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Section 20

Pressure, Vacuum, Temperature and Float Switches



Machine Tool Pressure Switch



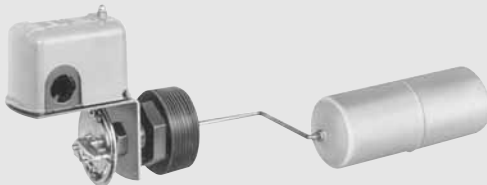
Electronic Pressure Switch



Vacuum Switch



Industrial Pressure Switch



Closed Tank Float Switch



Air Compressor Switch



Water Pump Switch

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Electronic Pressure Switches

Type XMLF

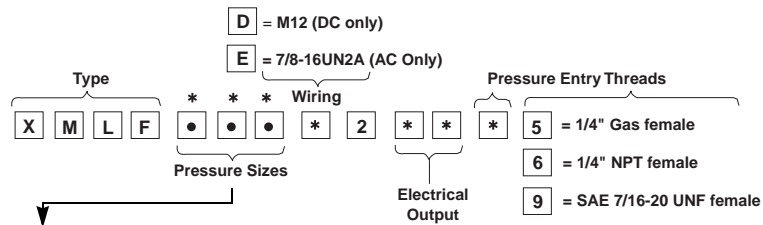


XMLF is a user friendly electronic pressure switch, with an easy to read four digit display. Finger operated adjustment buttons, allow the user to scroll both up and down through the menu functions. Burst pressure is six times the nominal pressure (up to 1800 bar: 26100 psi).

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

Available in six versions:

- Analog sensor (4–20 mA) with shunt calibration
- Analog sensor (1–10 V) with shunt calibration
- Universal sensor; 1 analog output (4–20 mA) and 1 digital output
- Universal sensor; 1 analog output (1–10 V) and 1 digital output
- Dual stage sensor; 2 digital outputs 1–5 are 17–33 Vdc
- Electronic pressure switch with relay output: 120 Vac (102–132 Vac)



Size Code	psi	BAR			
M01	-14.5 to 0	-1 to 0	0	1	= DC Analog 4–20 mA—shunt calibration
002	0 to 36.25	0 to 2.5	0	2	= DC Analog 4–20 mA—digital single stage
010	0 to 145	0 to 10	1	1	= DC Analog 0–10 V—shunt calibration
016	0 to 232	0 to 16	1	2	= DC Analog 0–10 V—digital single stage
025	0 to 362.5	0 to 25	0	3	= DC digital dual stage
040	0 to 580	0 to 40	0	4	= AC Relay 120 V
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			

The switches can be adjusted: 7% to 100% of the nominal pressure with a differential adjustable 5% to 95% of the nominal pressure.

Electrical Connections					
AC Connector			DC Connector		
102–132 Vac	N.O. – N.C.	Relays	Output 2.5 A	5 Wire	
17–33 Vdc	Analog	PNP–NPN	N.O.	Outputs	4 Wire
17–33 Vdc	Analog	+ Shunt Calibration		4 Wire	
17–33 Vdc	Dual Stage	N.O. – N.C.	PNP–NPN	Outputs	4 Wire

The display will show the pressure in the circuit, even if it is higher than the pressure size of the device, up to twice that value (i.e.: XMXF.6000...display up to 1200 bar). If the pressure is higher than 130% of the pressure range the display will start blinking. The display will show two digits after the point from -1 up to 2.5 bar (-14.5 to 36.25); one digit after the point from 10 up to 70 bar (145 to 1015); and no digit after the point from 100 up to 600 bar (1450 to 8700). In any case the display will not show values that are lower than 2% at the beginning of the scale.

20 PRESSURE, VAC, TEMP AND FLOAT SWITCHES



File E164865
CCN NKPZ



File LR44087
Class 3211-03



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Discount
Schedule

The XMLF electronic pressure switch can be set without any tools once hooked up to a 24 Vdc power supply. It has been 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 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 will change state when pressures goes outside the window setting.



	Range	Output	Pressure Connector	Electrical Connector	Price
AC Versions					
XMLF010E2046	0 to 145 psi	Relay (2.5A)	1/4" NPT Female	SAE7/8-16UNF	\$357.
XMLF070E2046	0 to 1015 psi	Relay (2.5A)	1/4" NPT Female	SAE7/8-16UNF	373.

DC Versions					
XMLFMO1D2026	-14.5 to 0 psi	Analog or Single Stage	1/4" NPT Female	M12	326.
XMLF010D2026	0 to 145 psi		1/4" NPT Female	M12	326.
XMLF070D2029	0 to 1015 psi		SAE7/16-20 Female	M12	342.
XMLF400D2029	0 to 5800 psi	Dual Stage	SAE7/16-20 Female	SAE7/8-16UNF	357.
XMLF010D2039	0 to 145 psi		SAE7/16-20 Female	M12	342.
XMLF070D2039	0 to 1015 psi		SAE7/16-20 Female	M12	357.
XMLF400D2039	0 to 5800 psi		SAE7/16-20 Female	M12	373.
XMLF010D2036	0 to 145 psi		1/4" NPT Female	M12	342.
XMLF070D2036	0 to 1015 psi		1/4" NPT Female	M12	357.

Wiring Configurations

AC Version (5-pin E)	Pin 1 & 2 to power supply, Pin 3 Ground, Pin 4 + Relay, Pin 5—Relay
DC Version (4-pin D) Analog or Single Stage	Pin 1 + power supply, Pin 3—power supply, Pin 2 4–20 mA, Pin 4 Single Stage
DC Version (4-pin D) Dual Stage	Pin 1 + power supply, Pin 3—power supply Pin 2 Second Stage Pin 4 First Stage

Degree of protection is IP67 and NEMA 4, 6, 12, 13 with M12 connector (DC version) and 7/8–16UNF (AC version)
 Ambient Temperature : -25°C to +80°C (-15°F to + 176°F)
 Media Temperature : -15°C to +80°C (+5°F 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

Solid State Pressure Switches

Type XMLE

XMLE is an international pressure switch that meets IEC, Cenelec and UL standards.

- Adjustable differential
- Range listed is on increasing pressure
- Temperature range: +5°F to +176°F (-15°C to 80°C)
- Enclosure rating: IP65 conforming to IEC60529
- Operating rate: up to 50 operations per minute
- Conduit connection: DIN43650A or M12
- Fluid connections 1/4" NPT male
- 1 bar = 14.5 psi
- 24 Vdc (voltage limits 11–33 Vdc)
- Analog output available



M12 Connector



DIN 43650A Connector

Electronic pressure switches with solid state output (NPN N.C. output) DIN 43650A electrical connector

Range on Increasing (psi)	Approximate Differential Across Range	Maximum Allowable	Type	Price
7.25–145	2.9 LOW 142 HIGH	290	XMLE010U1C33	\$445.00
43.5–870	17.5 LOW 852 HIGH	1740	XMLE060U1C33	445.00
72.5–1450	29 LOW 1420 HIGH	2900	XMLE100U1C33	445.00

Electronic pressure switches with solid state output (NPN N.C. output) M12 5-pin electrical connector

Range on increasing (psi)	Approximate Differential across range	Maximum Allowable	Type	Price
7.25–145	2.9 LOW 142 HIGH	290	XMLE010U1D33	\$460.00
43.5–870	17.5 LOW 852 HIGH	1740	XMLE060U1D33	460.00
72.5–1450	29 LOW 1420 HIGH	2900	XMLE100U1D33	460.00

Electronic pressure switches with analog output (4 to 20 mA 2 wire) DIN 43650A electrical connector

Range on Increasing (psi)	Current Consumption	Maximum Allowable	Type	Price
0–145	< 20 mA	290	XMLE010U1C23	\$362.00
0–870	< 20 mA	1740	XMLE060U1C23	362.00
0–1450	< 20 mA	2900	XMLE100U1C23	362.00
0–3625	< 20 mA	7250	XMLE250U1C23	362.00
0–8700	< 20 mA	17400	XMLE600U1C23	362.00

Electronic pressure switches with analog output (4 to 20 mA 2 wire) M12 5-pin electrical connector

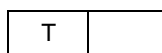
Range on Increasing (psi)	Current Consumption	Maximum Allowable	Type	Price
0–145	< 20 mA	290	XMLE010U1D23	\$373.00
0–870	< 20 mA	1740	XMLE060U1D23	373.00
0–1450	< 20 mA	2900	XMLE100U1D23	373.00
0–3625	< 20 mA	7250	XMLE250U1D23	373.00
0–8700	< 20 mA	17400	XMLE600U1D23	373.00



File E164865
 CCN NKPZ



File LR44087
 Class 3211-03



Discount Schedule

For additional information, reference Catalog #9012CT9701.



XML is an international pressure switch that meets IEC, Cenelec, UL and CSA standards. CE marked.

- Adjustable differential (XMLB) or fixed differential (XMLA)
- 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°F to +158°F (-25°C 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
- Repeat accuracy: < 2%

Non-adjustable Differential diaphragm switches with setting scale

Range on Increasing (psi)	Approximate Differential Across Range	Maximum Allowable	Type	Price
9–145	7.5	326	XMLA010A2S13	\$135.
10–290	6 LOW 14.5 HIGH	652	XMLA020A2S13	135.
22–507	18.25	1160	XMLA035A2S13	135.

Non-adjustable Differential diaphragm switches without setting scale

Range on Increasing (psi)	Approximate Differential Across Range	Maximum Allowable	Type	Price
9–145	7.5	326	XMLA010A1S13	\$124.
10–290	6 LOW 14.5 HIGH	652	XMLA020A1S13	124.
22–507	18.25	1160	XMLA035A1S13	124.

Adjustable Differential diaphragm switches with setting scale

Range on Increasing (psi)	Differential	Maximum Allowable	Type	Price
9–145	8.25 LOW 108 HIGH	326	XMLB010A2S13	\$155.
10–290	14.5 LOW 159 HIGH	652	XMLB020A2S13	155.
22–507	25 LOW 290 HIGH	1160	XMLB035A2S13	155.

Adjustable Differential diaphragm switches without setting scale

Range on Increasing (psi)	Differential Across Range	Maximum Allowable	Type	Price
9–145	8.5 LOW 108 HIGH	326	XMLB010A1S13	\$145.
10–290	14.5 LOW 159 HIGH	652	XMLB020A1S13	145.
22–507	25 LOW 290 HIGH	1160	XMLB035A1S13	145.

Non-adjustable Differential piston switches with setting scale

Range on Increasing (psi)	Approximate Differential Across Range	Maximum Allowable	Type	Price
145–2320	80 LOW 261 HIGH	5220	XMLA160D2S13	\$238.
290–4350	240 LOW 507 HIGH	9787	XMLA300D2S13	238.
435–7250	290 LOW 652 HIGH	16312	XMLA500D2S13	238.

Non-adjustable Differential piston switches without setting scale

Range on Increasing (psi)	Approximate Differential Across Range	Maximum Allowable	Type	Price
145–2320	80 LOW 261 HIGH	5220	XMLA160D1S13	\$228.
290–4350	240 LOW 507 HIGH	9787	XMLA300D1S13	228.
435–7250	290 LOW 652 HIGH	16312	XMLA500D1S13	228.

Adjustable Differential piston switches with setting scale

Range on Increasing (psi)	Approximate Differential Across Range	Maximum Allowable	Type	Price
145–2320	80 LOW 261 HIGH	5220	XMLB160D2S13	\$259.
290–4350	240 LOW 507 HIGH	9787	XMLB300D2S13	259.
435–7250	290 LOW 652 HIGH	16312	XMLB500D2S13	259.

Adjustable Differential piston switches without setting scale

Range on Increasing (psi)	Approximate Differential Across Range	Maximum Allowable	Type	Price
145–2320	80 LOW 261 HIGH	5220	XMLB160D1S13	\$248.
290–4350	240 LOW 507 HIGH	9787	XMLB300D1S13	248.
435–7250	290 LOW 652 HIGH	16312	XMLB500D1S13	248.

For additional information, reference Catalog #9012CT9701.

20 PRESSURE, VAC, TEMP AND FLOAT SWITCHES

Pressure Switches

Class 9012—Machine Tool

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.

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	.6 ± .1	100	GDW1	\$276.	GDW21	\$338.
1–40	1.6 ± .4	100	GDW2	239.	GDW22	299.
1.5–75	3.0 ± .5	240	GDW4	239.	GDW24	299.
3–150	6.0 ± .8	475	GDW5	233.	GDW25	290.
5–250	10.0 ± 1.5	750	GDW6	233.	GDW26	290.
13–425	16 ± 3.5	850	GEW1	327.	GEW21	392.
20–675	27 ± 5	2000	GEW2	465.	GEW22	539.

Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Fluorocarbon (VITON®) Diaphragm and O-ring, TEFLON® Retaining Ring

20–1000	59 ± 9	10000	GFW1	494.	GFW21	570.
90–2900	170 ± 15	15000	GFW2	494.	GFW22	570.
170–5600	289 ± 55	20000	GFW3	494.	GFW23	570.
270–9000	495 ± 70	25000	GFW4	567.	GFW24	642.

