

ECAS level switch is a capacitive level sensor for level measurement of conductive liquid, nonconductive liquid, granulated materials with solid particles, adhesive and acid/basic liquids.

When a material comes between electrode rod and tank wall, a capacitance change occurs and when this change exceed adjustment threshold, contact output is delivered.

Designed for difficult process conditions. Refrigerated models can be manufactured for high temperature and pressure conditions.

Calibrations of triggering point and relay operation range can be performed by the user under workplace conditions.

It can be connected horizontally or vertically.

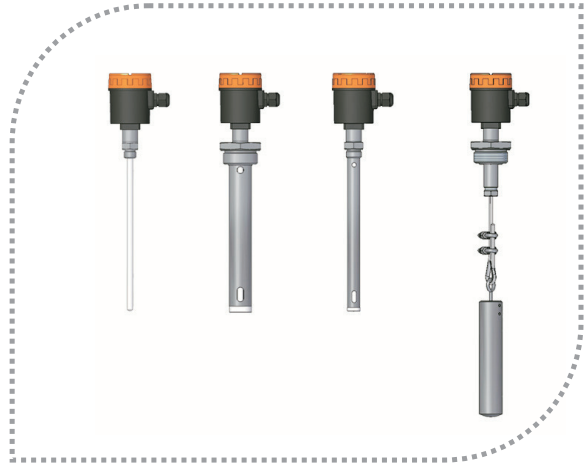
Application Areas

Liquid tanks, food machines, cooling liquid tanks, shipping, glycol tanks, brine, waste water tanks.

Oil tanks, CO2 liquid tanks, high temperature tanks, non-conductive liquids.

Grain stores, cement, sand feed, flour, milk powder, organic and plastic granule.

Sticky hot and high viscosity liquid, acid and chemical liquids.



ECAS

CAPACITIVE LEVEL SWITCH

ECAS 101 / 102 / 103 / 107

ECAS 202 / 203 / 204 / 205

ECAS 301 / 304 / 305 / 30D / 30S

ECAS 408A / 408B / 408T / 408Tp / 408Tm

Advantages :

- * Optionally high temperature-resistant design.
- * Easy assembly and sensitivity adjustment.
- * No need to clean.
- * Not affected by foam, liquid splash and probe coating.
- * Can be mounted upside.



Model : 49-2017-003

Technical Specifications:

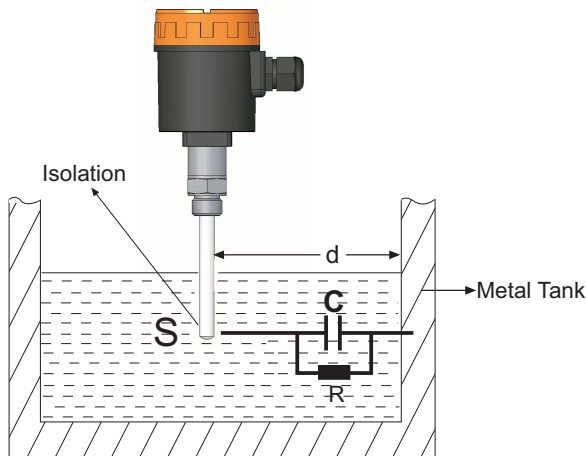
| | |
|---------------------------|--|
| Measurable Material | Conductive liquids, refrigerants Non-conductive liquids Solids particulate materials Adhesive and acid/basic liquids |
| Supply | 24 VDC |
| Signal Output | 1 NONC x5 A/250VAC Relay |
| Min.Di-Electric Constant | 1,6 ϵ_r |
| Connection Material | 304 St.St. Opt. 316 St.St. |
| Isolation Material | PTFE, PFA Opt. Peek, Ceramic |
| Housing Material | PBT (Std.) Opt. Aluminium, St.St. |
| Working Pressure | -1...100 bar (Depending on the model) |
| Working Temperature | (-)40/(+)150 °C (Depending on the model)) 200°C with cooling apparatus 230°C with PEEK isolation 400°C with ceramic isolation |
| Ambient Temperature | (-)20...(+)60°C |
| Display | With LED-Power and Contact LED |
| Isolation | Max. 500V |
| Power Consumption | Max. 1 W |
| Electrical Connection | Clemens |
| Protection Class(EN60529) | PBT-IP 66 , Aluminium , St.St. IP 65 |
| Test | EMC, Low Voltage |
| Max. Tensile Force | Max. 40 NM |
| Weight | 285 g. for ECAS 101 |

Working Principle :

