

Captrol 520

RF Capacitance Level Switch for Liquids & Bulk Solids

For refinery, chemical, wastewater, and industrial process operators who require dependable point-level detection in demanding liquid and bulk solid applications, the Captrol 520 delivers proven RF capacitance sensing with adjustable setpoints, universal power input, and compatibility with a full range of rigid and flexible probes up to 250 ft long. Unlike mechanical or optical switches that suffer from wear, fouling, or sensitivity to product buildup, the Captrol 520 provides coating-rejection electronics, fail-safe logic, and independent calibration controls for stable, drift-free switching across viscous, abrasive, or corrosive media.

Its explosion-proof enclosure and Class I & II hazardous-area ratings support safe installation in harsh process environments, while optional dual-relay configurations allow pump control or alarm logic without requiring multiple devices. With adjustable time delay, wide dielectric sensitivity, and rugged probe construction, the Captrol 520 offers a reliable and flexible solution for overflow protection, pump automation, and material handling where accuracy and durability are critical.



Key Features

High-frequency RF sensing

Uses a 2 MHz excitation signal to detect level changes accurately through coatings, low dielectric materials, and electrical noise found in difficult processes.

Coating-rejection circuitry

Compensates for conductive or sticky buildup on the probe, preventing nuisance trips and ensuring stable switching in viscous or adhesive materials.

Universal power compatibility

Accepts 115/230 VAC or 24 VDC, enabling simple retrofits and reducing spare-part requirements across facilities with mixed power standards.

Selectable fail-safe logic

Allows high-level or low-level fail-safe modes, ensuring predictable relay behavior during power loss or wiring faults to protect pumps and tanks.

Extended-length probe support

Allows rigid or flexible probes up to 250 ft, enabling reliable level detection in deep vessels, tall silos, and remote sumps without custom assemblies.

Hazard-area certified enclosure

Explosion-proof NEMA 4/5/7/9/12 housing supports safe installation in Class I & II environments with flammable vapors, dusts, or industrial contaminants.



Typical Applications



STICKY COATINGS

Coating-rejection RF circuitry prevents false trips when viscous, adhesive, or fouling products cling to probe surfaces during normal operation.



TALL SILOS

Long rigid or flexible probes up to 250 ft enable accurate detection in deep storage vessels without signal loss or special mechanical supports.



CORROSIVE LIQUIDS

Teflon, Kynar, and Hastelloy probe options maintain performance and service life when exposed to aggressive chemical media or corrosive vapors.



PUMP CONTROL

Dual-point switching supports pump ON/OFF logic with differential, preventing short-cycling, overflow, or run-dry conditions in sumps or lift stations.



HAZARDOUS AREAS

Explosion-proof housing and Class I/II approvals allow installation in flammable or dust-laden environments requiring certified protection.



ABRASIVE SOLIDS

Heavy-duty probes withstand wear from granular or fast-moving bulk solids, maintaining stability in bins, hoppers, and material handling systems.

Benefits



No nuisance tripping

Driven-guard and coating-rejection circuitry ignore buildup, keeping switching stable in sticky, viscous, or conductive media without frequent cleaning.



Lower inventory cost

Universal AC/DC power and broad probe compatibility reduce model variations, simplifying maintenance planning across multiple plant locations.



Enhanced process safety

Selectable fail-safe logic ensures a predictable shutdown state during power loss or sensor faults, protecting pumps and preventing overflow incidents.



Simplified deep-tank installation

Extended probe lengths eliminate custom assemblies, enabling reliable level detection in tall silos, deep wells, and remote sumps.



Long-term durability

Rugged probe materials resist abrasion, corrosion, and thermal stress, delivering consistent performance in abrasive solids or aggressive chemicals.



Reliable in harsh environments

Explosion-proof construction and industrial ratings ensure dependable operation in hazardous or outdoor process areas with temperature and dust extremes.



Technical Specifications & Key Features

Electrical

- Power: 115 VAC (95–135 V), 230 VAC (180–270 V), or 24 VDC (18–28 V)
- Consumption: < 3 VA
- Output: Up to 2 DPDT relays (independent)
- Load Rating:
 - 5 A @ 115 VAC non-inductive
 - 2.5 A @ 230 VAC non-inductive
 - 3 A @ 26 VDC non-inductive

Performance

- RF frequency: ~ 2 MHz
- Sensitivity: Adjustable, suitable for liquids ≥ 1.5 dielectric constant & bulk solids ≥ 10 lb/ft³
- Stability: 0.01 % / °F
- Time delay: Fixed fast response + adjustable 50 ms–10 s