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						
.2–10	1.0 ± .1	100	GDR1	\$ 926.	GDR21	\$ 971.
1–40	2.4 ± .8	100	GDR2	894.	GDR22	941.
1.5–75	4.5 ± 1	240	GDR4	884.	GDR24	927.
3–150	9 ± 1.5	475	GDR5	860.	GDR25	903.
5–250	15 ± 3	750	GDR6	860.	GDR26	903.
13–425	25 ± 7	850	GER1	995.	GER21	1040.
20–675	41 ± 10	2000	GER2	1154.	GER22	1199.

Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Fluorocarbon (VITON) Diaphragm and O-ring, TEFLON Retaining Ring

20–1000	89 ± 18	10000	GFR1	1187.	GFR21	1232.
90–2900	255 ± 30	15000	GFR2	1187.	GFR22	1232.
170–5600	578 ± 110	20000	GFR3	1187.	GFR23	1232.
270–9000	788 ± 140	25000	GFR4	1187.	GFR24	1232.

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	.6–2	100	GAW1	\$300.	GAW21	\$351.
1–40	1.6–8	100	GAW2	263.	GAW22	324.
1.5–75	3.5–15	240	GAW4	263.	GAW24	324.
3–150	6.0–30	475	GAW5	257.	GAW25	315.
5–250	10.0–49	750	GAW6	257.	GAW26	315.
13–425	16–90	850	GBW1	351.	GBW21	419.
20–675	27–130	2000	GBW2	489.	GBW22	566.

Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Fluorocarbon (VITON) Diaphragm and O-ring, TEFLON Retaining Ring

20–1000	59–200	10000	GCW1	518.	GCW21	596.
90–2900	170–560	15000	GCW2	518.	GCW22	596.
170–5600	289–1260	20000	GCW3	518.	GCW23	596.
270–9000	495–1900	25000	GCW4	596.	GCW24	672.

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						
.2–10	1.0–2	100	GAR1	\$ 954.	GAR21	\$ 999.
1–40	2.4–8	100	GAR2	923.	GAR22	966.
1.5–75	4.5–15	240	GAR4	912.	GAR24	956.
3–150	9–35	475	GAR5	888.	GAR25	932.
5–250	15–49	750	GAR6	888.	GAR26	932.
13–425	25–90	850	GBR1	1023.	GBR21	1068.
20–675	41–130	2000	GBR2	1179.	GBR22	1226.

Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Fluorocarbon (VITON) Diaphragm and O-ring, TEFLON Retaining Ring

20–1000	89–200	10000	GCR1	1215.	GCR21	1260.
90–2900	255–560	15000	GCR2	1215.	GCR22	1260.
170–5600	578–1260	20000	GCR3	1215.	GCR23	1260.
270–9000	788–1900	25000	GCR4	1215.	GCR24	1260.

▲ For metric threads, add M after the W on all types. Price adder \$8.50.

■ UL Marine Listed for use on ships/vessels greater than 65 feet long where ignition protection is not required. Also UL Listed for use in Class II, Division 2, Group G and Class III hazardous locations.

◆ 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.

Note: When switches are required to be factory set and only one setting is identified, specify whether this setting is on increasing or decreasing pressure. Use Form Y1.



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



File	E12442	CCN	NOWT	G*W, G*R
File	E12158	CCN	NKPZ	G*O, G*G
File	E12443	CCN	NTHT	(marine use)



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

Acceptable Wire Sizes	12–22 AWG
Recommended Terminal Clamp Torque	.7 in-lb
Electrical Ratings	page 20-26
Temperature Ratings	page 20-26
Modifications	page 20-8
Accessories	page 20-12
Replacement Parts Kits	page 20-10

For additional information, reference Catalog #9012CT9701.

CP1

Discount
Schedule

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9/8/03



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.

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	\$ 596.	GGW21	\$ 633.
0-175	0.5-36	5-15	240	GGW4	525.	GGW24	566.
0-500	3-175	22-90	850	GHW1	611.	GHW21	651.
Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing							
Fluorocarbon (VITON®) Diaphragm and O-Ring. TEFLON® Retaining Ring.							
0-5000	15-825	80-200	7500	GJW1	1131.	GJW21	1172.



Dual Stage Pressure Switch

Class 9012 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.

Dual Stage Pressure Switch
NEMA 4, 4X, 13 Enclosure
UL Listed and CSA Certified As Industrial Control Equipment ▲

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	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	\$423.
1-40	4-20	4.0 ± 1.0	6.0 ± 1.5	100	GKW2	386.
1.5-75	6-30	5.0 ± 1.5	8.0 ± 2.0	240	GKW4	386.
3-150	12-75	8.0 ± 2.0	12 ± 3	475	GKW5	378.
5-250	22-110	14 ± 3	21 ± 5	750	GKW6	378.
13-425	40-180	20 ± 4	30 ± 7.5	850	GLW1	393.
20-675	45-250	30 ± 6	45 ± 11	2000	GLW2	393.
Piston Actuated—#400 Stainless Steel Piston. #300 Stainless Steel Housing.						
Fluorocarbon (VITON) Diaphragm and O-Ring. TEFLON Retaining Ring.						
20-1000	50-300	50 ± 10	75 ± 19	10000	GMW1	515.
90-2900	140-800	140 ± 30	210 ± 52	15000	GMW2	515.
170-5600	300-1700	275 ± 60	400 ± 100	20000	GMW3	515.
270-9000	500-2500	400 ± 80	800 ± 150	25000	GMW4	515.

▲ UL Listed for use in Class II, Division 2, Group G and Class III hazardous locations. Also, UL Marine Listed for use on vessels greater than 65 feet long where ignition protection is not required.

- File E12443 CCN NOWT
- File E12433 CCN NTHT - (marine use)
- File LR25490 Class 3211-03
-

Acceptable Wire Sizes:	12-22 AWG
Recommended Terminal Clamp Torque: .....	.7 in-lb
Electrical Ratings:	page 20-26
Temperature Ratings:	page 20-26
Modifications:	page 20-8
Accessories:	page 20-12
Replacement Parts Kits:	page 20-10

Ordering Information Required

- 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 20-8. If one or more of these modifications are desired, add the appropriate Form to the Class and Type. Arrange form letters in alphabetical sequence when ordering more than one modification.

For additional information, reference Catalog #9012CT9701.

Pressure Switches

Class 9012—Machine Tool Modifications

Available Modifications

Modification	Applies To:	Form	Price Addition
Side conduit hub not available separately nor as a replacement.	Standard on GAW, GAWM, GDW, GDWM, GGW, GKW1, 21 only. Available on all other GAW thru GMW, GAWM thru GFWM.	B2	\$ 19.10
Removable conduit hub	Available on all GAW thru GMW and GAWM thru GFWM except Types 1 and 21. Standard on Types GGW4 & 24, GHW & GJW. Standard with Forms E2, E3, E4, K, K1, M14.	B4	19.10
Fluorocarbon (VITON®) Enclosure Gaskets	All Types except NEMA 7 and 9.	D6	41.10
Pull-to-test button	GAW thru GFW and GAWM thru GFWM only.	E2	52.20
Lock on rising pressure, manual reset only	Available on GDW, GDWM, GEW, GEWM, GFW, GFWM only.	E3	52.20
Lock on falling pressure, manual reset only	Available on GDW, GDWM, GEW, GEWM, GFW, GFWM only.	E4	52.20
Mounting feet (factory installed only)	GAW, GAWM, GDW, GDWM, GGW, GKW1, 21 only.	F	23.70
120 Volt AC or DC neon pilot light	Available on all GAW thru GMW, GAWM thru GFWM.	G17 G18	47.60 47.60
240 Volt AC or DC neon pilot light	For replacement pilot lights: See 9998 PC-303 through 305.	G19 G20	47.60 47.60
24 Volt DC only LED	For pilot light conversion kits: See 9998 PC-306 through 308. Complete Class and Type information required.	G21 G22	57.00 57.00
24 Volt DC LED pilot light with green lens.	Class 9012 GAW thru GMW, and GAWM thru GFWM or Class 9016 GAW and Class 9025G.	G23	57.00
SPDT snap switch rated 1.1 A at 125 Vdc (minimum differential doubles)	Available on GAR thru GFR, GAW thru GJW, GAWM thru GFWM.	H3	42.80
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 thru GJW single pole devices only.	H10 or H11	101.00
Micro connector	G●W (single pole only), except GAW2 and Form B2.	H17	101.00
External range adjustment (includes knob and range scale window)	GAW thru GFW, GAWM thru GFWM, GKW thru GMW.	K	33.30
External range adjustment slotted for screwdriver (includes range scale window)	GAW thru GFW, GAWM thru GFWM, GKW thru GMW.	K1	23.70
Pg 13.5 conduit thread and 1/4—19 BSP pressure connection	G●WM Only	M12	12.60
G ¹ / ₄ " BS2779 parallel pipe thread on pressure connection	GGW, GHW, GJW GAW thru GFW, GKW thru GMW	M14 M14	25.40 12.60
Actuator prepared for oxygen service	GGW, GHW GAR, GBR, GDR, GER, GAW, GBW, GDW, GEW, GAWM, GBWM, GDWM, GEWM, GKW, GLW	O1 O1	95.00 47.60
Standard Nitrile (Buna-N) diaphragm in #316 stainless steel flange	GGW-1, 21 only.	Q1	362.00
	All other GGW, GHW only.	Q1	76.00
	GAR, GAW, GDR, GDW, GAWM, GDWM, GKW1, 21 only.	Q1	180.00
Ethylene propylene diaphragm in #316 stainless steel flange	All other GAR, GBR, GDR, GER, GAW, GBW, GDW, GEW, GAWM, GBWM, GDWM, GEWM, GKW, GLW	Q1	38.00
	Available on all GGW, GHW except GGW-1, 21.	Q3	114.00
	Available on all GAR, GBR, GDR, GER, GAW, GBW, GDW, GEW, GAWM, GBWM, GDWM, GEWM, GKW, GLW except Types 1 and 21.	Q3	57.00
Fluorocarbon (VITON) diaphragm in #316 stainless steel flange	GGW1, 21 only.	Q4	411.00
	All other GGW, GHW.	Q4	114.00
	GAR, GAW, GBR, GBW, GDR, GDW, GER, GEW, GAWM, GBWM, GDWM, GEWM, GKW-1, 21 only.	Q4	206.00
Ethylene propylene diaphragm and O-ring	All other GAR, GAW, GBR, GBW, GDR, GDW, GER, GEW, GAWM, GBWM, GDWM, GEWM, GKW, GLW.	Q4	57.00
	GJW only.	Q5	57.00
	GCR, GCW, GFR, GFW, GCWM, GFWM, GMW	Q5	28.50
Ethylene propylene diaphragm in standard zinc plated steel flange	Available on all GGW, GHW except GGW1, 21.	Q13	38.00
	Available on all GAR, GBR, GDR, GER, GAW, GBW, GDW, GEW, GAWM, GBWM, GDWM, GEWM, GKW, GLW except Types 1 and 21.	Q13	19.10
	GGW1, 21 only.	Q14	47.60
Fluorocarbon (VITON) diaphragm in standard zinc plated steel flange	All other GGW, GHW.	Q14	38.00
	GAR, GAW, GBR, GBW, GDR, GDW, GER, GEW, GAWM, GBWM, GDWM, GEWM, GKW1, 21 only	Q14	23.70
	All other GAR, GAW, GBR, GBW, GDR, GDW, GER, GEW, GAWM, GBWM, GDWM, GEWM, GKW, GLW	Q14	19.10
Range scale window (standard with Forms K and K1)	GAW thru GMW, GAWM thru GFWM.	V1	11.90
Special cover screws. Accept lockwire and seal.	All Types	V2	6.00
Special setting specified	All 9012G	Y1	N/C
1/4"—18 NPT external thread pressure connection	GAR, GAW, GDR, GDW, GGW, GKW. Not available in combination with Forms Q1, Q3, Q4.	Z	N/C
Fungus proofing per MIL-T-152B with varnishes per MIL-V-173A	All Types.	Z12	Add 10% to price
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	63.30
7/16"—20 UNF-2B internal thread pressure connection	GAR thru GFR; GAW thru GMW. Not available in combination with Forms Q1, Q3, Q4.	Z18	N/C
Stainless steel return spring	Replace existing return spring with stainless steel return spring. This only applies to 9012GAW, GBW, GDW and GEW devices that are diaphragm actuated switches.	Z25	N/C

For additional information, reference Catalog #9012CT9701.



NEMA Type 1



Open Type

Non-adjustable Differential
Open Type, NEMA Type 1 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	Open Type		NEMA Type 1	
			Type	Price	Type	Price
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing						
0.2–10	0.4 ± .1	100	GRO1	\$252.	GRG1	\$261.
1–40	1.2 ± .3	100	GRO3	227.	GRG3	236.
1.5–75	2.2 ± .4	240	GRO4	200.	GRG4	209.
3–150	4.2 ± 1	475	GRO5	174.	GRG5	183.
5–250	7.4 ± 2	750	GRO6	200.	GRG6	209.
13–425	13 ± 3	850	GSO1	252.	GSG1	261.
20–675	19 ± 5	2000	GSO2	252.	GSG2	261.

Piston Actuated—#440 Stainless Steel Piston, #303 Stainless Steel Housing, Fluorocarbon (VITON®) Diaphragm and O-Ring, TEFLON® Retaining Ring.

