIC T135°C Da Ta = -40°C to +60°C, IP66</td></tr>
<tr><td colspan="2">Ex d ia</td></tr>
<tr><td colspan="2">II 1/2G Ex d ia IIC T4 Gb / Ga Ta = -40°C to +60°C, IP66
(PTFE Sealing Antenna and Rod Antenna)
II 2G Ex d ia IIC T4 Gb Ta = -40°C to +60°C, IP66
(Cone Antenna)</td></tr>
<tr><td rowspan="4">IECEx</td><td rowspan="4">IEC 60079-0:2011
IEC 60079-1:2006
IEC 60079-11:2011
IEC 60079-26:2006
IEC 60079-31:2008</td><td colspan="2">Ex ia</td></tr>
<tr><td colspan="2">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</td></tr>
<tr><td colspan="2">Ex d ia</td></tr>
<tr><td colspan="2">Ex d ia IIC T4 Gb / Ga Ta = -40°C to +60°C, IP66
(PTFE Sealing Antenna and Rod Antenna)
Ex d ia IIC T4 Gb Ta = -40°C to +60°C, IP66
(Cone Antenna)</td></tr>
<tr><td colspan="2">TIIS (Pending)</td><td>Ex d ia</td><td>Ex d ia IIC T4</td></tr>
<tr><td colspan="2">EMC directive</td><td colspan="3">EN61326-1:2006 Class A</td></tr>
<tr><td colspan="2">Low voltage directive</td><td colspan="3">EN61010-1:2010</td></tr>
<tr><td colspan="2">R & TTE directive</td><td colspan="3">EN302372-1, -2</td></tr>
</table>

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 d ia	DC 18 ~ 36V
Analog output	Current output	4-20mA
	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	Every second	
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 Internal temperature (°C)	
	Method of Operating	4 keys operation	
Surge immunity	Non-Ex	COM 4kV / Dif 2kV (IEC61000-4-5 level-4)	
	Ex ia	COM / Dif 30V	
	Ex d ia	COM / Dif 250V	
Ambient temperature	Non-Ex (Without display)	-40 ~ +70°C	
	Non-Ex (With display)	-20 ~ +70°C	
	Ex ia, Ex d ia (Without display)	-40 ~ +60°C	
	Ex ia, Ex d ia (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 (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 d ia	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^2 (AWG20~12)
		Single wire	0.8 ~ 2.0mm^2 (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, NEMA 4X NOTE: ・For Rod antenna and PTFE sealing antenna, it must be used with flange(optional), seal gasket (out of scope) and O-ring (accessory), to satisfy protection class IP66.		
Dimensions	Without display	H180 x W110 x L152	
	With display	H190 x W110 x L152	

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	
		ATEX, IECEx :Ex ia 1G ATEX, IECEx :Ex d ia 2G TIIS :Ex d ia	
		FKM O-ring:-10 to +130 °C Kalrez O-ring:-20 to +130 °C VMQ O-ring:-40 to +130 °C	
		ATEX, IECEx :Ex ia 1D	
		FKM O-ring:-10 to +130 °C Kalrez O-ring:-20 to +130 °C VMQ O-ring:-40 to +130 °C	
		NOTE:The maximum temperature is valid by temperature class of explosion proof.	
	Process pressure	-0.1 ~ 1.5Mpa	
Process fitting	Flange[1)] (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°) 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	
		ATEX, IECEx :Ex ia 1G ATEX, IECEx :Ex d ia 1/2G TIIS :Ex d ia	
		FKM O-ring:-10 to +180 °C VMQ O-ring:-40 to +180 °C	
		ATEX, IECEx :Ex ia 1D	
		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[1)] (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, PFA
Operating conditions	Process temperature	Non-Ex	
		VMQ O-ring:-40 to +150 °C	
		ATEX, IECEx :Ex ia 1G ATEX, IECEx :Ex d ia 1/2G TIIS :Ex d ia	
		VMQ O-ring:-40 to +130 °C	
		ATEX, IECEx :Ex ia 1D	
		VMQ O-ring:-40 to +130 °C	
		NOTE:The maximum temperature is valid by temperature class of explosion proof.	
	Process pressure	-0.1 ~ 1.5MPa	
Process fitting	Flange[1)] (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
	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 : m3 or L

