

SERIES FERF 200 : THE CONSIDERATIONS

DESIGN CONSIDERATIONS

Radio Frequency (Rf) Principle based Level Sensors have been designed taking into consideration characteristics and behaviour of materials like Solids (in their granular form), Slurries and Liquids. Few important conditions are given below:

COATING

Most materials have a common tendency to accumulate and coat over anything in contact like walls or any other part that protrudes inside the vessel. That happens by natural phenomena and can not be avoided completely. The Level Sensor must be unaffected by coating and accumulation of material on the sensing element or on side walls.

RADIO FREQUENCY (RF)

RF ADMITTANCE / CAPACITANCE LEVEL SWITCH

TEMPERATURE

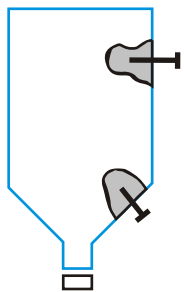
Materials in process may have high temperature. Therefore it is important that the Sensor must not contain any element sensitive to temperature.

SUSPENDED PARTICLES & MATERIAL IN TRANSIT

Empty portion of vessels have high density of suspended particles. Specially during filling, it is much more. A reliable Level Sensor must be unaffected by suspended particles, splashing or turbulence.

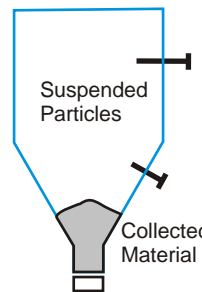
MECHANICAL DAMAGE

Extractin or filling of material exerts various mechanical forces on anything that protrudes inside the vessel. Long insertions of Sensors from the sides of the vessel are prone to damage.



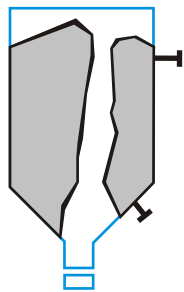
COATING

- ◆ Material coating on sensing probe is very common.
- ◆ Flowstar Level Sensors are unaffected by heavy coating/accumulation.



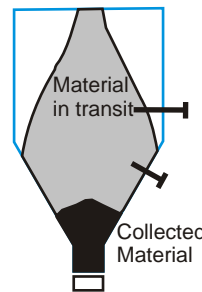
SUSPENDED PARTICLES

- ◆ Flowstar's FERF 200 Series Level Sensors ignore suspended Particles.



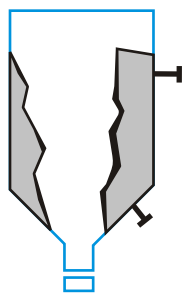
RATHOLING

- ◆ Material flows from the middle of the bin, but storage capacity is reduced.
- ◆ Operator assumes bin empty. Flowstar Level Sensor indicates material present.



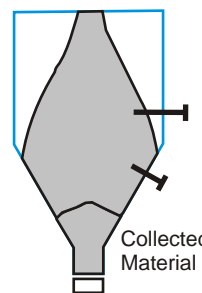
MATERIAL INTRANSIT

- ◆ Flowstar's FERF 200 Series Level Sensors are unaffected by heavy density of suspended particles during filling.



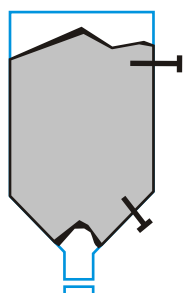
CLINGING

- ◆ Material hangs up on the sides of the bin.
- ◆ This being a common problem part cannot be stopped for this, Flowstar level Sensor still indicates no material.



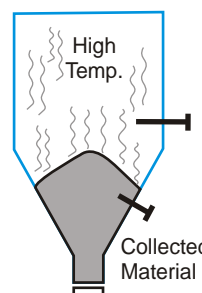
MECHANICAL DAMAGE

- ◆ Flowstar's FERF 200 Series Level Sensors do not require long insertions.
- ◆ Minimise the risks of damage.



PLUGGING

- ◆ Materials do not flow, only lower portion of material flows.
- ◆ Flowstar Level Sensor gives actual position.



