

## 9321/9321E Pneumatic & Electric Liquid Level Switch

### Application

The WellMark Series 9321 On-Off Pneumatic Liquid Level Switch operates shut-down valves or alarm systems when liquid in a vessel reaches a predetermined level. This switch uses an externally mounted displacer that operates a nozzle-flapper to vent the supply pressure when the switch is activated. The nozzle-flapper has a soft seat for tight shut-off when the switch is in its normal position (flapper against the nozzle).

The Series 9321E is an external cage-mounted electric liquid level switch. Rising liquid exerts a buoyant force on the displacer, producing a torque in the tube. This force will either trip or reset an electrical switch. Falling liquid will trip or reset the same switch if so desired. The WellMark Series 9321E Electric Switch uses the displacer and torque tube movement to trip and reset an electric switch for on-off condition. The displacer can withstand up to 1 1/2 times the maximum working pressure, allowing it to remain in the cage during hydrostatic testing.

### Features

- Pneumatic or Electric
- Left Hand or Right Hand
- Hi-Level Alarm or Lo-Level Alarm

### Specifications

#### Output Signal:

Pneumatic Output equal to supply pressure when the switch is in the normal position. Output reduced to approximately atmospheric pressure, depending upon size of the bleed orifice and piping configuration, when the switch is activated. Electric output same as supply signal.

#### Supply Signal

Pneumatic	Standard 30 - 60 psi Optional 60 -100 or 100 -150
Electric	11 AMP, 1/4 HP @ 125/250 VAC 5 AMP RES @ 28 VDC 0.5 AMP RES @ 125 VDC Leads Factory Sealed

#### Steady-State Air Consumption:

Less than 1.0 scfh for all supply pressures when the liquid level is one inch below the normal switch position for high-level switching or one inch above the normal switch position for low-level switching.



(Right Hand Mount as Shown)

Maximum Working Pressure	2500 psi
Operating Temperature	-20°F to 400°F
Displacer Diameter	4 in.
Process Connection Size	1" Female NPT
Supply Pressure Connection Size	
Pneumatic	1/4 inch female NPT
Electric	1/2 inch conduit
Shipping Weight	Approx. 35 lb.

### Materials

Displacer	Stainless Steel
Cage	Cast Steel
Torque Tube	Monel®
Body	Carbon Steel
Nozzle Block	Aluminum
Switch Box	Stainless Steel

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### Principle of Operation

The Series 9321 (Figure 1) is an external, cage-mounted pneumatic liquid level switch. When the switch is in the normal position with the flapper against the nozzle, output pressure cannot bleed off and remains the same as full supply pressure. Rising liquid level exerts a buoyant force on the displacer, producing a torque in the tube. When this torque exceeds the torque exerted on the flapper by the magnet, the flapper snaps away from the nozzle. This action allows output pressure to bleed through the nozzle faster than supply pressure can enter through the bleed orifice. The reduced pressure

in the output signal line activates the shutdown or alarm systems. When the liquid level lowers, the falling displacer forces the flapper into the field of the magnet, letting the magnet snap the flapper against the nozzle and causing output pressure to build to full supply pressure.

On applications where low-level switch operation is required (Figure 2) the nozzle, flapper and magnet are positioned on the opposite side of the torque tube so that downward displacer travel moves the flapper away from the nozzle.

