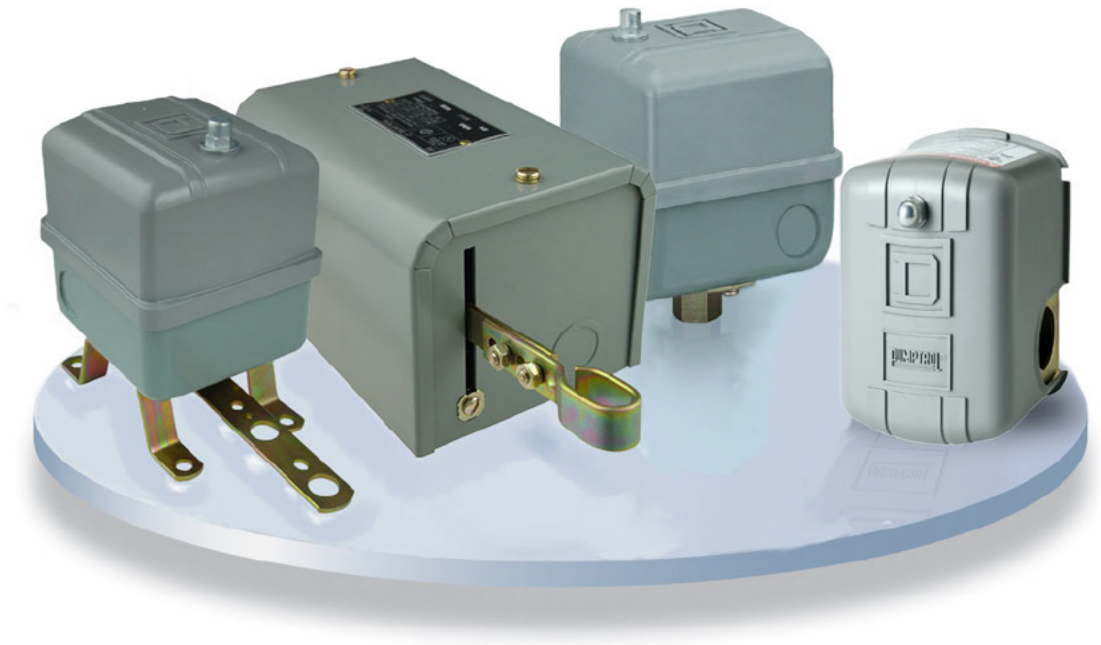
# Commercial Pressure and Float Switches for Power Circuits

Catalog
9034CT9701R01/11
Class 9013, 9036, 9037, 9038

PUMPTROL™



SQUARE D
by Schneider Electric

# Table of Contents

# Selection Guide—Pumptrol™ Commercial Pressure Switches

## Class 9013 Electromechanical, Conforming to UL508 and CSA

| Pumptrol Family | | 9013FSG | 9013FTG | 9013FYG |
|---|---|---|---|---|
| Applications | Type of Installation | Power circuit | Power circuit | Power circuit |
| | Controls | Fresh or sea water | Fresh or sea water | Fresh or sea water |
| | Type of Operation | Regulation between 2 thresholds (adjustable differential). Suitable for all pumps. | Detection of a single threshold (non-adjustable differential) | Regulation between 2 thresholds (adjustable differential). For higher hp and pressure requirements. |

| | | | | |
|---|---|---|---|---|
| Size / Range | psi | 20–80 | 20–65 | 25–80 |
| | bar | 1.38–4.48 | 1.38–4.48 | 1.72–5 52 |
| Conforming to Standards | | NEMA A600 UL508 | UL508 | NEMA A600 UL508 |
| Product Certifications | | UL File: E12158 CCN NKPZ<br>CSA File: LR 25490<br>Class 3211 06 | UL File: E12158 CCN NKPZ<br>CSA File: LR 25490<br>Class 3211 06 | UL File: E12158 CCN NKPZ<br>CSA File: LR 25490<br>Class 3211 06 |
| Dimensions (l x h x w) in inches (mm) | | 3.76 x 2.8 x 2.78<br>(95.5 x 71.12 x 70.6) | 3.76 x 2.8 x 2.78<br>(95.5 x 71.12 x 70.6) | 3.76 x 2.8 x 2.78<br>(95.5 x 71.12 x 70.6) |
| Contact Blocks (snap action contacts) | | 2 N.C. | 2 N.C. | 2 N.C. |
| Degree of Protection | | NEMA Type 1, NEMA Type 3R, and IP20 | NEMA Type 1, NEMA Type 3R, and IP20 | NEMA Type 1, NEMA Type 3R, and IP20 |
| Connections | Electrical | Screw terminals | Screw terminals | Screw terminals |
| | Fluid | Multiple | Multiple | Multiple |
| Cable Entries | | 2 | 2 | 2 |
| Catalog Numbers | | **9013FSG•••** | **9013FTG•••** | **9013FYG•••** |
| Specifications | | Page 19 | Page 19 | Page 19 |
| Interpretation of Catalog Numbers | | Page 24 | Page 27 | Page 29 |
| Other versions:<br>Form B7, one grommet, CE<br>Form B8, two grommets, CE<br>**NOTE:** Inclusion of B7 or B8 grommets will negate UL/CSA approvals for the device, but they may be used for applications which do not require UL/CSA approvals. | | <br>—<br>— | <br>—<br>— | <br>—<br>— |

| Pumptrol Family | | 9013FRG | 9013FHG | 9013G |
|---|---|---|---|---|
| Applications | Type of Installation | Power circuit | Power circuit | Power circuit |
| | Controls | Fresh or sea water | Air only | Water or air |
| | Type of Operation | Reverse acting, contacts open on falling pressure (adjustable differential) | Control of electrically driven air compressors, contacts open on rising pressure (fixed differen ial, adjustable cut-out), diaphragm actuated | Light industrial, with higher electrical ratings for direct control of motors in pumps and compressors, contacts open on rising pressure (adjustable differential) |
| | |  |  |  |
| Size / Range | psi | 8–150 | 40–200 | 10–250 |
| | bar | 0.41–10 34 | 2.76–13.79 | 0.69–17.24 |
| Conforming to Standards | | NEMA A300 UL508 | NEMA A600 UL508 | NEMA A600 UL508 |
| Product Certifications | | UL File: E12158 CCN NKPZ<br>CSA File: LR 25490<br>Class 3211 06 | UL File: E12158 CCN NKPZ<br>with Form T<br>CSA File: LR 25490<br>Class 3211 06 | UL File: E12158 CCN NKPZ<br>(except GHR and GSR)<br>UL File: E12443 CCN NOWT<br>(for GHR and GSR)<br>CSA File: LR 25490 Class 3211 06<br>(except GHR and GSR)<br>CSA File: LR 26817 Class 3218 05<br>(for GHR and GSR) |
| Dimensions (l x h x w) in inches (mm) | | 3.76 x 2.8 x 2.78<br>(95.5 x 71.12 x 70.6) | 3.76 x 2.8 x 2.78<br>(95.5 x 71.12 x 70.6) | 3.68 x 3.85 x 3.44<br>(93.47 x 97.79 x 87.37) |
| Contact Blocks (snap action contacts) | | 2 N.O. | 2 N.C. | 2 N.C. |
| Degree of Protection | | NEMA Type 1, NEMA Type 3R, and IP20 | NEMA Type 1, NEMA Type 3R, and IP20 | NEMA Type 1, NEMA Type 3R, NEMA Type 7, NEMA Type 9, and IP20 |
| Connections | Electrical | Screw terminals | Screw terminals | Screw terminals |
| | Fluid | Multiple | Multiple | Multiple |
| Cable Entries | | 2 | 2 | 3 knock-outs available |
| Catalog Numbers | | **9013FRG•••** | **9013FHG•••** | **9013G•••** |
| Specifications | | Page 20 | Page 20 | Page 20 |
| Interpretation of Catalog Numbers | | Page 21 | Page 21 | Page 21 |
| Other versions:<br>Form B7, one grommet, CE<br>Form B8, two grommets, CE<br>**NOTE:** Inclusion of B7 or B8 grommets will negate UL/CSA approvals for the device, but they may be used for applications which do not require UL/CSA approvals. | | —<br>— | —<br>— | —<br>— |

# Selection Guide—Float Switches

## Class 9036 Type D—Open Tank, General Purpose

| | | | |
|---|---|---|---|
| **Type of Installation** | **Horsepower rated** | | |
| **Product Features** | **2-pole switch, lever operated**<br>**Standard action—contacts close on liquid rise**<br>**Reverse action—contacts open on liquid rise** | | |
| |  |  | |
| **Fluids Controlled** | Water, hydraulic oils, corrosive fluids | | |
| **Fluid Characteristics** | Fresh water, sea water, hydraulic oils, and corrosive fluids with a density ≥ 0.8 | | |
| **Contact Arrangement** | **Standard**: 2 N.O. (DPST), **Form R**: 2 N.C. (DPST), **Form H**: 1 N.O. and 1 N.C. (SPDT) | | |
| **Degree of Protection** | NEMA Type 1 | NEMA Type 4 | NEMA Type 7, 9 |
| **Electrical Connection** | 4 screw terminals, 3 knockouts for 1/2 in. conduit entry | 4 screw terminals, 2 cable entries, 3/4-14 conduit entry | |
| **Ambient Temperature** | –22 to +220 °F (–30 to +105 °C) | | |
| **Catalog Numbers** | **9036DG** | **9036DW** | **9036DR** |
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## Class 9036 Type G—Open Tank, Heavy Duty

| | |
|---|---|
| **Type of Installation** | **Horsepower rated** |
| **Product Features** | **2-pole switch**<br>**Standard action—contacts close on liquid rise**<br>**Reverse action—contacts open on liquid rise** |

| | | | |
|---|---|---|---|
| **Fluids Controlled** | Water, hydraulic oils, corrosive fluids | | |
| **Fluid Characteristics** | Fresh water, sea water, hydraulic oils, and corrosive fluids wi h a density ≥ 0.8 | | |
| **Contact Arrangement** | **Standard**: 2 N.O. (DPST), **Form R**: 2 N.C. (DPST), **Form H**: 1 N.O. and 1 N.C. (SPDT) | | |
| **Degree of Protection** | NEMA Type 1 | NEMA Type 4 | NEMA Type 7, 9 |
| **Electrical Connection** | 4 screw terminals, 3 knockouts for 1/2 in. conduit entry | 4 screw terminals, 2 cable entries, 3/4-14 conduit entry | |
| **Ambient Temperature** | –22 to +220 °F (–30 to +105 °C) | | |
| **Catalog Numbers** | **9036GG** | **9036GW** | **9036GR** |
| **Page** | 49 | | |

## Class 9049—Accessories for Class 9036 Type D and G

| Accessory Kits | Tapped-at-Top Floats (#304 SS) [1] | | | Center-Hole Floats (#304 SS) [2] | | | Additional Tubing [3] | | |
|---|---|---|---|---|---|---|---|---|---|
| |  | | |  | | |  | | |
| **Tubing (rods)** | 5 ft brass | 5 ft Al | 5 ft SS | 5 ft brass | 5 ft Al | 5 ft SS | 2.5 ft brass | 2.5 ft Al | 2.5 ft SS |
| **Net buoyancy in water 7 in. float [4]** | 60 | 60 | 60 | 70 | 70 | 70 | — | — | — |
| **Total weight of stops oz (g)** | 3 (85) | 3 (85) | 3 (85) | 6 (170) | 6 (170) | 6 (170) | — | — | — |
| **Number of stops** | 2 | 2 | 2 | 4 | 4 | 4 | — | — | — |
| **Weight of the included 5 ft rod oz (g)** | 18.5 (524) | 6 (170) | 16.9 (479) | 18.5 (524) | 6 (170) | 16 9 (479) | — | — | — |
| **Weight per ft of extra rod oz (g)** | 3.7 (105) | 1.2 (34) | 3.4 (96) | 3.7 (105) | 1.2 (34) | 3.4 (96) | 3.7 (105) | 1.2 (34) | 3.4 (96) |
| **Catalog Numbers** | **9049A6** | **9049A6A** | **9049A6S** | **9049A6C** | **9049A6CA** | **9049A6CS** | **9049T1** | **9049T1A** | **9049T1S** |
| **Page** | 50 | | | | | | | | |

1 Maximum recommended tubing length for tapped-at-top float: 12.5 ft (3810 mm).

2 Maximum recommended tubing length for center-hole float: 30 ft (9144 mm).

3 Additional tubing kits add on to float accessory kits and include a connector.

4 Net buoyancy calculated with the float 80% submerged, allowing for a 20% operating margin. Buoyancy data calculated for use in water. Contact the Sensor Competency Center for buoyancy data in media having a specific gravity different than water (1.0).

**NOTE:** When ordering float accessories, first specify the desired accessory kit, then as a second item, give the catalog number and the quantity of the additional tubing kits required. For example, for a 9049A6C kit with 15 ft of tubing, specify:

- 9049A6C, quantity = 1 (float with 5 ft of tubing)
- 9049T1, quantity = 4 (2.5 ft of tubing each, for a total of 10 additional ft)

### Compensating Spring

Compensating springs support the weight of long rods that cannot be supported by center-hole floats.

**Example**

| **Calculation example**<br>Measuring 15 ft of tank depth<br>*System has 15 ft of brass rod, 4 stops, and a center hole float.*<br>Buoyancy is positive, so no compensating spring is required | | |
|---|---|---|
| | **Float buoyancy** | 70.0 oz |
| | **Total weight** | (61.5 oz) |
| | Weight of stops: | (6.0 oz) |
| | Weight of 5 ft of brass rod (included): | (18.5 oz) |
| | Weight of 10 ft of brass rod (separate): | (37.0 oz) |
| | **Buoyancy** | 8.5 oz |

## Class 9036 Type FG—Open Tank, Pedestal Style

| | | | |
|---|---|---|---|
| **Type of Installation** | **Horsepower rated** | | |
| **Product Features** | **2-pole switch, forward or reversing**<br>**Contacts open or close on liquid rise (field convertible)** | | |
| |  |  |  |
| **Fluids Controlled** | Water, hydraulic oils, corrosive fluids | | |
| **Fluid Characteristics** | Fresh water, sea water, hydraulic oils, and corrosive fluids with a density ≥ 0.8 | | |
| **Contact Arrangement** | 2 N.O. or 2 N.C. (DPST), depending on rod connection | | |
| **Degree of Protection** | NEMA Type 1 | | |
| **Electrical Connection** | 4 screw terminals, 2 cable entries 0.88 in. (22.4 mm) with 0.84 in. (21.3 mm) across flat | | |
| **Ambient Temperature** | –22 to +220 °F (–30 to +105 °C) | | |
| **Catalog Numbers** | **9036FG** | **9049A60** | **9049A61** |
| **Description** | 2-pole, pedestal-style sump pump switch | Plastic, center-hole float | 33.75 in. aluminum rod, 2 float stop assemblies, and attaching hardware |
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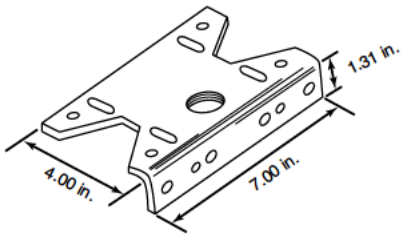
## Class 9049 Type UMS1—Universal Mounting Plate

| | |
|---|---|
| **Description** | **Mounting plate** |
| **Product Features** | **Pedestal mount** |

| | |
|---|---|
| **Material** | Cold rolled steel |
| **Finish** | Painted, powder coated |
| **Mounting Connection** | Threaded to accept 1 in. diameter iron pipe |
| **Catalog Numbers** | **9049UMS1** |
| **Page** | 67 |

**Figure 1: 9049UMS1 Dimensions**



## Class 9037 Type E—Closed Tank, Flange Mounted

| | |
|---|---|
| **Type of Installation** | **Horsepower rated** |
| **Product Features** | **2-pole switch**<br>**Standard action—contacts close on liquid rise**<br>**Reverse action—contacts open on liquid rise** |

| | | | |
|---|---|---|---|
| **Fluids Controlled** | Water, hydraulic oils, corrosive fluids | | |
| **Fluid Characteristics** | Fresh water, sea water, hydraulic oils, and corrosive fluids with a density ≥ 0 8 | | |
| **Contact Arrangement** | **Standard**: 2 N.O. (DPST), **Form R**: 2 N.C. (DPST) | | |
| **Degree of Protection** | NEMA Type 1 | NEMA Type 4 | NEMA Type 7, 9 |
| **Electrical Connection** | 4 screw terminals, 3 knockouts for 1/2 in. conduit entry | 4 screw terminals, 2 cable entries, 3/4-14 conduit entry | |
| **Ambient Temperature** | –22 to +220 °F (–30 to +105 °C) | | |
| **Catalog Numbers** | **9037EG** | **9037EW** | **9037ER** |
| **Page** | 53 | | |

**NOTE:** For float and rod kits, refer to page 55.

# Class 9037 Type H—Closed Tank with Bushing

| | |
|---|---|
| **Type of Installation** | **Horsepower rated** |
| **Product Features** | **2-pole switch**<br>**Standard action—contacts close on liquid rise**<br>**Reverse action—contacts open on liquid rise** |

| | | | |
|---|---|---|---|
| **Fluids Controlled** | Water, hydraulic oils, corrosive fluids | | |
| **Fluid Characteristics** | Fresh water, sea water, hydraulic oils, and corrosive fluids with a density ≥ 0.8 | | |
| **Contact Arrangement** | **Standard**: 2 N.O. (DPST). **Form R**: 2 N.C. (DPST). [1] | | |
| **Degree of Protection** | NEMA Type 1 | NEMA Type 4 | NEMA Type 7, 9 |
| **Electrical Connection** | 4 screw terminals, 3 knockouts for 1/2 in. conduit entry | 4 screw terminals, 2 cable entries, 3/4-14 conduit entry | |
| **Ambient Temperature** | –22 to +220 °F (–30 to +105 °C) | | |
| **Catalog Numbers** | **9037HG** | **9037HW** | **9037HR** |
| **Page** | 57 | | |

1 NEMA Type 1 devices can be field modified for reverse action. NEMA Type 4, 7, and 9 devices **cannot** be field modified for reverse action.