Range On Decreasing Pressure psig	▲ Approximate Differential Adds To Decreasing Set Point	Maximum Allowable Pressure psig	Open Type	Price	NEMA Type 1	Price
20–1000	49 ± 10	10000	GT01	393.	GTG1	404.
90–2900	141 ± 15	15000	GT02	393.	GTG2	404.
170–5600	200 ± 40	20000	GT03	393.	GTG3	404.
270–9000	350 ± 45	25000	GT04	393.	GTG4	404.

Adjustable Differential
Open Type, NEMA Type 1 Enclosure

UL Listed and CSA Certified As Industrial Control Equipment

Range On Decreasing Pressure psig	▲ Approximate Mid-Range Differential Adds To Decreasing Set Point	Maximum Allowable Pressure psig	Open Type		NEMA Type 1	
			Type	Price	Type	Price
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing						
0.2–10	0.4–1.5	100	GNO1	\$260.	GNG1	\$269.
1–40	1.2–6	100	GNO3	236.	GNG3	246.
1.5–75	2.2–11	240	GNO4	212.	GNG4	222.
3–150	4.2–22	475	GNO5	185.	GNG5	195.
5–250	7.4–56	750	GNO6	212.	GNG6	222.
13–425	13–62	850	GPO1	260.	GPG1	269.
20–675	19–98	2000	GPO2	260.	GPG2	269.

Piston Actuated—#440 Stainless Steel Piston, #303 Stainless Steel Housing, Fluorocarbon (VITON) Diaphragm and O-Ring, TEFLON Retaining Ring.

Range On Decreasing Pressure psig	▲ Approximate Mid-Range Differential Adds To Decreasing Set Point	Maximum Allowable Pressure psig	Open Type	Price	NEMA Type 1	Price
20–1000	49–150	10000	GQO1	395.	GQG1	407.
90–2900	141–455	15000	GQO2	395.	GQG2	407.
170–5600	200–950	20000	GQO3	395.	GQG3	407.
270–9000	350–1400	25000	GQO4	395.	GQG4	407.

▲ Determines operating point on rising pressure.

Available Modifications

Modification	Applies to:	Form	Price Addition
Actuator prepared for oxygen service	GNG, GNO, GPG, GPO, GRG, GRO, GSG, GSO	O1	\$ 47.60
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	180.00 38.00
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	57.00
Fluorocarbon (VITON) diaphragm in #316 stainless steel housing	GNG, GNO, GRG, GRO1 only All other GNG, GNO, GPG, GPO, GRG, GRO, GSG, GSO	Q4	206.00 57.00
Ethylene propylene diaphragm & O-ring	GQG, GQO, GTG, GTO	Q5	28.50
Ethylene propylene diaphragm in standard zinc plated steel housing	Not available on GNG, GNO, GRG, GRO1. Available on all other GNG, GNO, GPG, GPO, GRG, GRO, GSG, GSO	Q13	38.00
Fluorocarbon (VITON) diaphragm in standard zinc plated steel housing	GNG, GNO, GRG, GRO1 only All other GNG, GNO, GPG, GPO, GRG, GRO, GSG, GSO	Q14	23.70 19.10
1/4–18 NPT external thread pressure connection	GNG, GNO, GRG, GRO	Z	N/C
1/2–14 NPT external thread, 1/4–18 NPTF internal thread pressure connection. Standard actuator only.	GNG, GNO, GRG, GRO	Z16	63.00
3/16–20 UNF-2B internal thread pressure connection	GNG, GNO, GPG, GPO, GQG, GQO, GRG, GRO, GSG, GSO, GTG, GTO	Z18	N/C

Acceptable Wire Sizes..... 12-22 AWG
Recommended Terminal Clamp Torque..... 7 in-lb
Electrical Ratings..... page 20-26
Temperature Ratings..... page 20-26
Modifications..... page 20-8
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Replacement Parts Kits..... page 20-10



File E12158
CCN NKPZ



File LR25490
Class 3211-03



For additional information, reference Catalog #9012CT9701.

Replacement Parts Kits

Class 9998—For 9012—9038

Replacement parts are generally available for Pump Control Products with numerical date code: Example 172 (first quarter, 1972) or with current date code. Parts no longer available for devices manufactured prior to 1965.

Equipment To Be Serviced	Parts Kit Class 9998 Type	Price
Actuator Assy. 9012GB, GE, GH1, 21, 31, 41, 51; GL, GP, GS1 Actuator Assy. 9012GB, GE, GH2, 22, 32, 42, 52; GL, GP, GS2 Gasket Kit containing all replaceable gaskets for all 9012 Open, NEMA 1, 4, 4X, 13 Repl. Contact Kit 9013GHG, GSG, GHR, GSR, GMG; 9036GG, GR, GW; 9037GG Series C All except Forms H & R, 9016GVG, Form R Repl. Contact Kit 9013GHG, GSG, GSR, GMG; 9036GG, GR, GW; 9037GG, GR, GW Series C Form H Only; 9016GVG, Form H	PC177★ PC178★ PC184 PC205▲ PC206▲	\$119.00† 119.00† 21.80 17.60 27.30
Repl. Contact Kit 9013GHG, GSG, GHR, GSR, GMG; 9036GR, GW: Series C Form R Only; 9016GVG Convolute Diaphragm Assy. 9013GHG, GSG: Series C Diaphragm Assy. 9013GMG: Series C Diaphragm Assy. 9016GVG: Series C Diaphragm Assy. 9013GHW, GSW; GSW, GHR: Series C	PC207▲ PC208 PC209 PC210 PC211	27.30 9.90 8.40 11.00 6.70
Repl. Sw. Mechanism 9036GR, GW All Except Form H and R: Series C Repl. Sw. Mechanism 9036GR, GW (Form R Only): Series C Repl. Sw. Mechanism 9036GR, GW (Form H Only): Series C Cover Gasket 9013GHW, GSW; 9036, 9037 GW Only Repl. Diaphragm Assy. 9016 GAW-1, 21	PC213 PC214 PC215 PC216 PC233	90.00 101.00 101.00 9.60 24.10
Replacement Contact Kit 9013FHG2, 9, 12, 19, 42, 49 FSG; OBS. 9013HHG, HSG; 9036FG-1; 9037CG, FG, HG-1, HFG Replacement Contact Kit 9013FHG22, 29, 32, 39, 52, 59; 9013 FYG; 9035DG30, DW30; 9036DG, DR, DW; 9037DG, EG, ER, EW, HG, HR, HW30 thru 39; 9038 All Types (2 Kits Required); OBS. 9013HHGY, HSGY; HSWY; 9037HEG, HSG3, 4, 9035DG10, DW10 Repl. Diaphragm Kit All 9013GHG, GSG, .050 Diaphragm Diaphragm Assy. 9012GA, GD, GN, GR1, 21 Series C Only Diaphragm Assy. 9012GA, GD, GG, GK, GN, GR 2, 3, 22, 52 Series C Only	PC241■▲ PC242■▲ PC252■ PC265* PC266★	8.10†† 12.80†† 8.10 36.50 23.70†
Diaphragm Assy. 9012GA, GD, GG, GK, GN, GR4, 24, 54 Series C Only Actuator Assembly 9012GA, GD, GG, GK, GN, GR 5, 25, 55 Series C Only Actuator Assembly 9012GA, GD, GG, GK, GN, GR 6, 26, 36, 46, 56 Series C Only Piston Assembly 9012GC, GF, GJ, GQ, GT1, 21, 31, 41, 51 Series C Only Piston Assembly 9012GC, GF, GJ, GQ, GT2, 22, 32, 42, 52 Series C Only	PC267★ PC268★ PC269★ PC270★ PC271★	23.70† 45.90† 45.90† 237.00† 237.00†
Piston Assembly 9012GC, GF, GQ, GT3, 23, 33, 43, 53 Series C Only Piston Assembly 9012GC, GF, GQ, GT4, 24, 34, 44, 54 Series C Only Buna N QUAD-RING® Seal Tube Repl. Kit for Series C devices: 9037HG/HW/HR3 thru 12; 9038CG/CW/CR1 thru 6 Repl. Sw. Mechanism 9036DR1, DW1 Series B Repl. Sw. Mechanism 9036DR1, DW1 Form C Series B	PC272★ PC273★ PC282 PC285 PC286	237.00† 237.00† 29.00 63.00 69.00
Repl. Sw. Mechanism 9036DR1, DW1 Form R Series B Repl. Contact Kit 9013FRG, HRG (2-Pole) Repl. Contact Kit 9013FRG, HRG (1-Pole) Repl. Contact Kit 9013FRG Form H; 9035 DG11 Diaphragm Assy. 9016 GAW2, 22	PC287 PC288■ PC289■ PC290■ PC295★	69.00 21.40†† 19.30†† 21.40†† 23.30†
Repl. Diaphragm Assy. 9016GAR1, 21 Cover Assy. 9012, 9016 NEMA 4, 4X, 13 Enclosure: Series C Only Repl. Pilot Light 9012, 9016G Forms G1, G2, G5, G6, G17, G18; 120 Volt Repl. Pilot Light 9012, 9016G Forms G11, G12, G15, G16, G19, G20; 240 Volt Repl. Pilot Light 9012, 9016G Forms G7, G8, G9, G10, G21, G22; 24 Volts DC	PC301■ PC302◆ PC303 PC304 PC305	47.60† 47.60† 23.70† 23.70† 33.30†
Pilot Light Conversion Kit 9012, 9016G Forms G17, G18; 120 Volt Pilot Light Conversion Kit 9012, 9016G Forms G19, G20; 240 Volt Pilot Light Conversion Kit 9012, 9016G, Forms G21, G22; 24 Volts DC Switch Mechanism 9012GAR1: Series C Only Switch Mechanism 9012GAR2, 4, 5, 6: Series C Only	PC306◆ PC307◆ PC308◆ PC309 PC310	47.60† 47.60† 57.00† 204.00† 204.00†
Switch Mechanism 9012GBR1, 2, 3 Series C Only Switch Mechanism 9012GCR1, 2, 3, 4 Series C Only SPDT Snap Switch 9012GA, GB, GC, GD, GE, GF, GG, GH, GJ Single Pole; Except Forms E2, E3, E4, H3: Series C Only DPDT Snap Switch 9012GA, GB, GC, GD, GE, GF, GG, GH, GJ Double Pole; Except Forms E2, E3, H6, H7: Series C Only Snap Switch Assy. 9016GAW1, 2; GAR1	PC311 PC312 PC313★ PC314★ PC315	204.00† 275.00† 57.00† 86.00† 57.00†
Snap Switch Assy. 9016GAW21, 22; GAR21 Cover Assy. 9016GAW1, 2, 21, 22 Repl. Sw. Mechanism 9035DG11 Switch Mechanism 9012GAR21 Switch Mechanism 9012GAR22, 24, 25, 26	PC316 PC317◆ PC319 PC320 PC321	86.00† 47.60† 141.00† 242.00† 242.00†

- ▲ Contacts are 2-pole.
- These kits also contain replacement diaphragm for pressure switch. Diaphragm fits pressure switch only.
- ◆ Give complete CLASS, TYPE, FORM information to be stamped on replacement cover.
- ★ If one of these FORM designations appears on the pressure switch nameplate, the 9998 PC number must be COMPLETED with that same FORM suffix from page 20-8 and the FORM price added to the kit price.

Order Information Required—Class and Type Number of Kit.

+CP1		CP7G		+CP7	
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Discount Schedule

For additional information, reference Catalog #9012CT9701.

Equipment To Be Serviced	Parts Kit Class 9998 Type	Price
Switch Mechanism 9012GBR21, 22, 23; Series C Only	PC322	\$242.00†
Switch Mechanism 9012GCR21, 22, 23, 24; Series C Only	PC323	312.00†
Switch Mechanism 9012GDR1; Series C Only	PC324	180.00†
Switch Mechanism 9012GDR2, 4, 5, 6; Series C Only	PC325	180.00†
Switch Mechanism 9012GER1, 2, 3; Series C Only	PC326	180.00†
Switch Mechanism 9012GFR1, 2, 3, 4; Series C Only	PC327	251.00†
Switch Mechanism 9012GDR21; Series C Only	PC328	219.00†
Switch Mechanism 9012GDR22, 24, 25, 26; Series C Only	PC329	219.00†

Equipment To Be Serviced	Parts Kit Class 9998 Type	Price
Switch Mechanism 9012GER21, 22, 23; Series C Only	PC330	\$219.00†
Switch Mechanism 9012GFR21, 22, 23, 24; Series C Only	PC331	288.00†
VITON® QUAD-RING® Seal Tube Replacement. Kit for Series C devices: 9037HG/HW/HR3 thru 12; 9038CG/CW/CR1 thru 6	PC333	29.00
Repl. Sw. Mechanism 9035DR10, DW10, DR30, DW30	PC334	105.00†
Repl. Sw. Mechanism 9035DR11, DW11, DR31, DW31	PC335	152.00†
Repl. Buna N Seal Kit for Series A devices: 9037HG/HW/HR30 thru 39; 9038CG/CW/CR31 thru 36	PC337	9.60
Repl. VITON Seal Kit for Series A devices with Form Z19 or Z20: 9037HG/HW/HR30 thru 39; 9038CG/CW/CR31 thru 36	PC338	10.50
Replacement Seal Kit 9037D, E and 9038D, J	PC341	18.60
Replacement Plastic Flange 9013F, 6 long screws, warning label, and diaphragm	PC342▲	7.80

▲ These kits also contain replacement diaphragm for pressure switch. Diaphragm fits pressure switch only.

