

Pressure, Vacuum, and Float Switches



**XMLG
Pressure Sensor**
p. 22-4



**XMLF Electronic
Pressure Switch**
p. 22-6



**9012G
Industrial Pressure Switch**
p. 22-11



**9012G Machine Tool
Pressure Switch**
p. 22-12



**XMLA Electromechanical
Pressure Switch**
p. 22-8



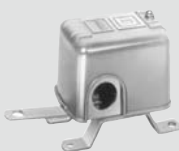
**9016G
Vacuum Switch**
p. 22-17



**9013F
Water Pump Switch**
p. 22-19



**9013G
Air Compressor Switch**
p. 22-20



**9036D
Open Tank Float Switch**
p. 22-21



**9037H
Closed Tank Float Switch**
p. 22-23

Electronic—Industrial

<i>New!</i> Pressure Sensors	XMLG	22-4
Electronic Pressure Switches	XMLF	22-6

Electromechanical—Industrial






<i>New!</i> Pressure Switches	XMLA, B, C, D Compact International	22-8
	9012G General Industrial	22-11
	9012G Machine Tool	22-12
	9012G Dual Stage and Differential	22-13
Vacuum Switches	9016GAW, GAR	22-17

Electromechanical—Commercial

Vacuum Switches	9016GVG	22-17
Pressure Switches	9013FHG—Air Compressor	22-18
	9013FRG, FSG, FYG—Water Pump	22-19
	9013G—Air Compressor	22-20
Float Switches	9036D, G—Open Tank	22-21
	9036FG—Open Tank	22-22
	9037E—Closed Tank	22-22
	9037H—Closed Tank	22-23
	9038A—Alternators, Open Tank	22-24
	9038C, D—Alternators, Closed Tank	22-24

Renewal Parts

Renewal Part Kits	Class 9998, for Class 9012–9038	22-26
-------------------	---------------------------------	-------

Application	Electronic	Electromechanical Control			
					

Product Family	XMLG	XMLF	XMLA, B, C, D	9012G	9016G
Type of Installation/ Application	Control circuits	Control circuits	Control circuits	Control circuits	Control/power circuits
Fluids Controlled	Air, water, hydraulic oils, corrosive fluids				
Type of Operation and Features	Pressure/vacuum switches and transmitters Analog output 4–20 mA or 0–10 V	Pressure/vacuum switches and transmitters Configurable units with digital display Analog output 4–20 mA Regulation between 2 trip points (adjustable differential)	Pressure/vacuum switches Detection of single trip point (non-adjustable differential) Regulation between 2 trip points (adjustable differential)	Pressure switches Detection of single trip point (non-adjustable differential) Regulation between 2 trip points (adjustable differential) 2-stage	Vacuum switches Regulation between 2 trip points (adjustable differential)
Size/Range (PSI)	-14.5 to 5800 psi	-14.5 to 8700 psi	-14.5 to 7250 psi	0.2 to 9000psi	0 to 29 inches of Hg
Type of Output	Analog, 4–20 mA or 0–10 V Digital, PNP or NPN normally closed (NC) output	Analog, 4–20 mA Digital, PNP or NPN, 200 mA, Relay output 2 A	Snap action contacts SPDT or DPDT 10 A continuous	Snap action contacts SPDT or DPDT 10 A continuous	Snap action contacts SPDT 10 A continuous DPST horsepower rated
Electrical Connection	M12 connector or Integrated quick connection	M12 connector, Snap-C™ compatible SAE 7/8-16 UN2A	Cable entry for No. 13 (DIN PG13.5) Cable Gland	1/2" -14 NPT Cable entry 20 mm	1/2" -14 NPT Cable entry 20 mm
Fluid Connection	G 1/4" BSP internal, 1/4" NPT internal SAE 7/16"-20 UNF female	G 1/4" BSP internal, 1/4" NPT internal SAE 7/16"-20 UNF female	G 1/4" BSP internal, 1/4" NPT internal 1/4"-18 NPT external	1/4" - 18 NPTF internal 7/16"-20 UNF-2B internal G 1/4" BSP internal G 1/4"-19 BSP internal	G 1/4" BSP internal, 1/4" NPT internal 1/4" - 18 NPT external
Fluid Characteristics	Hydraulic oils, air, fresh water, sea water, corrosive fluids from -15 to +125 °C (5 to +257 °F)	Hydraulic oils, air, fresh water, sea water, corrosive fluids from - 15 to +80 °C (5 to +176 °F)	Hydraulic oils, air, fresh water, sea water (0 to +160 °C), depending on model Steam, corrosive fluids, viscous products (0 to +160 °C), depending on model	Hydraulic oils, air, fresh water, sea water, corrosive fluids from -26 to +120 °C (-15 to +250 °F) depending on model	Hydraulic oils, air, fresh water, sea water, from -26 to +120 °C (-15 to +250 °F) depending on model
Enclosure Rating	IP66, IP67 conforming to IEC/EN 60529, NEMA 4	IP67 conforming to IEC/EN 60529, NEMA 4/6/12/13	Screw terminal models: IP 66 conforming to IEC 529	NEMA Type 4, 4X, 7, 9, 13	NEMA Type 4, 4X, 7, 9, 13
Dimensions of Case width x height x depth in. (mm)	dia. 90 x 2.762.95 (dia. 22.8 x 70.1mm)	1.81 x 4.45 x 2.28 in. (46 x 113 x 58 mm)	4.45 x 1.38 x 2.95 in. (113 x 35 x 75 mm) NEMA 4: 3.50 x 3.60 x 2.63 in. (89 x 91 x 67 mm)	NEMA 1: 2.06 x 5.03 x 2.75 in. (52 x 128 x 70 mm) NEMA 4: 3.50 x 3.60 x 2.63 in. (89 x 91 x 67 mm)	Control circuit: same as 9012G Power circuit: same as 9013G
Conforming to Standards	CE, IEC/EN 60947-1, IEC/EN 60947-5-1, EN 50081-1, EN 50082-2, EN 61000-6-2	CE, IEC/EN 60947-1, IEC/EN 60947-5-1, EN 50081, EN 50082, EN 61000-6-2, EN 61000-4-2/3/4/5/6/8/11	CE, IEC/EN 60947-5-1, VDE 0660-200, UL 508, CSA C22-2 No. 14	NEMA A600 UL508	NEMA A600 UL508
Certifications	UL Listed, CSA Certified	UL Listed, CSA Certified	UL B300 - R300 Listed. CSA B300 - R300, (BV, GL, RINA, LROS pending)	UL Listed, CSA Certified	UL Listed, CSA Certified
Catalog Number	XMLG	XMLF	XMLA, XMLB, XMLC, XMLD	9012GA, 9012GC, 9012GG, 9012GH, 9012GK, 9012GM, 9012GR, 9012GS, 9012GT, 9012GN, 9012GP, 9012GQ	9016GA, 9016GV

Application	Electromechanical Power	Electromechanical Float
--------------------	--------------------------------	--------------------------------



Product Family	9013F	9013G	9036	9036	9037	9038
Type of Installation/ Application	Power circuits	Power circuits	Power circuits	Power circuits	Power circuits	Power circuits
Fluids Controlled	Fresh water, air		Fresh or sea water, hydraulic oils; suitable for corrosive fluids except for cast iron bushing (shown above)			
Type of Operation and Features	Pressure switches Detection of single trip point (non-adjustable differential) Regulation between 2 trip points (adjustable differential)	Pressure switches Regulation between 2 trip points (adjustable differential)	Liquid level control in Open tanks—either pumping in or pumping out of tank	Liquid level control in Open tanks—either pumping in or pumping out of tank	Liquid level control in Closed tanks for condensate, return heating water, fuel oil, etc.	Liquid level control in Open or Closed tanks—two pumps alternate, and both pumps run in peak demand
Size/Range (psi)	6 to 200 psi	10 to 250 psi	—	—	—	—
Type of Output	2-pole, snap action contacts HP rated	2-pole, snap action contacts HP rated	2-pole, snap action contacts HP rated	2-pole, snap action contacts HP rated	2-pole, snap action contacts HP rated	2 sets of 2-pole, snap action contacts HP rated
Electrical Connection	2 1/2" NPT conduit entries	2 1/2" NPT conduit entries	2 1/2" NPT conduit entries	2 1/2" NPT conduit entries	2 1/2" NPT conduit entries	4 1/2" NPT conduit entries
Fluid Connection	1/4" NPSF internal, 1/4" NPT external, plus other options	1/4" NPSF internal, 1/4" NPT external	Open tank	Open tank	Closed tank	Open tank (9038A) Closed tank (9038C, D)
Fluid Characteristics	Fresh water, air		Fresh water, sea water, hydraulic oils (and corrosive fluids, depending on model) with a density ≥ 0.8			
Enclosure Rating	NEMA Type 1 (NEMA Type 3R in the vertical position only) IP20	NEMA Type 1, 3R, 7, 9 IP20	NEMA Type 1, 4, 7, 9	NEMA Type 1, 4, 7, 9	NEMA Type 1, 4, 7, 9	NEMA Type 1, 4, 7, 9
Dimensions of Case width x height x depth in. (mm)	3.76 x 2.8 x 2.78 in. (95.5 x 71.12 x 70.6mm)	3.68 x 3.85 x 3.44 in. (93.47 x 97.79 x 87.37mm)	See page 22-21	See page 22-21	See pages 22-22, 22-23	See page 22-24
Conforming to Standards	NEMA A600 UL508	NEMA A600 UL508	NEMA A600 UL508	NEMA A600 UL508	NEMA A600 UL508	NEMA A600 UL508
Certifications	UL Listed, CSA Certified	UL Listed, CSA Certified	UL Listed, CSA Certified	UL Listed, CSA Certified	UL Listed, CSA Certified	UL Listed, CSA Certified
Catalog Number	9013FS, 9013FR, 9013FH, 9013FT, 9013FY	9013GS, 9013GH, 9013GM	9036DG, 9036DW, 9036DR, 9036FG	9036GG, 9036GW, 9036GR	9037EG, 9037EW, 9037ER, 9037HG, 9037HW, 9037HR	9038AG, 9038AW, 9038AR, 9038CG, 9038CW, 9038CR, 9038DG, 9038DW, 9038DR

22
**PRESSURE, VACUUM, AND
FLOAT SWITCHES**

New!

XMLG pressure transmitters and pressure switches are characterized by their ceramic pressure measuring cell. The deformation caused by the pressure is transmitted to the resistors of a Wheatstone bridge silk-screened on the ceramic. The change in resistance is then processed by the integrated electronics, providing either a digital or analog output signal.

Table 22.1: Specifications

Enclosure Rating	IP66, IP67 conforming to IEC/EN 60529, NEMA 4
Ambient Temperature (Operation)	-15 to +85 °C (+5 to +185 °F)
Media Temperature	-15 to +125 °C (+5 to +257 °F)
Precision (Linearity, Repeat Accuracy, Hysteresis)	Transmitters: <0.3%; pressure/vacuum switches: <1%
Repeat Accuracy (PNP/NPN output)	0.1% of the measuring range
Maximum Load Current	Transmitters: < 20 mA; pressure/vacuum switches: <4 mA
Rated Voltage	12/24 V for transmitters and pressure/vacuum switches
Voltage Limits	24 V for transmitters and pressure/vacuum switches
Fluids Controlled	Hydraulic oils, air, fresh/sea water, corrosive fluids from -15 to +125 °C (+5 to +257 °F)
Materials in Contact with Fluid	Ceramic Al ₂ O ₃ , stainless steel type AISI 303, Viton® FPM, PPS (leakage protection for P> 40 bar)
Output Response Time	<2 ms



Table 22.2: Interpretation of the Catalog Number (example: XMLG100D21TQ)

XML	10	D	2	1	TQ
Units without display, 22.8 mm diameter	Rated pressure Code psi bar	Electrical connection	Output	Fluid connection	Bulk pack
	M01 -14.5 to 0 -1 to 0 001 0 to 14.5 0 to 1 010 0 to 145 0 to 10 025 0 to 362.5 0 to 25 100 0 to 1450 0 to 100 250 0 to 3625 0 to 250 400 0 to 5800 0 to 400	D: M12 Q: Integrated quick connect	1: DC Analog, 4–20 mA, shunt calibration 2: Analog, 4–20 mA 3: Solid state, NPN 4: Solid state, PNP 7: Analog, 0–10 V (bulk packs only) 11: DC Analog, 0–10 V shunt calibration	1: G 1/4 A (BSP male) 3: 1/4" NPT male 7: 7/16-20 UNF male	

NOTE: Use this table only to interpret the catalog number. Some combinations are not available.

Table 22.3: Selection

Range	Fluid Connector	Electrical Connector	Catalog Number ▲ ■		SPrice	
			Analog Output, 4–20 mA	Analog Output, 0–10 Vdc		
-14.5 to 0 psi	-1 to 0 bar	1/4" NPT Male	M12	XMLGM01D23	XMLGM01D73	220.
0 to 14.5 psi	0 to 1 bar			XMLG001D23	XMLG001D73	220.
0 to 87 psi	0 to 6 bar			XMLG006D23	XMLG006D73	220.
0 to 145 psi	0 to 10 bar			XMLG010D23	XMLG010D73	220.
0 to 232 psi	0 to 16 bar			XMLG016D23	XMLG016D73	220.
0 to 362.5 psi	0 to 25 bar			XMLG025D23	XMLG025D73	220.
0 to 1450 psi	0 to 100 bar			XMLG100D23	XMLG100D73	220.
0 to 2320 psi	0 to 160 bar			XMLG160D23	XMLG160D73	220.
0 to 3625 psi	0 to 250 bar			XMLG250D23	XMLG250D73	220.
0 to 5800 psi	0 to 400 bar			XMLG400D23	XMLG400D73	220.

- ▲ For devices with a switch output or 0–10 Vdc analog output, contact your local Schneider Electric field office.
- For a bulk package (25 units), add TQ to the end of the catalog number. The minimum order quantity is 50 units (two bulk packs). When ordering, specify the individual number of units, NOT the number of bulk packs. The bulk price per unit is \$150 each. Minimum order quantity for factory ordered individual items (non-stock) is 48 pieces.

NOTE: For pressure sensors, settings must be specified for each order.

Table 22.4: Wiring Configurations (M12)

Output	Pin 1	Pin 3	Pin 4
Analog, 4–20 mA	+ Power supply	Output	—
Analog, 0–10 Vdc	+ Power supply	Output	Ground
Solid State, NPN	+ Power supply	Ground	Output
Solid State, PNP	+ Power supply	Ground	Output



For wiring diagrams, refer to Table 22.5 on page 22-5.

22 PRESSURE, VACUUM, AND FLOAT SWITCHES



XMLG...D
M12 Connector

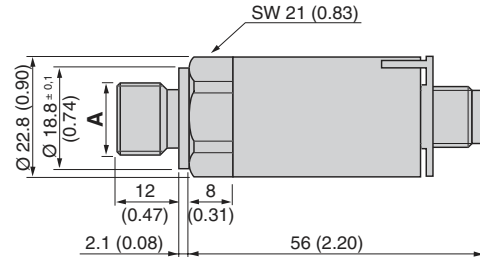


XMLG...Q
Quick Connect

For connectors and cables, see Table 22-09 on page 22-7.

Figure 22.1: Dimensions

XMLG*D**., M12 x 1 Connection**



Dimension A

XMLG***D2**1	G 1/4 A (BSAP Male)
XMLG***D2**3	1/4" NPT Male
XMLG***D2**7	7/16-20 UNF Male

XMLG*Q**., Integrated Quick Connection**

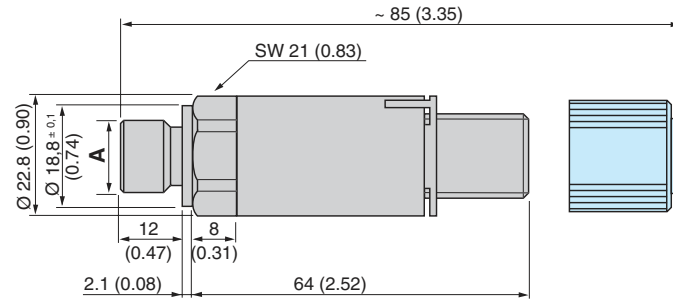


Table 22.5: Connector Wiring

Pressure Transmitters		Electronic Pressure Switches	
M12	Integrated Quick Connection	M12	Integrated Quick Connection
<p>2-wire (4–20 mA)</p>	<p>2-wire (4–20 mA)</p>	<p>3-wire (PNP)</p>	<p>3-wire (PNP)</p>
<p>3-wire (0–10 V)</p>	<p>3-wire (0–10 V)</p>	<p>3-wire (NPN)</p>	<p>3-wire (NPN)</p>

For wiring configurations, refer to Table 22.4 on page 22-4.