# Class 9038 Type A—Mechanical Alternator, Open Tank

| | |
|---|---|
| **Type of Installation** | **Horsepower rated** |
| **Product Features** | **4-pole switch**<br>**Standard action—contacts close on liquid rise**<br>**Reverse action—contacts open on liquid rise** |

| | | | |
|---|---|---|---|
| **Fluids Controlled** | Water, hydraulic oils, corrosive fluids | | |
| **Fluid Characteristics** | Fresh water, sea water, hydraulic oils, and corrosive fluids with a density ≥ 0.8 | | |
| **Contact Arrangement** | 4 N.O. (2 DPST) | | |
| **Degree of Protection** | NEMA Type 1 | NEMA Type 4 | NEMA Type 7, 9 |
| **Electrical Connection** | 8 screw terminals, 4 knockouts for 1/2 in. or 3/4 in. conduit entry | 8 screw terminals, 2 cable entries, 3/4-14 conduit entry | |
| **Ambient Temperature** | –22 to +220 °F (–30 to +105 °C) | | |
| **Catalog Numbers** | **9038AG** | **9038AW** | **9038AR** |
| **Page** | 59 | | |

## Class 9038 Type C—Mechanical Alternator, Closed Tank

| | |
|---|---|
| **Type of Installation** | **Horsepower rated** |
| **Product Features** | **4-pole switch**<br>**Standard action—contacts close on liquid rise**<br>**Reverse action—contacts open on liquid rise** |

| | | | |
|---|---|---|---|
| **Fluids Controlled** | Water, hydraulic oils, corrosive fluids | | |
| **Fluid Characteristics** | Fresh water, sea water, hydraulic oils, and corrosive fluids wi h a density ≥ 0.8 | | |
| **Contact Arrangement** | 4 N.O. (2 DPST), alternating contacts | | |
| **Degree of Protection** | NEMA Type 1 | NEMA Type 4 | NEMA Type 7, 9 |
| **Electrical Connection** | 8 screw terminals, 8 knockouts for 1/2 in. or 3/4 in. conduit entry | 8 screw terminals, 2 cable entries, 3/4-14 conduit entry | |
| **Ambient Temperature** | –22 to +220 °F (–30 to +105 °C) | | |
| **Catalog Numbers** | **9038CG** | **9038CW** | **9038CR** |
| **Page** | 61 | | |

## Class 9038 Type D—Mechanical Alternator, Closed Tank

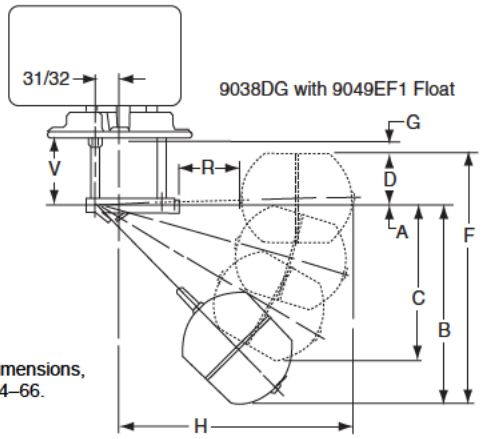
| | |
|---|---|
| **Type of Installation** | **Horsepower rated** |
| **Product Features** | **4-pole switch**<br>**Standard action—contacts close on liquid rise**<br>**Reverse action—contacts open on liquid rise** |

| | | | |
|---|---|---|---|
| **Fluids Controlled** | Water, hydraulic oils, corrosive fluids | | |
| **Fluid Characteristics** | Fresh water, sea water, hydraulic oils, and corrosive fluids with a density ≥ 0 8 | | |
| **Contact Arrangement** | 4 N.O. (2 DPST) | | |
| **Degree of Protection** | NEMA Type 1 | NEMA Type 4 | NEMA Type 7, 9 |
| **Electrical Connection** | 8 screw terminals, 8 knockouts for 1/2 in. or 3/4 in. conduit entry | 8 screw terminals, 2 cable entries, 3/4-14 conduit entry | |
| **Ambient Temperature** | –22 to +220 °F (–30 to +105 °C) | | |
| **Catalog Numbers** | **9038DG** | **9038DW** | **9038DR** |
| **Page** | 63 | | |

| Type of Installation | Float Kits | | | | Float Rod Kits | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| |  | | | |  | | | | | |
| **Material** | #304 SS | #316 SS | #304 SS | #316 SS | — | — | — | — | — | — |
| **Dimensions, in. (mm) Diameter x Length** | 3.625 x 4.5 (92 x 114) | 3.625 x 4.5 (92 x 114) | 2.5 x 7 (64 x 178) | 2.5 x 7 (64 x 178) | — | — | — | — | — | — |
| **R Dimension, in. (mm)** | — | — | — | — | 1.75 (44) | 2.50 (64) | 3.25 (83) | 5.25 (133) | 7.25 (184) | 12.25 (311) |
| **H Dimension, in. (mm)** | — | — | — | — | 8 25 (210) | 9.00 (229) | 9.50 (241) | 11.75 (298) | 13.75 (349) | 18.75 (476) |
| **Catalog Numbers** | **9049EF1** | **9049EF2** | **9049HF3** | **9049HF4** | **9049ER1** | **9049ER2** | **9049ER3** | **9049ER5** | **9049ER7** | **9049ER12** |
| **Pages** | 53, 63, 67 | | | | 55–56, 64–67 | | | | | |

**Figure 2: Float and Rod Kits**

9038DG shown with rod kit 9049ER5 and float kit 9049EF1 installed




For additional dimensions, refer to pages 64–66.

PUMPTROL™

# Electromechanical Pressure Switches, Class 9013 Types F and G

## Introduction

The Pumptrol Class 9013 Type F commercial pressure switches are UL Listed and CSA certified as commercial control equipment. Type G pressure switches are UL Listed and CSA certified as commercial / light industrial control equipment.

The Type FHG compressor pressure switch is used to control electrically driven air compressors. It is diaphragm actuated, and its contacts open on rising pressure.

The Type FSG, FTG, FYG, and FRG water pump pressure switches are used to control electrically driven water pumps. They are diaphragm actuated.

- The Type FSG standard water pump switch is suitable for all types of pumps, including jets, submersible, and reciprocating.
- The Type FTG fixed differential water pump switch is suitable for all types of pumps, including jets, submersible, and reciprocating. It is an ideal choice for OEM markets. Minimum quantity restrictions apply.
- The Type FYG is designed to meet higher horsepower and pressure requirements.
- The Type FRG is reverse acting: the contacts open on falling pressure.

The Type G commercial / light industrial pressure switch is used to control electrically driven water pumps and air compressors. It has higher electrical ratings for direct control of motors in pump and compressor applications. The Type G switch is diaphragm actuated, and its contacts open on rising pressure.

### Setting Points

Every pressure switch has two setting points: one on rising pressure and one of falling pressure. For pumps and compressors, the setting point on rising pressure is called the trip point or cut-out; the setting point on falling pressure is called the reset point or cut-in.

### Differential

The differential is the difference in pressure between the trip point (cut-out) and the reset point (cut-in). It can be adjustable or fixed. **Example**—Cut-in (30 psi) / Cut-out (50 psi): Differential = 20 psi

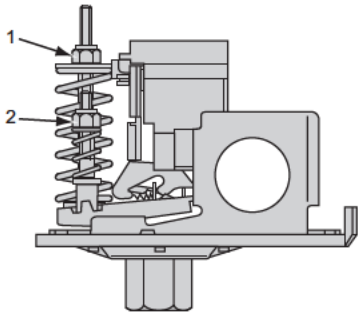
### Range

The range indicates the pressure limits within which the settings can be adjusted. The range is referenced to the setting point on rising pressure (trip point). The differential subtracts from the trip point setting. When using a diaphragm-actuated switch, system pressure during the normal operating cycle should never exceed the upper limit of the range. Excessive pressure will greatly reduce the life of the diaphragm.

### Maximum Allowable Pressure

Maximum allowable pressure is the pressure to which a switch can be subjected without causing a change in operating characteristics, shift in settings, or damage to the device. Pressure surges may occur in a system during the start up of a machine or from valve operation. Surges are not normally detrimental to the life of a switch if the surge is within the maximum allowable pressure rating of the switch. Diaphragm-actuated switches should not be subjected to more than 10 surges per day. More frequent surges will greatly reduce the life of the diaphragm.

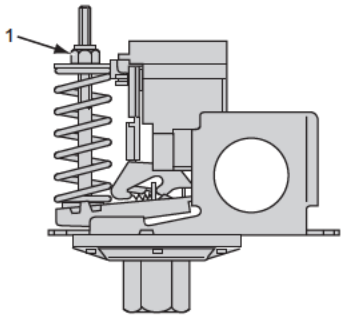
## Settings




### Pressure switches with adjustable differential (Types FSG, FYG, and FRG)

When setting the pressure switch, adjust the setting point on falling pressure first, then the setting point on rising pressure (PB).

- **Setting point on falling pressure**
  The setting point on falling pressure is set by adjusting range-nut **1**.
- **Setting point on rising pressure**
  The setting point on rising pressure is set by adjusting range-nut **2**.

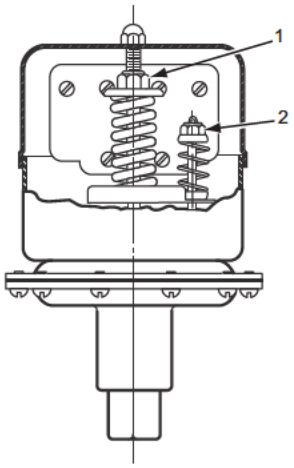



### Pressure switches with fixed differential (Types FTG and FHG)

Only the setting point on rising pressure is adjustable.

- **Setting point on rising pressure**
  The setting point on rising pressure is set by adjusting range-nut **1**.
- **Setting point on falling pressure**
  The setting point on falling pressure is not adjustable.

The difference between the tripping and resetting points of the contact is the inherent differential of the switch (due to factors such as contact differential and friction).




### Pressure switches with adjustable differential (Type G)

When setting the pressure switch, adjust the setting point on falling pressure first, then the setting point on rising pressure.

- **Setting point on falling pressure**
  The setting point on falling pressure is set by adjusting range-nut **1**.
- **Setting point on rising pressure**
  The setting point on rising pressure is set by adjusting range-nut **2**.

# General Specifications
# Types FSG/FSW, FTG/FTW, and FYG/FYW

**Table 1: Environment**

| Type | FSG/FSW | FTG/FTW | FYG/FYW |
|---|---|---|---|
| **Conforming to standards** | UL 508, NEC Ar icle 430-84, ANSI/NSF Standard 61, FDA 21CFR.2600 | | |
| **Product approvals** | UL File E12158 CCN NKPZ , CSA File LR 25490 Class 321106 | | |
| **Degree of protection** | IP20, NEMA Type 1 (Types F•G). NEMA Type 3R (Types F•W) must be mounted in vertical position to maintain enclosure rating. | | |
| **Operating position** | IP20 and NEMA Type 1 in any position, NEMA Type 3R in the vertical position only. | | |
| **Operating rate** | 10 cycles/m | | |
| **Repeat accuracy** | ±3% of the range | | |
| **Ambient air temperature** | | | |
| **Storage** | –22 to 158 °F (–30 to 70 °C) | | |
| **Operation** | –22 to 257 °F (–30 to 125 °C) | | |
| **Fluids Controlled** | Fresh water (or sea water with Form Q) | | |
| **Materials** | Cover: polypropylene, Noryl® thermoplastic resin or equivalent for Type 3R. Component material in contact with fluid: flange, zinc plated or equivalent (fluid entry), nitrile or equivalent rubber (diaphragm) | | |
| **Fluid connection** | 1/8" NPSF internal, 1/4" NPSF internal, 1/2" NPT external, 1/4" bayonet (barbed), 90° elbow 1/4" bayonet, four-way flange, 3/8" NPSF internal, 1/4" flare and other specials | | |
| **Electrical connection** | 2 open side entries, 0.88 in. diameter, with two flats | | |

**Table 2: Contact Block Characteristics**

| | |
|---|---|
| **Type of contacts** | One 2 pole, 2 N.C. (4 terminal) contacts, snap action |
| **Resistance across terminals** | < 25 mΩ |
| **Short-circuit protection** | 5,000 A |
| **Connection** | Screw clamp terminals. Clamping capacity up to 10 AWG (5.261 $mm^2$ ) |
| **Electrical durability** | 100,000 cycles |
| **Mechanical durability** | 300,000 cycles (actual product life will vary based on electrical load, duty cycle, application, and environmental conditions) |

**Table 3: Electrical Ratings**

| Type (2 pole) | | FSG/FSW | | | FTG/FTW | | | FYG/FYW | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Voltage** | ~ 1 Ø Vac | ~ 3 Ø Vac | Vdc | ~ 1 Ø Vac | ~ 3 Ø Vac | Vdc | ~ 1 Ø Vac | ~ 3 Ø Vac | Vdc |
| **Power ratings of controlled motors** | **115 V** | 1.1 kW (1.5 hp) | 1 5 kW (2 hphp) | 0.18 kW (.25 hp) | 0.75 kW (1 hp) | — | — | 1.5 kW (2 hp) | 2.2 kW (3 hp) | 0.37 kW (.50 hp) |
| | **230 V** | 1.5 kW (2 hp) | 2 2 kW (3 hp) | 0.18 kW (.25 hp) | 0.75 kW (1 hp) | — | — | 2.2 kW (3 hp) | 3.7 kW 5 hp) | 0.37 kW (.50 hp) |
| | **460 / 575 V** | — | 0.75 kW (1 hp) | — | — | — | — | — | 0.75 kW (1 hp) | — |

## Types FRG, FHG, and G

### Table 4: Environment

| Type | FRG | FHG | G |
|---|---|---|---|
| **Conforming to Standards** | UL 508, NEC Article 430-84, ANSI/NSF Standard 61, FDA 21CFR.2600 | | |
| **Product approvals** | UL File E12158 CCN NKPZ , CSA File LR 25490 Class 321106 | | |
| **Degree of protection** | IP20, NEMA Type 1. NEMA Type 3R (only Types G•B) must be mounted in vertical position to maintain enclosure rating | | |
| **Operating position** | IP20 and NEMA Type 1 in any position, NEMA Type 3R in the vertical position only | | |
| **Operating rate** | 10 cycles/m | | |
| **Repeat accuracy** | ±3% of the range | | |
| **Ambient air temperature** | | | |
| **Storage** | –22 to 158 °F (–30 to 70 °C) | | |
| **Operation** | –22 to 257 °F (–30 to 125 °C) | | |
| **Fluids Controlled** | Fresh water (or sea water with Form Q) | | |
| **Materials** | Cover: polypropylene, Noryl thermoplastic resin or equivalent for Type 3R,<br>Component material in contact with fluid: flange, zinc plated or equivalent (fluid entry), nitrile or equivalent rubber (diaphragm) | | |
| **Fluid connection** | 1/8" NPSF internal, 1/4" NPSF internal, 1/2" NPT external, 1/4" bayonet (barbed), 90° elbow 1/4" bayonet, four-way flange, 3/8" NPSF internal, 1/4" flare and other specials | | |
| **Electrical connection** | 2 open side entries, 0.88 in. diameter, with two flats | | 3 knockouts for 1/2" conduit |

### Table 5: Contact Block Characteristics

| | |
|---|---|
| **Type of contacts** | One 2 pole, 2 N.C. (4 terminal) contacts, snap action<br>Type FRG: 1 or 2 pole, 2 N.O. (2 or 4 terminal) contacts, snap action |
| **Resistance across terminals** | < 25 mΩ |
| **Short-circuit protection** | 5,000 A |
| **Connection** | Screw clamp terminals. Clamping capacity up to 10 AWG (5.261 $mm^2$ ) |
| **Electrical durability** | 100,000 cycles |
| **Mechanical durability** | 300,000 cycles (actual product life will vary based on electrical load, duty cycle, application, and environmental conditions) |