Factory Order Modifications for Kits Used on Class 9012–9013 Devices.

Form	Applies To:	Price
E2	PC313, 314	N/C
H3	PC313	\$42.80†
01	PC177 thru 179 PC265 thru 269	47.00†
Q1	PC177 thru 179 PC268, 269	38.00†
	PC265 thru 267	N/C
Q3	PC177 thru 178 PC268, 269	57.00†
	PC266, 267	19.10

Order Information Required—Class and Type Number of kit.

Factory Order Modifications for Kits Used on Class 9012–9013 Devices. (Continued)

Form	Applies To:	Price
Q4	PC177 thru 178 PC268, 269	\$57.00†
	PC265 thru 267	23.70†
Q5	PC270 thru 273	28.50†
Q13	PC177 thru 179 PC266 thru 269	19.10†
Q14	PC177 thru 179 PC266 thru 269	19.10†
	PC265, 295	23.70†
Z	PC265 thru 269	N/C
Z16	PC265 thru 269	64.00†
Z18	PC177, 178 PC265 thru 273	N/C

For additional information, reference Catalog #9012CT9701.

Switches

Class 9049—Accessories, All Types



www.SquareD.com

For the most up-to-date information

Type	Description	Applies to Class	Price
A6	7" Tapped at Top #304 Stainless Steel Float, 5' Brass rod, 2 stops	All 9036, 9038A	\$ 95.00*
A6A	Same as A-6 except rod is Aluminum	All 9036, 9038A	99.00*
A6C	7" Center Hole #304 Stainless Steel Float, 5' Brass rod, 4 stops	All 9036, 9038A	112.00*
A6CA	Same as A-6C except rod is Aluminum	All 9036, 9038A	118.00*
A6CS	7" Center Hole #316 Stainless Steel Float, 5' Stainless Steel rod, 4 Stainless Steel stops	All 9036, 9038A	267.00*
A6S	7" Tapped at top #316 Stainless Steel Float, 5' Stainless Steel rod, 2 Stainless Steel stops	All 9036, 9038A	246.00*
AF1	7" Round Center Hole #304 Stainless Steel Replacement Float	9049A6C, A6CA, DRA-31	70.00*
AF2	7" Round Center Hole #316 Stainless Steel Replacement Float	9049A6CS, DRA-32	150.00*
AF3	7" Round Tapped at top #304 Stainless Steel Replacement Float	9049A6, A6A, DCA-1, DCA-3	61.00*
AF4	7" Round Tapped at top #316 Stainless Steel Replacement Float	9049A6S, DCA-2, DCA-4	160.00*
A8B	Tank fitting, 400 psi maximum pressure, 3/4" O.P.T.	9025GXW	138.00†
A12	Two-way Pressure Release Valve, Replacement only. Cannot be added to switch that originally had no valve.	9013GHG, GSG, Form X only	21.20*
A13	Compensating Spring	9036GG	8.40*
A15	Compensating Spring	9038AG	25.00*
A19	Compensating Spring	9036DG	6.70*
A20	Compensating Spring	9036DR, DW	6.70*
A26	Surge Reducer for use on oils, coolants, hydraulic fluids, not recommended for air or water	9012G	80.00†
A26S	Stainless Steel Surge Reducer	9012	98.00†
A30	Brass Well	9025GYW	108.00†
A31	Stainless Steel Well	9025GYW	252.00†
A34	Brass Well	9025GXW	123.00†
A35	Stainless Steel Well	9025GXW	309.00†
A48	Two-Way Release Valve. Replacement only. Cannot be added to switch that originally had no valve.	9013HHG, HHGY, Form X only	12.10††
A52	Mtg. Bracket - Replacing OBS, 9013A with 9013G	9013GHG, GSG	7.00*
A53	Mtg. Bracket - Replacing OBS, 9013A with 9013G or for current 9016GVG	9013GMG, 9016GVG	8.90*
A54	Mtg. Bracket - Replacing OBS, 9036A with 9036G	9036GG	16.80*
A55	Mtg. Bracket - Replacing 9036A (S or F1) with 9036G	9036GG	20.20*
A56	Two-way Pressure release valve. Replacement only. Cannot be added to switch that originally had no valve.	9013FHG, Form X only	6.90††
A58	Form R lever	9036DG	3.40*
BF1	#304 Stainless Steel Float	9038B	60.00*
EF1	#304 Stainless Steel Float	9037E, 9038D	20.20*
EF2	#316 Stainless Steel Float	9037E, 9038D	50.00*
ER1	1 3/4" Stainless Steel Rod	9037E, 9038D	8.40*
ER2	2 1/2" Stainless Steel Rod	9037E, 9038D	8.40*
ER3	3 1/4" Stainless Steel Rod	9037E, 9038D	8.40*
ER5	5 1/4" Stainless Steel Rod	9037E, 9038D	8.40*
ER7	7 1/4" Stainless Steel Rod	9037E, 9038D	8.40*
ER12	12 1/4" Stainless Steel Rod	9037E, 9038D	8.40*
GF1	#304 Stainless Steel Float	9037G	21.70*
GF2	#316 Stainless Steel Float	9037G	57.00*
HF3	#304 Stainless Steel Float	9037H, 9038C, D	21.70*
HF4	#316 Stainless Steel Float	9037H, 9038C, D	68.00*
T1	Additional Rod Kit: One 2 1/2" section of Brass rod, connector	9049A6, A6C	21.70*
T1A	Additional Rod Kit: One 2 1/2" section of Aluminum rod, connector	9049A6A, A6CA	23.50*
T1S	Additional Rod Kit: One 2 1/2" section of Stainless Steel rod, connector	9049A6S, A6CS	54.00*
UMS1	Universal Mounting Bracket	All 9035, All 9036, 9038AG, AR, AW	39.00†

CP1†		CP7G#		CP7††	
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Discount Schedule

For additional information, reference Catalog #9034CT9701.



- Class 9013 Type FHG pressure switches are designed for the control of small electrically driven air compressors.
- Contacts open on pressure rise.
- Diaphragm actuated.
- See page 20-26 for the following:
Electrical Ratings
Application Data
- See page 20-10 for repair parts kits

Selection Tables

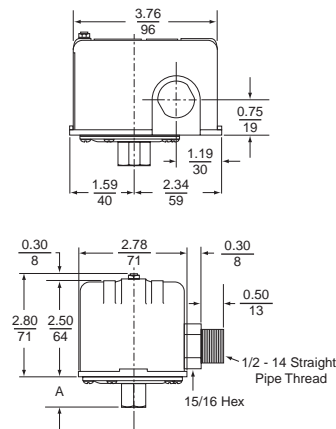
Adjustable Cut-Out Range Increasing Pressure (psig)	Approximate Differential Non-adjustable (psig)	Poles	Pressure Connection	Lower hp		Higher hp	
				NEMA Type 1 Enclosure	Price	NEMA Type 1 Enclosure	Price
				Type	Type	Type	Type
40-100	20	2	1/4" NPSF (Internal)	FHG2	\$18.20	FHG22	\$26.60
			3/8" NPSF (Internal)	FHG3	18.20	...	...
			1/4" Four Way	FHG4	23.40	FHG24	31.70
			1/4" NPT (External)	FHG9	18.20	FHG29	26.60
70-150	30	2	1/4" NPSF (Internal)	FHG12	18.20	FHG32	26.60
			3/8" NPSF (Internal)	FHG13	18.20	FHG33	26.60
			1/4" Four Way	FHG14	23.40	FHG34	31.70
			1/4" NPT (External)	FHG19	18.20	FHG39	26.60
100-200	40	2	1/4" NPSF (Internal)	FHG42	18.20	FHG52	26.60
			1/4" Four Way	FHG44	23.40	FHG54	31.70
			1/4" NPT (External)	FHG49	18.20	FHG59	26.60

UL Listed industrial control equipment. However Type 4 must have FORM T or T1, otherwise these types are component recognized

Special Features and Modifications for Type FHG

Description	Form Letter	Price Addition
Standard Pack of 20 Switches	C20	N/C
Addition of a Second Ground Screw	G4▲	\$ 0.32
Maintained Manual Cut-Out Lever (AUTO-OFF)	M1	3.40
Pulsation Plug	P	0.49
Salt Water Flange (1/4 NPSF Internal Only)	Q▲	16.60
1/2" Conduit Bushing—1/2" Long Thread—on Left	T	2.70
1/2" Conduit Bushing—1/2" Long Thread—on Right	T1	2.70
Slip-On Connectors (Load Side Terminals Only)	U	0.32
Slip-On Connectors (Line and Load Terminals)	U2	0.64
Factory Sealed Range Stud	W	0.32
Two-Way Pressure Release Valve	X	6.90
Quick Connect Two-Way Pressure Release Valve (for use with POLYFLOW® Tubing)	X1	11.80
Black Cover	Z22	N/C

▲ Can be field installed. Nameplate should then be marked with the FORM letter and maintenance and ordering records corrected.



Shown with Form T

Type F—Net Weight—1 1/8 Pounds

Switch Type	A	
	Inches	MM
FSG1, FYG1	1 1/32	26
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

Pressure Code (fixed differential)

Below is the pressure code table for fixed differential action devices. Existence of a code does not imply that that code is available for any or all devices.

Settings	Code
Off at 100 psi	J27
Off at 110 psi	J37
Off at 115 psi	J38
Off at 120 psi	J69
Off at 125 psi	J52
Off at 135 psi	J39
Off at 140 psi	J68
Off at 155 psi	J40
Off at 150 psi	J55
Off at 175 psi	J59
Specify other pressure	J99

Ordering Information

1. Specify Class 9013 Type FHG.
2. Select pressure code from Pressure Code Table at left and add code designation to end of type number. Be sure that the pressure code falls within the limits of the device as shown in the device listings.
3. If special features are desired, add the appropriate Form letter to the Class and Type. Arrange Form letters in alphabetical sequence when ordering more than one special feature.
4. Place packaging code in alphabetical sequence with other forms when ordering.
For standard pack of 20 devices per box C20 †
For individually packaged devices leave blank ††

Note: If no packaging code is indicated, devices will be shipped individually packaged.



File E12158 CCN NKPZ



File LR25490

20 PRESSURE, VAC, TEMP AND FLOAT SWITCHES

For additional information, reference Catalog #9013CT9701R8/98.

Commercial Pressure Switches

Type F—PUMPTROL® Water Pump Pressure Switches—Class 9013



www.SquareD.com

For the most up-to-date information



- Designed for the control of electrically driven water pumps.
- 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.
- Diaphragm actuated.
- See page reference below for the following:
 - Electrical Ratings20-26
 - Dimensions20-13
 - Repair Parts Kits20-10

Pressure Codes

Below is the pressure code table for standard action devices. Existence of a code does not imply that that code is available for any or all devices.

Settings	Code
5–21 psi	J15
8–20 psi	J16
20–40 psi	J20
20–50 psi	J18
30–50 psi	J21
40–60 psi	J24
50–70 psi	J33
55–85 psi	J34
60–80 psi	J25
Specify other pressure	J99

Pressure Codes (Reverse action)

Below is the pressure code table for reverse action devices. Existence of a code does not imply that that code is available for any or all devices.

Settings	Code
8.5–5.5 psi	J17
10–5 psi	J36
22–12 psi	J22
22–16 psi	J19
35–20 psi	J70
40–20 psi	J23
50–30 psi	J35
80–60 psi	J32
100–80 psi	J51
150–120 psi	J64
Specify other pressure	J99

Ordering Information

1. Specify Class 9013 Type F.
2. Select pressure code from Pressure Code Table above and add code designation to end of type number. Be sure that the pressure code falls within the limits of the device as shown in the device listings.
3. If special features are desired, add the appropriate Form letter to the Class and Type. Arrange Form letters in alphabetical sequence when ordering more than one special feature.
4. Place packaging code in alphabetical sequence with other forms when ordering.
 - For standard pack of 20 devices per box C20†
 - For individually packaged devices leave blank††

Note: If no packaging code is indicated, devices will be shipped individually packaged.



