

The Model 3900 Liquid Level Switch is a pneumatic snap acting or electric SPDT or DPDT High/Low level switch. This rugged instrument applies the same "Force Balance" control mechanism as the Model 3200 Liquid Level Controller, combined with a compact vertical cage assembly. The Model 3900 is designed specifically to meet the level control requirements found on onshore and offshore oil and gas production equipment.

### Features:

- **Electric or Pneumatic** - The Model 3900 Liquid Level Switch can be fitted with either a non-bleeding pneumatic snap (on/off) pilot or a SPDT or DPDT electric switch.
- **Field Reversible Switch Action** - Changing switch action requires no special tools and no additional parts, and can be easily done without removing the instrument from the vessel. Refer to the **Switch Action** section on Page 2.
- **Field Reversible Mounting** - Simply follow the instructions provided on the inside of the instrument's cover. Again, no special tools and no additional parts are required.
- **Marine Service** - The Model 3900 Liquid Level Switch comes standard with stainless steel internals for marine type environments.
- **NACE** - The Model 3900 Liquid Level Switch can be made to meet NACE MR-01-75 material specifications for sour service.



## Specifications

### Process Connection

Threaded:	1" FNPT
Flanged <sup>1</sup> :	2"
Butt Weld <sup>1</sup> :	1", 1.5", and 2"
Socket Weld <sup>1</sup> :	1"

### Displacer Cage Pressure Rating<sup>2</sup>

FNPT, BW, SW:	2250 psig (155 bar)
Flanged:	
• 150# RF	275 psig (19 bar)
• 300# RF	740 psig (51 bar)
• 600# RF	1480 psig (102 bar)
• 600# RTJ	1480 psig (102 bar)
• 900# RF	2220 psig (152 bar)
• 900# RTJ	2220 psig (152 bar)

### Temperature Limit

-20 to 400°F (-29 to 204°C)

### Switch Type

Pneumatic Snap Pilot (On/Off), standard  
 Electric SPDT, optional (rated Class I, Group B/C/D, Div. 1)  
 Electric DPDT, optional (rated Class I, Group B/C/D, Div. 1)

### Minimum Allowable Fluid Specific Gravity

Snap Pilot:	0.50
SPDT Switch:	0.50
DPDT Switch:	0.75

### Supply Pressure Requirements (Pneumatic Pilot)

0-20 psig output: 25 psig supply  
 0-30 psig output: 35 psig supply

### Electric Switch Rating

SPDT:	15A @ 125, 250, or 480 VAC
DPDT:	10A @ 125 or 250 VAC

### Supply & Output Connections

Pneumatic Pilot: 1/4" FNPT  
 Electric Switch: 1/2" FNPT (Conduit Connection)

### Materials of Construction

#### Level Switch:

Case / Cover: Anodized Die-Cast Aluminum  
 Snap Pilot: Anodized Aluminum with Aluminum Seat and SST Internals  
 Gauges: Bronze Internals (standard)  
 316 SST Internals (optional)  
 316 SST, Liquid-Filled (optional)  
 Brass Internals, Liquid-Filled (optional)

#### Cage / Body Assembly:

Cage: WCC Steel  
 Body: 1018 Steel  
 Displacer: 316 SST (standard)  
 Alloy 20 (optional for NACE)  
 Displacer Arm: 304 SST  
 Seals: Viton (standard)  
 Buna-N (optional)

1. Top / bottom connections only.

2. Maximum pressure ratings at 100°F (38°C).

## Switch Action

*Action* refers to the change in instrument output that results from a change in instrument input. The input is the liquid level, which is detected through the mechanical force applied to the instrument linkage from the relative weight of the displacer. The output is the "making" or "breaking" of a circuit. A reverse acting level switch is one that "breaks" a circuit on rising level. A direct acting level switch is one that "makes" a circuit on rising level.