### Table 6: Electrical Ratings

| Type (1 pole) [1] | | FRG | | | FHG | | | G | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Voltage** | ~ 1 Ø Vac | ~ 3 Ø Vac | Vdc | ~ 1 Ø Vac | ~ 3 Ø Vac | Vdc | ~ 1 Ø Vac | ~ 3 Ø Vac | Vdc |
| **Power ratings of controlled motors [2]** | **32 V** | — | — | — | — | — | — | — | — | — |
| | **115 V** | 0.75 kW (1 hp) | — | 0.18 kW (.25 hp) | 1.1 kW (1 5 hp) | 1.5 kW (2 hp) | 0.18 kW (.25 hp) | 0.75 kW (1 hp) | — | 0.37 kW (.50 hp) |
| | **230 V** | 0.75 kW (1 hp) | — | 0.18 kW (.25 hp) | 1.5 kW (2 hp) | 2.2 kW (3 hp) | 0.18 kW (.25 hp) | 1 5 kW (2 hp) | — | 0.37 kW (.50 hp) |
| | **460 / 575 V** | — | — | — | — | 0.75 kW (1 hp) | — | 1 5 kW (2 hp) | | — |
| **Type (2 pole) [3]** | | | | | | | | | | |
| | **Voltage** | ~ 1 Ø Vac | ~ 3 Ø Vac | Vdc | ~ 1 Ø Vac | ~ 3 Ø Vac | Vdc | ~ 1 Ø Vac | ~ 3 Ø Vac | Vdc |
| **Power ratings of controlled motors** | **32 V** | — | — | 0.18 kW (.25 hp) | — | — | — | — | — | — |
| | **115 V** | 0.75 kW (1 hp) | 0.75 kW (1 hp) | 0.18 kW (.25 hp) | 1.5 kW (2 hp) | 2.2 kW (3 hp) | 0.37 kW (.50 hp) | 1.5 kW (2 hp) | 2.2 kW (3 hp) | 0.75 kW (1 hp) |
| | **230 V** | 0.75 kW (1 hp) | 0.75 kW (1 hp) | 0.18 kW (.25 hp) | 2.2 kW (3 hp) | 3.7 kW 5 hp) | 0.37 kW (.50 hp) | 2.2 kW (3 hp) | 3.7 kW 5 hp) | 0.75 kW (1 hp) |
| | **460 / 575 V** | — | — | — | — | 0.75 kW (1 hp) | — | 3.7 kW 5 hp) | 3.7 kW 5 hp) | — |

1 Includes: FHG 2, 3, 4, 9, 12, 13, 14, 19, 42, 44, 49

2 Type FRG and G devices include 1 N.O. and 1 N.C. contact (Form H).

3 Includes: FHG 22, 24, 29, 32, 33, 34, 39, 52, 54, 59

## Interpretation of the Catalog Number

PUMPTROL™

## Class 9013 Type F Water Pump Switches

**Example: 9013FSG2J24C20**

| FS | G | 2 | | | J24 | | C20 | |
|---|---|---|---|---|---|---|---|---|
| **Type** | **Enclosure** | **Fluid Connection** | | **Differential psi** | **Range psi** | **Code** | **psi** | **Form** | **Modification** |
| **FS**: Standard Adj Diff ≤ 1.5 hp<br>**FT**: Fixed Diff ≤ 1 hp<br>**FY**: Adj Diff ≤ 2 hp<br>**FR**: Reverse Acting, Adj Diff ≤ 1 hp | **G**: NEMA 1<br>**W**: NEMA 3R | **1**: | 1/8" NPSF Internal | 15–30 | 20–65 | **Standard Action** | | **C20**: | Standard pack of 20 devices per box [1] |
| | | **2**: | ¼" NPSF internal | 15–30 | 20–65 | **J15**: | 5–21 | **H**: | 1 N.O. / 1 N.C. contact FRG 2-pole only |
| | | **9**: | ¼" NPT external | 15–30 | 20–65 | **J16**: | 8–20 | **M1**: | Maintained manual cut-out lever (Auto-Off) FSG, FYG |
| | | **10**: | ¼" Bayonet (barbed) | 15–30 | 20–65 | **J20**: | 20–40 | **M3**: | Momentary manual cut-in lever (Auto-Start) (FRG2–59) |
| | | **20**: | 90° Elbow ¼" Bayonet | 15–30 | 20–65 | **J18**: | 20–50 | **M4**: | Low pressure cut-off (Auto-Start-Off) FSG, FYG |
| | | **22**: | ¼" NPSF internal | 10–30 | 20–50 | **J21**: | 30–50 | **M5**: | Maintained manual cut-in lever (Auto-On) FRG2–59 |
| | | **29**: | ¼" NPT external | 10–30 | 20–60 | **J24**: | 40–60 | **P**: | Pulsation plug (Type 2 and 9) |
| | | **42**: | ¼" NPSF internal | 6–20 | 9–30 | **J33**: | 50–70 | **T**: | ½" conduit bushing— ½" long thread—on left |
| | | **49**: | ¼" NPT external | 6–20 | 9–30 | **J34**: | 55–85 | **U**: | Slip-on connections (load side terminals only) FSG, FYG |
| | | **52**: | ¼" NPSF internal | 20–30 | 25–80 | **J25**: | 60–80 | **U2**: | Slip-on connections (line and load side terminals) FSG, FYG |
| | | **59**: | ¼" NPT external | 20–30 | 25–80 | **Reverse Action** | | **Z22**: | Black cover FSG, FYG |
| | | | | | | **J17**: | 8.5–5.5 | | |
| | | | | | | **J36**: | 10–5 | | |
| | | | | | | **J22**: | 22–12 | | |
| | | | | | | **J19**: | 22–16 | | |
| | | | | | | **J70**: | 35–20 | | |
| | | | | | | **J23**: | 40–20 | | |
| | | | | | | **J35**: | 50–30 | | |
| | | | | | | **J32**: | 80–60 | | |
| | | | | | | **J51**: | 100–80 | | |
| | | | | | | **J64**: | 150–120 | | |
| | | | | | | **J99**: | Specify pressure setting | | |

[1] Additional bulk packages are available. See Table 7 on page 37.

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

## Class 9013 Type F Air Compressor Switches

PUMPTROL™

**Example: 9013FHG2J27C20**

**FH G 2 J27 C20**

| Type | Enclosure | Low hp ≤ 1.5 hp | High hp ≥ 2 hp | Fluid Connection | Differential psi | Range psi | Code | psi |
|---|---|---|---|---|---|---|---|---|
| **FH**: | **G**: NEMA 1 | **2**: | **22**: | ¼" NPSF internal | 20 | 40–100 | **J43**: | Off at 80 |
| | | **3**: | **—** | 3/8" NPSF internal | 20 | 40–100 | **J27**: | Off at 100 |
| | | **4**: | **24**: | ¼" 4-way flange | 20 | 40–100 | **J37**: | Off at 110 |
| | | **9**: | **29**: | ¼" NPT external | 20 | 40–100 | **J38**: | Off at 115 |
| | | **12**: | **32**: | ¼" NPSF internal | 30 | 70–150 | **J69**: | Off at 120 |
| | | **13**: | **33**: | 3/8" NPSF internal | 30 | 70–150 | **J52**: | Off at 125 |
| | | **14**: | **34**: | ¼" 4-way flange | 30 | 70–150 | **J39**: | Off at 135 |
| | | **19**: | **39**: | ¼" NPT external | 30 | 70–150 | **J68**: | Off at 140 |
| | | **42**: | **52**: | ¼" NPSF internal | 40 | 100–200 | **J55**: | Off at 150 |
| | | **44**: | **54**: | ¼" 4-way flange | 40 | 100–200 | **J40**: | Off at 155 |
| | | **49**: | **59**: | ¼" NPT external | 40 | 100–200 | **J59**: | Off at 175 |
| | | | | | | | **J99**: | Specify pressure setting |

| Form | Modification |
|---|---|
| **C20**: | Standard pack of 20 devices per box [1] |
| **G4**: | Addition of a second ground screw |
| **M1**: | Maintained manual cut-out lever (Auto-Off) |
| **P**: | Pulsa ion plug (copper) (not field installable) |
| **T**: | ½" conduit bushing—½" long thread—on left |
| **U**: | Slip-on connections (load side terminals only) |
| **U2**: | Slip-on connections (line and load side terminals) |
| **W**: | Factory sealed range stud |
| **X**: | 2-way pressure release value |
| **X1**: | Quick connect two-way pressure release valve |
| **Z22**: | Black cover |

1 Additional bulk packages are available. See Table 7 on page 37.

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

## Class 9013 Type G Pressure Switches

PUMPTROL™

**Example: 9013GHG2J26C10**

| GH | G | 2 | J26 | C10 |
|---|---|---|---|---|

| Type | Enclosure | Fluid Connection | | Code | psi | Form | Modification [1] |
|---|---|---|---|---|---|---|---|
| | | | GH | | | | |
| **GH**: 200/250 psi | **G**: NEMA 1 | **1**: 1/8" NPSF internal | 200 | **J20**: | 20–40 | **C10**: | Standard pack of 10 devices per box GHB, GHG, GSB, GSG |
| **GS**: 80 psi | **B**: NEMA 3R | **2**: ¼" NPSF internal | 200 | **J21**: | 30–50 | **E**: | 3-way lever (On-Auto-Off) not compatible with Form X GHG, GMG, GSG |
| **GM**: 35 psi | **W**: NEMA 4 | **3**: 3/8" NPSF internal | 200 | **J23**: | 40–20 | **H**: | 1 N.O. / 1 N.C. contact |
| | **R**: NEMA 7, 9 | **4**: 1/8" NPSF internal | 250 | **J24**: | 40–60 | **P**: | Pulsation plug (copper) (not field installable) |
| | | **5**: ¼" NPT external | 250 | **J25**: | 60–80 | **R**: | Reverse action / 2 N.O. contacts |
| | | **6**: 3/8" NPSF internal | 250 | **J26**: | 70–90 | **U**: | Slip-on connections (load side terminals only) |
| | | | | **J28**: | 70–100 | **U2**: | Slip-on connections (line and load side terminals) |
| | | | GS | **J29**: | 75–100 | **X**: | 2-way pressure release value (not compatible with Form E) available on GHB, GMG, GSB, GHG, GSG, GHR, GHW, GSR, GSW |
| | | **1**: 1/8" NPSF internal | 80 | **J30**: | 80–100 | | |
| | | **2**: ¼" NPSF internal | 80 | **J31**: | 90–120 | **Z**: | ¼" male pipe thread on pressure connection |
| | | **3**: 3/8" NPSF internal | 80 | **J51**: | 100–80 | **Z16**: | ½" - 14 NPT external, ¼" - 18 NPT internal |
| | | | | **J53**: | 100–125 | | |
| | | | GM | **J54**: | 110–125 | | |
| | | **2**: ¼" NPSF internal | 35 | **J56**: | 110–150 | | |
| | | | | **J57**: | 120–150 | | |
| | | | | **J58**: | 125–150 | | |
| | | | | **J60**: | 125–175 | | |
| | | | | **J61**: | 130–175 | | |
| | | | | **J50**: | 135–175 | | |
| | | | | **J66**: | 140–170 | | |
| | | | | **J62**: | 140–175 | | |
| | | | | **J63**: | 145–175 | | |
| | | | | **J64**: | 150–120 | | |
| | | | | **J67**: | 150–175 | | |
| | | | | **J65**: | 215–250 | | |
| | | | | **J99**: | Specify pressure setting | | |

1 Cannot order Form R in combina ion with Form H.

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

## Selection and Specifications

### Type FSG, 2-Pole, 2 N.C. Contacts
### Degree of Protection IP20, NEMA Type 1

| Flange Style |  |  |  |  |  |
|---|---|---|---|---|---|
| **Adjustable range of setting point 20.3–66.7 psi (1.4–4.6 bar)**<br>Contacts open on rising pressure | | | | | |
| **Differential** | Adjustable | | | | |
| **Fluid Connections** | 1/8" NPSF internal | 1/4" NPSF internal | 1/4" NPT external | 1/4" bayonet (barbed) | 90° elbow ¼" bayonet |
| **Catalog Numbers** | | | | | |
| **NEMA Type 1, IP20** | 9013FSG1 | 9013FSG2 | 9013FSG9 | 9013FSG10 | 9013FSG20 |
| **NEMA Type 3R** [1] | 9013FSW1 | 9013FSW2 | 9013FSW9 | 9013FSW10 | 9013FSW20 |
| **Fluids Controlled** | Water | Water | Water | Water | Water |
| **Pressure Range** | | | | | |
| **Cut-out** psig (bar) | 20–65 (1.4–4 5) | 20–65 (1.4–4.5) | 20–65 (1.4–4.5) | 20–65 (1.4–4.5) | 20–65 (1.4–4.5) |
| **Cut-in** psig (bar) | 5–45 (0.3–3.1) | 5–45 (0.3–3.1) | 5–45 (0.3–3.1) | 5–45 (0.3–3.1) | 5–45 (0.3–3.1) |
| **Weight, lb (kg)** | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0 340) | 0.75 (0.340) |
| **Supplemental Specifications (not shown under General Specifications)** | | | | | |
| **Differential**<br>psig (bar) | 15–30 (1.0–2.1) | | | | |
| **Maximum Allowable Pressure**<br>psig (bar) | 65 (4.5) | | | | |
| **Cable Entry** | 2 cable entries 0.88 in. (22.4 mm) with 0.84 in. (21.3 mm) across flats | | | | |
| **Pressure Switch Style** | Diaphragm | | | | |

1 Must be mounted in a vertical position to maintain enclosure rating.

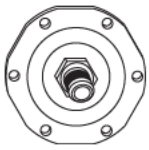
### Ordering information

1. Select the catalog number from the table above.
2. Select the pressure code and add the code designation to the end of the catalog number. Ensure that the pressure code falls within the limits of the device as shown in the device lis ings.
3. If special features are desired, add the appropriate Form letter to the catalog number after the pressure code. Arrange the Form letters in alphabetical sequence when ordering more than one special feature.
4. Add the packaging code at the end of the sequence, after the Forms. (For example, to order a standard pack of 20 devices, specify 9013FSG2J21MIC20.) If no packaging code is indicated, the devices will be shipped individually packaged.

### Pressure codes

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

| Settings (psi) | Code |
|---|---|
| 5–21 | J15 |
| 8–20 | J16 |
| 20–40 | J20 |
| 20–50 | J18 |
| 30–50 | J21 |
| 40–60 | J24 |
| 50–70 | J33 |
| 60–80 | J25 |
| Specify pressure settings | J99 |

| Flange Style |  |  |  |  | |
|---|---|---|---|---|---|
| **Adjustable range of setting point 20.3–66.7 psi (1.4–4.6 bar)**<br>Contacts open on rising pressure | | | | | |
| **Differential** | Adjustable | | | | |
| **Fluid Connections** | 1/4" NPSF internal | 1/4" NPT external | 1/4" NPSF internal | 1/4" NPT external | — |
| **Catalog Numbers** | | | | | |
| **NEMA Type 1, IP20** | 9013FSG22 | 9013FSG29 | 9013FSG42 | 9013FSG49 | 9013FSG1–20 with M4 [1] |
| **NEMA Type 3R** [2] | 9013FSW22 | 9013FSW29 | 9013FSW42 | 9013FSW49 | — |
| **Fluids Controlled** | Water | Water | Water | Water | Water |
| **Pressure Range** | | | | | |
| **Cut-out** psig (bar) | 20–50 (1.4–3.5) | 20–60 (1.4–4.2) | 9–30 (0.6–2.1) | 9–30 (0.6–2.1) | 34–65 (2.3–4.5) |
| **Cut-in** psig (bar) | 10–30 (0.7–2.1) | 10–45 (0.7–3.1) | 3–10 (0.2–0.7) | 3–10 (0.2–0.7) | 19–45 (1.3–3.1) |
| **Weight, lb (kg)** | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) |
| **Supplemental Specifications (not shown under General Specifications)** | | | | | |
| **Differential** psig (bar) | 10–30 (0.7–2.1) | 10–30 (0.7–2.1) | 6–20 (0.4–1.4) | 6–20 (0.4–1.4) | 15–30 (1.0–2.1) |
| **Maximum Allowable Pressure** psig (bar) | 50 (3.5) | 60 (4.1) | 30 (2.1) | 30 (2.1) | 65 (4.5) |
| **Cable Entry** | 2 cable entries 0.88 in. (22.4 mm) with 0.84 in. (21.3 mm) across flats | | | | |
| **Pressure Switch Style** | Diaphragm | | | | |

1 Nylon pulsation plug can be field installed on types having 1/4" NPSF internal connector. Catalog number 1530S6G1 is one bag of 50 plugs.

