




Safety Instructions

Microwave Level Gauge

KRG-10

FM 13 ATEX 0069X

IECEX FMG 13.0039X

-  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
-  II 1/2G Ex ia/d IIC T4 Ga/Gb Ta= -40°C to +60°C, IP66

EN 60079-0(2012) / IEC 60079-0(2011)

EN 60079-1(2007) / IEC 60079-1(2007)

EN 60079-11(2012) / IEC 60079-11(2011)

EN 60079-26(2015) / IEC 60079-26(2014)



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1 Category

1.1 Category 1G,1D instruments

The KRG-10-*I***-** are installed in hazardous areas requiring instruments of category 1G/1D.

1.2 Category 1/2G instruments

The KRG-10-*D***-** are installed in hazardous areas requiring instruments of category 1/2G.

2 Gas and Dust group and Temperature class

This equipment may be used with gas groups IIA, IIB and IIC, dust groups IIIA, IIIB and IIIC and with temperature classes T4.

3 Mounting and wiring

Mounting and wiring operations in classified areas for explosive gas atmospheres, must be executed accordingly to the current procedures and to the national and international standards (e.g. EN 60079-14) only by qualified personnel specifically and completely trained.

4 Inspection and Maintenance

Inspection and maintenance of this equipment must be carried out according to the EN60079-17. Only approved spares supplied by the manufacturer or approved agent should be used.

5 Ambient temperature range

This equipment is certified for use in ambient temperature range of -40°C to +60°C.

6 Contact with aggressive substances

If the equipment is likely to come into contact with aggressive substances, it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.

Aggressive substances: - e.g. acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials

Suitable precautions: - e.g. regular checks as part of routine inspections or establishing from the material's data sheet that it is resistant to specific chemicals

7 Technical data

7.1 The KRG-10-**I*****-**

Ex ia model

Ratings

Power supply	:	12 to 30V DC
Output	:	4 to 20 mA HART
Microwave output	:	within 23uJ

Intrinsically safe parameters

Ui	:	30V
Ii	:	93mA
Pi	:	700mW
Ci	:	negligible
Li	:	negligible

7.2 The KRG-10-**D*****-**

Ex d ia model

Ratings

Power supply	:	18 to 36V DC
Um	:	250V AC
Output	:	4 to 20mA HART
Microwave output	:	within 23uJ

8 Application conditions

In the event of potentially explosive vapor/air mixtures, only operate the device under atmospheric conditions.

- Ambient Temperature: -40 to +60 °C
- Pressure: 80 to 110 kPa (0.8 to 1.1 bar)
- Air with normal oxygen content, usually 21 % (V/V)

If no potentially explosive mixtures are present, or if additional protective measures have been taken according to EN 1127-1, the device may also be operated under non-atmospheric conditions in accordance with the manufacturer's specifications.

The maximum permissible ambient temperatures depending on the temperature classes are specified in the following tables. If the KRG-10 is operated at temperatures higher than those specified in the following tables, please make sure through appropriate measures that there is no danger of ignition from the hot surfaces. The maximum permissible temperature on the body should not exceed the values specified in the following tables. The permissible operating pressures are stated in the manufacture information.

8.1 Temperature condition of antenna and body

Category 1G, 1/2G instruments

Temperature class	O-ring material	Process temperature on the 2", 4" cone and 1"rod antenna	Process temperature on the 2", 4" PTFE sealing antenna	Ambient temperature on the body
T4	FKM	-10 to +150 °C	-10 to +200 °C	-40 to + 60 °C
	VMQ	-40 to +150 °C	-40 to +180 °C	
	Kalrez 6375	-20 to +150 °C		

Category 1D instruments

O-ring material	Process temperature on the 2", 4" cone and 1"rod antenna	Process temperature on the 2", 4" PTFE sealing antenna	Ambient temperature on the body
FKM	-10 to +135 °C	-10 to +135 °C	-40 to + 60 °C
VMQ	-40 to +135 °C	-40 to +135 °C	
Kalrez 6375	-20 to +135 °C		



9 Degree of Protection

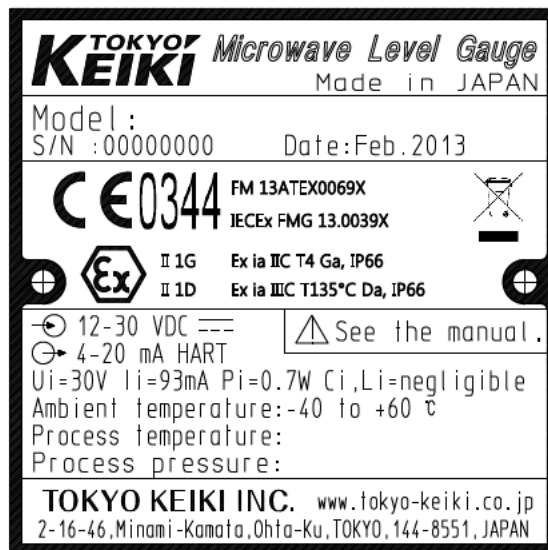
This equipment, if correctly installed, have an ingress protection rating IP66.

