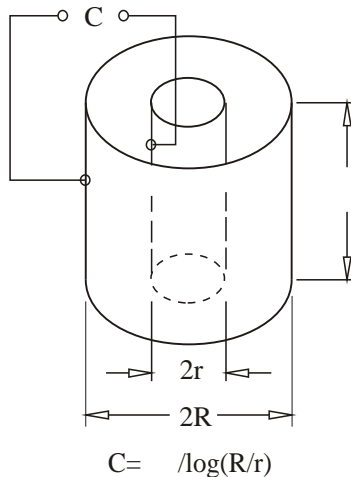


PRINCIPLE

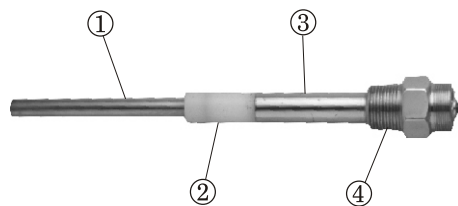
The Capacitance Level Sensor measuring principle is based on the "capacitance effects", when this level sensor is set on a silo, it will be formed a condenser between the detector electrode and the silo wall.

The capacitance of this condenser varies proportional to the change of material specific inductivity (DK value) of the material stored in the silo, when the more material substances increased in the silo, the more capacitance value added simultaneously, then it will let his interior circuit's resonant signal to create a bigger amplitude, and such a signal amplitude become more or less than factory default threshold value, the relay device will be energized.

when the sensor probe is not covered, the dielectric constant =1 (air environment is usually =1), when the detected probe is covered by substance material, and the changes of its capacitance will be increased and detected, whereby the liquid or powdery level is detected.



CONSTRUCTION

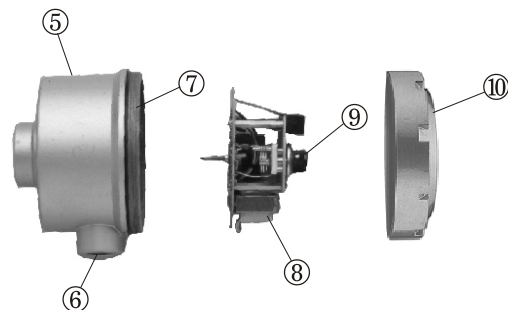


1. **Probe** : SUS304 or SUS316
2. **Insulation** : UPE or PTFE
3. **Grounding Sleeve** : SUS304 or SUS316
4. **Connection** : SUS304 or SUS316
1"PT (default) or 3/4"PT(option)

FEATURES AND APPLICATIONS

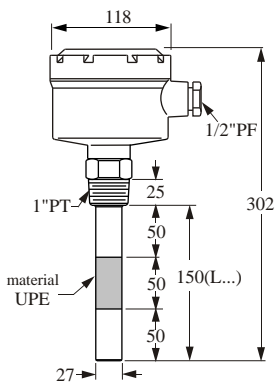
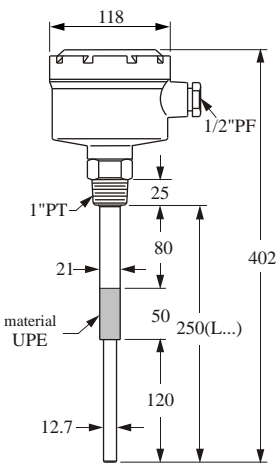
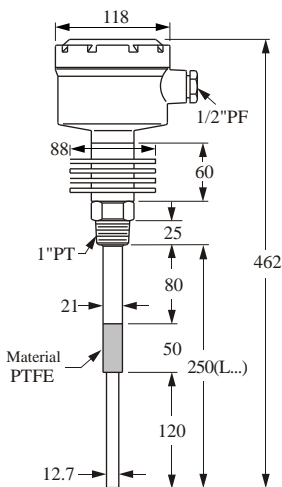
Because the Capacitance Level Switch has no moving parts inside the device, it will not be affected by friction. It is suitable for powder or liquid application easy to install. The customer can choose the types for his requirements.

1. **Standard Type (SA110 & SA111 A/B/C)**
Suitable for general use.
2. **Hi-Temp Type (SA120 & SA128 A/B/C)**
Suitable for high temperature environment.
3. **Anti-Corrosion Type (SA130 & SA132 A/B/C)**
Suitable for corrosive environment.
4. **Remote Probe Type (SA140 A/B/C)**
For use with vibrator equipped with tank.
5. **Wire-Probe Type (SA150 A/B/C)**
Suitable for silo or deeper tank.
6. **Plate-Probe Type (SA160 A/B/C)**
Suitable for granules and at lower position of tank side.
7. **Explosion-Proof Type (SA270 ~ SA279)**
Ex dia IIC T4~T6, DIP A21 TA, T3~T6
8. **Explosion-Proof Type (SA370 ~ SA378)**
Ex ia IIC T3~T6
Equipped with SA-75U signal conditioner can be used in hazardous areas.
9. **Anti-Static Type (SA180 & SA181 A/B/C)**
Suitable for electrostatic environment
(It won't be damaged by the electrostatic discharge)