2 Must be mounted in a vertical position to maintain enclosure rating.

## Modifications (Forms)

| Description | Applies to: | Form letter |
|---|---|---|
| Standard pack of 20 devices per box | All Type F | C20 [1] |
| Maintained manual cut-out lever (Auto-Off) | FSG, FYG | M1 |
| Low pressure cut-off (Auto-Start-Off ) operates at approximately 10 psig below cut-in and will turn off the pump | FSG, FYG (Type 1–20 only) | M4 |
| Maintained manual cut-in lever (Auto-On) | FSG, FYG | M5 |
| Pulsation plug (standard on FSG4) | FSG2, 9 | P [2] |
| ½" conduit bushing—½" long thread—on left | All Type F | T |
| Slip-on connectors (load side terminals only) | FSG, FYG | U |
| Slip-on connectors (line and load side terminals) | FSG, FYG | U2 |
| Black cover | FSG, FYG | Z22 |

1 Additional bulk packages are available. See Table 7 on page 37.

2 Nylon pulsation plug can be field installed on types having 1/4" NPSF internal connector. Catalog number 1530S6G1 is one bag of 50 plugs.

| Flange Style |  |  |
|---|---|---|
| **Adjustable range of setting point**<br>Contacts open on rising pressure | | |
| **Differential** | Adjustable | |
| **Fluid Connections** | 1/4" NPSF internal | 1/4" NPT external |
| **Catalog Numbers** | | |
| **NEMA Type 1, IP20** | 9013FSG52 | 9013FSG59 |
| **NEMA Type 3R** | — | — |
| **Fluids Controlled** | Water | Water |
| **Pressure Range** | | |
| **Cut-out** psig (bar) | 25–80 (1.7–5.5) | 25–80 (1.7–5.5) |
| **Cut-in** psig (bar) | 5–60 (0.3–4.2) | 5–60 (0.3–4.2) |
| **Weight, lb (kg)** | 0.75 (0.340) | 0.75 (0 340) |
| **Supplemental Specifications (not shown under General Specifications)** | | |
| **Differential**<br>psig (bar) | 20–30 (1.4–2.1) | |
| **Maximum Allowable Pressure**<br>psig (bar) | 80 (5 5) | |
| **Cable Entry** | 2 cable entries 0.88 in. (22.4 mm) with 0.84 in. (21 3 mm) across flats | |
| **Pressure Switch Style** | Diaphragm | |

### Ordering information

1. Select the catalog number from the table above.
2. Select the pressure code and add the code designa ion to the end of the catalog number. Ensure that the pressure code falls within the limits of the device as shown in the device listings.
3. If special features are desired, add the appropriate Form letter to he catalog number after the pressure code. Arrange the Form letters in alphabetical sequence when ordering more than one special feature.
4. Add the packaging code at he end of he sequence, after the Forms. (For example, to order a standard pack of 20 devices, specify 9013FSG2J21MIC20.) If no packaging code is indicated, the devices will be shipped individually packaged.

### Pressure codes

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

| Settings (psi) | Code |
|---|---|
| 5–21 | J15 |
| 8–20 | J16 |
| 20–40 | J20 |
| 20–50 | J18 |
| 30–50 | J21 |
| 40–60 | J24 |
| 50–70 | J33 |
| 60–80 | J25 |
| Specify pressure settings | J99 |

## Type FTG, 2-Pole, 2 N.C. Contacts
## Degree of Protection IP20, NEMA Type 1

| Flange Style |  |  |  |  |  |
|---|---|---|---|---|---|
| **Fixed range of setting point**<br>Contacts open on rising pressure | | | | | |
| **Differential** | Fixed | | | | |
| **Fluid Connections** | 1/8" NPSF internal | 1/4" NPSF internal | 1/4" NPT external | 1/4" bayonet (barbed) | 90° elbow ¼" bayonet |
| **Catalog Numbers** | | | | | |
| **NEMA Type 1, IP20** | 9013FTG1 | 9013FTG2 | 9013FTG9 | 9013FTG10 | 9013FTG20 |
| **NEMA Type 3R** [1] | 9013FTW1 | 9013FTW2 | 9013FTW9 | 9013FTW10 | 9013FTW20 |
| **Fluids Controlled** | Water | Water | Water | Water | Water |
| **Pressure Range** | | | | | |
| **Cut-out** psig (bar) | 20–65 (1.4–4.5) | 20–65 (1.4–4.5) | 20–65 (1.4–4.5) | 20–65 (1.4–4.5) | 20–65 (1.4–4.5) |
| **Cut-in** psig (bar) | — | — | — | — | — |
| **Weight, lb (kg)** | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) |
| **Supplemental Specifications (not shown under General Specifications)** | | | | | |
| **Differential**<br>psig (bar) | 20 (1.4) | | | | |
| **Maximum Allowable Pressure**<br>psig (bar) | 65 (4.5) | | | | |
| **Cable Entry** | 2 cable entries 0.88 in. (22.4 mm) with 0.84 in. (21.3 mm) across flats | | | | |
| **Pressure Switch Style** | Diaphragm | | | | |

1 Must be mounted in a vertical position to maintain enclosure rating.

### Ordering information

1. Select the catalog number from the table above.
2. Select the pressure code and add the code designation to he end of the catalog number. Ensure that the pressure code falls within he limits of the device as shown in the device listings.
3. If special features are desired, add the appropriate Form letter to the catalog number after the pressure code. Arrange the Form letters in alphabetical sequence when ordering more han one special feature.
4. Add the packaging code at the end of the sequence, after the Forms. (Sold in lots or multiple of 500; for example: 9013FTG2J21C500.) If no packaging code is indicated, the devices will be shipped individually packaged.

### Pressure codes

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

| Settings (psi) | Code |
|---|---|
| 5–21 | J15 |
| 8–20 | J16 |
| 20–40 | J20 |
| 20–50 | J18 |
| 30–50 | J21 |
| 40–60 | J24 |
| 50–70 | J33 |
| 60–80 | J25 |
| Specify pressure settings | J99 |

| Flange Style |  |  |  |  |
|---|---|---|---|---|
| **Fixed range of setting point**<br>Contacts open on rising pressure | | | | |
| **Differential** | Fixed | | | |
| **Fluid Connections** | 1/4" NPSF internal | 1/4" NPT external | 1/4" NPSF internal | 1/4" NPT external |
| **Catalog Numbers** | | | | |
| **NEMA Type 1, IP20** | 9013FTG22 | 9013FTG29 | 9013FTG42 | 9013FTG49 |
| **NEMA Type 3R** [1] | 9013FSW22 | 9013FSW29 | 9013FSW42 | 9013FSW49 |
| **Fluids Controlled** | Water | Water | Water | Water |
| **Pressure Range** | | | | |
| **Cut-out** psig (bar) | 20–50 (1.4–3.5) | 20–60 (1.4–4.1) | 9–30 (0.6–2.1) | 9–30 (0.6–2.1) |
| **Cut-in** psig (bar) | — | — | — | — |
| **Weight, lb (kg)** | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0 340) |
| **Supplemental Specifications (not shown under General Specifications)** | | | | |
| **Differential** psig (bar) | 20 (1.4) | 15 (1.0) | 20 (1.4) | 20 (1.4) |
| **Maximum Allowable Pressure** psig (bar) | 50 (3.5) | 60 (4.2) | 30 (2.1) | 30 (2.1) |
| **Cable Entry** | 2 cable entries 0.88 in. (22.4 mm) with 0.84 in. (21.3 mm) across flats | | | |
| **Pressure Switch Style** | Diaphragm | | | |

1 Must be mounted in a vertical position to maintain enclosure rating.

### Modifications (Forms)

| Description | Applies to: | Form letter |
|---|---|---|
| Standard pack of 500 devices per box | All Type FTG | C500 |
| Pulsation plug | FTG2, 9 | P [1] |
| ½" conduit bushing—½" long thread—on left | All Type FTG | T |
| Slip-on connectors (line and load terminals) | All Type FTG, FYG | U2 [2] |
| Black cover | FTG, FYG | Z22 |

1 Nylon pulsation plug can be field installed on types having 1/4" NPSF internal connector. Catalog number 1530S6G1 is one bag of 50 plugs.

2 Standard device has slip-on connectors on the load side.

## Type FYG, 2-Pole, 2 N.C. Contacts
## Degree of Protection IP20, NEMA Type 1

| Flange Style |  |  |  |  |  |
|---|---|---|---|---|---|
| **Adjustable range of setting point**<br>Contacts open on rising pressure | | | | | |
| **Differential** | Adjustable | | | | |
| **Fluid Connections** | 1/8" NPSF internal | 1/4" NPSF internal | 1/4" NPT external | 1/4" bayonet (barbed) | 90° elbow ¼" bayonet |
| **Catalog Numbers** | | | | | |
| **NEMA Type 1, IP20** | 9013FYG1 | 9013FYG2 | 9013FYG9 | 9013FYG10 | 9013FYG20 |
| **NEMA Type 3R** [1] | 9013FYW1 | 9013FYW2 | 9013FYW9 | 9013FYW10 | 9013FYW20 |
| **Fluids Controlled** | Water | Water | Water | Water | Water |
| **Pressure Range** | | | | | |
| **Cut-out** psig (bar) | 25–80 (1.7–5.5) | 25–80 (1.7–5.5) | 25–80 (1.7–5.5) | 25–80 (1.7–5.5) | 25–80 (1.7–5.5) |
| **Cut-in** psig (bar) | 5–60 (0.3–4.2) | 5–60 (0.3–4.2) | 5–60 (0.3–4.2) | 5–60 (0.3–4.2) | 5–60 (0.3–4.2) |
| **Weight, lb (kg)** | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) |
| **Supplemental Specifications (not shown under General Specifications)** | | | | | |
| **Differential**<br>psig (bar) | 20–30 (1.4–2.1) | | | | |
| **Maximum Allowable Pressure**<br>psig (bar) | 80 (5.5) | | | | |
| **Cable Entry** | 2 cable entries 0.88 in. (22.4 mm) with 0.84 in. (21.3 mm) across flats | | | | |
| **Pressure Switch Style** | Diaphragm | | | | |

1 Must be mounted in a vertical position to maintain enclosure rating.

### Ordering information

1. Select the catalog number from the table above.
2. Select the pressure code and add the code designation to the end of the catalog number. Ensure that the pressure code falls within he limits of the device as shown in the device listings.
3. If special features are desired, add the appropriate Form letter to the catalog number after the pressure code. Arrange the Form letters in alphabetical sequence when ordering more han one special feature.
4. Add the packaging code at the end of the sequence, after the Forms. (For example, to order a standard pack of 20 devices, specify 9013FYG2J21C20.) If no packaging code is indicated, the devices will be shipped individually packaged.

### Pressure codes

**NOTE:** Existence of a code does not imply hat the code is available for any or all devices.

| Settings (psi) | Code |
|---|---|
| 5–21 | J15 |
| 8–20 | J16 |
| 20–40 | J20 |
| 20–50 | J18 |
| 30–50 | J21 |
| 40–60 | J24 |
| 50–70 | J33 |
| 60–80 | J25 |
| Specify pressure settings | J99 |

| Flange Style |  |  |  |  | |
|---|---|---|---|---|---|
| **Adjustable range of setting point** Contacts open on rising pressure | | | | | |
| **Differential** | Adjustable | | | | |
| **Fluid Connections** | 1/4" NPSF internal | 1/4" NPT external | 1/4" NPSF internal | 1/4" NPT external | — |
| **Catalog Numbers** | | | | | |
| **NEMA Type 1, IP20** | 9013FYG22 | 9013FYG29 | 9013FYG42 | 9013FYG49 | 9013FYG1–20 FYG20 with M4 [1] |
| **NEMA Type 3R** [2] | 9013FYW22 | 9013FYW29 | 9013FYW42 | 9013FYW49 | — |
| **Fluids Controlled** | Water | Water | Water | Water | Water |
| **Pressure Range** | | | | | |
| **Cut-out** psig (bar) | 25–50 (1.7–3.5) | 20–60 (1.4–4.2) | 9–40 (0.6–2.8) | 9–40 (0.6–2.8) | 39–80 (2.1–5.5) |
| **Cut-in** psig (bar) | 10–30 (0.7–2.1) | 10–45 (0.7–3.1) | 3–10 (0.2–0.7) | 3–10 (0.2–0.7) | 19–60 (1.3–4.2) |
| **Weight, lb (kg)** | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0 340) | 0.75 (0.340) |
| **Supplemental Specifications (not shown under General Specifications)** | | | | | |
| **Differential** psig (bar) | 10–30 (0.7–2.1) | 10–30 (0.7–2.1) | 6–20 (0.4–1.4) | 6–20 (0.4–1.4) | 20–30 (1.4–2.1) |
| **Maximum Allowable Pressure** psig (bar) | 50 (3.5) | 60 (4.2) | 40 (2 8) | 40 (2.8) | 80 (5.5) |
| **Cable Entry** | 2 cable entries 0.88 in. (22.4 mm) with 0.84 in. (21.3 mm) across flats | | | | |
| **Pressure Switch Style** | Diaphragm | | | | |

1 Nylon pulsation plug can be field installed on types having 1/4" NPSF internal connector. Catalog number 1530S6G1 is one bag of 50 plugs.

2 Must be mounted in a vertical position to maintain enclosure rating.

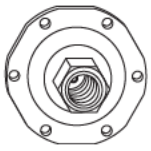
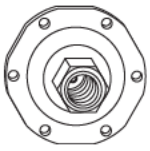
**Modifications (Forms)**

| Description | Applies to: | Form letter |
|---|---|---|
| Standard pack of 20 devices per box | All Type F | C20 [1] |
| Maintained manual cut-out lever (Auto-Off) | FSG, FYG | M1 |
| Low pressure cut-off (Auto-Start-Off ) operates at approximately 10 psig below cut-in and will turn off the pump | FSG, FYG (Type 1–20 only) | M4 |
| Pulsation plug (standard on FYG4) | FYG2, 9 | P [2] |
| Salt water flange (¼ NPSF internal only) | All Type F | Q |
| ½" conduit bushing—½" long thread—on left | All Type F | T |
| Slip-on connectors (load side terminals only) | FSG, FYG | U |
| Slip-on connectors (line and load side terminals) | FSG, FYG | U2 |
| Black cover | FSG, FYG | Z22 |

1 Additional bulk packages are available. See Table 7 on page 37.

2 Nylon pulsation plug can be field installed on types having 1/4" NPSF internal connector. Catalog number 1530S6G1 is one bag of 50 plugs.

## Type FRG, 1- or 2-Pole, 2 N.O. Contacts
## Degree of Protection IP20, NEMA Type 1

| | | | | | | |
|---|---|---|---|---|---|---|
| **Flange Style** |  |  |  |  |  |  |
| **Adjustable range of setting point** Contacts open on falling pressure | | | | | | |
| **Differential** | Adjustable | | | | | |
| **Fluid Connections** | 1/4" NPSF internal | 3/8" NPSF internal | 1/4" flare | 1/4" NPT external | 1/4" NPSF internal | 3/8" NPSF internal |
| **Catalog Numbers** | | | | | | |
| **1-pole NEMA Type 1, IP20** | 9013FRG12 | 9013FRG13 | 9013FRG18 | 9013FRG19 | 9013FRG32 | 9013FRG33 |
| **2-pole NEMA Type 1, IP20** | 9013FRG2 | 9013FRG3 | 9013FRG8 | 9013FRG9 | 9013FRG22 | 9013FRG23 |
| **Fluids Controlled** | Water | Water | Water | Water | Water | Water |
| **Pressure Range** | | | | | | |
| **Cut-out** psig (bar) | 8–45 (0.6–3.1) | 8–45 (0.6–3.1) | 8–45 (0.6–3.1) | 8–45 (0.6–3.1) | 4–25 (0 3–1.7) | 4–25 (0.3–1.7) |
| **Cut-in** psig (bar) | 23–65 (1.6–4.5) | 23–65 (1.6–4.5) | 23–65 (1.6–4.5) | 23–65 (1.6–4.5) | 10–45 (0.7–3.1) | 10–45 (0.7–3.1) |
| **Weight, lb (kg)** | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0 340) | 0.75 (0.340) |
| **Supplemental Specifications (not shown under General Specifications)** | | | | | | |
| **Differential** psig (bar) | 15–30 (1.0–2.1) | 15–30 (1.0–2.1) | 15–30 (1.0–2.1) | 15–30 (1.0–2.1) | 6–20 (0.4–1.4) | 6–20 (0.4–1.4) |
| **Maximum Allowable Pressure** psig (bar) | 65 (4.5) | 65 (4.5) | 65 (4.5) | 65 (4.5) | 45 (3.1) | 45 (3.1) |
| **Cable Entry** | 2 cable entries 0.88 in. (22.4 mm) with 0.84 in. (21 3 mm) across flats | | | | | |
| **Pressure Switch Style** | Diaphragm | | | | | |

### Ordering information

1. Select the catalog number from the table above.
2. Select the pressure code and add the code designation to he end of the catalog number. Ensure that the pressure code falls within he limits of the device as shown in the device listings.
3. If special features are desired, add the appropriate Form letter to the catalog number after the pressure code. Arrange the Form letters in alphabetical sequence when ordering more han one special feature.
4. Add the packaging code at the end of the sequence, after the Forms. (For example, to order a standard pack of 20 devices, specify 9013FRG2J21MIC20.) If no packaging code is indicated, the devices will be shipped individually packaged.

