

Level-Tek Model 304B

GENERAL DESCRIPTION

The Robertshaw Model 304B Level-Tek is an all electronic, RF, capacitance-actuated, on-off control instrument for detecting predetermined product level changes in tanks, sumps, silos, and other vessels or containers. Products may include liquids, powder, granular, lump and flake materials (conductive or non-conductive).

Housed in a CSA Certified explosion-proof and dust-tight enclosure, the Model 304B is self-contained and features the use of integrated circuits to insure long-term stability, reliability, and reduced maintenance. Control action is provided through contacts of a DPDT dust-tight plug-in relay. The instrument is available with a choice of three supply voltages, and has adjustable differential (dead band) and adjustable time delay.

PRINCIPLE OF OPERATION

The Robertshaw Model 304B Level-Tek operates on the unique capacitance measurement concept. The instrument mounts directly on a Robertshaw Probe Assembly, which is installed into a tank or other container, and senses the change in product or material level as a function of the capacitance change between the probe element and the wall of the container.

The sensing probe is "charged" by the Model 304B through a sealed potentiometer (zero adjust) and its charging rate is compared with that of a reference capacitor within the instrument. These charging rates are simultaneously fed as time sequenced inputs to an integrated circuit differential amplifier, which provides an output only if the charging rate of the reference capacitor exceeds that of the probe capacitance. This signal then establishes an input to a second integrated circuit differential amplifier, having reversing capabilities, to provide for the desired fail-safe operational mode.

The Model 304B design provides adjustable differential, accomplished by means of positive feedback within the circuit, and is easily adjustable by means of a sealed potentiometer. Also incorporated, is potentiometer adjustable time delay which acts upon the input of the second differential amplifier. Output of this amplifier drives the electromechanical control relay circuit.

 Certified



Probe shown for illustration only.
Must be ordered separately.

FEATURES AND BENEFITS

- **Versatile - Suits Many Applications**
Explosion-proof and dust-tight with wide temperature limits. Choice of supply voltages. Adjustable differential and adjustable time delay are standard.
- **All Solid-State Construction -**
Use of integrated circuits insures long-term stability, reliability, and reduced maintenance.
- **Simplified Installation -**
Self-contained unit may be oriented in any position. Mounts directly on installed Robertshaw Probe Assembly, connected to probe element by rugged disconnect pin.
- **Field Selectable Operational Modes -**
High or low fail-safe operation established by means of screw-connected mechanical links.
- **Ease of Calibration and Adjustment -**
Built-in solid-state light aids in calibration (no external meter required). All adjustments are continuous by means of sealed potentiometers.
- **Convenient Design for Wiring and Maintenance -**
Plug-in chassis assembly provides easy access to wiring and terminal board. Control relay is of rugged dust tight plug-in design.
- **CSA Certified**
See Specifications.

SPECIFICATIONS

Enclosure CSA Certified, Explosion-proof, Class I, Division 1, Groups C & D, Class II, Division 1, Groups E, F, & G and Dust-tight Enclosure 5. CSA Certified Intrinsically safe probe input circuit for Class I, Division 1, Group C & D and Class II, Division 1, Groups E, F, & G when used with Models 702, 728, 729, 736, 738, 739, 740, and 741 probes.

Operating Temperature Limits -40 to +160° F

Storage Temperature Limits -55 to +225° F

Operating Humidity Range 0 to 95% RH

Vibration Limits 2 g's to 100 Hz

Weight 3.0 lbs.

Supply Voltage 26.5 VDC ±10%,

120 VAC ± 10%, 50/60 Hz,

240 VAC ± 10%, 50/60 Hz

Supply Power 5 VA 3 watts max. @ 120/240 VAC

80 ma max @ 26.5 VDC

Control Range (zero adjustment) 15 to 225 pf

Sensitivity (dead-band):

Adjustable differential 0.2 to 200 pf

Response Time (time delay):

Adjustable 0.5 to 20 seconds

Temperature Coefficient Control Point,

0.0065 pf/°F.

Control Relay:

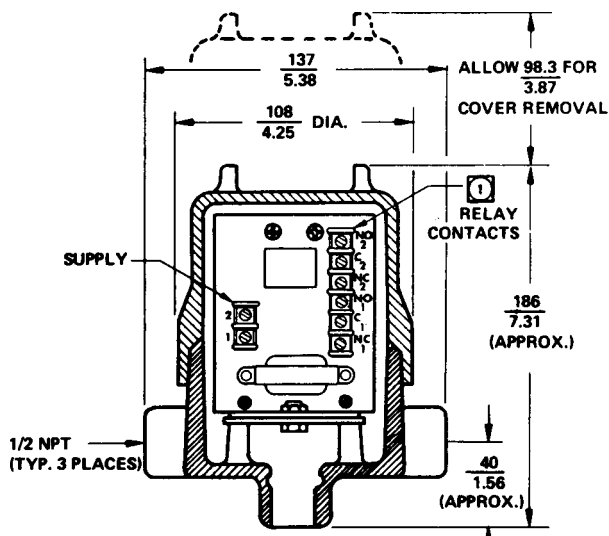
Form Dust-tight DPDT plug-in

Contact rating DPDT 5A @ 28 VDC;

5A @ 120 VAC, non-inductive;

2.2A @ 240 VAC, non-inductive.

DIMENSION DATA



CUSTOMER CONNECTIONS

SUPPLY VOLTAGE (see Rating Plate)	
TERMINAL	DESCRIPTION
2	120V 50/60 Hz
1	
2	240V 50/60 Hz
1	
2	26.5 VDC
1	

RELAY CONTACTS †	
TERMINAL	DESCRIPTION
N.C. 2	Normally closed No. 2
C 2	Common No. 2
N.O. 2	Normally open No. 2
N.C. 1	Normally closed No. 1
C 1	Common No. 1
N.O. 1	Normally open No. 1

† Control relay contact designations are shown with relay in the de-energized condition. The relay is normally energized and becomes de-energized when level or process reached the control point.

ORDERING INFORMATION

STANDARD MODEL* 304B - B 2 - B 5

TABLE A – KEY MODEL NUMBER

Model No.	Description
*304B	Capacitance-actuated On-Off Level Control. CSA Certified enclosure, Explosion proof Class I, Division I Groups C & D, Class II, Division I Groups E, F & G, and Dust-Tight Enclosure 5. Also meets NEMA 4 requirements. Does not include probe. Intrinsically Safe probe input circuit.

TABLE 1- CONTROL RELAY

Designation	Description
*B	DPDT Dust-Tight

TABLE 2 - SUPPLY VOLTAGE

Designation	Description
1	26.5 VDC ±10%
*2	120 VAC ±10%, 50/60 Hz
3	240 VAC ±10%, 50/60 Hz

TABLE 3 - DIFFERENTIAL (DEAD BAND)

Designation	Description
*B	Adjustable dead band. Differential adjustable from 0.2 to 200 pf.

TABLE 4 - RESPONSE TIME (TIME DELAY)

Designation	Description
*5	Adjustable Time Delay from 0.5 to 20 seconds.

Robertshaw

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