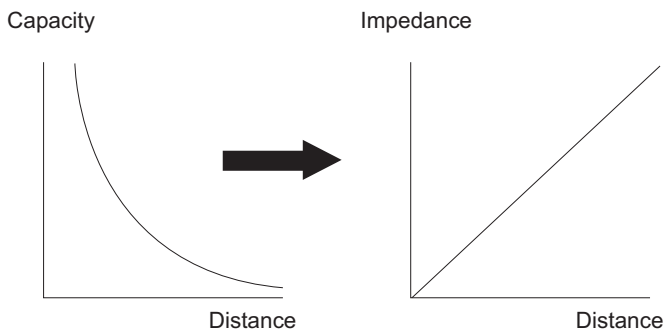
Capacitance definition, assuming two parallel conductive plates are used;

$$C = \frac{\epsilon_0 \cdot \epsilon_r \cdot S}{d}$$

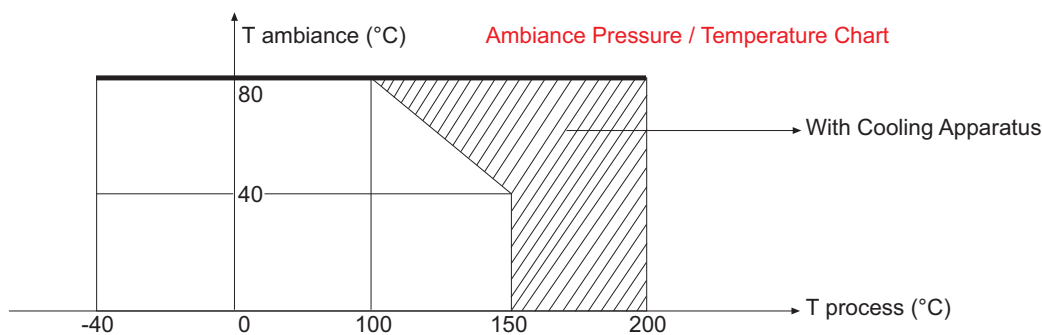
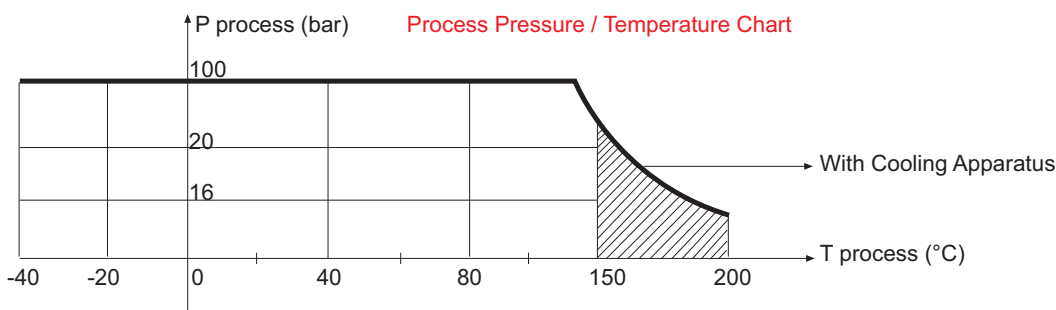
C: capacity , Farad
S: Surface Area , m²
d: Distance , m