### Pressure codes

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

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

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| | | | | | | |
|---|---|---|---|---|---|---|
| **Flange Style** |  |  |  |  |  |  |
| **Adjustable range of setting point** Contacts open on falling pressure | | | | | | |
| **Differential** | Adjustable | Adjustable | Fixed | Fixed | Fixed | Fixed |
| **Fluid Connections** | 1/4" flare | 1/4" NPT external | 1/4" NPSF internal | 3/8" NPSF internal | 1/4" flare | 1/4" NPT external |
| **Catalog Numbers** | | | | | | |
| **1-pole NEMA Type 1, IP20** | 9013FRG38 | 9013FRG39 | 9013FRG52 | 9013FRG53 | 9013FRG58 | 9013FRG59 |
| **2-pole NEMA Type 1, IP20** | 9013FRG28 | 9013FRG29 | 9013FRG42 | 9013FRG43 | 9013FRG48 | 9013FRG49 |
| **Fluids Controlled** | Water | Water | Water | Water | Water | |
| **Pressure Range** | | | | | | |
| **Cut-out** psig (bar) | 4–25 (0.3–1.7) | 4–25 (0.3–1.7) | 1–11 (0.1–0.8) | 1–11 (0.1–0.8) | 1–11 (0.1–0.8) | 1–11 (0.1–0.8) |
| **Cut-in** psig (bar) | 10–45 (0.7–3.1) | 10–45 (0.7–3.1) | 6–14 (0.4–1.0) | 6–14 (0.4–1.0) | 6–14 (0.4–1.0) | 6–14 (0.4–1.0) |
| **Weight, lb (kg)** | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) |
| **Supplemental Specifications (not shown under General Specifications)** | | | | | | |
| **Differential** psig (bar) | 6–20 (0.4–1.4) | 6–20 (0.4–1.4) | 5 (0.3) | 5 (0.3) | 5 (0.3) | 5 (0.3) |
| **Maximum Allowable Pressure** psig (bar) | 45 (3.1) | 45 (3.1) | 14 (1.0) | 14 (1.0) | 14 (1.0) | 14 (1.0) |
| **Cable Entry** | 2 cable entries 0.88 in. (22.4 mm) with 0.84 in. (21.3 mm) across flats | | | | | |
| **Pressure Switch Style** | Diaphragm | | | | | |

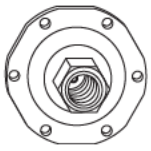
### Modifications (Forms)

| Description | Applies to: | Form letter |
|---|---|---|
| Standard pack of 20 devices per box | All Type F | C20 [1] |
| 1 N.O. / 1 N.C. contact | FRG (2-pole only) | H |
| Momentary manual cut-in lever (Auto-Start) | FRG2–59 only | M3 |
| Maintained manual cut-in lever (Auto-On) | FRG2–59 only | M5 |
| Pulsation plug | FSG2, 9 | P [2] |
| Salt water flange (¼ NPSF internal only) | All Type F | Q |
| ½" conduit bushing—½" long thread—on left | All Type F | T |
| Black cover | FSG, FYG, FRG | Z22 |

1 Additional bulk packages are available. See Table 7 on page 37.

2 Nylon pulsation plug can be field installed on types having 1/4" NPSF internal connector. Catalog number 1530S6G1 is one bag of 50 plugs.

## Type FRG, 1- or 2-Pole, 2 N.O. Contacts
## Degree of Protection IP20, NEMA Type 1

| | | | | | | |
|---|---|---|---|---|---|---|
| **Flange Style** |  |  |  |  |  |  |
| **Adjustable range of setting point** Contacts open on falling pressure | | | | | | |
| **Differential** | Adjustable | | | | | |
| **Fluid Connections** | 1/4" NPSF internal | 3/8" NPSF internal | 1/4" flare | 1/4" NPSF internal | 3/8" NPSF internal | 1/4" flare |
| **Catalog Numbers** | | | | | | |
| **1-pole NEMA Type 1, IP20** | 9013FRG72 | 9013FRG73 | 9013FRG78 | 9013FRG92 | 9013FRG93 | 9013FRG98 |
| **2-pole NEMA Type 1, IP20** | 9013FRG62 | 9013FRG63 | 9013FRG68 | 9013FRG82 | 9013FRG83 | 9013FRG88 |
| **Fluids Controlled** | Water | Water | Water | Water | Water | Water |
| **Pressure Range** | | | | | | |
| **Cut-out** psig (bar) | 20–75 (1.4–5.2) | 20–75 (1.4–5.2) | 20–75 (1.4–5.2) | 35–120 (2.4–8.3) | 35–120 (2.4–8.3) | 35–120 (2.4–8.3) |
| **Cut-in** psig (bar) | 40–100 (2.8–6.9) | 40–100 (2 8–6.9) | 40–100 (2.8–6.9) | 65–150 (4.5–10.3) | 65–150 (4.5–10.3) | 65–150 (4.5–10.3) |
| **Weight, lb (kg)** | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0 340) | 0.75 (0.340) |
| **Supplemental Specifications (not shown under General Specifications)** | | | | | | |
| **Differential** psig (bar) | 20–30 (1.4–2.1) | 20–30 (1.4–2.1) | 20–30 (1.4–2.1) | 30–45 (2.1–3.1) | 30–45 (2.1–3.1) | 30–45 (2.1–3.1) |
| **Maximum Allowable Pressure** psig (bar) | 100 (6.9) | 100 (6.9) | 100 (6.9) | 150 (10.3) | 150 (10 3) | 150 (10.3) |
| **Cable Entry** | 2 cable entries 0.88 in. (22.4 mm) with 0.84 in. (21 3 mm) across flats | | | | | |
| **Pressure Switch Style** | Diaphragm | | | | | |

### Ordering information

1. Select the catalog number from the table above.
2. Select the pressure code and add the code designation to he end of the catalog number. Ensure that the pressure code falls within he limits of the device as shown in the device listings.
3. If special features are desired, add the appropriate Form letter to the catalog number after the pressure code. Arrange the Form letters in alphabetical sequence when ordering more han one special feature.
4. Add the packaging code at the end of the sequence, after the Forms. (For example, to order a standard pack of 20 devices, specify 9013FRG72J23C20 ) If no packaging code is indicated, the devices will be shipped individually packaged.

### Pressure codes

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

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

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| **Flange Style** |  |
|---|---|

| | |
|---|---|
| **Adjustable range of setting point**<br>Contacts open on falling pressure | |
| **Differential** | Adjustable |
| **Fluid Connections** | 1/4" NPT external |
| **Catalog Numbers** | |
| **1-pole**<br>**NEMA Type 1, IP20** | 9013FRG99 |
| **2-pole**<br>**NEMA Type 1, IP20** | 9013FRG89 |
| **Fluids Controlled** | Water |
| **Pressure Range** | |
| **Cut-out** psig (bar) | 35–120 (2.4–8.3) |
| **Cut-in** psig (bar) | 60–150 (4.14–10.3) |
| **Weight, lb (kg)** | 0.75 (0.340) |
| **Complementary Characteristics**<br>**(not shown under general characteristics)** | |
| **Differential**<br>psig (bar) | 30–45 (2.1–3.1) |
| **Maximum Allowable Pressure**<br>psig (bar) | 150 (10.3) |
| **Cable Entry** | 2 cable entries 0 88 in. (22.4 mm) with 0.84 in. (21 3 mm) across flats |
| **Pressure Switch Style** | Diaphragm |

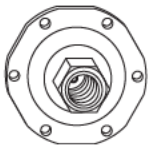
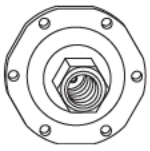
**Modifications (Forms)**

| Description | Applies to: | Form letter |
|---|---|---|
| Standard pack of 20 devices per box | All Type F | C20 [1] |
| 1 N.O. / 1 N.C. contact | FRG (2-pole only) | H |
| Momentary manual cut-in lever (Auto-Start) | FRG2–59 only | M3 |
| Maintained manual cut-in lever (Auto-On) | FRG2–59 only | M5 |
| Pulsation plug | FSG2, 9 | P [2] |
| Salt water flange (¼ NPSF internal only) | All Type F | Q |
| ½" conduit bushing—½" long thread—on left | All Type F | T |
| Black cover | FSG, FYG, FRG | Z22 |

1 Additional bulk packages are available. See Table 7 on page 37.

2 Nylon pulsation plug can be field installed on types having 1/4" NPSF internal connector. Catalog number 1530S6G1 is one bag of 50 plugs.

## Type FHG, 2-Pole, 2 N.C. Contacts
## Degree of Protection IP20, NEMA Type 1

| | | | | | | |
|---|---|---|---|---|---|---|
| **Flange Style** |  |  |  |  |  |  |
| **Adjustable range of setting point** Contacts open on rising pressure | | | | | | |
| **Differential** | Fixed | | | | | |
| **Pressure Connections** | 1/4" NPSF internal | 3/8" NPSF internal | 1/4" 4-way Flange | 1/4" NPT external | 1/4" NPSF internal | 3/8" NPSF internal |
| **Catalog Numbers** | | | | | | |
| **Lower hp, 2-pole NEMA Type 1, IP20** | 9013FHG2 | 9013FHG3 | 9013FHG4 | 9013FHG9 | 9013FHG12 | 9013FHG13 |
| **Higher hp, 2-pole NEMA Type 1, IP20** | 9013FHG22 | — | 9013FHG24 | 9013FHG29 | 9013FHG32 | 9013FHG33 |
| **Controls** | Air | Air | Air | Air | Air | Air |
| **Pressure Range** | | | | | | |
| **Adjustable cut-out** psig (bar) | 40–100 (2.8–6.9) | 40–100 (2 8–6.9) | 40–100 (2.8–6.9) | 40–100 (2.8–6.9) | 70–150 (4.8–10.3) | 70–150 (4.8–10.3) |
| **Weight, lb (kg)** | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0 340) | 0.75 (0.340) |
| **Supplemental Specifications (not shown under General Specifications)** | | | | | | |
| **Differential, Fixed** psig (bar) | 20 (1.4) | 20 (1.4) | 20 (1.4) | 20 (1.4) | 30 (2.1) | 30 (2.1) |
| **Maximum Allowable Pressure** psig (bar) | 100 (6.9) | 100 (6.9) | 100 (6.9) | 100 (6.9) | 150 (10 3) | 150 (10.3) |
| **Cable Entry** | 2 cable entries 0.88 in. (22.4 mm) with 0.84 in. (21 3 mm) across flats | | | | | |
| **Pressure Switch Style** | Diaphragm | | | | | |

### Ordering information

1. Select the catalog number from the table above.
2. Select the pressure code and add the code designation to the end of the catalog number. Ensure that the pressure code falls within he limits of the device as shown in the device listings.
3. If special features are desired, add the appropriate Form letter to the catalog number after the pressure code. Arrange the Form letters in alphabetical sequence when ordering more han one special feature.
4. Add the packaging code at the end of the sequence, after the Forms. (For example, to order a standard pack of 20 devices, specify 9013FHG19J52MIXC20.) If no packaging code is indicated, the devices will be shipped individually packaged.

### Pressure codes

**NOTE:** Existence of a code does not imply hat the code is available for any or all devices.

| Settings (psi) | Code |
|---|---|
| Off at 80 | J43 |
| Off at 100 | J27 |
| Off at 110 | J37 |
| Off at 115 | J38 |
| Off at 120 | J69 |
| Off at 125 | J52 |
| Off at 135 | J39 |
| Off at 140 | J68 |
| Off at 150 | J55 |
| Off at 155 | J40 |
| Off at 175 | J59 |
| Specify pressure settings | J99 |

| **Flange Style** |  |  |  |  |  |
|---|---|---|---|---|---|
| **Adjustable range of setting point**<br>Contacts open on rising pressure | | | | | |
| **Differential** | Fixed | | | | |
| **Pressure Connections** | 4-way Flange | 1/4" NPT external | 1/4" 4-way Flange | 1/4" 4-way Flange | 1/4" 4-way Flange |
| **Catalog Numbers** | | | | | |
| **Lower hp, 2 pole NEMA Type 1, IP20** | 9013FHG14 | 9013FHG19 | 9013FHG42 | 9013FHG44 | 9013FHG49 |
| **Higher hp, 2-pole NEMA Type 1, IP20** | 9013FHG34 | 9013FHG19 | 9013FHG52 | 9013FHG54 | 9013FHG59 |
| **Controls** | Air | Air | Air | Air | Air |
| **Pressure Range** | | | | | |
| **Adjustable cut-out**<br>psig (bar) | 70–150 (4.8–10.3) | 70–150 (4.8–10.3) | 100–200 (6.9–13.8) | 100–200 (6.9–13.8) | 100–200 (6.9–13.8) |
| **Weight, lb (kg)** | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0.340) | 0.75 (0 340) | 0.75 (0.340) |
| **Supplemental Specifications (not shown under General Specifications)** | | | | | |
| **Differential, Fixed**<br>psig (bar) | 30 (2.1) | 30 (2.1) | 40 (2 8) | 40 (2.8) | 40 (2.8) |
| **Maximum Allowable Pressure**<br>psig (bar) | 150 (10.3) | 150 (10.3) | 200 (13.8) | 200 (13.8) | 200 (13.8) |
| **Cable Entry** | 2 cable entries 0.88 in. (22.4 mm) with 0.84 in. (21.3 mm) across flats | | | | |
| **Pressure Switch Style** | Diaphragm | | | | |

**Modifications (Forms)**

**NOTE:** Modifications G4 and Z22 can be field installed, all others are factory installed only.

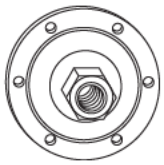
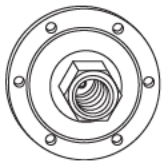
| **Description** | **Form letter** |
|---|---|
| Standard pack of 20 devices per box | C20 [1] |
| Addition of a second ground screw | G4 |
| Maintained manual cut-out lever (Auto-Off) | M1 |
| Pulsation plug (copper) | P |
| ½" conduit bushing—½" long thread—on left | T |
| Slip-on connectors (load side terminals only) | U |
| Slip-on connectors (line and load side terminals) | U2 |
| Factory sealed range stud | W |
| Two-way pressure release valve | X |
| Quick connect two-way pressure release valve (for use with Polyflow Tubing) | X1 |
| Black cover | Z22 |

1 Additional bulk packages are available. See Table 7 on page 37.

**Table 7: 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" 4-way flange) | — | 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" 4-way flange) | — | 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" 4-way flange) | C16 | — | C40 | — | — | — |
| | 9013FRG | C16 | — | C40 | — | — | — |
| | 9013FSG | C16 | — | C40 | — | — | — |
| | 9013FYG | C16 | — | C40 | — | — | — |
| **9013FHG9 Special with Extended Flange** | | C16 | — | — | — | — | C500 |

### Type G, 2-Pole, 2 N.C. Contacts
### Degree of Protection IP20, NEMA Type 1, 3R, 7, and 9

| | | | | | | |
|---|---|---|---|---|---|---|
| **Flange Style** |  |  |  |  |  |  |
| **Adjustable range of setting point** Contacts open on rising pressure | | | | | | |
| **Fluid Connections** | 1/4" NPSF internal | 1/4" NPSF internal | 1/8" NPSF internal | 1/4" NPSF internal | 3/8" NPSF internal | 1/8" NPSF internal |
| **Catalog Numbers** | | | | | | |
| **NEMA Type 1, IP20** | 9013GMG2 | — | 9013GSG1 | 9013GSG2 | 9013GSG3 | — |
| **NEMA Type 3R** [1] | — | 9013GSB2 | — | — | — | — |
| **NEMA Type 7, 9** | — | — | — | — | — | 9013GSR1 |
| **Fluids / Pressure Controls** | Water or air | Water or air | Water or air | Water or air | Water or air | Water or air |
| **Pressure Range** | | | | | | |
| **Cut-out** psig (bar) | 10–35 (0.7–2.4) | 20–80 (1.4–5.5) | 20–80 (1.4–5 5) | 20–80 (1.4–5.5) | 20–80 (1.4–5.5) | 20–80 (1.4–5.5) |
| **Cut-in** psig (bar) | 5.5–30.5 (0.4–2.1) | 5–60 (0.4–4.2) | 5–60 (0.4–4.2) | 5–60 (0.4–4.2) | 5–60 (0.4–4.2) | 5–60 (0.4–4.2) |
| **Weight, lb (kg)** | 2 (0.91) | 2 (0.91) | 2 (0.91) | 2 (0.91) | 2 (0.91) | 8 (3.62) |
| **Supplemental Specifications (not shown under General Specifications)** | | | | | | |
| **Differential** psig (bar) | 4–8 (0.3–0.6) | 15–30 (1.0–2.1) | 15–30 (1.0–2.1) | 15–30 (1.0–2.1) | 15–30 (1.0–2.1) | 20–40 (1.4–2.8) |
| **Maximum Allowable Pressure** psig (bar) | 35 (2.4) | 80 (5.5) | 80 (5.5) | 80 (5.5) | 80 (5.5) | 80 (5.5) |
| **Cable Entry** | 3 knockouts for 1/2 in. conduit | 3 knockouts for 1/2 in. conduit | 3 knockouts for 1/2 in. conduit | 3 knockouts for 1/2 in. conduit | 3 knockouts for 1/2 in. conduit | 2 conduit entries 3/4"-14 NTP |
| **Pressure Switch Style** | Diaphragm | | | | | |

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

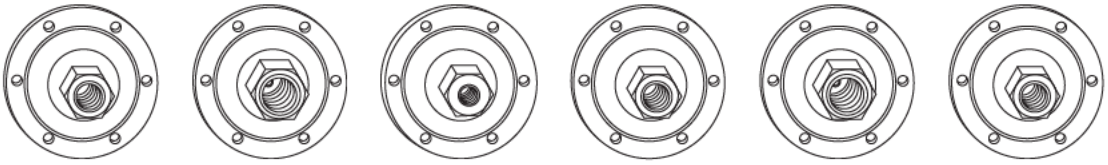
### Ordering information

1. Select the catalog number from the table above.
2. Select the pressure code and add the code designation to the end of the catalog number. Ensure that the pressure code falls within the limits of the device as shown in the device listings.
3. If special features are desired, add the appropriate Form letter to the catalog number after the pressure code. Arrange the Form letters in alphabetical sequence when ordering more than one special feature.
4. Add the packaging code at the end of the sequence, after the Forms. (For example, to order a standard pack of 10 devices, specify 9013GHG2J99RZC10.) If no packaging code is indicated, the devices will be shipped individually packaged.
   To order a standard pack of 10 devices per box C10 (available on GHB, GHG, GSB, and GSG) see page 39 for Form C10.

