Kansai Automation

SENSOR TECHNOLOGY

CAPACITANCE TYPE LEVEL INDICATOR

Model KLI/KLT/KLG SERIES

NO MOVING PART, EASY TO HANDLE!!

CAT. No. CM-029-0803E

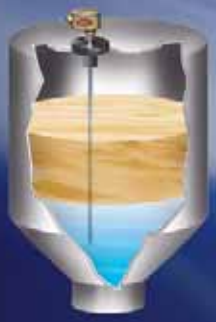
KANSAI Automation Co.,Ltd.

Wide measuring span
Cement or the like

Unaffected by dust on pneumatic conveyor
Cement or the like

Unaffected by fouling
Flour or the like

Interfacial detection of two liquids



KLI/KLT/KLG SERIES

CAPACITANCE TYPE LEVEL INDICATOR

THERE BEING NO MOVING PART, IT RELIABLY OPERATES FOR A LONG PERIOD OF TIME AND ITS MAINTENACE IS EASY. BEST SELLING LINE IN CONTINUOUS MEASUREMENT

FEATURES

- Reliable detection even when objects are being fed.
- It can be applied to anything including powder, granules and liquid.
- Not affected by dust, it can accurately indicate.
- It is possible to select one of the most suitable sensors out of a wide range of products, depending upon the applicable conditions.
  (high temperature, high pressure, strong acid/ alkali, conductivity, insulation property and others)
- Safely measure a wide span with electrodes designed to be strong enough.
- The intrinsically safe explosion-proof model is also available for use at an explosive area.

Accurate detection of minimal capacitance
Adhesives, Lard (Food oil), Liquefied gas & others

Operating Principle

When an electrode is set in a tank so as to be coaxial with its wall as shown below, there forms a capacitance Cx between the tank and the electrode. By offsetting the stray capacitance of Co, when the tank is empty, with a high frequency impedance bridge, it is possible to obtain ΔC, namely the output electric signal which is proportional to the height (level) ℓ1 of the material to be measured.

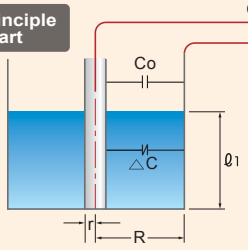
$$Cx = Co + \triangle C$$

$$\triangle C = \frac{K(\varepsilon_2 - \varepsilon_1)\ell_1}{\log_{10}(R/r)}$$

(Increment of capacitance when the tank is filled with materials to be measured.)

(Co: Capacitance when the tank is empty, K = Constant)

Principle chart



$io \propto (\varepsilon_2 - \varepsilon_1)\ell_1$

io : Output Current (mA)

ε_2 : Dielectric Constant of material to be measured

ε_1 : Dielectric constant of Air ≒1

Agitating vessel

Liquid, dirt or the like

Unaffected by static electricity

Resin pellet

model KLI

Electrode · Amplifier Remote Type

(Outdoor wall mount)

- Length of Exclusive Cable: Max.50m (Sensitivity Class1 =Max.25m)
- 24VDC model can be availalble
- Electrostatic protective model can be manufactured.

model KLG

Intrinsically safe explosion-proof model (i)2G4 RIIS No.44622

- Attached safety barrier
- Exclusive cable : Max.25m

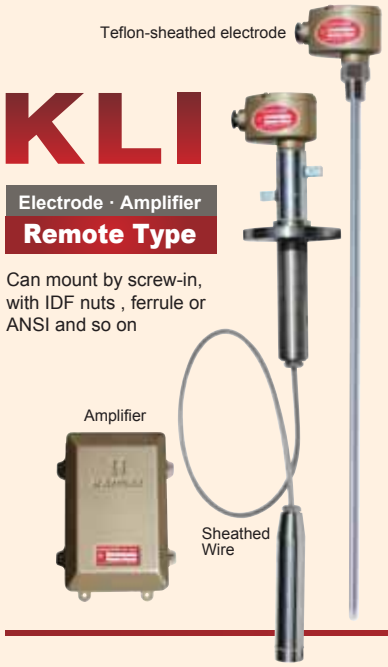
APPLICATIONS

Molten resin	Organic solvent		
Flour	Food oil	Heavy oil	
Sludge	Sulphuric acid	Caustic soda	
Industrial water	Fruit juice	Sea water	Waste water
Cement	Grain	Resin pellet	
Calcium carbonate	Powdered coal		
Metal powder			

model KLT

Electrode · Amplifier Built-in Type

- No exclusive cable is required.
- 24VDC model can be available.