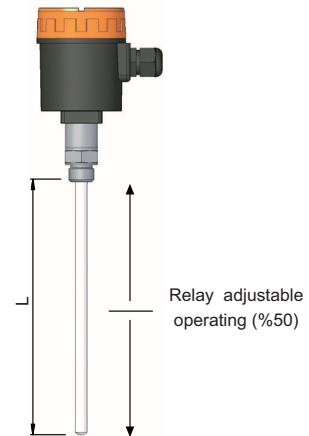
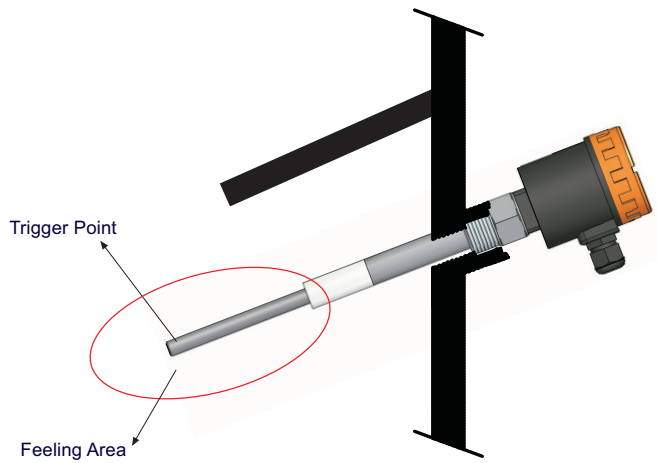
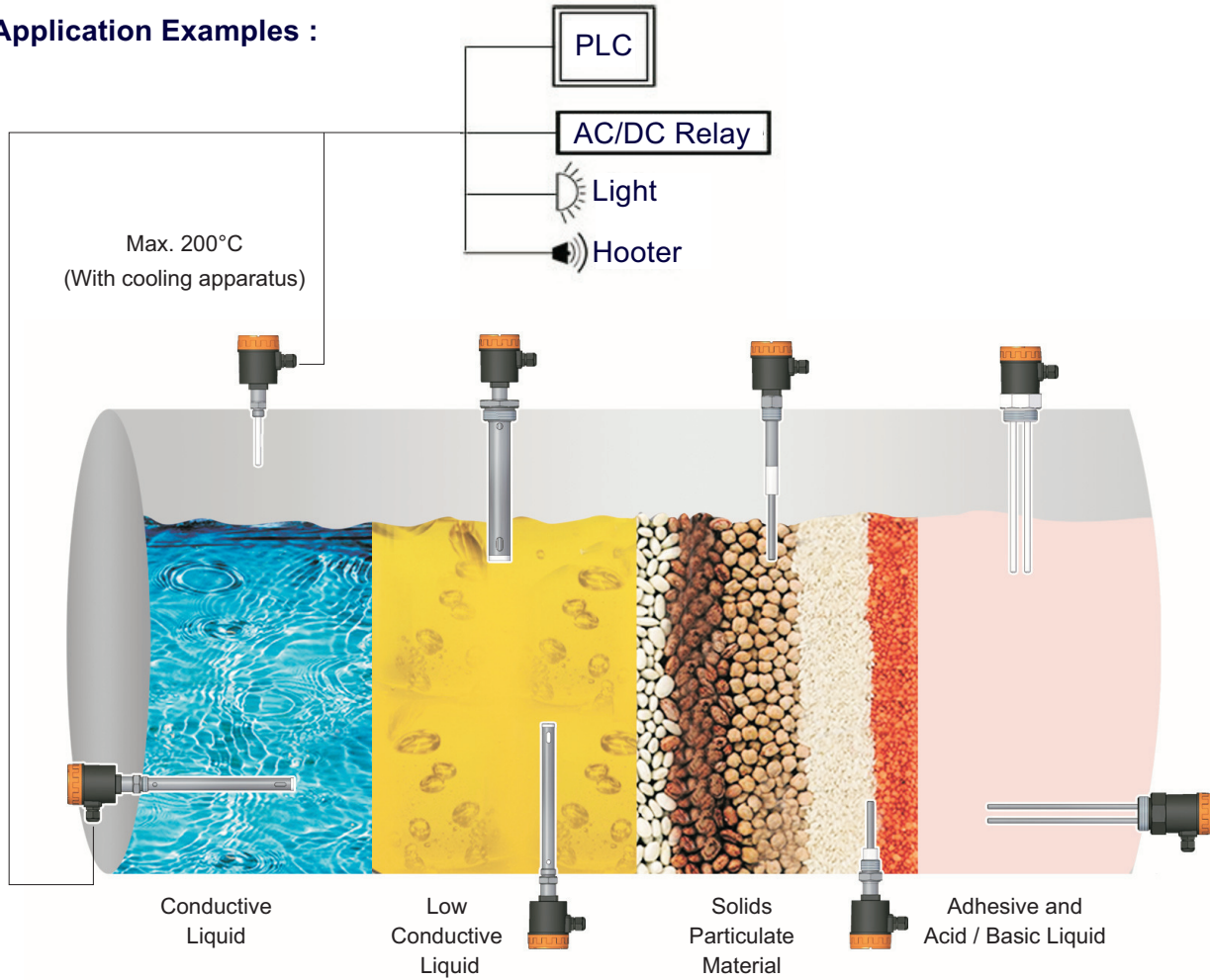
However, there are scarcely any sensor type which this definition can be practically utilized. Above Formula can no longer be reliable especially when residual areas increase due to large distance (d) (which is usually the case). Thus, measuring impedance for distance measurements give more accurate results than capacitance measurement.



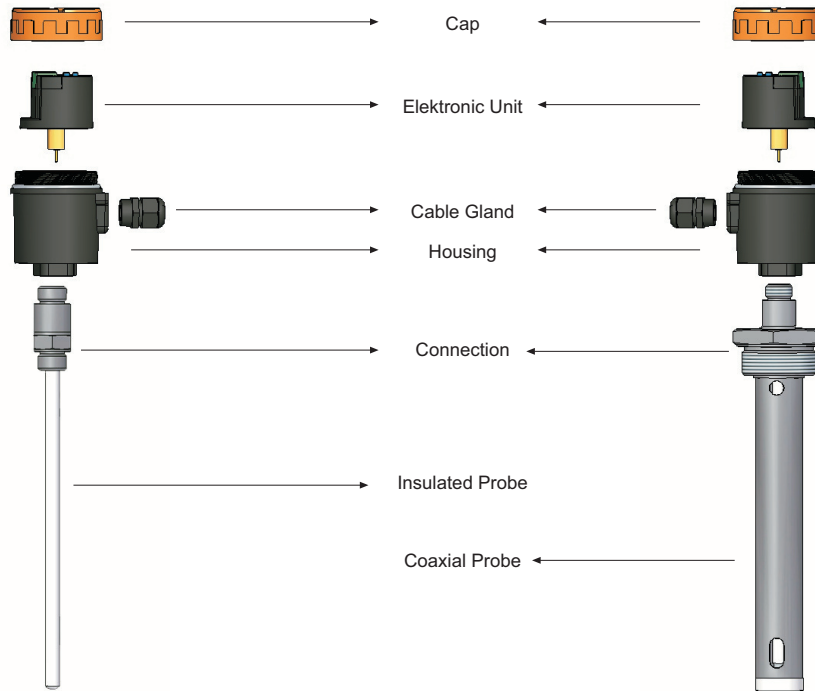
Excitation applied between 10KHz...250KHz based on length for all our models. ($\omega = 2\pi \times f$) Linearity error that may be caused by conductivity component (R) effect is prevented by electronic circuit design and mechanical design. Reduced to a level lower than 1ppm, acceptable as zero.