### Pressure codes

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

| Settings (psi) | Code | Settings (psi) | Code |
|---|---|---|---|
| 20–40 | J20 | 110–150 | J56 |
| 30–50 | J21 | 120–150 | J57 |
| 40–20 | J23 | 125–150 | J58 |
| 40–60 | J24 | 125–175 | J60 |
| 60–80 | J25 | 130–175 | J61 |
| 70–90 | J26 | 140–170 | J66 |
| 70–100 | J28 | 140–175 | J62 |
| 75–100 | J29 | 145–175 | J63 |
| 80–100 | J30 | 150–120 | J64 |
| 90–120 | J31 | 150–175 | J67 |
| 100–80 | J51 | 215–250 | J65 |
| 100–125 | J53 | Specify pressure settings | J99 |
| 110–125 | J54 | — | — |

| Flange Style |  | | | | | |
|---|---|---|---|---|---|---|
| **Adjustable range of setting point**<br>Contacts open on rising pressure | | | | | | |
| **Fluid Connections** | 1/4" NPSF internal | 3/8" NPSF internal | 1/8" NPSF internal | 1/4" NPSF internal | 3/8" NPSF internal | 1/4" NPSF internal |
| **Catalog Numbers** | | | | | | |
| **NEMA Type 3R** | — | — | — | — | — | 9013GHB2 |
| **NEMA Type 4** | — | — | 9013GSW1 | 9013GSW2 | 9013GSW3 | — |
| **NEMA Type 7, 9** | 9013GSR2 | 9013GSR3 | — | — | — | — |
| **Fluids / Pressure Controls** | Water or air | Water or air | Water or air | Water or air | Water or air | Water or air |
| **Pressure Range** | | | | | | |
| **Cut-out** psig (bar) | 20–80 (1.4–5.5) | 20–80 (1.4–5.5) | 20–80 (1.4–5.5) | 20–80 (1.4–5.5) | 20–80 (1.4–5.5) | 60–200 (4.1–13.8) |
| **Cut-in** psig (bar) | 5–50 (0.4–3.5) | 5–50 (0.4–3.5) | 5–50 (0.4–3.5) | 5–50 (0.4–3.5) | 5–50 (0.4–3.5) | 40–170 (2.8–12) |
| **Weight, lb (kg)** | 8 (3.62) | 8 (3.62) | 8 (3.62) | 8 (3.62) | 8 (3.62) | 2 (0.91) |
| **Supplemental Specifications (not shown under General Specifications)** | | | | | | |
| **Differential** psig (bar) | 20–40 (1.4–2.8) | 20–40 (1.4–2.8) | 20–40 (1.4–2.8) | 20–40 (1.4–2.8) | 20–40 (1.4–2.8) | 20–40 (1.4–2.8) |
| **Maximum Allowable Pressure** psig (bar) | 80 (5.5) | 80 (5.5) | 80 (5.5) | 80 (5.5) | 80 (5.5) | 200 (13.8) |
| **Cable Entry** | 2 conduit entries 3/4"-14 NTP | 2 conduit entries 3/4"-14 NTP | 2 conduit entries 3/4"-14 NTP | 2 conduit entries 3/4"-14 NTP | 2 conduit entries 3/4"-14 NTP | 3 knockouts for 1/2 in. conduit |
| **Pressure Switch Style** | Diaphragm | | | | | |

## Modifications (Forms)

**NOTE:** Factory installed only.

| Description | Applies to: | Form letter |
|---|---|---|
| Standard pack of 10 devices per box | GHB, GHG, GSB, GSG | 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 [1] |
| Pulsation plug (copper) | All Type G | P |
| Reverse action / 2 N.O. contacts | All Type G | R [1] |
| Slip-on connectors (load side terminals only) | All Type G | U |
| Slip-on connectors (line and load side terminals) | All Type G | U2 |
| 2-way pressure release valve (not compatible with Form E) | GHB, GMG, GSB, GHG, GSG, GHR, GHW, GSR, GSW | X |
| ¼" male pipe thread on pressure connection | All Type G | Z |
| ½" - 14 NPT external<br>¼" - 18 NPT internal | All Type G | Z16 |
| 3/8" male pipe thread on pressure connection | All Type G | Z23 |

1 Cannot order Form R in combina ion with Form H.

| Flange Style |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| **Adjustable range of setting point** Contacts open on rising pressure | | | | | | |
| **Fluid Connections** | 1/8" NPSF internal | 1/4" NPSF internal | 3/8" NPSF internal | 1/8" NPSF internal | 1/4" NPSF internal | 3/8" NPSF internal |
| **Catalog Numbers** | | | | | | |
| **NEMA Type 1, IP20** | 9013GHG1 | 9013GHG2 | 9013GHG3 | — | — | — |
| **NEMA Type 7, 9** | — | — | — | 9013GHR1 | 9013GHR2 | 9013GHR3 |
| **Fluids / Pressure Controls** | Water or air | Water or air | Water or air | Water or air | Water or air | Water or air |
| **Pressure Range** | | | | | | |
| **Cut-out** psig (bar) | 60–200 (4.1–13 8) | 60–200 (4.1–13.8) | 60–200 (4.1–13.8) | 65–200 (4.5–13.8) | 65–200 (4.5–13.8) | 65–200 (4 5–13.8) |
| **Cut-in** psig (bar) | 40–170 (2.8–12) | 40–170 (2.8–12) | 40–170 (2.8–12) | 35–150 (2.4–10.3) | 35–150 (2.4–10.3) | 35–150 (2.4–10.3) |
| **Weight, lb (kg)** | 2 (0.91) | 2 (0.91) | 2 (0.91) | 8 (3.62) | 8 (3.62) | 8 (3.62) |
| **Supplemental Specifications (not shown under General Specifications)** | | | | | | |
| **Differential** psig (bar) | 20–40 (1.4–2.8) | 20–40 (1.4–2.8) | 20–40 (1.4–2.8) | 30–50 (2.1–3.5) | 30–50 (2.1–3.5) | 30–50 (2.1–3.5) |
| **Maximum Allowable Pressure** psig (bar) | 80 (5.5) | 80 (5.5) | 80 (5.5) | 80 (5.5) | 80 (5.5) | 200 (13.8) |
| **Cable Entry** | 3 knockouts for 1/2 in. conduit | 3 knockouts for 1/2 in. conduit | 3 knockouts for 1/2 in. conduit | 2 conduit entries 3/4"-14 NTP | 2 conduit entries 3/4"-14 NTP | 2 conduit entries 3/4"-14 NTP |
| **Pressure Switch Style** | Diaphragm | | | | | |

### Ordering information

1. Select the catalog number from the table above.
2. Select the pressure code and add the code designation to the end of the catalog number. Ensure that the pressure code falls within the limits of the device as shown in the device listings.
3. If special features are desired, add the appropriate Form letter to the catalog number after the pressure code. Arrange the Form letters in alphabetical sequence when ordering more than one special feature.
4. Add the packaging code at the end of the sequence, after the Forms. (For example, to order a standard pack of 10 devices, specify 9013GHG2J99RZC10.) If no packaging code is indicated, the devices will be shipped individually packaged.
   To order a standard pack of 10 devices per box C10 (available on GHB, GHG, GSB, and GSG) see page 39 for Form C10.

### Pressure codes

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

| Settings (psi) | Code | Settings (psi) | Code |
|---|---|---|---|
| 20–40 | J20 | 110–150 | J56 |
| 30–50 | J21 | 120–150 | J57 |
| 40–20 | J23 | 125–150 | J58 |
| 40–60 | J24 | 125–175 | J60 |
| 60–80 | J25 | 130–175 | J61 |
| 70–90 | J26 | 140–170 | J66 |
| 70–100 | J28 | 140–175 | J62 |
| 75–100 | J29 | 145–175 | J63 |
| 80–100 | J30 | 150–120 | J64 |
| 90–120 | J31 | 150–175 | J67 |
| 100–80 | J51 | 215–250 | J65 |
| 100–125 | J53 | Specify pressure settings | J99 |
| 110–125 | J54 | — | — |

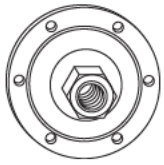
| Flange Style |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| **Adjustable range of setting point**<br>Contacts open on rising pressure | | | | | | |
| **Fluid Connections** | 1/8" NPSF internal | 1/4" NPSF internal | 3/8" NPSF internal | 1/4" NPSF internal | 1/8" NPSF internal | 1/4" NPSF internal |
| **Catalog Numbers** | | | | | | |
| **NEMA Type 1, IP20** | — | — | — | — | 9013GHG4 | 9013GHG5 |
| **NEMA Type 3R** | — | — | — | 9013GHB5 | — | — |
| **NEMA Type 4** | 9013GHW1 | 9013GHW2 | 9013GWG3 | — | — | — |
| **Fluids / Pressure Controls** | Water or air | Water or air | Water or air | Water or air | Water or air | Water or air |
| **Pressure Range** | | | | | | |
| **Cut-out** psig (bar) | 65–200 (4.5–13.8) | 65–200 (4.5–13.8) | 65–200 (4.5–13.8) | 80–250 (5.5–17.2) | 80–250 (5.5–17.2) | 80–250 (5.5–17.2) |
| **Cut-in** psig (bar) | 35–150 (2.4–10.3) | 35–150 (2.4–10.3) | 35–150 (2.4–10.3) | 32–215 (2.2–14.8) | 32–215 (2.2–14.8) | 32–215 (2.2–14.8) |
| **Weight, lb (kg)** | 8 (3.62) | 8 (3.62) | 8 (3.62) | 2 (0.91) | 2 (0.91) | 2 (0.91) |
| **Supplemental Specifications (not shown under General Specifications)** | | | | | | |
| **Differential** psig (bar) | 30–50 (2.1–3.5) | 30–50 (2.1–3.5) | 30–50 (2.1–3.5) | 25–45 (1.7–3.1) | 25–45 (1.7–3.1) | 25–45 (1.7–3.1) |
| **Maximum Allowable Pressure** psig (bar) | 200 (13.8) | 200 (13.8) | 200 (13.8) | 250 (17.2) | 250 (17 2) | 250 (17.2) |
| **Cable Entry** | 2 conduit entries 3/4"-14 NTP | 2 conduit entries 3/4"-14 NTP | 2 conduit entries 3/4"-14 NTP | 3 knockouts for 1/2 in. conduit | 3 knockouts for 1/2 in. conduit | 3 knockouts for 1/2 in. conduit |
| **Pressure Switch Style** | Diaphragm | | | | | |

## Modifications (Forms)

**NOTE:** Factory installed only.

| Description | Applies to: | Form letter |
|---|---|---|
| Standard pack of 10 devices per box | GHB, GHG, GSB, GSG | 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 [1] |
| Pulsation plug (copper) | All Type G | P |
| Reverse action / 2 N.O. contacts | All Type G | R [1] |
| Slip-on connectors (load side terminals only) | All Type G | U |
| Slip-on connectors (line and load side terminals) | All Type G | U2 |
| 2-way pressure release valve (not compatible with Form E) | GHB, GMG, GSB, GHG, GSG, GHR, GHW, GSR, GSW | X |
| ¼" male pipe thread on pressure connection | All Type G | Z |
| ½" - 14 NPT external<br>¼" - 18 NPT internal | All Type G | Z16 |
| 3/8" male pipe thread on pressure connection | All Type G | Z23 |

1 Cannot order Form R in combina ion with Form H.

| Flange Style |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| **Adjustable range of setting point** Contacts open on rising pressure | | | | | | |
| **Fluid Connections** | 3/8" NPSF internal | 1/8" NPSF internal | 1/4" NPSF internal | 3/8" NPSF internal | 1/8" NPSF internal | 1/4" NPSF internal |
| **Catalog Numbers** | | | | | | |
| **NEMA Type 1, IP20** | 9013GHG6 | — | — | — | — | — |
| **NEMA Type 4** | — | — | — | — | 9013GHW4 | 9013GHW5 |
| **NEMA Type 7, 9** | — | 9013GHR4 | 9013GHR5 | 9013GHR6 | — | — |
| **Fluids / Pressure Controls** | Water or air | Water or air | Water or air | Water or air | Water or air | Water or air |
| **Pressure Range** | | | | | | |
| **Cut-out** psig (bar) | 80–250 (5.5–17.2) | 80–250 (5.5–17.2) | 80–250 (5.5–17.2) | 80–250 (5.5–17.2) | 80–250 (5.5–17.2) | 80–250 (5.5–17.2) |
| **Cut-in** psig (bar) | 32–215 (2.2–14 8) | 30–190 (2.0–13.1) | 30–190 (2.0–13.1) | 30–190 (2.0–13.1) | 30–190 (2.0–13.1) | 30–190 (2 0–13.1) |
| **Weight, lb (kg)** | 2 (0.91) | 8 (3.62) | 8 (3.62) | 8 (3.62) | 8 (3.62) | 8 (3.62) |
| **Supplemental Specifications (not shown under General Specifications)** | | | | | | |
| **Differential** psig (bar) | 25–45 (1.7–3.1) | 40–60 (2.8–4.1) | 40–60 (2.8–4.1) | 40–60 (2.8–4.1) | 40–60 (2.8–4.1) | 40–60 (2.8–4.1) |
| **Maximum Allowable Pressure** psig (bar) | 250 (17.2) | 250 (17.2) | 250 (17.2) | 250 (17.2) | 250 (17.2) | 250 (17.2) |
| **Cable Entry** | 3 knockouts for 1/2 in. conduit | 2 conduit entries 3/4"-14 NTP | 2 conduit entries 3/4"-14 NTP | 2 conduit entries 3/4"-14 NTP | 2 conduit entries 3/4"-14 NTP | 2 conduit entries 3/4"-14 NTP |
| **Pressure Switch Style** | Diaphragm | | | | | |

### Ordering information

1. Select the catalog number from the table above.
2. Select the pressure code and add the code designation to the end of the catalog number. Ensure that the pressure code falls within the limits of the device as shown in the device listings.
3. If special features are desired, add the appropriate Form letter to the catalog number after the pressure code. Arrange the Form letters in alphabetical sequence when ordering more than one special feature.
4. Add the packaging code at the end of the sequence, after the Forms. (For example, to order a standard pack of 10 devices, specify 9013GHG2J99RZC10.) If no packaging code is indicated, the devices will be shipped individually packaged.
   To order a standard pack of 10 devices per box C10 (available on GHB, GHG, GSB, and GSG) see page 39 for Form C10.

