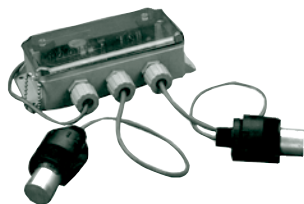


DELAVAL

Process Instrumentation



GETTING TO THE POINT OF LIQUID & SOLID LEVEL CONTROLS



MAGNETOSTRICTIVE

ULTRASONIC

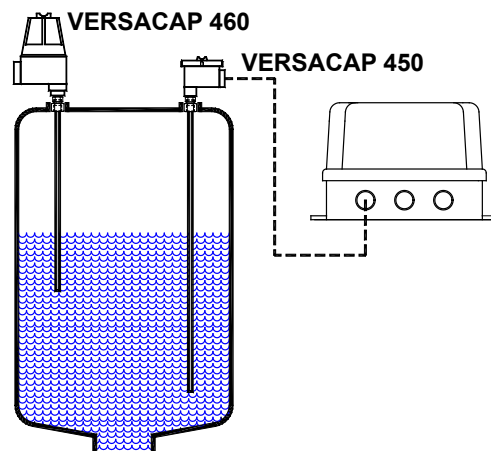
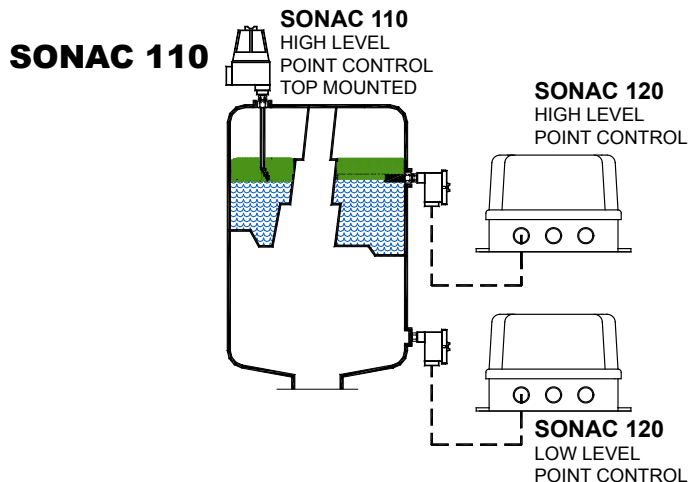
MICROWAVE

CAPACITANCE



L&J TECHNOLOGIES

REPRESENTATIVE LIQUID APPLICATIONS



100 SERIES

- ▶ Free Flowing Liquids
- ▶ High/Low Level Alarms
- ▶ Pump Control
- ▶ Starvation Alarms
- ▶ Corrosive Environments
- ▶ Refrigeration Units
- ▶ Petrochemical

320 SERIES

- ▶ Bulk Liquids
- ▶ Molten Metals
- ▶ Slurries
- ▶ Pulp

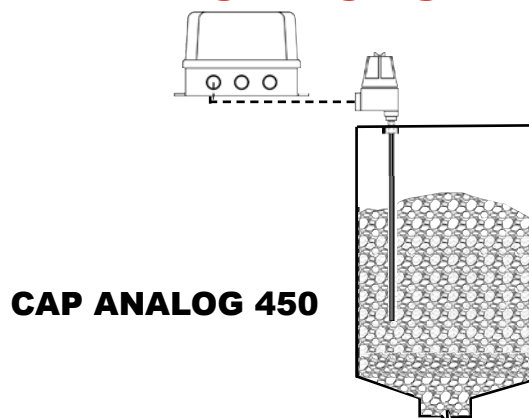
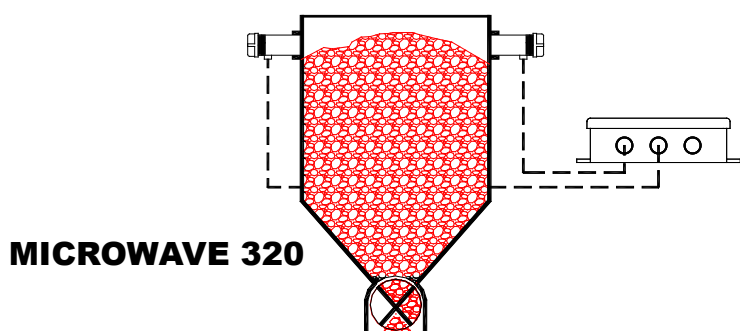
400 SERIES