Application Examples :

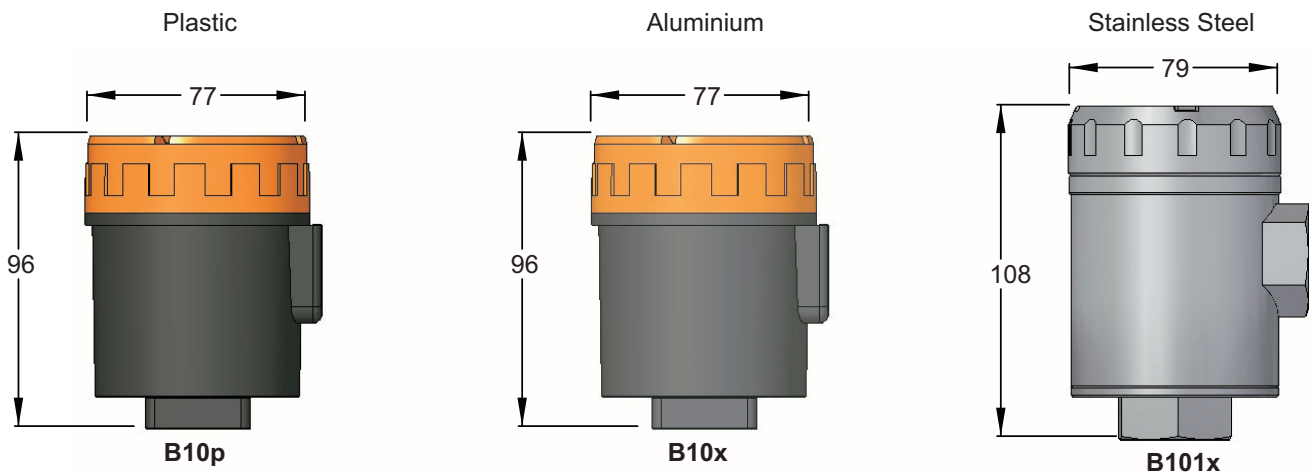


Parts:



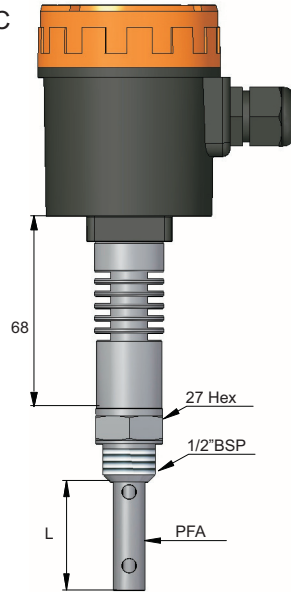
Housing :

| TYPE | MATERIALS | PROTECTION CLASS | TEMPERATURE (°C) | SIZE a x b x c (mm) |
|-------|-----------------|------------------|------------------|---------------------|
| B10p | Plastic (PBT) | IP 65 / IP 67 | -40...+150 | 96 x 77 |
| B10x | Aluminium | IP 65 | -40...+150 | 96 x 77 |
| B101x | Stainless Steel | IP 65 | -40...+150 | 108 x 79 |



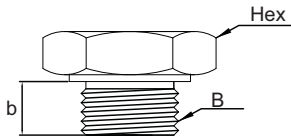
Cooling :

For Max. 200°C



Mechanical Connection :

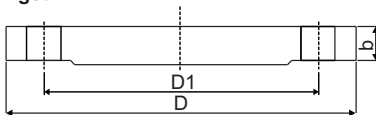
Thread



(ISO228-1)

| Dimension B | Hex [mm] | Screw Length b [mm] |
|----------------|-------------|------------------------|
| 1/2" BSP | 27 | 14 |
| 3/4" BSP | 32 | 14 |
| 1" BSP | 41 | 23 |
| 1 1/4" BSP | 51 | 23 |
| 1 1/2" BSP | 60 | 23 |
| 2" BSP | 70 | 23 |

Flanged



(ISO1092-1)

| PN 16 | D (mm) | D1 (mm) | b (mm) |
|-------|--------|---------|--------|
| DN25 | 165 | 85 | 16 |
| DN50 | 165 | 115 | 18 |

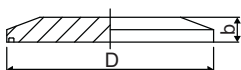
(ISO1092-1)

| PN 40 | D (mm) | D1 (mm) | b (mm) |
|-------|--------|---------|--------|
| DN25 | 115 | 85 | 18 |
| DN32 | 140 | 100 | 20 |
| DN50 | 165 | 125 | 20 |
| DN80 | 200 | 160 | 20 |
| DN100 | 235 | 190 | 24 |

(ANSI B16.5)

| PN 40 | D (mm) | D1 (mm) | b (mm) |
|-------|--------|---------|--------|
| DN50 | 152,4 | 121 | 19 |
| DN80 | 190,5 | 152,4 | 23,8 |
| DN100 | 228,6 | 157,2 | 23,8 |