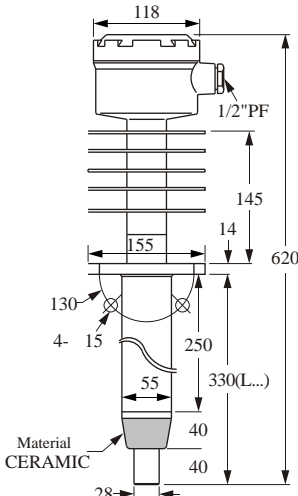
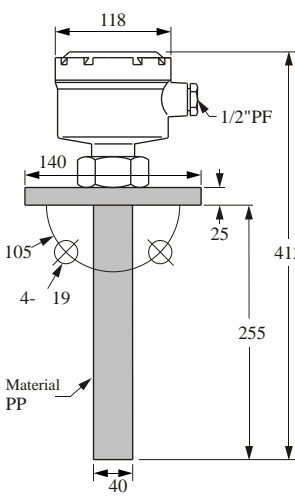
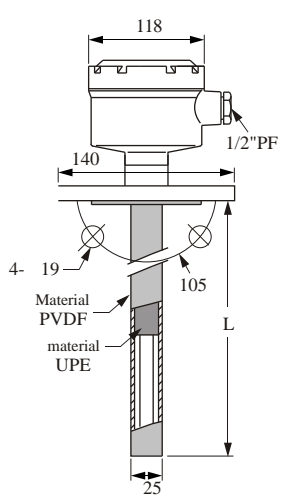
5. **Housing** : ADC-12 Aluminum IP65
6. **Conduit opening** : 1/2"PF or 3/4"PF
7. **O-RING** : NBR
8. **PC board** : A, B, C, D Type
9. **Sensitivity adjustment** : 10pf (std.), 20pf, 40pf
10. **Cover** : ADC-12 Aluminum

STANDARD TYPE

| | | | |
|--------------------|---|--|---|
| Dimension |  |  |  |
| Order No. | [STANDARD TYPE] SA110 A/B/C | [STANDARD TYPE] SA111A/B/C | [HI-TEMP. TYPE] SA120 A/B/C |
| Ambient Temp. | -20 C~60 C | -20 C~60 C | -20 C~60 C |
| Operating Temp. | -20 C~80 C | -20 C~80 C | -20 C~200 C |
| Operation Pressure | 20kg/cm ² | 20kg/cm ² | 20kg/cm ² |
| Probe Material | SUS 304/316 | SUS 304/316 | SUS 304/316 |
| Insulated Material | UPE | UPE | PTFE |
| Connection | 1"PT Screw (SUS) | 1"PT Screw (SUS) | 1"PT Screw (SUS) |
| Sensitivity Range | 10pf (std.) 20pf, 40pf (option) | 10pf (std.) 20pf, 40pf (option) | 10pf (std.) 20pf, 40pf (option) |
| Weight | Approx. 1.9kg | Approx. 1.9kg | Approx. 2.4kg |
| Housing Spec. | Aluminum IP65 | | |
| Supply Voltage | 110/220Vac 10% or 16~24Vdc | | |
| Delay Time | 0~6 sec | | |
| Power Consumption | 2W | | |
| Output Rating | Relay: 5A/250Vac or 5A/30Vdc,NPN 100mA | | |

If length of sensing probes is longer than 3 meters, please choose 20pf or 40pf sensitivity type.

STANDARD TYPE

| | | | |
|---------------------------|---|--|---|
| Dimension |  |  |  |
| Order No. | [SUPER HI-TEMP. TYPE] SA128 A/B/C | [CORROSION-PROOF TYPE] SA130 A/B/C | [CORROSION-PROOF TYPE] SA132 A/B/C |
| Ambient Temp. | -20 C~60 C | -20 C~60 C | -20 C~60 C |
| Operating Temp. | -20 C~800 C | -20 C~80 C | -20 C~120 C |
| Operation Pressure | ATM | 20kg/cm ² | 20kg/cm ² |
| Probe Material | SUS 304/316 | SUS 304 Coating PP | SUS304 Coating PVDF |
| Insulated Material | CERAMIC | UPE | UPE |
| Connection | 2-1/2"x5kg/cm ² Flange(SUS) | 1-1/2"x10kg/cm ² Flange(PP) | 1-1/2"x10kg/cm ² Flange(SUS) (5mm PVDF) |
| Sensitivity Range | 10pf (std.) 20pf, 40pf (option) | 10pf (std.) 20pf, 40pf (option) | 10pf (std.) 20pf, 40pf (option) |
| Weight | Approx. 6.5kg | Approx. 2kg | _____ |
| Housing Spec. | Aluminum IP65 | | |
| Supply Voltage | 110/220Vac 10% or 16~24Vdc | | |
| Delay Time | 0~6 sec | | |
| Power Consumption | 2W | | |
| Output Rating | Relay: 5A/250Vac or 5A/30Vdc, NPN 100mA | | |

If length of sensing probes is longer than 3 meters, please choose 20pf or 40pf sensitivity type.

STANDARD TYPE

| | | | |
|--------------------|---|------------------------------------|--|
| Dimension | | | |
| Order No. | [REMOTE PROBE TYPE] SA140 A/B/C | [WIRE-PROBE TYPE] SA150 A/B/C | [PLATE TYPE] SA160 A/B/C |
| Ambient Temp. | -20 C~60 C | -20 C~60 C | -20 C~60 C |
| Operating Temp. | -20 C~80 C | -20 C~80 C | -20 C~200 C |
| Operation Pressure | 20kg/cm ² | 20kg/cm ² | 20kg/cm ² |
| Probe Material | SUS 304/316 | SUS 304/316 cable | SUS 304/316 |
| Insulated Material | UPE | UPE | UPE |
| Connection | 1"PT Screw (SUS) | 1"PT Screw (SUS) | 2-1/2"x 5kg/cm ² Flange (SUS) |
| Sensitivity Range | 10pf (std.) | 10pf (std.) 20pf, 40pf (option) | 10pf (std.) 20pf, 40pf (option) |
| Weight | Approx. 3kg | Approx. 4.1kg | Approx. 3.2kg |
| Housing Spec. | Aluminum IP65 | | |
| Supply Voltage | 110/220Vac 10% or 16~24Vdc | | |
| Delay Time | 0~6 sec | | |
| Power Consumption | 2W | | |
| Output Rating | Relay: 5A/250Vac or 5A/30Vdc, NPN 100mA | | |

If length of sensing probes is longer than 3 meters, please choose 20pf or 40pf sensitivity type.

