




Series 291

# Welded Chamber

Single Stage, Low Cost, Hermetically Sealed Snap


Switches, Series 291: Pressure 300 psig (24 bar) to 600°F (315°C)





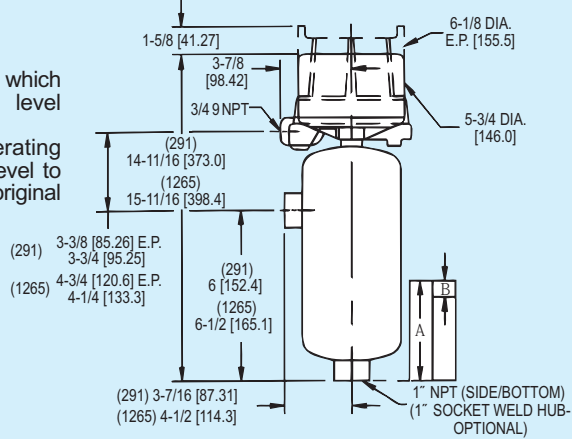
Series 293 has one vertical and one horizontal flanged connection (1" RF forged steel - ANSI specifications). Flange centerlines: 9 1/4" (235 mm). Other centerlines available.

Series 294 has two vertical flanged connections (1" RF forged steel - ANSI specifications). Flange centerlines: 10" (254 mm). Other centerlines available.



Series 291 has one vertical and one horizontal 1" NPT pipe connection. 1" socket weld optional.

"A" is the level at which stage operates on level rise.  
"B" is the operating differential drop in level to restore switch to original position.



Technical drawing showing dimensions for Series 291. Key dimensions include: 1-5/8 [41.27], 3-7/8 [98.42], 3/4 9 NPT, 6-1/8 DIA. E.P. [155.5], 5-3/4 DIA. [146.0], 14-11/16 [373.0], 15-11/16 [398.4], 3-3/8 [85.26] E.P., 3-3/4 [95.25], 4-3/4 [120.6] E.P., 4-1/4 [133.3], 6 [152.4], 6-1/2 [165.1], 3-7/16 [87.31], 4-1/2 [114.3], and 1" NPT (SIDE/BOTTOM) (1" SOCKET WELD HUB- OPTIONAL).

**Series 291**  
**Switch Level Change**  
**Single Stage-Not Adjustable**

CODE	SP GR	A	B
C1-60	1.0	3 1/4" (82.55 mm)	7/8" (22 mm)
	0.60	3 5/8" (92 mm)	1 1/8" (28.6 mm)

**Series 291:** Inexpensive yet rugged construction in a welded chamber control. The 291 series is specifically designed for single stage operation where pressure does not exceed 350 psig (24 bar) at 100°F (38°C) or 300 psig (21 bar) at 600°F (315°C) available with a variety of hermetically sealed snap switch or mercury switch circuits protected by a general purpose, weatherproof or explosion-proof enclosure and will accommodate specific gravities down to 0.60.

### APPLICATIONS

Refineries, chemical plants, power generating stations, water treatment facilities.

### SPECIFICATIONS

**C1-60:** Minimum specific gravity. Process pressure 350 psig (24 bar) at 100°F (38°C), 300 psig (21 bar) at 600°F (315°C).\*

**Temperature Limits:** Ambient Temperature: 212°F (100°C); Process Temperature: 600°F (315°C).\*

\*Heat fins and/or high temperature switches must be used for process temperatures above 600°F (315°C).

**Switch Type:** Snap action or mercury. See charts A and B.

**Electrical Rating:** See chart.

**Wiring Connections:** G, WT or E enclosure, terminal block. EV enclosure 18" (460 mm) leads.

**Process Connection:** 1" NPT (socket weld hubs or flanged optional).

**Enclosures:** G, painted steel and aluminum; WT, painted steel, aluminum and neoprene; E, aluminum; EV, aluminum and neoprene.

**Wetted Parts:** C1 construction, carbon steel, 303SS, 304SS, 430SS.

**Weight:** 291, 10 lb (4.5 kg); 293, 15 lb (6.8 kg); 294, 17 lb (7.7 kg).

### Suggested Specifications

Liquid level control shall be 291 (293) (294) series with 1" NPT (socket weld hubs) (flanged) process connections. Chamber shall be welded carbon steel (316SS) suitable for operation at 350 psig (24 bar) at 100°F (38°C) and 300 psig (21 bar) at 600°F (315°C) with a minimum specific gravity of 0.60. Circuit shall be (hermetically sealed) snap action (mercury) switch (SPST) (SPDT) (DPDT). Switch mechanism shall be gravity return activated by a stainless steel float. Enclosure shall be general purpose, (weatherproof), (explosion-proof), (explosion-proof, vapor proof).