- ▶ Chemicals
- ▶ Soft Drinks/Winery
- ▶ Slurries
- ▶ Ground Water
- ▶ Sump Level Controls
- ▶ Refrigeration Units
- ▶ Pharmaceuticals

500/800 SERIES

- ▶ Liquid Level Detection
- ▶ Beverages
- ▶ Slurries
- ▶ Paint
- ▶ Chemicals
- ▶ Pharmaceuticals
- ▶ Oil

REPRESENTATIVE SOLID APPLICATIONS



220 SERIES

- ▶ Light Bulky Materials
- ▶ Shredded Plastic
- ▶ Newspaper
- ▶ Tobacco
- ▶ Rubber
- ▶ Stringy Fibers
- ▶ Puff Cereals
- ▶ Baler
- ▶ Boiler Feeder Starvation
- ▶ Position Detectors
- ▶ Plugged Chute Detection

320 SERIES

- ▶ Bulk Solids
- ▶ Fly Ash
- ▶ Rubber
- ▶ Foundries
- ▶ High/Low Level Alarms
- ▶ Plugged Chute Detection
- ▶ Coal
- ▶ Wood Chips/Wafers
- ▶ Recycling
- ▶ Mining

400 SERIES

- ▶ Foundries
- ▶ Rubber
- ▶ Powders
- ▶ Plastics
- ▶ Pharmaceuticals
- ▶ Food

500/800 SERIES

- ▶ Solid Level Detection
- ▶ Grains
- ▶ Rubber
- ▶ Candy
- ▶ Power Utility
- ▶ Hot, Granular Materials
- ▶ Metals
- ▶ Mining
- ▶ Foundries
- ▶ Food
- ▶ Wood Products

SONAC 110

- ▶ Liquid level single point switch
- ▶ Auto-test; self-checking
- ▶ Stable, dependable performance
- ▶ No false trips due to surges or splashing liquids
- ▶ Compact
- ▶ Integral electronics
- ▶ Long-life single sensor
- ▶ Non-intrusive
- ▶ Rugged

- ▶ 115/230 VAC; 24 VDC Input
- ▶ 50ms min - 10sec. nom. time delay; 30sec. max
- ▶ High or low level fail safe
- ▶ -40°F to +160°F (-40°C to +71°C)
- ▶ Ratings - 5 amp @ 120 VAC, 3 amp @ 240 VAC, 3 amp @ 24 VDC
- ▶ 2000 PSI max pressure
- ▶ DPDT relay outputs
- ▶ NEMA 4,5,7,9,12 housing
- ▶ NEC Class I - Groups C, D
- ▶ NEC Class II Groups E, F, G

SONAC 120

- ▶ Remote liquid level single point switch
- ▶ Auto-test; self-checking
- ▶ Stable, dependable performance
- ▶ Corrosion resistant sensors
- ▶ Water-tight remote enclosure
- ▶ No false trips due to surges or splashing liquids
- ▶ Unit is fail-safe and self checking
- ▶ LED indicators

- ▶ 115/230 VAC; 24 VDC Input
- ▶ 50ms min - 10sec. nom. time delay; 30sec. max
- ▶ High or low level fail safe
- ▶ -40°F to +160°F (-40°C to +71°C)
- ▶ Ratings - 5 amp @ 120 VAC, 3 amp @ 240 VAC, 3 amp @ 24 VDC
- ▶ 2000 PSI max pressure
- ▶ 1 DPDT relay output
- ▶ NEMA 4,4X,12 enclosure

SONAC 1100

- ▶ True "two wire" point level detection for liquids
- ▶ Isolated output
- ▶ Fault indicator
- ▶ Stable, dependable performance
- ▶ No false trips due to surges or splashing liquids
- ▶ Non-intrusive
- ▶ Rugged
- ▶ No field calibration
- ▶ LED indicators
- ▶ Integral electronics

- ▶ 12 VDC; 24 VDC Input
- ▶ 1 second time delay
- ▶ High or low level fail safe
- ▶ -60°F to +160°F (-50°C to +75°C)
- ▶ 4 or 20mA Output
- ▶ NEMA 4,5,7,9,12 Housing
- ▶ NEC Class I - Groups C, D
- ▶ NEC Class II Groups E, F, G