XMLF is a user-friendly electronic pressure switch with an easy-to-read four digit display and finger-operated adjustment buttons for scrolling up and down through the menu functions. Burst pressure is six times the nominal pressure (up to 1,800 bar or 26,100 psi).

- DC versions protected against reverse polarity, short circuit, and overvoltage.
- DC versions are double insulated
- Response time display: 3 levels (slow-normal-fast)

Available in four versions:

- Universal sensor with 1 analog output (4–20 mA) and 1 digital output
- Universal sensor with 1 analog output (1–10 V) and 1 digital output
- Dual stage sensor, 2 digital outputs, 24 Vdc (17-33 Vdc)
- Electronic pressure switch with relay output, 120 Vac (102–132 Vac)

The XMLF electronic pressure switch can be set without any tools once hooked up to a 24 Vdc power supply. It is ergonomically designed to be easy to hold and set in your hand. The pressure connection is on the bottom of the switch and the electrical connector on the top, giving a slim, straight-through profile to the switch. It has built-in water hammer resistance. It is available in AC and DC versions that both feature a 4-digit LED display. It is programmable to display either bar or psi. It also has a programmable feature for NPN–PNP and N.O. or N.C. solid state outputs.

Window mode (FEN) allows the switch to operate between a selected minimum and maximum range. Outputs change state when the pressures goes outside the window setting.

Table 22.6: Specifications

Enclosure Rating	IP67 NEMA 4, 6, 12, 13
Ambient Temperature	-25 to +80 °C (-15 to + 176 °F)
Media Temperature	-15 to +80 °C (+5 to + 176 °F)
Precision (Linearity, Repeat Accuracy, Hysteresis)	2% of the nominal pressure
Repeat Accuracy (PNP/NPN output)	0.5%
Maximum Load Current	DC: 200 mA for 17–33 Vdc; AC: 2.5A AC15 C300

Table 22.7: Interpretation of the Catalog Number (example: XMLF100D2025)

XMLF	100	D	2	02	5	
Configurable	Rated pressure		Electrical Connection	With Viewing Window	Output	Fluid Connection
	Code	psi	bar			
	M01	-14.5 to 0	-1 to 0	D: M12 DC only E: 7/8-16 UN2A AC only	01: DC Analog 4–20 mA, shunt calibration 02: DC Analog 4–20 mA, digital single stage 11: DC Analog 0–10 V, shunt calibration 12: DC Analog 0–10 V, digital single stage 03: DC digital dual stage 04: AC Relay 120 V	5: 1/4" BSP female 6: 1/4" NPTF female 9: SAE 7/16-20 UNF female
	002	0 to 36.25	0 to 2.5			
	010	0 to 145	0 to 10			
	016	0 to 232	0 to 16			
	025	0 to 362.5	0 to 25			
	040	0 to 580	0 to 40			
	070	0 to 1015	0 to 70			
	100	0 to 1450	0 to 100			
	160	0 to 2320	0 to 160			
	250	0 to 3625	0 to 250			
	400	0 to 5800	0 to 400			
	600	0 to 8700	0 to 600			

NOTE: Use this table only to interpret the catalog number. Some combinations are not available.

Table 22.8: Selection

Catalog Number	Range	Output	Pressure Connector	Electrical Connector	\$ Price
AC Versions					
XMLF010E2046	0 to 145 psi	Relay (2.5 A)	1/4" NPT Female	SAE7/8-16UNF	525
XMLF070E2046	0 to 1015 psi	Relay (2.5 A)	1/4" NPT Female	SAE7/8-16UNF	525
DC Versions					
XMLFM01D2026	-14.5 to 0 psi	Analog with single stage	1/4" NPT Female	M12	500
XMLF010D2026	0 to 145 psi		1/4" NPT Female	M12	500
XMLF070D2029	0 to 1015 psi		SAE7/16-20 Female	M12	500
XMLF400D2029	0 to 5800 psi		SAE7/16-20 Female	M12	500
XMLF010D2039	0 to 145 psi	Dual stage	SAE7/16-20 Female	M12	500
XMLF070D2039	0 to 1015 psi		SAE7/16-20 Female	M12	500
XMLF400D2039	0 to 5800 psi		SAE7/16-20 Female	M12	500
XMLF010D2036	0 to 145 psi		1/4" NPT Female	M12	500
XMLF070D2036	0 to 1015 psi		1/4" NPT Female	M12	500



File E164865
CCN NKPZ



File LR44087
Class 3211-03



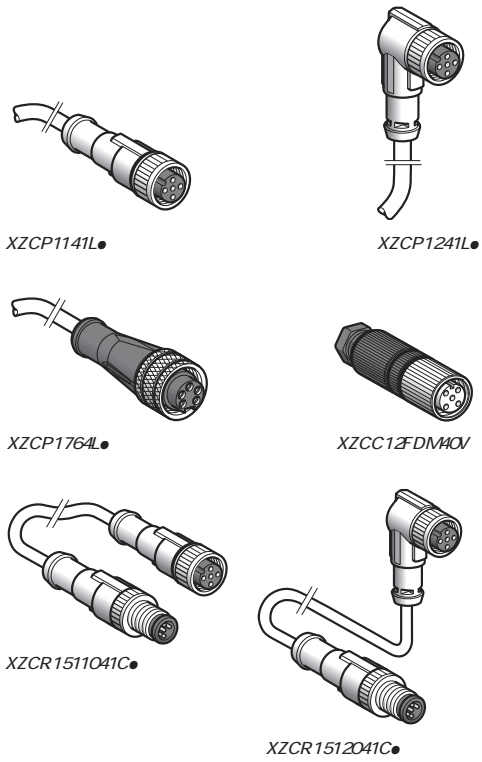


Table 22.9: Connectors and Cables

Description	Cable Length m (ft)	Catalog Number	Weight g (oz)	\$ Price	
Phoenix Contact QUICKON connector	—	XMLGZ001	—	5.00	
Pre-wired M12 female connector with cable	Straight black PVR	2 (6.6)	XZCP1141L2	115 (4.06)	13.50
		5 (16.4)	XZCP1141L5	270 (9.52)	18.00
		10 (32.8)	XZCP1141L10	520 (18.34)	24.80
	Straight yellow PVC	2 (6.6)	XZCD101Y	90 (3.17)	13.50
		5 (16.4)	XZCD102Y	190 (6.70)	18.00
		10 (32.8)	XZCD103Y	370 (13.05)	22.50
90°	2 (6.6)	XZCP1241L2	115 (4.06)	13.50	
	5 (16.4)	XZCP1241L5	270 (9.52)	18.00	
	10 (32.8)	XZCP1241L10	520 (18.34)	24.80	
Pre-wired 7/8" 16UN, female connector with cable	Straight	2 (6.6)	XZCP1764L2	185 (6.53)	37.50
		5 (16.4)	XZCP1764L5	460 (16.23)	53.00
		10 (32.8)	XZCP1764L10	900 (31.75)	40.00
M12-M12 jumper cables with straight male connector, for splitter box	Straight female connector	1 (3.3)	XZCR1511041C1	65 (2.29)	28.50
		2 (6.6)	XZCR1511041C2	95 (3.35)	27.80
	90° female connector	1 (3.3)	XZCR1512041C1	65 (2.29)	26.30
		2 (6.6)	XZCR1512041C2	95 (3.35)	27.80

▲ Connector incorporating IDCs (insulation displacement connectors) for quick, direct, in-line connection to cable without a screwdriver or soldering iron.

Table 22.10: Accessories

Description	Catalog Number	Weight g (oz)	\$ Price
Sealing gasket	XMLZL010	15 (0.48)	0.50
Mounting bracket	XMLZL008	37 (1.19)	62.00
Cooler for versions with 1/4" BSP fluid connection	XMLZL009	370 (11.90)	124.00

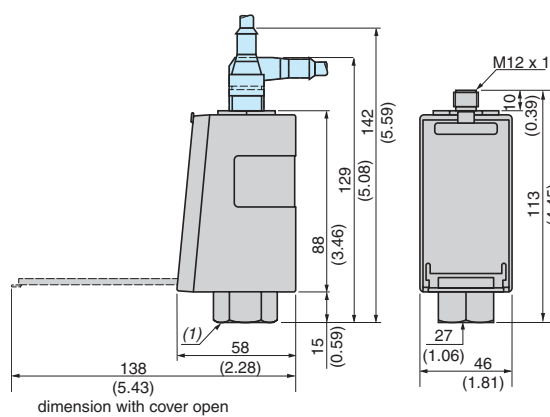
Table 22.11: Wiring Configurations

Version	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5
AC (5-pin E)	Power supply	Power supply	Ground	+ Relay	- Relay
DC (4-pin D), analog or single stage	+ Power supply	4-20 mA	- Power supply	Single stage	
DC (4-pin D), dual stage	+ Power supply	Second stage	- Power supply	First stage	

Table 22.12: Electrical Connections

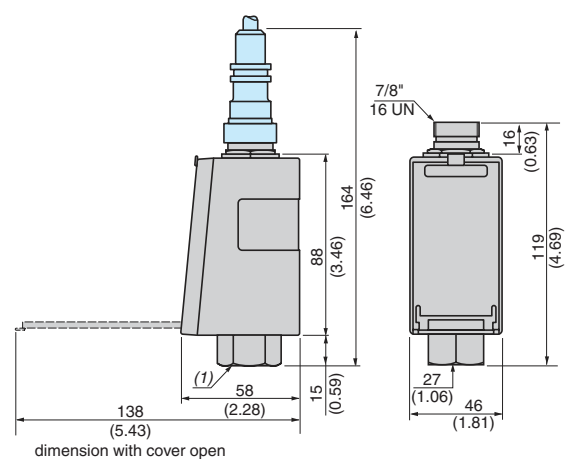
	AC Connector	DC Connector										
Wiring	<ol style="list-style-type: none"> L1 Power L2 Power Ground Relay Relay 	<table border="0"> <tr> <td>Analog</td> <td>Dual Stage</td> </tr> <tr> <td>1. + Power Supply</td> <td>1. + Power Supply</td> </tr> <tr> <td>2. 4-20 mA</td> <td>2. 2nd Stage Solid-State Output</td> </tr> <tr> <td>3. - Power Supply</td> <td>3. - Power Supply</td> </tr> <tr> <td>4. Solid State, PNP or NPN</td> <td>4. 1st Stage Solid-State Output</td> </tr> </table>	Analog	Dual Stage	1. + Power Supply	1. + Power Supply	2. 4-20 mA	2. 2nd Stage Solid-State Output	3. - Power Supply	3. - Power Supply	4. Solid State, PNP or NPN	4. 1st Stage Solid-State Output
Analog	Dual Stage											
1. + Power Supply	1. + Power Supply											
2. 4-20 mA	2. 2nd Stage Solid-State Output											
3. - Power Supply	3. - Power Supply											
4. Solid State, PNP or NPN	4. 1st Stage Solid-State Output											
Rated Supply Voltage	120 Vac (102-132 Vac), N.O. - N.C. Relays, Output 2.5 A, 5 Wire	24 Vdc (17-33 Vdc), Analog PNP-NPN, N.O. Outputs, 4 Wire 24 Vdc (17-33 Vdc), Analog + Shunt Calibration, 4 Wire 24 Vdc (17-33 Vdc), Dual Stage N.O. - N.C., PNP-NPN Outputs, 4 Wire										
Display	The display shows the pressure in the circuit up to a value of twice the maximum pressure size of the device (for example, XMXF6000... displays values up to 1200 bar). If the pressure is higher than 130% of the pressure range, the display blinks. The display shows two digits after the decimal point from -1 to 2.5 bar (-14.5 to 36.25); one digit after the decimal from 10 to 70 bar (145 to 1015); and no digits after the decimal from 100 to 600 bar (1450 to 8700). In all cases, the display shows no values below 2% at the beginning of the scale.											

Figure 22.2: XMLF...D2... Dimensions



(1) Female fluid entry:
XMLF...D2...5: G 1/4 A (BSP)
XMLF...D2...6: 1/4" NPTF
XMLF...D2...9: SAE 7/16-20UNF

Figure 22.3: XMLF...E2... Dimensions



(1) Female fluid entry:
XMLF...E2...5: G 1/4 A (BSP)
XMLF...E2...6: 1/4" NPTF
XMLF...E2...9: SAE 7/16-20UNF

New!

XML international pressure switches meet IEC, Cenelec, UL and CSA standards. They are CE marked.

- Fixed differential (XMLA), adjustable differential single-pole (XMLB) or double-pole (XMLC), and dual stage (XMLD)
- Range listed is on increasing pressure (psi, bar, kPa)
- External pressure setting window available
- 1 N.O.–1 N.C. snap acting contacts standard
- Temperature range: –13 to +158 °F (–25 to +70 °C)
- Enclosure rating: IP65 with plug-in connector, IP66 with terminal connections
- Operating rate: up to 120 operations per minute for diaphragm and 60 per minute for piston
- Media connection: 1/4" NPT
- Conduit connection: 1/2" NPT

Table 22.13: Specifications

Enclosure Rating	Screw terminal models: IP66 conforming to IEC/EN 60529 Connector models: IP65 conforming to IEC/EN 60529
Ambient Temperature (Operation)	–25 to +70 C (–13 to +158 °F)
Repeat Accuracy	< 2%
Fluids Controlled	Hydraulic oils, air, fresh/sea water (0 to +160 °C) Steam, corrosive fluids, viscous products (0 to +160 °C)
Operating Rate	Piston version switches: ≤60 cycles per minute above 0 °C Diaphragm version switches: ≤20 cycles per minute above 0 °C
Operations Characteristics	–AC-15; B300 (Ue = 240 V, Ie = 1.5 A-Ue = 120 V, Ie = 3A) = DC-13; R300 (Ue = 250 V, Ie = 0.1) conforming to IEC 947-5-1 Appendix A, EN 60 947-5-1
Type of Contacts	Silver tipped contacts XMLA & XMLB: 1 C/O single-pole contact (4 terminal), snap action XMLC: 2 C/O single-pole contacts (8 terminal), simultaneous snap action XMLD: 2 C/O single-pole contacts (8 terminal), staggered snap action
Resistance Across Terminals	< 25 mΩ conforming to NF C 93-050 method A or IEC 255-7 category 3
Terminal Referencing	Conforming to CENELEC EN 50013
Short-Circuit Protections	10 A cartridge fuse type gG (gl) recommended
Connection	Screw clamp terminals Clamping capacity, min: 1 x 0.2 mm ² , max: 2 x 2.5 mm ²



XMLB

Table 22.14: Component Materials in Contact with Fluid

Pressure Switch Catalog Number	Zinc Alloy	Stainless Steel	Brass	Steel	Nitrile	PTFE	FPM, FKM	Aluminum
XMLAM01V**** / XMLM02V****	X	X ▲	—	—	X	—	—	—
XMLBM03S****	—	X ▲	—	—	—	X	—	—
XMLM05A****	X	X ▲	—	—	X	—	—	—
XMLBL05S****	—	X ■	—	—	—	X	—	—
XMLL35R****	—	X ■	—	X	—	—	X	—
XMLL35S****	—	X ■	—	—	—	X	—	—
XML001S****	—	X ■	—	—	—	X	—	—
XML002A****	X	—	—	—	X	—	—	—
XML002B****	—	—	—	X	—	—	X	—
XMLA004A****	X	—	—	—	X	—	—	—
XMLB004A****	X	—	—	—	X	—	—	—
XML004B****	—	—	—	X	—	—	X	—
XML010A****	X	—	—	—	X	—	—	—
XML010B****	—	—	X	—	—	—	X	—
XML020A**** / XML035A****	X	—	—	—	X	—	—	X
XML020B**** / XML035B****	—	—	X	—	—	—	X	—
XML070D**** / XML160D****	—	—	X	X	—	X	X	—
XML300D****	—	—	X	X	—	X	X	—
XML500D****	—	—	X1	X	—	X	X	—

▲ X2GNiMo 17-12-2 (AISI 316L)
■ X8GNiS 18-09 (AISI 303)

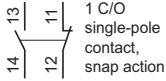
Table 22.15: Interpretation of the Catalog Number (example: XMLD070D1S13)

XML D	070	D	1	S	1	3
Contacts	Rated Pressure	Actuator	Scale	Electrical Connection	Output	Fluid Connection
A Fixed differential, single-pole contact	Code psi bar L05 0 to 0.725 0 to 0.05 L35 0 to 5.075 0 to 0.35	Diaphragm A Hydraulic oil, air, fresh/sea water (0 to 70°C)	1 Without (XMLD only) 2 With (not available on solid state devices)	S Without connector (not available on solid-state devices) C Square / DIN 43650 D D12 Micro connector	1 Contacts	Fluid Electrical 1 1/4 Gas Type 13 (PG 13,5)
B Adjustable differential, single-pole contact	M01 -14.5 to -4.06 -1 to -0.28 M02 -14.5 to -2.03 -1 to -0.14 M03 -2.9 to -.029 -0.2 to -0.02	B Hydraulic oil, air, fresh/sea water (0 to 160°C) C Corrosive fluids P Viscous fluids			2 1/4 Gas ISO M20	
C 2 adjustable differential, single-pole contacts, simultaneous	M05 -7.25 to 72.5 -0.5 to 5 001 0 to 14.5 0 to 1 002 0 to 36.25 0 to 2.5 004 0 to 58 0 to 4	R Hydraulic oil, air (0 to 160°C) S Fresh/sea water, corrosive fluids (0 to 160°C)			3 1/4 in. NPTF 1/2 in. NPT	
D 2 fixed differential, single-pole contacts, staggered	010 0 to 145 0 to 10 020 0 to 290 0 to 20 035 0 to 507.5 0 to 35 040 0 to 580 0 to 40 070 0 to 1015 0 to 70 160 0 to 2320 0 to 160 300 0 to 4350 0 to 300 500 0 to 7250 0 to 500	Vacuum V Hydraulic oil, air, fresh/sea water (0 to 70°C) T Hydraulic oil, air, fresh/sea water (0 to 160°C) Piston D Hydraulic oil E Fresh / sea water			4 PT 1/4 (JIS B0203) 1/2 in. PF (JIS B0202)	

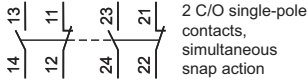
NOTE: Use this table only to interpret the catalog number. Some combinations are not available.