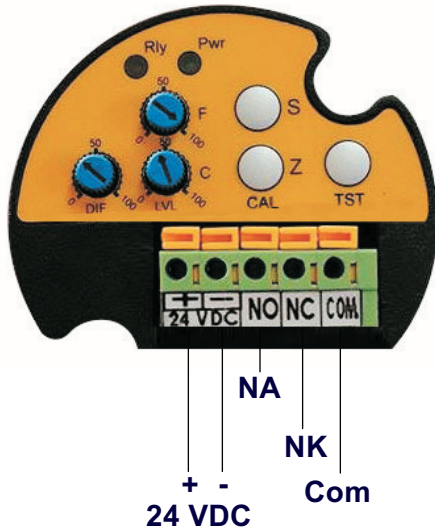
Clamp



(ISO2852)

| Dimension | Çap D (mm) | b (mm) |
|-----------|---------------|-----------|
| DN32 | 50,5 | 32 |
| DN50 | 64 | 50 |
| DN65 | 91 | 65 |

Electrical Connection :



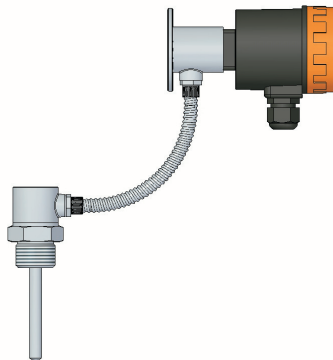
Indification and Calibtarion :

- * **RlyLED:** “Relay active” during normal operation; means operation continues during calibration. Flashes continuously in normal operation mode –if relay is active– and blinks in calibration mode. It is red colored.
- * **PwrLED:** Means there is no sensor failure during normal operation, and means “desired measurement values are saved in memory” during calibration. Operates by flashing. If light is continuous, it indicates failure. It is gren colored.
- * **CAL - S Button:** Used to acquire “High Level-span-“value during calibration.
- * **CAL - Z Button:** Used to acquire “Low Level-zero-“value during calibration.
- * **TST Button:** During normal operation, functions as “Relay Test”; during calibration, performs “saving to nonvolatile memory” of Zero-Span, the values previously acquired by S and Z button, function.
- * **LVL - C Pot:** Adjusts relay triggering point between Zero-Span values.
- * **LVL - F Pot:** Performs as “fine tuning” for triggering point. Adjustment field is equal to +/- 5% of the point adjusted by “C Pot” (total 10%).
- * **DIF Pot:** Adjusts “Release” level of the relay activated by “C/F Pot”. Highest adjustable value is equal to half (50%) of the operation region specified by “Z and S”. Meaning that, when DIF Pot is at 100% and relay is pulled, the level to release it shall be reduced as half of the total scale.

Electronic Unit with Cable:

Electronic unit and sensor component can be separated by a cable protected against exterior conditions for easy calibration on site. Cable provides easy assembly for user by its property not affecting capacitive measurement.

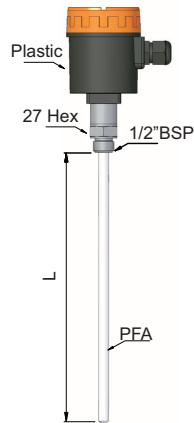
Sample Model:



Sample
Models:

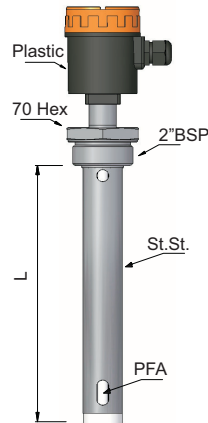
CONDUCTIVE LIQUIDS

ECAS 101
Fully Insulated Probe
Conductive Tank



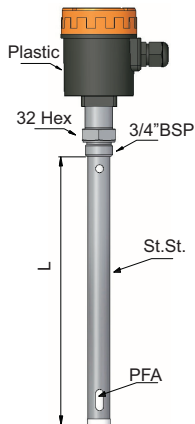
L=250mm.(Std) Max. 4 m.
(-1...+100 bar
(-40...+150°C

ECAS 102
Fully Insulated Coaxial Probe
Insulated Tank



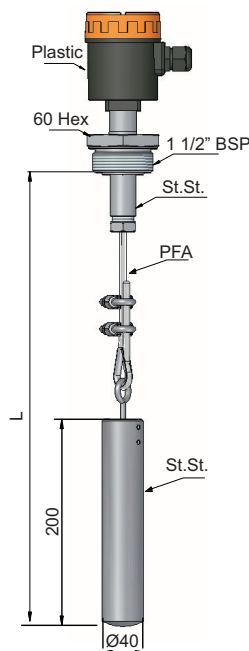
L=250mm.(Std) Max. 4 m.
(-1...+100 bar
(-40...+150°C

ECAS 103
Fully Insulated Coaxial Probe
Insulated Tank



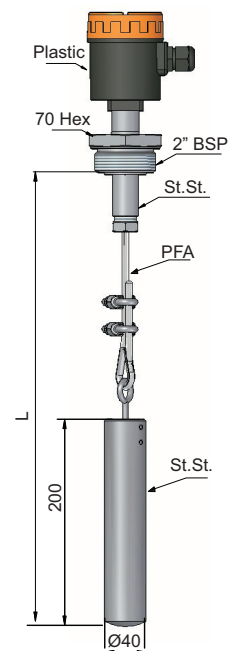
L=250mm.(Std) Max. 1 m.
(-1...+100 bar
(-40...+150°C