The Model 3900 Liquid Level Switch is available in either direct or reverse acting configurations. For switches equipped with the pneumatic snap pilot, "making" the pneumatic circuit means connecting supply air to the output port in order to pressurize a signal-receiving device. "Breaking" the pneumatic circuit is done by connecting the exhaust port to the output port to remove pressure from the signal-receiving device. Changing the switch action is done by moving the Flapper Bar pivot point to the opposite side of the switch housing. This is easily performed in the field and requires no special tools.

For switches equipped with electric SPDT or DPDT pilots, "making" the electrical circuit means closing the electrical contacts, while "breaking" the circuit means opening the electrical contacts. The switch is supplied with three leadwires per set of contacts - "C" (common), "NO" (normally open), and "NC" (normally closed) - and a ground leadwire. A direct acting switch (contacts to close on rising level) is achieved by using "C" and "NO" wires. A reverse acting switch (contacts to open on rising level) is achieved by using "C" and "NC" wires.

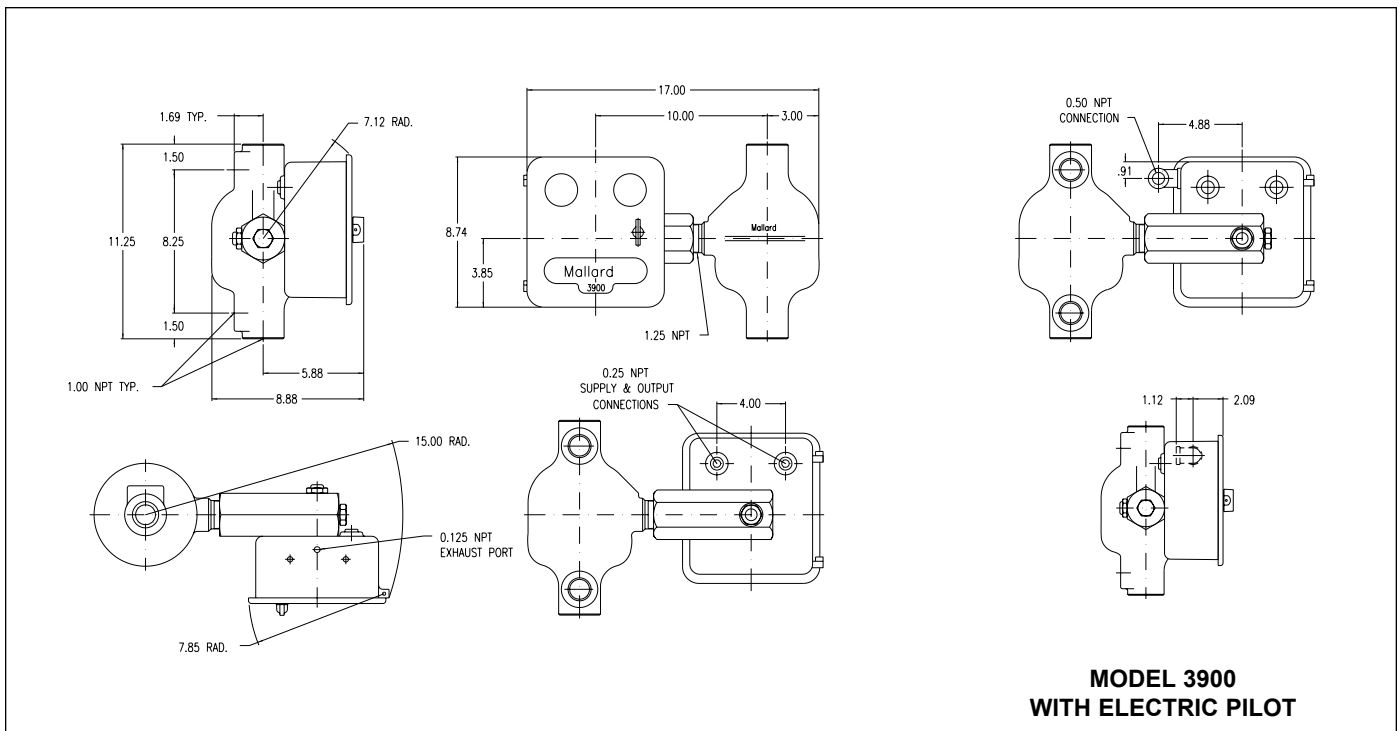
**IMPORTANT NOTE:** Moving the Flapper Bar pivot point is not necessary to change switch action for electrical switches. All Model 3900 switches with electric pilots are shipped from the factory conforming to the above wiring requirements. If the Flapper Bar pivot point is reversed, the action of the switch contacts will be reversed.