File E12158 CCN NKPZ



File LR25490

Selection Tables

Standard Action: Contacts Open On Rising Pressure

Cut-Out Range (psig)	Approximate Adjustable Differential (psig)	Cut-in Range (psig)	Pressure Connection	2 Pole			
				NEMA Type 1	Price	NEMA Type 3R▲	Price
20–65	15–30	10–45	1/8" NPSF Internal	FSG1	\$20.00	FSW1	\$23.20
			1/4" NPSF Internal	FSG2	18.20	FSW2	21.40
			1/4" NPT External	FSG9	18.20	FSW9	21.40
			1/4" Bayonet (barbed) 90° Elbow 1/4" Bayonet	FSG10 FSG20	18.20 20.00	FSW10 FSW20	21.40 23.20
20–50 20–60 9–30 9–30	10–30 10–30 6–20 6–20	10–30 10–45 3–10 3–10	1/4" NPSF Internal	FSG22	23.20	FSW22	26.40
			1/4" NPT External	FSG29	23.20	FSW29	26.40
			1/4" NPSF Internal	FSG42	23.20	FSW42	26.40
			1/4" NPT External	FSG49	23.20	FSW49	26.40
34–65	15–30	19–45	(FSG120 WITH FORM M4)				
25–80	20–30	5–60	1/8" NPSF Internal	FYG1	28.20	FYW1	31.40
			1/4" NPSF Internal	FYG2	26.60	FYW2	29.80
			1/4" NPT External	FYG9	26.60	FYW9	29.80
			1/4" Bayonet (barbed) 90° Elbow 1/4" Bayonet	FYG10 FYG20	26.60 28.20	FYW10 FYG20	29.80 31.40
39–80	20–30	19–60	(FYG120 WITH FORM M4)				
20–50 20–60 9–40 9–40	10–30 10–30 6–20 6–20	10–30 10–45 3–10 3–10	1/4" NPSF Internal	FYG22	31.50	FYW22	34.70
			1/4" NPT External	FYG29	31.50	FYW29	34.70
			1/4" NPSF Internal	FYG42	31.50	FYW42	34.70
			1/4" NPT External	FYG49	31.50	FYW49	34.70

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	\$31.50	FRG2	\$33.20
			3/8" NPSF Internal	FRG13	31.50	FRG3	33.20
			1/4" Flare	FRG18	31.50	FRG8	33.20
			1/4" NPT External	FRG19	31.50	FRG9	33.20
10–45	6–20	4–25	1/4" NPSF Internal	FRG32	34.70	FRG22	36.40
			3/8" NPSF Internal	FRG33	34.70	FRG23	36.40
			1/4" Flare	FRG38	34.70	FRG28	36.40
			1/4" NPT External	FRG39	34.70	FRG29	36.40
6–14	5 Non-adjustable	1–9	1/4" NPSF Internal	FRG52	34.70	FRG42	36.40
			3/8" NPSF Internal	FRG53	34.70	FRG43	36.40
			1/4" Flare	FRG58	34.70	FRG48	36.40
			1/4" NPT External	FRG59	34.70	FRG49	36.40
40–100	20–30	20–75	1/4" NPSF Internal	FRG72	31.50	FRG62	33.20
			3/8" NPSF Internal	FRG73	31.50	FRG63	33.20
			1/4" Flare	FRG78	31.50	FRG68	33.20
65–150	30–45	35–120	1/4" NPSF Internal	FRG92	31.50	FRG82	33.20
			3/8" NPSF Internal	FRG93	31.50	FRG83	33.20
			1/4" Flare	FRG98	31.50	FRG88	33.20
			1/4" NPT External	FRG99	31.50	FRG89	33.20

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

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

Description	Applies to	Form Letter	Price Addition
Standard Pack of 20 Devices per box	All Type F	C20	N/C
Pilot Light—Indicates Switch Contacts Closed	FSG, FYG	G5■	\$ 8.40
One Normally Open—One Normally Closed Contact	FRG 2-Pole Only	H	6.60
Maintained Manual Cut-Out Lever (AUTO-OFF)	FSG, FYG	M1	3.40
Momentary Manual Cut-In Lever (AUTO-START)	FRG2-59 Only	M3	3.40
Low Pressure Cut-Off (AUTO-START-OFF) Operates at Approximately 10 psig Below Cut-in and will turn off the pump	FSG, FYG	M4	5.80
Maintained Manual Cut-in Lever (AUTO-ON)	FRG2-59 Only	M5	3.40
Pulsation Plug (Type 2 & 9 Only)	FRG, FSG, FYG	P◆	0.49
Salt Water Flange (1/4" NPSF Internal Only)	All Type F	Q	16.60
Plastic Flange (max. temp. 120°F) (max. pressure 80 psi)	FSG, FYG, FRG	Q8	8.00
	1/4" NPSF Internal Only		
1/2" Conduit Bushing—1/2" Long Thread—on Left	All Type F	T	2.70
1/2" Conduit Bushing—1/2" Long Thread—on Right	All Type F	T1	2.70
Slip-On Connectors (Load Side Terminals Only)	FSG, FYG	U	0.32
Slip-On Connectors (Line and Load Terminals)	FSG, FYG	U2	0.64
Black Cover	FSG, FYG	Z22	N/C

- Can be field installed. Nameplate should then be marked with the Form letter and maintenance and ordering records corrected.
- ◆ Nylon pulsation plug can be field installed on types having 1/4" NPSF Internal connector. Part number 1530S6G1 is one bag of 50 plugs.

For additional information, reference Catalog #9013CT9701R8/98.

20 PRESSURE, VAC, TEMP AND FLOAT SWITCHES



Shown with Form X

Pressure Code Table

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

♦ Reverse action.

Ordering Information

- Specify Class 9013 Type G.
- Select pressure code from Pressure Code Table above and add code designation to end of type number. Be sure that pressure code falls within the limits of the device as shown in the device listings below.
- If special features are desired, add the appropriate Form letter to the Class and Type. Arrange Form letters in alphabetical sequence when ordering more than one special feature.
- Place packaging code in alphabetical sequence with other forms when ordering.
For standard pack of 10 devices per box:C10
(Available on GHB, GHG, GSB, and GSG)
For individually packaged devices:leave blank

Note: If no packaging code is indicated, devices will be shipped individually packaged.

- Designed for the control of electrically driven water pumps and air compressors. The Class 9013 Type G devices cover higher electrical ratings for direct control of motors in pump and compressor applications.
- Contacts open on pressure rise.
- Diaphragm actuated.
- See page 20-26 for electrical ratings
- See page 20-10 for repair parts kits.

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	5½–30½	NEMA Type 1 General Purpose	2	¼	GMG2	\$102.
20–80	15–30	5–60	NEMA Type 3R ▲ Rainproof	2	¼	GSB2	99.
20–80	15–30	5–60	NEMA Type 1 General Purpose	2	⅛	GSG1	57.
					¼	GSG2	
					⅜	GSG3	
20–80	20–40	5–50	NEMA Type 7 & 9 Hazardous Locations	2	⅛	GSR1	302.
					¼	GSR2	
					⅜	GSR3	
			NEMA Type 4 Watertight		⅛	GSW1	315.
					¼	GSW2	
					⅜	GSW3	
65–200	20–40	40–170	NEMA Type 3R ▲ Rainproof	2	¼	GHB2	99.
65–200	20–40	40–170	NEMA Type 1 General Purpose	2	⅛	GHG1	57.
					¼	GHG2	
					⅜	GHG3	
65–200	30–50	35–150	NEMA Type 7 & 9 Hazardous Locations	2	⅛	GHR1	302.
					¼	GHR2	
					⅜	GHR3	
			NEMA Type 4 Watertight		⅛	GHW1	315.
					¼	GHW2	
					⅜	GHW3	
80–250	25–45	32–215	NEMA Type 3R ▲ Rainproof	2	¼	GHB5	99.
80–250	24–45	32–215	NEMA Type 1 General Purpose	2	⅛	GHG4	57.
					¼	GHG5	
					⅜	GHG6	
80–250	40–60	30–190	NEMA Type 7 & 9 Hazardous Locations	2	⅛	GHR4	302.
					¼	GHR5	
					⅜	GHR6	
			NEMA Type 4 Watertight		⅛	GHW4	315.
					¼	GHW5	
					⅜	GHW6	

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

Special Features and Modifications for Type G Devices

Description	Applies to	Form Letter	Price Addition
Standard Pack of 10 Devices per box	All Type G	C10	N/C
3-Way Lever (On-Auto-Off) (Not compatible with Form X)	GHG, GMG, GSG	E	\$20.40
One Normally Open-One Normally Closed Contact	All Type G	H	9.90
Pulsation Plug (Not field replaceable.)	All Type G	P	0.54
Reverse Action (Select pressure code from reverse action table on page 20-14)	All Type G	R	9.90
Slip-On Connectors (Load Side Terminals Only)	All Type G	U	0.32
Slip-On Connectors (Line and Load Terminals)	All Type G	U2	0.64
Two-way Pressure Release Valve (Not compatible with Form E)	GHB, GMG, GSB, GHG, GSG	X	20.40
	GHR, GHW, GSR, GSW	X	56.80
¼" Male Pipe Thread on Pressure Connection	All Type G	Z	N/C
½"-14 NPT External	All Type G	Z16	25.70
¼"-18 NPT Internal ■			
⅜" Male Pipe Thread on Pressure Connection	All Type G	Z23	2.20

■ UL Listed industrial control equipment.



File CCN E12158 NKPZ
Except GHR and GSR



File LR25490
Except GHR and GSR



For GHR and GSR
File CCN E12443 NOWT

Vacuum Switches

Types GAW and GVG—Class 9016



Type GAW

Sensitive Control Applications

GAW 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 will be 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 $\frac{9}{32}$ " mounting holes on $3\frac{3}{4}$ " centers. Range and Differential adjustments are internal and exposed by removal of the front cover.



File E12443
CCN NOWT



File LR25490
Type GAW ONLY



Maximum allowable positive pressure: 100 psig.

Diaphragms are oil resisting, nitrile butadiene rubber (BUNA N).

Electrical Ratings and Temperature Limitations—See page 20-6 for Type G machine tool.

Class 9016		Diaphragm Actuated					
Range on Decreasing Vacuum (In of Hg)	Adjustable Differential Adds to Range▲ (In of Hg)	Contact Arrangement	Pipe Tap (NPTF)	NEMA 4, 4X & 13 Encl.		NEMA 7 & 9 ■	
				Type	Price	Type	Price
0-28.7	At Minimum Range.....8-9 At Mid-Range.....1.3-7.4	1 N.O.-1 N.C.	$\frac{1}{4}$ "-18	GAW1	\$206.	GAR1	\$646.
0-25	5-20	1 N.O.-1 N.C.	$\frac{1}{4}$ "-18	GAW2	180.	N/A	N/A
0-28.3	At Minimum Range.....1-9 At Mid-Range.....1.7-7.4	2 N.O.-2 N.C.	$\frac{1}{4}$ "-18	GAW21	225.	GAR21	677.
0-25	5-20	2 N.O.-2 N.C.	$\frac{1}{4}$ "-18	GAW22	220.	N/A	N/A

▲ Add Differential to Range to obtain operating point on increasing vacuum (within vacuum limitations). Differential increases linearly over range.

■ Min. differential doubles with NEMA 7 & 9 enclosures.

Available Modifications

Modifications		
Description	Form	Price
Side conduit hub.....	B2	\$13.10
Removable conduit hub.....	B4	13.10
Mounting feet (GAW 1+21 Only).....	F	16.40
VITON® diaphragm.....	Q14	16.40
Range scale window.....	V1	8.70
$\frac{1}{4}$ "-18 NPT external thread pressure connection.....	Z	N/C
Fungus proofing per MIL-T-152B with varnishes per MIL-V-173A.....	Z12	Add 10% to price
$\frac{1}{2}$ "-14 NPT external thread, $\frac{1}{4}$ "-18 NPTF internal thread pressure connection (standard actuator only).....	Z16	42.60



Class 9016, Type GVG1
Form E, F

Type GVG

The Class 9016 Type GVG1 is designed as a companion to the Class 9036 Type GG and the Class 9037 Type GG float switches in common use on vacuum heating pumps. Electrical ratings of float and vacuum switch types are equal.

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 Type 1 Encl.	
					Type	Price
5-25	5-10	0-20	2	$\frac{1}{4}$ "-18 NPSF	GVG1	\$105.00

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



File E12158
CCN NKPZ



File LR25490

Available Modifications

Description	Form Letter	Price
3-Way Lever—Nameplate marked: Float only—Vacuum and Float—Continuous (Factory Modification Only)	Form E	\$19.30
Mounting Bracket (For Retrofit Order Class 9049 Type A-53 Bracket Kit).....	Form F	12.80
Reverse action—Normally open contacts.....	Form R	9.60
$\frac{1}{4}$ Inch Male Pipe Connection ($\frac{1}{4}$ "-18 NPT, External Thread) (For Retrofit, Use $\frac{1}{4}$ " Pipe Nipple).....	Form Z	N/C

For additional information, reference Catalog #9012CT9701.

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 vacuum	J99

Ordering Information Required

1. Specify Class 9016 Type G. Give vacuum settings within the limits of the listings above.

For Setting Codes See table above

2. If special features are desired, add the appropriate Form Letter to the class and type. Arrange form letters in alphabetical sequence when ordering more than one special feature.

For the Automatic Control of Temperature Maintaining Equipment In Industrial and General Duty Applications.

Industrial Type Enclosures are Die Cast Aluminum, Water-tight, Oil Resistant, and Corrosion Resistant

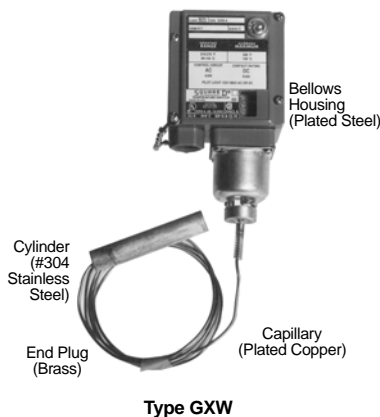
Heating Types—These temperature controllers are recommended for heating applications where the temperature to be controlled is higher than the normal or ambient temperature.