Environment

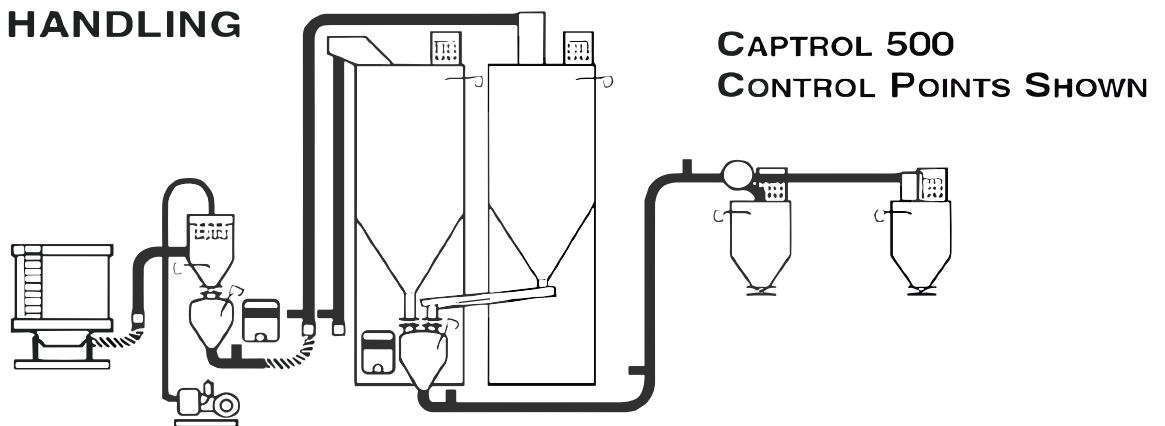
- Electronics: –40 °F to +160 °F (–40 °C to +71 °C)
- Probe rating (depends on type): up to 450 °F and 400–500 psi
- Enclosure: NEMA 4, 5, 7, 9, 12
- Enclosure Hazardous: NEC Class I C&D, Class II E/F/G

Mechanical / Probes

- Mounting: ¾" NPT or flange
- Probe types: Rigid, flexible cable, heavy-duty, Teflon, Kynar, Hastelloy
- Probe length: Up to 250 ft

Typical System Layout

■ MATERIAL HANDLING





Model Number Selection

The model number will consist of a base number 520 followed by a digit:

Part Number Structure

D520-A-B-CDEF-GHIJ-KL-MN

Part Prefix D520

Part Number	A- Electronic Control Options
1	1 independently adjustable relay
2	2 independently adjustable relays

Part Number	B- Remote Pre-Amp
S	Standard gain
H	High gain (low dielectric materials)

Part Number	CDEF- Sensing Probe (specify insertion length in notes)
THD0	THD- Standard, 1/2" S.S. center rod insulated with Teflon, 3/4" NPT, max length 19 ft., max temperature 450° F @ atmospheric, max pressure 500 psig @ 100° F.
KHD0	KHD- Standard, 1/2" S.S. center rod insulated with Kynar, 3/4" NPT, max length 15ft., max temperature 400° F @ atmospheric, max pressure 250 psig @ 100° F.
TCP0	TCP- Teflon Concentric Pipe, 1/2" S.S. center rod insulated with Teflon and surrounded with a 3" O.D. 316 S.S. concentric pipe, 3" S.S. flange, max length is 12 ft. max temperature 450° F @ atmospheric, max pressure 500 psig @ 100° F. *Used in cylindrical and non-metallic vessels and/or materials with extremely low dielectric values that are free flowing and non-viscous.
TCT0	TCT- Teflon Concentric Tube, 1/4" S.S. center rod insulated with Teflon and surrounded with a 7/8" O.D. 316 S.S. concentric tube, 3/4" NPT, max length 12 ft. max temperature 450° F @ atmospheric, max pressure 500 psig @ 100° F. *Used in cylindrical and non-metallic vessels and/or materials with extremely low dielectric values that are free flowing and non-viscous.
BF00	BF- Bare Flexible cable, S.S. braided cable 1/4" O.D., 1" NPT, max length is 50 ft. Anchoring assembly required, either turnbuckle or weight. DO NOT use in conductive liquids.
TF00	TF- Teflon Flexible cable, S.S. braided cable 1/4" with Teflon insulation. 1" NPT, max length for liquids 100 ft. max length for solids 50 ft. Anchoring assembly required, either turnbuckle or weight. Actual probe length may vary by ±1%.
T000	T- Standard, 1/4" S.S. center rod insulated with Teflon, 3/4" NPT, max length 8ft., max temperature 450° F @ atmospheric, max pressure 500 psig @ 100° F.
BHT0	BHT- Bare High Temperature, 1/2" S.S. probe non-insulated, 1" NPT with high temperature soap stone compression gland packings. Max length is 6 ft. max temperature 650° F. *Used in petroleum based hydrocarbons. DO NOT use in conductive liquids.