TEMPERATURE ADAPTABLE

- ◆ Flowstar's FERF 200 Series Level Sensors contain no electronics or other elements sensitive to Temperature, making them adaptable to high temperature.

SERIES FERF 200: THE DESIGN

Rf DESIGN

Rf Principle based Level Sensors have been designed based on the considerations discussed and various other aspects. Flowstar's Rf Level Sensors are highly reliable for use with materials that are conductive or nonconductive, granular or slurries, fines to large particles and contaminated or pure liquids at varying temperatures and pressures

DESCRIPTION

Flowstar's Rf Level Switch series FERF 200 comprises of two parts, namely a Sensing Probe and an Electronic controller. The Sensing Probe has two parts, active section and shield section insulated from each other as shown in the diagram. A dust proof Probe Head is provided to cover the terminals of the Rf signal cable. Meaning hereby, the Probe contains no electronics or any other sensitive element.

The Electronic Controller separately housed in dust proof enclosure designed for outdoor duty and mounted at a convenient location. It contains the entire electronics, etc. and is connected through a coaxial cable to the Sensing Probe.

FUNCTION

Flowstar's Rf Level Switch Series FERF200 Models work on Rf Principle. Independent but identical low power Rf signals equal in frequency, phase, amplitude and wave shape generated in the Electronic Controller are provided to active and shield sections of the Sensing Probe, whereas, the reference ground of electronics is connected to the vessel shell. The signal provided to the shield section is maintained constant by use of a compensating circuit in the Electronic Controller while the signal applied to the active section varies with change of media between probe and the vessel shell/wall.

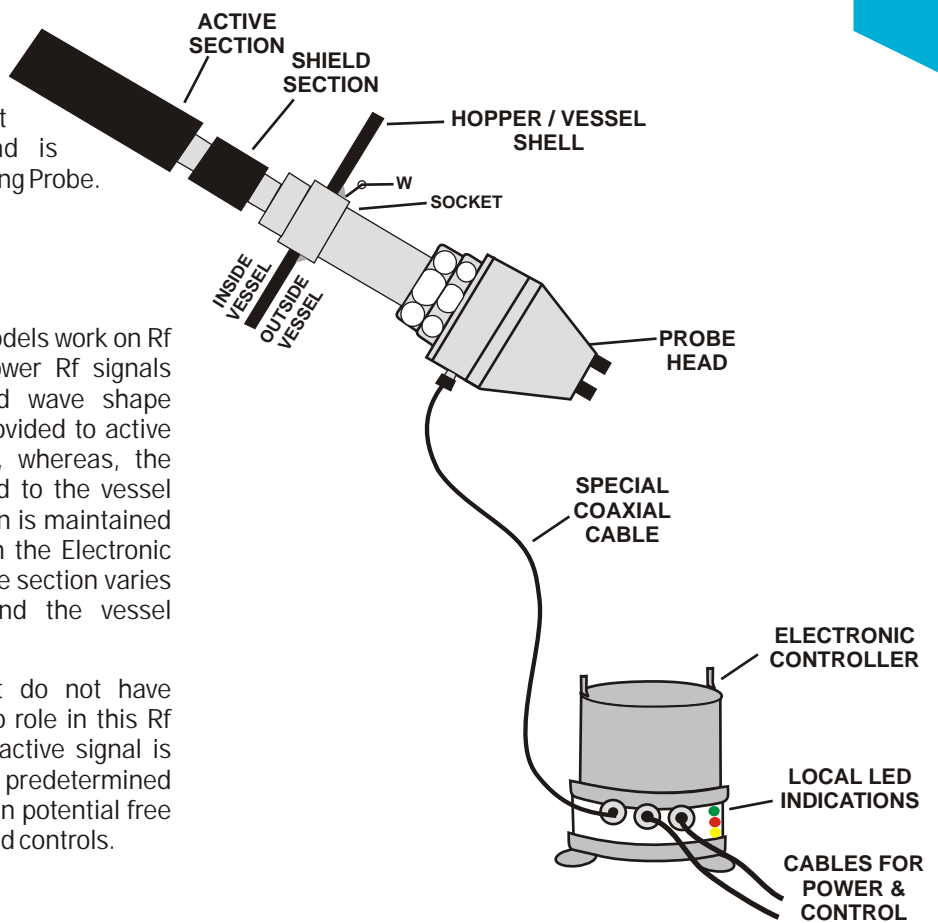
The suspended dust or material in-transit do not have cohesive inter-particulate contact, and have no role in this Rf Principle of Level Sensing. The variation in active signal is compared with the constant shield signal. At a predetermined value of difference a relay is actuated to obtain potential free relay change-over contacts for further alarm and controls.