Terminal Diagrams

XMLA, XMLB



XMLC



XMLD

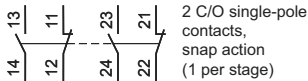


Table 22.16: Fixed Differential Catalog Numbers

Range on Increasing Pressure (psi)	Approximate Differential Across Range	Maximum Allowable Pressure	Catalog Number	\$ Price
Fixed Single-Pole Contact (XMLA)				
-4.06 to -14.5	3.5	130.5	XMLAM01V2S13	300.00
0.435 to 14.5	0.29 low / 0.58 high	32.62	XMLA001S2S13	300.00
2.17 to 36.25	1.88	130.5	XMLA002A2S13	279.00
5.8 to 58	5.07	130.5	XMLA004A2S13	310.00
8.7 to 145	7.25	326.25	XMLA010A2S13	310.00
10.2 to 290	5.8 low / 14.5 high	652.5	XMLA020A2S13	270.00
21.75 to 507.5	18.12	1160	XMLA035A2S13	310.00
72.5 to 1015	43.5 low / 108.75 high	2320	XMLA070D2S13	476.00
145 to 2320	79.75 low / 261 high	5220	XMLA160D2S13	476.00
290 to 4350	239.25 low / 507.5 high	9787.5	XMLA300D2S13	476.00
435 to 7250	290 low / 652.5 high	16312.5	XMLA500D2S13	476.00
2 Fixed Single-Pole Contacts, Staggered (XMLD)				
0.84 to 5.07	0.44	32.62	XMLDL35S1S13	793.00
-1.74 to -14.5	1.45	130.5	XMLDM02V1S13	635.00
1.74 to 14.5	0.44 low / 1.02 high	32.62	XMLD001S1S13	793.00
4.93 to 36.25	2.03 low / 2.76 high	130.5	XMLD002B1S13	857.00
5.8 to 58	2.18 low / 2.76 high	130.5	XMLD004B1S13	857.00
17.4 to 145	6.53 low / 8.7 high	326.25	XMLD010B1S13	857.00
2.14 to 20	10.15 low / 18.85 high	652.5	XMLD020B1S13	857.00
63.8 to 507.5	21.75 low / 37.7 high	1160	XMLD035B1S13	857.00
136.3 to 1015	72.5 low / 137.75 high	2320	XMLD070D1S13	699.00
239.25 to 2320	127.6 low / 290 high	5220	XMLD160D1S13	699.00
522 to 4350	246.5 low / 609 high	9787.5	XMLD300D1S13	699.00
594.5 to 7250	304.5 low / 942.5 high	16312.5	XMLD500D1S13	825.00

Table 22.17: Adjustable Differential Catalog Numbers

Range on Increasing Pressure (psi)	Approximate Differential Across Range	Maximum Allowable Pressure	Catalog Number	\$ Price
Adjustable Single-Pole Contact (XMLB)				
0.038 to 0.72	0.02 low / 0.06 high	1.63	XMLBL05S2S13	452.00
0.65 to 5.07	0.6 low / 0.72 high	32.62	XMLBL35R2S13	452.00
-2 to -14.5	1.9	130.5	XMLBM02V2S13	425.00
-0.29 to -2.9	0.26	29	XMLBM03S2S13	482.00
-7.25 to 72.5	7.25	163.12	XMLBM05A2S13	482.00
0.72 to 14.5	0.58 low / 0.87 high	32.62	XMLB001S2S13	300.00
4.35 to 36.25	2.32 low / 3.04 high	130.5	XMLB002A2S13	302.00
3.62 to 58	2.9 low / 3.62 high	130.5	XMLB004A2S13	290.00
10.15 to 145	8.26 low / 12.32 high	326.25	XMLB010A2S13	310.00
18.9 to 290	14.5 low / 23.2 high	652.5	XMLB020A2S13	328.00
50.75 to 507.5	24.65 low / 36.97 high	1160	XMLB035A2S13	310.00
101.5 to 1015	68.15 low / 127.6 high	2320	XMLB070D2S13	310.00
145 to 2320	134.85 low / 301.6 high	5220	XMLB160D2S13	476.00
319 to 4350	281.3 low / 536.5	9787.5	XMLB300D2S13	518.00
435 to 7250	333.5 low / 762.7 high	16312.5	XMLB500D2S13	518.00
2 Adjustable Single-Pole Contacts, Simultaneous (XMLC)				
0.65 to 5.07	0.29 low / 0.51 high	32.62	XMLCL35S2S13	568.00
-2 to -14.5	1.89 low / 2.03 high	130.5	XMLCM02V2S13	534.00
-7.97 to 72.5	6.52	163.12	XMLCM05S2S13	568.00
0.725 to 14.5	0.43 low / 0.58 high	32.62	XMLC001S2S13	586.00
4.35 to 36.25	1.89 low / 2.47 high	130.5	XMLC002B2S13	650.00
4.35 to 58	2.18 low / 2.47 high	130.5	XMLC004B2S13	650.00
10.15 to 145	6.53 low / 10.15 high	326.25	XMLC010B2S13	650.00
18.85 to 290	10.15 low / 14.5 high	652.5	XMLC020B2S13	650.00
50.75 to 507.5	14.5 low / 21.75 high	1160	XMLC035B2S13	650.00
101.5 to 1015	65.25 low / 129.05 high	2320	XMLC070D2S13	585.00
174 to 2320	130.5 low / 304.5 high	5220	XMLC160D2S13	585.00
319 to 4350	232 low / 507.5 high	9787.5	XMLC300D2S13	585.00
435 to 7250	275.5 low / 754 high	16312.5	XMLC500D2S13	585.00

Table 22.18: Accessories for XML Pressure and Vacuum Switches

Description	For Use with Switches	Catalog Number	\$ Price
Rear fixing bracket For vibrations > 2 gn	XML•L35 XML•001	XMLZL006	27.00
Additional top support bracket For vibrations > 4 gn	XMLAM01 XML•M05 XMLA004 XML•010 ... XML•500	XMLZL002	41.40
Lead sealable protective cover To prevent unauthorized access to the adjustment screws and the switch cover mounting screw	XMLA XMLB	XMLZL001	41.40
Lead sealable protective cover To prevent unauthorized access to adjustment screws	All models	XMLZL011	41.40

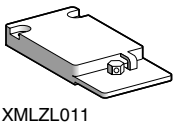
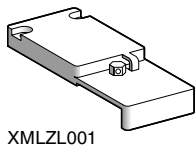
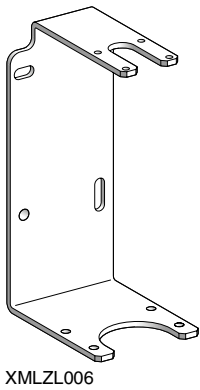
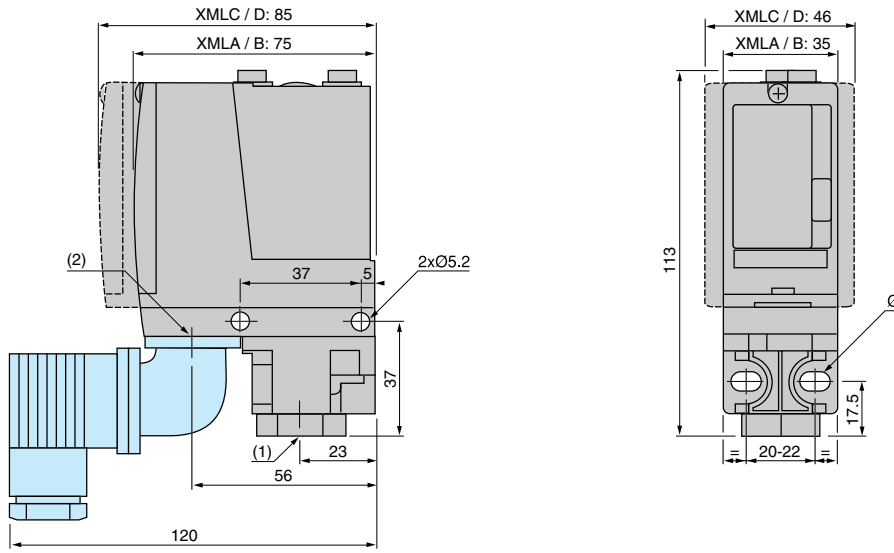


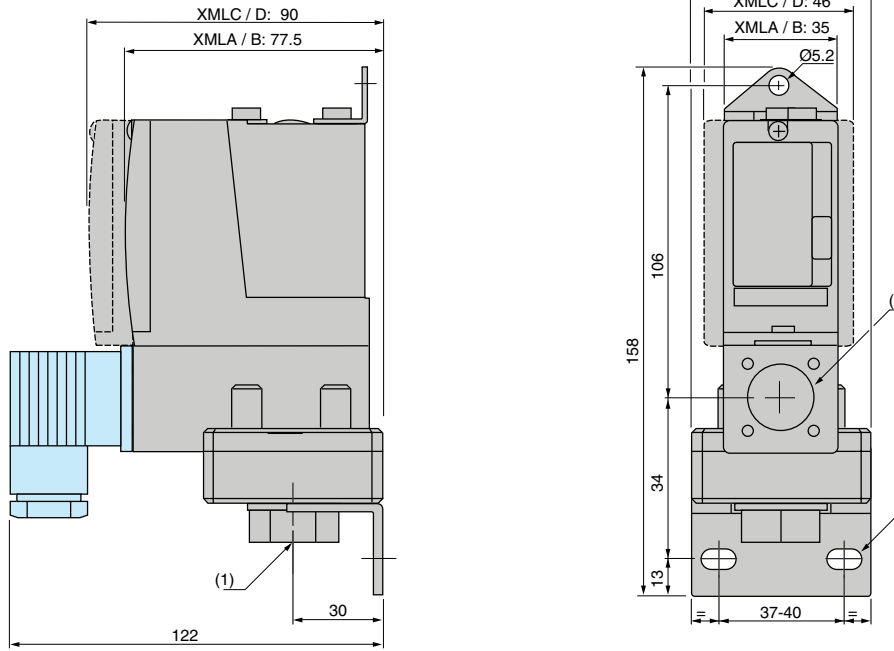
Figure 22.4: Dimensions

XMLAM01, XMLBM05, XMLCM05, XMLA004, X•ML010...500



(1) 1 fluid entry, tapped G 1/4 (BSP female) or 1/4" NPT
 (2) 1 electrical connections entry, tapped M20 x 1.5 or Pg 13.5, or 1/2" NPT
 Ø: 2 elongated holes Ø 5.2 x 6.7

XML-M02, XML-002, XMLB004, XMLC004, XMLD004



(1) 1 fluid entry, tapped G 1/4 (BSP female) or 1/4" NPT
 (2) 1 electrical connections entry, tapped M20 x 1.5 or Pg 13.5, or 1/2" NPT
 Ø: 2 elongated holes Ø 10.2 x 5.2

22 PRESSURE, VACUUM, AND FLOAT SWITCHES

Table 22.19: Non-adjustable Differential, Open Type, NEMA 1 Enclosure

UL Listed and CSA Certified As Industrial Control Equipment



NEMA 1

Range On Decreasing Pressure psig	Approximate Differential at Mid-Range psig▲	Maximum Allowable Pressure psig	Open Type		NEMA 1	
			Type	\$ Price	Type	\$ Price
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing						
0.2–10	0.4 ±0.1	100	GRO1	378.00	GRG1	392.00
1–40	1.2 ±0.3	100	GRO3	341.00	GRG3	354.00
1.5–75	2.2 ±0.4	240	GRO4	300.00	GRG4	314.00
3–150	4.2 ±1	475	GRO5	261.00	GRG5	275.00
5–250	7.4 ±2	750	GRO6	300.00	GRG6	314.00
13–425	13 ±3	850	GSO1	378.00	GSG1	392.00
20–675	19 ±5	2000	GSO2	378.00	GSG2	392.00
Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton® Fluorocarbon Diaphragm and O-Ring, Teflon® Retaining Ring						
20–1000	49 ±10	10000	GTO1	590.00	GTG1	606.00
90–2900	141 ±15	15000	GTO2	590.00	GTG2	606.00
170–5600	200 ±40	20000	GTO3	590.00	GTG3	606.00
270–9000	350 ±45	25000	GTO4	590.00	GTG4	606.00

Table 22.20: Adjustable Differential, Open Type, NEMA 1 Enclosure

UL Listed and CSA Certified As Industrial Control Equipment



Open Type

Range On Decreasing Pressure psig	Approximate Mid-Range Differential Adds to Decreasing Set Point▲	Maximum Allowable Pressure psig	Open Type		NEMA 1	
			Type	\$ Price	Type	\$ Price
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing						
0.2–10	0.4–0.9	100	GNO1	390.00	GNG1	404.00
1–40	1.2–3.6	100	GNO3	354.00	GNG3	369.00
1.5–75	2.2–6.6	240	GNO4	318.00	GNG4	333.00
3–150	4.2–13.2	475	GNO5	278.00	GNG5	293.00
5–250	7.4–33.6	750	GNO6	318.00	GNG6	333.00
13–425	13–37.2	850	GPO1	390.00	GPG1	404.00
20–675	19–58.8	2000	GPO2	390.00	GPG2	404.00
Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton Fluorocarbon Diaphragm and O-Ring, Teflon Retaining Ring						
20–1000	49–150	10000	GQO1	593.00	GQG1	611.00
90–2900	141–455	15000	GQO2	593.00	GQG2	611.00
170–5600	200–950	20000	GQO3	593.00	GQG3	611.00
270–9000	350–1400	25000	GQO4	593.00	GQG4	611.00

▲ Determines operating point on rising pressure.