IMPORTANT: Where the ambient temperature may vary from a value below the control point to a value above it, the use of a universal or cross ambient bulb would be required. The 9025GXW and GYW are not intended for this service.

Applications—controlling the temperature of liquid baths, bearings, internal combustion engines, large air compressors, etc., are possible applications for these devices.

Ambient Temperature Range:

Minimum: -56°C (-70°F) Maximum: +85°C (+185°F).



Range on Decreasing Temp. °F (at sea level)	Non Cross-ambient Heating Controls		Maximum Allowable Temp. ▲ °F	NEMA Type 4, 4X, 13 Enclosures ■			
	Adjustable Differential ± Adds to Range			Single Pole Double Throw		Double Pole Double Throw	
	Decreasing Set Point	Single Pole		Type	Price	Type	Price
Capillary (6 Feet) and Bulb Type—Vertical or Horizontal Immersion							
85–145	Min-Range 7–40	8–55	190	GXW2	\$437.	GXW22	\$485.
125–240	Mid-Range 7–40	7–25	260	GXW3	437.	GXW23	485.
180–280	Max-Range 17–25	19–55	330	GXW4	437.	GXW24	485.
210–355	Min-Range 15–25	21–35	450	GXW5	437.	GXW25	485.
	Mid-Range 8–16	15–25					
	Max-Range	8–16					
Direct Connection Type—Vertical Immersion							
85–145	Min-Range 7–40	8–55	190	GYW2	362.	GYW22	408.
125–240	Mid-Range 7–40	7–25	260	GYW3	362.	GYW23	408.
	Max-Range	6–25					

▲ Maximum bulb pressure is 3000 psi.
■ For a 9025GXW switch in a NEMA Type 7 & 9 enclosure, change the type to 9025GXR. Add \$476. to list price. Minimum differentials double for G*R devices.



File: E132998
CCN: XBDV



Modification	Form	Price Addition
Substitute 6' of armored capillary tubing for standard capillary	A6	\$14.00
Substitute 12' of armored capillary tubing for standard capillary	A12	41.30
Substitute 16' of armored capillary tubing for standard capillary	A16	65.00
Side conduit hub. Not available separately nor as a replacement. Standard on GYW. Available on GXW	B2	19.10
Removable conduit hub. GXW only	B4	19.10
Push button—push-to-test	E2	52.00
Push button—lock out or in on rising temperature, manual reset only	E3	52.00
Push button—lock out or in on falling temperature, manual reset only	E4	52.00
120 Volt AC or DC Neon Pilot Light with clear lens with red lens	G17 G18	47.60
240 Volt AC or DC Neon Pilot Light with clear lens with red lens	G19 G20	47.60
24 Volt DC ONLY LED Pilot Light with clear lens with red lens	G21 G22	47.60
SPDT Snap Switch Rated 1.1 A at 125 Vdc	H3	42.80
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. See diagrams on page 6-8.	H10 or H11	101.00
External range adjustment (includes range scale window and knob)	K	33.80
External range adjustment slotted for screwdriver (includes range scale window)	K1	23.70
Substitute 12' of capillary tubing for standard capillary	L12	14.30
Substitute 16' of capillary tubing for standard capillary	L16	22.20
Range scale window (standard with Forms K and K1)	V1	11.90
Fungus proofing per MIL-T-1528 with varnishes per MIL-V-173A	Z12	Add 10% to Price

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

Electrical Ratings page 20-26
Accessories page 20-12

For additional information, reference Catalog #9012CT9701.

Level Sensors

Type LSV, LSD—Solid State Liquid Level—Class 9034



www.SquareD.com

For the most up-to-date information



LSVFW2

Type LSV—Solid State Liquid Level

The Class 9034 Type LSVFW2 sensors can be used to detect either rising or falling liquid levels in storage vessels, mixing tanks or pipelines. It can be used with any liquid compatible with Type 316 stainless steel in a temperature range of -40°F to +300°F. The unit will operate reliably in viscosities up to 2,000 centistokes (cSt). It is ideally suited for applications which have material buildup, foam, gas bubbles, or suspended solids. It is unaffected by agitation, wave action, or turbulence and can be directly installed without the need for measuring chambers or bypasses.

General Specifications

Housing:	Stainless steel
Stainless Steel Body:	Stainless steel
Black Cover:	Polycarbonate
Mounting Gland and Oscillating Fork:	Type 316 stainless steel
Operating Frequency:	87 MHz
Enclosure Rating:	IP65
Operating Temperature:	Sensor, -40°F to +300°F Ambient, -40°F to +160°F
Operating Pressure:	230 psig maximum
Maximum Viscosity of Liquid:	2,000 centistokes (cSt)
Response Time:	Approximately 0.5 seconds
Switching Hysteresis:	Approximately 0.1 inch
Output Mode:	Field Selectable, minimum or maximum minimum—liquid present, output on maximum—liquid absent, output on
Indicator:	LED, lights when output is switched off
Mounting:	1" NPT
Cable Entry:	Liquid tight for cable diameters of 0.21 to 0.27 in. Threaded for 1/2" NPT conduit

Power Requirements

Input Power:	24 Vac to 250 Vac, 50/60 Hz
Momentary Inrush:	1.5 A max. for 40 ms max.
Continuous Operation:	
Maximum Load:	350 mA maximum
Minimum Load:	20 mA at 24 Vac 12 mA at 115 Vac 10 mA at 240 Vac
Leakage Current:	<5 mA
On-state Voltage Drop:	10 Volts maximum
Operating Principle:	SCR

Description	Type	Price
Sensor AC switching, 2-wire, 24 Vac to 250 Vac, 50/60 Hz	LSVFW2	\$701.

▲ For dimensions, reference Catalog #9034CT9701, page 12.



Type LSDDAC2

Type LSD—Solid State Solid Level

The Class 9034 Type LSD sensor is a capacitance type level limit sensor that is ideal for use in applications where the control and measurement of powders, granulars or pelletized solids is required. The extremely sensitive sensing head will detect materials with dielectric constants as low as 1.5. To ensure switch point reliability, the unit has an electronic shield that eliminates the effects of sidewall buildup and guards against false signaling.

Description	Type	Price
Sensor AC switching, 2-wire, 24 Vac to 250 Vac, 50/60 Hz DC switching, 3-wire PNP, 10 Vdc to 55 Vdc	LSDDAC2 LSDDDP3	\$570. 570.

General Specifications—LSD

Housing:	Polycarbonate
Blue Body:	Polycarbonate
Clear Cover:	Polycarbonate
Enclosure Rating:	NEMA Type 4X, 12
Operating Temperature:	Sensor, -5°F to +175°F Ambient, -5°F to +140°F
Operating Pressure:	90 psig maximum
Sensitivity:	Minimum 1.5 dielectric constant, adjustable
Response Time:	0.2 seconds
Output Mode:	Field Selectable, minimum or maximum minimum—material present, output on maximum—material absent, output on
Indicator:	Red LED lights when output is switched off
Mounting:	1" BSPP mounting thread
Cable Entry:	Liquid tight for cable diameters of 0.21 to 0.27 in. Threaded for PG11 conduit

Power Requirements—LSD

	AC Version, 2-Wire	DC Version, 3-Wire NPN or PNP
Input Power:	24 Vac to 250 Vac, 50/60 Hz	10 Vdc to 55 Vdc
Momentary Inrush:	1.5 A max. for 40 ms max.	1 A max. for 1 second max.
Continuous Operation:		
Maximum Load	350 mA	350 mA
Minimum Load	20 mA at 24 Vac 12 mA at 115 Vac 10 mA at 240 Vac	
Burden Current:	...	Approximately 7 mA
Leakage Current:	<3.5 mA	...
On-state Voltage Drop:	10 Volts maximum	3 Volts maximum
Operating Principle:	SCR	Open collector, PNP or NPN, 55 Vdc max. input
Polarity Protection:	...	Yes

Accessories

Type	Description	Price
LSDMWM11	Mounting well will allow Type LSD to be removed without spilling contents. 1 1/2" BSPP external threads, 1" BSPP internal threads to accept Type LSD. Housing material is polyterephthalate (PBT).	\$183.00
LSDMWCSM11.1	304 Stainless Steel coupling to be welded to tank. 1 1/2" BSPP internal threads to accept mounting weld. For use in conjunction with LSDMWM11 Mounting Well listed above.	137.00
LSDCSM11.2	304 Stainless Steel coupling to be welded to tank. 1" BSPP internal thread to accept Type LSD.	108.00
LSDCSM11.3	304 Stainless Steel coupling with 1" BSPP internal threads on end to accept Type LSD. Other end has 1 1/4" NPT external threads for addition of user supplied extension pipe for low level, top of tank mounting in dry solids.	183.00

For additional information, reference Catalog #9034CT9701.

20 PRESSURE, VAC, TEMP AND FLOAT SWITCHES

Miniature

Designed to meet limited space requirements in many chemical environments.



LLV80

- Mounting: 1/8" NPT
- Leads: LLV80—22 AWG MTW (24"); LLV50—22 AWG TEFLON® (24")

Class 9034 LLV

Model No.	Material	Max. Temp	Max. psig	Float SG	Watt Rating	Price	Application
LLV50	316SS	200°C	300	0.60	30	\$47.60	High temp., high pressure, corrosive conditions
LLV80	Polypro.	105°C	100	0.60	30	28.50	General purpose



UL recognition E54633 for the U.S. and Canada



CSA approval LR56150

Full-Size

Designed for use in many chemical environments



LLV56

- Mounting: 1/4" NPT
- Leads: 22 AWG TEFLON (24")

Class 9034 LLV

Model No.	Material	Max. Temp	Max. psig	Float SG	Watt Rating	Price	Application
LLV56	316SS	200°C	200	0.55	60	\$63.00	High temp., high pressure, corrosive conditions



UL recognition E54633 for the U.S. and Canada



CSA approval LR56150

For hazardous locations Class I, Groups A, B, C, D; Class II, Groups E, F, G; Class III, E150881

Side-Mounted

Designed for mounting through walls of tanks and other vessels



LLH77

- Mounting: LLH501—3/8" bulkhead; LLH77, LLH87—1/2" NPT inner, 1/2" NPT outer
- Leads: LLH501, LLH77—22 AWG TEFLON (24"); LLH87—22 AWG MTW (24")

Class 9034 LLH

Model No.	Material	Max. Temp	Max. psig	Float SG	Watt Rating	Price	Application
LLH501▲	316SS	200°C	300	0.60	30	\$45.90	High temp., high pressure, corrosive conditions
LLH77	PBT	150°C	100	0.75	30	38.00	Fuels and lubricating oils
LLH87	Polypro.	105°C	100	0.50	30	31.70	General purpose; highly acidic conditions

▲ Bulkhead fitting only.



UL recognition E54633 for the U.S. and Canada



CSA approval LR56150

Current & Voltage Ratings

For resistive loads only. Maximum voltage ratings: SPS—220 Vac; SPST—120 Vac.

Watts	Amperes (Resistive)			
	at 220 Vac	at 110 Vac	at 120 Vdc	at 24 Vdc
60	0.4	0.5	0.2	0.5
30	0.14	0.28	0.07	0.28
25	...	0.28	...	0.28
15	0.07	0.15	0.03	0.14



LLH501

20 PRESSURE, VAC, TEMP AND FLOAT SWITCHES

For additional information, reference Catalog #9034CT9701.

Level Sensors

Types DG, DW, DR—Open Tank or Sump—Class 9035



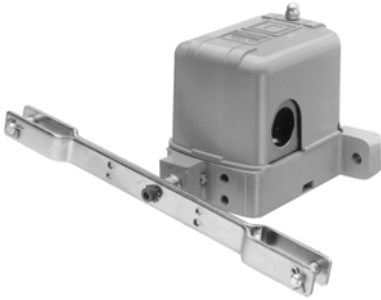
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For the most up-to-date information

Build A Switch To Meet Your Requirements From The Component Groups Below.

Class 9035 float switches are designed for the automatic control of AC or DC pump motor magnetic starters or for the automatic direct control of light motor loads.

Class 9035 float switches are for wall or floor mounting.