10 Marking


This equipment with following labels attached has been certified to comply with the ATEX Directive.

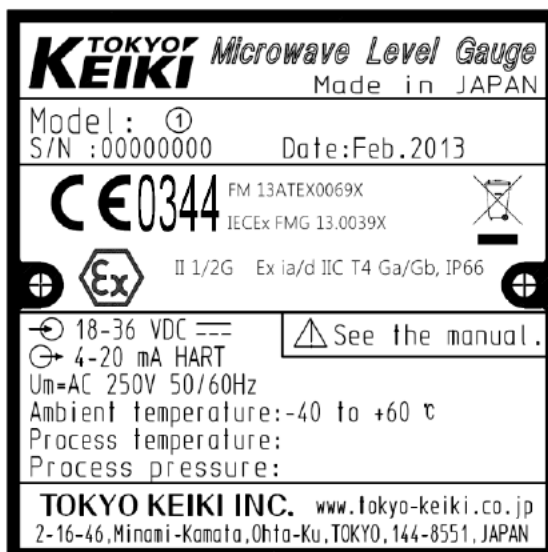
10.1 The KRG-10-*I***_**

-  II 1G Ex ia IIC T4 Ga, IP66
-  II 1D Ex ia IIIC T135°C Da, IP66



10.2 The KRG-10-*D***_**

-  II 1/2G Ex ia/d IIC T4 Ga/Gb, IP66



11 Protection equipment

11.1 Symbol “X”

This equipment are marked “X”. The meaning of this mark “X” is the following.

- This equipment body use more than 15% in total of aluminum.
- This equipment use plastic parts, as e.g. Enclosure’s paint, window use polycarbonate and antenna use PTFE or PFA.
- This equipment must be used with flange, because of satisfied protection level of IP.
- When this equipment is installed in the boundary wall between Ga and Gb (1G and 2G), this equipment contains a nonmetallic material that acts as a partition wall. The partition wall is shown below.

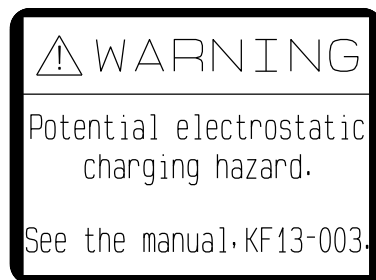
Partition wall of category 1/2G instruments

	Antenna type		
	2”, 4” cone antenna	2”, 4” PTFE sealing antenna	1”rod antenna
Partition wall	equipment body	Antenna unit	Antenna unit

11.2 Protection against static electricity

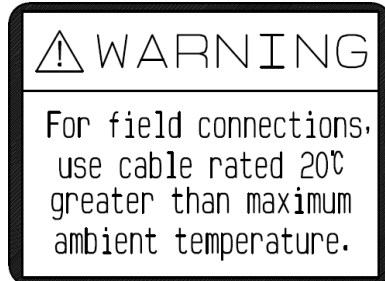
This equipment with chargeable non-conductive parts, e.g. Enclosure’s paint, window use polycarbonate and antenna use PTFE or PFA, is provided with a caution label referring to the safety measures that must be taken if there is electrostatic charging during operation.

For use in hazardous area, the equipment must be connected to earth. And be attention to not only the measuring object, e.g. liquids, gases, powders and etc, but also the related conditions, e.g. tank, container, vessel and etc. (According to IEC 60079-32-1)



11.3 Wiring

For field connections, use cable rated 20 °C greater than maximum ambient temperature.



11.4 Others

- The KRG-10-*D***-** have Ex d terminal box. Terminal box cover does not open when an explosive atmosphere is present.



12 Connection compartment

The KRG-10-*D***-** connection compartment is provided with a M20 x 1.5 thread for connecting to a certified “Conduit” system or for mounting an “Ex d” cable gland and blanking element (blind plug) certified according to EN 60079-1 (ATEX) or IEC 60079-1 (IECEX).

Cable glands of simple construction may not be used.

Please take note section 13.1 and 13.2 of EN 60079-1 and IEC 60079-1.

