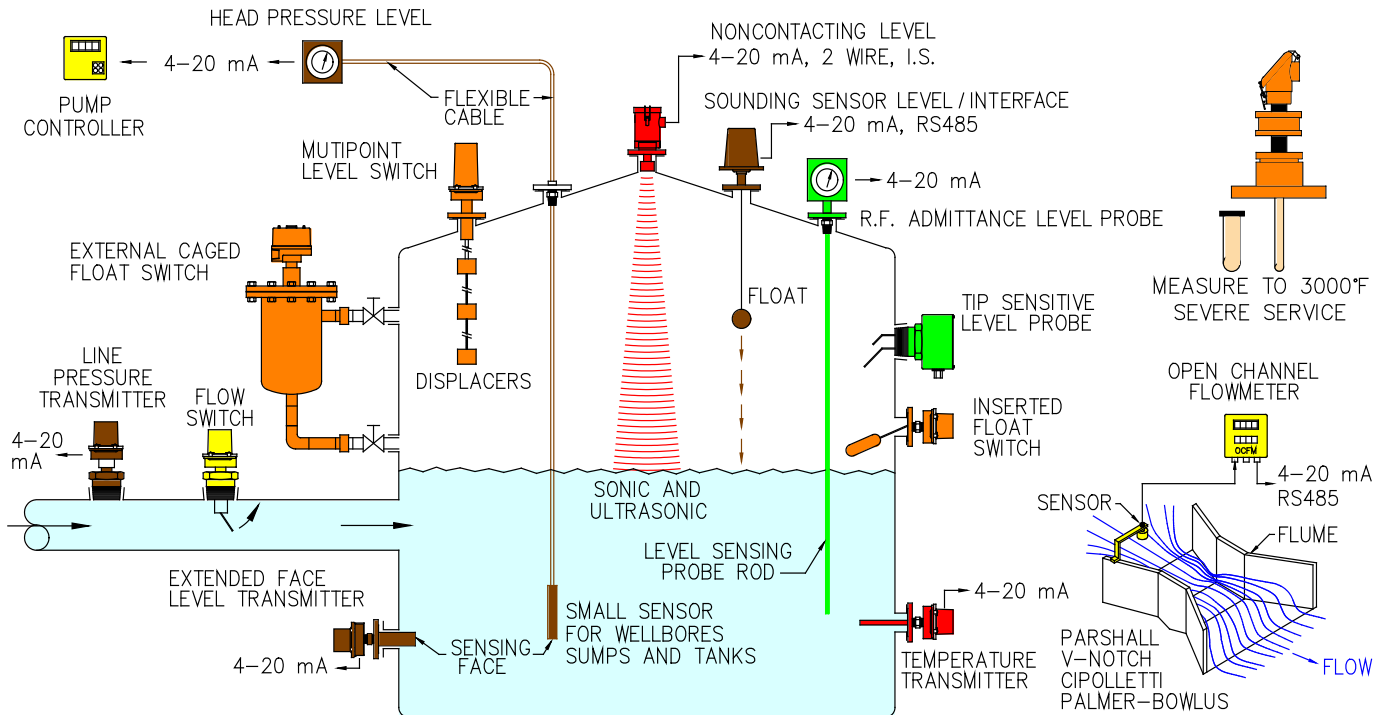


# INDUSTRIAL PROCESS SENSORS - FOR SEVERE AND DIFFICULT SERVICES -

## SENSE THE LEVEL OF LIQUIDS AND INTERFACES



### SENSING METHODS

- Non-contacting Level:** Ultrasonic, Sonic, Proximity
- Inserted Probe:** Tip sensitive, Capacitance, Tilting
- Hydrostatic Head Level:** Isolated strain gage
- Mechanical Level:** Floats, Displacers, Weights
- Interface Level:** Capacitance, Head, Displacer
- Process Pressure:** Isolated, Strain gage
- Closed Pipe Flow:** Target type switch
- Open Channel Flow:** Ultrasonic, Head Pressure

### OUTPUT SIGNALS

- Indication:** Direct reading in engineering units
- Digital:** EIA 232C and RS 485 standards
- Analog:** 4-20 mA, 2 wire
- Contact Closures:** Alarm, Warning, Shutdown
- Contact Control:** On-Off, Differential, Multiple
- Proportional Control:** 1 mode and 3 mode PID
- Pacing:** Switch or analog to samplers and feeders

### PROCESS SERVICES

- Industrial Process:** Acids, Bases, Hydrocarbons
- Environmental:** Water, Wellbores, Sewage, Waste
- Power:** Fossil, Nuclear, Hydro, Tidal, Storage
- Mining:** Crushers, Ore Houses, Petroleum, Hot Brines
- Sanitary:** Food, Pharmaceuticals, Beverages, Packaging
- Manufacturing:** Painting, Machining, Assembly, Testing