Table 22.21: Available Modifications

Modification	Applies to	Form	\$ Price Addition
Standard Nitrile (Buna-N) diaphragm in #316 stainless steel housing	GNG, GNO, GRG, GRO1 only All other GNG, GNO, GPG, GPO, GRG, GRO, GSG, GSO	Q1	270.00
Ethylene propylene diaphragm in #316 stainless steel housing	Not available on GNG, GNO, GRG, GRO1. Available on all other GNG, GNO, GPG, GPO, GRG, GRO, GSG, GSO	Q3	86.00
Viton fluorocarbon diaphragm in #316 stainless steel housing	GNG, GNO, GRG, GRO1 only All other GNG, GNO, GPG, GPO, GRG, GRO, GSG, GSO	Q4	309.00
1/4–18 NPT external thread pressure connection	GNG, GNO, GRG, GRO	Z	—
1/2–14 NPT external thread, 1/4–18 NPT internal thread pressure connection. Standard actuator only.	GNG, GNO, GRG, GRO	Z16	95.00
7/16–20 UNF-2B internal thread pressure connection	GNG, GNO, GPG, GPO, GQG, GQO, GRG, GRO, GSG, GSO, GTG, GTO	Z18	—

Table 22.22: Class 9049 Accessories for Class 9012 Pressure Switches

Description	Applies to	Type	\$ Price
Stainless steel surge reducer for use on oils, coolants, and hydraulic fluids (not recommended for air or water)	9012G	A26S	147.00

Acceptable Wire Sizes 12-22 AWG
 Recommended Terminal Clamp Torque. 7 lb-in
 Electrical Rating. page 22-14
 Temperature Rating. page 22-14
 Renewal Parts Kits page 22-26



File E12158
CCN NKPZ



File LR25490
Class 3211-03





9012GAW5
NEMA 4, 4X, 13

Class 9012 single stage pressure switches are control circuit rated devices used in pneumatic or hydraulic systems on a wide variety of machine and process applications to protect the equipment and control or monitor the system pressure.

- Type G machine tool switches are available with NEMA Type 4, 4X, and 13 (IEC IP66) enclosure ratings.
- The NEMA 7 and 9 devices are UL listed for use in the following hazardous locations: Class I, Divisions 1 and 2, Groups C and D; and Class II, Divisions 1 and 2, Groups E, F, and G.
- Enclosure materials are cast aluminum.
- To ensure repeatability and minimize setting drift, pressure settings should fall within the middle 80 percent of the pressure range.

**Table 22.23: Non-adjustable Differential ▲
NEMA 4, 4X, 13 Enclosure**

UL Listed and CSA Certified As Industrial Control Equipment

Range on Decreasing Pressure psig	♦ Approximate Differential at Mid-Range psig	Maximum Allowable Pressure psig	Single Pole Double Throw		Double Pole Double Throw	
			Type	\$ Price	Type	\$ Price
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing						
2-10	0.6 ±0.1	100	GDW1	414.00	GDW21	507.00
1-40	1.6 ±0.4	100	GDW2	359.00	GDW22	449.00
1.5-75	3.0 ±0.5	240	GDW4	359.00	GDW24	449.00
3-150	6.0 ±0.8	475	GDW5	350.00	GDW25	435.00
5-250	10.0 ±1.5	750	GDW6	350.00	GDW26	435.00
13-425	16 ±3.5	850	GEW1	491.00	GEW21	588.00
20-675	27 ±5	2000	GEW2	698.00	GEW22	809.00
Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton® Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring						
20-1000	59 ±9	10000	GFW1	741.00	GFW21	855.00
90-2900	170 ±15	15000	GFW2	741.00	GFW22	855.00
170-5600	289 ±55	20000	GFW3	741.00	GFW23	855.00
270-9000	495 ±70	25000	GFW4	851.00	GFW24	963.00

**Table 22.24: Non-adjustable Differential
NEMA 7 & 9 Enclosure
Class I & II, Division 1 & 2, Groups C, D, E, F, G**

UL Listed As Industrial Control Equipment ■

Range on Decreasing Pressure psig	♦ Approximate Differential at Mid-Range psig	Maximum Allowable Pressure psig	Single Pole Double Throw		Double Pole Double Throw	
			Type	\$ Price	Type	\$ Price
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing						
0.2-10	1.0 ±0.1	100	GDR1	1389.00	GDR21	1457.00
1-40	2.4 ±0.8	100	GDR2	1341.00	GDR22	1412.00
1.5-75	4.5 ±1	240	GDR4	1326.00	GDR24	1391.00
3-150	9 ±1.5	475	GDR5	1290.00	GDR25	1355.00
5-250	15 ±3	750	GDR6	1290.00	GDR26	1355.00
13-425	25 ±7	850	GER1	1493.00	GER21	1560.00
20-675	41 ±10	2000	GER2	1731.00	GER22	1799.00
Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring						
20-1000	89 ±18	10000	GFR1	1781.00	GFR21	1848.00
90-2900	255 ±30	15000	GFR2	1781.00	GFR22	1848.00
170-5600	578 ±110	20000	GFR3	1781.00	GFR23	1848.00
270-9000	788 ±140	25000	GFR4	1781.00	GFR24	1848.00

Acceptable Wire Sizes: 12-22 AWG
Recommended Terminal Clamp Torque: 7 lb-in

Electrical Rating	page 22-14
Temperature Rating	page 22-14
Modifications	page 22-16
Accessories	page 22-16
Renewal Parts Kits	page 22-26
Dimensions	page 22-15

**Table 22.25: Adjustable Differential ▲
NEMA 4, 4X, 13 Enclosure**

UL Listed and CSA Certified As Industrial Control Equipment

Range on Decreasing Pressure psig	♦ Adjustable Differential Approximate at Mid-Range	Maximum Allowable Pressure psig	Single Pole Double Throw		Double Pole Double Throw	
			Type	\$ Price	Type	\$ Price
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing						
2-10	0.6-2	100	GAW1	450.00	GAW21	527.00
1-40	1.6-8	100	GAW2	395.00	GAW22	486.00
1.5-75	3.5-15	240	GAW4	395.00	GAW24	486.00
3-150	6.0-30	475	GAW5	386.00	GAW25	473.00
5-250	10.0-49	750	GAW6	386.00	GAW26	473.00
13-425	16-90	850	GBW1	527.00	GBW21	629.00
20-675	27-130	2000	GBW2	734.00	GBW22	849.00
Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring						
20-1000	59-200	10000	GCW1	777.00	GCW21	846.00
90-2900	170-560	15000	GCW2	777.00	GCW22	894.00
170-5600	289-1260	20000	GCW3	777.00	GCW23	894.00
270-9000	495-1900	25000	GCW4	894.00	GCW24	1008.00

**Table 22.26: Adjustable Differential
NEMA 7 & 9 Enclosure
Class I & II, Division 1 & 2, Groups C, D, E, F, G**

UL Listed As Industrial Control Equipment ■

Range on Decreasing Pressure psig	♦ Adjustable Differential Approximate at Mid-Range	Maximum Allowable Pressure psig	Single Pole Double Throw		Double Pole Double Throw	
			Type	\$ Price	Type	\$ Price
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing						
0.2-10	1.0-2	100	GAR1	1431.00	GAR21	1499.00
1-40	2.4-8	100	GAR2	1385.00	GAR22	1449.00
1.5-75	4.5-15	240	GAR4	1368.00	GAR24	1434.00
3-150	9-35	475	GAR5	1332.00	GAR25	1398.00
5-250	15-49	750	GAR6	1332.00	GAR26	1398.00
13-425	25-90	850	GBR1	1535.00	GBR21	1602.00
20-675	41-130	2000	GBR2	1769.00	GBR22	1839.00
Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring						
20-1000	89-200	10000	GCR1	1823.00	GCR21	1890.00
90-2900	255-560	15000	GCR2	1823.00	GCR22	1890.00
170-5600	578-1260	20000	GCR3	1823.00	GCR23	1890.00
270-9000	788-1900	25000	GCR4	1823.00	GCR24	1890.00

- ▲ For metric threads, add M after the W on all types. Price adder \$8.50.
- UL Marine Listed for use on vessels greater than 65 feet long where ignition protection is required.
- ♦ Differential adds to range setting and determines operating point on rising pressure.



Complies with IEC 60957.5.1, 5C8.3.4 when protected with a Bussman CCKTK-R-10 fuse.



File E12443 Haz. Loc. CCN NOWT G*R
File E12158 CCN NKPZ G*O, G*G, G*W
File E12158 CCN NTHT Marine Use, G*W



File LR25490 Class 3211-03 G*W, G*O, G*G
File LR26817 Class 3218-02 G*R

Differential Pressure Switch

Differential pressure switches monitor the change in the difference between two pressures. Type G differential pressure switches are used in applications to signal that a predetermined pressure difference has been reached as a result of a widening or increasing difference between the two pressures. They can also signal that a predetermined pressure difference has been reached as a result of a narrowing or decreasing difference between the two pressures.



9012GGW1

Table 22.27: NEMA 4, 4X, 13 Enclosures

UL Listed and CSA Certified As Industrial Control Equipment ▲

Working Pressure Range on Decreasing X (upper) Actuator	Adjustable Difference on Decreasing Pressure (adds to working pressure) Y (lower) Actuator	Adjustable Differential Actuates on Increasing Pressure (adds to adjustable difference)	Maximum Allowable Pressure psi	Single Pole Double Throw		Double Pole Double Throw	
				Type	\$ Price	Type	\$ Price
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing							
0-75	0.25-10	0.8-2	100	GGW1	894.00	GGW21	950.00
0-175	0.5-36	5-15	240	GGW4	788.00	GGW24	849.00
0-500	3-175	22-90	850	GHW1	917.00	GHW21	977.00
Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton® Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring							
0-5000	15-825	80-200	7500	GJW1	1697.00	GJW21	1758.00

Dual Stage Pressure Switch

Type G dual stage pressure switches are designed for use in applications where two separate pressure operations must be controlled by a single pressure monitoring device. These controls are most commonly used where dual functions are required or in sequencing applications such as alarm, followed by shutdown.

Table 22.28: Dual Stage Pressure Switch NEMA 4, 4X, 13 Enclosure

UL Listed and CSA Certified As Industrial Control Equipment ▲



9012GKW1

Range Setting Limits of Pressure Between Which Stage 1 Can Be Adjusted to Operate on Decreasing Pressure	Add Adjustable Spread to Range Setting to Obtain Decreasing Operating Point of Stage 2	Fixed Differential—Add to Low (Decreasing) Operating Point to Obtain Approximate High (Rising) Operating Point of Each Stage		Maximum Allowable Pressure psi	SPDT Each Stage Type	\$ Price
		Stage 1	Stage 2			
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing						
.2-10	1-5	1.0 ±0.2	1.5 ±0.4	100	GKW1	635.00
1-40	4-20	4.0 ±1.0	6.0 ±1.5	100	GKW2	579.00
1.5-75	6-30	5.0 ±1.5	8.0 ±2.0	240	GKW4	579.00
3-150	12-75	8.0 ±2.0	12 ±3	475	GKW5	567.00
5-250	22-110	14 ±3	21 ±5	750	GKW6	567.00
13-425	40-180	20 ±4	30 ±7.5	850	GLW1	590.00
20-675	45-250	30 ±6	45 ±11	2000	GLW2	590.00
Piston Actuated—#400 Stainless Steel Piston. #300 Stainless Steel Housing, Viton Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring						
20-1000	50-300	50 ±10	75 ±19	10000	GMW1	773.00
90-2900	140-800	140 ±30	210 ±52	15000	GMW2	773.00
170-5600	300-1700	275 ±60	400 ±100	20000	GMW3	773.00
270-9000	500-2500	400 ±80	800 ±150	25000	GMW4	773.00

▲ UL Marine Listed for use on vessels greater than 65 feet long where ignition protection is not required.

Ordering

- Specify Class 9012 Type..., and indicate the high or low operating point for each stage within the limits shown in the above table.

Example:

Class 9012 Type GKW4

Set: Stage 1 at 30 psi decreasing pressure

Stage 2 at 50 psi decreasing pressure

(20 psi spread)

Differential of each stage will be approximately as shown in the table above.

- For available modifications see page 22-16. If one or more of these modifications are desired, add the appropriate Form to the Class and Type. Arrange form letters in alphabetical order when ordering more than one modification.

Acceptable Wire Sizes 12-22 AWG
Recommended Terminal Clamp Torque 7 lb-in

Electrical Rating page 22-14
Temperature Rating page 22-14
Modifications page 22-16
Accessories page 22-16
Renewal Parts Kits page 22-26
Dimensions page 22-15



File E12158 CCN NKPZ
File E12158 CCN NTHT - Marine Use



File LR25490 Class 3211-03



Table 22.29: Control Duty Circuit Ratings

Contacts	AC—50 or 60 Hz						DC			AC or DC Continuous Carrying Amperes
	V	Inductive, 35% Power Factor		Resistive		V	Inductive and Resistive			
		Make	Break	75% Power Factor	Make and Break Amperes		Make and Break Amperes	Double Throw		
SPDT	120	60	7200	6	720	6	0.55	0.22	10	
	240	30	7200	3	720	3	0.27	0.11	10	
	480	15	7200	1.5	720	1.5	0.10	—	10	
	600	12	7200	1.2	720	1.2	—	—	—	
DPDT	120	60	7200	6	720	6	0.22	0.22	10	
	240	30	7200	3	720	3	0.11	0.11	10	
	480	15	7200	1.5	720	1.5	—	—	10	
	600	12	7200	1.2	720	1.2	—	—	—	

Table 22.30: Type G Industrial

Contact Arrangement	Contact Symbol
1 N.O. – 1 N.C. (600 Vdc rating does not apply)	

Note: Contacts are single pole, double throw—one circuit normally open and one circuit normally closed. These circuits are not electrically separate and can not be used on opposite polarities.

Table 22.31: Temperature Ratings

	Actuator	Minimum	Maximum
Ambient	All	-23 °C (-10 °F)	+85°C (+185°F)
	Diaphragm	-40 °C (-40 °F)	
Media	Piston	-26 °C (-15 °F)	+120°C (+250°F)
	All with Forms Q4 and Q14	-26 °C (-15 °F)	

Table 22.34: Type G Machine Tool and Vacuum (except GVG)

Type	Contact Arrangement	Contact Symbol
Single Pole Double Throw	1 N.O.–1 N.C.	

Note: Snap switch contains two double-break contact elements (1 N.O. and 1 N.C.) that must be used on circuits of same polarity.

Type	Contact Arrangement	Contact Symbol
Double Pole Double Throw	2 N.O.–2 N.C.	

Note: Snap switch contains two electrically separated sets of contact elements allowing use on circuits of opposite polarity. Each set contains two double break contact elements (1 N.O. and 1 N.C.) that must be used on circuits of the same polarity.

Figure 22.5: Types GAW, GBW, GCW, GDW, GEW, GFW, GKW, GLW, and GMW Machine Tool Switches (except 1, 21)

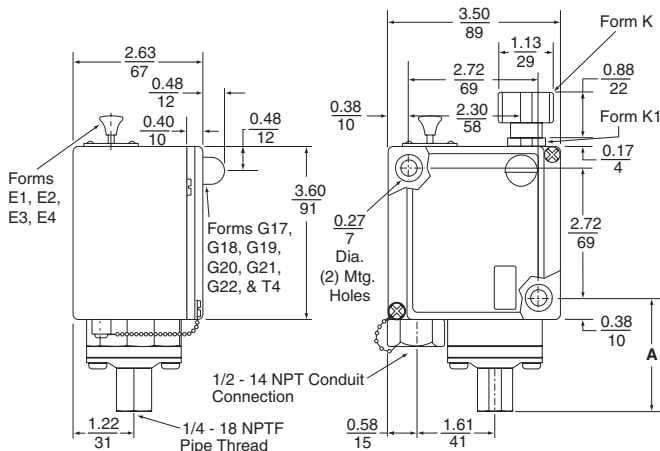
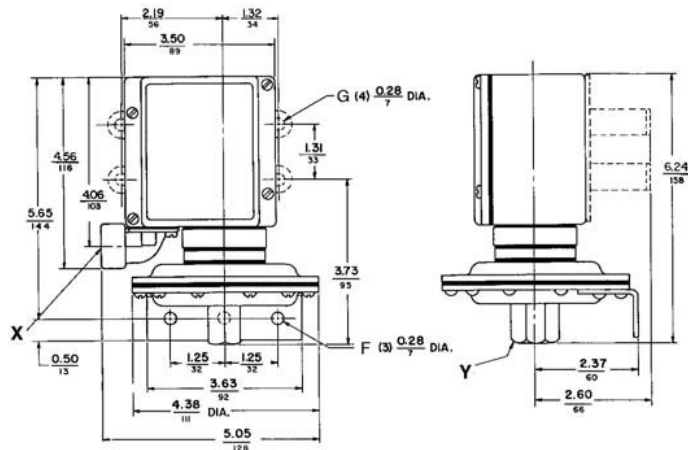


Figure 22.6: Types GAW, GDW, GKW 1, 21



X: Conduit connection: G•W = 1/2-14 NPT; G•WM = 20MMBGS4568, Form M12 = Pg13.5; DIN40430.
Y: Pressure connection: G•W = 1/4-18 NPTF; G•WM = 8; Form M14 = G 1/4 BS 2779; RP1/4 ISO 711; R 1/4 DIN 2999; GJ 1/4 UN1339.