STANDARD TYPE

| | | |
|--------------------|---|---|
| Dimension | | |
| | | |
| Order No. | [ANTI-STATIC TYPE] SA180 A/B/C | [HI-TEMP ANTI-STATIC TYPE] SA181 A/B/C |
| Ambient Temp. | -20 C~60 C | -20 C~60 C |
| Operating Temp. | -20 C~80 C | -20 C~80 C |
| Operation Pressure | 20kg/cm ² | 20kg/cm ² |
| Probe Material | UPE Coating | PTFE Coating |
| Insulated Material | UPE | PTFE |
| Connection | 1"PT Screw (SUS) | 1"PT Screw (SUS) |
| Sensitivity Range | 10pf (std.) 20pf (option) | 10pf (std.) 20pf (option) |
| Weight | Approx. 2kg | Approx. 2.5kg |
| Housing Spec. | Aluminum IP65 | |
| Supply Voltage | 110/220Vac 10% or 16~24Vdc | |
| Delay Time | 0~6 sec | |
| Power Consumption | 2W | |
| Output Rating | Relay: 5A/250Vac or 5A/30Vdc, NPN 100mA | |

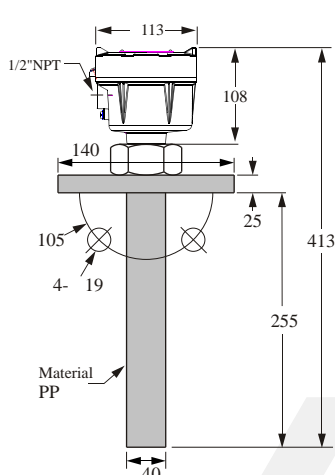
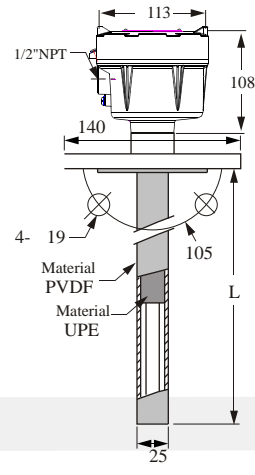
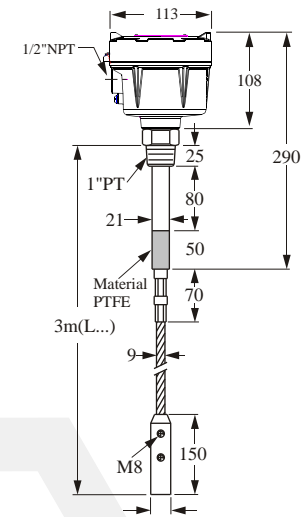
If length of sensing probes is longer than 3 meters, please choose 20pf or 40pf sensitivity type.

EXPLOSION PROOF TYPE

| | | | |
|----------------------|---|------------------------------------|------------------------------------|
| Dimension | | | |
| Order No. | [STANDARD TYPE] SA270 | [STANDARD TYPE] SA271 | [HI-TEMP. TYPE] SA272 |
| Ambient Temp. | -20 C~60 C | -20 C~60 C | -20 C~60 C |
| Operating Temp. | -20 C~80 C | -20 C~80 C | -20 C~200 C |
| Operation Pressure | 20kg/cm ² | 20kg/cm ² | 20kg/cm ² |
| Probe Material | SUS 304/316 | SUS 304/316 | SUS 304/316 |
| Insulated Material | PTFE or UPE | UPE | PTFE |
| Connection | 1"PT Screw (SUS) | 1"PT Screw (SUS) | 1"PT Screw (SUS) |
| Sensitivity Range | 10pf (std.) 20pf, 40pf (option) | 10pf (std.) 20pf, 40pf (option) | 10pf (std.) 20pf, 40pf (option) |
| Weight | Approx. 1.9kg | Approx. 2.4kg | Approx. 4.1kg |
| Housing Spec. | Aluminum IP65 | | |
| Supply Voltage | 110/220Vac 10% or 16~24Vdc | | |
| Enclosure Protection | Ex dia II C T4~T6, DIP A21 T _A , T3~T6 | | |
| Power Consumption | 2W | | |
| Output Rating | Relay: 5A/250Vac or 5A/30Vdc,NPN 100mA | | |

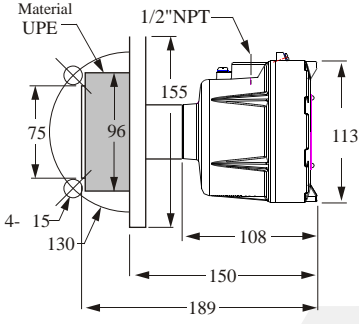
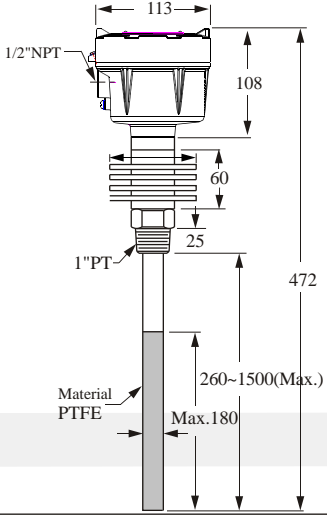
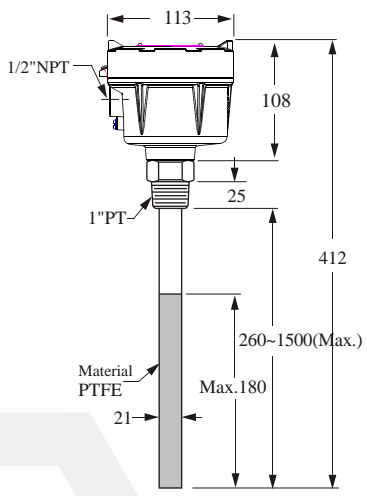
If length of sensing probes is longer than 3 meters, please choose 20pf or 40pf sensitivity type.