When connecting to a “Conduit” system, the appendant seal facility must be located directly on the “Ex d” connection compartment.

13 Special condition of use

- 1) The KRG-10 enclosure contains aluminium and is considered to present a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.
- 2) The KRG-10 enclosure contains exposed non-metallic surfaces considered to constitute an electrostatic discharge hazard. Clean only with a damp cloth.
- 3) The painted surface of the KRG-10 may store electrostatic charge and become a source of ignition in applications with a low relative humidity <30% relative humidity where the painted surface is relatively free of surface contamination such as dirt, dust, or oil. Guidance on protection against the risk of ignition due to electrostatic discharge can be found in EN TR50404 and IEC TS 60079-32. Cleaning of the painted surface should only be done with a damp cloth.
- 4) The KRG-10-*D***-** can be installed in the boundary wall between an area of EPL Ga (Category 1) and the less hazardous area, EPL Gb (Category 2). In this configuration, the antenna process connection portion may be installed in EPL Ga (Category 1), while the electronics housing is installed in EPL Gb (Category 2).
- 5) For the KRG-10-*D***-**, consult the manufacturer for dimensional information on the flameproof joints for repair.

- 6) The device contains a nonmetallic wall constructed of PTFE, PFA, Glass part and Epoxy resin that acts as a partition wall between the process and the device. Please make sure that the application condition is satisfied with the specifications in below and there is no danger of the corrosion.

2", 4" PTFE sealing antenna

- Material: PTFE
- Thermal properties: -40 to +200 °C
- Mechanical properties: -0.1 to +1.5MPa

1"rod antenna

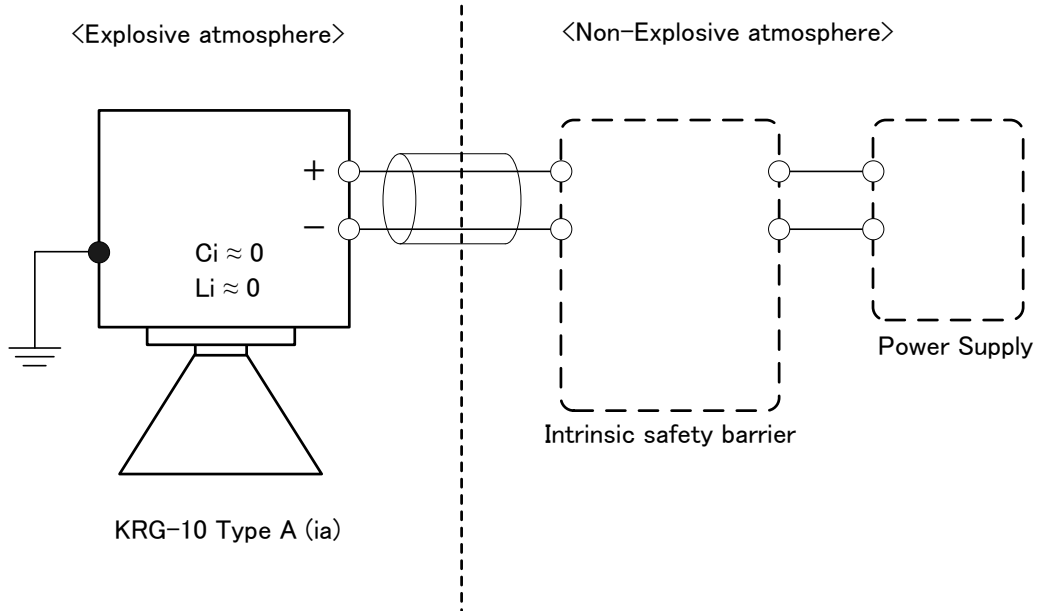
- Material: PFA
- Thermal properties: -40 to +150 °C
- Mechanical properties: -0.1 to +1.5MPa

Equipment Body

- Material: Glass and Epoxy resin
- Thermal properties: see the chapter 8
- Mechanical properties: see the chapter 8

- 7) The device contains a nonmetallic wall constructed of PTFE, PFA, Glass parts and Epoxy resin that acts as a partition wall between the process and the device. Installation, Maintenance and use shall take into account the environmental conditions to which the partition wall will be subjected. The manufacturer's instruction for maintenance shall be followed in detail to assure safety during its expected lifetime.