SONAC 100 SERIES SENSORS

- ▶ **93)** Sanitary - ladish fitting (USDA approval for AAA sanitary service)
Specifications - 316 stainless steel field adjustable
Temp. range: -65°F to +220°F (-54°C to +104°C)
- ▶ **94TS)** General purpose, Specifications - 316 stainless steel,
Temp. range:-65°F to +220°F (-54°C to +104°C) pressure: 2000 psi
- ▶ **94-F2.0)** General purpose, Specifications - same as 93
- ▶ **95)** General purpose - sensor sintered teflon coated for non-stick,
Specifications-same as 94TS

SONAC 220

- ▶ Single point level switch for bulk solids
- ▶ Vibration resistant
- ▶ Independent time delays
- ▶ Corrosion resistant, water-tight enclosure
- ▶ Versatile power supply
- ▶ Quick test button option
- ▶ LED indicators

- ▶ 115/230 VAC; 24 VDC Input
- ▶ 50ms min - 10sec. nom. time delay; 30sec. max
- ▶ High or low level fail safe
- ▶ -40°F to +160°F (-40°C to +71°C)
- ▶ Ratings - 5 amp @ 120 VAC, 3 amp @ 240 VAC, 3 amp @ 24 VDC
- ▶ DPDT relay outputs
- ▶ NEMA 4x enclosure
- ▶ NEC Class II Groups E, F, G

MICROWAVE 320

- ▶ Microwave single point level switch for bulk solids & liquids
- ▶ Non-contact
- ▶ No vessel openings required
- ▶ Non-intrusive
- ▶ Independent time delays
- ▶ Corrosion resistant, watertight enclosure
- ▶ Long cables up to 1,000 feet
- ▶ Quick test button option
- ▶ LED indicators

- ▶ 115/230 VAC; 24 VDC Input
- ▶ 50ms min - 10sec. nom. time delay; 30sec. max
- ▶ High or low level fail safe
- ▶ -40°F to +160°F (-40°C to +71°C)
- ▶ Ratings - 5 amp @ 120 VAC, 3 amp @ 240 VAC, 3 amp @ 24 VDC
- ▶ 1 DPDT relay output
- ▶ NEMA 4x enclosure
- ▶ NEC Class II, Division 1 with 851 sensing Groups E, F, G

MICROWAVE SENSORS**MT811/MR811**

- ▶ **MT811/MR811** - Short range accurate high/low level detection. Range up to 10 feet in air. Used primarily for accurate position and level sensing of bottles, small boxes and battery filling level control.

**MT841/MR841**

- ▶ **MT841/MR841** - 10 db gain horn antennas are used. Maximum range 100 feet in air. Level control when vessel or environment is extremely hot. Applications include furnaces, kilns, cupolas, fly ash, etc. (mounting extension available)

**MT851/MR851**

- ▶ **MT851/MR851** - Sensors are constructed in 2 1/2 inch steel pipe. Designed to be threaded directly into steel vessels. For severe service including bin level control of sand, rock, asphalt, coal, etc.

**MT861/MR861**

- ▶ **MT861/MR861** - Similar to MT851/MR851 except waveguide 10db horn and electronics are located inside water cooled jacket. Applications include hot product, water cooled level control of limestone, ores, and other products contained in firebrick enclosures.

Capacitance

Features

Specifications

SONAC 410



- ▶ R.F. Capacitance integral transmitter
- ▶ Self-contained integral electronics
- ▶ Explosion proof design
- ▶ Isolated 4-20mA & 0-10 VDC Output
- ▶ Simple two-step calibration
- ▶ Immune to effects of product build-up
- ▶ Built-in static suppression
- ▶ Economical and cost effective

- ▶ 115/230 VAC; 24 VDC Input
- ▶ 4-20mA & 0-10 VDC Output
- ▶ High or low level fail safe
- ▶ -40°F to +160°F (-40°C to +71°C)
- ▶ 0.5pF/30°F (at maximum sensitivity)
- ▶ 3/4 inch N.P.T. standard process connection
- ▶ NEMA 4,5,7,9,12 enclosure
- ▶ NEC Class I - Groups C, D
- ▶ NEC Class II - Groups E, F, G