EXPLOSION PROOF TYPE

| | | | |
|-----------------------------|---|---|---|
| Dimension |  |  |  |
| Order No. | [CORROSION-PROOF TYPE] SA273 | [CORROSION-PROOF TYPE] SA274 | [WIRE-PROBE TYPE] SA275 |
| Ambient Temp. | -20 C~60 C | -20 C~60 C | -20 C~60 C |
| Operating Temp. | -20 C~80 C | -20 C~120 C | -20 C~80 C |
| Operation Pressure | ATM | 20kg/cm ² | 20kg/cm ² |
| Probe Material | SUS 304/316(PP Coating) | SUS 304/316 | SUS 304/316 Cable |
| Insulated Material | PTFE or UPE | PTFE | PTFE |
| Connection | 1-1/2"x10kg/cm ² (PP) | 1-1/2"x10kg/cm ² (SUS) | 1"PT Screw (SUS) |
| Sensitivity Range | 10pf (std.) 20pf, 40pf (option) | 10pf (std.) 20pf, 40pf (option) | 10pf (std.) 20pf, 40pf (option) |
| Weight | Approx. 1.9kg | _____ | Approx. 4.1kg |
| Housing Spec. | Aluminum IP65 | | |
| Supply Voltage | 110/220Vac 10% or 16~24Vdc | | |
| Enclosure Protection | Ex dia II C T4~T6, DIP A21 T _A , T3~T6 | | |
| Power Consumption | 2W | | |
| Output Rating | Relay: 5A/250Vac or 5A/30Vdc, NPN 100mA | | |

If length of sensing probes is longer than 3 meters, please choose 20pf or 40pf sensitivity type.

EXPLOSION PROOF TYPE

| | | | |
|-----------------------------|---|--|---|
| Dimension |  |  |  |
| Order No. | [PLATE TYPE] SA276 | [HI-TEMP ANTI-STATIC TYPE] SA277 | [ANTI-STATIC TYPE] SA278 |
| Ambient Temp. | -20 C~60 C | -20 C~60 C | -20 C~60 C |
| Operating Temp. | -20 C~80 C | -20 C~200 C | -20 C~80 C |
| Operation Pressure | 20kg/cm ² | 20kg/cm ² | 20kg/cm ² |
| Probe Material | SUS 304/316 | PTFE or UPE Coating | PTFE or UPE Coating |
| Insulated Material | PTFE or UPE | PTFE or UPE | PTFE or UPE |
| Connection | 2-1/2"x 5kg/cm ² Flange (SUS) | 1"PT Screw (SUS) | 1"PT Screw (SUS) |
| Sensitivity Range | 10pf (std.) 20pf, 40pf (option) | 10pf (std.) 20pf, 40pf (option) | 10pf (std.) 20pf (option) |
| Weight | Approx. 3.2kg | Approx. 3.1kg | Approx. 2kg |
| Housing Spec. | Aluminum IP65 | | |
| Supply Voltage | 110/220Vac 10% or 16~24Vdc | | |
| Enclosure Protection | Ex dia II C T4~T6, DIP A21 T _A , T3~T6 | | |
| Power Consumption | 2W | | |
| Output Rating | Relay: 5A/250Vac or 5A/30Vdc, NPN 100mA | | |

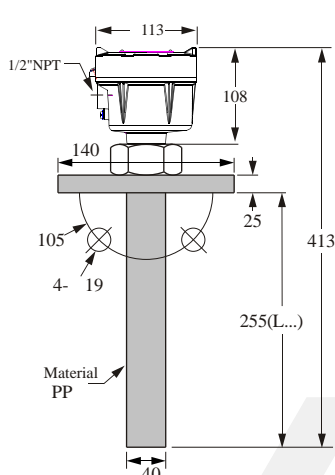
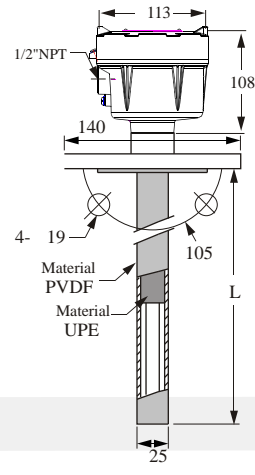
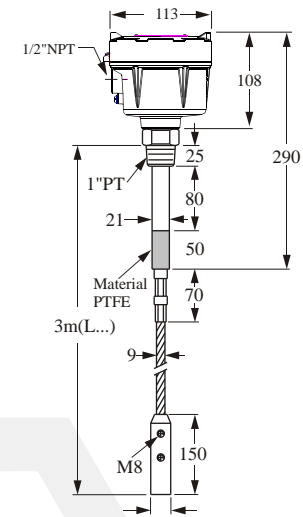
If length of sensing probes is longer than 3 meters, please choose 20pf or 40pf sensitivity type.

INTRINSICALLY SAFE EXPLOSION PROOF TYPE

| | | | |
|-----------------------------|--|--|--|
| Dimension | | | |
| Order No. | [STANDARD TYPE] SA370 (WITH SA-75U) | [STANDARD TYPE] SA371 (WITH SA-75U) | [HI-TEMP. TYPE] SA372 (WITH SA-75U) |
| Ambient Temp. | -20 C~60 C | -20 C~60 C | -20 C~60 C |
| Operating Temp. | -20 C~80 C | -20 C~80 C | -20 C~200 C |
| Operation Pressure | 20kg/cm ² | 20kg/cm ² | 20kg/cm ² |
| Probe Material | SUS 304/316 | SUS 304/316 | SUS 304/316 |
| Insulated Material | PTFE or UPE | PTFE | PTFE |
| Connection | 1"PT Screw (SUS) | 1"PT Screw (SUS) | 1"PT Screw (SUS) |
| Sensitivity Range | 10pf (std.) 20pf, 40pf (option) | 10pf (std.) 20pf, 40pf (option) | 10pf (std.) 20pf, 40pf (option) |
| Weight | Approx. 1.9kg | Approx. 2.4kg | Approx. 2.4kg |
| Housing Spec. | Aluminum IP65 | | |
| Supply Voltage | 16~24Vdc | | |
| Enclosure Protection | Ex ia IIC T3~T6 | | |
| Power Consumption | 2W | | |
| Output Rating | NPN 100mA | | |

If length of sensing probes is longer than 3 meters, please choose 20pf or 40pf sensitivity type.