Type A



NOTE

1. KRG-10 Type A (ia) is installed in accordance with the above figure.

2. Electrical parameters:

$$U_i = 30V, I_i = 93mA, P_i = 0.7W$$

$$C_i \approx 0, L_i \approx 0$$

3. Ambient Temperature: -40 ... 60 °C

4. Marking

ATEX:

II 1 G Ex ia IIC T4 Ga

II 1 D Ex ia IIIC T 135°C Da, IP 66

IECEX:

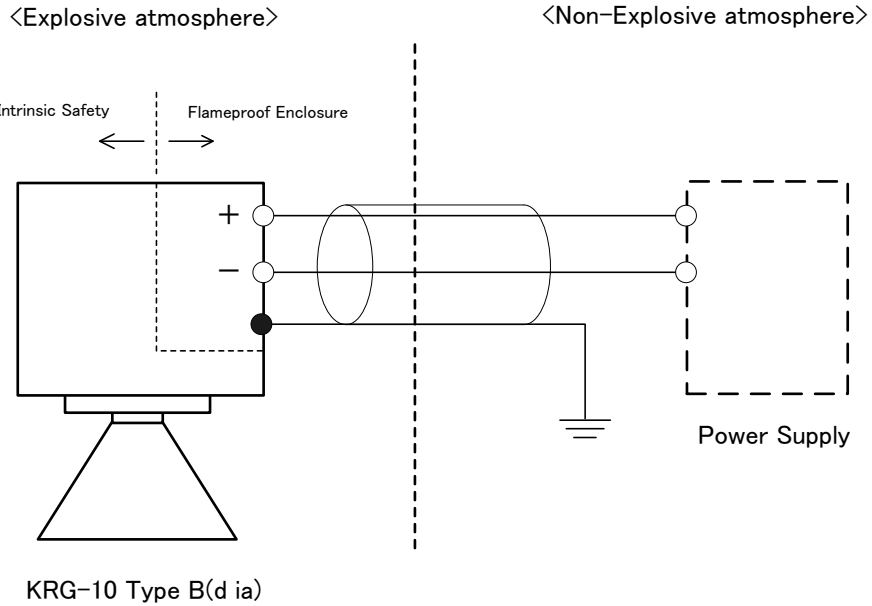
Ex ia IIC T4 Ga

Ex ia IIIC T 135°C Da, IP 66

5. The device contains a nonmetallic wall constructed of glass parts that acts as a partition wall between the process and the device. Installation, Maintenance and use shall take into account the environmental conditions to which the partition wall will be subjected. The manufacturer's instruction for maintenance shall be followed in detail to assure safety during its expected lifetime.

				Installation DWG. Type A				
△	20150107	Modifying Marking	T.nakamura					
MARK	日付DATE	変更項目 REVISION	担当 SIGN	製 図 DRAWN BY	設 計 CHARGED BY	検 図 CHECKED BY	承 認 APPROVED BY	
記事 NOTE			サイズSIZE	T.Nakamura	T.Nakamura	H.Tamura	H.Hamada	
KRG-10-AI0***-A			A					
東京計器株式会社 TOKYO KEIKI INC.			尺 度 SCALE	~		図番 DRAWING NO.	REV	SHT
				日 付 DATE		2012-12-10	5198706001	1

Type B



NOTE

1. KRG-10 Type B (d ia) are installed in accordance with the above figure.
2. Electrical parameters:
Um = AC 250V 50/60Hz
3. Ambient Temperature: -40 ... 60 °C
4. Marking

ATEX:

II 1/2 G Ex ia/d IIC T4 Ga/Gb, IP66

IECEX:

Ex Ia/d IIC T4 Ga/Gb, IP66

5. The device contains a nonmetallic wall constructed of glass parts that acts as a partition wall between the process and the device. Installation, Maintenance and use shall take into account the environmental conditions to which the partition wall will be subjected. The manufacturer's instruction for maintenance shall be followed in detail to assure safety during its expected lifetime.

				<h2 style="margin: 0;">Installation DWG. Type B</h2>			
③	20150518	Modifying Note	T.nakamura				
②	20150107	Modifying Note	T.nakamura				
①	20140901	Modifying Marking	T.nakamura				
MARK	日付DATE	変更項目 REVISION	担当 SIGN	製 図 DRAWN BY	設 計 CHARGED BY	検 図 CHECKED BY	承 認 APPROVED BY
記事 NOTE			サイズSIZE	T.Nakamura	T.Nakamura	H.Tamura	H.Hamada
KRG-10-AD0***-A			A				
KEIKI TOKYO KEIKI INC.				尺 度 SCALE	~	図番 DRAWING NO.	REV
			日 付 DATE	2012-12-10	5198706103		SHT 1/1

Document No. KF13-003C
Microwave Level Gauge KRG-10
Safety Instructions
Nov. 2018 4th Edition

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