### WETTED MATERIALS

- Steel, Stainless Steel, Brass, Hastelloy "C"<sup>®</sup>, Epoxy, Exotic Alloys, PVC, PTFE, Kynar<sup>®</sup>, Alumina, Ceramics

### HOUSINGS

- Watertight, Explosionproof; Basic materials are aluminum, stainless steel, PVC, epoxy-glass

### PROCESS CONNECTIONS

- ANSI, JIS, DIN, 3A, AWWA, NPT, SPT, BSP



**Delta Controls**  
CORPORATION

## HEAD PRESSURE LEVEL AND PROCESS PRESSURE TRANSMITTERS DIAPHRAGM ISOLATED SOLID STATE SENSORS

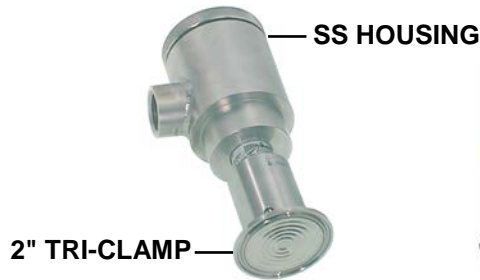
**MODEL 551  
COMPACT**



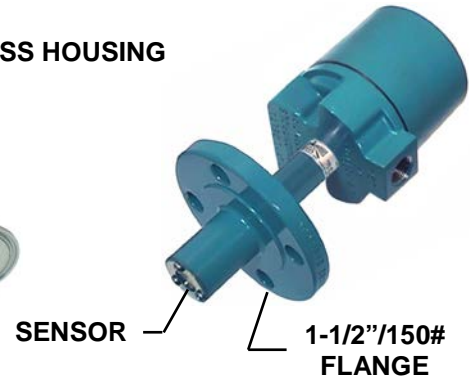
**MODEL 552 PLUG-IN  
ELECTRONICS**



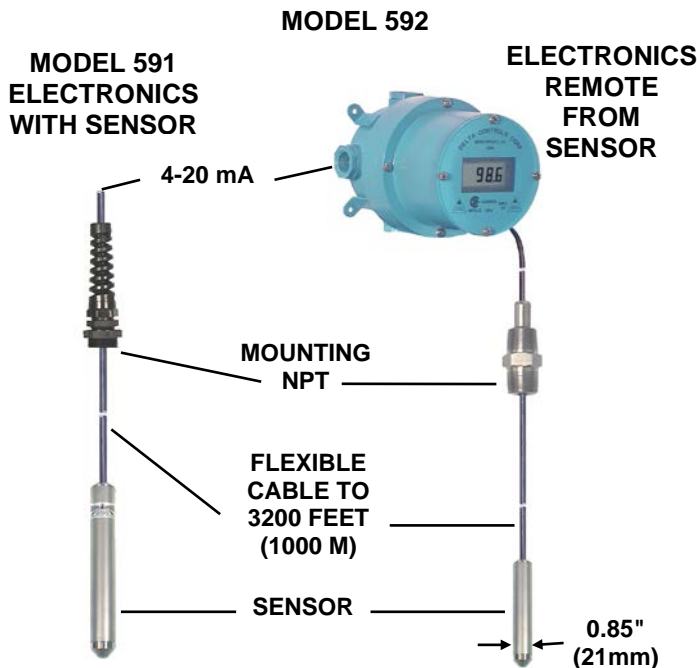
**MODEL 571  
SANITARY**



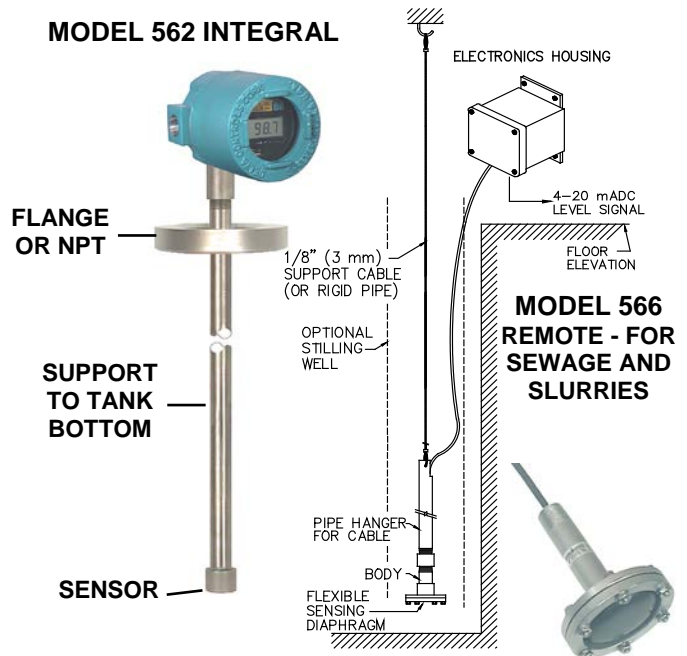
**MODEL 563 EXTENDED  
SENSOR**



### LEVEL IN WELLS, LEACHATE, TALL TANKS



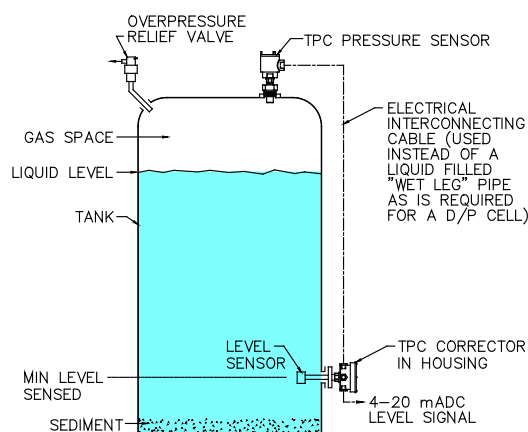
### LEVEL IN SUMPS, TANKS, AND PITS



### SPECIFICATIONS FOR BASIC UNITS

**Sensor:** Silicon strain gage isolated by an oil filled 316 S.S. or Hastelloy "C"® diaphragm.  
**Range:** 0-20 inches water to 0-3000 PSIG, gauge or absolute reference  
**Overpressure:** 200% of maximum range  
**Accuracy:** 1/2%  
**Operating Temperature:**  
**Sensor:** -50 to +300°F (-55 to +150°C)  
**Electronics:** -20 to +185°F (-6 to +135°C)  
**Signal Wiring:** Single twisted pair, up to 1000 loop ohms impedance, 4-20 mA signal  
**Supply Voltage:** 12-35 VDC  
**Basic Body:** 316 SS, PTFE, and Viton  
**Basic Cable:** PVC, PTFE, or Tefzel jacket, available up to 3200 feet long (1000 M)

### LEVEL IN PRESSURIZED TANKS



**MODEL TPC**



**ULTRASONIC LEVEL TRANSMITTERS, PUMP CONTROLS, AND FLOW METERS  
NON-CONTACTING MEASUREMENT, MICROPROCESSOR BASED**

