# Section 22

## Pressure, Vacuum, and Float Switches



Electronic Pressure Sensors
XMLG XMLK XMLR



9012G
Industrial Pressure Switch



9012G Machine Tool
Pressure Switch



XMLA Electromechanical
Pressure Switch



9016G
Vacuum Switch



9013F
Water Pump Switch



9013G
Air Compressor Switch



9036D
Open Tank Float Switch



9037H
Closed Tank Float Switch


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# 9012 Sensor Selections

| Application | Electronic | | | Electromechanical Control | | |
|---|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| **Product Family** | **XMLG** | **XMLK** | **XMLR** | **XMLA, B, C, D** | **9012G** | **9016G** |
| **Type of Installation/ Application** | Control circuits | Control circuits<br>Pumping applications | Control circuits | Control circuits | Control circuits | Control/power circuits |
| **Fluids Controlled** | Air, water, hydraulic oils, corrosive fluids | Air, fresh water, 0 to + 80 ° C (32 to 176 °F) | Air, water, hydraulic oils, corrosive fluids | | | |
| **Type of Operation and Features** | Pressure/vacuum switches and transmitters<br>Analog output<br>4–20 mA or 0–10 V | Pressure transmitters<br>Analog output, 4–20 mA or 0–10 V | Pressure/vacuum switches and transmitters<br>Configurable units with digital display<br>Analog output 4–20 mA, 0–10 V<br>Regulation between 2 trip points (adjustable differential) | Pressure/vacuum switches<br>Detection of single trip point (nonadjustable differential)<br>Regulation between 2 trip points (adjustable differential) | Pressure switches<br>Detection of single trip point (nonadjustable differential)<br>Regulation between 2 trip points (adjustable differential)<br>2-stage | Vacuum switches<br><br>Regulation between 2 trip points (adjustable differential) |
| **Size/Range** | –14.5 to 5800 psi | 0 to 25 bar or 0 to 300 psi, depending on the model | –14.5 to 8700 psi | –14.5 to 7250 psi | 0.2 to 9000 psi | 0 to 29 in. of Hg |
| **Type of Output** | Analog, 4–20 mA or 0–10 V<br>Digital, PNP or NPN normally closed ( N.C.) output | Analog, 4–20 mA or 0–10 V | Analog, 4–20 mA, `0–10 V<br>Digital, PNP or NPN, | Snap action contacts<br>SPDT or DPDT<br>10 A continuous | Snap action contacts<br>SPDT or DPDT<br>10 A continuous | Snap action contacts<br>SPDT 10 A continuous<br>DPST horsepower rated |
| **Electrical Connection** | M12 connector or<br>Integrated quick connection | M12, DIN 43650 A or<br>Metri-Pack connector *[1]* | M12 connector<br>SAE 7/8-16 UN2A | Cable entry for Pg 13 (DIN PG13.5) cable gland,<br>ISO M20, 1/2" NPT, and 1/2" PF | 1/2" -14 NPT<br>Cable entry 20 mm | **9016G**: 1/2" -14 NPT<br>Cable entry 20 mm<br>9016GVG<br>**NEMA Type 1 and 3R**:<br>3 knockouts for 1/2 in. conduit<br>**NEMA Type 7 and 9**:<br>2 conduit entries, 3/4"-14 NPT |
| **Fluid Connection** | G 1/4" BSP internal,<br>1/4" NPT internal<br>SAE 7/16"-20 UNF female | G 1/4 A (male) conforming to ISO7 or 1/4"-18 NPT male *[1]* | G 1/4" BSP internal,<br>1/4" NPT internal<br>SAE 7/16"-20 UNF female | G 1/4" BSP internal,<br>1/4" NPT internal<br>1/4"-18 NPT external | 1/4" - 18 NPTF internal<br>7/16"-20 UNF-2B internal<br>G 1/4" BSP internal<br>G 1/4"-19 BSP internal | G 1/4" BSP internal,<br>1/4" NPT internal<br>1/4"-18 NPT external |
| **Fluid Characteristics** | Hydraulic oils, air, fresh water, sea water, corrosive fluids from –15 to +125 °C (5 to +257 °F) | Air, fresh water, 0 to + 80 ° C (32.0 to 176.0 °F) | Hydraulic oils, air, fresh water, sea water, corrosive fluids from –15 to +80 °C (5 to +176 °F) | Hydraulic oils, air, fresh water, sea water, steam, corrosive fluids, viscous products, 32 to 320 °F (0 to 160 °C) depending on the model | Hydraulic oils, air, fresh water, sea water, corrosive fluids from –26 to +120 °C (–15 to +250 °F) depending on the model | Hydraulic oils, air, fresh water, sea water, from –26 to +120 °C (–15 to +250 °F) depending on the model |
| **Enclosure Rating** | IP66, IP67 conforming to IEC/EN 60529, NEMA 4 | IP65 conforming to IEC/ EN60529, NEMA 4 | IP67 conforming to IEC/ EN 60529, NEMA 4/6/12/ 13 | Screw terminal models: IP66 conforming to IEC 529, NEMA 4 | NEMA Type<br>4, 4X, 7, 9, 13 | **9016G**: NEMA Type 4, 4X, 7, 9, 13<br>**9016GVG**: NEMA Type 1 |
| **Dimensions of Case, in. (mm) width x height x depth** | dia. 0.90 x 2.76<br>(dia. 22.8 x 70.1 mm) | dia. 1.40 x 3.10<br>(dia. 36 x 79.5) | 1.6 x 3.93 x 1.6 in.<br>(41 x 100 x 42 mm) | 4.45 x 1.38 x 2.95 in.<br>(113 x 35 x 75 mm)<br>NEMA 4: 3.50 x 3.60 x 2.63 in. (89 x 91 x 67 mm) | NEMA 1: 2.06 x 5.03 x 2.75 in.<br>(52 x 128 x 70 mm)<br>NEMA 4: 3.50 x 3.60 x 2.63 in.<br>(89 x 91 x 67 mm) | Control circuit:<br>same as 9012G<br>Power circuit:<br>same as 9013G |
| **Conforming to Standards** | CE,<br>IEC/EN 60947-1,<br>IEC/EN 60947-5-1,<br>EN 50081-1, EN 50082-2,<br>EN 61000-6-2 | CE,<br>IEC/EN 60947-1,<br>IEC/EN 60947-5-1<br>EN 50081-1, EN 50082-2,<br>EN 61000-6-2 | CE,<br>IEC/EN 60947-1,<br>IEC/EN 60947-5-1,<br>EN 50081, EN 50082,<br>EN 61000-6-2,<br>EN 61000-4-2/3/4/5/6/8/ 11 | CE,<br>IEC/EN 60947-5-1,<br>VDE 0660-200,<br>UL 508,<br>CSA C22-2 No. 14 | NEMA A600 UL508 | NEMA A600 UL508 |
| **Certifications** | UL Listed,<br>CSA Certified | UL: File E97729, CCN NKPZ<br>CSA: File 240515, Class 3211-03 | UL Listed,<br>CSA Certified | UL B300 - R300 Listed.<br>CSA B300 - R300,<br>(BV, GL, RINA, LROS pending) | UL Listed,<br>CSA Certified | UL Listed,<br>CSA Certified |
| **Catalog Number** | XMLG | XMLK | XMLR | XMLA, XMLB, XMLC, XMLD | 9012GA, 9012GC, 9012GG, 9012GH, 9012GK, 9012GM, 9012GR, 9012GS, 9012GT, 9012GN, 9012GP, 9012GQ | 9016GA, 9016GV |

*[1]* For other connections, consult the Sensor Competency Center.



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## 9013,9036, 9037, 9038 Sensor Selections

| Application | Electromechanical Pressure Switches | | Electromechanical Float Switches | | | |
|---|---|---|---|---|---|---|
| |  |  |  |  |  | |
| **Product Family** | **9013F** | **9013G** | **9036D, 9036F** | **9036G** | **9037** | **9038** |
| **Type of Installation/ Application** | Power circuits | Power circuits | Power circuits | Power circuits | Power circuits | Power circuits |
| **Fluids Controlled** | Fresh water, air | | Fresh or sea water, hydraulic oils; suitable for corrosive fluids except for cast iron bushing (shown above) | | | |
| **Type of Operation and Features** | Pressure switches<br>Detection of single trip point (fixed differential)<br>Regulation between 2 trip points (adjustable differential) | Pressure switches<br>Regulation between 2 trip points (adjustable differential) | Liquid level control in **Open** tanks—either pumping in or pumping out of tank | Liquid level control in **Open** tanks—either pumping in or pumping out of tank | Liquid level control in **Closed** tanks for condensate, return heating water, fuel oil, etc. | Liquid level control in **Open** or **Closed** tanks—two pumps alternate, and both pumps run in peak demand<br>Non-alternating option also available |
| **Size/Range (psi)** | 6 to 200 psi | 10 to 250 psi | Light duty | Medium duty | — | — |
| **Type of Output** | 1-pole or 2-pole, snap action contacts<br>HP rated | 2-pole, snap action contacts<br>HP rated | 2-pole, snap action contacts<br>HP rated | 2-pole, snap action contacts<br>HP rated | 2-pole, snap action contacts<br>HP rated | 2 sets of 2-pole, snap action contacts<br>HP rated |
| **Electrical Connection** | 2 open side entries, 0.88 in. diameter, with two flats | **NEMA Type 1 and 3R**: 3 knockouts for 1/2 in. conduit<br>**NEMA Type 7 and 9**: 2 conduit entries, 3/4"-14 NPT | 4 screw terminals<br>**NEMA Type 1**: 2 open side entries, 0.88 in. diameter, with two flats<br>**NEMA Type 4, 7, 9**: 2 cable entries, 3/4-14 conduit entry<br>**9036FG**: 2 cable entries, 0.88 in. (22.4 mm) with 0.84 in. (21.3 mm) across flat | 4 screw terminals<br>**NEMA Type 1**: 3 knockouts for 1/ 2 in. conduit entry<br>**NEMA Type 4, 7, 9**: 2 cable entries, 3/4-14 conduit entry | 4 screw terminals<br>**NEMA Type 1**: 2 open side entries, 0.88 in. diameter, with two flats<br>**NEMA Type 4, 7, 9**: 2 cable entries, 3/4-14 conduit entry | 8 screw terminals<br>**NEMA Type 1**: 8 knockouts for 1/2 or 3/4 in. conduit entry<br>**NEMA Type 4, 7, 9**: 2 cable entries, 3/4-14 conduit entry |
| **Fluid Connection** | 1/4" NPSF internal, 1/4" NPT external, plus other options | 1/4" NPSF internal, 1/4" NPT external | Open tank | Open tank | Closed tank | Open tank (9038A)<br>Closed tank (9038C, D) |
| **Fluid Characteristics** | Fresh water, air | | Fresh water, sea water, hydraulic oils (and corrosive fluids, depending on the model) with a density ≥ 0.8 | | | |
| **Enclosure Rating** | NEMA Type 1<br>NEMA Type 3R<br>IP20 | NEMA Type 1, 3R, 7, 9<br>IP20 | NEMA Type 1, 4 , 7, 9 | NEMA Type 1, 4 , 7, 9 | NEMA Type 1, 4 , 7, 9 | NEMA Type 1, 4 , 7, 9 |
| **Dimensions of Case width x height x depth in. (mm)** | 3.76 x 2.8 x 2.78 in. (95.5 x 71.12 x 70.6 mm) | 3.68 x 3.85 x 3.44 in. (93.47 x 97.79 x 87.37 mm) | See page 22-24 | See page 22-24 | See page 22-26–page 22-27 | See page 22-28 |
| **Conforming to Standards** | NEMA A600 UL508 | NEMA A600 UL508 | NEMA A600 UL508 | NEMA A600 UL508 | NEMA A600 UL508 | NEMA A600 UL508 |
| **Certifications** | UL Listed,<br>CSA Certified | UL Listed,<br>CSA Certified | UL Listed,<br>CSA Certified | UL Listed,<br>CSA Certified | UL Listed,<br>CSA Certified | UL Listed,<br>CSA Certified |
| **Catalog Number** | 9013FS, 9013FR, 9013FH, 9013FT, 9013FY | 9013GS, 9013GH, 9013GM | 9036DG, 9036DW, 9036DR, 9036FG | 9036GG, 9036GW, 9036GR | 9037EG, 9037EW, 9037ER, 9037HG, 9037HW, 9037HR | 9038AG, 9038AW, 9038AR, 9038CG, 9038CW, 9038CR, 9038DG, 9038DW, 9038DR |

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XMLG●●●D
M12 Connector



XMLG●●●Q
Quick Connect

## XMLG Pressure Transmitters and Switches

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

### Table 22.1: Specifications

| | |
|---|---|
| **Enclosure Rating** | IP66, IP67 conforming to IEC/EN 60529, NEMA 4 |
| **Ambient Temperature (Operation)** | -15 to +85 °C (+5 to +185 °F) |
| **Media Temperature** | -15 to +125 °C (+5 to +257 °F) |
| **Precision (Linearity, Repeat Accuracy, Hysteresis)** | Transmitters: <0.3%; pressure/vacuum switches: <1% |
| **Repeat Accuracy (PNP/NPN output)** | 0.1% of the measuring range |
| **Current Consumption** | Transmitters: < 20 mA<br>Pressure/vacuum switches: < 4 mA |
| **Maximum Load Current** | Transmitters: < 20mA<br>Pressure/vacuum switches: 150 mA switching capacity |
| **Rated Voltage** | 12/24 V for transmitters and pressure/vacuum switches |
| **Voltage Limits** | 24 V for transmitters and pressure/vacuum switches |
| **Fluids Controlled** | Hydraulic oils, air, fresh/sea water, corrosive fluids from -15 to +125 °C (+5 to +257 °F) |
| **Materials in Contact with Fluid** | Ceramic $Al_2O_3$, stainless steel type AISI 303, Viton® FPM, PPS (leakage protection for P> 40 bar) |
| **Output Response Time** | < 2 ms |

### Table 22.2: Interpretation of the Catalog Number (example: XMLG100D23TQ)

| XMLG | 100 | | | D | 2 | 3 | TQ |
|---|---|---|---|---|---|---|---|
| Units without Display, 22.8 mm diameter | Rated Pressure Range | | | Electrical Connection | Output | Fluid Connection | Bulk Pack |
| | Code | psi | bar | | | | |
| | **M01** | –14.5 to 0 | –1 to 0 | **D**: M12 | **1**: DC Analog, 4–20 mA, shunt calibration | **1**: G 1/4 A (BSP male) | |
| | **001** | 0 to 14.5 | 0 to 1 | **Q**: Integrated quick connect | **2**: Analog, 4–20 mA | **3**: 1/4" NPT male | |
| | **006** | 0 to 87.0 | 0 to 6 | | **3**: Solid state, NPN | **7**: 7/16-20 UNF male | |
| | **010** | 0 to 145 | 0 to 10 | | **4**: Solid state, PNP | | |
| | **016** | 0 to 232.1 | 0 to 16 | | **7**: Analog, 0–10 V (bulk packs only) | | |
| | **025** | 0 to 362.5 | 0 to 25 | | **11**: DC Analog, 0–10 V shunt calibration | | |
| | **100** | 0 to 1450 | 0 to 100 | | | | |
| | **160** | 0 to 2329.6 | 0 to 160 | | | | |
| | **250** | 0 to 3625 | 0 to 250 | | | | |
| | **400** | 0 to 5800 | 0 to 400 | | | | |

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

### Table 22.3: Selection

| Rated Pressure Range | | Fluid Connection | Electrical Connection | Catalog Number*[1][2]* | |
|---|---|---|---|---|---|
| | | | | Analog Output, 4–20 mA | Analog Output, 0–10 Vdc |
| -14.5 to 0 psi | -1 to 0 bar | 1/4" NPT Male | M12 | XMLGM01D23 | XMLGM01D73 |
| 0 to 14.5 psi | 0 to 1 bar | | | XMLG001D23 | XMLG001D73 |
| 0 to 87 psi | 0 to 6 bar | | | XMLG006D23 | XMLG006D73 |
| 0 to 145 psi | 0 to 10 bar | | | XMLG010D23 | XMLG010D73 |
| 0 to 232 psi | 0 to 16 bar | | | XMLG016D23 | XMLG016D73 |
| 0 to 362.5 psi | 0 to 25 bar | | | XMLG025D23 | XMLG025D73 |
| 0 to 1450 psi | 0 to 100 bar | | | XMLG100D23 | XMLG100D73 |
| 0 to 2320 psi | 0 to 160 bar | | | XMLG160D23 | XMLG160D73 |
| 0 to 3625 psi | 0 to 250 bar | | | XMLG250D23 | XMLG250D73 |
| 0 to 5800 psi | 0 to 400 bar | | | XMLG400D23 | XMLG400D73 |

**NOTE:** For units with a solid-state output, the settings must be specified for each order.

### Table 22.4: Wiring Configurations (M12)

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

UL E164865
CCN NKPZ

LR 44087
Class 3211-03

For wiring diagrams, refer to page 22-5.