Level

## MODEL CHART – SERIES 291

<b>EXAMPLE</b>	291	WT	7810BN	C1	60	291-WT-7810-C1-60. Liquid level control with welded carbon steel chamber. General purpose enclosure. Single pole double throw snap action switch rated at 12 amp 120 VAC; 5 amp 240 VAC. Fixed deadband and automatic reset. Operating pressure 350 psig (24 bar) at 100°F (38°C), 300 psig (21 bar) at 600°F (315°C). Side/bottom process connections 1" NPT. Minimum specific gravity 0.60.	
<b>ENCLOSURE</b>		G WT E EV				General purpose, NEMA-1. Weather proof, NEMA-3R, 4, 4X. Explosion proof, NEMA-7, 9. Class I Groups B, C, D. Class II Groups E, F, G. Explosion proof, vapor proof, NEMA-7, 9. Class I Groups B, C, D. Class II Groups E, F, G.	UL UL UL UL
<b>CIRCUITS</b>  (For Electrical Circuits see charts A & B below.)			48XXBN 78XXBN 98XXBN			Single stage. Mercury switch. See Chart A. Single stage. Snap switch. See Chart B. Single stage. High capacity DC snap switch. Use heat fins (HF) if process temperature exceeds 350°F (177°C). Do not exceed 450°F (232°C). See Chart B.	
<b>WELDED CHAMBER CONSTRUCTION 1" NPT PROCESS CONNECTIONS</b>	291			C1 C1	60	Carbon steel body. Minimum specific gravity 0.60. Side/bottom process connections. 19 NPT. Pressure rating 350 psig (24 bar) at 100°F (38°C), 300 psig (21 bar) at 600°F (315°C).	UL UL
<b>WELDED CHAMBER CONSTRUCTION WITH FLANGED PROCESS CONNECTIONS</b>	293			C1	160	1" 150# RF flanges side/bottom process connection. Pressure rating 275 psi (19 bar) at 100°F (38°C), 150 psi (10 bar) at 600°F (315°C). Minimum specific gravity 0.60.	UL
	293			C1	360	1" 300# RF flanges side/bottom process connection. Pressure rating 350 psi (24 bar) at 100°F (38°C), 300 psi (21 bar) at 600°F (315°C). Minimum specific gravity 0.60.	UL
	294			C1	160	1" 150# RF flanges side/side process connection. Pressure rating 275 psi (19 bar) at 100°F (38°C), 150 psi (10 bar) at 600°F (315°C). Minimum specific gravity 0.60.	UL
	294			C1	360	1" 300# RF flanges side/side process connection. Pressure rating 350 psi (24 bar) at 100°F (38°C), 300 psi (21 bar) at 600°F (315°C). Minimum specific gravity 0.60.	UL
<b>OPTIONS</b>				C216	H2	316SS chamber and trim. 430SS armature. 1" socket weld hubs in place of 1" NPT process connections.	

## CHARTS A & B - ELECTRICAL CIRCUITS AND RATINGS

SWITCH TYPE	SWITCH ACTION	ELECTRICAL RATINGS IN AMPS						291 SERIES ORDERING CODE	
		AC			DC				
		120V	240V	440V	30V	125V	250V		
<b>CHART A</b>  Mercury Contacts	SP-ST Open on level FALL	10	5	3†		10	5	-4821 BN	UL
	SP-ST Open on level RISE	10	5	3†		10	5	-4820 BN	UL
	SP-DT One Switch	4	2	1†		4	2	-4810 BN	UL
	SP-DT Two switches E.I.*	10	5	3†		10	5	-4815 BN	UL
	DP-ST Two switches E.I.* Open on level FALL	10	5	3†		10	5	-4813 BN	UL
	DP-ST Two switches E.I.* Open on level RISE	10	5	3†		10	5	-4814 BN	UL
	DP-DT Two SP-DT switches	4	2	1†		4	2	-4806 BN	UL
<b>CHART B</b>  Snap Action Contacts	SP-DT One switch	12	5	3†		0.5**	0.25**	-7810 BN	UL
	DP-DT Two SP-DT switches	12	5	3†		0.5**	0.25**	-7806 BN	UL
	SP-DT One hermetically sealed switch	5	5		5**			-7810HM	
	DP-DT Two hermetically sealed SP-DT switches	5	5		5**			-7806HM	
	DP-DT Two SP-DT switches	10	3			10‡	3‡	-9806 BN	
	SP-DT One switch	10	3			10‡	3‡	-9810 BN	

\*Electrically Independent  
‡10 Amp inductive (Polarized) at 125 VDC

†Available on special order. Change 1st digit in Ordering Code from 4 to 5 or 7 to 8  
i.e. -4820 becomes -5820, -7810 becomes -8810, etc.

\*\*Resistive