**MODEL 872 INTEGRAL TRANSMITTER**



**Output:** Isolated 4-20 mA, 2 wire  
**Ranges:** 6 inches to 50 feet  
**Calibration:** Pushbutton  
**Housings:** PVC, Hoseproof  
**Circuitry:** Intrinsically Safe  
**Self-test:** Continuous, programmable for various actions  
**Wetted Materials:** PVC or Kynar®  
**Temperature Compensation:** Yes  
**Housing Temp:** -40 to +160EF

**MODEL 858 SMART TRANSMITTER, 6 RELAYS**



**Indication:** Large sixteen character alphanumeric LCD, and 10 LED's  
**Ranges:** 6 inches to 120 feet  
**Housings:** Watertight, Explosionproof  
**Software Features:** Automatic prompting for setup, alarms, complete pump control, PID control, self diagnostics, RS485 com port, auto-correction for tank conditions, signal characterization  
**Option:** Monitor/control 4 tanks

**MODEL 855 PUMP CONTROL/ALARM**



**Output:** 3 relays, 10 amps  
**Display:** 6 digit LED  
**Ranges:** 0-3 to 0-60 feet  
**Calibration:** Direct reading keypad, with user prompting  
**Housings:** Watertight, 4X, or Explosionproof  
**Pump Control Functions:** Software for lead/lag, alternate, timed override, delay between starts and stops, queued rotation, etc.

**MODEL 873 REMOTED TRANSMITTER**



**Output:** Isolated 4-20 mA, 2 wire, for inage or outage sensing  
**Ranges:** 6 inches to 50 feet  
**Calibration:** Pushbutton  
**Housings:** 4X Hoseproof, Submersible  
**Circuitry:** Potted for long life  
**Self-test:** Various logical actions; output alarm optional  
**Integral Display:** Large LCD  
**Housing Temperature:** -40 to +160°F  
**Cabling:** Up to 200 feet separation

**MODEL 658 OPEN CHANNEL FLOWMETER**



**Output:** Isolated 4-20 mA; 232C, and RS485 digital communication; 4 SPDT relays; pacing for sampler; 8 digit totalizer; 16 character display  
**Calibration:** Integral keypad for all functions, e.g. distance, element type, scaling, flow curve, etc.  
**Software:** Stored flow element equations, automatic overranging, self-checking diagnostics; 14 digit memory resettable totalizer for special studies.  
**Sensor:** Noncontact ultrasonic or submerged head pressure type