*[1]* For devices with a switch output or 0–10 Vdc analog output, contact the Sensor Competency Center at 1-800-435-2121.

*[2]* For a bulk package (25 units), add TQ to the end of the catalog number. The minimum order quantity is 50 units (two bulk packs). When ordering, specify the individual number of units, NOT the number of bulk packs. Minimum order quantity for factory ordered individual items (non-stock) is 50 pieces.



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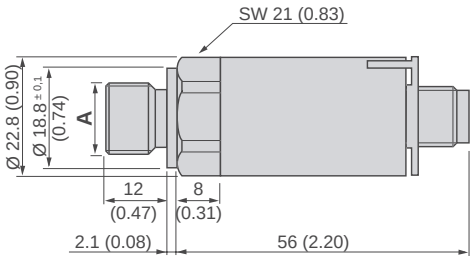
## XMLG Pressure Transmitters and Switches

For connectors and cables, see page 22-9.

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

**Table 22.5: Dimensions, in. (mm)**

**XMLG●●●D●●, M12 x 1 Connection**




**XMLG●●●Q●●, Integrated Quick Connection**

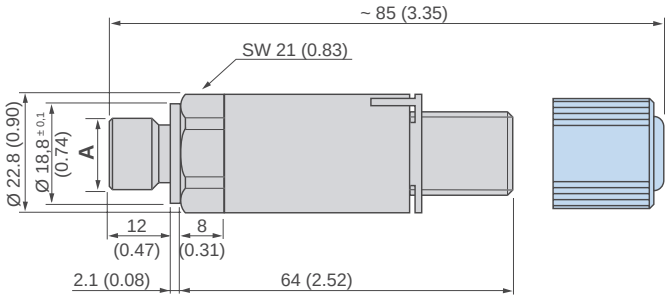
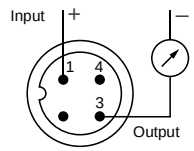
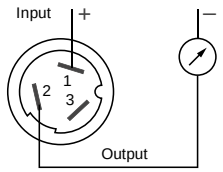
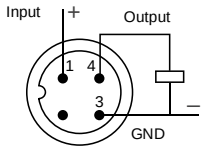
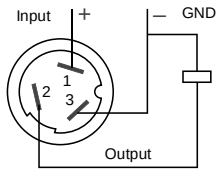
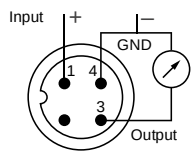
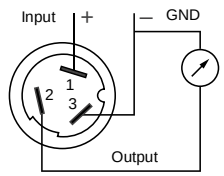
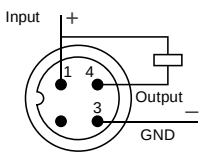
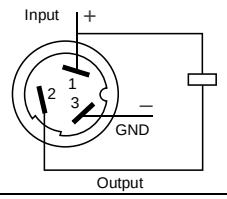



**Table 22.6: Connector Wiring**

| Pressure Transmitters | | Electronic Pressure Switches | |
|---|---|---|---|
| **M12** | **Integrated Quick Connection** | **M12** | **Integrated Quick Connection** |
| **2-wire (4–20 mA)** | **2-wire (4–20 mA)** | **3-wire (PNP)** | **3-wire (PNP)** |
|  |  |  |  |
| **3-wire (0–10 V)** | **3-wire (0–10 V)** | **3-wire (NPN)** | **3-wire (NPN)** |
|  |  |  |  |

For wiring configurations, refer to page 22-5.

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XMLK•••••C
DIN 43650A Connector



XMLK•••••D
M12 Connector



XMLK•••••P
Metri-Pack Connector

## XMLK Pressure Transmitters

Type XMLK pressure transmitters are characterized by their ceramic pressure-measuring cell. The deformation caused by the pressure is transmitted to the resistors of a Wheatstone bridge silk-screened on the ceramic. The change in resistance is then processed by the integrated electronics to provide an analog output signal.

### Table 22.7: Environmental Specifications

| | | |
|---|---|---|
| **Enclosure Rating** | | IP65 conforming to IEC/EN 60529, NEMA 4 |
| **Ambient Air Temperature** | **For Operation** | 0 to + 80 °C (32 to 176 °F) |
| | **For Storage** | –25 to + 85 °C (13 to 185 °F) |
| **Precision (Resolution)** | | Combined sum of linearity, hysteresis, and repeat accuracy <± 0.5% of the measuring range |
| | | Setting tolerance of zero point and measuring range limit < ± 1% of the measuring range |
| **Repeat Accuracy** | | ± 0.3% of the measuring range |
| **Current Consumption** | | 4–20 mA: < 20 mA<br>0–10 V: < 6 mA |
| **Rated Supply Voltage** | | 24 Vdc |
| **Voltage Limits** | | 4–20 mA: 8–33 V c<br>0–10 V: 16.2–33 V c |
| **Fluids or Products Controlled** | | Air, fresh water (0 to + 80 °C / 32 to 176 °F) |
| **Materials in Contact with Fluid** | | Steel, type AISI 303 (stainless steel)<br>nitrile (NBR) |
| **Output Response Time** | | < 2 ms |

### Table 22.8: Interpretation of the Catalog Number

| Units Without Display | Rated Pressure | | | Unit of Pressure | O-Ring | Electrical Connection | Output | Fluid Connection | Bulk Pack |
|---|---|---|---|---|---|---|---|---|---|
| | Code | psi | bar | | | | | | |
| **XMLK** | **100** | | | **P** | **2** | **D** | **2** | **3** | **TQ** |
| 36 mm (1.42 in.) diameter | 006 | | 0–6 | B: bar | 2: NBR (Nitrile) | C: DIN 43650A | 2: Analog, 4–20 mA | 1: G 1/4 A (male) | |
| | 010 | | 0–10 | P: psi | | D: M12 | 7: Analog, 0-10 V | 3: 1/4"-18 NPT (male) | |
| | 016 | | 0–16 | | | P: Metri-Pack | | | |
| | 025 | | 0–25 | | | | | | |
| | 100 | 0–100 | | | | | | | |
| | 150 | 0–150 | | | | | | | |
| | 200 | 0–200 | | | | | | | |
| | 300 | 0–300 | | | | | | | |

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

### Table 22.9: Selection

| Rated Pressure Range | Catalog Number *[3]* | | | | | |
|---|---|---|---|---|---|---|
| | 4–20 mA Analog Output | | | 0–10 Vdc Analog Output | | |
| | DIN | M12 | Metri-Pack | DIN | M12 | Metri-Pack |
| Bar Version, G 1/4 A Male Fluid Connector | | | | | | |
| 0–6 bar (0–87 psi) | XMLK006B2C21 | XMLK006B2D21 | — | XMLK006B2C71 | XMLK006B2D71 | — |
| 0–10 bar (0–145 psi) | XMLK010B2C21 | XMLK010B2D21 | — | XMLK010B2C71 | XMLK010B2D71 | — |
| 0–16 bar (0–232 psi) | XMLK016B2C21 | XMLK016B2D21 | — | XMLK016B2C71 | XMLK016B2D71 | — |
| 0–25 bar (0–362.5 psi) | XMLK025B2C21 | XMLK025B2D21 | — | XMLK025B2C71 | XMLK025B2D71 | — |
| PSI Version, 1/4"-18 NPT Male Fluid Connector | | | | | | |
| 0–100 psi (0–6.9 bar) | XMLK100P2C23 | XMLK100P2D23 | XMLK100P2P23 | XMLK100P2C73 | XMLK100P2D73 | XMLK100P2P73 |
| 0–150 psi (0–10.3 bar) | XMLK150P2C23 | XMLK150P2D23 | XMLK150P2P23 | XMLK150P2C73 | XMLK150P2D73 | XMLK150P2P73 |
| 0–200 psi (0–13.8 bar) | XMLK200P2C23 | XMLK200P2D23 | XMLK200P2P23 | XMLK200P2C73 | XMLK200P2D73 | XMLK200P2P73 |
| 0–300 psi (0–.20.7 bar) | XMLK300P2C23 | XMLK300P2D23 | XMLK300P2P23 | XMLK300P2C73 | XMLK300P2D73 | XMLK300P2P73 |

### Table 22.10: Wiring Configurations (M12)

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

UL E164865
CCN NKPZ

LR 44087 Class 3211-03

For wiring diagrams, refer to page 22-5.

*[3]* For a bulk package (25 units), add TQ to the end of the catalog number. The minimum order quantity is 50 units (two bulk packs). When ordering, specify the individual number of units, **not** the number of bulk packs. Minimum order quantity for factory ordered individual items (non-stock) is 50 pieces.



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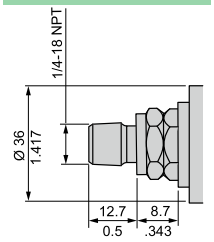
## XMLK Dimensions

For connectors and cables, see XMLF Accessories, Wiring Configurations, and Electrical Connections, page 22-9.

**Table 22.11: Dimensions**

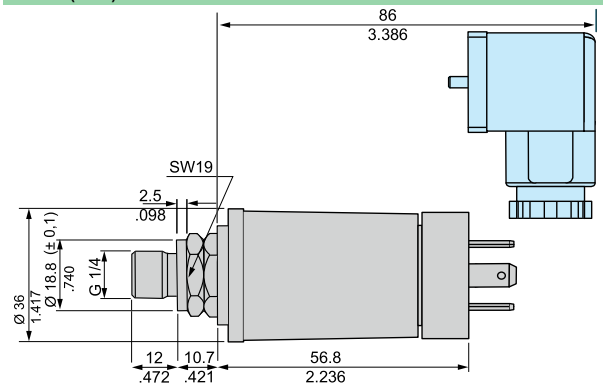
**XMLK, DIN connector**

**NPT**



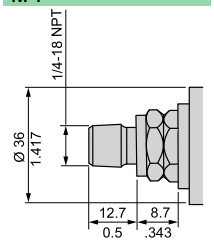

Dimensions = mm / in.

**G 1/4 A (male)**

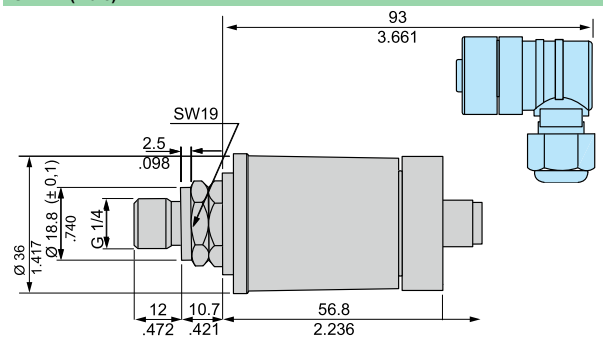



**XMLK, M12 connector**

**NPT**

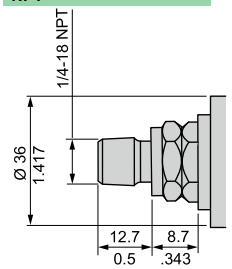



**G 1/4 A (male)**




**XMLK, Metri-Pack connector**

**NPT**




**G 1/4 A (male)**

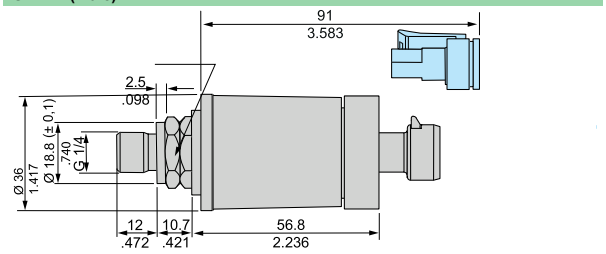
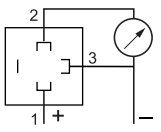
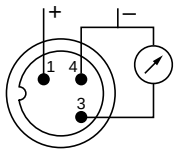
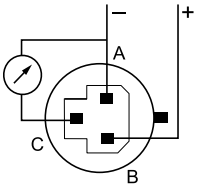



**Table 22.12: Connector Wiring**

| DIN 43650A | M12 | Metri-Pack |
|---|---|---|
|  |  |  |







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XMLR


ZMLP

## XMLR and ZMLP Pressure Switches

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

**Configurable functions:**
**Display**

- Pressure unit of measurement ( bar, psi, kPa, or MPa).
- Display refresh time: fast (50 ms), normal (200 ms), slow (600 ms).
- 180° reversed display function.

**Analog output** (4…20 mA or 0…10 V):

- Offset compensation in the range of ±5% of the nominal pressure.
- Adjustment of analog end point between 75 and 125% of the nominal pressure.

**Solid-state output**

- NO or NC contact.
- Switching mode of outputs: Hysteresis (pumping) or Window (control).
- Time delay both on trip and on reset (adjustable from 0 to 50 s, in steps of 1 s).

**Diagnostic functions**

- Illumination of all the segments of the display on each power-up, enabling checking of their operation.
- Diagnostic function for checking correct operation of the sensor.
- Saving of min. and max. pressures measured by the sensor and their subsequent display.

Outputs change state when the pressure ranges outside the window settings.