INTRINSICALLY SAFE EXPLOSION PROOF TYPE

| | | | |
|---------------------------|---|---|---|
| Dimension |  |  |  |
| Order No. | [CORROSION-PROOF TYPE] SA373 (WITH SA-75U) | [CORROSION-PROOF TYPE] SA374 (WITH SA-75U) | [WIRE-PROBE TYPE] SA375 (WITH SA-75U) |
| Ambient Temp. | -20 C~60 C | -20 C~60 C | -20 C~60 C |
| Operating Temp. | -20 C~80 C | -20 C~120 C | -20 C~80 C |
| Operation Pressure | ATM | 20kg/cm ² | 20kg/cm ² |
| Probe Material | SUS 304/316(PP Coating) | SUS 304/316 | SUS 304/316 Cable |
| Insulated Material | PTFE or UPE | PTFE | PTFE |
| Connection | 1-1/2"x10kg/cm ² (PP) | 1-1/2"x10kg/cm ² (SUS) | 1"PT Screw (SUS) |
| Sensitivity Range | 10pf (std.) 20pf, 40pf (option) | 10pf (std.) 20pf, 40pf (option) | 10pf (std.) 20pf, 40pf (option) |
| Weight | Approx. 1.9kg | _____ | Approx. 4.1kg |
| Housing Spec. | Aluminum IP65 | | |
| Supply Voltage | 16~24Vdc | | |
| Delay Time | Ex ia IIC T3~T6 | | |
| Power Consumption | 2W | | |
| Output Rating | NPN 100mA | | |

If length of sensing probes is longer than 3 meters, please choose 20pf or 40pf sensitivity type.

INTRINSICALLY SAFE EXPLOSION PROOF TYPE

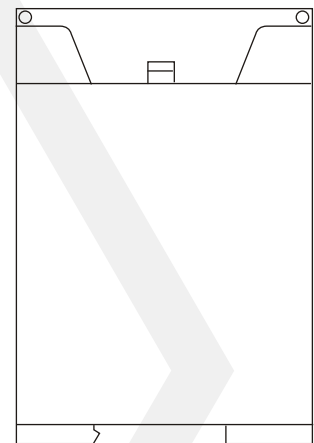
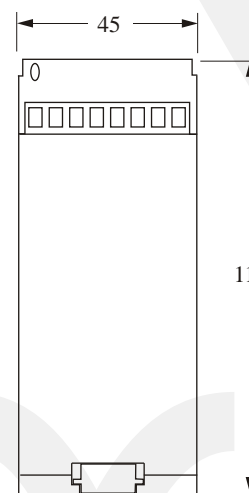
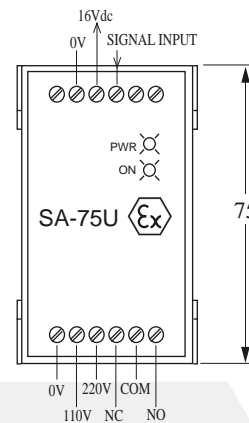
| | | | |
|---------------------------|---|---|---|
| Dimension | | | |
| Order No. | [PLATE TYPE] SA376 (WITH SA-75U) | [HI-TEMP ANTI-STATIC TYPE] SA377 (WITH SA-75U) | [ANTI-STATIC TYPE] SA378 (WITH SA-75U) |
| Ambient Temp. | -20 C~60 C | -20 C~60 C | -20 C~60 C |
| Operating Temp. | -20 C~80 C | -20 C~200 C | -20 C~80 C |
| Operation Pressure | 20kg/cm ² | 20kg/cm ² | 20kg/cm ² |
| Probe Material | SUS 304/316 | PTFE or UPE Coating | PTFE or UPE Coating |
| Insulated Material | PTFE or UPE | PTFE or UPE | PTFE or UPE |
| Connection | 2-1/2"x 5kg/cm ² Flange (SUS) | 1"PT Screw (SUS) | 1"PT Screw (SUS) |
| Sensitivity Range | 10pf (std.) 20pf, 40pf (option) | 10pf (std.) 20pf, 40pf (option) | 10pf (std.) 20pf (option) |
| Weight | Approx. 3.2kg | Approx. 3.1kg | Approx. 2kg |
| Housing Spec. | Aluminum IP65 | | |
| Supply Voltage | 16~24Vdc | | |
| Delay Time | Ex ia IIC T3~T6 | | |
| Power Consumption | 2W | | |
| Output Rating | NPN 100mA | | |

If length of sensing probes is longer than 3 meters, please choose 20pf or 40pf sensitivity type.