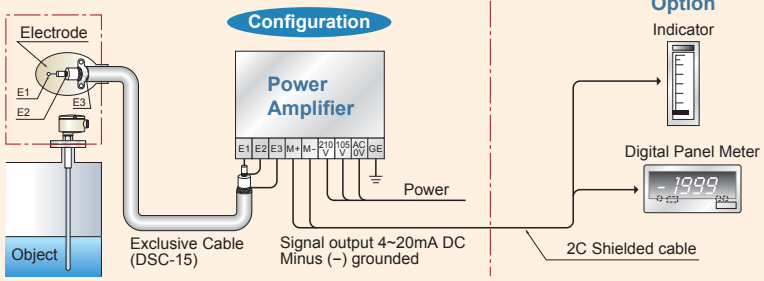
KLI

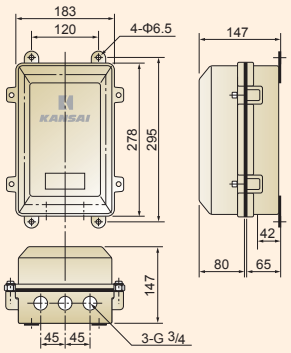
Electrode · Amplifier
Remote Type

Can mount by screw-in, with IDF nuts , ferrule or ANSI and so on

ELECTRODE

Permissibly Distributed Capacitance : 0~400pF (Depending on shape)
Operating Temperature : −25~+80°C (Standard Specification)
−200~+500°C (Option)
Maximum Pressure : 980KPa (10kgf /cm²) (Standard)
Housing : IP-66
Color : Hammer-net gold





POWER · AMPLIFIER (Outdoor wall mounting)

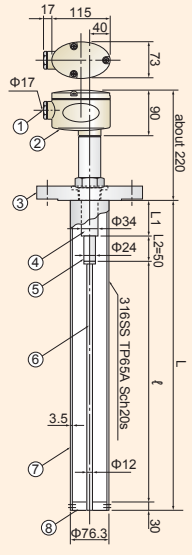
Input Power Source : 105/210VAC ±15% 50/60Hz (24VDC OK)
Power Consumption : 4VA
Output Signal : 4~20mA DC, (500Ω Max) (−) grounded
Measuring Sensitivity : 10pF, 30pF, 300pF, 3000pF (F·S)
Accuracy : (Amplifier) 1%
Weight : 6.5Kg (Outdoor use)
Box Type : Outdoor Wall mounting or Panel built-in
Length of Exclusive Cable : Max. 50m (Sensitivity Class1=Max.25m)
Operating Temperature : −20~+70°C
Housing : IP-55 equivalent
Color : Hammer-net gold

*Compact amplifier (panel mounting) is optionally available.

OUTLINE DRAWING

KLI-1□3 Special
B31·Z·SP·65

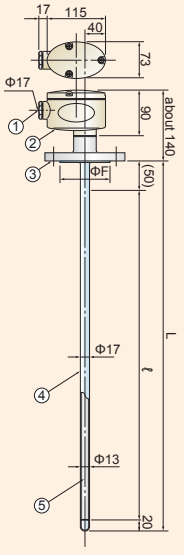
Mounting : JPI300#3B
Temperature : −20~+80°C
Pressure : 980KPa
Length of L : Max 4m



1	Cable Gland	C3604
2	Housing Flange	AC4B
3	Earth electrode	316SS
4	Insulator	316SS
5	Main electrode	Ceramic
6	Auxiliary electrode	316SS
7	Insulator supporter	316SS
8		Teflon