### Table 22.13: Interpretation of the Catalog Number (example: XMLRM01G0T25)

| XMLR | M01 | G | 0 | T | 2 | 5 |
|---|---|---|---|---|---|---|
| **Pressure range** | | | | | | |
| -1 – +0 | M01 | | | | | |
| 1 | 001 | | | | | |
| 2.5 | 002 | | | | | |
| 10 | 010 | | | | | |
| 16 | 016 | | | | | |
| 25 | 025 | | | | | |
| 40 | 040 | | | | | |
| 100 | 100 | | | | | |
| 160 | 160 | | | | | |
| 250 | 250 | | | | | |
| 400 | 400 | | | | | |
| 600 | 600 | | | | | |
| **Pressure technology** | | | | | | |
| Gauge ceramic | | G | | | | |
| Gauge metal | | M | | | | |
| **Digital output** | | | | | | |
| No digital output | | | 0 | | | |
| 1 DC Digital output | | | 1 | | | |
| 2 DC Digital output | | | 2 | | | |
| **Output / input type** | | | | | | |
| No digital output / Test input | | | | T | | |
| PNP | | | | P | | |
| NPN | | | | N | | |
| **Analog output** | | | | | | |
| No analog output | | | | | 0 | |
| DC analog 4 – 20 mA | | | | | 2 | |
| DC analog 0 – 10 V | | | | | 7 | |
| **Fluid entry** | | | | | | |
| G 1/4 (female) DIN 3852-E | | | | | | 5 |
| 1/4 in. – 18 NPT (female) | | | | | | 6 |
| 7/16 in. – 20 UNF-2B (female) | | | | | | 9 |

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

### Table 22.14: Specifications

| | | |
|---|---|---|
| Enclosure Rating | | IP67<br>NEMA 4, 6, 12, 13 |
| Ambient Air Temperature for Operation | | DC Models: –25 to +80 °C (–13 to + 176 °F)<br>AC Models: –25 to +80 °C (–13 to + 176 °F) |
| Media Temperature | | –15 to +80 °C (+5 to + 176 °F) |
| Precision | Analog Output | ≤ 0.6% of the measurement range, output offset < 200 mV |
| | Digital Output | ≤ 0.6% of the measurement range |
| Repeat Accuracy (PNP/NPN output) | | ≤ 0.5% of the measurement range |
| Maximum Load Current | | **DC:** 200 mA for 17–33 Vdc; **AC:** 2.5A AC15 C300 |

### Table 22.15: ZMLP Selection

| Output 1 | Output 2 | Switching Mode | Reference |
|---|---|---|---|
| 4...20 mA | PNP | Hysteresis | ZMLPA2PSH |
| | | Windows | ZMLPA2PSW |
| | NPN | Hysteresis | ZMLPA2NSH |
| | | Windows | ZMLPA2NSW |
| PNP | PNP | Hysteresis | ZMLPDPPSH |
| NPN | NPN | Hysteresis | ZMLPDNNSH |

### Table 22.16: XMLR Selection

| Fluid entries | Outputs | | | Size | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 4...20 mA | PNP | NPN | -1 bar | 1 bar | 10 bar | 16 bar | 40 bar | 250 bar | 400 bar |
| 1/4" -18NPT | 1 | — | 1 | XMLRM01G1N26 | XMLR001G1N26 | XMLR010G1N26 | XMLR016G1N26 | XMLR040G1N26 | XMLR250M1N26 | XMLR400M1N26 |
| | — | — | 2 | XMLRM01G2N06 | XMLR0012G2-N06 | XMLR010G2N06 | XMLR016G2N06 | XMLR040G2N06 | XMLR250M2N06 | XMLR400M2N06 |
| G1/4A | 1 | — | — | XMLRM01G0T25 | XMLR001G0T25 | XMLR010G0T25 | XMLR016G0T25 | XMLR040G0T25 | XMLR250M0T25 | XMLR400M0T25 |
| | 1 | 1 | — | XMLRM01G1P25 | XMLR001G1P25 | XMLR010G1P25 | XMLR016G1P25 | XMLR040G1P25 | XMLR250M1P25 | XMLR400M1P25 |
| | — | 2 | — | XMLRM01G2P05 | XMLR001G2P05 | XMLR010G2P05 | XMLR016G2P05 | XMLR040G2P05 | XMLR250M2P05 | XMLR400M2P05 |

For more options for fluid entry, output, and size, visit www.schneider-electric.com.

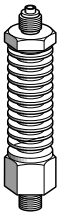
File: E164865
CCN / NKPZ

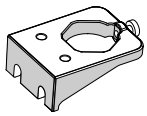
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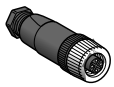


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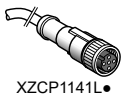
## XMLR Accessories, Wiring, and Electrical Connections

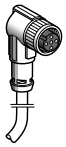

XMLZL009

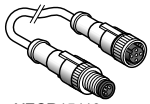

XMLZL017

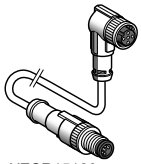

XZCC12FDM●0B


**XZCC12FC●0B**


XZCP1141L●


XZCP1241L●


XZCR15110●●●●


XZCR15120●●●●

### Table 22.17: Accessories

| Description | For use with | Catalog Number | Weight kg (oz) |
|---|---|---|---|
| Cooler with G 1/4 A (male) connections<br>Usage temperature:<br>150° C (302° F) max. for the fluid,<br>50°C (122° F) for the ambient air | XMLR●●●●●●●5 | XMLZL009 | 0.370 (13.051) |
| Fixing bracket aluminium | XMLR●●● | XMLZL017 | 0.029 (1.023) |

### Table 22.18: Connectors

| Description | For use with | Type | Catalog Number | Weight kg (oz) |
|---|---|---|---|---|
| M12 female connector, 4-pin metal clamping ring | XMLR●●●●0T●●<br>XMLR●●●●1P●●<br>XMLR●●●●1N●●<br>XMLR●●●●2P0p | Straight | XZCC12FDM40B | 0.020 (0.705) |
| | XMLR●●●●2N0● | Elbowed | XZCC12FCM40B | 0.020 (0.705) |
| M12 female connector,5-pinMetal clamping ring | XMLR●●●●2P2●<br>XMLR●●●●2N2● | Straight | XZCC12FDM50B | 0.020 (0.705) |
| | | Elbowed | XZCC12FCM50B | 0.020 (0.705) |

### Table 22.19: Pre-wired connectors and jumper cables

| Description | For use with | Type | Cable length m (ft) | Catalog Number | Weight kg (oz) |
|---|---|---|---|---|---|
| Pre-wired M12, 4-pin connectors<br>Metal clamping ring PUR cable | XMLR●●●●0T●●<br>XMLR●●●●1●●●<br>XMLR●●●●2P0●<br>XMLR●●●●2N0● | Straight | 2 (6.561) | XZCP1141L2 | 0.090 (3.174) |
| | | | 5 (16.404) | XZCP1141L5 | 0.190 (6.702) |
| | | | 10 (32.808) | XZCP1141L10 | 0.370 (13.051) |
| | | Elbowed | 2 (6.561) | XZCP1241L2 | 0.090 (3.174) |
| | | | 5 (16.404) | XZCP1241L5 | 0.190 (6.702) |
| | | | 10 (32.808) | XZCP1241L10 | 0.370 (13.051) |
| Pre-wired M12, 5-pin connectors<br>PVC cable | XMLR●●●●2P2●<br>XMLR●●●●2N2● | Straight female connector | 2 (6.561) | XZCPV11V12L2 | 0.100 (3.527) |
| | | | 5 (16.404) | XZCPV11V12L5 | 0.200 (7.054) |
| | | | 10 (32.808) | XZCPV11V12L10 | 0.400 (14.109) |
| | | Elbowed female connector | 2 (6.561) | XZCPV12V12L2 | 0.100 (3.527) |
| | | | 10 (32.808) | XZCPV12V12L10 | 0.400 (14.109) |
| M12-M12 4-pin jumper cables<br>PUR cable | XMLR●●●●0T●●<br>XMLR●●●●1●●●<br>XMLR●●●●2P0●<br>XMLR●●●●2N0● | Straight female connector | 1 (3.280) | XZCR1511041C1 | 0.100 (3.527) |
| | | | 2 (6.561) | XZCR1511041C2 | 0.100 (3.527) |
| | | Elbowed female connector | 1 (3.280) | XZCR1512041C1 | 0.100 (3.527) |
| | | | 2 (6.561) | XZCR1512041C2 | 0.100 (3.527) |
| M12-M12 5-pin jumper cables<br>PUR cable | XMLR●●●●2P2●<br>XMLR●●●●2N2● | Straight female connector | 1 (3.280) | XZCR1511064D1 | 0.100 (3.527) |
| | | | 2 (6.561) | XZCR1511064D2 | 0.100 (3.527) |
| | | Elbowed female connector | 1 (3.280) | XZCR1512064D1 | 0.100 (3.527) |
| | | | 2 (6.561) | XZCR1512064D2 | 0.100 (3.527) |

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XMLB


XMLD

## XML International Pressure Switches

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

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

### Table 22.20: Specifications

| | | |
|---|---|---|
| **Enclosure Rating** | | Screw terminal models: IP66 conforming to IEC/EN 60529; Connector models: IP65 conforming to IEC/EN 60529 |
| **Ambient Temperature** | **Operation** | –25 to +70 °C (–13 to +158 °F) |
| | **Storage** | –40 to +70 °C (–40 to 158 °F) |
| **Repeat Accuracy** | | < 2% |
| **Fluids Controlled** | | Hydraulic oils, air, fresh water, 32 to 320 °F (0 to +160 °C), depending on the model<br>Steam, corrosive fluids, viscous products, 32 to 320 °F (0 to +160 °C), depending on the model |
| **Operating Rate (operating cycles/minute)** | | Piston version switches: up to 60 cycles/minute for temperatures above 32 °F (0 °C)<br>Diaphragm version switches: up to 120 cycles/minute for temperatures above 32 °F (0 °C) |
| **Operational Characteristics** | | AC-15; B300 (Ue = 240 V, Ie = 1.5 A; Ue = 120 V, Ie = 3 A)<br>DC-13; R300 (Ue = 250 V, Ie = 0.1) conforming to IEC 947-5-1 Appendix A, EN 60 947-5-1 |
| **Type of Contacts** | | Silver tipped contacts<br>XMLA & XMLB: 1 C/O single-pole contact (4 terminal), snap action<br>XMLC: 2 C/O single-pole contacts (8 terminals), simultaneous snap action<br>XMLD: 2 C/O single-pole contacts (8 terminals), staggered snap action |
| **Resistance Across Terminals** | | < 25 mW conforming to NF C 93-050 method A or IEC 255-7 category 3 |
| **Terminal Referencing** | | Conforming to CENELEC EN 50013 |
| **Short-Circuit Protections** | | 10 A cartridge fuse type gG (gl) recommended |
| **Connection** | | Screw clamp terminals; Clamping capacity, min: 1 x 0.2 mm², max: 2 x 2.5 mm² |

### Table 22.21: Component Materials in Contact with Fluid

| Pressure Switch Catalog Number | Zinc Alloy | Stainless Steel | Brass | Steel | Nitrile | PTFE | FPM, FKM | Aluminum |
|---|---|---|---|---|---|---|---|---|
| XMLAM01V•••• / XML•M02V•••• | X | X *[1]* | — | — | X | — | — | — |
| XMLBM03S•••• | — | X *[1]* | — | — | — | X | — | — |
| XML•M05A•••• | X | X *[1]* | — | — | X | — | — | — |
| XMLBL05S•••• | — | X *[2]* | — | — | — | X | — | — |
| XML•L35R•••• | — | X *[2]* | — | X | — | — | X | — |
| XML•L35S•••• / XML•001S•••• | — | X *[2]* | — | — | — | X | — | — |
| XML•002A•••• | X | — | — | — | X | — | — | — |
| XML•002B•••• | — | — | — | X | — | — | X | — |
| XMLA004A•••• / XMLB004A•••• | X | — | — | — | X | — | — | — |
| XML•004B•••• | — | — | — | X | — | — | X | — |
| XML•010A•••• | X | — | — | — | X | — | — | — |
| XML•010B•••• | — | — | X | — | — | — | X | — |
| XML•020A•••• / XML•035A•••• | X | — | — | — | X | — | — | X |
| XML•020B•••• / XML•035B•••• | — | — | X | — | — | — | X | — |
| XML•070D•••• / XML•160D•••• / XML•300D•••• | — | — | X | X | — | X | X | — |
| XML•500D•••• | — | — | X1 | X | — | X | X | — |

### Table 22.22: Interpretation of the Catalog Number (example: XMLD070D1S13)

| (XML) D | 070 | | D | 1 | S | 1 | 3 | |
|---|---|---|---|---|---|---|---|---|
| **Contacts** | **Rated Pressure** | | **Actuator** | **Scale** | **Electrical Connection** | **Output** | **Fluid Connection** | |
| | **Code** | **psi** / **bar** | ***Diaphragm*** | | | | **Fluid** | **Electrical** |
| **A** Fixed differential, single-pole contact | **L05** | 0 to 0.725 / 0 to 0.05 | **A** Hydraulic oil, air, fresh water, sea water (0 to 70 °C) | **1** Without | **S** Without connector (not available on solid-state devices) | **1** Contacts | | |
| | **L35** | 0 to 5.075 / 0 to 0.35 | | **2** With | **C** Square / DIN 43650 | | **1** 1/4 Gas | Type 13 (PG 13,5) |
| **B** Adjustable differential, single-pole contact | **M01** | -14.5 to -4.06 / -1 to -0.28 | **B** Hydraulic oil, air, fresh water, sea water (0 to 160 °C) | | **D** M12 Micro connector | | | |
| | **M02** | -14.5 to -2.03 / -1 to -0.14 | | | | | | |
| | **M03** | -2.9 to -.029 / -0.2 to -0.02 | **C** Corrosive fluids | | | | **2** 1/4 Gas | ISO M20 |
| **C** 2 adjustable differential, single-pole contacts, simultaneous | **M05** | -7.25 to 72.5 / -0.5 to 5 | **P** Viscous fluids | | | | | |
| | **001** | 0 to 14.5 / 0 to 1 | **R** Hydraulic oil, air (0 to 160 °C) | | | | **3** 1/4 in. NPTF | 1/2 in. NPT |
| | **002** | 0 to 36.25 / 0 to 2.5 | **S** Fresh/sea water, corrosive fluids (0 to 160 °C) | | | | | |
| | **004** | 0 to 58 / 0 to 4 | | | | | **4** PT 1/4 (JIS B0203) | 1/2 in. PF (JIS B0202) |
| **D** 2 fixed differential, single-pole contacts, staggered | **010** | 0 to 145 / 0 to 10 | ***Vacuum*** | | | | | |
| | **020** | 0 to 290 / 0 to 20 | **V** Hydraulic oil, air, fresh water, sea water (0 to 70 °C) | | | | | |
| | **035** | 0 to 507.5 / 0 to 35 | | | | | | |
| | **040** | 0 to 580 / 0 to 40 | **T** Hydraulic oil, air, fresh water, sea water (0 to 160 °C) | | | | | |
| | **070** | 0 to 1015 / 0 to 70 | | | | | | |
| | **160** | 0 to 2320 / 0 to 160 | ***Piston*** | | | | | |
| | **300** | 0 to 4350 / 0 to 300 | **D** Hydraulic oil | | | | | |
| | **500** | 0 to 7250 / 0 to 500 | **E** Fresh / sea water | | | | | |

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

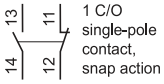
*[1]* X2GNiMo 17-12-2 (AISI 316L)
*[2]* X8GNiS 18-09 (AISI 303)



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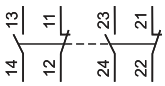
## Terminal Diagrams