**SENDER / RECEIVERS  
A SIZE AND TYPE TO FIT THE JOB**

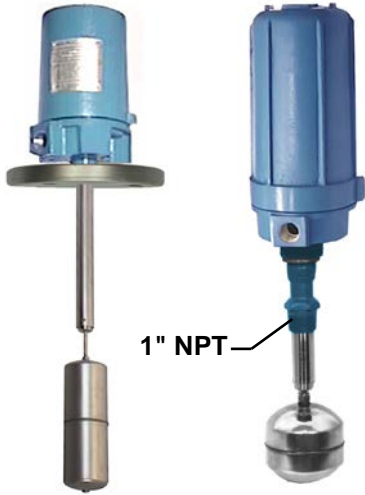


**Ranges:** 4 inches to 120 feet  
**Temperature:** -40 to +265°F  
**Pressure:** 2 PSIV to 60 PSIG  
**Mounting:** Stem, NPT, Flanged, Sanitary, Wall or Ledge Bracket  
**Cabling:** Up to 500 feet  
**Wetted Materials:** PVC, PVDF (Kynar®), Polypropylene, 316 SS, PTFE, Hastelloy "C", others  
**Tank Temperature Sensor:** Integral two wire, current generating

# HIGH RELIABILITY FLOAT AND DISPLACER ACTUATED LEVEL SWITCHES

## TOP INSERTED FLOAT SENSOR

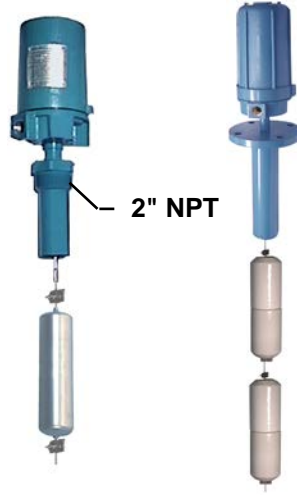
709 ALARM    712 MULTIPOINT



**Operation:** A float rides up and down on the surface of a liquid. One or more switch actions occur at selected liquid surface elevations  
**Uses:** Alarm, warning, sequencing  
**Switch Action:** 1 to 4 points  
**Process Temp:** -150 to +700°F  
**Working Press:** -15 to +2200 PSIG  
**Insertion:** Up to 120 inches  
**Materials:** Steel and most alloys

## TOP INSERTED DISPLACER SENSORS

715 ALARM    717 MULTIPOINT



**Operation:** The weight of a displacer(s) is supported by a spring. The net weight decreases as the process liquid covers a displacer; this causes the spring to elongate, and a switch action occurs.  
**Uses:** Alarm, differential pump control  
**Switch Action:** At 1 to 4 elevations over a maximum range of 50 feet  
**Process Temperature:** -20 to +500°F  
**Working Pressure:** -15 to +2200 PSIG

## EXTERNAL CAGED FLOAT AND DISPLACER SENSORS

MODELS 760, 762, 765 & 770



**Operation:** A float or displacer moves up and down in response to changes in liquid level. Magnetically coupled switch(s) are operated; no seals.  
**Switch Points:** 1-4 separate actions  
**SPG Range:** 0.35 to 2.40 units  
**Interface:** 0.08 or greater difference  
**Process Temp.:** -100 to +800°F  
**Process Press.:** -15 to +20,000 psig  
**Process Conn.:** NPT, flanged, socket weld, or clamp hubs

## SIDE INSERTED FLOAT SENSOR ALARM OR PUMP CONTROL

MODEL 740



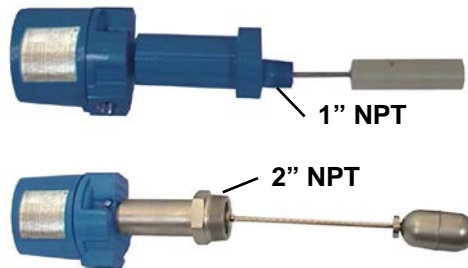
**Operation:** A shaft supports a float, which rides on the liquid level. Two switch actions occur as the level varies.