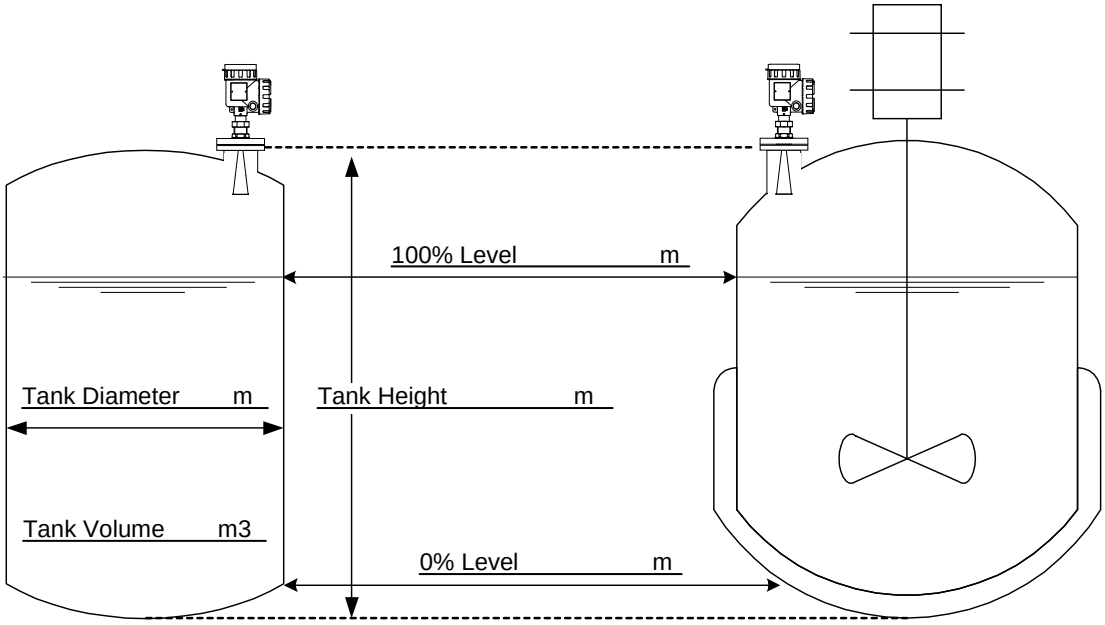
Tank Height : m Tank Diameter : m

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 : ε r = (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

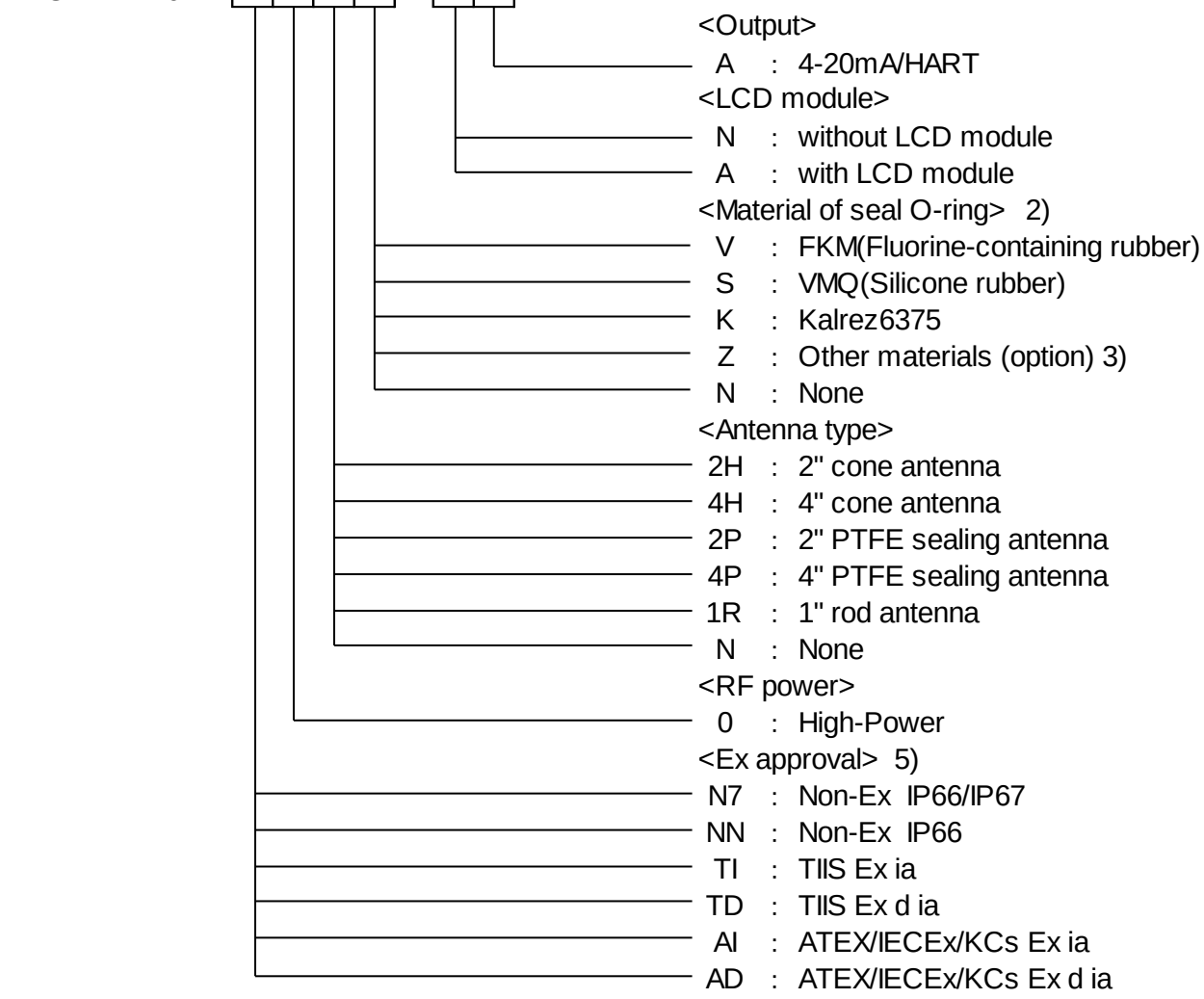
1) Purpose of process :

2) Existing Level instruments : (if any)

3) Any other problems at Level :

12. Product Code

KRG - 1 0 - □□□□□ - □□



NOTE1:
Required cable gland depends on type of explosion protection ATEX, IECEx and TIIS. Each Ex ia & Ex d ia transmitter(ATEX and IECEx) 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 Required flange dimensions.
NOTE5:
Please refer to the safety instructions to know the IP code for the type of explosion protection.

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Jan 2017 / PDS009K