Table 22.32: Dimension A for G•W Switches

Type	Dimension A, in. (mm)
GAW, GDW, GKW 2, 4, 5, 6 22, 24, 25, 26, 52, 54, 55, 56	2.33 (59)
GBW, GEW, GLW 1, 2, 21, 22, 51, 52	2.23 (57)
GCW, GFW, GMW 1, 2, 3, 4 21, 22, 23, 24, 51, 52, 53, 54	3.15 (80)

Table 22.33: Dimension A for G•R, Switches

Type / Tipo / Type	Dimension A, in. (mm)
GAR1, 2, 21, 22	2.02 (56)
GAR4, 5, 6, 24, 25, 26	1.42 (36)
GBR1, 2, 21, 22; GCR1, 21	1.32 (34)
GCR2, 3, 4, 22, 23, 24	2.24 (57)
GDR1, 2, 21, 22	2.02 (56)
GDR4, 5, 6, 24, 25, 26	1.42 (36)
GER1, 2, 21, 22; GFR1, 21	1.32 (34)
GFR2, 3, 4, 22, 23, 24	2.24 (57)

Figure 22.7: Types GAR, GBR, GCR, GDR, GER, and GFR

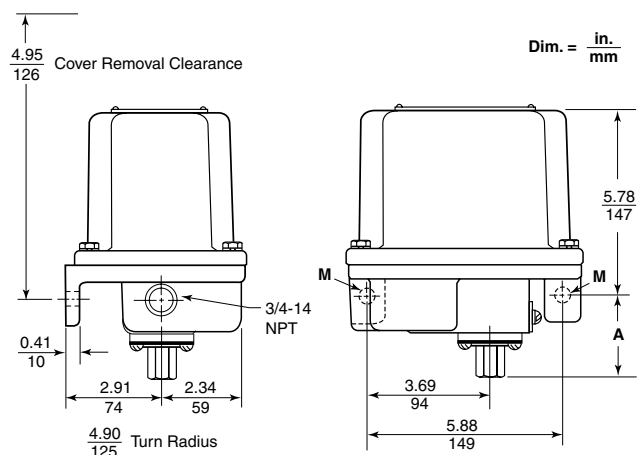


Figure 22.8: 9012G Dimensions

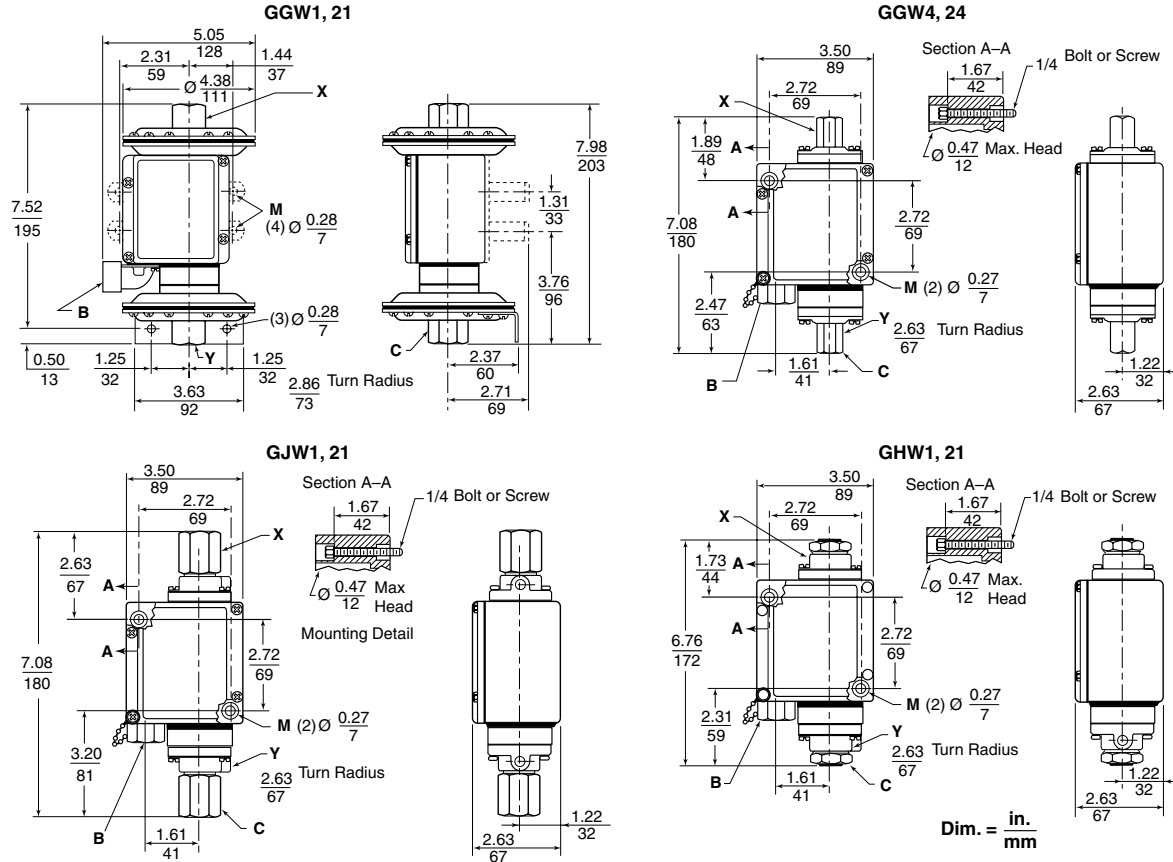


Figure 22.9: 9012GNO1, GRO1

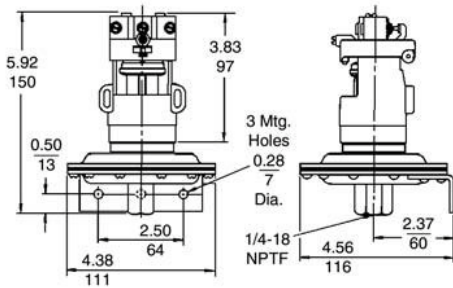


Figure 22.10: 9012GNG1, GRG1

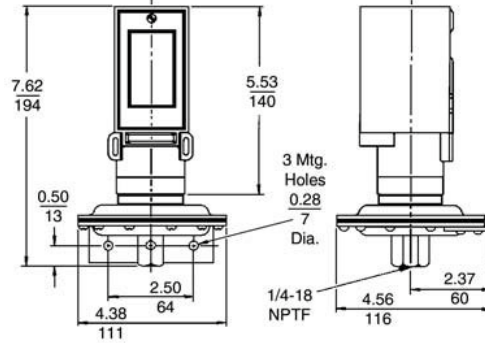


Figure 22.11: 9012GNO, GRO

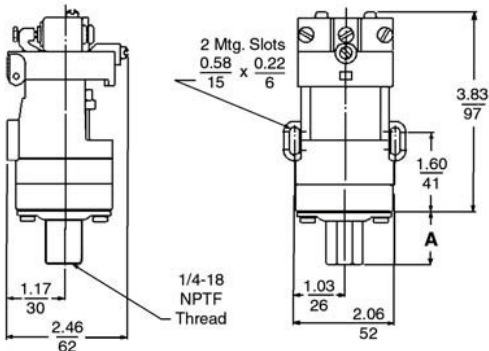
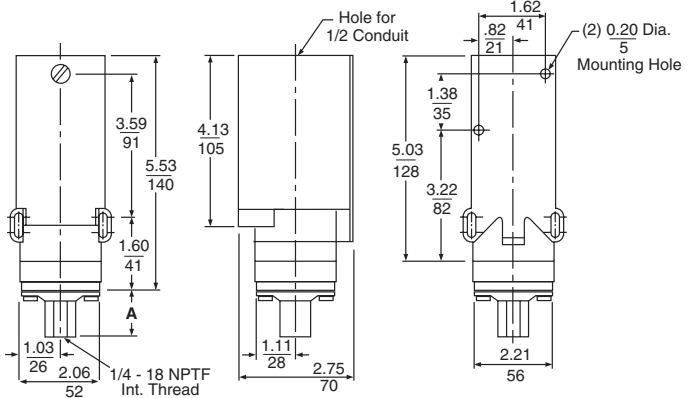


Figure 22.12: 9012GNG, GRG



Type	Dimension A, in. (mm)
GNO, GRO 3, 4, 5, 6	1.41 (35.8)
GPO, GSO 1, 2, 3	1.31 (33.3)
GQO, GTO 1, 2, 3, 4	2.24 (56.9)

Type	Dimension A, in. (mm)
GNG, GRG 3, 4, 5, 6	1.41 (35.8)
GPG, GSG 1, 2, 3	1.31 (33.3)
GQG, GTG 1, 2, 3, 4	2.24 (56.9)

NOTE: Refer to discount schedule CP1 unless otherwise indicated.

Table 22.35: Factory Modifications for Class 9012 Pressure Switches

Modification	Applies to Pressure Switch Type	Form	\$ Price Addition	
Lock on rising pressure, manual reset only	Available on GDW, GDWM, GEW, GEWM, GFW, GFWM only	E3	78.00	
120 Vac or Vdc neon pilot light	Available on all GAW-GMW, GAWM-GFWM	with clear lens	G17	71.00
		with red lens	G18	71.00
		with clear lens	G21	86.00
24 Vdc only LED	For pilot light conversion kits: See 9998 PC-306-308. Complete Class and Type information required	with red lens	G22	86.00
24 Vdc LED pilot light with green lens	Class 9012 GAW-GMW and GAWM-GFWM, or Class 9016 GAW and Class 9025G	G23	86.00	
SPDT snap switch rated 1.1 A at 125 Vdc (minimum differential doubles)	Available on GAR-GFR, GAW-GJW, GAWM-GFWM	H3	64.00	
Prewired 5-pin Brad Harrison male receptacle #41310 or interchangeable Crouse-Hinds receptacle at our convenience. For use with Brad Harrison female portable plug #41306, 41307, 41308 or equal.	Available on GAW-GJW single pole devices only	H10 or H11	152.00	
Micro connector, 4-pin, for 24 Vdc pilot light	G*W (single pole only), except GAW2 and Form B2.	H17	152.00	
External range adjustment (includes knob and range scale window)	GAW-GFW, GAWM-GFWM, GKW-GMW	K	50.00	
External range adjustment slotted for screwdriver (includes range scale window)	GAW-GFW, GAWM-GFWM, GKW-GMW	K1	35.60	
Pg 13.5 conduit thread and 1/4-19 BSP pressure connection	G*WM only	M12	18.90	
	GGW1, GGW 21 only	Q1	543.00	
Standard Nitrile (Buna-N) diaphragm in #316 stainless steel flange	All other GGW, GHW only	Q1	114.00	
	GAR, GAW, GDR, GDW, GAWM, GDWM, GKW1, 21 only	Q1	270.00	
	All other GAR, GBR, GDR, GER, GAW, GBW, GDW, GEW, GAWM, GBWM, GDWM, GEWM, GKW, GLW	Q1	57.00	
Ethylene propylene diaphragm in #316 stainless steel flange	Available on all GGW, GHW except GGW1, 21	Q3	171.00	
	Available on all GAR, GBR, GDR, GER, GAW, GBW, GDW, GEW, GAWM, GBWM, GDWM, GEWM, GKW, and GLW, except Types 1 and 21	Q3	86.00	
Viton® fluorocarbon diaphragm in #316 stainless steel flange	GGW1, 21 only	Q4	617.00	
	All other GGW, GHW	Q4	171.00	
	GAR, GAW, GBR, GBW, GDR, GDW, GER, GEW, GAWM, GBWM, GDWM, GEWM, GKW1, 21 only	Q4	309.00	
	All other GAR, GAW, GBR, GBW, GDR, GDW, GER, GEW, GAWM, GBWM, GDWM, GEWM, GKW, GLW	Q4	86.00	
Range scale window (standard with Forms K and K1)	GAW-GMW, GAWM-GFWM	V1	17.90	
Special setting specified (If indicating only one special setting, specify whether this setting is on increasing or decreasing pressure.)	All 9012G	Y1	—	
1/4"-18 NPT external thread pressure connection	GAR, GAW, GDR, GDW, GGW, GKW Not available in combination with Forms Q1, Q3, Q4.	Z	—	
1/2"-14 NPT external thread, 1/4"-18 NPTF internal thread pressure connection	GAR, GAW, GDR, GDW, GGW, GKW Not available in combination with Forms Q1, Q3, Q4.	Z16	95.0	
7/16"-20 UNF-2B internal thread pressure connection	GAR-GFR; GAW-GMW Not available in combination with Forms Q1, Q3, Q4.	Z18	—	

Table 22.36: Factory Modifications for Renewal Parts Kits for Class 9012 Pressure Switches

Suffixes for renewal parts kits, see page 22-26.

Modification	Applies to Parts Kit Type	Form	\$ Price
SPDT snap switch rated 1.1 A at 125 Vdc (minimum differential doubles)	PC313	H3	64.00
Standard Nitrile (Buna-N) diaphragm in #316 stainless steel flange	PC177-179, PC268, 269	Q1	57.00
	PC265-267 ■		—
Ethylene propylene diaphragm in #316 stainless steel flange	PC177-178, PC268, 269	Q3	86.00
	PC266, 267 ■		28.70
Viton® fluorocarbon diaphragm in #316 stainless steel flange	PC177-178, PC268, 269	Q4	86.00
	PC265-267		35.60
1/4"-18 NPT external thread pressure connection	PC265-269 ■	Z	—
1/2"-14 NPT external thread, 1/4"-18 NPTF internal thread pressure connection	PC265-269	Z16	96.00
7/16"-20 UNF-2B internal thread pressure connection	PC177, 178, PC265-273 ■	Z18	—

■ Refer to discount schedule CP7G.

Table 22.37: Class 9049 Accessories for Class 9012 Pressure Switches

Description	Applies to	Type	\$ Price
Stainless steel surge reducer for use on oils, coolants, and hydraulic fluids (not recommended for air or water)	9012G	A26S	147.00

22 PRESSURE, VACUUM, AND FLOAT SWITCHES



Type GAW—Sensitive Control Applications

9016GAW vacuum switches are provided with double throw contacts; normally open and normally closed circuits allow these controls to be used for standard or reverse action applications.

Standard devices can be mounted from the front with the bracket provided. Two mounting screws are required for a firm attachment to any smooth, flat surface. Allowance must be made for flange projection. Controls with Form F modification include two mounting feet with 9/32" mounting holes on 3-3/4" centers. Range and Differential adjustments are internal and exposed by removal of the front cover.

Maximum allowable positive pressure: 100 psig.
Diaphragms are oil resistant, nitrile butadiene (Buna N) rubber.
Electrical Ratings and Temperature Limitations—See page 22-12 for Type G machine tool.
Dimensions—See page 22-15.

Table 22.38: Class 9016, Diaphragm Actuated

Range on Decreasing Vacuum (In. of Hg)	Adjustable Differential Adds to Range▲ (In. of Hg)	Contact Arrangement	Pipe Tap (NPTF)	Enclosure			
				NEMA 4, 4X & 13		NEMA 7 & 9 ■	
				Type	\$ Price	Type	\$ Price
0–28.7	At Minimum Range: 0.8–9 At Mid-Range: 1.3–7.4	1 N.O., 1 N.C.	1/4"-18	GAW1	309.00	GAR1	646.00
0–25	5–20	1 N.O., 1 N.C.	1/4"-18	GAW2	270.00	N/A	—
0–28.3	At Minimum Range: 1–9 At Mid-Range: 1.7–7.4	2 N.O., 2 N.C.	1/4"-18	GAW21	338.00	GAR21	677.00
0–25	5–20	2 N.O., 2 N.C.	1/4"-18	GAW22	330.00	N/A	—

▲ Add Differential to Range to obtain the operating point on increasing vacuum (within vacuum limitations). The differential increases linearly over its range.
■ The minimum differential doubles with NEMA 7 & 9 enclosures.