KLI-2□3
K·P2·17

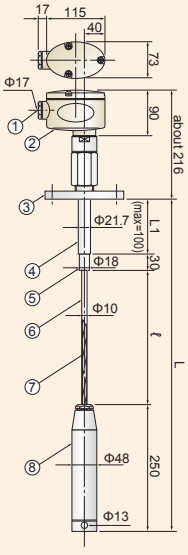
Mounting : JIS10K50A
Temperature : −20~+80°C
Pressure : 980KPa
Length of L : Max 4m



1	Cable gland	C3604
2	Housing	AC4B
3	Flanage	304SS
4	Sheath	Teflon
5	Main electrode	304SS

KLI-4□3
K·W·10P· (G)

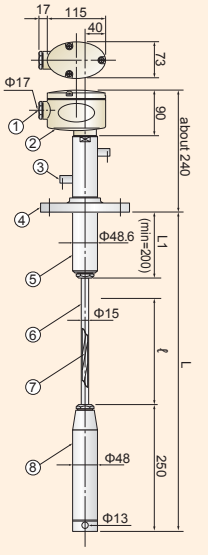
Mounting : JIS10K65A
Temperature : −20~+80°C
Pressure : 980KPa
Length of L : Max 15mm



1	Cable gland	C3604
2	Housing	AC4B
3	Flanage	304SS
4	Earth electrode	304SS
5	Insulator	Polyacetal
6	Sheathed	Teflon
7	Main electrode wire	304SS
8	Weight	304SS

KLI-4□3
K·W·15P·3

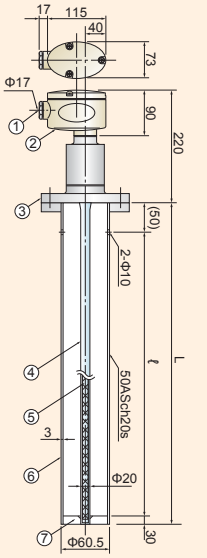
Mounting : JIS10K65A
Temperature : −20~+80°C
Pressure : 980KPa
Length of L : Max 30m



1	Cable gland	C3604
2	Housing	AC4B
3	Vent	SS400
4	Flanage	304SS
5	Earth electrode	304SS
6	Sheath	Teflon
7	Main electrode wire	304SS
8	Weight	304SS

KLI-6□3 Pyrex
K·P1·20·SP (50A)

Mounting : JIS10K65A
Temperature : −20~+200°C
Pressure : 1960KPa
Length of L : Max 1m

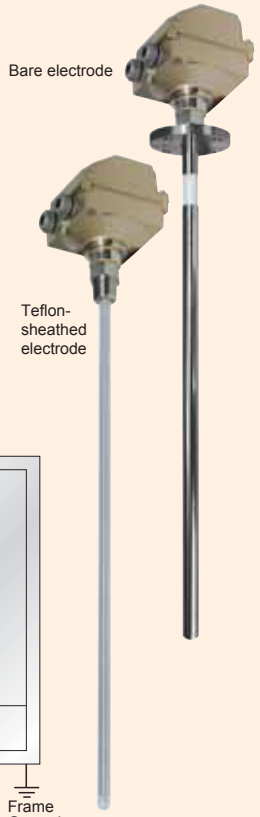


1	Cable gland4	C3604
2	Housing	AC4B
3	Flanage	304SS
4	Sheath	Pyrex
5	Main electrode	304SS
6	Auxiliary electrode	304SS
7	Main electrode supporter	304SS

KLT

Electrode · Amplifier
Built-in Type

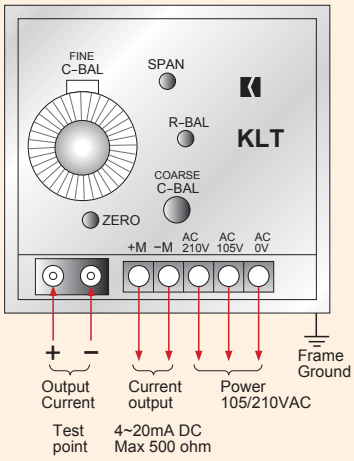
Can mount by screw-in, with IDF nuts , ferrule or ANSI and so on