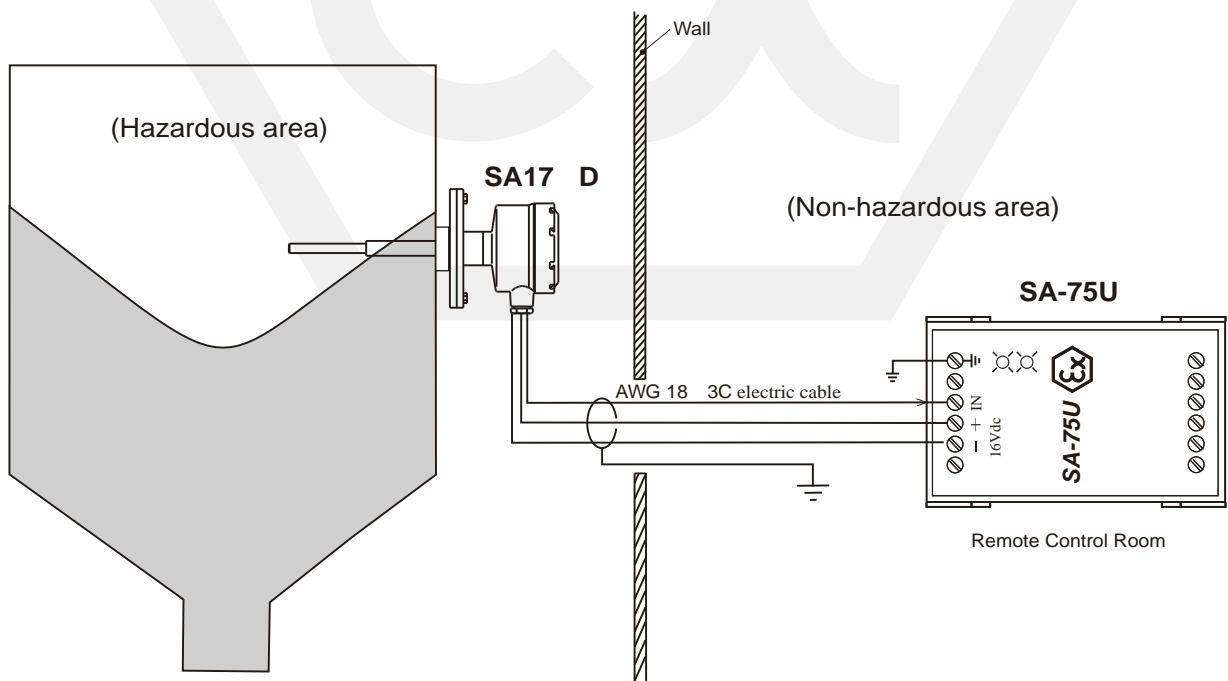
SA-75U INTRINSIC SAFE SIGNAL CONDITIONER

SA-75U Zener barriers inside provide intrinsic safety to SA17 D type level sensor. The unit works via a current-limiting feature which protects the device from damage by emission of sparks.

1. Supply voltage : 110 / 220Vac
2. Power consumption : 2W
3. Input signal : NPN transistor
resistance $R_i = 500$
4. Output voltage : 16~24 Vdc
5. Short circuit current : 25mA max.
6. Relay output : SPDT
10A /30Vdc
10A /220Vac
7. Operating temp. : -20 C ~ 60 C
8. Weight : 0.3 kg
9. Enclosure rating : Ex (ia) IIC T6



WIRING CONFIGURATION



ADJUSTMENT

COARSE CALIBRATION

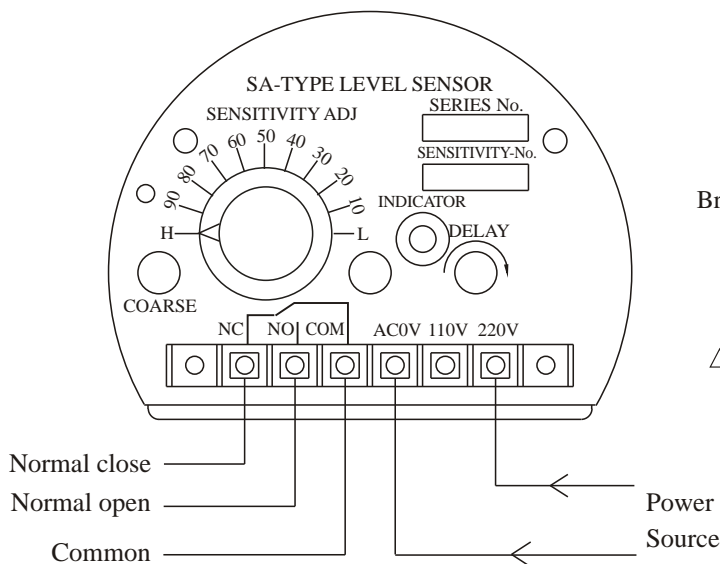
Set the "Sensitive ADJ. " to the "H" position. Then use a screw driver to adjust the "Coarse" until indicator is lighted. At last check "Indicator" is light or not by adjust the "Sensitivity Adj" knob, if not, repeat procedure.