1. Float Switches	Class	NEMA Type 1		NEMA Type 4		NEMA Type 7 & 9	
		Type	Price	Type	Price	Type	Price
Basic Float Switch, 2-Pole ▲	9035	DG30	\$387.	DW30	\$588.	DR30	\$573.
Basic Float Switch, 1 N.O. —1 N.C.	9035	DG31	411.	DW31	626.	DR31	623.
2. Float Accessory Kits, mounting hardware, all linkages included: Class 9049		Class		Type		Price	
5' Brass rod; #304 Stainless Steel, 7" dia. float		9049		DRA31		\$321.00	
5' Stainless Steel rod; #316 Stainless Steel, 7" dia. float		9049		DRA32		512.00	
15' Bronze chain; #304 Stainless Steel, 7" dia. float, pulleys		9049		DCA1		432.00	
15' Stainless Steel chain; #316 Stainless Steel, 7" dia. float, pulleys		9049		DCA2		555.00	
15' Bronze chain; #304 Stainless Steel, 7" dia. float -remote pulleys		9049		DCA3		432.00	
15' Stainless Steel chain; #316 Stainless Steel, 7" dia. float - remote pulleys		9049		DCA4		755.00	
3. FLOOR MOUNTING KIT		9049		UMS1		39.00	
Additional chain or rod kits Adds onto float accessory kits sold above. Note: 30' is the maximum recommended length for rod.		Class		Type		Price	
2 1/2' Section of brass rod, includes connector & counterweight		9049		T2		\$ 62.00	
2 1/2' Section #316 Stainless Steel rod, includes connector & counterweight		9049		T2S		105.00	
5' of Bronze chain, includes connector		9049		C2		37.10	
5' of Stainless steel chain, includes connector		9049		C2S		44.40	

Replacement Parts

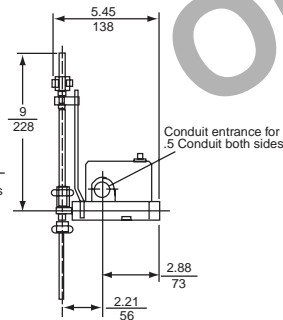
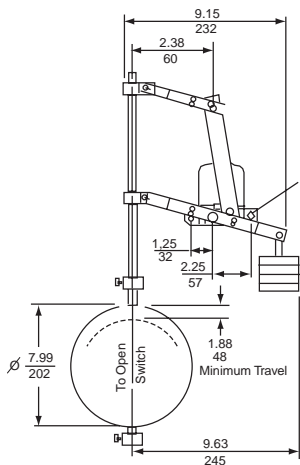
Float Only		Class	Type	Price
Applies To	Description			
9049DRA31	7" dia., ctr. hole, #304 Stainless Steel	9049	AF1	\$105.00
9049DRA32	7" dia., ctr.hole, #316 Stainless Steel	9049	AF2	222.00
9049DCA1,3	7" dia., tapped, #304 Stainless Steel	9049	AF3	90.00
9049DCA2,4	7" dia., tapped, #316 Stainless Steel	9049	AF4	237.00

Stops

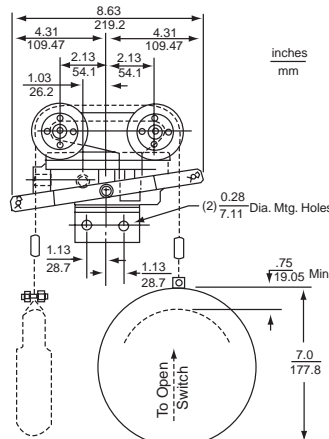
Applies To	Description	Part No.	Price
9049DRA31	Stop and Screw	1091S14G1	9.50
9049DRA32	#316 Stainless Steel Stop and Screw	1091S15G1	23.70
9049DCA (all)	Stop Assembly	1471L9G1	55.00

- ▲ DG Type: Float on left: Contacts open on rise, close on fall. Float on right: Contacts close on rise, open on fall. Lever moves CW: Contacts open. Lever moves CCW: Contacts close.
- ▲ DR, DW Types: Float on left: Contacts close on rise, open on fall. Float on right: Contacts open on rise, close on fall. Lever moves CW: Contacts close. Lever moves CCW: Contacts open.

Approximate Dimensions

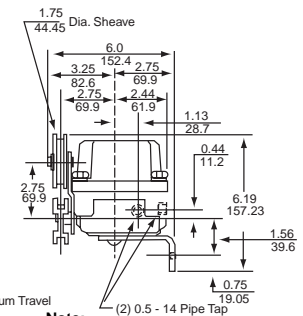


Note: Above view shows standard arrangement for tank control. For sump control, reverse float and counterweight.



Type DR or DW (Wall Mounting)
Shown with chain accessory kit
9049DCA1 installed

Dual Dimensions: Inches / Millimeters



Note: Above view shows standard arrangement for tank control. For sump control, reverse float and counterweight.

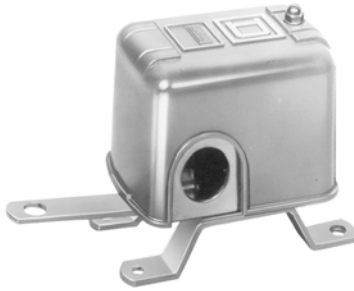
20 PRESSURE, VAC, TEMP AND FLOAT SWITCHES

Ordering Information Required

- 1—Specify Class 9035 Type (Basic Switch)
- 2—Specify Class 9049 Type (Accessory Kit)
- 3—Specify Class 9049 Type (Floor Mounting Kit if desired)

For additional information, reference Catalog #9034CT9701.

For Open Tank or Sump Applications



Type DG2



Type GG



Type FG

Description	Class 9036		2-Pole		Single Lever Operated	
			NEMA Type 1		NEMA Type 4	
	Type	Price	Type	Price	Type	Price
Contacts Close on Liquid Rise	DG2	\$36.80	DW31	\$244.	DR31	\$235.
Contacts Open on Liquid Rise	DG2R	40.20	DW31R	247.	DR31R	238.
Contacts Close on Liquid Rise	GG2	70.00	GW1	411.	GR1	402.
Contacts Open on Liquid Rise	GG2R	70.00	GW1R	418.	GR1R	411.

Order universal mounting bracket and float accessory kits separately from Class 9049 section. Types GW and GR use center hole float. Devices with Form C use center hole float. All others use tapped at top float. See page 20-12 for 9049 accessories.

Modifications For Type DG, DW, DR

	Factory Installed		Field Installed	
	Form	Price	9049 Kit	Price
Reverse Action (Type DG)	R	\$ 3.40	A58	\$3.40
Compensating Spring (Type DG)	C	6.70	A19	6.70
Compensating Spring (Type DR, DW)	C	6.70	A20	6.70
Comp. Spring and Reverse Action	CR	10.10	Not Available	

Modifications For Type GG, GW, GR

	Factory Installed		Field Installed	
	Form	Price	9049 Kit	Price
Compensating Spring for Type GG2	C	\$ 8.40	9049A13	\$8.40
Combination of Comp. Spring & Reverse Action (Type GG2)	CR	18.30	9049A13	8.40
1 N.O.-1 N.C. Contact Configuration	H	9.90	Not Available	
Combination of Comp. Spring & 1 N.O.-1 N.C. Contact for Type GG2	CH	18.30	Not Available	
Reverse Action (Type GR, GW)	R	9.90	Not Available	

Maximum Forces at Which Switches are Tested (in ounces)

Type	Force Up To Trip	Force Down To Trip	Will Support This Weight With Compensating Spring
DG2	9	8	60
DG2 Form R	8	8	60
DW31	8	8	66
DW31 Form R	8	8	66
DR31	8	8	66
DR31 Form R	8	8	66

Type (with or without Form H)	Lever Length Position	Force Up to Trip	Force Down to Trip	Will Support This Weight With Compensating Spring at Max. Adj. in Ozs.
GG2	Short	33	39	▲
GG2	Long	21	27	▲ 100
GG2 Form R	Short	30	24	▲
GG2 Form R	Long	22	16	150
GR1, GW1	Short	24	31	80
GR1, GW1	Medium	22	29	72
GR1, GW1	Long	20	27	64

▲ Compensating spring not effective in combination with SHORT lever length position.

Class 9049 Float Accessory Specifications (in ounces)

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 foot 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 above is calculated for use in water. Consult factory for buoyancy data media having specific gravity different than water.
When ordering Float Accessories, first specify the desired Float Accessory Package such as 9049A6, 9049A6CS, etc., then as a second item give the number of additional rod kits required. For Example: To get a 9049 A6 with 15 feet of rod, order as follows:
Item A (1) 9049A6
Item B (4) 9049T1

Refer to page 20-12 for Float Accessories.

Type FG

The Class 9036 Type FG30 pedestal style float switch is designed for liquid level control with electric motor operated pumps either directly or through a magnetic starter. It can also be used to activate alarms in liquid level control systems. The upward or downward movement of the lever arm of the Class 9036 Type FG30 float switch controls the ON and OFF positions corresponding to the water level changes required to turn the pump or alarm on and off.

Description	Type			Price
Contacts close on liquid rise	FG30	2-pole	NEMA Type 1	\$15.50

Accessories

Description	Number Required	Class	Type	Price
Plastic center hole float	1	9049	A60	\$4.10
33.75 inch aluminum rod, 2 float stop assemblies and attaching hardware	1	9049	A61	4.10

For additional information, reference Catalog #9034CT9701.

Float Switches

Class 9037—Type E—Closed Tank



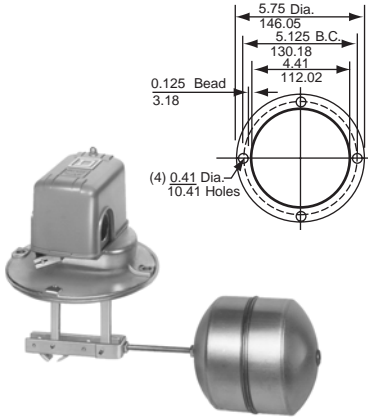
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For the most up-to-date information

Type E switches are flange mounted and float movement is transmitted through a stuffing box.

Build up the switch to meet your exact requirements from the **basic switch**, **float rod** and **float** groups below. Switch may be assembled in the field to give contacts that open on liquid rise or close on liquid rise.

Mounting Dimensions for Class 9037 Type E



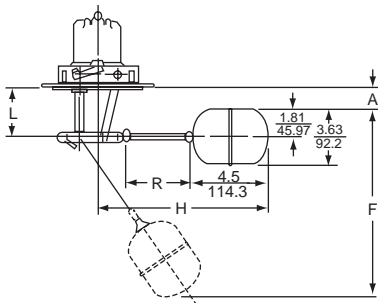
Type EG
Shown with 9049ER3 Rod Kit
and 9049EF1 Float Kit Installed

Class 9049 Floats for Type E Switches		
#304 Stainless Steel	EF1	\$19.50
#316 Stainless Steel	EF2	48.40

Class 9049 Float Rod Kits			
	"R"	"H"	Price
Type ER1	1 ³ / ₄ "	8 ¹ / ₄ "	\$8.40
Type ER2	2 ¹ / ₂ "	9"	8.40
Type ER3	3 ¹ / ₂ "	9 ¹ / ₂ "	8.40
Type ER5	5 ¹ / ₄ "	11 ³ / ₄ "	8.40
Type ER7	7 ¹ / ₄ "	13 ³ / ₄ "	8.40
Type ER12	12 ¹ / ₄ "	18 ³ / ₄ "	8.40

Class 9037 Type E						Application	Post Length "L"
NEMA Type 1	NEMA Type 4	NEMA Type 7 & 9					
Type	Price	Type	Price	Type	Price		
EG8	\$137.	EW8	\$346.	ER8	\$336.	For Minimum Water Level Change	2 ⁵ / ₁₆ "
EG10	151.	...	...	...	...		4 ¹¹ / ₁₆ "
EG9	137.	EW9	346.	ER9	336.	For Maximum Water Level Change	2 ⁵ / ₁₆ "
EG13	151.	EW13	360.	...	...		4 ¹¹ / ₁₆ "

Consult factory for use in media having specific gravity different than water.



For additional information, reference Catalog #9034CT9701.



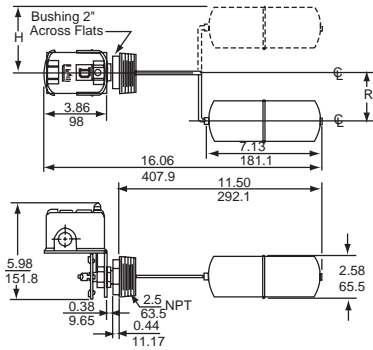
**Type HG35
Float on Right
90° Offset Rod**

Type H 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 stainless steel float and rod. Buna N QUAD-RING® seal is used between the float rod and sealing connector. Normal application is at atmospheric pressure, but where higher pressures are encountered, the switch will withstand tank pressures up to 50 psi at temperatures up to 220°F. Occasional replacement of the QUAD-RING seal may be necessary.

Class 9037 Type H Contacts Close On Liquid Rise

Float Position Viewed from Front of Switch Facing Indicator Scale	Float Rod Angle		Approximate Water Level Change in Inches (Field Adjustable)		NEMA Type 1		NEMA Type 4		NEMA Type 7 & 9		
	"R"	"H"	Min.	Max.	Type	Price	Type	Price	Type	Price	
Right	45°	-	6 3/8"	2"	5"	HG33	\$99.	HW33	\$308.	HR33	\$299.
Right	90° Offset	3"	4 3/8"	2"	5"	HG35	99.	HW35	308.	HR35	299.
Right	90° Offset	4 1/4"	5 3/8"	2"	7"	HG37	99.	HW37	308.	...	...
Right	90° Offset	5"	6 3/8"	2"	8 1/4"	HG39	99.	HW39	308.	...	...
Right	90° Offset	7"	8 3/8"	2"	11 1/2"	HG31	99.	HW31	308.	HR31	299.
Left	45°	-	6 3/8"	2"	5"	HG34	99.	HW34	308.	HR34	299.
Left	90° Offset	3"	4 3/8"	2"	5"	HG36	99.	HW36	308.	HR36	299.
Left	90° Offset	4 1/4"	5 5/8"	2"	7"	HG38	99.	...	...	...	...
Left	90° Offset	5"	6 3/8"	2"	8 1/4"	HG30	99.	HW30	308.	HR30	299.
Left	90° Offset	7"	8 7/8"	2"	11 1/2"	HG32	99.	HW32	308.	HR32	299.