### XMLA, XMLB



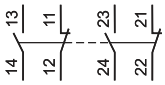

1 C/O single-pole contact, snap action

### XMLC

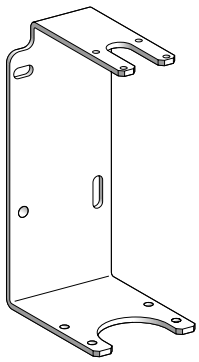



2 C/O single-pole contacts, simultaneous snap action

### XMLD



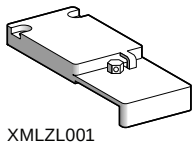

2 C/O single-pole contacts, snap action (1 per stage)



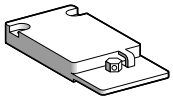
XMLZL006



XMLZL002



XMLZL001



XMLZL011

## XML Catalog Numbers and Accessories

### Table 22.23: Fixed Differential Catalog Numbers

| Range on Increasing Pressure (psi) | Approximate Differential Across Range | Maximum Allowable Pressure | Catalog Number |
|---|---|---|---|
| Fixed, 1 Single-Pole Contact (XMLA) | | | |
| -4.06 to -14.5 | 3.5 | 130.5 | XMLAM01V2S13 |
| 0.435 to 14.5 | 0.29 low / 0.58 high | 32.62 | XMLA001S2S13 |
| 2.17 to 36.25 | 1.88 | 130.5 | XMLA002A2S13 |
| 5.8 to 58 | 5.07 | 130.5 | XMLA004A2S13 |
| 8.7 to 145 | 7.25 | 326.25 | XMLA010A2S13 |
| 10.2 to 290 | 5.8 low / 14.5 high | 652.5 | XMLA020A2S13 |
| 21.75 to 507.5 | 18.12 | 1160 | XMLA035A2S13 |
| 72.5 to 1015 | 43.5 low / 108.75 high | 2320 | XMLA070D2S13 |
| 145 to 2320 | 79.75 low / 261 high | 5220 | XMLA160D2S13 |
| 290 to 4350 | 239.25 low / 507.5 high | 9787.5 | XMLA300D2S13 |
| 435 to 7250 | 290 low / 652.5 high | 16312.5 | XMLA500D2S13 |
| Fixed, 2 Single-Pole Contacts, Staggered (XMLD) | | | |
| 0.84 to 5.07 | 0.44 | 32.62 | XMLDL35S1S13 |
| -1.74 to -14.5 | 1.45 | 130.5 | XMLDM02V1S13 |
| 1.74 to 14.5 | 0.44 low / 1.02 high | 32.62 | XMLD001S1S13 |
| 4.93 to 36.25 | 2.03 low / 2.76 high | 130.5 | XMLD002B1S13 |
| 5.8 to 58 | 2.18 low / 2.76 high | 130.5 | XMLD004B1S13 |
| 17.4 to 145 | 6.53 low / 8.7 high | 326.25 | XMLD010B1S13 |
| 2.14 to 20 | 10.15 low / 18.85 high | 652.5 | XMLD020B1S13 |
| 63.8 to 507.5 | 21.75 low / 37.7 high | 1160 | XMLD035B1S13 |
| 136.3 to 1015 | 72.5 low / 137.75 high | 2320 | XMLD070D1S13 |
| 239.25 to 2320 | 127.6 low / 290 high | 5220 | XMLD160D1S13 |
| 522 to 4350 | 246.5 low / 609 high | 9787.5 | XMLD300D1S13 |
| 594.5 to 7250 | 304.5 low / 942.5 high | 16312.5 | XMLD500D1S13 |

### Table 22.24: Adjustable Differential Catalog Numbers

| Range on Increasing Pressure (psi) | Approximate Differential Across Range | Maximum Allowable Pressure | Catalog Number |
|---|---|---|---|
| Adjustable, 1 Single-Pole Contact (XMLB) | | | |
| 0.038 to 0.72 | 0.02 low / 0.06 high | 1.63 | XMLBL05S2S13 |
| 0.65 to 5.07 | 0.6 low / 0.72 high | 32.62 | XMLBL35R2S13 |
| -2 to -14.5 | 1.9 | 130.5 | XMLBM02V2S13 |
| -0.29 to -2.9 | 0.26 | 29 | XMLBM03S2S13 |
| -7.25 to 72.5 | 7.25 | 163.12 | XMLBM05A2S13 |
| 0.72 to 14.5 | 0.58 low / 0.87 high | 32.62 | XMLB001S2S13 |
| 4.35 to 36.25 | 2.32 low / 3.04 high | 130.5 | XMLB002A2S13 |
| 3.62 to 58 | 2.9 low / 3.62 high | 130.5 | XMLB004A2S13 |
| 10.15 to 145 | 8.26 low / 12.32 high | 326.25 | XMLB010A2S13 |
| 18.9 to 290 | 14.5 low / 23.2 high | 652.5 | XMLB020A2S13 |
| 50.75 to 507.5 | 24.65 low / 36.97 high | 1160 | XMLB035A2S13 |
| 101.5 to 1015 | 68.15 low / 127.6 high | 2320 | XMLB070D2S13 |
| 145 to 2320 | 134.85 low / 301.6 high | 5220 | XMLB160D2S13 |
| 319 to 4350 | 281.3 low / 536.5 | 9787.5 | XMLB300D2S13 |
| 435 to 7250 | 333.5 low / 762.7 high | 16312.5 | XMLB500D2S13 |
| Adjustable, 2 Single-Pole Contacts, Simultaneous (XMLC) | | | |
| 0.65 to 5.07 | 0.29 low / 0.51 high | 32.62 | XMLCL35S2S13 |
| -2 to -14.5 | 1.89 low / 2.03 high | 130.5 | XMLCM02V2S13 |
| -7.97 to 72.5 | 6.52 | 163.12 | XMLCM05S2S13 |
| 0.725 to 14.5 | 0.43 low / 0.58 high | 32.62 | XMLC001S2S13 |
| 4.35 to 36.25 | 1.89 low / 2.47 high | 130.5 | XMLC002B2S13 |
| 4.35 to 58 | 2.18 low / 2.47 high | 130.5 | XMLC004B2S13 |
| 10.15 to 145 | 6.53 low / 10.15 high | 326.25 | XMLC010B2S13 |
| 18.85 to 290 | 10.15 low / 14.5 high | 652.5 | XMLC020B2S13 |
| 50.75 to 507.5 | 14.5 low / 21.75 high | 1160 | XMLC035B2S13 |
| 101.5 to 1015 | 65.25 low / 129.05 high | 2320 | XMLC070D2S13 |
| 174 to 2320 | 130.5 low / 304.5 high | 5220 | XMLC160D2S13 |
| 319 to 4350 | 232 low / 507.5 high | 9787.5 | XMLC300D2S13 |
| 435 to 7250 | 275.5 low / 754 high | 16312.5 | XMLC500D2S13 |

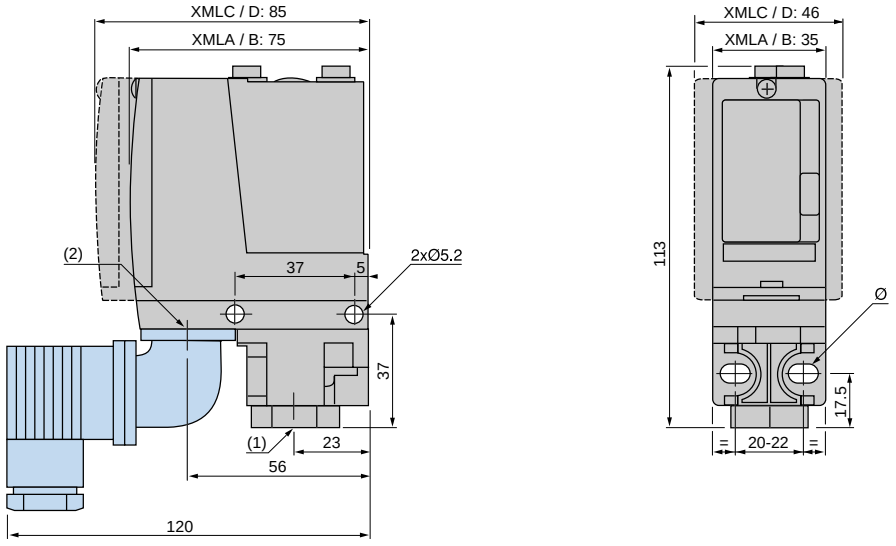
### Table 22.25: Accessories for XML Pressure and Vacuum Switches

| Description | For Use with Switches | Catalog Number |
|---|---|---|
| **Rear mounting bracket**<br>For vibrations > 2 gn | XML•L35<br>XML•001 | XMLZL006 |
| **Additional top support bracket**<br>For vibrations > 4 gn | XMLAM01<br>XML•M05<br>XMLA004<br>XML•010 … XML•500 | XMLZL002 |
| **Lead sealable protective cover**<br>To prevent unauthorized access to the adjustment screws and the switch cover mounting screw | XMLA<br>XMLB | XMLZL001 |
| **Lead sealable protective cover**<br>To prevent unauthorized access to adjustment screws | All models | XMLZL011 |

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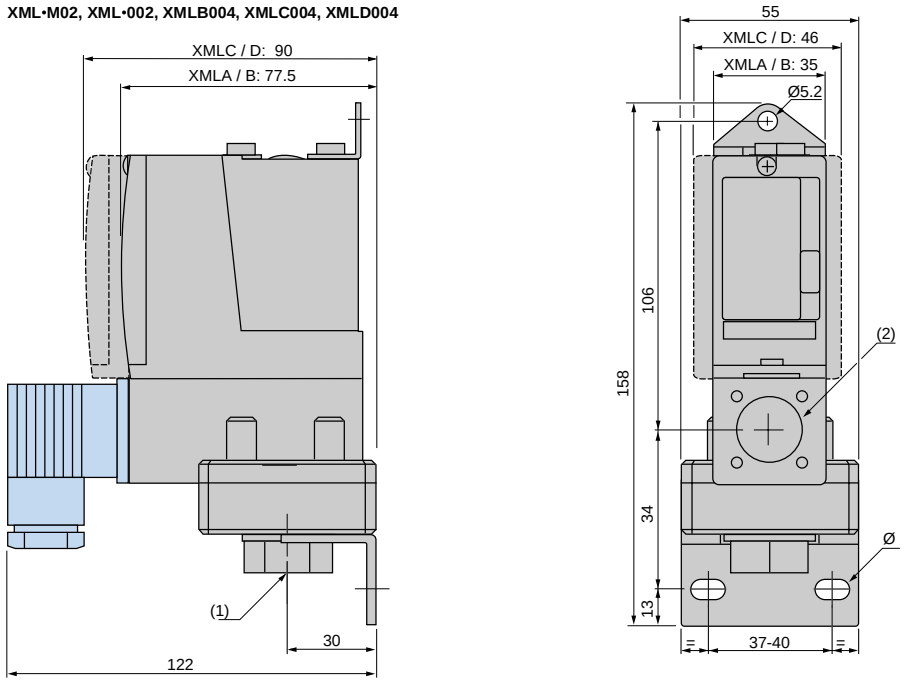
## XML Dimensions

**XMLAM01, XMLBM05, XMLCM05, XMLA004, X•ML010…500**




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

**XML•M02, XML•002, XMLB004, XMLC004, XMLD004**




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



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NEMA 1



Open Type

## Type G Pressure Switches

### Table 22.26: Fixed Differential, Open Type or NEMA 1 Enclosure

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

### Table 22.27: Adjustable Differential, Open Type or NEMA 1 Enclosure

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

### Table 22.28: Available Modifications *[4]*

| Modification | Applies to | Form |
|---|---|---|
| Standard Nitrile (Buna-N) diaphragm in #316 stainless steel housing | **Not available** on GNG1, GNO1, GRG1, or GRO1. **Available** on all other GNG, GNO, GPG, GPO, GRG, GRO, GSG, and GSO switches. | Q1 |
| Ethylene propylene diaphragm in #316 stainless steel housing | **Not available** on GNG1, GNO1, GRG1, or GRO1. **Available** on all other GNG, GNO, GPG, GPO, GRG, GRO, GSG, and GSO switches. | Q3 |
| Viton fluorocarbon diaphragm in #316 stainless steel housing | **Not available** on GNG1, GNO1, GRG1, or GRO1. **Available** on all other GNG, GNO, GPG, GPO, GRG, GRO, GSG, and GSO switches. | Q4 |
| 1/4–18 NPT external thread pressure connection | GNG, GNO, GRG, GRO | Z |
| 1/2–14 NPT external thread, 1/4–18 NPTF internal thread pressure connection. Standard actuator only. | GNG, GNO, GRG, GRO | Z16 |
| 7/16–20 UNF-2B internal thread pressure connection | GNG, GNO, GPG, GPO, GQG, GQO, GRG, GRO, GSG, GSO, GTG, GTO | Z18 |

### Table 22.29: Class 9049 Accessories for Class 9012 Pressure Switches

| Description | Applies to Class | Type |
|---|---|---|
| Stainless steel surge reducer for use on oils, coolants, and hydraulic fluids (not recommended for air or water) | 9012G | A26S |

Acceptable Wire Sizes 12-22 AWG

Recommended Terminal Clamp Torque 7 lb-in

Electrical Rating page 22-16

Temperature Rating page 22-16

Renewal Parts Kits page 22-30

File E12158
CCN NKPZ

File LR25490
Class 3211-03

*[3]* Determines operating point on rising pressure.
*[4]* Some product configurations are not available—contact your Schneider Electric representative for details.

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# Control Circuit Rated Type G Pressure Switches



9012GAW5
NEMA 4, 4X, 13

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

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

## Table 22.30: Fixed Differential *[5]*
## NEMA 4, 4X, 13 Enclosure
## UL Listed and CSA Certified As Industrial Control Equipment

| Range on Decreasing Pressure psig | *[6]*Approximate Differential at Mid-Range psig | Maximum Allowable Pressure psig | Single Pole Double Throw Type | Double Pole Double Throw Type |
|---|---|---|---|---|
| Diaphragm Actuated—**Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing** | | | | |
| .2–10 | 0.6 ±0.1 | 100 | GDW1 | GDW21 |
| 1–40 | 1.6 ±0.4 | 100 | GDW2 | GDW22 |
| 1.5–75 | 3.0 ±0.5 | 240 | GDW4 | GDW24 |
| 3–150 | 6.0 ±0.8 | 475 | GDW5 | GDW25 |
| 5–250 | 10.0 ±1.5 | 750 | GDW6 | GDW26 |
| 13–425 | 16 ±3.5 | 850 | GEW1 | GEW21 |
| 20–675 | 27 ±5 | 2000 | GEW2 | GEW22 |
| Piston Actuated—**#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton® Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring** | | | | |
| 20–1000 | 59 ±9 | 10000 | GFW1 | GFW21 |
| 90–2900 | 170 ±15 | 15000 | GFW2 | GFW22 |
| 170–5600 | 289 ±55 | 20000 | GFW3 | GFW23 |
| 270–9000 | 495 ±70 | 25000 | GFW4 | GFW24 |

## Table 22.31: Adjustable Differential *[5]*
## NEMA 4, 4X, 13 EnclosureUL Listed and CSA Certified As Industrial Control Equipment

| Range on Decreasing Pressure psig | *[6]*Adjustable Differential Approximate at Mid-Range | Maximum Allowable Pressure psig | Single Pole Double Throw Type | Double Pole Double Throw Type |
|---|---|---|---|---|
| Diaphragm Actuated—**Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing** | | | | |
| .2–10 | 0.6–2 | 100 | GAW1 | GAW21 |
| 1–40 | 1.6–8 | 100 | GAW2 | GAW22 |
| 1.5–75 | 3.5–15 | 240 | GAW4 | GAW24 |
| 3–150 | 6.0–30 | 475 | GAW5 | GAW25 |
| 5–250 | 10.0–49 | 750 | GAW6 | GAW26 |
| 13–425 | 16–90 | 850 | GBW1 | GBW21 |
| 20–675 | 27–130 | 2000 | GBW2 | GBW22 |
| Piston Actuated—**#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring** | | | | |
| 20–1000 | 59–200 | 10000 | GCW1 | GCW21 |
| 90–2900 | 170–560 | 15000 | GCW2 | GCW22 |
| 170–5600 | 289–1260 | 20000 | GCW3 | GCW23 |
| 270–9000 | 495–1900 | 25000 | GCW4 | GCW24 |