SENSITIVITY ADJUSTMENT

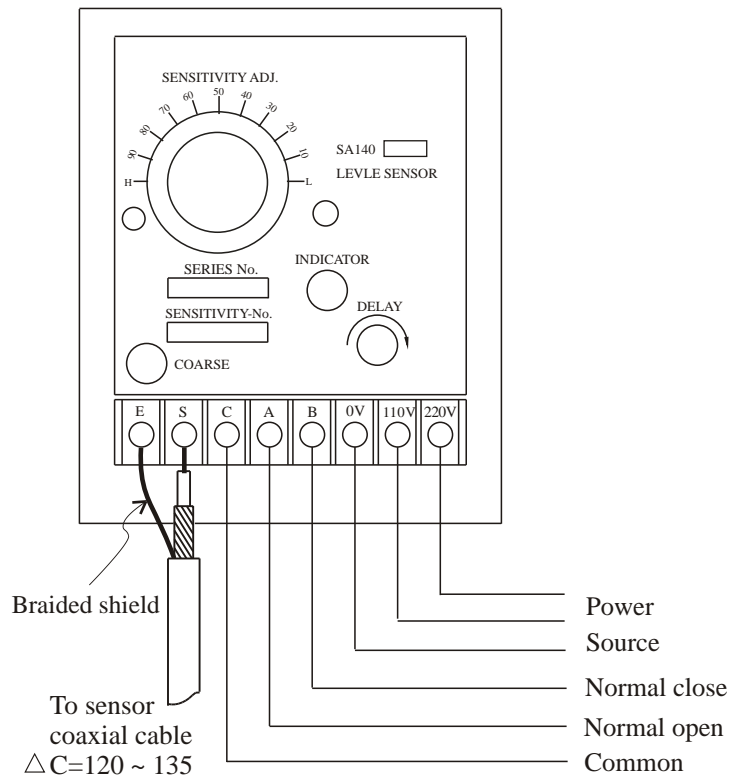
When the material is out of contact with probe will extinguish the "Indicator". When the material is in contact with probe will illuminated the "Indicator " lamp, at this time please adjust "Sensitivity ADJ." until lamp is in extinction. And then set "Sensitivity ADJ." in the middle between "H" and extinction position. e.g. If extinction position is 10p, you should set "Sensitivity ADJ." in "75" position.

DELAY FUNCTION CALIBRATION

The default setting is 0 second, here at the material is in contact with probe will illuminate "Indicator" lamp and energize relay. When the user need to use this delay function, please set timer in clockwise. The relay will energized after "Indicator" illuminate for several seconds if set timer more than 0 second. The delay function is suitable for variable material level. e.g. liquid tank equip with agitator.

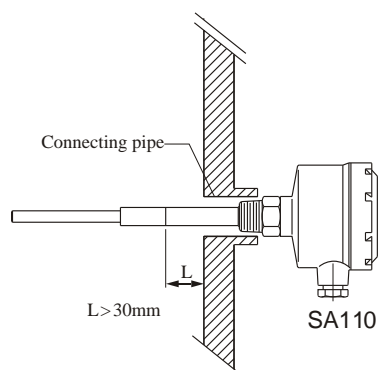


SA110, 120, 130, 150, 160, 17 , 180 A/B/C/D

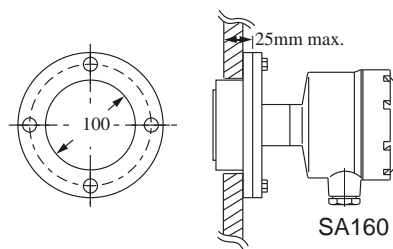


Remote Probe Type (SA140 A/B/C)

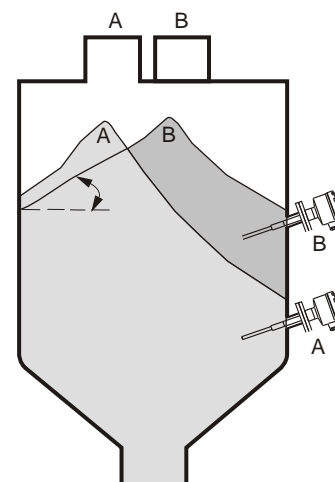
INSTALLATION NOTICE



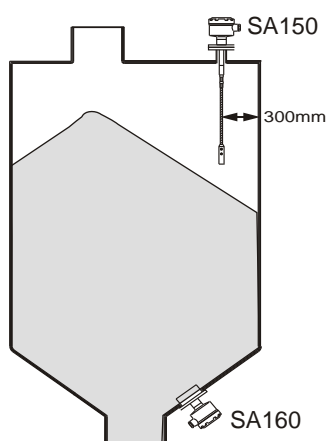
The insensible portion should be mounted to protrude 30mm from the vessel wall. That's to prevent malfunction from a fill material or an insufficient clearance between probe and connection pipe.



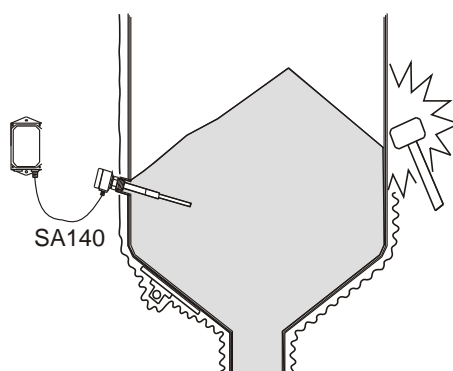
SA160 to be mounted properly, the vessel walls should not exceed 25mm.



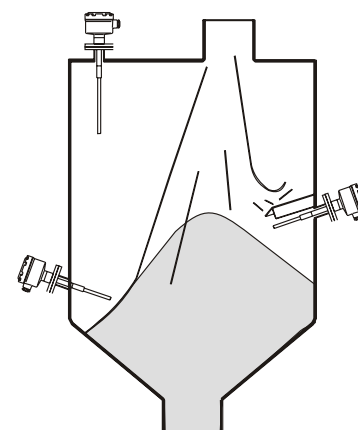
To prevent false readings, users have to make sure the material flows symmetrically. If the inlet is not located in the center portion of the tank roof, check the flow pattern (angle) of your material and place the probe in the appropriate location.



If the probe is mounted on the top, make sure the length of probe long enough to touch the highest level of raw material. SA150 type must have at least 300mm from the electrode probe to the silo wall. SA160 type is usually installed at the lower of tank side.

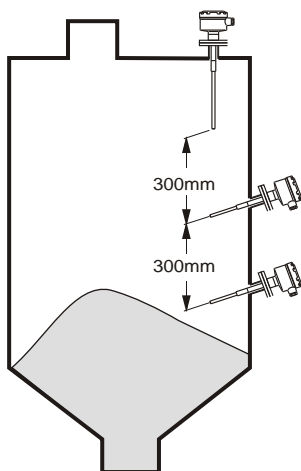


For Non-Stationary or vibrating environment, a separate control unit such as the SA140 is suggested.