CAP ANALOG 420/421



- ▶ R.F. Capacitance remote transmitter with relay outputs
- ▶ On-board 3.5 digit LCD display (421)
- ▶ Inverted output
- ▶ Versatile
- ▶ Immune to effects of product build-up
- ▶ Built-in static suppression
- ▶ Up to 800 feet of cable between probe and electronics
- ▶ LED indicators

- ▶ 115/230 VAC; 24 VDC Input
- ▶ 4-20mA output; 0-10 VDC Output
- ▶ High or low level fail safe
- ▶ -40°F to +160°F (-40°C to +71°C)
- ▶ Ratings - 5 amp @ 120 VAC, 3 amp @ 240 VAC, 3 amp @ 24 VDC
- ▶ 3/4 inch N.P.T. standard process connection
- ▶ 2 DPDT relays (optional)
- ▶ NEMA 4,5,7,9,12
- ▶ NEC Class I - Groups C, D
- ▶ NEC Class II - Groups E, F, G

VERSA-CAP 450/460



(450 Shown)

- ▶ R.F. Capacitance level transmitter
- ▶ Integral version (450)
- ▶ Remote version (460)
- ▶ Requires only one level change for calibration
- ▶ Convenient analog and digital process displays
- ▶ Keystroke set-up
- ▶ Universal power supply
- ▶ Independently adjustable relay set-points with differential
- ▶ Microprocessor controlled pump sequencing

- ▶ 115/230 VAC; 24 VDC Input
- ▶ 4-20mA output (optional); 0-5 VDC; 0-10 VDC
- ▶ High or low level fail safe
- ▶ -40°F to +160°F (-40°C to +71°C)
- ▶ 4 DPDT relays (optional)
- ▶ 8 digits 0.5 inch LED
- ▶ 0-250 second time delay
- ▶ NEMA 4,5,7,9,12
- ▶ NEC Class I - Groups C, D
- ▶ NEC Class II - Groups E, F, G

SONAC 4100



- ▶ R.F. Capacitance "two-wire" transmitter
- ▶ True "two-wire" 24 VDC operation
- ▶ Built-in immunity to process build-up coatings
- ▶ Reversible output
- ▶ Completely adjustable
- ▶ One-time "zero-cal" function test
- ▶ 1 mile twisted pair separation
- ▶ Economical and cost effective
- ▶ Self-contained integral electronics
- ▶ Sensing probe lengths up to 250 feet

- ▶ 24/18 VDC; 13 VDC Input
- ▶ 4-20mA Output
- ▶ -40°F to +160°F (-40°C to +71°C)
- ▶ NEMA 4,5,7,9,12
- ▶ NEC Class I - Groups C, D
- ▶ NEC Class II - Groups E, F, G
- ▶ Intrinsically safe

Capacitance

Features

Specifications

CAPTROL 500/500R



(500 Model)

- ▶ Integral or remote mount electronics
- ▶ On-board microcontroller
- ▶ One-touch button calibration
- ▶ Built-in "self diagnostics"
- ▶ Built-in driven shield/guard
- ▶ Adjustable sensitivity
- ▶ Adjustable time delay
- ▶ Built-in static suppression
- ▶ Explosion proof design
- ▶ LED indicators

- ▶ 115/230 VAC; 24 VDC Input
- ▶ 4-20mA & 0-10 VDC Output
- ▶ High or low level fail safe
- ▶ -40°F to +160°F (-40°C to +71°C)
- ▶ Ratings - 5 amp @ 120 VAC, 2.5 amp @ 240 VAC, 3 amp @ 26 VDC
- ▶ 0.1%F stability
- ▶ 3/4 inch N.P.T. standard process connection
- ▶ 1 DPDT relay output
- ▶ NEMA 4,5,7,9,12
- ▶ NEC Class I - Groups C, D
- ▶ NEC Class II - Groups E, F, G

CAPTROL 510



- ▶ R.F. Capacitance on/off switch
- ▶ Built-in "coating rejection"
- ▶ Built-in static suppression
- ▶ Status indication LED's
- ▶ Sensing probe options/materials
- ▶ Built in self diagnostics
- ▶ Pump control
- ▶ Independent set-point & differential adjustments
- ▶ LED indicators