ECAS 107
Fully Insulated Rope
Conductive Tank



L=1m.(Std) Max. 16 m.
(-1...+60 bar
(-40...+150°C

ECAS 107
Fully Insulated Rope
Conductive Tank

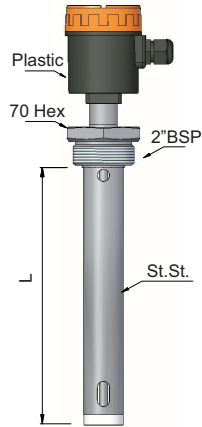


L=1m.(Std) Max. 32 m.
(-1...+60 bar
(-40...+150°C

LOW CONDUCTIVE LIQUIDS

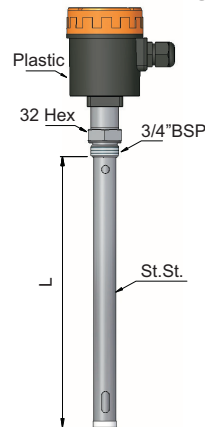
Sample Models:

ECAS 202
Partly Insulated Coaxial Probe
Conductive / Insulating Tank



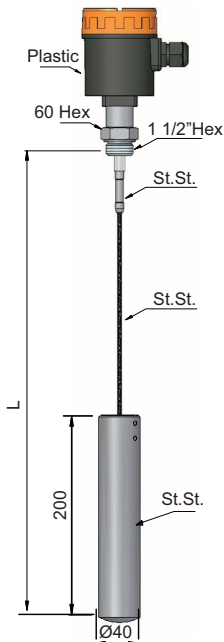
L=250mm.(Std) Max. 4 m.
(-)1...+100 bar
(-)40...+150°C

ECAS 203
Partly Insulated Coaxial Probe
Conductive / Insulating Tank



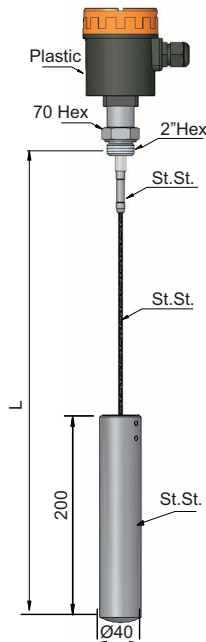
L=250mm.(Std) Max. 1 m.
(-)1...+100 bar
(-)40...+150°C

ECAS 204
Partly Insulated Rope
Conductive Tank



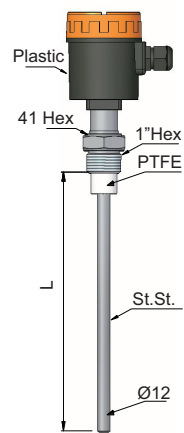
L=1m.(Std) Max. 16 m.
(-)1...+60 bar
(-)40...+150°C

ECAS 204
Partly Insulated Rope
Conductive Tank



L=1m.(Std) Max. 32 m.
(-)1...+60 bar
(-)40...+150°C

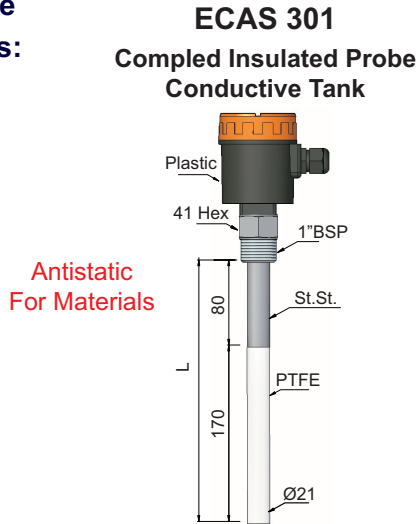
ECAS 205
Partly Insulated Probe
Conductive Tank



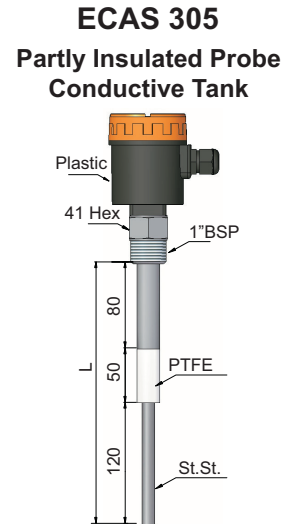
L=250mm.(Std) Max. 6 m.
(-)1...+60 bar
(-)40...+150°C

SOLID PARTICLE LIQUIDS

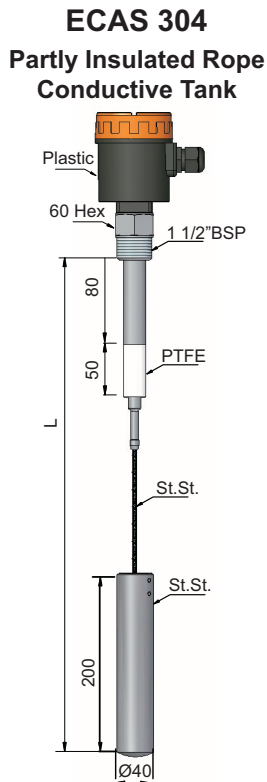
Sample Models:



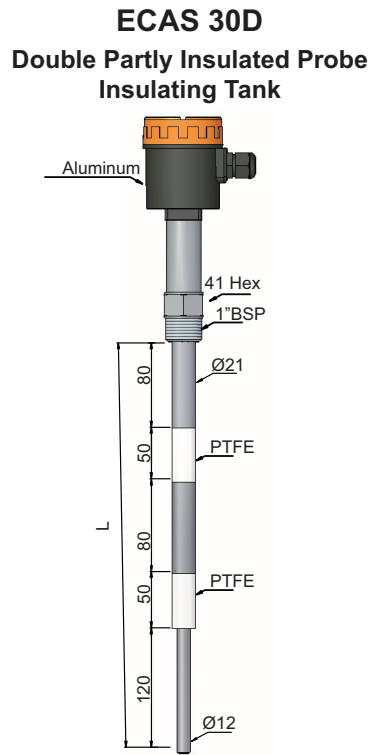
L=250mm.(Std) Max. 1 m.
(-)1...+25 bar
(-)40...+150°C



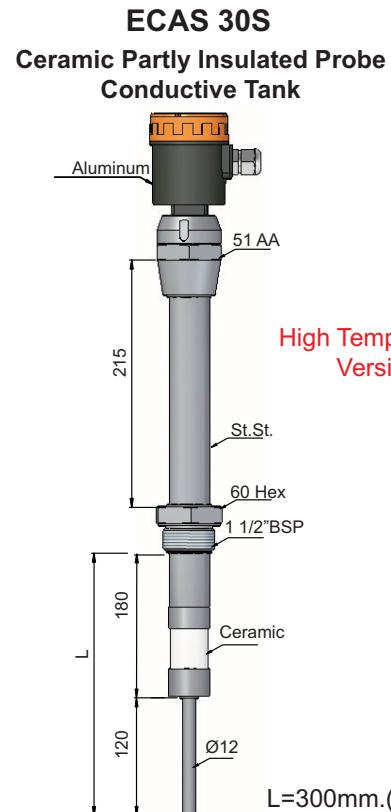
L=250mm.(Std) Max. 6 m.
(-)1...+25 bar
(-)40...+150°C



L=1000mm.(Std) Max. 16 m.
(-)1...+25 bar
(-)40...+150°C



L=380mm.(Std) Max. 1 m.
(-)1...+25 bar
(-)40...+200°C



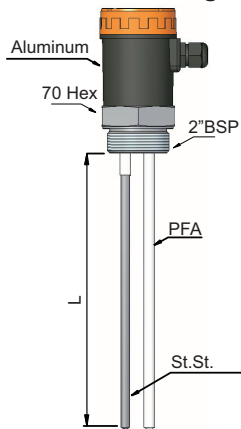
L=300mm.(Std) Max. 4 m.
(-)1...+25 bar
(-)40...+400°C

ADHESIVE AND ACID / BASIC LIQUIDS

Sample Models:

ECAS 408A

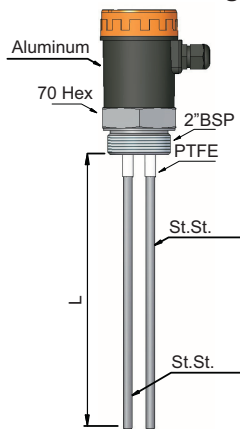
Double Probe (Single Fully Insulated)
Conductive / Insulating Tank



L=250mm.(Std) Max. 4 m.
(-)1...+100 bar
(-)40...+150°C

ECAS 408B

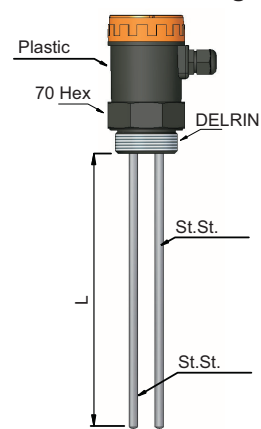
Double Partly Insulated Probe
Conductive / Insulating Tank



L=250mm.(Std) Max. 6 m.
(-)1...+60 bar
(-)40...+150°C

ECAS 408B

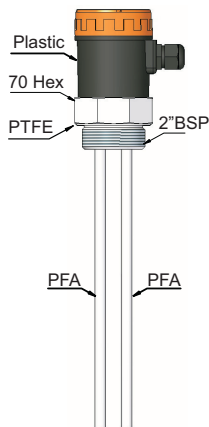
Double Partly Insulated Probe
Conductive / Insulating Tank



L=250mm.(Std) Max. 6 m.
(-)1...+25 bar
(-)20...+80°C

ECAS 408T

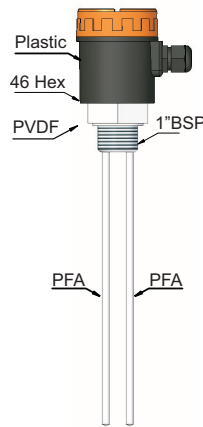
Double Partly Insulated Probe
Conductive / Insulating Tank