Table 22.39: Available Modifications

Description	Form	\$ Price
Mounting feet (GAW1 and GAW21 only)	F	24.60
Range scale window	V1	17.90
1/4"-18 NPT external thread pressure connection	Z	—
1/2"-14 NPT external thread, 1/4"-18 NPTF internal thread pressure connection (standard actuator only)	Z16	64.00



File E12443 Haz Loc CCN NOWT G*R
File E12158 CCN NKPZ G*W
File E12158 CCN NTHT Marine Use, G*W



File LR25490 Type GAW only
File LR26817 Type GAR only (NEMA 7 and 9 Haz Loc)



Vacuum Switch



Class 9016 Type GVG1
Forms E, F

Type GVG—Power Circuit Applications

The 9016GVG1 vacuum switch is a companion to the 9036GG and 9037GG float switches commonly used on vacuum heating pumps. Electrical ratings of float and vacuum switch types are equal.

Table 22.40: Class 9016, Contacts Open on Increasing Vacuum

Cut-out Range (In. of Hg)	Approximate Adjustable Differential (In. of Hg)	Cut-in Range (In. of Hg)	Poles	Pressure Connection	NEMA 1 Enclosure	
					Type	\$ Price
5–25	5–10	0–20	2	1/4"-18 NPSF	GVG1	158.00

Note: Maximum allowable positive pressure: 150 psig. In. of Hg = inches of mercury.

Table 22.41: Available Modifications

Description	Form	\$ Price
3-way lever—nameplate marked: Float only—Vacuum and Float—Continuous (factory modification only)	E	29.00
Mounting bracket (for retrofit, order 9049A53 bracket kit)	F	19.20
Reverse action—normally open contacts	R	14.40
1/4" male pipe connection (1/4"-18 NPT, external thread) (for retrofit, use 1/4" pipe nipple)	Z	—

Table 22.42: Electrical Ratings—9016GVG

Voltage	AC		DC
	Single Phase	Polyphase	
110 V	2 hp	3 hp	1 hp
220 V	3 hp	5 hp	1 hp
440–550 V	5 hp	5 hp	—
32 V	—	—	1/2 hp

Note: Control Circuit Rating: A600

Table 22.43: Vacuum Codes

Settings (In. of Hg)	Code
3–8	J09
16.5–25	J10
17–22	J11
18–23	J12
20–25	J13
Specify other setting (minimum order quantity is 4 pieces)	J99

Ordering Information: Specify Class 9016 Type G. Give vacuum settings within the limits of the listings above.
For Setting Codes, see table above. If special features are desired, add the appropriate Form letter to the Class and Type. Arrange the Form letters in alphabetical order when ordering more than one special feature.



File E12158
CCN NKPZ



File LR25490

Dimensions page 22-14



PUMPTROL®
Pressure Switch

Class 9013 Type FHG pressure switches are designed for the control of small electrically driven air compressors.

- Contacts open on pressure rise.
- Diaphragm actuated.
- For application data, see page 22-14.
For repair parts kits, see page 22-26.

Table 22.44: Selection Table

Adjustable Cut-out Range Increasing Pressure (psig)	Approximate Differential Non-adjustable (psig)	Poles	Pressure Connection	NEMA 1 Enclosure			
				Lower hp		Higher hp	
				Type	\$ Price	Type	\$ Price
40-100	20	2	1/4" NPSF internal	FHG2	27.30	FHG22	39.90
			3/8" NPSF internal	FHG3	27.30	—	—
			1/4" four way	FHG4	35.10	FHG24	47.60
			1/4" NPT external	FHG9	27.30	FHG29	39.90
70-150	30	2	1/4" NPSF internal	FHG12	27.30	FHG32	39.90
			3/8" NPSF internal	FHG13	27.30	FHG33	39.90
			1/4" four way	FHG14	35.10	FHG34	47.60
			1/4" NPT external	FHG19	27.30	FHG39	39.90
100-200	40	2	1/4" NPSF internal	FHG42	27.30	FHG52	39.90
			1/4" four way	FHG44	35.10	FHG54	47.60
			1/4" NPT external	FHG49	27.30	FHG59	39.90

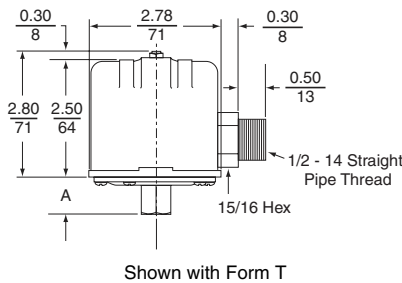
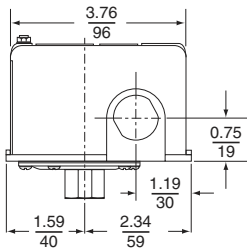


Table 22.45: Special Features and Modifications for Type FHG

Description	Form	\$ Price Addition
Bulk pack	▲	—
Addition of a second ground screw	G4 ■	0.48
Maintained manual cut-out lever (Auto-Off)	M1	5.10
Pulsation plug—factory order only (available only on 1/4-inch fittings, not to include 4-way)	P	0.74
1/2" conduit bushing—1/2" long thread—on left	T	4.05
Slip-on connectors (load side terminals only)	U	0.48
Slip-on connectors (line and load terminals)	U2	0.96
Factory sealed range stud	W	0.48
Two-way pressure release valve	X	10.35
Quick connect two-way pressure release valve (for use with Polyflow® tubing)	X1	17.7
Black cover	Z22	—

- ▲ For bulk package quantities and Form numbers, see Table 22.55 on page 22-19. Refer to discount schedule CP7. If Form is not specified, devices will be shipped individually packaged. Refer to discount schedule CP71.
- Can be field installed. Nameplate should then be marked with the Form letter and maintenance and ordering records corrected.

Table 22.46: Type F—Net Weight, 1-1/8 lb

Switch Type	A	
	in.	mm
FHG2, 12, 22, 32, 42, 52 FRG2, FSG2, FYG2	2-29/32	23
FHG3, 13, 33 FRG3, FSG3, FYG3	1-9/32	33
FHG9, 19, 29, 39, 49, 59 FSG9, FYG9	1-3/32	28

Table 22.47: Pressure Code (fixed differential)

Off at...	Code
80 psi	J43
100 psi	J27
110 psi	J37
115 psi	J38
120 psi	J69
125 psi	J52
135 psi	J39
140 psi	J68
155 psi	J40
150 psi	J55
175 psi	J59
Specify other pressure (minimum order quantity is 4 pieces)	J99

Note: The existence of a code does not imply that the code is available for any or all devices.

Table 22.48: Electrical Ratings For All 9013 Switches

Switch Type	Voltage	Single Phase AC	Polyphase AC ▼	DC	Control Circuit Rating
FHG2, 9, 12, 13, 14, 19, 42, 43, 44, 49 FSG, FSW	115	1-1/2 hp	2 hp	1/4 hp ♦	A600
	230	2 hp	3 hp	1/4 hp ♦	
	460/575	—	1 hp	—	
FHG22, 29, 32, 33, 34, 39, 52, 54, 59 FYG, FYW	115	2 hp	3 hp	1/2 hp ★	A600
	230	3 hp	5 hp	1/2 hp ★	
	460/575	—	1 hp	—	
FRG One Pole All Form H	32	—	—	—	A300
	115	1 hp	—	1/4 hp	
	230	1 hp	—	1/4 hp	
FRG Two Pole	32	—	—	1/4 hp	A300
	115	1 hp	1 hp	1/4 hp	
	230	1 hp	1 hp	1/4 hp	
All 9013G Form H	115	1 hp	—	1/2 hp	A600
	230	2 hp	—	1/2 hp	
	460/575	2 hp	—	—	
All 9013G, except Form H	115	2 hp	3 hp	1 hp	A600
	230	3 hp	5 hp	1 hp	
	460/575	5 hp	5 hp	—	

- ♦ DC rating does not apply to Form M4.
- ★ 1/4 hp with Form M1.
- ▼ See 1993 NEC Article 430-84

Ordering Information

1. Specify Class 9013 Type FHG.
2. Select pressure code from Table 22.47, and add the code designation to end of the Type number. Ensure that the pressure code falls within the limits of the device as shown in Table 22.44.
3. To order special features, add the appropriate Form designation to the Class and Type. Arrange Forms in alphabetical order when specifying more than one special feature.

Accessories page 22-20



File E12158
CCN NKPZ



File LR25490

Note: UL Listed control equipment. Type 4 must have Form T; otherwise these Types are component recognized. If conduit or pressure line is rigid, UL; if both are flexible, UR.

- Designed for the control of electrically driven water pumps. Diaphragm actuated.
- Type FSG is the standard water pump switch, suitable for all types of pumps: jets, submersible, reciprocating, etc.
- Type FYG is designed to meet higher horsepower and pressure requirements.
- Type FRG is reverse acting: contacts open on falling pressure.



PUMPTROL®
Pressure Switch

Table 22.49: Pressure Codes▲

Standard Action Devices		Reverse Action Devices	
Settings	Code	Settings	Code
5–21 psi	J15	8.5–5.5 psi	J17
8–20 psi	J16	10–5 psi	J36
20–40 psi	J20	22–12 psi	J22
20–50 psi	J18	22–16 psi	J19
30–50 psi	J21	35–20 psi	J70
40–60 psi	J24	40–20 psi	J23
50–70 psi	J33	50–30 psi	J35
55–85 psi	J34■	80–60 psi	J32■
60–80 psi	J25	100–80 psi	J51■
Specify other pressure	J99■	150–120 psi	J64■
		Specify other pressure	J99■

- ▲ Existence of a code does not imply that the code is available for any or all devices.
- Minimum order quantity is 4 pieces.

Table 22.52: Maximum Allowable Pressure for All 9013 Switches

Type	Pressure
FHG, FSG, FYG, FSW, FYW, FRG	220 psig
GHB, GHG, GSB, GSG	300 psig
GMG, GSR, GSW	100 psig
GHR, GHW	250 psig

Table 22.53: Temperature Limitations for All 9013 Switches

Operation (Media)	Storage
Min. -36 °C (-33 °F) Max. +125 °C (+257 °F)	Min. -36 °C (-33 °F) Max. +125 °C (+257 °F)

Ordering Information

- Specify Class 9013 Type F.
- Select the pressure code from Table 22.49, and add the code designation to the end of the Type number. Ensure that the pressure code falls within the limits of the device as shown in Tables 22.50 and 22.51.
- To order special features, add the appropriate Form letter to the Class and Type. Arrange the Form letters in alphabetical order when ordering more than one special feature.

Electrical Ratings:page 22-18
Dimensions:page 22-18
Renewal Parts Kits:page 22-26



File E12158 CCN NKPZ



File LR25490

Note: Products on this page are UL Listed, however type numbers ending in 8, 10 or 20 (non rigid pressure lines) must have Form T or TI—otherwise these are UL component recognized.

Table 22.50: Standard Action: Contacts Open On Rising Pressure

Cut-out Range (psig)	Approximate Adjustable Differential (psig)	Cut-in Range (psig)	Pressure ♦ Connection	2 Pole			
				NEMA 1		NEMA 3R ♦	
				Type	\$ Price	Type	\$ Price
20–65	15–30	5–45	1/4" NPSF internal	FSG2	27.30	FSW2	32.10
			1/4" NPT external	FSG9	27.30	FSW9	32.10
			1/4" bayonet (barbed)	FSG10	27.30	FSW10	32.10
			90° elbow 1/4" bayonet	FSG20	30.00	FSW20	34.80
20–50	10–30	10–30	1/4" NPSF internal	FSG22	34.80	FSW22	39.60
20–60	10–30	10–45	1/4" NPT external	FSG29	34.80	FSW29	39.60
9–30	6–20	3–10	1/4" NPSF internal	FSG42	34.80	FSW42	39.60
9–30	6–20	3–10	1/4" NPT external	FSG49	34.80	FSW49	39.60
34–65	15–30	19–45	(FSG1 through 20 with Form M4 Is only available in this range)				
25–80	20–30	5–60	1/4" NPSF internal	FYG2	39.90	FYW2	44.70
			1/4" NPT external	FYG9	39.90	FYW9	44.70
			1/4" bayonet (barbed)	FYG10	39.90	FYW10	44.70
			90° elbow 1/4" bayonet	FYG20	42.30	FYW20	47.10
39–80	20–30	19–60	(FYG1 through 20 with Form M4 Is only available in this range)				
20–50	10–30	10–30	1/4" NPSF internal	FYG22	47.30	FYW22	78.00
20–60	10–30	10–45	1/4" NPT external	FYG29	47.30	FYW29	78.00
9–40	6–30	3–10	1/4" NPSF internal	FYG42	47.30	FYW42	78.00
9–40	6–30	3–10	1/4" NPT external	FYG49	47.30	FYW49	78.00

♦ Must be mounted in vertical position to maintain enclosure rating.

Table 22.51: Reverse Action: Contacts Open On Falling Pressure

Cut-in Range (psig)	Approximate Adjustable Differential (psig)	Cut-out Range (psig)	Pressure Connection	1-Pole		2-Pole	
				Type	\$ Price	Type	\$ Price
23–65	15–30	8–45	1/4" NPSF internal	FRG12	47.30	FRG2	49.80
			3/8" NPSF internal	FRG13	47.30	FRG3	49.80
			1/4" NPT external	FRG19	47.30	FRG9	49.80
10–45	6–20	4–25	1/4" NPSF internal	FRG32	52.00	FRG22	55.00
			3/8" NPSF internal	FRG33	52.00	FRG23	55.00
			1/4" NPT external	FRG39	52.00	FRG29	55.00
6–14	5 Non-adjustable	1–9	1/4" NPSF internal	FRG52	52.00	FRG42	55.00
			3/8" NPSF internal	FRG53	52.00	FRG43	55.00
			1/4" NPT external	FRG59	52.00	FRG49	55.00
			1/4" NPSF internal	FRG72	47.30	FRG62	49.80
40–100	20–30	20–80	3/8" NPSF internal	FRG73	47.30	FRG63	49.80
			1/4" NPSF internal	FRG92	47.30	FRG82	49.80
65–150	30–45	35–120	3/8" NPSF internal	FRG93	47.30	FRG83	49.80
			1/4" NPT external	FRG99	47.30	FRG89	49.80

Table 22.54: Special Features and Modifications for Type FSG, FYG & FRG Devices

Description	Applies to Types	Form	\$ Price Addition
Bulk package	All Type F	★	—
One normally open—one normally closed contact	FRG 2-Pole only	H	9.90
Maintained manual cut-out lever (Auto-Off)	FSG, FYG	M1	5.10
Momentary manual cut-in lever (Auto-Start)	FRG2-59 only	M3	5.10
Low pressure cut-off (Auto-Start-Off) Operates at approximately 10 psig below cut-in and will turn off the pump	FSG, FYG	M4	8.70
Maintained manual cut-in lever (Auto-On)	FRG2-59 only	M5	5.10
Pulsation plug (Type 2 & 9 only)	FRG, FSG, FYG	P▼	0.74
Plastic flange (max. temp. 120°F) (max. pressure 80 psi) (available only on Types FSG2, FYG2, FRG2, FSG*2, FYG*2, FRG*2)	FSG*, FYG*, FRG*	Q8	12.00
1/2" conduit bushing, 1/2" long thread—on left	All Type F	T	4.10
Slip-on connectors (load side terminals only)	FSG, FYG	U	0.48
Slip-on connectors (line and load terminals)	FSG, FYG	U2	0.96
Black cover	FSG, FYG	Z22	—

- ★ For bulk package quantities and Form numbers, see Table 22.55. Refer to discount schedule CP7. If Form C** is not specified, devices will be shipped individually packaged. Refer to discount schedule CP71.
- ▼ Nylon pulsation plug can be field installed on types having 1/4" NPSF internal connector. Part number 1530S6G1 is one bag of 50 plugs.

Table 22.55: Bulk Package Form Numbers for 9013F Pressure Switches

Description	Bulk Package Quantity					
	16	20	40	50	400	500
Product without Forms M1, M3, M4, M5, T, X1						
9013FHG (without 1/4" four-way)	—	C20	—	C50	—	—
9013FHG4, 14, 24, 34, 44, 54 (with 1/4" four-way)	—	C20	—	C50	C400	—
9013FRG	—	C20	—	C50	—	—
9013FSG	—	C20	—	C50	—	—
9013FYG	—	C20	—	C50	—	—
Product with Forms M1, M3, M4, M5						
9013FHG (without 1/4" four-way)	—	C20	C40	—	—	—
9013FHG4, 14, 24, 34, 44, 54 (with 1/4" four-way)	—	C20	C40	—	—	—
9013FRG	—	C20	C40	—	—	—
9013FSG	—	C20	C40	—	—	—
9013FYG	—	C20	C40	—	—	—
Product with Forms T, X1						
9013FHG (without 1/4" four-way)	C16	—	C40	—	—	—
9013FHG4, 14, 24, 34, 44, 54 (with 1/4" four-way)	C16	—	C40	—	—	—
9013FRG	C16	—	C40	—	—	—
9013FSG	C16	—	C40	—	—	—
9013FYG	C16	—	C40	—	—	—
9013FHG9 Special with Extended Flange	C16	—	—	—	—	C500



PUMPTROL[®]
Pressure Switch

Shown with Form X

Class 9013 Type G Pumptrol pressure switches are designed to control electrically driven water pumps and air compressors. These devices cover higher electrical ratings for directly controlling motors in pump and compressor applications.