## Table 22.32: Fixed Differential
## NEMA 7 & 9 Enclosure
## Class I & II, Division 1 & 2, Groups C, D, E, F, G

| Range on Decreasing Pressure psig | *[6]*Approximate Differential at Mid-Range psig | Maximum Allowable Pressure psig | Single Pole Double Throw Type | Double Pole Double Throw Type |
|---|---|---|---|---|
| Diaphragm Actuated—**Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing** | | | | |
| 0.2–10 | 1.0 ±0.1 | 100 | GDR1 | — |
| 1–40 | 2.4 ±0.8 | 100 | GDR2 | GDR22 |
| 1.5–75 | 4.5 ±1 | 240 | GDR4 | GDR24 |
| 3–150 | 9 ±1.5 | 475 | GDR5 | GDR25 |
| 5–250 | 15 ±3 | 750 | GDR6 | GDR26 |
| 13–425 | 25 ±7 | 850 | GER1 | GER21 |
| Piston Actuated—**#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring** | | | | |
| 20–1000 | 89 ±18 | 10000 | GFR1 | GFR21 |
| 90–2900 | 255 ±30 | 15000 | GFR2 | GFR22 |
| 170–5600 | 578 ±110 | 20000 | GFR3 | — |

## Table 22.33: Adjustable Differential
## NEMA 7 & 9 Enclosure
## Class I & II, Division 1 & 2, Groups C, D, E, F, G

| Range on Decreasing Pressure psig | *[6]*Adjustable Differential Approximate at Mid-Range | Maximum Allowable Pressure psig | Single Pole Double Throw Type | Double Pole Double Throw Type |
|---|---|---|---|---|
| Diaphragm Actuated—**Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing** | | | | |
| 0.2–10 | 1.0–2 | 100 | GAR1 | GAR21 |
| 1–40 | 2.4–8 | 100 | GAR2 | GAR22 |
| 1.5–75 | 4.5–15 | 240 | GAR4 | GAR24 |
| 3–150 | 9–35 | 475 | GAR5 | GAR25 |
| 5–250 | 15–49 | 750 | GAR6 | GAR26 |
| 13–425 | 25–90 | 850 | GBR1 | GBR21 |
| 20–675 | 41–130 | 2000 | GBR2 | GBR22 |
| Piston Actuated—**#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring** | | | | |
| 20–1000 | 89–200 | 10000 | GCR1 | GCR21 |
| 90–2900 | 255–560 | 15000 | GCR2 | — |
| 170–5600 | 578–1260 | 20000 | GCR3 | GCR23 |
| 270–9000 | 788–1900 | 25000 | GCR4 | — |

**Acceptable Wire Sizes**: 12–22 AWG
**Recommended Terminal Clamp Torque**: 7 lb-in
Electrical Rating: see page 22-16
Temperature Rating: see page 22-16
Modifications: see page 22-18
Accessories: see page 22-18
Renewal Parts Kits: see page 22-30
Dimensions: see page 22-17

| | | | | |
|---|---|---|---|---|
| File: E12443 Haz. Loc. | CCN | NOWT | G•R | |
| File: E12158 | CCN | NKPZ | G•O, G•G, G•W | |
| File: E12158 | CCN | NTHT | Marine Use, G•W | |

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

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

*[5]* For metric threads, add **M** after the **W** on all types (offered at an additional cost).
To order a Pg13.5 electrical conduit entry and a 1/4"-19 BSP pressure connection, add M12 to the end of the catalog number, as well as adding "M" after "W" for metric threads. For example:
9012GAW1 = 1/2" NPT electrical conduit entry
9012GAWM1 = 20 x 1.5 mm electrical conduit entry
9012GAWM1M12 = Pg13.5 electrical conduit entry and 1/4-19 BSP pressure connection.

*[6]* The differential adds to the range setting and determines the operating point on rising pressure.



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9012GGW1

## Differential/Dual Stage, Type G

### Differential-Pressure Operation

Pressure switches for differential-pressure operation 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.

**Table 22.34: Differential-Pressure Switches**
**NEMA 4, 4X, 13 Enclosures**
**UL Listed and CSA Certified As Industrial Control Equipment** *[7]*

| 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 Type | Double Pole Double Throw Type |
|---|---|---|---|---|---|
| Diaphragm Actuated—**Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing** | | | | | |
| 0–75 | 0.25–10 | 0.8–2 | 100 | GGW1 | GGW21 |
| 0–175 | 0.5–36 | 5–15 | 240 | GGW4 | GGW24 |
| 0–500 | 3–175 | 22–90 | 850 | GHW1 | GHW21 |
| Piston Actuated—**#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton® Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring** | | | | | |
| 0–5000 | 15–825 | 80–200 | 7500 | GJW1 | GJW21 |

### Dual-Stage Operation

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

**Table 22.35: Dual-Stage Pressure Switch**
**NEMA 4, 4X, 13 Enclosure**
**UL Listed and CSA Certified As Industrial Control Equipment** *[8]*

| | 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 |
|---|---|---|---|---|---|---|
| | | | Stage 1 | Stage 2 | | Type |
| | Diaphragm Actuated—**Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing** | | | | | |
|  | .2–10 | 1–5 | 1.0 ±0.2 | 1.5 ±0.4 | 100 | GKW1 |
| | 1–40 | 4–20 | 4.0 ±1.0 | 6.0 ±1.5 | 100 | GKW2 |
| | 1.5–75 | 6–30 | 5.0 ±1.5 | 8.0 ±2.0 | 240 | GKW4 |
| | 3–150 | 12–75 | 8.0 ±2.0 | 12 ±3 | 475 | GKW5 |
| | 5–250 | 22–110 | 14 ±3 | 21 ±5 | 750 | GKW6 |
| | 13–425 | 40–180 | 20 ±4 | 30 ±7.5 | 850 | GLW1 |
| | 20–675 | 45–250 | 30 ±6 | 45 ±11 | 2000 | GLW2 |
| | Piston Actuated—**#400 Stainless Steel Piston. #300 Stainless Steel Housing, Viton Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring** | | | | | |
| | 20–1000 | 50–300 | 50 ±10 | 75 ±19 | 10000 | GMW1 |
| | 90–2900 | 140–800 | 140 ±30 | 210 ±52 | 15000 | GMW2 |
| | 170–5600 | 300–1700 | 275 ±60 | 400 ±100 | 20000 | GMW3 |
| | 270–9000 | 500–2500 | 400 ±80 | 800 ±150 | 25000 | GMW4 |

9012GKW1

**Ordering Dual-Stage Pessure Switches**

1. 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.

2. For available modifications see page 22-18. If one or more of these modifications are desired, add the appropriate Form to the Class and Type. Arrange form letters in alphabetical order when ordering more than one modification.

Acceptable Wire Sizes 12-22 AWG
Recommended Terminal Clamp Torque 7 lb-in
Electrical Rating page 22-16
Temperature Rating page 22-16
Modifications page 22-18
Accessories page 22-18
Renewal Parts Kits page 22-30
Dimensions page 22-17

File E12158 CCN NKPZ
File E12158 CCN NTHT - Marine Use

File LR25490 Class 3211-03

*[7]* UL Marine Listed for use on vessels greater than 65 feet long where ignition protection is not required.
*[8]* UL Marine Listed for use on vessels greater than 65 feet long where ignition protection is not required.

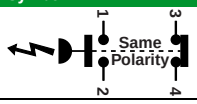
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# Electrical Ratings

## Table 22.36: Control Duty Circuit Ratings

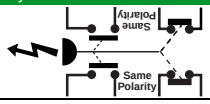
| Contacts | AC—50 or 60 Hz | | | | | | DC | | | AC or DC |
|---|---|---|---|---|---|---|---|---|---|---|
| | V | Inductive, 35% Power Factor | | | | Resistive 75% Power Factor | V | Inductive and Resistive | | Continuous Carrying Amperes |
| | | Make | | Break | | | | Make and Break Amperes | | |
|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

## Table 22.37: Type G Machine Tool and Vacuum (except GVG)

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



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

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



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

## Table 22.38: Type G Industrial

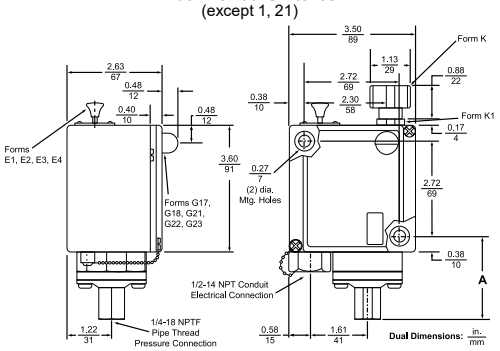
| Contact Arrangement | Contact Symbol |
|---|---|
| 1 N.O. – 1 N.C. (600 Vdc rating does not apply) |  |

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

## Table 22.39: Temperature Ratings

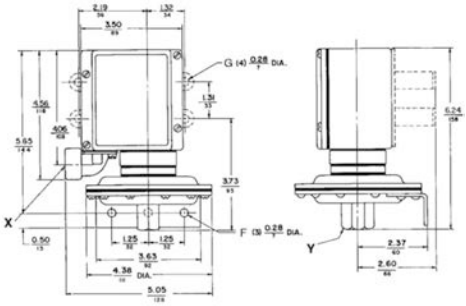
| | Actuator | Minimum | Maximum |
|---|---|---|---|
| Ambient | All | -23 °C (-10 °F) | +85 °C (+185 °F) |
| Media | Diaphragm | -40 °C (-40 °F) | +120 °C (+250 °F) |
| | Piston | -26 °C (-15 °F) | |
| | All with Forms Q4 and Q14 | -26 °C (-15 °F) | |

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





**Types GAW, GDW, GKW 1, 21**





**X**: Conduit connection: G•W = 1/2-14 NPT; G•WM = 20MMBGS4568, Form M12 = Pg13.5; DIN40430.

**Y**: Pressure connection: G•W = 1/4-18 NPTF; G•WM = 8; Form M14 = G 1/4 BS 2779; RP1/4 ISO 711; R 1/4 DIN 2999; GJ 1/4 UN1339.

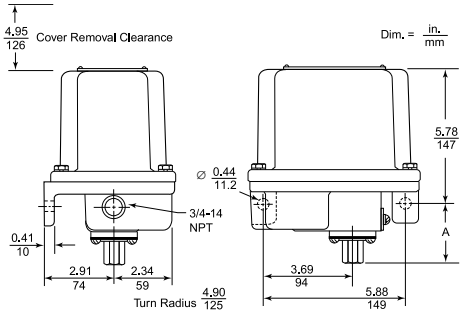
## Table 22.40: Dimension A for G•W Switches

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

## Table 22.41: Dimension A for G•R, Switches

| Type / Tipo / Type | Dimension A, in. (mm) |
|---|---|
| GAR1, 2, 21, 22 | 2.02 (51.3) |
| GAR4, 5, 6, 24, 25, 26 | 1.42 (36.1) |
| GBR1, 2, 21, 22; GCR1, 21 | 1.32 (33.5) |
| GCR2, 3, 4, 22, 23, 24 | 2.24 (56.9) |
| GDR1, 2, 21, 22 | 2.02 (51.3) |
| GDR4, 5, 6, 24, 25, 26 | 1.42 (36.1) |
| GER1, 2, 21, 22; GFR1, 21 | 1.32 (33.5) |
| GFR2, 3, 4, 22, 23, 24 | 2.24 (56.9) |

**Types GAR, GBR, GCR, GDR, GER, and GFR**





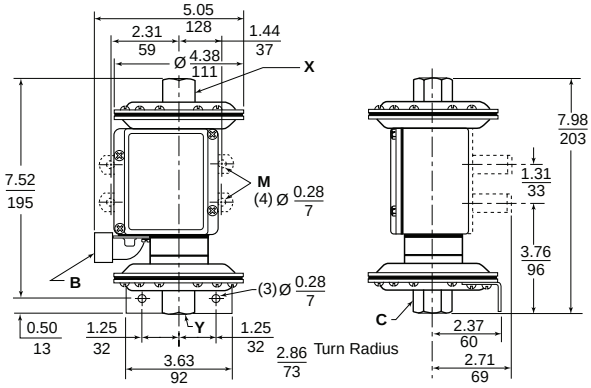


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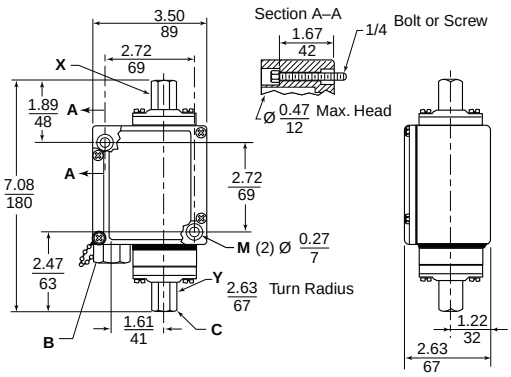
## Dimensions

### 9012G Dimensions, in. (mm)

**GGW1, 21**




**GGW4, 24**



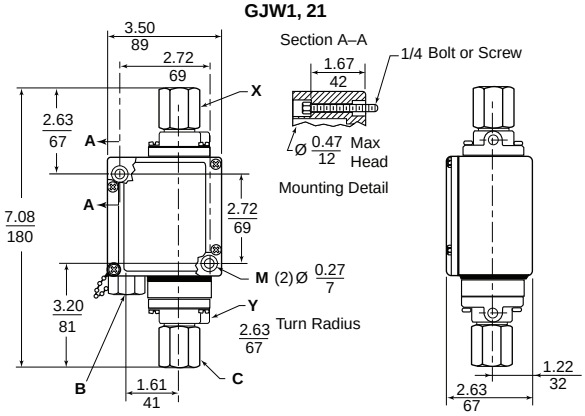

**B** = Conduit
Standard = 1/2-14 NPT
Options = Pg 13.5, 20 mm

**C** = Fluid Connection
Standard = 1/4-18 NPTF
Options = G 1/4

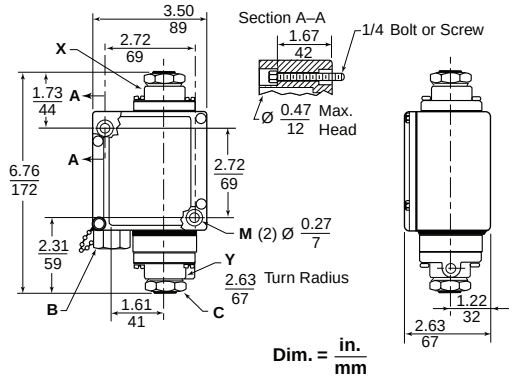
**X** = Lower pressure source

**Y** = Higher pressure source

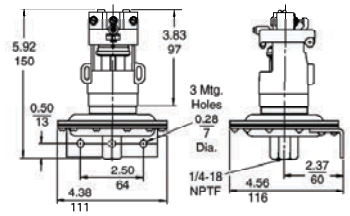
**GJW1, 21**



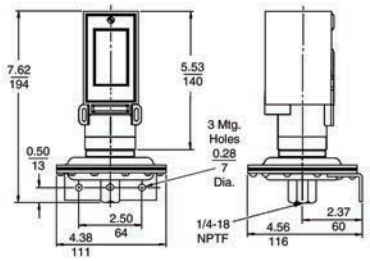

**GHW1, 21**



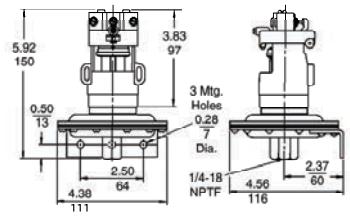

**9012GNO1, GRO1**



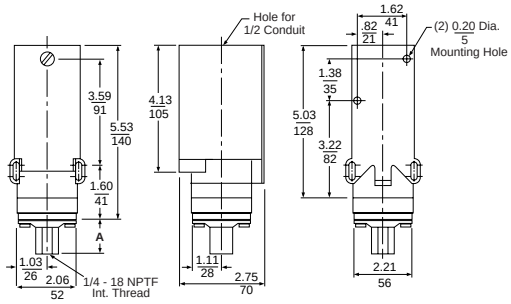

**9012GNG1, GRG1**




**9012GNO, GRO**




**9012GNG, GRG**




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

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

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# Factory Modifications and Accessories

## Table 22.42: Factory Modifications for Class 9012 Pressure Switches

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

## Table 22.43: Factory Modifications for Renewal Parts Kits for Class 9012 Pressure Switches

**Suffixes for renewal parts kits, see** **page 22-30**

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

## Table 22.44: Class 9049 Accessories for Class 9012 Pressure Switches

| Description | Applies to Class | Type |
|---|---|---|
| Stainless steel surge reducer for use on oils, coolants, and hydraulic fluids (not recommended for air or water) | 9012G | A26S |



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## Type GAW—Sensitive Control Applications

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

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

Maximum allowable positive pressure: 100 psig.
Diaphragms are oil resistant, nitrile butadiene (Buna N) rubber.
Electrical Ratings and Temperature Limitations—See page 22-14 for Type G machine tool.
Dimensions—See page 22-17.