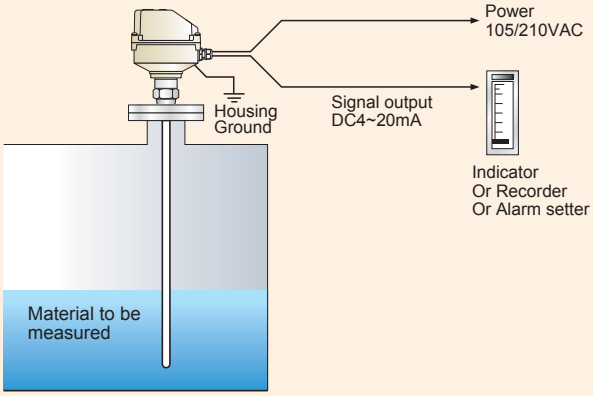
STANDARD SPECIFICATION

Input Power Source : 105 /210VAC ±15% 50/60Hz (24VDC OK)
Power Consumption : 4VA
Output Signal : 4~20mA DC, (500Ω Max) Minus (–) gronnded
Measuring Sensitivity : 10pF, 30pF, 300pF, 3000pF (F, S)
Accuracy : 1%
Permissibly Distributed Capacitance : 0~400pF (Depending on shape)
Operating temperature : −25~+80°C (Standard)
−200~+500°C (Special)
Maximum Pressure : 980KPa (10kgf /cm²) (Standard Specification)
Housing : IP-66 equivalent
Color : Hammer-net gold

WIRING DIAGRAM



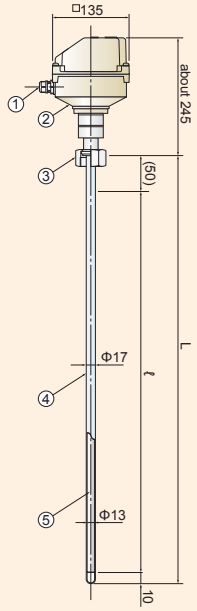
Configuration



OUTLINE DRAWING

KLT-2
T·P1·17·IN2S

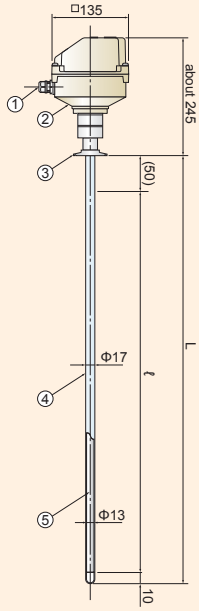
Mounting : IDF2s
Temperature : −20~+50°C
Pressure : 980KPa
Length of L : Max 4m



1	Cable gland	Polyacetal
2	Housing	ADC
3	IDF union nut	304SS
4	Sheath	Teflon
5	Main electrode	304SS

KLT-2□0
T·P1·17·IF2S

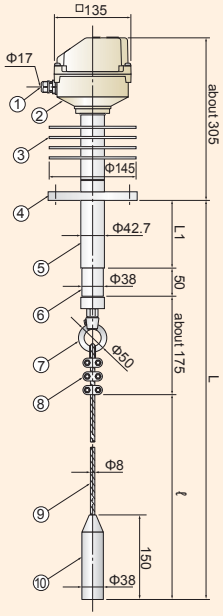
Mounting : Ferrule
Temperature : −20~+50°C
Pressure : 980KPa
Length of L : Max 4m