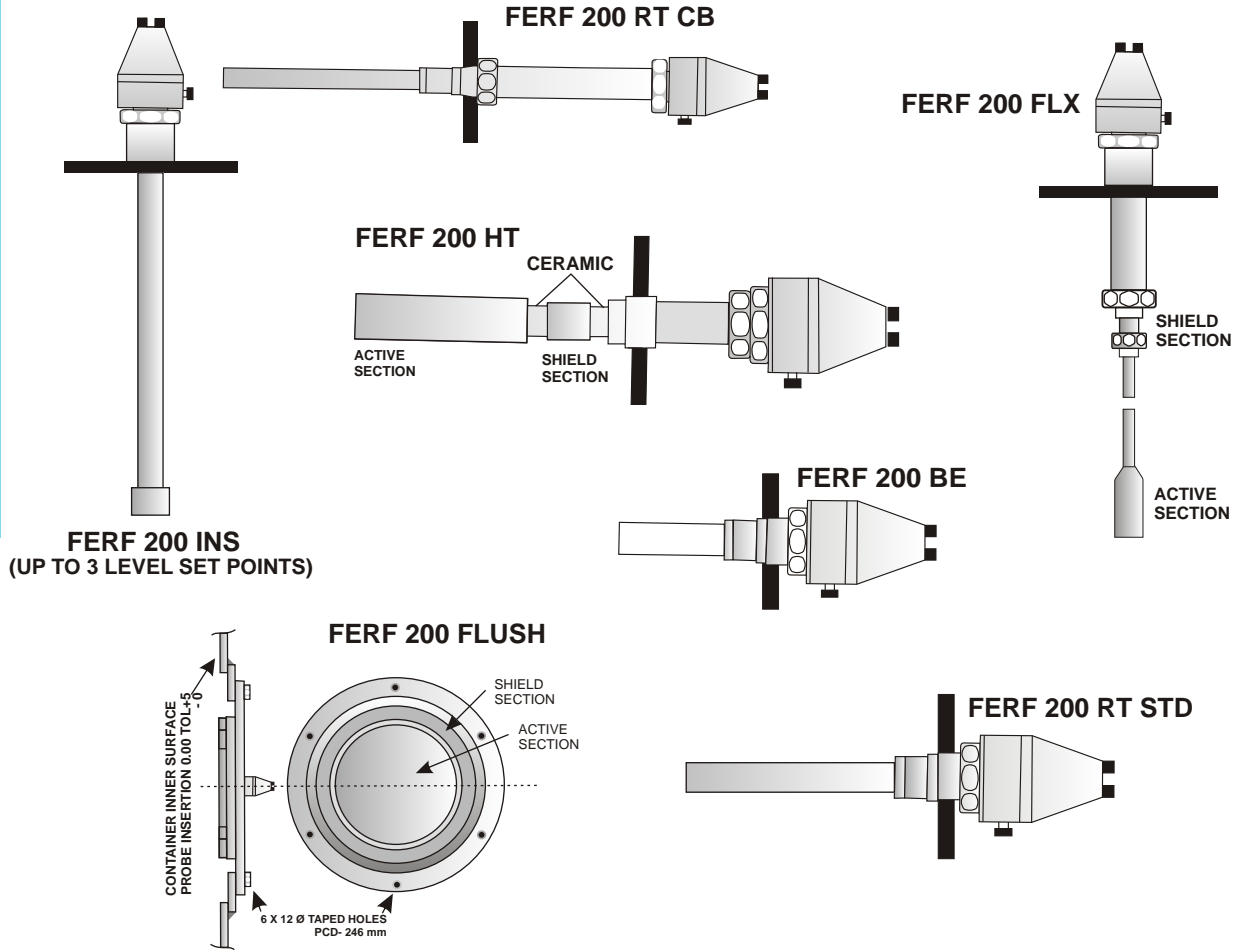
INSTALLATION

Flowstar's Rf Level Switch by design is free of conventional problems like coating, temperature, mechanical damage, Suspended Particles, etc. The installation is very simple by adapting Flowstar's easy installation tips.

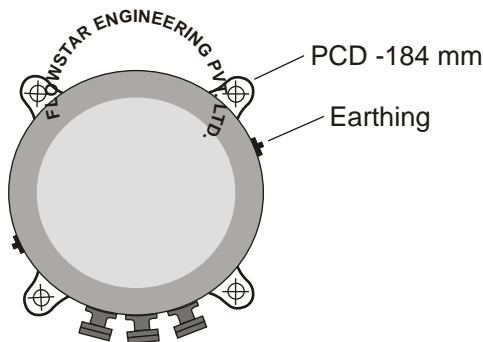
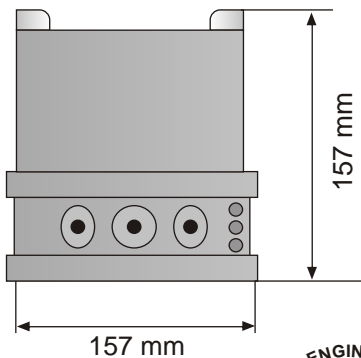
SELECTION

Flowstar provides various models of Sensing Probes to suit customer requirements. Since the Sensing Probes do not contain any electronics, the Electronic Controller is identical for all the Sensing Probes.



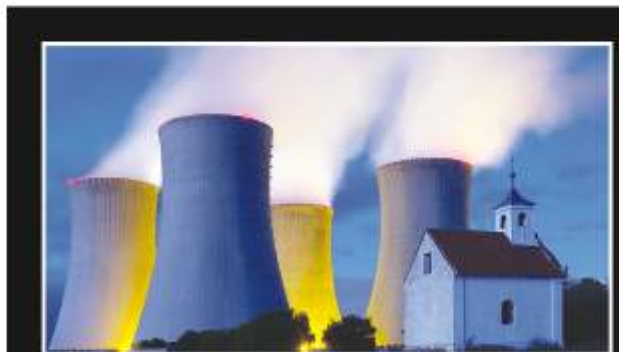


FERF 200 EC



ELECTRONIC CONTROLLER SPECIFICATIONS

- 1) Solid state, circuitry.
- 2) Supply voltage: 240/110 /24 Vac 50/60Hz 24/48/220 Vdc or as required.
- 3) DPDT relay output, rating 5 Amps @240 Vac.
- 4) Only one calibration adjustment.
- 5) Fail safe to high or low level Local indications 'Normal', 'Alarm', 'Probe Healthy'.
- 6) Remote from probe upto 100 ft.
- 7) Cable Entry-1/2" ET for probe connection or as specified 3/4" ET/ Plug & Socket for Power/Control cable or as specified.



Fly ash	Acid	Alkali	Coaltar
Water	Cement	Oil	Paint
Slurries	Coal Powder	Soda	Sponge Iron
Plastic	Polyester	Tea Leaves	Fertilizer
Tooth paste	Glass Batch	Sewage Water	Chemical
Sinter	Pigments	Food Grains	Ceramic/Tiles
Diamond ore	Naphthalene	Sugar	Resin
Filter choking	Milk	Medicine	and many more.