INSERTION	12	18	24	36	48
MAXIMUM DIFFERENTIAL	3.6	5.9	8.3	12.9	17.6

**Specific Gravity:** 0.4 to 2.4 units  
**Temperature:** -50 to +600°F  
**Pressure:** -15 to +1500 PSIG W.P.  
**Materials:** Steel, SS, and others  
**Process Connection:** 3" or 4" NPT; 3" to 12" flanged, up to 600# ANSI

## SIDE INSERTED POINT SWITCH FLOAT OR DISPLACER SENSOR

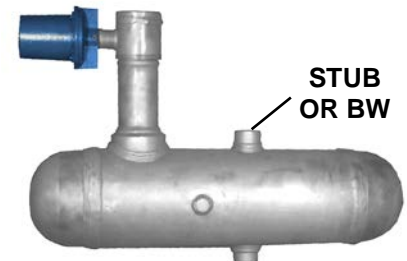
MODEL 735 ALARM



**Operation:** A heavy duty sensing element is supported by a counterweight acting through a support shaft. Switching occurs as the liquid surface passes the elevation of the body. Switching is accomplished by two magnetic fields, is positive in both directions, and is vibration proof.  
**SPG Range:** 0.15 to 2.40 units  
**Interface:** 0.17 units difference  
**Process Temperature:** -85 to +1000°F  
**Process Pressure:** -15 to +3600 PSIG

## EXTERNAL CAGE - HIGH TEMPERATURE AND PRESSURE

MODELS 762 AND 763 DISPLACER ELEMENTS



**Operation:** A counterweighted horizontal pivoting type element operates an output alarm switch as the liquid level or interface crosses the body centerline.  
**Uses:** 2860 PSI steam, hot oil, etc.  
**Specific Gravity:** 0.30 to 2.40 units  
**Interface Differential:** 0.1 units min.  
**Temperature:** -350 to +1000°F  
**Pressure:** -15 to +20,000 PSIG  
**Process Connection:** Welding stubs, socket weld, flanges, clamp hubs



## HIGH RELIABILITY PRECALIBRATED TARGET TYPE FLOW SWITCHES

**MODEL 621  
BODY AND TARGET INLINE**



**MODEL 622  
TARGET INSERTED INTO LINE**



**MODELS 624 AND 626 OPEN BORE  
BODY – NO FLOW RESTRICTION**



**Uses:** For alarm and/or control of liquids and gases in ducts and pipes  
**Operation:** The flowing fluid strikes a vane type target. The target rotates at a precalibrated flowrate and a switch actuates. The target is magnetically coupled to the switch, which eliminates leaks and sealing problems. The units are factory set at your specified flowrate and are ready to work when they arrive; field "guess-setting" is not required.

**Output Contacts:** SDPT or DPDT; rated 5 or 10 amps @ 250 VAC  
**Accuracy:** 5% or 10% of setpoint  
**Temperature:** -50 to +420°F (-46 TO +215°C)  
**Pressure:** -15 to +5000 PSIG (-1 TO +350 BAR)  
**Process Connection:** NPT or flanged  
**Pipeline Sizes:** Type 621 - 1/2" to 4"; Type 622 - 1-1/2" to 48" ANSI

**Operation:** The inserted target is mounted in a spool piece body which becomes part of the pipeline. When a specified flow velocity is reached, the target rotates 90 degrees up and flush against the inside pipe wall; and the output switch actuates.

**Process Temperature:** -40 to +420°F  
**Process Pressure:** -15 to 3000 PSIG  
**Pipeline Sizes:** 2" to 12" ANSI

## SWITCHES FOR LOW FLOW RATES

**MODEL 625 ULTRA LOW FLOW**



**MODEL 623 VERY LOW FLOW**



**Service:** For ultralow flowrate sensing of gases or liquids. The deactuation point is adjustable from 0.04 to 1.0 GPM water or 0.15 to 4.0 SCFM air.

**Operation:** A spring-loaded piston varies the area of a flow orifice. Two engaged magnetic fields operate a switch when the preset flow rate is reached.

**Output Switch:** 5 amp, SPDT or DPDT  
**Size:** 1/2" to 1" NPT or Flanged  
**Process Temperature:** -20 to +300°F  
**Process Pressure:** -15 to 1500 PSIG  
**Materials:** Brass, SS, PTFE

**Service:** Deactuates at 0.5 GPM water, or 2.7 SCFM air  
**Operation:** A target covers a flow nozzle and detects very low flow rates. An inline CV valve opens and allows increasing volumes to flow without creating a high-pressure drop across the body.  
**Sizes:** 1", 1-1/2", 2" NPT, or Flange  
**Maximum Rates:** 90 GPM water, 300 SCFM air, or equivalent  
**Process Temperature:** -20 to +300°F  
**Process Pressure:** -15 to 1500 PSIG  
**Materials:** Steel, Stainless Steel