- ▶ 115/230 VAC; 24 VDC Input
- ▶ 0.5 sec. 50ms to 10 sec.
- ▶ High or low level fail safe
- ▶ -40°F to +160°F (-40°C to +71°C)
- ▶ Ratings - 5 amp @ 120 VAC, 3 amp @ 240 VAC, 3 amp @ 24 VDC
- ▶ 1 DPDT relay output
- ▶ NEMA 4,5,7,9,12
- ▶ NEC Class I - Groups C, D
- ▶ NEC Class II - Groups E, F, G

CAPTROL 511



- ▶ R.F. Capacitance point level switch
- ▶ Disregards effect of product build-up
- ▶ On-board performance DVM test points
- ▶ Adjustable to a variety of applications
- ▶ Field selectable fail-safe modes
- ▶ Built-in static suppression
- ▶ Explosion proof design
- ▶ Adjustable sensitivity
- ▶ Variable probe lengths
- ▶ LED indicators

- ▶ 115/230 VAC; 24 VDC Input
- ▶ .3 to 20 sec. time delay
- ▶ High or low level fail safe
- ▶ -40°F to +160°F (-40°C to +71°C)
- ▶ Ratings - 5 amp @ 120 VAC, 3 amp @ 240 VAC, 3 amp @ 24 VDC
- ▶ 1 DPDT relay output
- ▶ NEMA 4,5,7,9,12
- ▶ NEC Class I - Groups C, D
- ▶ NEC Class II - Groups E, F, G

CAPTROL 514



- ▶ R.F. Capacitance multi-point level switch
- ▶ On-board microcontroller
- ▶ Built-in system "auto-test"
- ▶ Built-in "self diagnostics"
- ▶ Easy to read 8-character alpha numeric LED display
- ▶ 4 independently adjustable set points/differential set points
- ▶ Menu driven key pad user interface
- ▶ LED indicators

- ▶ 115/230 VAC; 24 VDC Input
- ▶ .1 to 30 sec. time delay
- ▶ High or low level fail safe
- ▶ -40°F to +160°F (-40°C to +71°C)
- ▶ Ratings - 5 amp @ 120 VAC, 2.5 amp @ 240 VAC, 3 amp @ 26 VDC
- ▶ 4 DPDT adjustable relay outputs
- ▶ NEMA 4,5,7,9,12
- ▶ NEC Class I - Groups C, D
- ▶ NEC Class II - Groups E, F, G

Capacitance

Features

Specifications

CAPTROL 520



- ▶ R.F. Capacitance remote point level switch
- ▶ Cable lengths up to 800 feet
- ▶ Rugged construction
- ▶ Immune to static
- ▶ Immune to RFI radio frequency interference
- ▶ Immune to product build-up
- ▶ High sensitivity
- ▶ Independent set-point and differential adjustment
- ▶ LED indicators

- ▶ 115/230 VAC; 24 VDC Input
- ▶ .5sec. standard 50ms 10sec. variable optional time delay
- ▶ High or low level fail safe
- ▶ -40°F to +160°F (-40°C to +71°C)
- ▶ Ratings - 5 amp @ 120 VAC, 2.5 amp @ 240 VAC, 3 amp @ 26 VDC
- ▶ 520 - 1: 1 relay, 2 DPDT
- ▶ 520 - 2: 2 relays, 1 SPDT
- ▶ NEMA 4,5,7,9,12
- ▶ NEC Class I - Groups C, D
- ▶ NEC Class II - Groups E, F, G

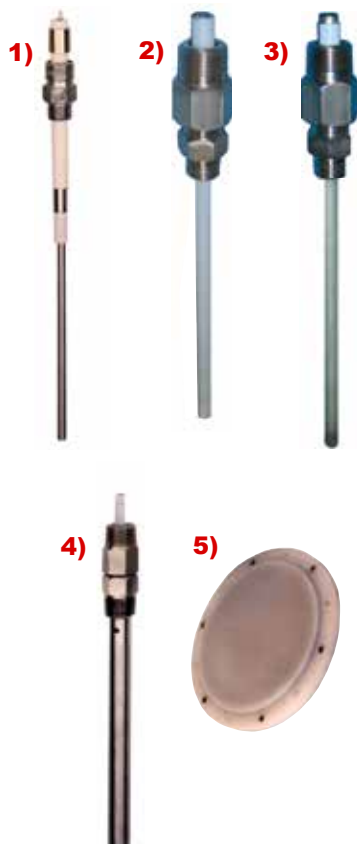
MICROPOINT 800



- ▶ R.F. Capacitance point level switch
- ▶ Designed for OEM customers
- ▶ On-board microprocessor
- ▶ Push button calibration
- ▶ Built-in driven guard
- ▶ Sensitivity to .5 pF
- ▶ Integral electronics
- ▶ Non-volatile memory
- ▶ Sensing probes to 50 feet
- ▶ LED indicators