- Contacts open on pressure rise.
- Diaphragm actuated.
- For electrical ratings, see page 22-18.
- For repair parts kits, see page 22-26.



File E12158
CCN NKPZ

File E12443
CCN NOWT
Haz Loc



File 25490
File 26817
Haz. Loc.

Table 22.56: Pressure Codes

Code	Pressure Setting (Close-Open) psi
J20	20-40
J21	30-50
J23	40-20 (reverse action)
J24	40-60
J25	60-80
J26	70-90
J28	70-100
J29	75-100
J30	80-100
J31	90-120
J50	135-175
J51	100-80 (reverse action)
J53	100-125
J54	110-125
J56	110-150
J57	120-150
J58	125-150
J60	125-175
J61	130-175
J62	140-175
J63	145-175
J64	150-120 (reverse action)
J65	215-250
J99	Specify the required setting

Table 22.57: Selection Tables

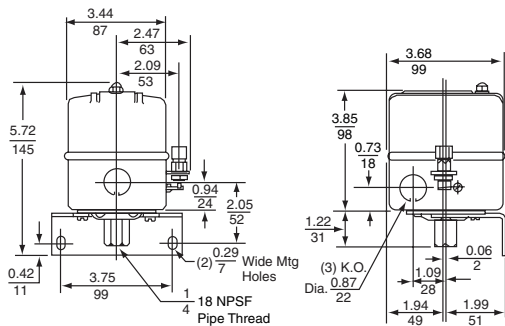
Cut-out Range (psig)	Approximate Adjustable Differential (psig)	Cut-in Range (psig)	Enclosure	Poles	NPSF Internal Pressure Connection	Type	\$ Price
10-35	4-8	5.5-30.5	NEMA 1 (General Purpose)	2	1/4	GMG2	153.00
20-80	15-30	5-60	NEMA 3R ▲ (Rainproof)	2	1/4	GSB2	149.00
20-80	15-30	5-60	NEMA 1 (General Purpose)	2	1/8	GSG1	86.00
					1/4	GSG2	
					3/8	GSG3	
20-80	20-40	5-50	NEMA 7 & 9 (Hazardous Locations)	2	1/8	GSR1	453.00
					1/4	GSR2	
					3/8	GSR3	
					1/8	GSW1	
65-200	20-40	40-170	NEMA 4 (Watertight)	2	1/4	GSW2	473.00
					3/8	GSW3	
					1/4	GHB2	
65-200	20-40	40-170	NEMA 3R ▲ (Rainproof)	2	1/4	GHB1	149.00
65-200	20-40	40-170	NEMA 1 (General Purpose)	2	1/8	GHG1	86.00
					1/4	GHG2	
					3/8	GHG3	
65-200	30-50	35-150	NEMA 7 & 9 (Hazardous Locations)	2	1/8	GHR1	453.00
					1/4	GHR2	
					3/8	GHR3	
					1/8	GHW1	
80-250	25-45	32-215	NEMA 4 (Watertight)	2	1/4	GHW2	473.00
					3/8	GHW3	
					1/4	GHB5	
80-250	25-45	32-215	NEMA 3R ▲ (Rainproof)	2	1/4	GHB5	149.00
80-250	24-45	32-215	NEMA 1 (General Purpose)	2	1/8	GHG4	86.00
					1/4	GHG5	
					3/8	GHG6	
80-250	40-60	30-190	NEMA 7 & 9 (Hazardous Locations)	2	1/8	GHR4	453.00
					1/4	GHR5	
					3/8	GHR6	
					1/8	GHW4	
80-250	40-60	30-190	NEMA 4 (Watertight)	2	1/4	GHW5	473.00
					3/8	GHW6	
					1/4	GHW6	

▲ Must be mounted in vertical position to maintain enclosure rating.

Ordering Information

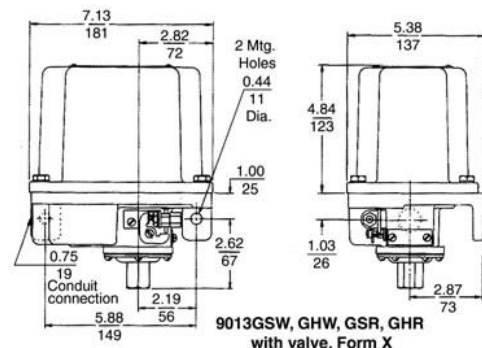
- Specify Class 9013 Type G.
- Select pressure code from Table 22.56 above, and add code designation to the end of the Type number. Ensure that pressure code falls within the limits of the device as shown in Table 22.57.
- To order special features, add the appropriate Form letter to the Class and Type. Arrange Form letters in alphabetical order when ordering more than one special feature.

Electrical Ratings.....page 22-18



Note: The mounting bracket shown is available as kit 9049A52.

9013GHG, GSG - with or without Form X



9013GSW, GHW, GSR, GHR with valve, Form X

Table 22.58: Special Features and Modifications for Type G Devices

Description	Applies to	Form	\$ Price Addition
Standard pack of 10 switches ■	All Type G	C10	—
3-way lever (On-Auto-Off) (not compatible with Form X)	GHG, GMG, GSG	E	30.60
1 N.O., 1 N.C. contact	All Type G	H	14.90
Pulsation plug (not field replaceable.)	All Type G	P	0.81
Reverse action (Select pressure code from reverse action table on page 22-19)	All Type G	R	14.90
Slip-on connectors (load side terminals only)	All Type G	U	0.48
Slip-on connectors (line and load terminals)	All Type G	U2	0.96
Two-way pressure release valve (Not compatible with Form E)	GHB, GMG, GSB, GHG, GSG	X	30.60
	GHR, GHW, GSR, GSW	X	85.00
1/4" male pipe thread on pressure connection	All Type G	Z	—
1/2"-14 NPT external	All Type G	Z16	38.60
1/4"-18 NPT internal ◆	All Type G	Z16	38.60

- Available on GHB, GHG, GSB, and GSG.
- ◆ If Form C10 is not specified, devices will be shipped individually packaged.
- ◆ UL Listed industrial control equipment.

Table 22.59: Class 9049 Accessories for Class 9013 Pressure Switches

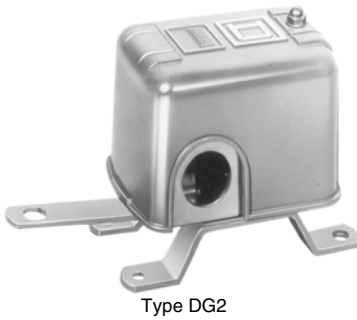
Type	Description	Applies to Class	\$ Price
A12	Two-way pressure release valve, replacement only. Cannot be added to switch that originally had no valve.	9013GHG, GSG, Form X only★	31.80
A52	Mtg. bracket—replacing obsolete 9013A with 9013G	9013GHG, GSG★	10.50
A53	Mtg. bracket—replacing obsolete 9013A with 9013G, or for current 9016GVG	9013GMG, 9016GVG★	13.40
A56	Two-way pressure release valve. Replacement only. Cannot be added to switch that originally had no valve.	9013FHG, Form X only▼	10.40

- ★ Refer to discount schedule CP7G.
- ▼ Refer to discount schedule CP7.

Open Tank or Sump Applications

Ambient temperature ratings: Min. -30 °C (-22 °F); Max. +105 °C (+220 °F)

For accessories, refer to page 22-26.



Type DG2



Type GG



File No. E12158
File No. E12443
Haz Loc



File LR25490
File LR26817
Haz Loc

Table 22.60: Class 9036, 2-Pole, Single Lever Operated

Contact Operation	NEMA 1		NEMA 4		NEMA 7, 9	
	Type	\$ Price	Type	\$ Price	Type	\$ Price
Close on liquid rise	DG2	55.00	DW31	366.00	DR31	353.00
Open on liquid rise	DG2R	60.00	DW31R	371.00	DR31R	357.00
Close on liquid rise	GG2	105.00	GW1	617.00	GR1	603.00
Open on liquid rise	GG2R	105.00	GW1R	627.00	GR1R	617.00

Order the universal mounting bracket and float accessory kits separately from the Class 9049 Accessories section on page 22-26. Types GW and GR use a center-hole float. Devices with Form C use a center-hole float. All others use a tapped-at-top float.

Table 22.61: Modifications

Description	Factory Installed		Field Installed	
	Form	\$ Price	Class 9049 Kit	\$ Price
Types DG, DW, DR				
Reverse action (Type DG)	R	5.10	A58	5.10
Compensating spring (Type DG)	C	10.10	A19	10.10
Compensating spring (Type DR, DW)	C	10.10	A20	10.10
Compensating spring and reverse action	CR	15.20	Not available	
Types GG, GW, GR				
Compensating spring for Type GG2	C	12.60	9049A13	12.60
Combination of compensating spring and reverse action (Type GG2)	CR	27.50	9049A13	12.60
1 N.O., 1 N.C. contact configuration	H	14.90	Not available	
Combination of comp. spring & 1 N.O., 1 N.C. contact for Type GG2	CH	27.50	Not available	
Reverse action (Type GR, GW)	R	14.90	Not available	

Table 22.62: Class 9049 Float Accessory Specifications (oz)

Item	Type A6	Type A6S	Type A6C	Type A6CS	Type A6A	Type A6CA
Net buoyancy (in water) 7" float	60▲	60▲	70▲	70▲	60▲	70▲
Weight of 5 ft rod	18.5	16.9	18.5	16.9	6	6
Weight of extra ft of rod (per ft)	3.7	3.4	3.7	3.4	1.2	1.2
Total weight of stops	3 (2)	3 (2)	6 (4)	6 (4)	3 (2)	6 (4)

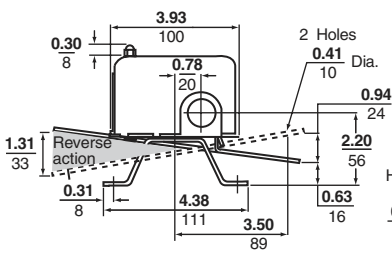
- ▲ Net buoyancy of float has been calculated with float 80% submerged, thus allowing 20% factor of safety.
 - Buoyancy data is calculated for use in water. Consult factory for buoyancy data in media with different specific gravity than water.
- When ordering float accessories**, first specify the desired float accessory package, such as 9049A6 or 9049A6CS, then as a second item give the number of additional rod kits required. For example, for a 9049A6 with 15 ft of rod, order as follows:
Item A = 9049A6, quantity = 1; Item B = 9049T1, quantity = 4.

Table 22.63: Maximum Forces at Which Switches Are Tested (oz)

Type	Force Up To Trip	Force Down To Trip	Weight Supported with Compensating Spring	Type (with or without Form H)	Lever Length Position	Force Up to Trip	Force Down to Trip	Weight Supported with Compensating Spring at Max. Adjustment (oz)
DG2	9	8	60	GG2	Short	33	39	◆
DG2 Form R	8	8	60	GG2	Long	21	27	100
DW31	8	8	66	GG2 Form R	Short	30	24	◆
DW31 Form R	8	8	66	GG2 Form R	Long	22	16	150
DR31	8	8	66	GR1, GW1	Short	24	31	80
DR31 Form R	8	8	66	GR1, GW1	Medium	22	29	72
				GR1, GW1	Long	20	27	64

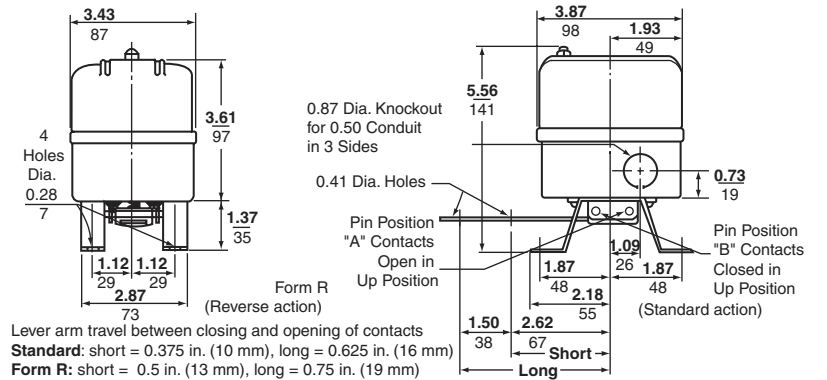
◆ Compensating spring not effective in combination with Short lever length position.

Figure 22.13: Type DG Dimensions



Float lever travel between closing and opening of contacts: short = 1 in. (25 mm), medium = 1.12 (28 mm), long = 1.25 in. (31.8)

Figure 22.14: Type GG Dimensions



Lever arm travel between closing and opening of contacts
Standard: short = 0.375 in. (10 mm), long = 0.625 in. (16 mm)
Form R: short = 0.5 in. (13 mm), long = 0.75 in. (19 mm)
 For Type GR/GW dimensions, see catalog 9034CT9701.

For Type DR/DW dimensions, see catalog 9034CT9701.

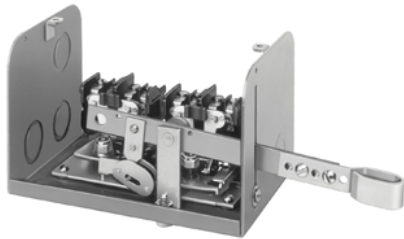
Table 22.64: Electrical Ratings for All Float Switches

Applies to Class and Type	Control Circuit	Single Phase AC			Polyphase AC ★			DC		
		115V	230V	460/ 575V	115V	230V	460/ 575V	32V	115V	230V
9036DG, DR, DW (2-pole), FG	A600	2 hp	3 hp	—	3 hp	5 hp	1 hp	1/4 hp	1/2 hp	1/2 hp
9036GG, GR, GW (2-pole)	A600	2 hp	3 hp	5 hp	3 hp	5 hp	5 hp	1/2 hp	1 hp	1 hp
9036G Form H (1 N.O., 1 N.C.)	A300	1 hp	2 hp	2 hp	—	—	—	—	1/2 hp	1/2 hp
9037EG, ER, EW; HG, HR, HW (2-pole)	A600	2 hp	3 hp	—	3 hp	5 hp	1 hp	1/4 hp	1/2 hp	1/2 hp
9038 All Devices (2-pole)	A600	2 hp	3 hp	—	3 hp	5 hp	1 hp	1/4 hp	1/2 hp	1/2 hp

★ See 1993 NEC Article 430-84

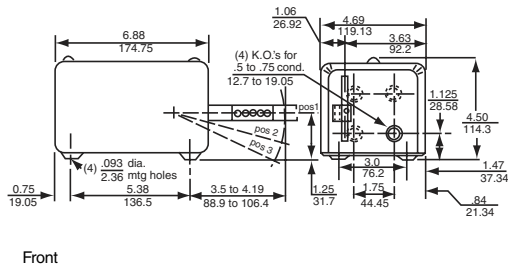
Type A, Open Tank

Alternators are designed to provide motor alternation in the operation of two motors.

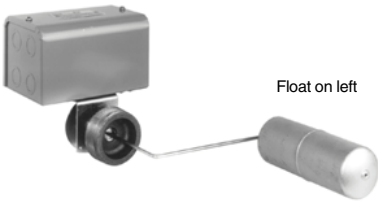


Type AG1
Mechanical Alternator, Float Operated

Figure 22.20: Type A Dimensions



Front



Type CG36

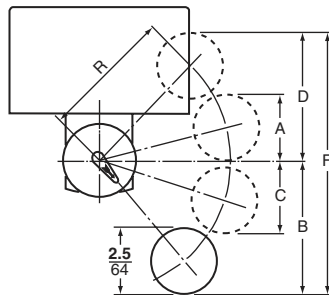


File No. E12158
excludes NEMA 7 & 9 products
(9038AR, CR, and DR)



File LR25490
excludes NEMA 7 & 9 products
(9038AR, CR, and DR)

Figure 22.21: Travel Dimensions



Replacement Float:
9049HF..... page 22-26

Table 22.72: Class 9038 Type A

Application	Description	NEMA 1		NEMA 4		NEMA 7 and 9	
		Type	\$ Price	Type	\$ Price	Type	\$ Price
For open tank or sump systems using duplex pumps	Mechanical alternator float operated	AG1	192.00	AW1	680.00	AR1	665.00

Note: For use with Class 9049 float accessories listed on page 22-26.
Type AW and AR alternators **must** use center hole floats.