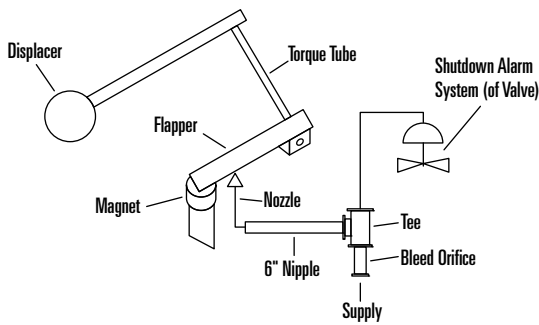


Figure 1: Principle of Operation for Hi-Level

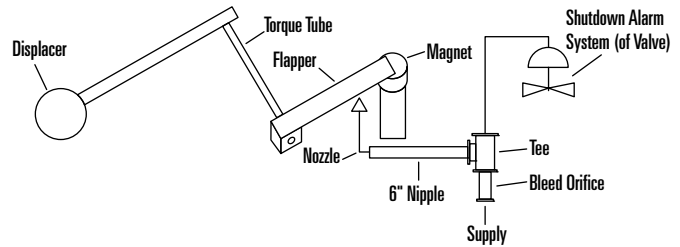
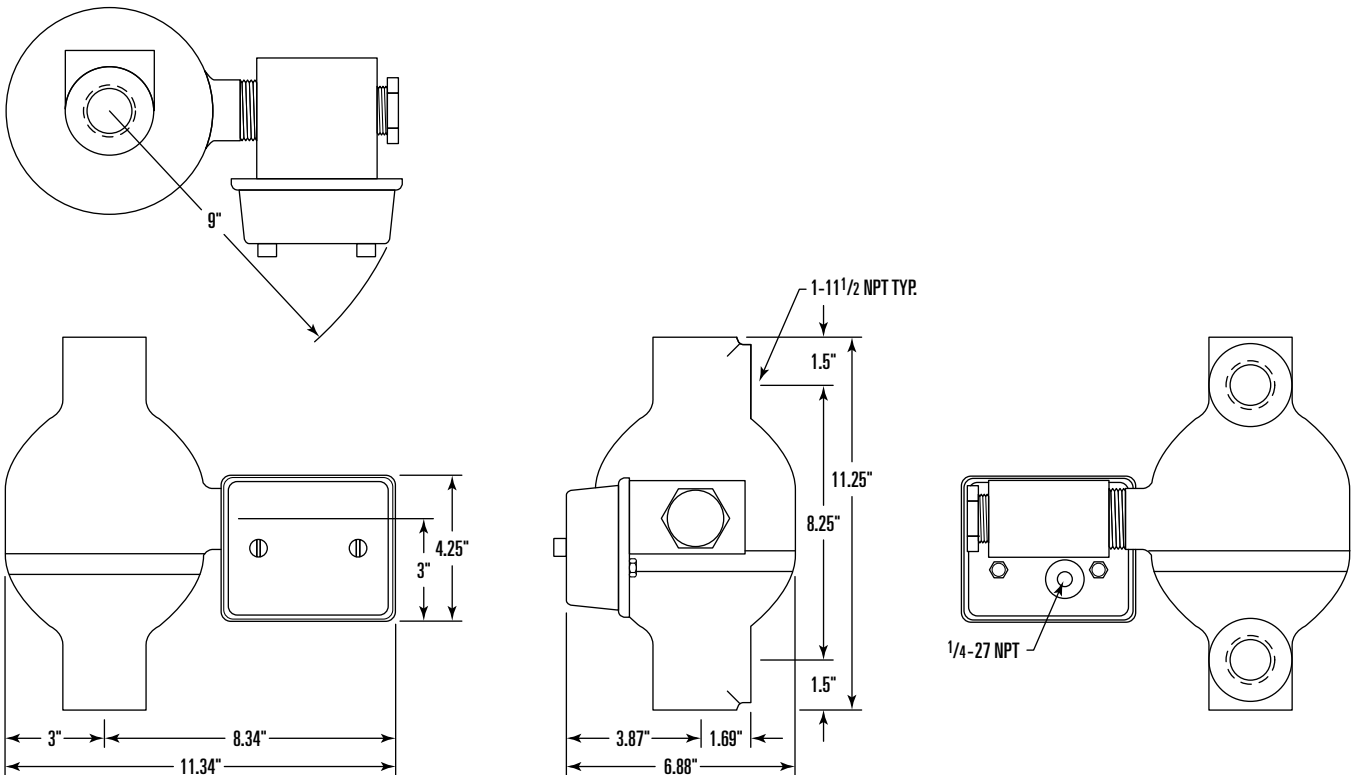
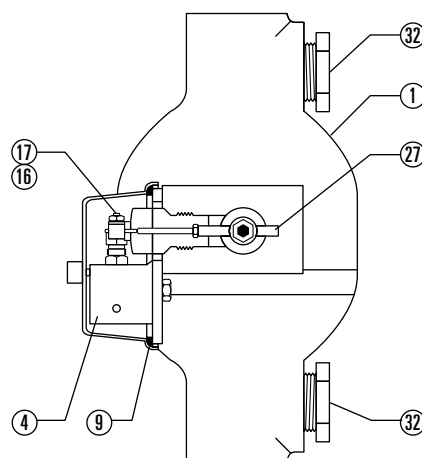
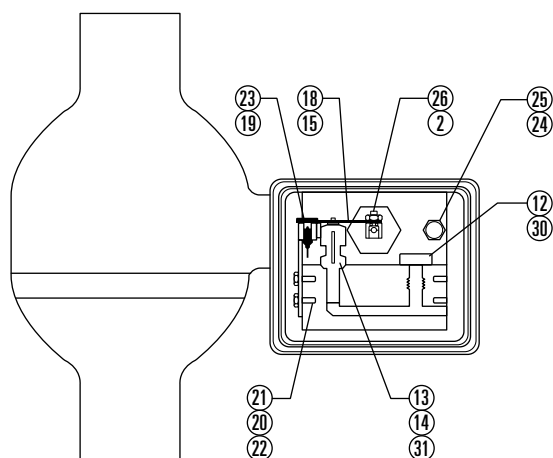
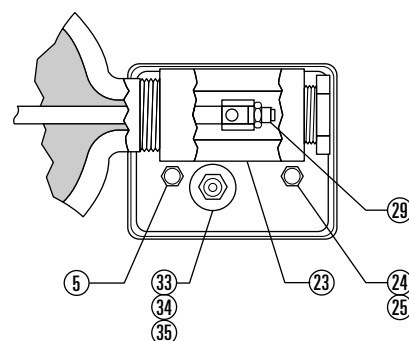
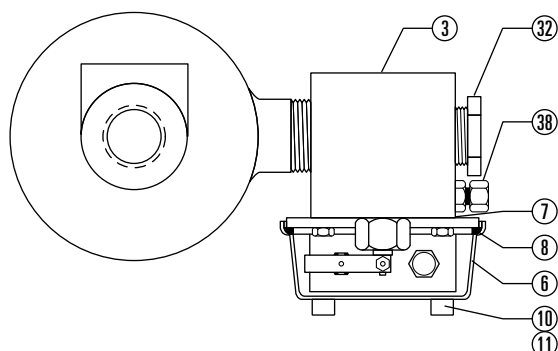