### Approximate Shipping Weight, Pounds (Kg)

Connection Type	Process Connection					
	1"		1.5"		2"	
	Lbs	(Kg)	Lbs	(Kg)	Lbs	(Kg)
FNPT	47	(21)	-	-	-	-
Butt Weld <sup>1</sup>	-	-	-	-	47	(21)
Socket Weld <sup>1</sup>	47	(21)	-	-	-	-
150# RF <sup>1</sup>	52	(23)	54	(25)	59	(27)
300# RF <sup>1</sup>	55	(25)	59	(27)	63	(29)
600# RF <sup>1</sup>	55	(25)	63	(29)	67	(31)
600# RTJ <sup>1</sup>	55	(25)	63	(29)	67	(31)
900# RF <sup>1</sup>	64	(29)	81	(37)	95	(43)
900# RTJ <sup>1</sup>	64	(29)	81	(37)	95	(43)

1. Top / bottom connections only.

### Dimensions:



### Model Number Information

Sample Model Number: 3900 - 10 FS - S V RD - S M

PROCESS CONNECTION SIZE	CODE		
1"	10		
1.5"	15		
2"	20		

PROCESS CONNECTION STYLE	CODE	
FNPT (Screwed)	FS	
Socket Weld	SW	
Butt Weld, Sch. 40	B4	
Butt Weld, Sch. 80	B8	
Butt Weld, Sch. 160	B1	
<b>Flanged</b>	<b>RF</b>	<b>RJ</b>
ANSI 150	F1	J1
ANSI 300	F3	J3
ANSI 600	F6	J6
ANSI 900	F9	J9

ANSI CLASS (PRESSURE RATING)			CODE
<b>Cage / Body</b>	<b>Displacer</b>	<b>Shaft/Blk Brng</b>	
WCC Steel	316 SST	303 SST	-
WCC Steel	316 SST	316 SST	A
WCC Steel (NACE)	Alloy 20	316 SST	N

PILOT	CODE
Pneumatic Snap	S
Electric SPDT, Explosion-Proof	E
Electric DPDT, Explosion-Proof	D

SEAL MATERIAL	CODE
Viton (standard)	V
Buna-N	B
Special	(specify)

MOUNTING ORIENTATION / SWITCH ACTION	CODE
Left Hand / Direct (Open Pneumatic Pilot on Rising Level)	LD
Left Hand / Reverse (Open Pneumatic Pilot on Falling Level)	LR
Left Hand / Electric Pilot	LE
Right Hand / Direct (Open Pneumatic Pilot on Rising Level)	RD
Right Hand / Reverse (Open Pneumatic Pilot on Falling Level)	RR
Right Hand / Electric Pilot	RE

SUPPLY / OUTPUT GAUGES	CODE
Standard Service	S
316 SST	6
Brass, Liquid-Filled	B
316 SST, Liquid-Filled	D

CASE	CODE
Marine Service	M
Marine Service with Piped Exhaust	N

While this information is presented in good faith and believed to be accurate, Mallard Control Company does not guarantee results based upon such information. Mallard Control Company reserves the right to change the design or specifications of these products without notice.

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