Table 22.73: Operating Forces—Types AG, AR and AW

Type	Without Comp. Spring (No Form C)		Maximum Weight of Rod and Stops That Can Be Supported by Compensating Spring (Form C) Note: AW1 and AR1 have compensating spring standard.	Length of Rod That Can Be Supported with the Compensating Spring at the Max. Adjustment		
	Force Up ■	Force Down ▽		Brass ▲	Stainless Steel ▲	Aluminum ▲
AG1 (min. lever ext.)	18 oz	20 oz	47 oz.	10 ft	12 ft	25 ft
AG1 (max. lever ext.)	16	17	41	8	10	21
AG1 Form R (min. lever ext.)	14	16	33	7	8	17
AG1 Form R (max. lever ext.)	11	12	30	6	7	15
AR1, AW1 (standard lever)	—	—	74	16	20	41
AR1, Form R, AW1 Form R (std. lever)	—	—	85	19	23	47

- ▲ Rod length has been determined using the weight of the rod material furnished on Class 9049 accessories (3/8" O.D. tubing).
- Other types of rod should be weighed and compared to the Weight of Rod column above.
- Add 2 oz for Form N5 High Water alarm.

Type C, Closed Tank, with Bushing

Flange mounted with bushing for control of liquid level within a closed tank. Build up the switch to meet your requirements from the basic switch, rod kit, and float kit groups below.

Type C switches are attached to the tank by means of a 2-1/2 inch screw-in connection. An external pointer indicates the float position within the tank when the unit is mounted. Switches come complete with screw-in connector, stainless steel float and rod.

Table 22.74: Class 9038 Type C

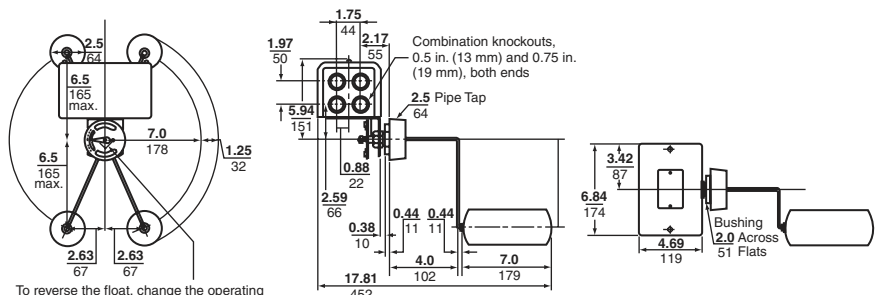
Float Position Viewed from Front of Switch Facing Indicator Scale	R in. (mm)	Approx. Water Level Change		NEMA Type 1		NEMA Type 4		NEMA Type 7, 9	
		Min. (in.)	Max. (in.)	Type	\$ Price	Type	\$ Price	Type	\$ Price
Right	7 (178)	6.5 (165)	13 (330)	CG31	410.00	CW31	944.00	CR31	929.00
Left	7 (178)	6.5 (165)	13 (330)	CG32	410.00	CW32	944.00	CR32	929.00
Right	4.25 (108)	4 (102)	7.75 (197)	CG33	410.00	CW33	944.00	CR33	929.00
Left	4.25 (108)	4 (102)	7.75 (197)	CG34	410.00	—	—	—	—
Right	5 (127)	4.75 (121)	9.25 (235)	CG35	410.00	—	—	—	—
Left	5 (127)	4.75 (121)	9.25 (235)	CG36	410.00	CW36	944.00	CR36	929.00

Table 22.75: Type C Float Travel Adjustments

R in. (mm)	A in. (mm)		B in. (mm)		C in. (mm)		D in. (mm)		F in. (mm)	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
7 (178) ◆	2.5 (64)	5 (127)	5 (127)	7 (178)	2 (51)	4 (102)	5 (152)	7 (178)	10 (254)	14 (495)
5 (127) ■	2.25 (57)	3.75 (95)	4 (102)	5.25 (133)	2.75 (70)	3 (76)	4 (102)	5.25 (133)	8 (203)	10.5 (267)
4.25 (108) ▲	2 (51)	3.5 (89)	3.5 (89)	4.75 (121)	2.5 (64)	3.75 (95)	3.5 (89)	4.75 (121)	7 (178)	9.5 (241)

- ▲ CG33, CG34, CW33, CW34, CR33, CR34
- CG35, CG36, CW35, CW36, CR35, CR36
- ◆ CG31, CG32, CW31, CW32, CR31, CR32

Figure 22.22: Type CG Dimensions



To reverse the float, change the operating link in the holes of the adjusting plate.



Type DG Shown with Rod Kit 9049ER5 and Float Kit 9049HF3 Installed.

Type D, Closed Tank, Top Mounted

Designed for applications where mounting is to be made at the top of a closed tank.

Table 22.76: Class 9038 Type D Contacts Close On Liquid Rise

Water Level Change	Hinge Post Dimension "V" (in.)	NEMA 1		NEMA 4		NEMA 7 and 9	
		Type	\$ Price	Type	\$ Price	Type	\$ Price
Min.	2-5/8	DG7	495.00	DW7	1026.00	—	—
Max.		DG8	495.00	DW8	1026.00	DR8	1013.00
Min.	4-11/16	DG9	515.00	—	—	—	—
Max.		DG10	515.00	—	—	—	—

Table 22.77: Float Kits, For Use with Type D Switches

Size and Material Diameter x Length (in.)	Class and Type	\$ Price
3.625 x 4.50, #304 stainless steel	9049EF1	30.30
3.625 x 4.50, #316 stainless steel	9049EF2	75.00
2.50 x 7, #304 stainless steel	9049HF3	32.55
2.50 x 7, #316 stainless steel	9049HF4	102.00

Table 22.78: Float Rod Kit, Class 9049

Type	R (in.)	H (in.)	G (in.)	F (in.)	\$ Price
ER1	1.75	8.25	3.25	8.75	12.60
ER2	2.50	9.00	3.50	10.50	12.60
ER3	3.25	9.50	3.50	11.00	12.60
ER5	5.25	11.75	3.75	12.75	12.60
ER7	7.25	13.75	4.00	14.50	12.60
ER12	12.25	18.75	4.75	19.00	12.60

Table 22.79: Available Modifications for All Mechanical Alternators

Consult the factory for use in media with a different specific gravity than water.

Description	Form	\$ Price Difference
Compensating spring (Type AG)	C	add 40.10
Omit 2-1/2 in. connecting bushing (Type CG, CR, CW)	F3	deduct 8.10
Omit float (Type CG, CR, CW)	L	deduct 29.30
Two-level non-alternating unit	N4	add 56.00
Addition of a third, high-water alarm circuit (Type AG, AR, AW, CG, DG only)	N5	add 134.00
High-water alarm circuit, 2-pole (Type CG only)	N25	add 173.00
Reverse action (contacts open on Rise)	R	—
Viton [®] packing, 5 oz. float (diesel fuel) (Type CG)	Z19	—
Viton packing (Type CG, CR, CW)	Z20	—
#316 stainless steel float and Viton packing (Type CG, CR, CW)	Z21	add 152.00

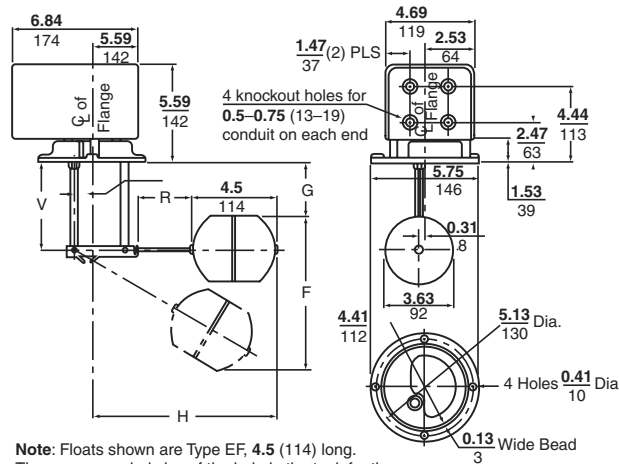


File No. E12158
excludes NEMA 7 & 9 products
(9038AR, CR, and DR)



File LR25490
excludes NEMA 7 & 9 products
(9038AR, CR, and DR)

Figure 22.23: Type DG Dimensions



Note: Floats shown are Type EF, 4.5 (114) long. The recommended size of the hole in the tank for the entry of the float and the mounting of the control is 4.19 (106). Add 2.5 (64) to "H" if using Type HF Floats, which are 7.0 (178) long.

Table 22.80: Temperature Ratings for Class 9038

Ambient Temperature		-22 to 220 °F (-30 to 105 °C)
Media	Buna-N Seal	Up to 215 °F (102 °C)
	Viton Seal	Up to 250 °F (121 °C)

Accessories for Float Switches

To order, specify the Class and Type number of the kit. Refer to discount schedule CP7G unless otherwise noted.

Table 22.81: Class 9049 Accessories for Float Switches

Description		Applies to Class	Type	\$ Price	
Compensating Spring		9036GG	A13	12.60	
		9038AG	A15	37.50	
		9036DR, DW	A20	10.10	
Float	Dia. 3.62 in. (92 mm), length 4.5 in. (114 mm)	#304 stainless steel	9037E, 9038D	EF1	30.30
		#316 stainless steel	9037E, 9038D	EF2	75.00
	Dia. 2.5 in. (64 mm), length 7 in. (178 mm)	#304 stainless steel	9037H, 9038C	HF3	32.60
		#316 stainless steel	9037H, 9038C	HF4	102.00
Float Kit	7 in. tapped-at-top #304 stainless steel float, 5 ft rod, 2 stops	Brass rod	All 9036, 9038A	A6	143.00
		Aluminum rod	All 9036, 9038A	A6A	149.00
	7 in. center-hole #304 stainless steel float, 5 ft rod, 4 stops	Brass rod	All 9036, 9038A	A6C	168.00
		Aluminum rod	All 9036, 9038A	A6CA	177.00
	7 in. center-hole #316 stainless steel float, 5 ft stainless steel rod, 4 stainless steel stops	All 9036, 9038A	A6CS	401.00	
	7 in. tapped-at-top #316 stainless steel float, 5 ft stainless steel rod, 2 stainless steel stops	All 9036, 9038A	A6S	369.00	
	Replacement float—7 in. round center-hole #304 stainless steel	9049A6C, A6CA	AF1	105.00	
Lever	Form R	9036DG	A58	5.30	
	Replacing obsolete 9036A with 9036G	9036GG	A54	25.10	
Mounting Bracket	Replacing 9036A (S or F1) with 9036G	9036GG	A55	30.30	
	Universal	All 9036, 9038AG, AR, AW▲	UMS1	40.40	
Rod	Stainless steel	1-3/4 in. long	9037E, 9038D	ER1	12.60
		2-1/2 in. long	9037E, 9038D	ER2	12.60
		3-1/4 in. long	9037E, 9038D	ER3	12.60
		5-1/4 in. long	9037E, 9038D	ER5	12.60
		7-1/4 in. long	9037E, 9038D	ER7	12.60
		12-1/4 in. long	9037E, 9038D	ER12	12.60
		Brass rod	9049A6, A6C	T1	32.60
Rod Kit	Additional 2-1/2 ft section with connector	Aluminum rod	9049A6A, A6CA	T1A	35.30
		Stainless steel rod	9049A6S, A6CS	T1S	81.00

▲ Refer to discount schedule CP1.

Renewal Parts for Class 9012–9038 Devices

Renewal parts are generally available for Pump Control Products with a numerical date code—for example, 172 (first quarter, 1972)—or a current date code. Parts are no longer available for devices manufactured before 1965.

To order, specify the Class and Type number of the kit. Refer to discount schedule CP7G unless otherwise indicated.

Table 22.82: Class 9998 Renewal Parts Kits for Class 9012–9038 Devices

Description / Equipment To Be Serviced		Parts Kit Type	\$ Price
Actuator Assembly	9012GA, GD, GG, GK, GN, GR 5, 25, 55 Series C only	PC268◆◆	69.00
	9012GA, GD, GG, GK, GN, GR 6, 26, 36, 46, 56 Series C only	PC269◆◆	95.00
	9012GB, GE, GH1, 21, 31, 41, 51; GL, GP, GS1	PC177◆◆	246.00
	9012GB, GE, GH2, 22, 32, 42, 52; GL, GP, GS2	PC178◆◆	246.00
Contact Kit (2-Pole Contacts)	9013FHG22, 29, 32, 39, 52, 59; 9013 FYG; 9036DG, DR, DW; 9037EG, ER, EW, HG, HR, HW30–39; 9038 All Types (2 Kits Required); obsolete 9013HHGY, HSGY; HSWY; 9037HEG, HSG3, 4; 9035DG10, DW10 (This kit also contains a replacement diaphragm for pressure switches. The diaphragm fits pressure switch only)	PC242★	19.20
	9013GHG, GSG, GHR, GSR, GMG; 9036GG, GR, GW; 9037GG Series C All except Forms H & R; 9016GVG, Form R	PC205	26.60
	9013GHG, GSG, GSR, GMG; 9036GG, GR, GW; 9037GG, GR, GW Series C Form H only; 9016GVG, Form H	PC206	41.00
Diaphragm Assembly	9013GHG, GSG, GHR, GSR, GMG; 9036GR, GW: Series C Form R only; 9016GVG	PC207	41.00
	9012GA, GD, GN, GR1, 21 Series C only	PC265◆◆	75.00
	9012GA, GD, GG, GK, GN, GR 2, 3, 22, 52 Series C only	PC266◆◆	49.20
	9012GA, GD, GG, GK, GN, GR4, 24, 54 Series C only	PC267◆◆	49.20
	Convolute diaphragm assembly for 9013GHG, GSG: Series C	PC208	14.40
Gasket Kit	9013GHW, GSW; and GSW, GHR: Series C	PC211	10.10
	9016 GAW-1, 21	PC233	36.20
	Contains all replaceable gaskets for all 9012 open, NEMA 1, 4, 4X, 13 devices	PC184	47.60
Pilot Light, 24 Vdc	9012, 9016G Forms G7, G8, G9, G10, G21, G22	PC305◆	69.00
Piston Assembly	9012GC, GF, GJ, GQ, GT1, 21, 31, 41, 51 Series C only	PC270◆◆	492.00
	9012GC, GF, GJ, GQ, GT2, 22, 32, 42, 52 Series C only	PC271◆◆	492.00
	9012GC, GF, GQ, GT4, 24, 34, 44, 54 Series C only	PC273◆◆	492.00
Seal Kit	Buna N, for Series A devices: 9037HG/HW/HR30–39; 9038CG/CW/CR31–36	PC337	14.40
	Viton®, for Series A devices with Form Z19 or Z20: 9037HG/HW/HR30–39; 9038CG/CW/CR31–36	PC338	15.80
Seal Tube Kit	Buna N Quad-Ring®, for Series C devices: 9037HG/HW/HR3–12; 9038CG/CW/CR1–6	PC282	43.40
	Viton Quad-Ring, for Series C devices: 9037HG/HW/HR3–12; 9038CG/CW/CR1–6	PC333	43.40
Snap Switch	SPDT, for 9012GA, GB, GC, GD, GE, GF, GG, GH, GJ single pole; except Forms E2, E3, E4, H3: Series C only	PC313◆◆	119.00
	DPDT, for 9012GA, GB, GC, GD, GE, GF, GG, GH, GJ double pole; except Forms E2, E3, H6, H7: Series C only	PC314◆◆	177.00
Switch Mechanism	9036DR1, DW1 Series B	PC285	95.00

◆ If one of these **Form** designations appears on the pressure switch nameplate, the 9998 PC number must be completed by adding that same **Form suffix** from page 22-16, and the Form price must be added to the kit price.

◆ Refer to discount schedule CP1.

★ Refer to discount schedule CP7.