Part Number	GHIJ- Process Mounting
0000	None
NPT0	NPT Standard, threaded 3/4" or 1" NPT connection
F1.5	F1.5 Flange, 1 1/2", 316 S.S.
T1.5	T1.5 Teflon faced flange, 1 1/2", 316 S.S.
H1.5	H1.5 Flange, 1 1/2", Hastelloy
S1.5	S1.5 Tri-clover, 1 1/2", 316 S.S.
X1.5	X1.5 Tri-clover, 1 1/2", Teflon faced
F2.0	F2.0 Flange, 2", 316 S.S.
T2.0	T2.0 Teflon faced flange, 2", 316 S.S.
H2.0	H2.0 Flange, 2", Hastelloy
S2.0	S2.0 Tri-clover, 2", 316 S.S.
X2.0	X2.0 Tri-clover, 2", Teflon faced
F3.0	F3.0 Flange, 3", 316 S.S.
T3.0	T3.0 Teflon faced flange, 3", 316 S.S.
H3.0	H3.0 Flange, 3", Hastelloy
S4.0	S4.0 Tri-clover, 4", 316 S.S.
X4.0	X4.0 Tri-clover, 4", Teflon faced
F4.0	F4.0 Flange, 4", 316 S.S.
F5.0	F5.0 Flange, 5", 316 S.S.
T5.0	T5.0 Teflon faced flange, 5", 316 S.S.
H5.0	H5.0 Flange, 5", Hastelloy
F6.0	F6.0 Flange, 6", 316 S.S.
T6.0	T6.0 Teflon faced flange, 6", 316 S.S.
H6.0	H6.0 Flange, 6", Hastelloy



KF00	KF- Kynar Flexible cable, S.S. braided cable 1/4" with Kynar insulation. 1" NPT, max length for liquids 100 ft. max length for solids 50 ft. Anchoring assembly required, either turnbuckle or weight. Actual probe length may vary by ±1%.
DWW0	DWW- Deep Water Well, 1/8" S.S. braided cable insulated with Teflon. 3/4" NPT, price includes bronze weights totaling approximately 3lbs. 7/8" O.D. Actual probe length may vary by ±1%. (Available field adjustable – please specify when ordering)
THDD	THDD- Teflon Heavy Duty Dual probe, 1/2" Teflon insulated probe with Teflon insulated 1/4: reference probe running parallel to active probe. 3" Teflon faced flange. Max length is 12 ft. max temperature 450° F @ atmospheric, max pressure 500 psig @ 100° F. *Used in cylindrical and non-metallic vessels and/or materials with extremely low dielectric values that are free flowing.
KHDD	KHDD- Kynar Heavy Duty Dual probe, 1/2" Kynar insulated probe with Kynar insulated 1/4: reference probe running parallel to active probe. 3" Kynar faced flange. Max length is 12 ft. max temperature 250° F @ atmospheric, max pressure 250 psig @ 100° F. *Used in cylindrical and non-metallic vessels and/or materials with extremely low dielectric values that are free flowing.
BHS0	BHS- Bare High Sensitivity, S.S. probe non-insulated, max length is 15 ft. max temperature 500° F. *Used in light bulk solid applications requiring maximum sensitivity.

Part Number	KL- Special Features
00	None
H0	High temp 12" lagging extension (>200° F)

Part Number	MN- Interconnect Cable
00	None
P1	P100 = PVC 100 ft. cable (160° F max)
P5	PVC 50 ft. cable (160° F max)

Summary

The Captrol 520 is a rugged, reliable RF-capacitance point-level switch engineered for demanding industrial tanks, sumps, bins, and silos. It delivers dependable operation in viscous, abrasive, corrosive, and dusty environments where other technologies struggle. With universal power, selectable fail-safe logic, flexible probe configurations, and explosion-proof design, the Captrol 520 is a cost-effective, field-proven solution for overflow protection, pump control, material handling, and process safety applications across chemical, oil & gas, water/wastewater, food, and general industry. L&J Technologies brings advanced process reliability backed by decades of RF-level sensing expertise — reducing downtime, preventing overflows, and improving operational confidence.

Info@cognesense.com
 tel: (708) 236-6000 5911
 Butterfield Road Hillside, Illinois 60162 USA

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