1	Cable gland	Polyacetal
2	Housing	ADC
3	Ferrule	304SS
4	Sheath	Teflon
5	Main electrode	304SS

KLT-3□0-H Special
T·W8·B3·H3

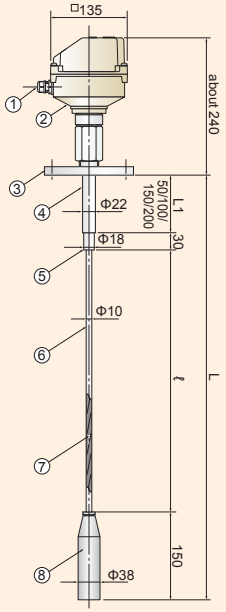
Mounting : JIS10K50A
Temperature : −20~+400°C
Pressure : 980KPa
Length of L : Max15m



1	Cable gland	Polyacetal
2	Housing	ADC
3	Fin	AC
4	Flange	304SS
5	Earth electrode	304SS
6	Insulator	Ceramic
7	Eyenut	304SS
8	Wire clip	304SS
9	Main electrode	304SS
10	Weight	304SS

KLT-4□0
T·W·10P·L

Mounting : JIS10K50A
Temperature : −20~+50°C
Pressure : 980KPa
Length of L : Max15m



1	Cable gland	Polyacetal
2	Housing	ADC
3	Flange	304SS
4	Earth electrode	304SS
5	Insulator	Polyacetal
6	Sheath	Teflon
7	Main electrode wire	304SS
8	Weight	304SS

KLG

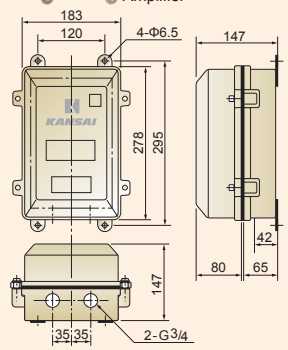
Intrinsically safe explosion-proof model (i)2G4 RIIS No.44622

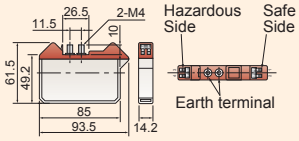
FOR HAZARDOUS GAS ENVIRONMENT

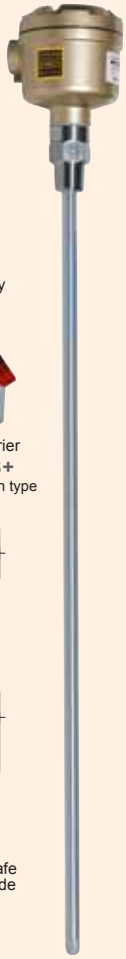
Explosion-proof available
Certified by Industry Safety-Technology Association, Labor Ministry.

Amplifier

Safety Barrier
MTL728+
Fuse Built-in type

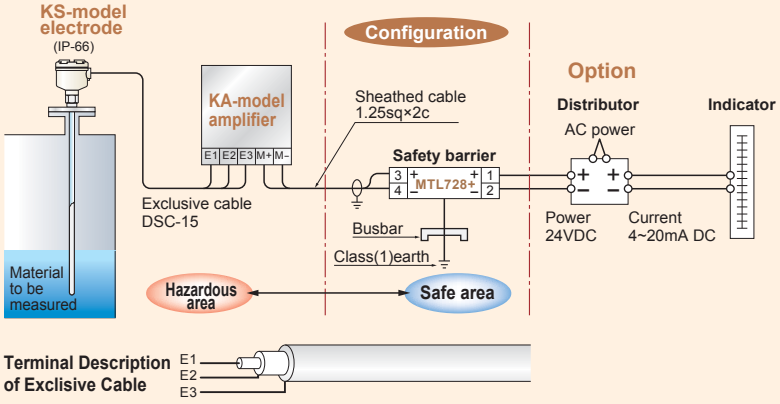






TEFLON-tubing probe

Can safely be used at any explosive environment.