For replacement float see Class 9049 Type H, page 20-12.



Dual Dimensions: Inches
Millimeters

Available Modifications For Class 9037 Type H

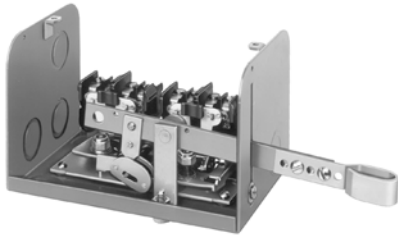
Omit 2 1/2" tank connecting bushing	Form F3 deduct	\$ 5.40
Omit float	Form L deduct	19.50
Reverse action, contacts open on rise	Form R	N.C.
VITON® packing: 5 oz. float (diesel fuel) For Types HG, HW, HR30, -31, -32, -37, -38, -39 only	Form Z19	N.C.
VITON packing (suitable for applications up to 250°F)	Form Z20	N.C.
#316 Stainless Steel float and VITON packing	Form Z21	101.00

For additional information, reference Catalog #9034CT9701.

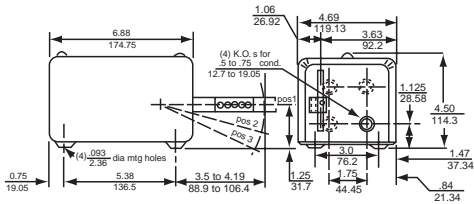
Float Switches

Class 9038—Types A, C—Mechanical Alternators

Type A Open Tank—Alternators are designed to provide motor alternation in the operation of two motors.



Type AG1
Mechanical Alternator, Float Operated



Class 9038 Type A							
Application	Description	NEMA Type 1		NEMA Type 4		NEMA Type 7 and 9	
		Type	Price	Type	Price	Type	Price
For Open Tank or Sump Systems Using Duplex Pumps	Mechanical Alternator Float Operated	AG1	\$128.	AW1	\$453.	AR1	\$443.

For use with Class 9049 Float Accessories listed on page 20-12. Type AW, AR alternators MUST use center hole floats.

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 Which Can Be Supported with Compensating Spring at Max. Adjust.		
	Force Up ■	Force Down		Brass ▲	Stainless Steel ▲	Aluminum ▲

Table Of Operating Forces - Types AG, AR and AW

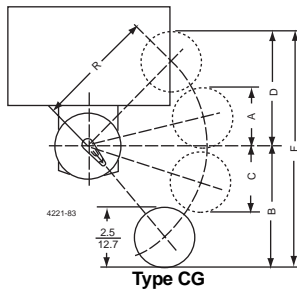
AG1 (Min. Lever Ext.)	18 oz.	20 oz.	47 oz.	10 ft.	12 ft.	25 ft.
AG1 (Max. Lever Ext.)	16	17	41	8	10	21
AG1 Form R (Min. Lever Ext.)	14	16	33	7	8	17
AG1 Form R (Max. Lever Ext.)	11	12	30	6	7	15
AR1, AW1 (Standard Lever)	...	...	74	16	20	41
AR1, Form R, AW1 Form R (Std. Lever)	...	...	85	19	23	47

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

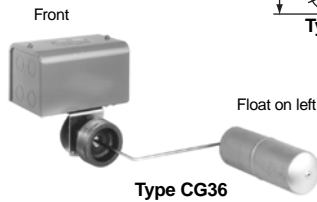
Type C Closed Tank—Flange mounted with bellows seal for control of liquid level within a closed tank. Build up the switch to meet your requirements from the basic switch, rod kit, and float kit groups below.

Class 9049 Float Kits For Use With 9038 Type B		
Description	Price	
#304 Stainless Steel	Class 9049 Type BF1	\$ 60.

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.



Type CG



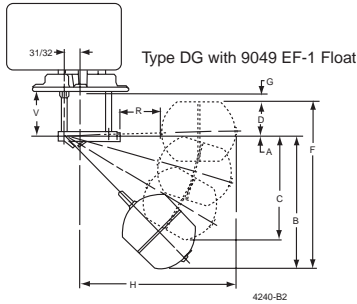
Type CG36

Class 9038 Type C									
Float Position Viewed from Front of Switch Facing Indicator Scale	"R"	Approx. Water Level Change		NEMA Type 1		NEMA Type 4		NEMA Type 7, 9	
		Min	Max	Type	Price	Type	Price	Type	Price
Right	7"	6 1/2"	13"	CG31	\$273.	CW31	\$629.	CR31	\$619.
Left	7"	6 1/2"	13"	CG32	273.	CW32	629.	CR32	619.
Right	4 1/4"	4"	7 3/4"	CG33	273.	CW33	629.	CR33	619.
Left	4 1/4"	4"	7 3/4"	CG34	273.	...	...	...	...
Right	5"	4 3/4"	9 1/4"	CG35	273.	...	...	...	...
Left	5"	4 3/4"	9 1/4"	CG36	273.	CW36	629.	CR36	619.

Float Travel Adjustments For Class 9038 Type C										
"R"	Minimum					Maximum				
	A	B	C	D	F	A	B	C	D	F
4 1/4"	2"	3 1/2"	2 1/2"	3 1/2"	7"	3 1/2"	4 3/4"	3 3/4"	4 3/4"	9 1/2"
5"	2 1/4"	4"	2 3/4"	4"	8"	3 3/4"	5 1/4"	3"	5 1/4"	10 1/2"
7"	2 1/2"	5"	2"	5"	10"	5"	7"	4"	7"	14"

For Replacement Float, see Type 9049 HF. page 20-12

For additional information, reference Catalog #9034CT9701.



Type D Mechanical Alternators are designed for applications where mounting is to be made at the top of a closed tank.

Class 9038 Type D Contacts Close On Liquid Rise							
Water Level Change	Hinge Post Dimension "V"	NEMA Type 1		NEMA Type 4		NEMA Type 7 and 9	
		Type	Price	Type	Price	Type	Price
Min.	2 ⁵ / ₈ "	DG7	\$330.	DW7	\$684.	...	...
Max.		DG8	330.	DW8	684.	DR8	675.
Min.	4 ¹¹ / ₁₆ "	DG9	343.	...	...	...	...
Max.		DG10	343.	...	...	...	...

Float Kits For Use With Type D Switches		
Size and Material	Class and Type	Price
Diameter x Length		
3 ⁵ / ₈ " x 4 ¹ / ₂ ", #304 Stainless Steel	Class 9049 Type EF1	\$20.20
3 ⁵ / ₈ " x 4 ¹ / ₂ ", #316 Stainless Steel	Class 9049 Type EF2	50.00
2 ¹ / ₂ " x 7", #304 Stainless Steel	Class 9049 Type HF3	21.70
2 ¹ / ₂ " x 7", #316 Stainless Steel	Class 9049 Type HF4	68.00

Float Rod Kit Class 9049	"R"	"H"	Price
Type ER1	1 ³ / ₄ "	8 ¹ / ₄ "	\$8.40
Type ER2	2 ¹ / ₂ "	9"	8.40
Type ER3	3 ¹ / ₄ "	9 ¹ / ₂ "	8.40
Type ER5	5 ¹ / ₄ "	11 ³ / ₄ "	8.40
Type ER7	7 ¹ / ₄ "	13 ³ / ₄ "	8.40
Type ER12	12 ¹ / ₄ "	18 ³ / ₄ "	8.40

Available Modifications For All Mechanical Alternators

Sub. monel bellows for standard brass bellows seal (Type BG, BR, BW)	Form A	add	\$ 68.00
Compensating spring (Type AG)	Form C	add	26.70
Omit 2 ¹ / ₂ " connecting bushing (Type CG, CR, CW)	Form F3	deduct	5.40
Omit Float (Type CG, CR, CW)	Form L	deduct	19.50
Omit Float and rod accessories (Type J)	Form L1	deduct	53.30
Omit Rod accessories (Type JG, JR, JW)	Form L2	deduct	10.70
Manual transfer selector	Form N3	add	37.30
(Enables operator to select which of two pumps will always "lead" or come on first, with the "lag" or second pump operating only under peak demand conditions or if first pump fails. When disengaged, unit reverts to normal alternation.)			
Two level non-alternating unit	Form N4	add	37.30
Addition of a third, high water alarm Circuit (Type AG, AR, AW, CG, DG only) . .	Form N5	add	89.00
Reverse action (contacts open on Rise)	Form R		N.C.
Sub. #316 Stainless Steel Float and rod accessories	Form Z5		
(Type JG, JR, JW)	A = 17"	add	188.00
	A = 23"	add	200.00
	A = 29"	add	211.00
	A = 35"	add	220.00
	A = 41"	add	232.00
	A = 47"	add	241.00
	A = 53"	add	254.00
	A = 59"	add	264.00
VITON [®] packing 5 oz. float (Diesel Fuel) (Type CG)	Form Z19		N.C.
VITON packing (Type CG, CR, CW)	Form Z20		N.C.
#316 Stainless Steel Float and VITON Packing (Type CG, CR, CW)	Form Z21		101.00

Consult factory for use in media having specific gravity different than water.

For additional information, reference Catalog #9034CT9701.

Electrical Ratings

Class 9012, 9013, 9016, 9025, 9035, 9036, 9037, and 9038



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Control Duty Circuit Ratings

Contacts	AC—50 or 60 Hz						DC			AC or DC Continuous Carrying Amperes	
	Volts	Inductive 35% Power Factor				Resistive 75% Power Factor	Volts	Inductive and Resistive			
		Make		Break				Make and Break Amperes	Make and Break Amperes		
		Amps.	VA	Amps.	VA				Single Throw		Double Throw
SPDT	120 240 480 600	60 30 15 12	7200 7200 7200 7200	6 3 1.5 1.2	720 720 720 720	6 3 1.5 1.2	120 250 600 ...	0.55 0.27 0.10 ...	0.22 0.11	10 10 10 ...	
DPDT	120 240 480 600	60 30 15 12	7200 7200 7200 7200	6 3 1.5 1.2	720 720 720 720	6 3 1.5 1.2	125 250 600 ...	0.22 0.11	0.22 0.11	10 10 10 ...	

Type G Industrial

Contact Arrangement ▲	Contact Symbol
1 N.O. – 1 N.C.	

▲ 600 Volt DC rating does not apply.
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.

Temperature Ratings

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

Temperature Limitations For All 9013 F and G Switches

Media	Ambient
Min. -30°C (-22°F) Max. +125°C (+257°F)	Min. -30°C (-22°F) Max. +70°C (+158°F)

■ FSG and FYG 32°F min. (0°C)

Maximum Allowable Pressure For All 9013 Switches

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

Electrical Ratings For All 9013 Switches

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

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

Type G Machine Tool, Temperature & Vacuum (except GVG)

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

Snap switch contains two (2) 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.	

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.

Electrical Ratings—9016 GVG Types

Voltage	Single Phase AC	Polyphase AC	DC
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

CONTROL CIRCUIT RATING: A600

Electrical Ratings:

Applies to Class and Type	Single Phase AC			Polyphase AC Δ			DC			Control Circuit
	115 V	230 V	460/575 V	115 V	230 V	460/575 V	32V	115V	230V	
9035DG30, DR30, DW30 (2-pole)	2 hp	3 hp	...	3 hp	5 hp	1 hp	1/4 hp	1/2 hp	1/2 hp	A600
9035DG31, DR31, DW31 (1 N.O., 1 N.C.)	1 hp	1 hp	...	...	...	...	...	1/4 hp	1/4 hp	A300
9036DG, DR, DW (2-pole), FG	2 hp	3 hp	...	3 hp	5 hp	1 hp	1/4 hp	1/2 hp	1/2 hp	A600
9036GG, GR, GW (2-pole)	2 hp	3 hp	5 hp	3 hp	5 hp	5 hp	1/2 hp	1 hp	1 hp	A600
9036G Form H (1 N.O., 1 N.C.)	1 hp	2 hp	2 hp	...	...	...	...	1/2 hp	1/2 hp	A300
9037DG, DR, DW; EG, ER, EW; HG, HR, HW (2-pole)	2 hp	3 hp	...	3 hp	5 hp	1 hp	1/4 hp	1/2 hp	1/2 hp	A600
9037GG, GR, GW (2-pole)	2 hp	3 hp	5 hp	3 hp	5 hp	5 hp	1/2 hp	1 hp	1 hp	A600
9037G Form H (1 N.O., 1 N.C.)	1 hp	2 hp	2 hp	...	...	...	...	1/2 hp	1/2 hp	A300
9038 All Devices (2-pole)	2 hp	3 hp	...	3 hp	5 hp	1 hp	1/4 hp	1/2 hp	1/2 hp	A600

Δ See 1993 NEC Article 430-84

Temperature Limitations For All Float Switches:

Ambient Min. -30°C (-22°F)
Max. 105°C (220°F)

20 PRESSURE, VAC. TEMP AND FLOAT SWITCHES

20

For additional information, reference Catalog #9012CT9701, 9013CT9701R8/98, 9034CT9701.