**Table 22.45: Class 9016, Diaphragm Actuated**

| Range on Decreasing Vacuum (In. of Hg) | Adjustable Differential Adds to Range *[1]* (In. of Hg) | Contact Arrangement | Pipe Tap (NPTF) | Enclosure | |
|---|---|---|---|---|---|
| | | | | NEMA 4, 4X & 13 | NEMA 7 & 9 *[2]* |
| | | | | Type | Type |
| 0–28.7 | At Minimum Range: 0.8–9<br>At Mid-Range: 1.3–7.4 | 1 N.O., 1 N.C. | 1/4"-18 | GAW1 | GAR1 |
| 0–25 | 5–20 | 1 N.O., 1 N.C. | 1/4"-18 | GAW2 | N/A |
| 0–28.3 | At Minimum Range: 1–9<br>At Mid-Range: 1.7–7.4 | 2 N.O., 2 N.C. | 1/4"-18 | GAW21 | GAR21 |
| 0–25 | 5–20 | 2 N.O., 2 N.C. | 1/4"-18 | GAW22 | N/A |

**Table 22.46: Available Modifications**

| Description | Form |
|---|---|
| Range scale window | V1 |
| 1/4"-18 NPT external thread pressure connection | Z |
| 1/2"-14 NPT external thread, 1/4"-18 NPTF internal thread pressure connection (standard actuator only) | Z16 |

File E12443 Haz Loc
File E12158
File E12158

CCN NOWT G*R
CCN NKPZ G*W
CCN NTHT Marine Use, G*W

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

PUMPTROL™



Class 9016 Type GVG1
Forms E, F

## Type GVG—Power Circuit Applications

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

**Table 22.47: Class 9016, Contacts Open on Increasing Vacuum**

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

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

**Table 22.48: Available Modifications**

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

**Table 22.49: Electrical Ratings—9016GVG**

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

**NOTE:** Control Circuit Rating: A600

**Table 22.50: Vacuum Codes**

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

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

File E12158
CCN NKPZ

File LR25490

Dimensions page 22-16

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

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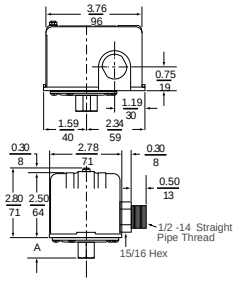
# Type FHG—Pumptrol™ Compressor Pressure Switch

Class **9013** / Refer to Catalog **9034CT9701**





Pressure Switch



Shown with Form T

## FHG Pressure Switch Selection and Features

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

- Contacts open on pressure rise.
- Diaphragm actuated.
- For application data, see page 22-16.
  For repair parts kits, see page 22-30.

### Table 22.51: Dimensions, Type F (Net Weight, 1-1/8 lb)

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

### Table 22.52: Special Features and Modifications for Type FHG[1]

| Description | Form |
|---|---|
| Bulk pack | [2] |
| Addition of a second ground screw | G4[3] |
| Maintained manual cut-out lever (Auto-Off) | M1 |
| Pulsation plug—factory order only (available only on 1/4-inch fittings, not to include 4-way) | P |
| Slip-on connectors (load side terminals only) | U |
| Slip-on connectors (line and load terminals) | U2 |
| Two-way pressure release valve | X |
| Quick connect two-way pressure release valve (for use with Polyflow® tubing) | X1 |
| Black cover | Z22 |

### Table 22.54: Pressure Code (fixed differential)[1]

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

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

File E12158
CCN NKPZ

File LR25490

**NOTE:** If conduit or pressure line is rigid, UL; if both are flexible, UR.

### Table 22.53: Selection Table

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

### Table 22.55: Electrical Ratings For All 9013 Switches

| Switch Type | Voltage | Single Phase AC | Polyphase AC [4] | DC | Control Circuit Rating |
|---|---|---|---|---|---|
| FHG2, 9, 12, 13, 14, 19, | 115 | 1-1/2 hp | 2 hp | 1/4 hp[5] | A600 |
| 42, 43, 44, 49 | 230 | 2 hp | 3 hp | 1/4 hp[5] | |
| FSG, FSW | 460/575 | — | 1 hp | — | |
| FHG22, 29, 32, 33, 34, 39, | 115 | 2 hp | 3 hp | 1/2 hp[6] | A600 |
| 52, 54, 59 | 230 | 3 hp | 5 hp | 1/2 hp[6] | |
| FYG, FYW | 460/575 | — | 1 hp | — | |
| FRG One Pole (All Form H) | 32 | — | — | — | A300 |
| | 115 | 1 hp | — | 1/4 hp | |
| | 230 | 1 hp | — | 1/4 hp | |
| FRG Two Pole | 32 | — | — | 1/4 hp | A300 |
| | 115 | 1 hp | 1 hp | 1/4 hp | |
| | 230 | 1 hp | 1 hp | 1/4 hp | |
| All 9013G Form H | 115 | 1 hp | — | 1/2 hp | A600 |
| | 230 | 2 hp | — | 1/2 hp | |
| | 460/575 | 2 hp | — | — | |
| All 9013G, except Form H | 115 | 2 hp | 3 hp | 1 hp | A600 |
| | 230 | 3 hp | 5 hp | 1 hp | |
| | 460/575 | 1 hp | 1 hp | — | |

**Ordering Information**

- Specify Class 9013 Type FHG.
- Select pressure code from the table entitled Pressure Code (fixed differential) on the left side of the page, and add the code designation to end of the Type number. Ensure that the pressure rating of the code falls within the limits of the device as shown in Table 22.53, page 22-20.
- To order special features as shown in Table 22.52, add the appropriate Form designation to the Class and Type. Arrange Forms in alphabetical order when specifying more than one feature or modification.
  Accessories: page 22-22

[1] Some product configurations are not available—contact your Schneider Electric representative for details.
[2] For bulk package quantities and Form numbers, see Table 22.62 on page 22-21. If a Form is not specified, devices will be shipped individually packaged.
[3] Can be field installed. Nameplate should then be marked with the Form letter and maintenance and ordering records corrected.
[4] See 1993 NEC Article 430-84
[5] DC rating does not apply to Form M4.
[6] 1/4 hp with Form MI.



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## Type F Pressure Switch Selection and Features

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

### Table 22.56: Pressure Codes *[7]*

| Standard Action Devices | | Reverse Action Devices | |
|---|---|---|---|
| Settings | Code | Settings | Code |
| 5–21 psi | J15 | 10–5 psi | J36 |
| 8–20 psi | J16 | 22–12 psi | J22 |
| 20–40 psi | J20 | 22–16 psi | J19 |
| 20–50 psi | J18 | 35–20 psi | J70 |
| 30–50 psi | J21 | 40–20 psi | J23 |
| 40–60 psi | J24 | 50–30 psi | J35 |
| 50–70 psi | J33 | 150–120 psi | J64*[8]* |
| 60–80 psi | J25 | | |
| Specify other pressure | J99*[8]* | Specify other pressure | J99*[8]* |

### Table 22.57: Standard Action: Contacts Open On Rising Pressure

| Cut-out Range (psig) | Approximate Adjustable Differential (psig) | Cut-in Range (psig) | Pressure Connection | 2 Pole | |
|---|---|---|---|---|---|
| | | | | NEMA 1 | NEMA 3R*[9]* |
| | | | | Type | Type |
| 20–65 | 15–30 | 5–45 | 1/4" NPSF internal | FSG2 | FSW2 |
| | | | 1/4" NPT external | FSG9 | FSW9 |
| | | | 1/4" bayonet (barbed) | FSG10 | FSW10 |
| | | | 90° elbow 1/4" bayonet | FSG20 | FSW20 |
| 20–50 | 10–30 | 10–30 | 1/4" NPSF internal | FSG22 | FSW22 |
| 20–60 | 10–30 | 10–45 | 1/4" NPT external | FSG29 | FSW29 |
| 9–30 | 6–20 | 3–10 | 1/4" NPSF internal | FSG42 | FSW42 |
| 9–30 | 6–20 | 3–10 | 1/4" NPT external | FSG49 | FSW49 |
| 25–80 | 20–30 | 5–60 | 1/4" NPSF internal | FSG52 | — |
| | | | 1/4" NPT external | FSG59 | — |
| 34–65 | 15–30 | 19–45 | (FSG1 through 20 with Form M4 is only available in this range) | | |
| 25–80 | 20–30 | 5–60 | 1/4" NPSF internal | FYG2 | FYW2 |
| | | | 1/4" NPT external | FYG9 | FYW9 |
| | | | 1/4" bayonet (barbed) | FYG10 | FYW10 |
| | | | 90° elbow 1/4" bayonet | FYG20 | FYW20 |
| 39–80 | 20–30 | 19–60 | (FYG1 through 20 with Form M4 is only available in this range) | | |
| 20–50 | 10–30 | 10–30 | 1/4" NPSF internal | FYG22 | FYW22 |
| 20–60 | 10–30 | 10–45 | 1/4" NPT external | FYG29 | FYW29 |
| 9–40 | 6–30 | 3–10 | 1/4" NPSF internal | FYG42 | FYW42 |
| 9–40 | 6–30 | 3–10 | 1/4" NPT external | FYG49 | FYW49 |

### Table 22.58: Maximum Allowable Pressure for All 9013 Switches

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

### Table 22.59: Temperature Limitations for All 9013 Switches

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

### Table 22.60: 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 | Type |
| 23–65 | 15–30 | 8–45 | 1/4" NPSF internal | FRG12 | FRG2 |
| | | | 3/8" NPSF internal | FRG13 | FRG3 |
| | | | 1/4" NPT external | FRG19 | FRG9 |
| 10–45 | 6–20 | 4–25 | 1/4" NPSF internal | FRG32 | FRG22 |
| | | | 3/8" NPSF internal | FRG33 | FRG23 |
| | | | 1/4" NPT external | FRG39 | FRG29 |
| 6–14 | 5, Fixed | 1–9 | 1/4" NPSF internal | FRG52 | FRG42 |
| | | | 3/8" NPSF internal | FRG53 | FRG43 |
| | | | 1/4" NPT external | FRG59 | FRG49 |
| 40–100 | 20–30 | 20–80 | 1/4" NPSF internal | FRG72 | FRG62 |
| | | | 3/8" NPSF internal | FRG73 | FRG63 |
| 65–150 | 30–45 | 35–120 | 1/4" NPSF internal | FRG92 | FRG82 |
| | | | 3/8" NPSF internal | FRG93 | FRG83 |
| | | | 1/4" NPT external | FRG99 | FRG89 |

### Table 22.61: Special Features and Modifications for Type FSG, FYG & FRG Devices

*[10]*

| Description | Applies to Types | Form |
|---|---|---|
| Bulk package | All Type F | *[11]* |
| One normally open—one normally closed contact | FRG 2-Pole only | H |
| Maintained manual cut-out lever (Auto-Off) | FSG, FYG | M1 |
| Momentary manual cut-in lever (Auto-Start) | FRG2-59 only | M3 |
| Low pressure cut-off (Auto-Start-Off) – Operates at approximately 10 psig below cut-in and will turn off the pump | FSG, FYG | M4 |
| Maintained manual cut-in lever (Auto-On) | FRG2-59 only | M5 |
| Pulsation plug (Type 2 & 9 only) | FRG, FSG, FYG | P*[12]* |
| Plastic flange (max. temp. 120 °F) (max. pressure 80 psi) Available only on Types FSG2, FYG2, FRG2, FSG•2, FYG•2, FRG•2 | FSG•, FYG•, FRG• | Q8 |
| | 1/4" NPSF internal only | |
| 1/2" conduit bushing, 1/2" long thread—on left | All Type F | T |
| Slip-on connectors (load side terminals *only*) | FSG, FYG | U |
| Slip-on connectors (line *and* load terminals) | FSG, FYG | U2 |
| Black cover | FSG, FYG | Z22 |

**Ordering Information**

- Specify Class 9013 Type F.
- Select the pressure code from the Pressure Code table above, and add the code designation to the end of the Type number. Ensure that the pressure rating of the code falls within the limits of the device as shown in Table 22.57 and Table 22.60.
- To order special features from Table 22.61, add the appropriate Form letter to the Class and Type. Arrange the Form letters in alphabetical order when ordering more than one special feature.

Electrical Ratings: see
Dimensions: see
Renewal Parts Kits

File E12158 CCN NKPZ

File LR25490

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

*[7]* Existence of a code does not imply that the code is available for any or all devices.
*[8]* Minimum order quantity is 4 pieces.
*[9]* Must be mounted in vertical position to maintain enclosure rating.
*[10]* Some product configurations are not available—contact your Schneider Electric representative for details.
*[11]* For bulk package quantities and Form numbers, see Table 22.62 on page 22-21. If a Form is not specified, devices will be shipped individually packaged.
*[12]* Nylon pulsation plug can be field installed on types having 1/4" NPSF internal connector. Part number 1530S6G1 is one bag of 50 plugs.

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**Table 22.62: Bulk Package Form Numbers for 9013F Pressure Switches**

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

PUMPTROL™



Shown with Form X

File E12158 CCN NKPZ

File E12443 CCN NOWT Haz Loc

File 25490 File 26817 Haz. Loc.

## Type G Pressure Switch Selection and Features

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

- Contacts open on pressure rise.
- Diaphragm actuated.
- For electrical ratings, see .
  For repair parts kits, see page 22-30.