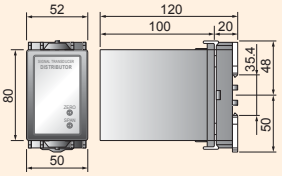


Terminal Description of Exclisive Cable

POWER

Power Consumption : 4 VA
Output Signal : 4~20mA DC (100Ω Max)
Measuring Sensitivity : 130pF, 300pF, 3000pF
Accuracy : (Amplifier) 1%
Weight : 6.0 kg
Housing : Outdoor Wall mounting
Length of Exclusive Cable : Max.25 m
Housing : IP-66
Painting Color : Hammer-net gold

Distributor



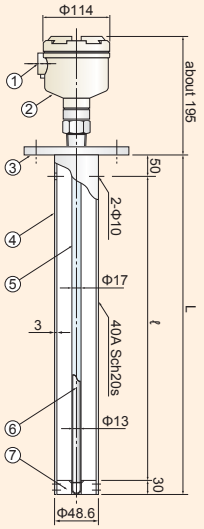
STANDARD SPECIFICATION (Option)

Distributor: 100 /110VAC or 200 /220V
Allowable load resistance 600Ω Max
(Using Model7552 made by Tsuruga Electric Corp.)

OUTLINE DRAWING

KLG-2□3
G·P1·17·SP(40A)

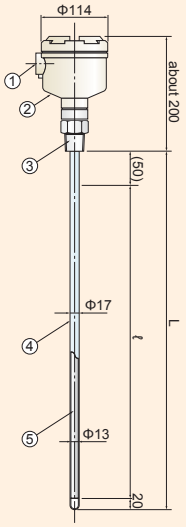
Mounting : JIS10K50A
Temperature: −20~+80°C
Pressure : 980KPa
Length of L : Max 4m



1	Cable gland	G 3/4
2	Housing	ADC
3	Flanage	304SS
4	Auxiliary electrode	304SS
5	Sheath	Teflon
6	Main electrode	304SS
7	Main electrode supporter	Teflon

KLG-2□3
G·P1·17

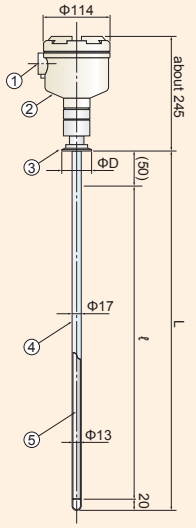
Mounting : R1
Temperature : −20~+80°C
Pressure : 980KPa
Length of L : Max 4m



1	Cable gland	G 3/4
2	Housing	ADC
3	Screw	304SS
4	Sheath	Teflon
5	Main electrode	304SS

KLG-2□3
G·P1·17·IF·1S

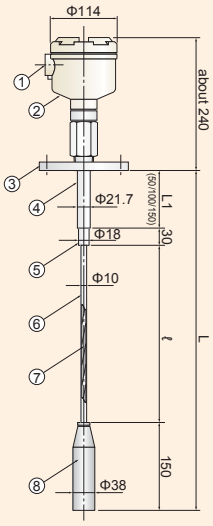
Mounting : IDF ferrule 1S
Temperature : −20~+80°C
Pressure : 980KPa
Length of L : Max 4m



1	Cable gland	G 3/4
2	Housing	ADC
3	Ferrule	304SS
4	Sheath	Teflon
5	Main electrode4	304SS

KLG-4□3
G·W·10P·L

Mounting : JIS10K50A
Temperature : −20~+80°C
Pressure : 980KPa
Length of L : Max 15m



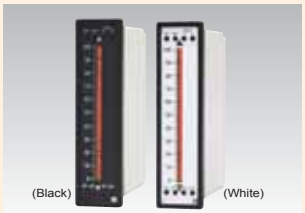
1	Cable gland	G 3/4
2	Housing	ADC
3	Flanage	SUS304
4	Earth electrode	SUS304
5	Insulator	Polyacetal
6	Sheath	Teflon
7	Main electrode wire	SUS304
8	Weight	SUS304