Figure 2: Principle of Operation for Lo-Level

### Dimensional Data



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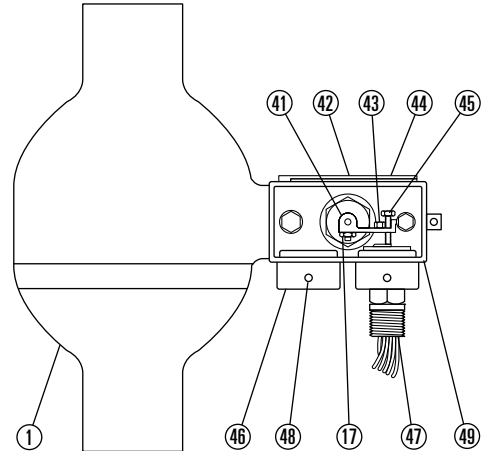
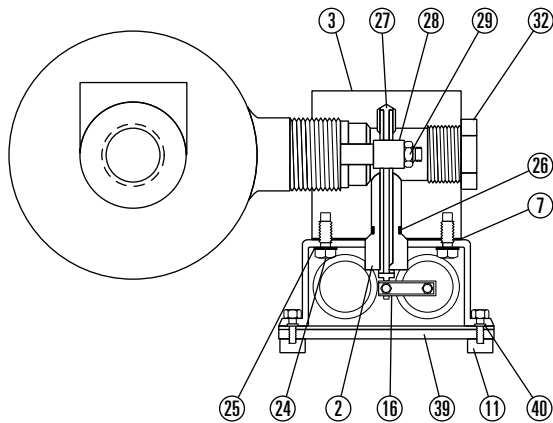
### Parts List Series 9321