## LOSS OF FLUID ALARM

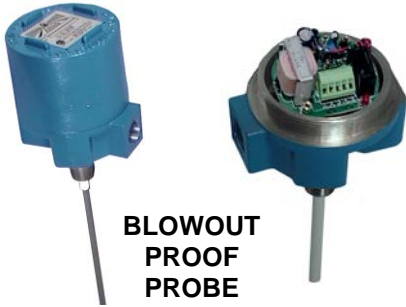
**MODEL 633 FLUID SWITCH**



**Service:** Detect empty pipeline condition or water interface  
**Operation:** A probe sensor is inserted into the pipeline. The presence or absence of material in the line is detected by using a low frequency electronic signal.  
**Output Relay:** 5 or 10 amp DPDT  
**Fluids:** Water, Chlorine, SO<sub>2</sub>, Acid, Gasoline, Alcohol, Oil, Caustic  
**Process Temperature:** -150 to 750°F  
**Process Pressure:** -15 to 1500 psig  
**Pipeline Sizes:** 1-1/2" to 48" ANSI  
**Wetted Materials:** Steel, Stainless Steel, Alumina, PTFE, exotic alloys

## R.F. ADMITTANCE PROBE LEVEL SWITCHES AND TRANSMITTERS DETECT LIQUIDS, SOLIDS, AND INTERFACE POSITION

**MODEL 104 – TIP SENSITIVE,  
POINT LEVEL SWITCH**



BLOWOUT  
PROOF  
PROBE

**MODEL 105 – LEVEL SWITCH,  
ALARM OR DIFFERENTIAL  
CONTROL**



INTEGRAL  
ELECTRONICS

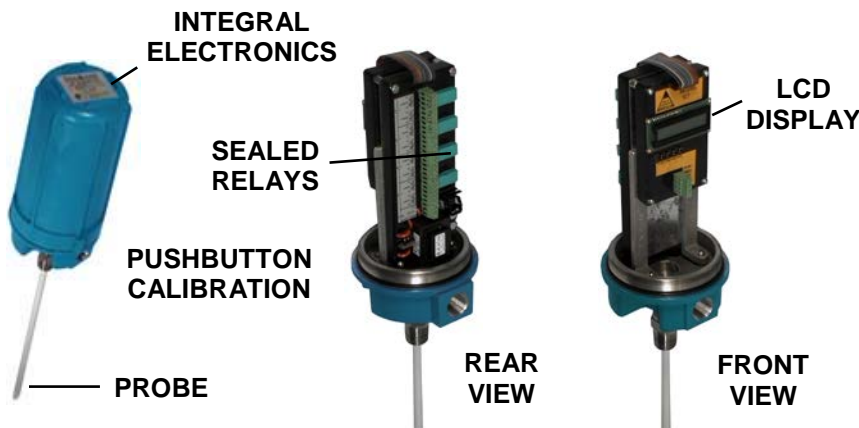
**MODEL 172  
4-20 mA LEVEL TRANSMITTER**



LCD DISPLAY

PUSHBUTTON  
CALIBRATION

**MODEL 107 – UP TO FOUR POINTS, PROMPTED SETUP,  
ALARM AND/OR DIFFERENTIAL CONTROL**



INTEGRAL  
ELECTRONICS

SEALED  
RELAYS

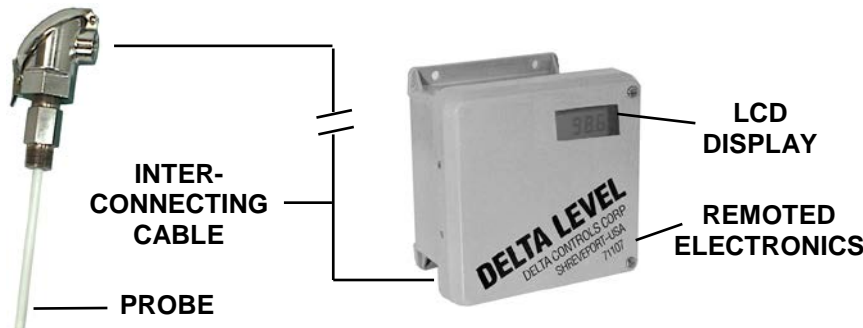
LCD  
DISPLAY

PUSHBUTTON  
CALIBRATION

REAR  
VIEW

FRONT  
VIEW

PROBE



INTER-  
CONNECTING  
CABLE

PROBE

LCD  
DISPLAY

REMOVED  
ELECTRONICS

### SENSING PROBES

LOW DC    SANITARY    CABLE



GENERAL  
USE

HEAVY  
DUTY

PARALLEL  
GROUND

SOLIDS

EXTERNAL  
CAGE

**Operation:** A sensing probe is inserted into a tank. A radio frequency signal is applied to the probe rod. The amount of energy pulsed away to ground is proportional to the amount of probe rod covered by the liquid, solid, or interface being measured.