**Table 22.63: Pressure Codes**

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

**Table 22.64: Special Features and Modifications**

| Description | Form Letter |
|---|---|
| 3-Way Lever (On-Auto-Off) | E |
| One Normally Open / One Normally Closed Contact | H |
| Pulsation Plug | P |
| Reverse Action | R |
| Slip-On Connectors (Load Side Terminals Only) | U |
| Slip-On Connectors (Line and Load Terminals) | U2 |
| Two-Way Pressure Release Valve | X |
| ¼" Male Pipe Thread on Pressure Connection | Z |
| ½"-14 NPT External<br>¼"-18 NPT Internal | Z16 |

**Table 22.65: Selection Tables**

| Cut-out Range (psig) | Approximate Adjustable Differential (psig) | Cut-in Range (psig) | Enclosure | Poles | NPSF Internal Pressure Connection | Type |
|---|---|---|---|---|---|---|
| 10–35 | 4–8 | 5.5–30.5 | NEMA 1 (General Purpose) | 2 | 1/4 | GMG2 |
| 20–80 | 15–30 | 5–60 | NEMA 3R *[13]* (Rainproof) | 2 | 1/4 | GSB2 |
| 20–80 | 15–30 | 5–60 | NEMA 1 (General Purpose) | 2 | 1/8 | GSG1 |
| | | | | | 1/4 | GSG2 |
| | | | | | 3/8 | GSG3 |
| 20–80 | 20–40 | 5–50 | NEMA 7 & 9 (Hazardous Locations) | 2 | 1/8 | GSR1 |
| | | | | | 1/4 | GSR2 |
| | | | | | 3/8 | GSR3 |
| | | | NEMA 4 (Watertight) | | 1/8 | GSW1 |
| | | | | | 1/4 | GSW2 |
| | | | | | 3/8 | GSW3 |
| 65–200 | 20–40 | 40–170 | NEMA 3R *[13]* (Rainproof) | 2 | 1/4 | GHB2 |
| 65–200 | 20–40 | 40–170 | NEMA 1 (General Purpose) | 2 | 1/8 | GHG1 |
| | | | | | 1/4 | GHG2 |
| | | | | | 3/8 | GHG3 |
| 65–200 | 30–50 | 35–150 | NEMA 7 & 9 (Hazardous Locations) | 2 | 1/8 | GHR1 |
| | | | | | 1/4 | GHR2 |
| | | | | | 3/8 | GHR3 |
| | | | NEMA 4 (Watertight) | | 1/8 | GHW1 |
| | | | | | 1/4 | GHW2 |
| | | | | | 3/8 | GHW3 |
| 80–250 | 25–45 | 32–215 | NEMA 3R *[13]* (Rainproof) | 2 | 1/4 | GHB5 |
| 80–250 | 24–45 | 32–215 | NEMA 1 (General Purpose) | 2 | 1/8 | GHG4 |
| | | | | | 1/4 | GHG5 |
| | | | | | 3/8 | GHG6 |
| 80–250 | 40–60 | 30–190 | NEMA 7 & 9 (Hazardous Locations) | 2 | 1/8 | GHR4 |
| | | | | | 1/4 | GHR5 |
| | | | | | 3/8 | GHR6 |
| | | | NEMA 4 (Watertight) | | 1/8 | GHW4 |
| | | | | | 1/4 | GHW5 |
| | | | | | 3/8 | GHW6 |

**NOTE:** Some product configurations are not available. Contact your Schneider Electric representative for details.

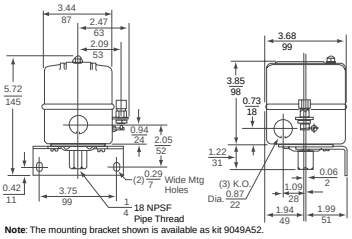
### Ordering Information

- Specify Class 9013 Type G.
- Select the pressure code from Table 22.63, and add the code to the end of the Type number. Ensure that the pressure rating of the code falls within the limits of the device. See Table 22.65.
- To order special features, add the appropriate Form letter to the Class and Type. Arrange Form letters in alphabetical order when ordering more than one special feature.

*[13]* Must be mounted in vertical position to maintain enclosure rating.

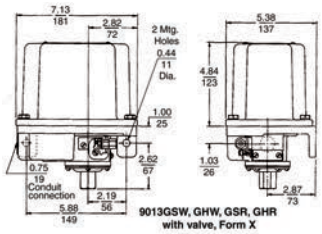


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**Note**: The mounting bracket shown is available as kit 9049A52.

**9013GHG, GSG - with or without Form X**




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

### Table 22.66: Special Features and Modifications for Type G Devices *[14]*

| Description | Applies to | Form |
|---|---|---|
| Standard pack of 10 switches*[15]* | All Type G | C10 |
| 3-way lever (On-Auto-Off) (not compatible with Form X) | GHG, GMG, GSG | E |
| 1 N.O., 1 N.C. contact | All Type G | H |
| Pulsation plug (not field replaceable.) | All Type G | P |
| Reverse action (Select pressure code from Table 22.60) | All Type G | R |
| Slip-on connectors (load side terminals only) | All Type G | U |
| Slip-on connectors (line and load terminals) | All Type G | U2 |
| Two-way pressure release valve (Not compatible with Form E) | GHB, GMG, GSB, GHG, GSG | X |
| | GHR, GHW, GSR, GSW | X |
| 1/4" male pipe thread on pressure connection | All Type G | Z |
| 1/2"-14 NPT external 1/4"-18 NPT internal*[16]* | All Type G | Z16 |

### Table 22.67: Class 9049 Accessories for Class 9013 Pressure Switches

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

*[14]* Some product configurations are not available—contact your Schneider Electric representative for details.
*[15]* Available on GHB, GHG, GSB, and GSG.
If Form C10 is not speciied, devices will be shipped individually packaged
*[16]* UL Listed industrial control equipment.

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Type DG2

File No. E12158
File No. E12443
Haz Loc



Type GG

File LR25490
File LR26817
Haz Loc

## Open Tank or Sump Applications

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

For accessories, refer to page 22-30.

### Table 22.68: Class 9036, 2-Pole, Single Lever Operated

| Contact Operation | NEMA 1 Type | NEMA 4 Type | NEMA 7, 9 Type |
|---|---|---|---|
| Close on liquid rise | DG2 | DW31 | DR31 |
| Open on liquid rise | DG2R | DW31R | DR31R |
| Close on liquid rise | GG2 | GW1 | GR1 |
| Open on liquid rise | GG2R | GW1R | GR1R |

Order the universal mounting bracket and float accessory kits separately from the Class 9049 Accessories section on page 22-30. Types GW and GR use a center-hole float. Devices with Form C use a center-hole float. All others use a tapped-at-top float.

### Table 22.69: Modifications *[1]*

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

### Table 22.70: Class 9049 Float Accessory Specifications (oz)

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

*[1]* Some product configurations are not available—contact your Schneider Electric representative for details.

*[2]* Buoyancy data is calculated for use in water. Consult factory for buoyancy data in media with a different specific gravity than water.
**When ordering float accessories,** first specify the desired float accessory package, such as 9049A6 or 9049A6CS, then as a second item give the number of additional rod kits required. For example, for a 9049A6 with 15 ft of rod, order as follows:
Item A = 9049A6, quantity = 1; Item B = 9049T1, quantity = 4.

*[3]* Net buoyancy of float has been calculated with float 80% submerged, thus allowing 20% factor of safety.

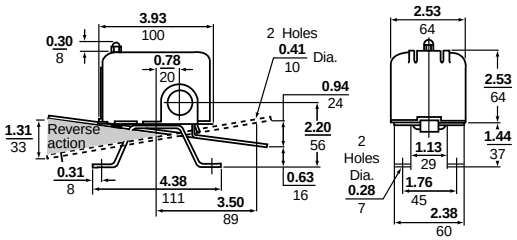


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### Table 22.71: Maximum Forces at Which Switches Are Tested (oz)

| Type | Force Up To Trip | Force Down To Trip | Weight Supported with Compensating Spring | Type (with or without Form H) | Lever Length Position | Force Up to Trip | Force Down to Trip | Weight Supported with Compensating Spring at Max. Adjustment (oz) |
|---|---|---|---|---|---|---|---|---|
| DG2 | 9 | 8 | 60 | GG2 | Short | 33 | 39 | *[4]* |
| DG2 Form R | 8 | 8 | 60 | GG2 | Long | 21 | 27 | 100 |
| DW31 | 8 | 8 | 66 | GG2 Form R | Short | 30 | 24 | *[4]* |
| DW31 Form R | 8 | 8 | 66 | GG2 Form R | Long | 22 | 16 | 150 |
| DR31 | 8 | 8 | 66 | GR1, GW1 | Short | 24 | 31 | 80 |
| DR31 Form R | 8 | 8 | 66 | GR1, GW1 | Medium | 22 | 29 | 72 |
| | | | | GR1, GW1 | Long | 20 | 27 | 64 |

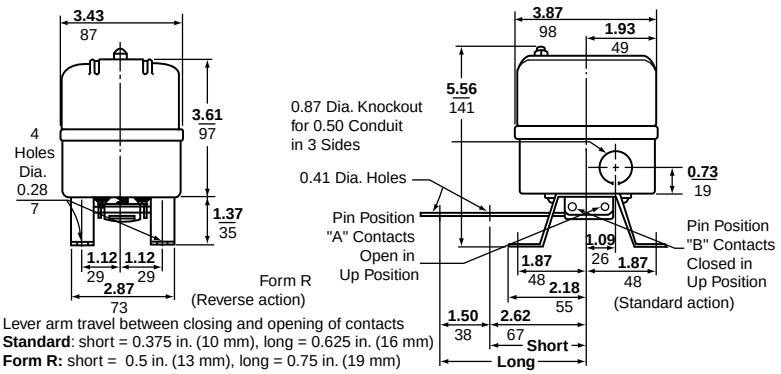
**Type DG Dimensions**




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

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

**Type GG Dimensions**




Lever arm travel between closing and opening of contacts
**Standard**: short = 0.375 in. (10 mm), long = 0.625 in. (16 mm)
**Form R:** short = 0.5 in. (13 mm), long = 0.75 in. (19 mm)

For Type GR/GW dimensions, see catalog 9034CT9701.

### Table 22.72: Electrical Ratings for All Float Switches

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



9036FG, 9049A60, and 9049A61

## Open Tank or Sump Applications, Float Switch, Class 9036 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.

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

### Table 22.73: Type FG Float Switch and Accessories

| Description | Class | Type |
|---|---|---|
| 2-pole, NEMA 1, contacts close on liquid rise | 9036 | FG30 |
| Plastic center hole float (1 required) | 9049 | A60 |
| 33.75 inch aluminum rod, 2 float stop assemblies and attaching hardware (1 required) | 9049 | A61 |

*[4]* Compensating spring not effective in combination with Short lever length position.
*[5]* See 1993 NEC Article 430-84

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9037EG with
9049ER3 Rod Kit and
9049EF1 Float

## Closed Tank, Class 9037 Type E

Type E switches are flange mounted and float movement is transmitted through a Quad-Ring® seal.

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. Consult Schneider Electric for use in media with a different specific gravity than water.

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

### Table 22.74: Class 9037 Type E

| Application | Post Length L (in.) | NEMA 1 Type | NEMA 4 Type | NEMA 7 & 9 Type |
|---|---|---|---|---|
| For minimum water level change | 2-5/8 | EG8 | EW8 | ER8 |
| | 4-11/16 | EG10 | — | — |
| For maximum water level change | 2-5/8 | EG9 | EW9 | ER9 |
| | 4-11/16 | EG13 | EW13 | — |

### Table 22.75: Class 9049 Floats for Type E Switches

| Description | Type |
|---|---|
| #304 stainless steel | EF1 |
| #316 stainless steel | EF2 |

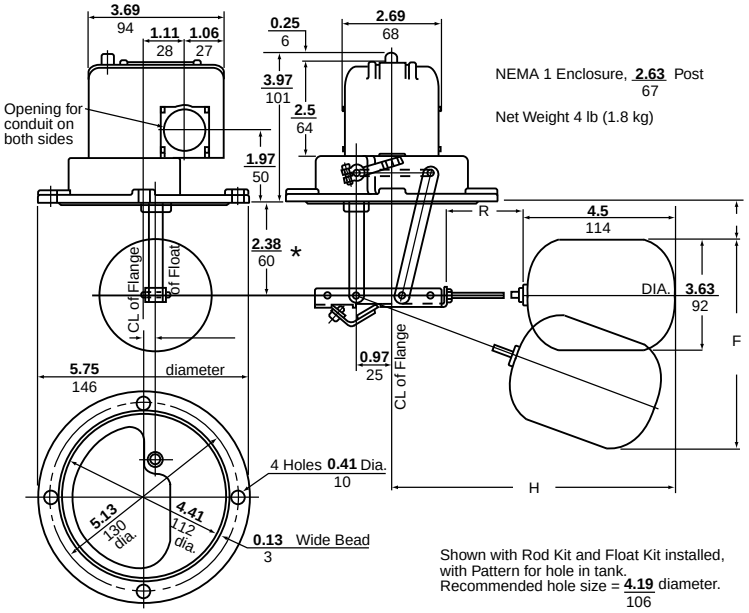
### Table 22.76: Class 9049 Float Rod Kits

| Type | A (in.) | F (in.) | R (in.) | H (in.) |
|---|---|---|---|---|
| ER1 | 1.00 | 4.75 | 1.75 | 8.25 |
| ER2 | 1.00 | 4.75 | 2.5 | 9.00 |
| ER3 | 1.00 | 4.75 | 3.50 | 9.50 |
| ER5 | 1.00 | 4.75 | 5.25 | 11.75 |
| ER7 | 1.00 | 5.00 | 7.25 | 13.75 |
| ER12 | 1.00 | 5.75 | 12.25 | 18.75 |

File No. E12158 and E12443 Haz Loc

File 25490 except Types ER8, ER9

**Type EG Dimensions, in. (mm)**
For 9037ER/EW dimensions and rod positions, see catalog 9034CT9701




* Short length (Dimension L)

Shown with Rod Kit and Float Kit installed, with Pattern for hole in tank.
Recommended hole size = 4.19 diameter.
106



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## Type H Switches

Type H switches are attached to the tank by means of a 2-1/2 in. screw-in bushing. An external pointer indicates the float position within the tank when the unit is mounted. Switches come complete with stainless steel float and rod. A 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.
Ambient temperature ratings: Min. -30 °C (-22 °F); Max. +105 °C (+220 °F)



Type HG35
Float on Right, 90° Offset Rod

File No. E12158 and E12443 Haz Loc

File LR25490, File LR26817 Haz Loc

**Table 22.77: 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 (Field Adjustable) | | NEMA 1 | NEMA 4 | NEMA 7 & 9 |
|---|---|---|---|---|---|---|
| | | Min. (in.) | Max. (in.) | Type | Type | Type |
| Right | 45° | 2 | 5 | HG33 | HW33 | HR33 |
| | 90° Offset | 2 | 5 | HG35 | HW35 | HR35 |
| | | | 7 | HG37 | HW37 | HR37 |
| | | | 8-1/4 | HG39 | HW39 | — |
| | | | 11-1/2 | HG31 | HW31 | HR31 |
| Left | 45° | 2 | 5 | HG34 | HW34 | HR34 |
| | 90° Offset | 2 | 5 | HG36 | HW36 | HR36 |
| | | | 7 | HG38 | — | HR38 |
| | | | 8-1/4 | HG30 | HW30 | HR30 |
| | | | 11-1/2 | HG32 | HW32 | HR32 |

**NOTE:** For replacement floats, see Class 9049 Type H on page 22-30. Types shaded in gray are available with Form Z19; see Table 22.79 on page 22-27. See Accessories and Renewal Parts on page 22-30.