SENSING PROBE MODELS

TABLE (A)

	PROBE MODELS	APPLICATION	PARTICLE SIZE	PROCESS TEMPERATURE	VESSEL PRESSURE
RIGID PROBES	FERF-200 ST	Solids & Liquids	Fine Dust to 15mm	250° C (Max.)	10, 20, 40, or 60 BAR (Specify)
	FERF-200 HT	High Temperature	Fine Dust to 15mm	450, 600 or 1000° C (Specify)	10, 20, 40, or 60 BAR (Specify)
	FERF-200 BE	Solids or Liquids	Fine Dust to 15mm	250, 450, 600 or 1000° C (Specify)	10, 20, 40, or 60 BAR (Specify)
	FERF 200 RT CB	Small Vessel / Bucket Elevator Boot	Fine Dust to 15 mm	250, 450, 600 or 1000° C (Specify)	10, 20, 40, or 60 BAR (Specify)
	FERF 200 INS	Paste & Liquids	Liquids	Up to 200° C	10, BAR (Specify)
FLEXIBLE PROBES	FERF-200 FLX/INS	High Level Sensing Material Presence Detectors on Belt Conveyors	Fine Dust to 400mm	250, 450, 600 or 1000° C (Specify)	1, 7, 20, 40, Bar (Specify)
FLUSHED PROBES	FERF-200 FLUSH Bar (Specify)	Low or High Level Sensing in detection in pneumatic or screw	Fines to 400mm (16") Or Larger	250, 450 , 600 or 1000° C (Specify)	Material Presence 1, 7, 20, 40 or 60

TABLE (B)

	PROBE MODELS	INSERTION LENGTH	MOUNTING	PROCESS CONNECTION	INGRESS PROTECTION
RIGID PROBES	FERF-200 ST	190mm or As Required	Side or Top	40NB Thread or Flange As Required	IP 66
	FERF-200 HT	190mm or As Required	Side or Top	40NB Thread or Flange As Required	IP 66
	FERF-200 BE	As Required	Side or Top	40NB Thread or Flange As Required	IP 66
	FERF 200 RT CB	As Required	Side or Top	40NB Thread or Flange As Required	IP 66
	FERF 200 INS	410mm or As Required	Side or Top	40NB Thread or Flange As Required	IP 66
FLEXIBLE PROBES	FERF-200 FLX/INS	Min-300mm (1') Max-12 Mtrs (40') (Specify) Select Probe Length Considering Repose and Distance From Fill Point	Top Vertical ±15°	40NB Thread or Flange As Required	IP 66
FLUSHED PROBES	FERF-200 FLUSH	Low or High Level Sensing In Detection In Pneumatic or Screw Conveyors Chute	Fines to 400mm (16") Or Larger	250, 450 , 600 or 1000° C (Specify)	Material Presence 1, 7, 20, 40 or 60 Bar (Specify)

TABLE (C)

	PROBE MODELS	ELECTRONICS	CABLE CONNECTION	CABLE From PROBE TO ELECTRONICS	COMPATIBLE ELECTRONICS	INSTALLATION
RIGID PROBES	FERF-200 ST	Remote	Cable Gland/ Plug & Socket	Rf Coaxial Cable	FERF 200 EC	As per Installation tips
	FERF-200 HT	Remote	Cable Gland/ Plug & Socket	Rf Coaxial Cable	FERF 200 EC	As per Installation tips
	FERF-200 BE	Remote	Cable Gland/ Plug & Socket	Rf Coaxial Cable	FERF 200 EC	As per Installation tips
	FERF 200 RT CB	Remote	Cable Gland/ Plug & Socket	Rf Coaxial Cable	FERF 200 EC	As per Installation tips
	FERF 200 INS	Remote	Cable Gland/ Plug & Socket	Rf Coaxial Cable	FERF 200 EC	As per Installation tips
FLEXIBLE PROBES	FERF-200 FLX/INS	Remote	Cable Gland/ Plug & Socket	Rf Coaxial Cable	FERF 200 EC	As per Installation tips
FLUSHED PROBES	FERF-200 FLUSH	Remote	Cable Gland/ Plug & Socket	Rf Coaxial Cable	FERF 200 EC	As per Installation tips