OPTIONAL UNITS

DIGITAL METER RELAY MR-B51D5

Size: 1/8DIN W48×H96mm
Power: 85~265VAC / 95~370VDC (Common power source for AC/DC)
Consumption: 5W
Indication: Digital (5 digit LED display) Bargraph (51 segment LED)
Output contact: 2SPDT (C contact) 2SPST (A contact), can be added
Remarks: LED with brightness control Output contact can be expanded up to 6 at the maximum. (A contact only)

BARGRAPH METER M-B101

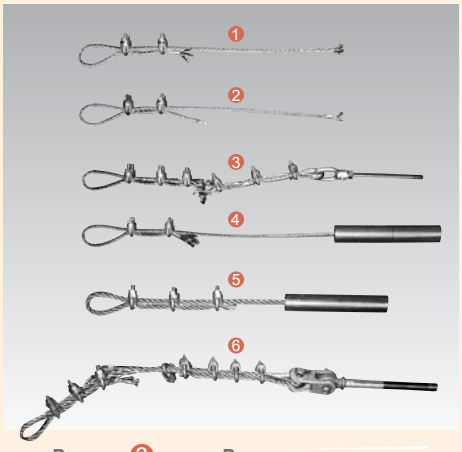


Size: 9/64DIN W36×H144mm
Power: 85~265VAC / 95~370VDC (Common power source for AC/DC)
Consumption: 5W
Indication: Bargraph (101 segment LED)
Output contact: nil
Remarks: LED with brightness control

BARGRAPH METER RELAY MR-B101D4

Size: 9/64DIN W38×H144mm
Power: 85~265VAC / 95~370VDC (Common power source for AC/DC)
Consumption: 5W
Indication: Digital (4 digit LED display) Bargraph (101 segment LED)
Output contact: 2SPDT (C contact) 2SPST (A contact), can be added
Remarks: LED with brightness control Output contact can be expanded up to 6 point at the maximum. (A contact only)

TENSION TEST Osaka Prefectural Industry Technology Research, 2/24/84



NAME OF PARTS FOR TENSION TEST

1. Φ8wire rope at lead brazing
2. Φ8 wire rope/ prevent falling
3. Φ8 wire rope/ eyenut
4. Φ8 wire rope/ bob base
5. Φ12 wire rope/ bob base
6. Φ12 wire rope/ eyebolt

3 Description of Deformed Part
The eyenut ring ovalizes but does not crack. No exception is noted on the screw-thread part of stainless steel bar.

3 Φ8 Wire
Eyenut Method
An eyenut and a heart thimble deform but withstand any breakage. The withstanding weight is 4.345 tons. The official tension shear weight of the wire is 4.13 tons.

6 Eyebolt Portion of Φ12 Wire
A right-angled crevice and a heart thimble deform but withstand any breakage. The withstanding weight is 9.5 tons. The official tension shear weight of the wire is 9.48tons.

6 Description of Deformed Part
Two pins of right-angled crevice, the lower half of the crevice and a pin-hole of the eyebolt as well as a heart thimble were metamorphosed. The left pin and the lower half of the crevice were severely damaged. The right pin and the eyebolt hole were metamorphosed by about 1mm.

OUTLINE DRAWING

KLI-□□□-□

- None= standard
  H = High temperature
- Alternative type of power supply amplifier Unit
  1 = Panel mount type
  3 = Outdoor type
- (F.S.) Sensitivity
  1 = 10~100pF
  2 = 30~300pF
  3 = 300~3,000pF
  4 = 3,000~30,000pF
  5 = Special
- Electrode type
  1 = Bare straight rod type
  2 = Covered straight rod type
  3 = Bare wire type
  4 = Covered wire type
  5 = Coaxial cable type
  6 = Special
- Electrode/Amplifier Remote Type

KLT-□□□-□

- None= standard
  H = High temperature
- Alternative type of power supply amplifier Unit
  0 = Built-in type
- (F.S.) Sensitivity
  1 = 10~800pF
  2 = 30~2,000pF
  3 = 300~7,000pF
  4 = over 7,000pF
  5 = Special
- Electrode type
  1 = Bare straight rod type
  2 = Covered straight rod type
  3 = Bare wire type
  4 = Covered wire type
  5 = Coaxial cable type
  6 = Special
- Electrode/Amplifier Built-in type