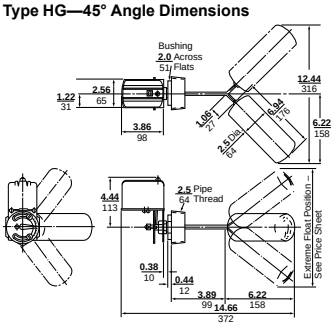
**Table 22.78: Type H Float Travel Distances**

| Float Rod Angle | R in. (mm) | H [6] in. (mm) | f1 in. (mm) | | f2 in. (mm) | | F in. (mm) | |
|---|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum |
| 45° | — | 6.22 (158) | 2.25 (57) | 4.50 (114) | 2.00 (52) | 4.50 (110) | 4.25 (108) | 9.00 (229) |
| 90° offset | 3.00 (76) | 4.25 (108) | 2.75 (70) | 4.25 (108) | 2.25 (57) | 4.25 (108) | 5.00 (127) | 7.50 (191) |
| | 4.25 (108) | 5.50 (140) | 3.50 (89) | 5.50 (140) | 2.75 (70) | 4.00 (102) | 6.25 (159) | 9.50 (241) |
| | 5.00 (127) | 6.25 (159) | 3.75 (95) | 6.25 (159) | 3.00 (76) | 4.50 (110) | 6.75 (171) | 10.75 (273) |
| | 7.00 (178) | 8.25 (210) | 4.75 (121) | 8.25 (210) | 3.75 (95) | 5.75 (146) | 8.50 (216) | 14.00 (356) |

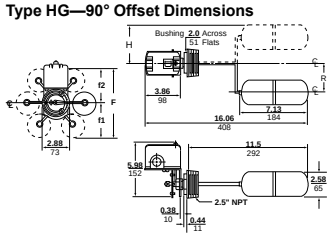
**Table 22.79: Available Modifications For Class 9037 Type H** *[7]*

| Description | Form |
|---|---|
| Omit 2-1/2" tank connecting bushing | F3 |
| Omit float | L |
| Reverse action, contacts open on rise | R |
| Viton® packing: 5 oz. float (diesel fuel) for Types shaded in gray in Table 22.77 above. | Z19 |
| Viton packing (suitable for applications up to +250 °F) | Z20 |
| #316 stainless steel float and Viton packing | Z21 |

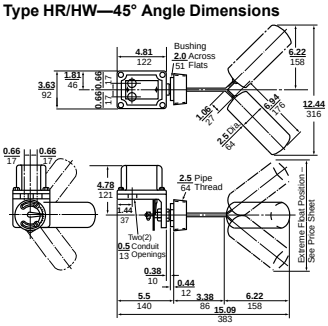
**Type HG—45° Angle Dimensions**



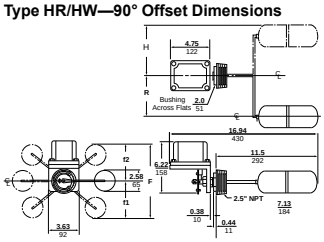

**Type HG—90° Offset Dimensions**




**Type HR/HW—45° Angle Dimensions**




**Type HR/HW—90° Offset Dimensions**

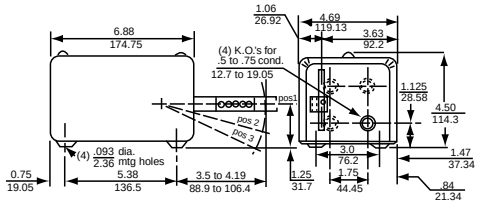



*[6]* Clearance from the centerline of the hub to the side of the tank.
*[7]* Some product configurations are not available—contact your Schneider Electric representative for details.

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Type AG1
Mechanical Alternator, Float Operated




Type A Dimensions, in. (mm)

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

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

## Type A, Open Tank

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

**Table 22.80: Class 9038 Type A**

| Application | Description | NEMA 1 Type | NEMA 4 Type | NEMA 7 and 9 Type |
|---|---|---|---|---|
| For open tank or sump systems using duplex pumps | Mechanical alternator float operated | AG1 | AW1 | AR1 |

**NOTE:** For use with Class 9049 float accessories listed on page 22-30.
Type AW and AR alternators **must** use center hole floats.

**Table 22.81: Operating Forces—Types AG, AR and AW**

| Type | Without Compensating Spring (No Form C) | | With Compensating Spring (Form C) | | | |
|---|---|---|---|---|---|---|
| | | | Maximum Weight of Rod and Stops Supported | Length of Rod Supported at the Maximum Adjustment | | |
| | Force Up *[8]* | Force Down | Note: AW1 and AR1 have compensating spring standard. | Brass *[9]* | Stainless Steel *[9]* | Aluminum *[9]* |
| 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 |

## Type C, Closed Tank, with Bushing

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

Type C switches are attached to the tank by means of a 2-1/2 in. screw-in bushing. 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 CG36
Float on left

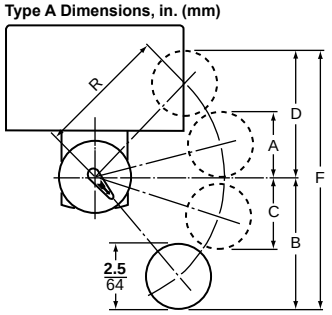
**Table 22.82: Class 9038 Type C**

| Float Position Viewed from Front of Switch Facing Indicator Scale | R in. (mm) | Approx. Water Level Change | | NEMA Type 1 | NEMA Type 4 | NEMA Type 7, 9 |
|---|---|---|---|---|---|---|
| | | Min. (in.) | Max. (in.) | Type | Type | Type |
| Right | 7 (178) | 6.5 (165) | 13 (330) | CG31 | CW31 | CR31 |
| Left | 7 (178) | 6.5 (165) | 13 (330) | CG32 | CW32 | CR32 |
| Right | 4.25 (108) | 4 (102) | 7.75 (197) | CG33 | CW33 | CR33 |
| Left | 4.25 (108) | 4 (102) | 7.75 (197) | CG34 | CW34 | CR34 |
| Right | 5 (127) | 4.75 (121) | 9.25 (235) | CG35 | — | — |
| Left | 5 (127) | 4.75 (121) | 9.25 (235) | CG36 | CW36 | CR36 |

**Table 22.83: Type C Float Travel Adjustments**

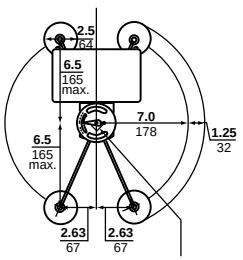
| R in. (mm) | A in. (mm) | | B in. (mm) | | C in. (mm) | | D in. (mm) | | F in. (mm) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| 7 (178) *[10]* | 2.5 (64) | 5 (127) | 5 (127) | 7 (178) | 2 (51) | 4 (102) | 5 (152) | 7 (178) | 10 (254) | 14 (495) |
| 5 (127) *[11]* | 2.25 (57) | 3.75 (95) | 4 (102) | 5.25 (133) | 2.75 (70) | 3 (76) | 4 (102) | 5.25 (133) | 8 (203) | 10.5 (267) |
| 4.25 (108) *[12]* | 2 (51) | 3.5 (89) | 3.5 (89) | 4.75 (121) | 2.5 (64) | 3.75 (95) | 3.5 (89) | 4.75 (121) | 7 (178) | 9.5 (241) |

**Type A Dimensions, in. (mm)**

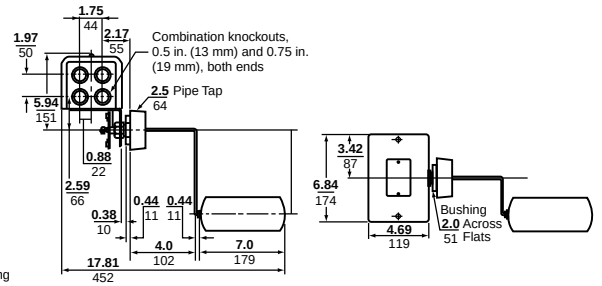



Replacement Float: 9049HF page 22-28

**Type CG Dimensions**




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




*[8]* Add 2 oz for Form N5 High Water alarm.
*[9]* Rod length has been determined using the weight of the rod material furnished on Class 9049 accessories (3/8" O.D. tubing). Other types of rod should be weighed and compared to the Maximum Weight of Rod column in Table 22.81.
*[10]* CG31, CG32, CW31, CW32, CR31, CR32
*[11]* CG35, CG36, CW35, CW36, CR35, CR36
*[12]* CG33, CG34, CW33, CW34, CR33, CR34



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

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

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

## Type D, Closed Tank, Top Mounted

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

### Table 22.84: Class 9038 Type D Contacts Close On Liquid Rise

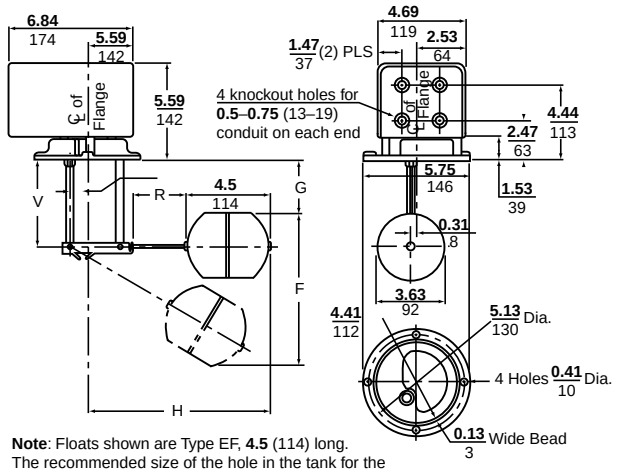
| Water Level Change | Hinge Post Dimension "V" (in.) | NEMA 1 Type | NEMA 4 Type | NEMA 7 and 9 Type |
|---|---|---|---|---|
| Min. | 2-5/8 | DG7 | DW7 | — |
| Max. | | DG8 | DW8 | DR8 |
| Min. | 4-11/16 | DG9 | — | — |
| Max. | | DG10 | — | — |

| Float Kits, For Use with Type D Switches | | Float Rod Kit, Class 9049 | | | | |
|---|---|---|---|---|---|---|
| Size and Material Diameter x Length (in.) | Class and Type | Type | R (in.) | H (in.) | G (in.) | F (in.) |
| | | ER1 | 1.75 | 8.25 | 3.25 | 8.75 |
| | | ER2 | 2.50 | 9.00 | 3.50 | 10.50 |
| 3.625 x 4.50, #304 stainless steel | 9049EF1 | ER3 | 3.25 | 9.50 | 3.50 | 11.00 |
| 3.625 x 4.50, #316 stainless steel | 9049EF2 | ER5 | 5.25 | 11.75 | 3.75 | 12.75 |
| 2.50 x 7, #304 stainless steel | 9049HF3 | ER7 | 7.25 | 13.75 | 4.00 | 14.50 |
| 2.50 x 7, #316 stainless steel | 9049HF4 | ER12 | 12.25 | 18.75 | 4.75 | 19.00 |

### Table 22.85: Available Modifications for All Mechanical Alternators *[13]*

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

**Type DG Dimensions, in. (mm)**




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

### Table 22.86: Temperature Ratings for Class 9038

| Description | | Rating |
|---|---|---|
| Ambient Temperature | | -22 to 200 °F (-30 to 93 °C) |
| Media | Buna-N Seal | Up to 215 °F (102 °C) |
| | Viton® Seal | Up to 250 °F (121 °C |

*[13]* Some product configurations are not available—contact your Schneider Electric representative for details.

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## Accessories for Float Switches

To order, specify the Class and Type number of the kit.

**Table 22.87: Class 9049 Accessories for Float Switches**

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

## Renewal Parts for Class 9012–9038 Devices

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

To order, specify the Class and Type number of the kit.

**Table 22.88: Class 9998 Renewal Parts Kits for Class 9012–9038 Devices**

| Description / Equipment To Be Serviced9thl | | Parts Kit Type |
|---|---|---|
| Actuator Assembly | 9012GA, GD, GG, GK, GN, GR 5, 25, 55 Series C only | PC268*[1]* |
| | 9012GA, GD, GG, GK, GN, GR 6, 26, 36, 46, 56 Series C only | PC269 |
| | 9012GB, GE, GH1, 21, 31, 41, 51; GL, GP, GS1 | PC177*[1]* |
| | 9012GB, GE, GH2, 22, 32, 42, 52; GL, GP, GS2 | PC178*[1]* |
| Contact Kit (2-Pole Contacts) | 9013FHG22, 29, 32, 39, 52, 59; 9013 FYG; 9036DG, DR, DW; 9037EG, ER, EW, HG, HR, HW30–39; 9038 All Types (2 Kits Required); obsolete 9013HHGY, HSGY; HSWY; 9037HEG, HSG3, 4; 9035DG10, DW10 (This kit also contains a replacement diaphragm for pressure switches. The diaphragm fits pressure switch only.) | PC242 |
| | 9013GHG, GSG, GHR, GSR, GMG; 9036GG, GR, GW; 9037GG Series C All except Forms H & R; 9016GVG, Form R | PC205 |
| | 9013GHG, GSG, GSR, GMG; 9036GG, GR, GW; 9037GG, GR, GW Series C Form H only; 9016GVG, Form H | PC206 |
| | 9013GHG, GSG, GHR, GSR, GMG; 9036GR, GW: Series C Form R only; 9016GVG | PC207 |
| Contact Replacement Kit | 9013FHG2 thru 19, 42 thru 49, all FSG (Complete contact replacement kit—includes new diaphragm) | PC241 |
| Diaphragm Assembly | 9012GA, GD, GN, GR1, 21 Series C only | PC265 |
| | 9012GA, GD, GG, GK, GN, GR 2, 3, 22, 52 Series C only | PC266*[1]* |
| | 9012GA, GD, GG, GK, GN, GR4, 24, 54 Series C only | PC267*[1]* |
| | Convoluted diaphragm assembly for 9013GHG, GSG: Series C | PC208 |
| | 9013GHW, GSW; and GSW, GHR: Series C | PC211 |
| | 9016 GAW-1, 21 | PC233 |
| Gasket Kit | Contains all replaceable gaskets for all 9012 open, NEMA 1, 4, 4X, 13 devices | PC184 |
| Pilot Light, 24 Vdc | 9012, 9016G Forms G7, G8, G9, G10, G21, G22 | PC305 |
| Piston Assembly | 9012GC, GF, GJ, GQ, GT1, 21, 31, 41, 51 Series C only | PC270*[1]* |
| | 9012GC, GF, GJ, GQ, GT2, 22, 32, 42, 52 Series C only | PC271*[1]* |
| | 9012GC, GF, GQ, GT4, 24, 34, 44, 54 Series C only | PC273 |
| Seal Kit | Buna N, for Series A devices: 9037HG/HW/HR30–39; 9038CG/CW/CR31–36 | PC337 |
| | Viton®, for Series A devices with Form Z19 or Z20: 9037HG/HW/HR30–39; 9038CG/CW/CR31–36 | PC338 |
| Seal Tube Kit | Buna N Quad-Ring®, for Series C devices: 9037HG/HW/HR3–12; 9038CG/CW/CR1–6 | PC282 |
| | Viton Quad-Ring, for Series C devices: 9 037HG/HW/HR3–12; 9038CG/CW/CR1–6 | PC333 |
| Snap Switch | SPDT, for 9012GA, GB, GC, GD, GE, GF, GG, GH, GJ single pole; except Forms E2, E3, E4, H3: Series C only | PC313 |
| | DPDT, for 9012GA, GB, GC, GD, GE, GF, GG, GH, GJ double pole; except Forms E2, E3, H6, H7: Series C only | PC314 |
| Switch Mechanism | 9036DR1, DW1 Series B | PC285 |

*[1]* If one of these **Form** designations appears on the pressure switch nameplate, complete the 9998 PC number by adding that same **Form suffix** from page 22-18, and add the Form price to the kit price.



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## California Proposition 65 Message

⚠ **WARNING:** Some of the products listed in this document can expose you to chemicals which are known to the State of California to cause cancer, birth defects, or other reproductive harm.

For more information, go to https://www.p65warnings.ca.gov/.

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