Item	Description	Qty.	Part No.
1	CHAMBER WELD ASSEMBLY	1	40298
2*	TORQUE ARM WELD ASSEMBLY	1	30425
3	BODY BLOCK	1	20689
4	NOZZLE BLOCK	1	20691
5	MOUNTING PLATE	1	20690
6	COVER, PLASTIC	1	10693
7*	GASKET, BODY BLOCK	1	10683
8*	GASKET, NOZZLE BLOCK	1	10684
9*	GASKET, PLASTIC COVER	1	10703
10*	SEAL, COVER SCREW	2	10685
11	THUMB SCREW, COVER	2	10688
12	PLUG, PILOT PRESSURE	1	20694
13	NOZZLE, 30-60 PSI	1	20696
	NOZZLE, 60-100 PSI	1	20720
	NOZZLE, 100-150 PSI	1	20721
14	JAM NUT, THIN (NOZZLE)	1	10209
15*	FLAPPER, WELDMENT	1	10713
16*	CLAMP, FLAPPER	1	20697
17*	JAM NUT, FLAPPER CLAMP	1	10710
18*	SEAT, NOZZLE	1	10695

\*Recommended Spare Part

Item	Description	Qty.	Part No.
19*	MAGNET	1	10714
20	BRACKET, MAGNET	1	10712
21	S.S. MACHINE SCREW, MAGNET BRACKET	2	10706
22	S.S. FLAT WASHER, MAGNET BRACKET	2	10705
23	S.S. MACHINE SCREW, MAGNET	1	10707
24	S.S. CAP SCREW	4	10708
25	S.S. LOCK WASHER	4	10709
26*	O-RING, VITON® (TORQUE TUBE)	1	10696
27*	BEARING SLEEVE (TORQUE TUBE)	1	10698
28	SLEEVE CLAMP, FLOAT ARM	1	20692
29	S.S. JAM NUT, SLEEVE CLAMP	1	10711
30*	O-RING, VITON®	1	10715
31*	O-RING, VITON®	1	10716
32	PIPE PLUG 1" NPT	3	10183
33	1/4 X 6 S.S. NPT	3	10735
34	1/4 S.S. TEE	1	10734
35	IN-LINE ORIFICE	1	20700
36	CA-PLUG (NOT SHOWN)	2	10686
37	SHIPPING TUBE (NOT SHOWN)	1	10687
38	VENT ASSEMBLY	1	20728

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**Parts List Series 9321E**

Item	Description	Qty.	Part No.
1	CHAMBER WELD ASSLY	1	40298
2*	TORQUE TUBE WELD ASSLY	1	30425
3	BODY BLOCK	1	20689
7*	GASKET	1	10683
11	THUMB SCREW	2	10688
16*	CLAMP	1	20697
17*	JAM NUT	1	10710
24	S.S. CAP SCREW	2	10708
25	S.S. LOCK WASHER	2	10709
26*	O-RING, VITON®	1	10696
27*	BEARING SLEEVE	1	10698
28	SLEEVE CLAMP	1	20692
29	S.S. JAM NUT	1	10711
32	PIPE PLUG	3	10183

Item	Description	Qty.	Part No.
36	CA-PLUG (NOT SHOWN)	2	10686
37	SHIPPING TUBE (NOT SHOWN)	1	10687
39	COVER & GASKET	1	10764
40*	O-RING	2	10905
41	SWITCH ARM	1	10765
42	DRIVE SCREW	2	10075
43	S. S. JAM NUT	1	10901
44	NAMEPLATE	1	10772
45	S.S. CAP SCREW	1	10900
46	CA-PLUG	1	10906
47*	SPDT SWITCH	1	10783
	DPDT SWITCH (OPTIONAL)		10790
48	S.S. SET SCREW	2	10794
49	SWITCH BOX	1	30455

\*Recommended Spare Part

**How to Order**

**Pneumatic**

- Left Hand Hi 9321 LH
- Left Hand Lo 9321 LL
- Right Hand Hi 9321 RH
- Right Hand Lo 9321 RL

**Electric**

Add the Letter "E" after 9321  
Example: 9321E-LH

**Repair Kits**

Minor Repair Kit Consists of:	20736 Part No.
GASKET	10683
GASKET	10684
GASKET	10685
FLAPPER SEAT	10695
O-RING	10696
BEARING SLEEVE	10698
GASKET	10703
FLAPPER ASSEMBLY	10713
HOLDING MAGNET	10714
O-RING	10715
O-RING	10716
Major Repair Kit Consists of:	20737 Part No.
SAME AS 20735 (ABOVE) PLUS TORQUE TUBE ASSY.	30425