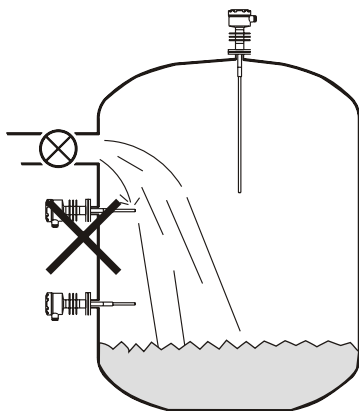


It is suggested to install the probe away from the inlet to reduce the risk of inflowing material damaging the probe. If the probe is near an inlet, it is recommended to place a protective cover 200mm above the probe. The cover should be parallel to the probe and the same length.

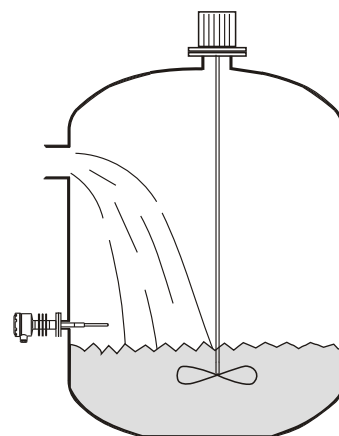
INSTALLATION NOTICE



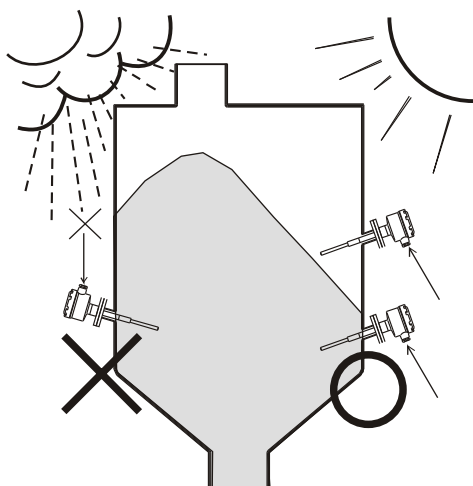
If two parallel probes are mounted, they must be installed separately at least 300 mm to minimize interference .



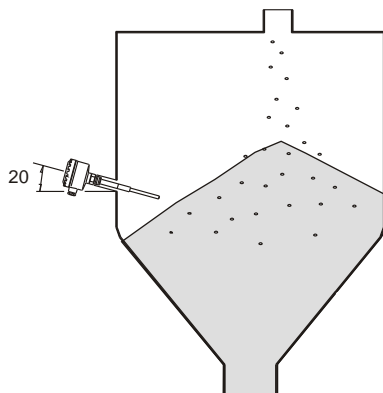
The probe should not be mounted underneath a liquid inlet, otherwise it will switch on erroneously.



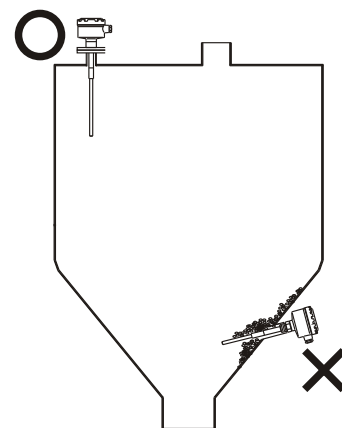
If the tank equips with agitator, please use the time-delay type (SA -A~D) to prevent fault level detection.



The cable inlet should face downward to avoid rain damage. Tighten the cable with the connecting part.



Mounting the probe at a 20 incline will optimize the results and increase sensitivity. It also won't be damaged by the inflowing material.



Mounting the probe at top of tank can avoid material bridges from forming. It's helpful to record accurate measurements.

ORDER INFORMATION

SA 1 1 0 A D Q 0 2 5 0

Model

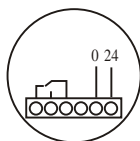
- 110 --- Standard Type
- 120 --- Hi-temp. Type
- 130 --- Corrosion Proof Type
- 140 --- Remote Probe Type
- 150 --- Wire Probe Type
- 160 --- Plate Type
- 180 --- Anti-Static Type
- 27 --- Explosion Proof Type
- 28 --- Explosion Proof Type

Terminal Arrangement

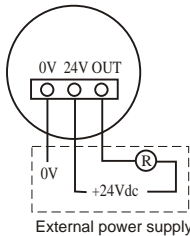
- A---110/220Vac, Relay output
- B---24Vdc, Relay output
- C---24Vdc, NPN transistor output
- D---Designed for use with SA-75U



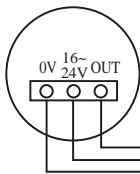
SA A
110V/220VAC
Relay output



SA B
DC24V
Relay output



SA C
DC24V
Transistor npn output



SA D
Ex (ia) IIC
Control unit output

SA-75U

RELAY OUTPUT: NO, COM, NC

AC SUPPLY: 220V, 110V, 0V

INPUT: 16VDC, 0V

Connection

- | | | |
|-----------------|--------------------------|-----------|
| C---3/4"(20A) | M---5kg/cm ² | W---PN 10 |
| D---1"(25A) | N---10kg/cm ² | X---PN 16 |
| E---1-1/2"(40A) | O---150 Lbs | Y---PN 25 |
| F---2"(50A) | P---300 Lbs | Z---PN 40 |
| G---2-1/2"(65A) | Q---PT | |
| H---3"(80A) | R---PF | |
| I---4"(100A) | T---BSP | |
| J---5"(125A) | U---NPT | |
| K---6"(150A) | V---GAS | |
| S---Others | S---Others | |

Probe Length (mm)

Tolerance of the total product length is 5mm.
 Characteristics, specifications and dimensions are subject to change without notice.
 Please contact your nearest distributor office for further informations.