L=250mm.(Std) Max. 1 m.
(-)1...+60 bar
(-)40...+150°C

ECAS 408Tm

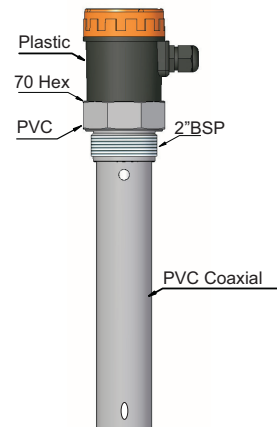
Double Partly Insulated Probe
Conductive / Insulating Tank



L=250mm.(Std) Max. 1 m.
(-)1...+60 bar
(-)40...+150°C

ECAS 408Tp

Double Partly Insulated
PVC Coaxial Probe
Conductive / Insulating Tank



L=250mm.(Std) Max. 1 m.
(-)1...+6 bar
0...+60°C

1 MODEL ECAS

| | |
|-------------------------------|---------------------------------------|
| Conductive Liquids.....1 | Solids Particulate Materials.....3 |
| Low Conductive Liquids2 | Adhesive and Acid/Basic Liquids.....4 |

2 CERTIFICATE

| |
|----------|
| No.....0 |
|----------|

3 PROBE TYPE (MAX. LENGHT)

| | |
|--|---|
| Single Probe - Insulated (Max 4m) 1 | Double Probe - Single Fully Insulated (Max 4m) 8A |
| Single Probe - Coaxial (max 4 m) Ø38 2 | Double Probe - Without Partly Insulated (Max 6 m) 8B |
| Single Probe - Thin Coaxial (max 1 m), Ø21 ... 3 | Double Probe - Double Insulated (Max 4m) 8T |
| Rope - Partly Insulated (Max 32 m).....4 | Double Probe - Double Fully Insulated, PVC Coaxial (Max 4m) ... 8Tp |
| Single Probe - Partly Insulated (Max 6 m) ... 5 | Double Probe - Double Fully Insulated (Max 1 m) 8Tm |
| Single Probe - High Temperature (Max 4m) ... 6 | Ceramic Partly Insulated Probe (Max 4 m) S |
| Rope - Fully Insulated (0 ... 32mt) 7 | Double Fully Insulated Probe (Max 4 m) D |
| | Special x |

4 STEM LENGHT

| |
|-------------|
| ...mm.....0 |
|-------------|

5 PROCESS TEMPERATURE

| | |
|-------------------------------------|-------------------------------------|
| 150°C Standard0 | (-)196°C For Cryogenic Tank2 |
| 200°C with Cooling Apparatus1 | 230°C with Peek Insulated3 |
| | 400°C with Ceramic Insulated4 |

6 CONNECTION

| <u>Thread (ISO 228-1)</u> | <u>Clamp (ISO 2852)</u> | <u>ISO Flange (1092-1)</u> | <u>ASA Flange (B16.5)</u> | <u>Special Flange</u> |
|---------------------------|-------------------------|----------------------------|---------------------------|-----------------------|
| 1/2" BSP.....04 | DN25 - PN16 ... 21 | DN25 - PN40 ... 26 | DN50 - 150lb ... 41 | Ø70 Flanged....71 |
| 3/4" BSP.....05 | DN50 - PN16 ... 23 | DN32 - PN40 ... 27 | DN80 - 150lb ... 43 | Special.....x |
| 1" BSP.....06 | | DN50 - PN40 ... 28 | DN100 - 150lb ... 44 | |
| 1 1/2" BSP08 | | DN80 - PN40 ... 29 | | |
| 2" BSP.....09 | | DN100 - PN16 ... 30 | | |
| 1/2" NPT.....12 | | | | |
| 3/4" NPT.....13 | | | | |

7 OUTPUT

| | |
|---------------------|---------------|
| Relay Output.....11 | Special.....x |
|---------------------|---------------|

8 HOUSING MATERIAL

| | |
|------------------------|----------------------------|
| Plastic (PBT).....B10p | Stainless SteelB101x |
| Aluminium.....B10x | Special.....x |

9 INSULATION MATERIAL

| | |
|------------------|---------------|
| PTFE.....10 | PBT.....14 |
| PEEK.....11 | PFA.....17 |
| Ceramic.....12 | Rubber.....18 |
| Polyamide.....13 | FKM.....19 |
| | Special.....x |

10 CONNECTION MATERIAL

| | |
|-----------------------------|----------------------|
| 316 Stainless Steel02 | PBT.....14 |
| Brass.....03 | PVDF.....15 |
| Delrin.....09 | Polypropylene.....16 |
| PTFE.....10 | PVC.....17 |
| | Special.....x |

11 OPTIONAL

| | |
|------------|-----------------------------------|
| No...../ 0 | Seperable Electronic Unit...../ S |
| | Wall Apparatus...../ W |

SAMPLE

ECAS - 101 - 300mm- 0 - 3 - 06 - 11 - B10x - 11 - 02 / 0 For Cond. Liquid,, L=300mm, 1" BSP, Relay Output, Aluminium Housing