### Pressure codes

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

| Settings (psi) | Code | Settings (psi) | Code |
|---|---|---|---|
| 20–40 | J20 | 110–150 | J56 |
| 30–50 | J21 | 120–150 | J57 |
| 40–20 | J23 | 125–150 | J58 |
| 40–60 | J24 | 125–175 | J60 |
| 60–80 | J25 | 130–175 | J61 |
| 70–90 | J26 | 140–170 | J66 |
| 70–100 | J28 | 140–175 | J62 |
| 75–100 | J29 | 145–175 | J63 |
| 80–100 | J30 | 150–120 | J64 |
| 90–120 | J31 | 150–175 | J67 |
| 100–80 | J51 | 215–250 | J65 |
| 100–125 | J53 | Specify pressure settings | J99 |
| 110–125 | J54 | — | — |

**Flange Style**

| | |
|---|---|
| **Adjustable range of setting point**<br>Contacts open on rising pressure | |
| **Fluid Connections** | 3/8" NPSF internal |
| **Catalog Numbers** | |
| **NEMA Type 4** | 9013GHW6 |
| **NEMA Type 7, 9** | — |
| **Fluids / Pressure Controls** | Water or air |
| **Pressure Range** | |
| **Cut-out** psig (bar) | 80–250 (5.5–17.2) |
| **Cut-in** psig (bar) | 30–190 (2.0–13.1) |
| **Weight, lb (kg)** | 8 (3.62) |
| **Supplemental Characteristics (not shown under General Characteristics)** | |
| **Differential** psig (bar) | 40–60 (2.8–4.1) |
| **Maximum Allowable Pressure** psig (bar) | 250 (17.2) |
| **Cable Entry** | 2 conduit entries 3/4"-14 NTP |
| **Pressure Switch Style** | Diaphragm |

## Modifications (Forms)

**NOTE:** Factory installed only.

| Description | Applies to: | Form letter |
|---|---|---|
| Standard pack of 10 devices per box | 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 [1] |
| Pulsation plug (copper) | All Type G | P |
| Reverse action | All Type G | R [1] |
| Slip-on connectors (load side terminals only) | All Type G | U |
| Slip-on connectors (line and load side terminals) | All Type G | U2 |
| 2-way pressure release valve (not compatible with Form E) | GHB, GMG, GSB, GHG, GSG, GHR, GHW, GSR, GSW | X |
| ¼" male pipe thread on pressure connection | All Type G | Z |
| ½" - 14 NPT external<br>¼" - 18 NPT internal | All Type G | Z16 |
| 3/8" male pipe thread on pressure connection | All Type G | Z23 |

1 Cannot order Form R in combina ion with Form H.

## Replacement contacts and diaphragms

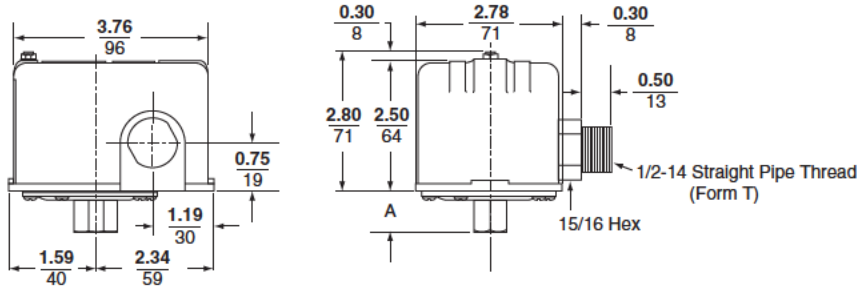
| Description | 9998 Type |
|---|---|
| Repl. Contact Kit 9013GHG, GSG, GHR, GSR, GMG Series C, all except Forms H & R | PC205 |
| Repl. Contact Kit 9013GHG, GSG, GSR, GMG; 9036GG, GR, GW; 9037GG, GR, GW Series C, Form H only; 9016GVG, Form H | PC206 |
| Repl. Contact Kit 9013GHG, GSG, GHR, GSR, GMG; 9036GR, GW Series C, Form R only; 9016GVG | PC207 |
| Convoluted Diaphragm Assy. 9013GHG, GSG Series C | PC208 |
| Diaphragm Assy. 9013GMG Series C | PC209 |
| Diaphragm Assy. 9013GHW, GSW, GSR, GHR Series C | PC211 |
| Repl. Contact Kit 9013FSG | PC241 [1] |
| Repl. Contact Kit 9013FYG | PC242 [1] |
| Repl. Contact Kit 9013FRG (1 pole) | PC289 [1] |
| Repl. Contact Kit 9013FRG (Form H) | PC290 [1] |

1 Diaphragm is included.

PUMPTROL™

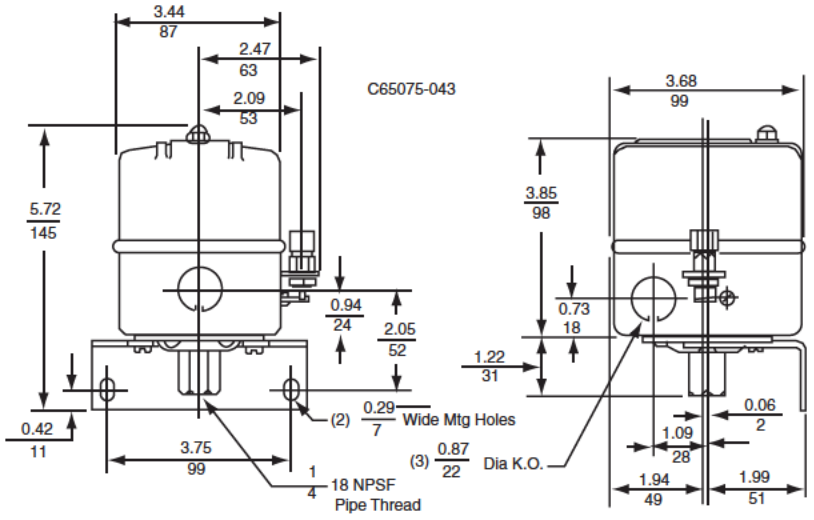
## Dimensions

### Type F Compressor and Water Pump Pressure Switches



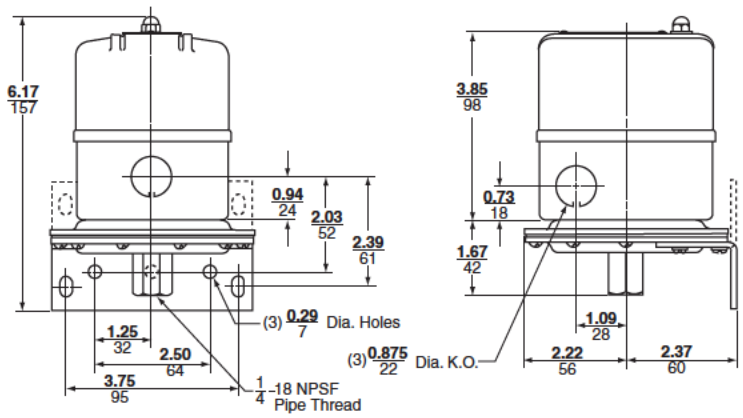

| Switch Type | A Dimension, in. (mm) | |
|---|---|---|
| FSG1, FYG1 | 1-1/32 | 26 |
| FHG2, 12, 22, 32, 42, 52, FRG2, FSG2, FYG2 | 29/32 | 23 |
| FHG3, 13, 33, FRG3, FSG3, FYG3 | 1-9/32 | 33 |
| FHG9, 19, 29, 39, 49, 59, FSG9, FYG9 | 1-3/32 | 28 |

### Type G Compressor and Water Pump Pressure Switches




**NOTE:** Mounting bracket shown is available as a Class 9049 Type A-52 Kit.

Switch Type: GHG, GSG (with Form X installed)




**NOTE:** Mounting bracket shown is available as a Class 9049 Type A-52 Kit.

Switch Type: GMG

# Float Switches—Class 9036, 9037, and 9038

## Introduction

9036DG2

Square D™ brand offers a wide range of electromechanical level control products.

- **Class 9036, Open Tank**
- **Class 9037, Closed Tank**
- **Class 9038, Mechanical Alternators**

## Class 9036 Open Tank

### Type D and G

9036GG

The Class 9036 Type D and G float switches are lever operated and designed for open tank applications. These switches are floor mounted, or they can be pedestal mounted using mounting plate 9049UMS1. They are available in NEMA Type 1, Type 4, or Type 7 and 9 enclosures.

### Type FG

The Class 9036 Type FG30 pedestal-style sump pump 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 float switch controls the On and Off positions corresponding to the water level changes required to turn the pump or alarm on and off.

**NOTE:** The rod for this device is 33.75 in. long. It cannot be lengthened.

9036FG
9049A60
9049A61

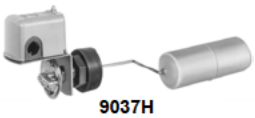
## Class 9037 Closed Tank

9037E

### Type E

The Class 9037 Type E switches are flange mounted. Float movement is transmitted through a quad ring seal. Each switch consists of a basic switch, float rod, and float. The switch can be configured in the field for contacts that open on liquid rise or close on liquid rise. These switches are used for top mounted or side mounted, closed tank applications.

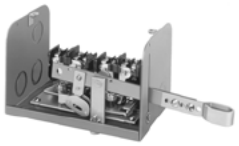
### Type H



9037H

The Class 9037 Type H switches are attached to the tank by means of a 2-1/2 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 nitrile rubber seal, such as a Buna-N quad ring seal, is used between the float rod and the sealing connector. Normal application is at atmospheric pressure. Where higher pressures are encountered, the available Viton® seal allows the switch to withstand tank pressures up to 50 psi at ambient temperatures up to 220 °F. Occasional replacement of the quad ring seal may be necessary.

## Class 9038 Mechanical Alternators



9038AG1

### Type A (Open Tank)

The Class 9038 Type A Open Tank level switch is a mechanical alternator designed to provide motor alternation in the operation of two motors.

### Type C (Closed Tank, Bushing Mounted)

9038CG

The Class 9038 Type C Closed Tank level switches are bushing mounted. Float movement is transmitted through a quad ring seal. Each switch consists of a basic switch, rod, and float.

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

Occasional replacement of the quad ring may be necessary.

### Type D (Closed Tank, Flange Mounted, Top)

9038DG
9049ER5
9049EF1

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

9036DG2

9036GG2

## Selecting a Float Switch

Standard float switches have two contacts that close when the liquid rises above the designated level. This contact configuration is used for tank emptying applications. Float switches are also available with reverse (Form R) and double throw (Form H) contacts. Form R switches, used for tank filling applications, have two contacts that open when the liquid rises above the designated level. Form H switches, which can be used for both applications, have one normally open (N.O.) and one normally closed (N.C.) contact.

To select the proper Square D™ float switch, determine the following:

- Type and shape of tank (open, closed, sump, etc.)
- Enclosure requirements
  - **NEMA Type 1**: For general purpose applications intended for indoor use.
  - **NEMA Type 4**: For watertight and dusttight applications for either indoor or outdoor use.
  - **NEMA Type 7 and 9**: For explosion proof applications. Suitable for Class I, Division 1 and 2, Groups C and D and Class II, Division 1 and 2, Groups E, F, and G hazardous locations.
- Total level change required
- Mounting requirements (such as flange mounting or screw-in bushing)
- Horsepower, phase, and voltage requirements
- Float material
  - Stainless steel (SS)
  - Plastic (available on 9036FG30 and as a Form for use with diesel fuel)
- Rod material
  - Brass
  - Stainless steel (SS)
  - Aluminum (Al)

In direct motor control applications, float switch ratings must be greater than or equal to the pump motor ratings.

**NOTE:** Contact the Sensor Competency Center when using float switches in liquids with a specific gravity different than water (1.0).

Specify the Class and Type when ordering float switches or accessory kits.

## Selecting Floats and Rods

Class 9036 and Class 9038 Type A float switches are actuated with the Class 9049 Type A line of accessories. Select the float and rod material according to the corrosiveness of the liquid used in the application. Two types of float kits are offered:

- Tapped-at-top float (Class 9049 Type A6, A6S, and A6A)
- Center-hole float (Class 9049 Type A6C, A6CS, and A6CA)

The tapped-at-top float is for applications requiring short lengths of tubing and small liquid level changes. The maximum tubing length is 12 ft (3.66 m). Adequate space must be available to allow for ceiling clearance when the level changes. The float must be buoyant enough to lift the tubing, stop collars, and switch lever. The rod has two stops, one above and one below the switch lever. The position of the stops determines the amount of water level change.

The center-hole float is used in applications requiring long lengths of tubing and large liquid level changes. A compensating spring, used for longer lengths of tubing, supports the weight of the tubing and stops. When a compensating spring is used, the float must be buoyant enough to lift up the switch lever and heavy enough to trip the switch lever down. The rod has four stops. The position of the stops on the rod above and below the float determines the amount of water level change.

## Temperature Ratings

**Table 8: Temperature Limitations for all Float Switches**

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

## Electrical Ratings

**Table 9: Class 9036, 9037, and 9038 Electrical Ratings**

| Class | Type | Single Phase AC Ratings (hp) | | | Polyphase AC Ratings (hp) | | | DC (hp) | | | Control Circuit Rating |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 115 V | 230 V | 460/575 V | 115 V | 230 V | 460/575 V | 32 V | 115 V | 230 V | |
| 9036 | D (2 pole) | 2 | 3 | — | 3 | 5 | 1 | 0.25 | 0.5 | 0.5 | A600 |
| | G (2 pole) | 2 | 3 | 5 | 3 | 5 | 5 | 0.5 | 1 | 1 | A600 |
| | G Form H (1 N.O., 1 N.C.) | 1 | 2 | 2 | — | — | — | — | 0.5 | 0.5 | A300 |
| 9037 | E, H (2 pole) | 2 | 3 | — | 3 | 5 | 1 | 0.25 | 0.5 | 0.5 | A600 |
| 9038 | All (2 pole) | 2 | 3 | — | 3 | 5 | 1 | 0.25 | 0.5 | 0.5 | A600 |

The following float switches are UL Listed under file E12158, CCN NKPZ:

- Class 9036 Types DG, DW, GG, GW
- Class 9037 Types EG, EW, HG, HW
- Class 9038 Types AG, AW, CG, CW, DG, DW

The following float switches are UL Listed under file E12443, CCN NOWT:

- Class 9036 Types DR, GR
- Class 9037 Types ER, HR

**Table 10: Control Duty Circuit Ratings (Form N5 or N25 only)**

| 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 | | Make and Break Amperes | | |
| | | A | VA | A | VA | | | Single Throw | Double Throw | |
| SPDT Form N5 | 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 Form N25 | 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 | — | — | — | — |

## Class 9036 Type D and G Open Tank Float Switches

Table 11 lists Class 9036 float switches and modifications.

- When ordering a **factory installed modification**, add the Form number to the end of the float switch catalog number. For example, to select a 9036DG2 switch with reverse action, order 9036DG2R.
- **Field installed modifications**, when available, are ordered as kits.

**Table 11: Class 9036 Float Switches**

| **Specifications** | |
|---|---|
| **Description** | 2-pole, single-lever operated float switches |
| **Applications** | Open industrial tanks and sump applications |

| | **General Purpose** | **Heavy Duty** |
|---|---|---|
| |  |  |

| **Catalog Numbers** | | | | |
|---|---|---|---|---|
| **Contact Action** | **Close on Liquid Rise** | **Open on Liquid Rise** | **Close on Liquid Rise** | **Open on Liquid Rise** |
| **NEMA Type 1** [1] | **9036DG2** | **9036DG2R** | **9036GG2** | **9036GG2R** |
| **NEMA Type 4** | **9036DW31** | **9036DW31R** | **9036GW1** [2] | **9036GW1R** [2] |
| **NEMA Type 7, 9** | **9036DR31** | **9036DR31R** | **9036GR1** [2] | **9036GR1R** [2] |

**NOTE:** A **compensating spring** supports the weight of long rods that cannot be supported by center-hole floats. A compensating spring is standard on Types GR and GW, and can be ordered as a modification (Form C) on other Class 9036 Type D and G float switches.

| **Modifications** | **Factory Installed** | **Field Installed** |
|---|---|---|
| | **Class 9036 Form** | **Kit Catalog Number** |
| **For Type D (General Purpose)** | | |
| Reverse action (Type DG) | R | **9049A58** |
| Compensating spring (Type DG) | C | **9049A19** |
| Compensating spring (Types DR and DW) | C | **9049A20** |
| Compensating spring and reverse action (Types DG, DR, and DW) | CR | — |
| **For Type G (Heavy Duty)** | | |
| Reverse action [3] | R | — |
| Compensating spring (Type GG) [4] | C | **9049A13** |
| Compensating spring and reverse action (Type GG) | CR | **9049A13** |
| 1 N.O.–1 N.C. contact configuration | H | — |
| Compensating spring and 1 N.O.–1 N.C. contact configuration (Type GG) | CH | — |

1 Contact action can be converted in the field by installing the appropriate float rod lever.

2 Compensa ing spring standard. Use center-hole float accessories.

3 Type GG is field convertible without the use of a kit. Types GR and GW are not field convertible.

4 Compensa ing spring standard on Types GR and GW.

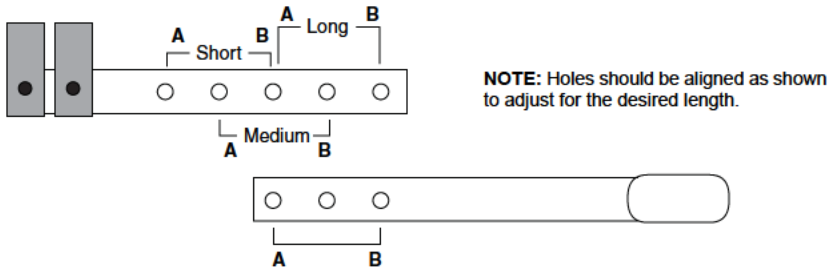
Table 12 lists the trip forces and compensating spring requirements for Class 9036 Type D and G float switches. The trip force can be adjusted on the Type G switches by changing the lever length position.

**Table 12: Maximum Trip Forces for Class 9036 Float Switches**

| Class 9036 Type and Form | | DG2 | DG2R | DW31 | DW31R | DR31 | DR31R | GG2 | | GG2R | | GR1, GW1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lever Length Position | | — | — | — | — | — | — | Short | Long | Short | Long | Short | Medium | Long |
| Force Up to Trip (oz) | | 9 | 8 | 8 | 8 | 8 | 8 | 33 | 21 | 30 | 22 | 24 | 22 | 20 |
| Force Down to Trip (oz) | | 8 | 8 | 8 | 8 | 8 | 8 | 39 | 27 | 24 | 16 | 31 | 29 | 27 |
| Maximum Supported Weight (oz) | Without Compensating Spring | 6 | 4 | 5 | 5 | 5 | 5 | 25 | 13 | 18 | 11 | 19 | 17 | 16 |
| | With Compensating Spring | 60 | 60 | 66 | 66 | 66 | 66 | [1] | 100 | [1] | 150 | 80 | 72 | 64 |

1 The compensating spring is not effective in combination with short lever length position.

**Figure 3: Lever Length**




**NOTE:** Holes should be aligned as shown to adjust for the desired length.

Table 13 lists Class 9049 accessory kits, which are ordered separately from Class 9036 Type D and G float switches. A **float kit** is required; a tubing kit and replacement float do not provide all needed parts.