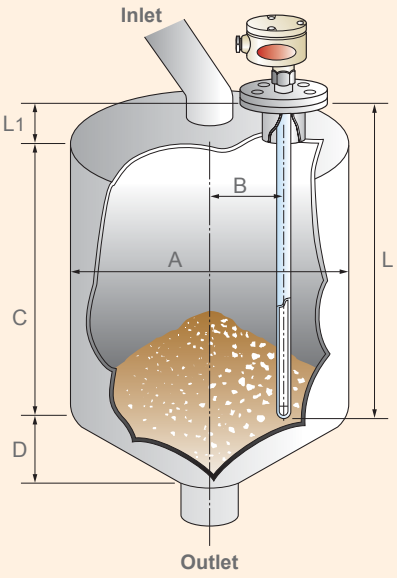
KLG-□□□

- Alternative type of power supply amplifier Unit
  3 = Outdoor type
- (F.S.) Sensitivity
  1 = 10~130pF
  2 = 30~300pF
  3 = 300~3,000pF
- Electrode type
  1 = Bare straight rod type
  2 = Covered straight rod type
  3 = Bare wire type
  4 = Covered wire type
  5 = Coaxial cable type
  6 = Special
- Electrode/ Amplifier Remote Type Intrinsically safe explosion-proof type (i)2G4

*As for the model of “Pyrex” and “Special”, please check with our Sales staff.

Please inform us of the following when inquiring and ordering

1.	Name of material to be measured	[ ]
2.	Dielectric constant, Specific resistance	[ ]
3.	Granularity	[ ]
4.	Viscosity / Agglomerating Nature	[Yes • No]
5.	Corrosive Nature	[Yes • No]
6.	Foamy Nature	[Yes • No]
7.	Tank Material	[ ]
8.	Tank Shape (1.Circular, 2.Square)	[ ]
9.	Agitator	[Yes • No]
10.	Service Temperature / °C	[°C]
11.	Service Pressure / Pa	[Pa]
12.	Length of Exclusive Cable (attachment)	[ ]
13.	Type of Amplifier Housing	[ ]
14.	Indicator and other ancillary equip.	[Yes • No]



Caution

You may come across some indication errors under the varied conditions as follows:

1. Varied water content of a material to be measured
2. Varied dielectric constant of a material to be measured
3. Varied particle size of a material to be measured

Fill out the following blanks:

A	Tank Diameter	[ ]
B	Instrument Location	[ ]
L	Length of Electrode	[ ]
L1	Height of Nozzle installed	[ ]
ℓ	Measuring Span	[ ]
C	Height of Tank's Cylindrical Part	[ ]
D	Height of Tank's Conical Part	[ ]

Line of business

- Rotary Paddle Type Level Switch
- Vibration Type Level Switch
- Swing Type Level Switch
- Acoustic Level Switch
- Capacitance Type Level Switch
- Capacitive Proximity Sensor
- Capacitance Type Level Indicator
- Diaphragm Type Level Switch
- Tilt Switch
- Leak Type Level Switch
- Microwave Switch
- Sounding Bob Type Level Indicator
- Flow Switch
- Conductance Type Level Switch
- Float Switch
- Float Type Level Indicator
- Ultrasonic Type Level Indicator
- Equipments For Conveyor Lines
- Dust Monitor System
- Zirconia Oxygen Analyzer
- Laser Type Level Indicator
- RADAR Type Level Indicator
- On-line Sensors for Accurate Liquid Analysis
- Ultrasonic Flow meter

*Please be sure to read USER'S GUIDE, Installation & Operation Instructions before using the instrument.
*The specifications herein may be subject to change without advance notice.

Nuclear Power Generation to Rice Milling
All-round Manufacturer of Level Controllers for Powder, Granules and Liquid

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Design,development,and manufacture of level measuring sensors

Agent