- ▶ 110/220 VAC; 24 VDC Input
- ▶ 50ms min - 30sec. max adjustable time delay
- ▶ High or low level fail safe
- ▶ -40°F to +160°F (-40°C to +71°C)
- ▶ 5 pF sensitivity
- ▶ 1 DPDT relay output
- ▶ NEMA 4,5,7,9,12
- ▶ NEC Class I
- ▶ NEC Class II

R.F. CAPACITANCE SENSING PROBES



- ▶ **1) G.T.** - (Guarded, Teflon). Used in general purpose liquid and bulk solid applications. Probe construction in 316 S.S with 1/4 inch center rod and teflon insulation. Mounting requirements are a 3/4 inch N.P.T. or flange mount. For use with model 500 & 511 point level controls. Max temperature 450°F, max length of 60 inch.

- ▶ **2) T.H.D.** - (Teflon, Heavy Duty). Used in general purpose and aggressive liquid applications. Standard, 1/2 inch S.S. center rod insulated with teflon, 3/4 inch N.P.T, max length 19 feet, max temp. 450°F @ atmospheric, max pressure 500 psig @ 100°F. For use with model 510, 514, 520, and cap analog transmitters.

Sanitary option available

- ▶ **3) K.H.D.** - (Kynar, Heavy Duty). Used in general purpose liquid application. Generally less expensive than teflon insulated probes. Standard, 1/2 inch S.S. center rod insulated with Kynar, 3/4 inch N.P.T max length 15 feet, max temp. 400°F @ atmospheric, max pressure 250 psig @ 100°F. For use with models 510, 514, 520, and cap analog transmitters.

- ▶ **4) T.C.T.** - (Teflon, Concentric Tube). Used in cylindrical and non-metallic vessels and/or materials with extremely low dielectric values that are free flowing and non-viscous. 1/4 inch S.S. center rod with teflon and surrounded with a 7/8 inch O.D. 316 S.S. concentric tube, 3/4 inch N.P.T., max length 12 feet, max temperature 450°F @ atmospheric, max pressure 500 psig @ 100°F.

- ▶ **5) G.N.I.** - (Guarded, Non-Intrusive). Used in applications that require minimum protrusion into the process due to heavy abrasive materials that come into direct contact with the sensing probe (i.e. coal and various aggregates). Probe construction is a 10 inch O.D. steel plate and guard ring with a UHMW insulating material. For use with model 500 & 511 point level controls.

Product Reference Chart

Material	Sonac 100 Series: Magnetostrictive technology (liquids only)	Sonac 200 Series: Ultrasonic technology (bulk solids only)	300 Series: Microwave technology	CAP ANALOG 400 Series: R.F. Capacitance continuous level technology	CAPTROL 500 Series: R.F. Capacitance point level technology
Bulk/Solid		●	●	●	●
Slurry			●	●	●
Liquid	●		●	●	●
Process Material Viscosity					
Low	●		●	●	●
Medium			●	●	●
High			●	●	●
Bulk Material Moisture					
Low (<5%)		●	●		●
Medium		●	●	●	●
High (>15%)		●	●	●	●
Bulk Material Density					
Low (<20 PCF)		●	●		●
Medium		●	●	●	●
High (>60 PCF)		●	●	●	●
Pressure					
Atmospheric	●	●	●	●	●
Low	●	●	●	●	●
High	●			●	●
Vibration					
Low	●	●	●	●	●
High		●	●	●	●
Process Material Changes (electrical characteristics)					
No	●	●	●	●	●
Yes	●	●	●		●
Corrosive					
No	●	●	●	●	●
Yes	●		●	●	●
Coating/Build-up Potential					
None	●	●	●	●	●
Minimal		●	●	●	●
Heavy			●		●