**Uses:** High reliability point alarm, pump control, and transmission of tank levels

**Configuration:** Integral or remoted electronics unit.

**Probe Types:** Rigid rod, flexible cable, sheathed, and flush tank wall

**Probe Length:** Up to 250 feet (80 M) maximum

**Process:** -450 to +1200°F; -15 to +10,000 PSIG (-1 to +700 BAR)

**Process Connection:** NPT, ANSI flanged, or 3A sanitary

**Wetted Materials:** PTFE, Kynar®, PVC, Steel, 316 SS, exotic materials

**Output Signals:** 4-20 mA, EIA 232C, RS485, displays and switch contacts

**Contact Ratings:** SPDT, or DPDT; 5 or 10 amp @ 250 VAC

**Power Required:** 120 or 240 VAC, 50/60 Hertz; or 24 VDC

**Housings:** 4X Hoseproof, Explosionproof; PVC, Aluminum or SS material.

### SERIES 300 4-20 mA ACCESSORIES

Displays, Alarms, Power Supplies

**MODEL 328  
DISPLAY**



**Operation:** 2 wire and loop powered

**Display:** LCD Plug-in module

**Housings:** Hoseproof, Explosionproof

**MODEL 513 – CONDUCTANCE ACTUATED PROBES  
FOR WATER AND WATER BASED LIQUIDS**

**POINT ALARMS, PUMP CONTROL, PUMP ROTATION**



**REMOTE  
ELECTRONICS**



**SINGLE  
PROBE**



**MULTIPLE  
PROBE**



**INTEGRAL  
ELECTRONICS**

**Operation:** One or more probes are inserted into the tank, sump, or basin to be monitored. A low voltage (non-polarizing AC) is supplied to each probe. A very small current (microamps) flows to ground when watery material touches a probe tip. This small current is detected and causes an output relay to operate.

**Number of Probes:** Up to 12, one switchpoint action at each probe tip

**Probe Length:** Rods, 1 to 240 inches; cables to 200 feet

**Temperature:** -20 to +160°F for electronics; probes to 750°F (400°C)

**Pressure:** -15 to 3000 PSIG (-1 to 210 BAR)

**Probe Rods:** 316 S.S., Monel, Hastelloy "C"®, exotic alloys.

**Probe Insulation:** PVC, PTFE, PVDF (Kynar®), Polypropylene

**Process Connection:** NPT, Flanged, Sanitary, Wall Bracket

**HIGH TEMPERATURE THERMOCOUPLE  
FOR CLAUS, SRU AND GASSIFIERS**

**MODEL HTP**

**REFRACTORY  
PROTECTIVE  
WELL**



**THERMOCOUPLE  
PROTECTIVE  
WELL**

**Operation:** The thermocouple is protected from its hostile environment, yet its accuracy and reliability are retained.

**Uses:** Corrosive conditions above 1800°F such as **Claus, SRU, Process Waste Incinerators, Gassifiers, etc.**

**Element:** 1 or 2 noble metal

**Temperature:** 4000°F (2200°C) maximum

**Pressure:** -15 to 3600 psig (-1 to +250 bar)

**Purge Supply:** Dry air or nitrogen

**Process Connection:** Flange

**ON/OFF, PUMP, AND PID PROPORTIONAL CONTROLLERS WITH ALARM FUNCTIONS**

**MODEL 358 SMART CONTROLLER  
FOR DIFFICULT SERVICES**



**INSTRUCTIONS**

**Operation:** Any mA, VDC, or RS485 com signal. From one to four transmitters can be input into this instrument. The signal can be scaled and characterized to be direct reading in engineering units.

**Control Outputs:** Six 10 amp relays, 4-20 mA isolated, valve position signal, differential on-off, characterized retransmission of input, temperature; also digital signals by EIA 232C, 422, and 485 methods.

**Software:** Pump control and rotation, PID analog control, smart member of a 485 group, self-checking and failure diagnostics, response parameters are selectable, signal characterization

**Programming:** 20 digit keypad, prompting during calibration, setup

**Display:** 16 character LCD, alphanumeric

**MODEL 352 AND 354 BASIC  
PUMP CONTROLLERS**

**4X HOUSING**



**Operation:** 2 or 4 relay outputs may be programmed for any combination of alarm and control points. Pump control points have selectable lead/lag position and failsafe action

**Circuitry:** Digital, I.S. loop supply

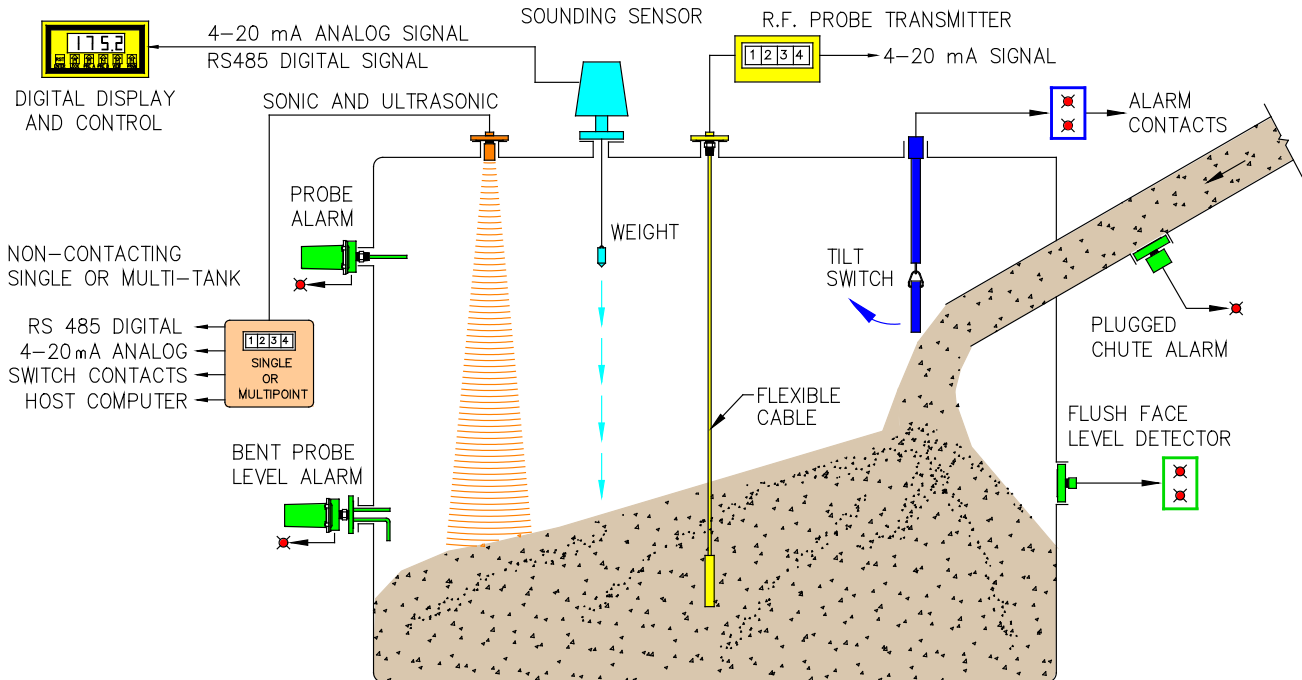
**Field Programming:** Hard selected, cannot be changed or lost due to loss of power, voltage spikes, electrical noise, etc.

**Setpoint Indication:** All continuous

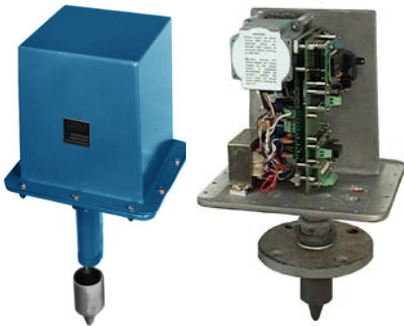
**Housing:** Waterproof, Explosionproof, or mount in enclosure by others



## SENSE THE LEVEL OF POWDERS AND GRANULATED SOLIDS



### MODEL 831 SOUNDING SENSOR



**Operation:** A cable lowers a plummet until it touches the material level, and then retracts it. The cable payout is digitized and used to compute the amount of material in the silo. A 4-20 mA, and/or RS-485 comm signal is produced.

**Calibration:** Direct reading LCD

**Control:** Pushbutton, PLC, host computer; digital, remote or local

**Range:** Up to 125 feet, and 50 FPM

**Drive:** Very long life brushless motor

### MODEL 835 TILT SWITCH



**Operation:** The probe tip is pushed to the side when material arrives. Tilting of more than 15 degrees is sensed and an output contact is actuated. Also used to detect over full belts, empty conveyors, etc. Can work directly with a PLC; eliminating the electronics unit.

**Output:** 1 or 5 amp, SCNO, DPDT

**Cable Length:** Up to 200 feet

**Power:** 24, 120 or 240 VAC

**Sensors:** Rods, floats, paddles

### SERIES 100 PROBE SWITCHES



**Operation:** A high frequency signal is used to detect when material is present on the sensing probe.

**Output Contacts:** SPDT, 10 amp

**Housings:** Exproof; aluminum, SS

**Probe Types:** Rod, paddle, knife-edge, cable, stub, and flush

**Lengths:** 4 inches to 200 feet

**Materials:** Steel, Stainless Steel, wear resistant facing optional.



**Engineered  
Reliability**

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