**Table 13: Class 9049 Accessories for Class 9036 Type D and G Float Switches (weight in oz)**

| Accessory Kits | Tapped-at-Top Floats (#304 SS) | | | Center-Hole Floats (#304 SS) [1] | | | Additional Tubing (#303 SS) [2] | | |
|---|---|---|---|---|---|---|---|---|---|
| Used on Class 9036 Float Switch Types | All Except GW, GR, and Form C | | | GW, GR, and Form C | | | All | | |
| Catalog Number | 9049A6 | 9049A6A | 9049A6S | 9049A6C | 9049A6CA | 9049A6CS | 9049T1 | 9049T1A | 9049T1S |
| Tubing (rod) | 5 ft brass | 5 ft Al | 5 ft SS | 5 ft brass | 5 ft Al | 5 ft SS | 2.5 ft brass | 2.5 ft Al | 2.5 ft SS |
| Net buoyancy in water, 7 in. float [3] | 60 | 60 | 60 | 70 | 70 | 70 | — | — | — |
| Combined weight of stops | 3 | 3 | 3 | 6 | 6 | 6 | — | — | — |
| Number of stops | 2 | 2 | 2 | 4 | 4 | 4 | — | — | — |
| Weight of 5 ft rod, included | 18.5 | 6 | 16.9 | 18.5 | 6 | 16.9 | — | — | — |
| Weight per ft of extra rod | 3.7 | 1.2 | 3.4 | 3.7 | 1.2 | 3.4 | 3.7 | 1.2 | 3.4 |

1 Require he use of the 9049A6, 9049A6A, or 9049A6S kit. The additional tubing only attaches to other lengths of tubing.

2 Additional tubing kits add on to the float accessory kits and include a connector.
Maximum recommended tubing length: **Tapped-at-top** float: 12.5 ft (3810 mm); **Center-hole float**: 30 ft (9144 mm).

3 Net buoyancy calculated with float 80% submerged, allowing for a 20% operating margin. Buoyancy data calculated for use in water. Consult the Sensor Competency Center for buoyancy data in media having specific gravity different than water (1.0).

When ordering, first specify the desired accessory kit, then as a second item give the number of additional tubing kits required. For example, to get a 9049A6C kit with 15 ft of tubing, specify:

A. 9049A6C, quantity = 1 (includes 5 ft of tubing)

B. 9049T1, quantity = 4 (2.5 ft of tubing each, for a total of 10 additional ft)

**Example**

| Calculation example | | |
|---|---|---|
| Measuring 15 ft of tank depth | **Float buoyancy** | 70.0 oz |
| *System has 15 ft of brass rod, 4 stops, and a center hole float.* | **Total weight** | (61.5 oz) |
| | Weight of stops: (6.0 oz) | |
| | Weight of 5 ft of brass rod (included): (18.5 oz) | |
| Buoyancy is positive, so no compensating spring is required | Weight of 10 ft of brass rod (separate): (37.0 oz) | |
| | **Buoyancy** | 8.5 oz |

**Figure 4: Type DG Dimensions**

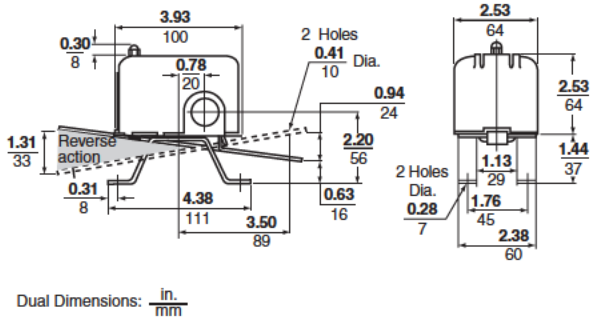



**Figure 5: Types DR/DW Dimensions**

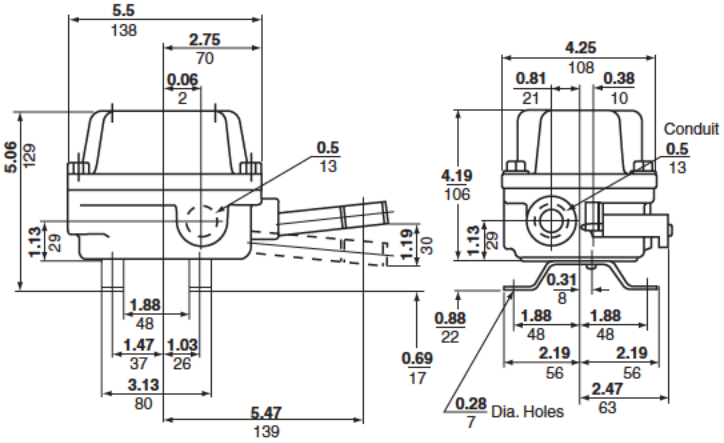
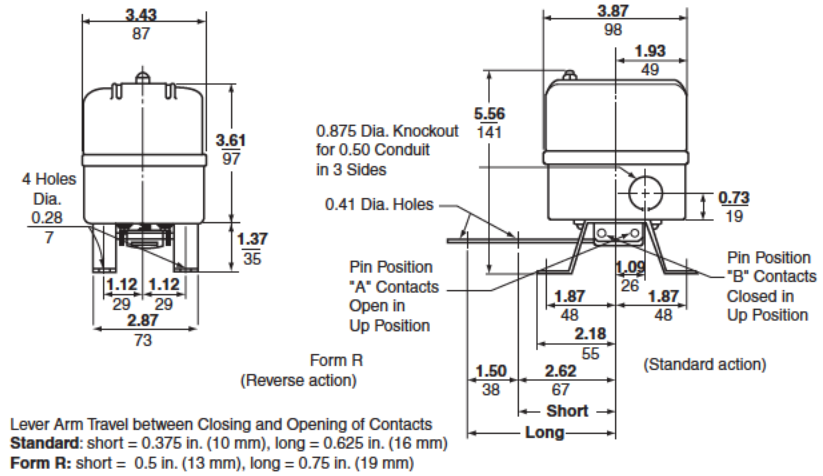
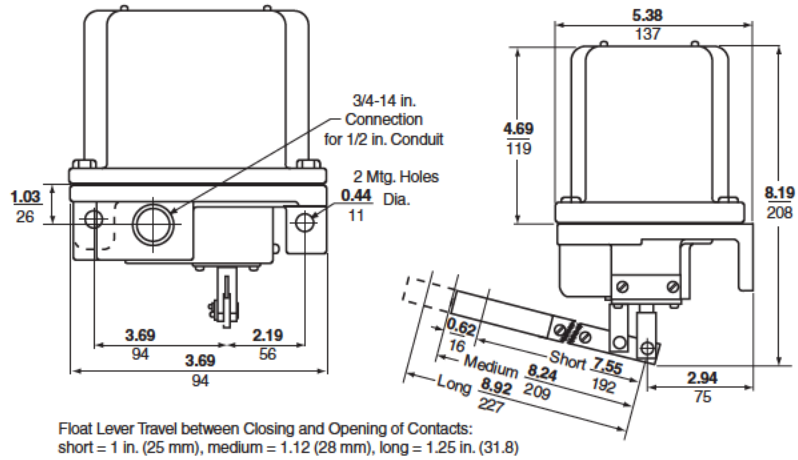



**Figure 6: Type GG Dimensions**




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)

**Figure 7: Types GR/GW 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)

## Class 9036 Type FG and Class 9049 Accessories

Class 9036 Type FG30 pedestal-style sump pump switches provide:

- Liquid level control with pumps operated by an electric motor, either directly or through a magnetic starter
- Activation of alarms in liquid level control systems
- Forward or reverse action (field selectable)

The upward or downward movement of the lever arm controls the On and Off positions corresponding to the water level changes required to turn the pump or alarm on and off.

**Table 14: Class 9036 Type FG30 Pedestal-Style Sump Pump Switch and Accessory Kits**

| Catalog Number | | Pedestal-style Sump Pump Switch | | Accessory Kits | |
|---|---|---|---|---|---|
| | | 9036FG30 | | 9049A60 | 9049A61 |
| Description | | 2-pole, pedestal-style sump pump switch | | Plastic center hole float | 33.75 in. aluminum rod, 2 float stop assemblies, and attaching hardware |
| Quantity Required | | 1 | | 1 | 1 |
| NEMA Type | | NEMA Type 1 | | — | — |
| Contact Action | | Contacts close on liquid rise | | — | — |
| Rod Length | | — | | — | 33.75 in. (cannot be lengthened) |
| Voltage | | 120/240 Vac | | — | — |
| Horsepower Rating | Single phase | 2 hp @ 120 Vac | 3 hp @ 240 Vac | — | — |
| | Polyphase | 3 hp @ 120 Vac | 5 hp @ 240 Vac | — | — |

**Example:**

**9036FG**
**9049A60**
**9049A61**

## Class 9037 Type E Closed Tank Float Switches

Class 9037 closed tank float switches are used primarily on condensate pumps but may also be installed on closed industrial and diesel fuel day tanks. There are two types of Class 9037 float switches:

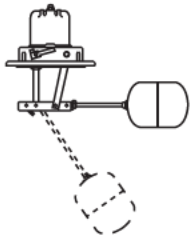
- Type E (flange mounted)
- Type H (with screw-in bushing)

## Class 9037 Type E Flange-Mounted Float Switches

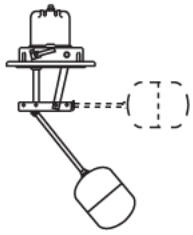
Table 15 contains ordering information for Class 9037 Type E float switches. Order the rod and float accessory kits separately. Contact the Sensor Competency Center when using Class 9037 float switches in liquids with a different specific gravity than water (1.0).

**Table 15: Class 9037 Type E Float Switches**

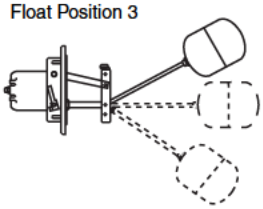
Float Position 1



Float Position 2



Float Position 3



| Specifications | | |
|---|---|---|
| **Application** | | Closed industrial tanks<br>Flange mounted |
| **Float movement** | | Transmitted through a quad ring seal, which may need occasional replacement |
| **Tank Pressure** | | Up to 50 psi |
| **Temperature** | **Ambient** | Up to 220 °F |
| | **Media** | Buna-N seal: up to 215 °F. Viton® seal: up to 250 °F. |
| **Contact Operation** | | Determined by the float and rod mounting position |
| **Float Travel** | | Determined by the post length |

| Catalog Numbers | | | | |
|---|---|---|---|---|
| **Post Length (L), in. (mm)** | **2.63 (67)** | | **4.69 (119)** | |
| **Water Level Change** | **Minimum** | **Maximum** | **Minimum** | **Maximum** |
| **NEMA 1** | 9037EG8 | 9037EG9 | 9037EG10 | 9037EG13 |
| **NEMA 4** | 9037EW8 | 9037EW9 | 9037EW10 | 9037EW13 |
| **NEMA 7, 9** | 9037ER8 | 9037ER9 | 9037ER10 | 9037ER13 |
| **Float Position [1]** | 1 | 1, 2, 3 | 1 | 1, 2, 3 |
| **Float Kits** | | | | |
| **Material** | **Catalog Number** | | | |
| #304 Stainless Steel | **9049EF1** | | | |
| #316 Stainless Steel | **9049EF2** | | | |

1 For more information on float position, refer to pages 55–56.

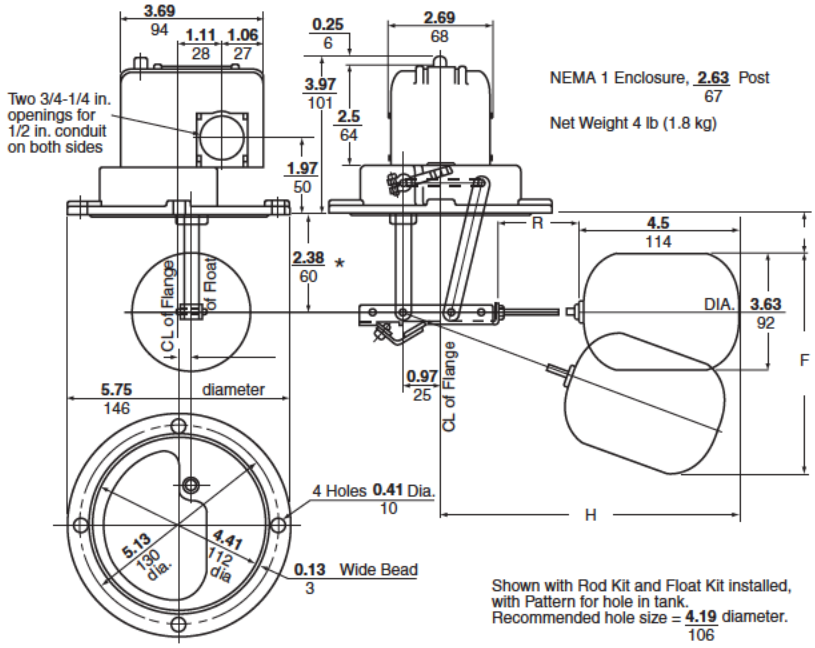
For rod kit catalog numbers, refer to pages 55 and 56.

To receive all components packaged in a single carton, specify:

- Float switch Class, Type, and Form
- "R" and the rod number
- "F" and the float number

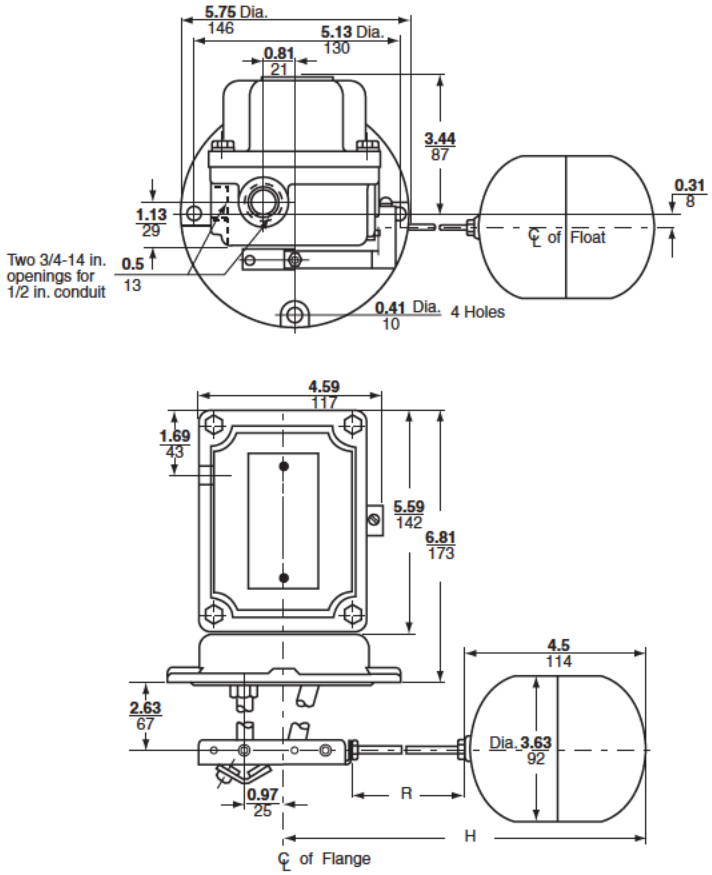
For example, to receive one each of 9037EG8, 9049ER1, and 9049EF1, specify **9037EG8R1F1**.

**Figure 8: Type EG Dimensions**




* Short length

**Figure 9: Type ER/EW Dimensions**




Dual Dimensions: in. / mm

# Class 9037 Type E Closed Tank Rod Kits

## Position 1 Operation

In Position 1, the contacts **close** when the liquid rises. Select rod kits from Table 16.

**Table 16: Class 9049 Rod Kits—Position 1 Operation (Contacts *Close* on Liquid Rise)**

| Catalog Numbers | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Dimension in. (mm) | | For Use on Float Switch Types | Rod Kits | | | | | |
| | | | 9049ER1 | 9049ER2 | 9049ER3 | 9049ER5 | 9049ER7 | 9049ER12 |
| R | | EG8, EW8, ER8, EG10, EW10, ER10 | 1.75 (44) | 2.5 (64) | 3.25 (83) | 5.25 (133) | 7.25 (184) | 12.25 (311) |
| | | EG9, EW9, ER9, EG13, EW13, ER13 | 1.75 (44) | 2.5 (64) | 3.25 (83) | 5.25 (133) | 7.25 (184) | 12.25 (311) |
| H | | EG8, EW8, ER8, EG10, EW10, ER10 | 8.25 (210) | 9 (229) | 9.5 (241) | 11.75 (298) | 13.75 (349) | 18.75 (476) |
| | | EG9, EW9, ER9, EG13, EW13, ER13 | 7.5 (191) | 8.25 (210) | 9 (229) | 11 (279) | 12 (305) | 18 (457) |
| A | Min. | EG8, EW8, ER8 | 1 (25) | 1 (25) | 1 (25) | 1 (25) | 1 (25) | 1 (25) |
| | | EG9, EW9, ER9 | 1 (25) | 1 (25) | 1 (25) | 1 (25) | 1 (25) | 1 (25) |
| | | EG10, EW10, ER10 | 3.06 (78) | 3.06 (78) | 3.06 (78) | 3.06 (78) | 3.06 (78) | 3.06 (78) |
| | | EG13, EW13, ER13 | 3.06 (78) | 3.06 (78) | 3.06 (78) | 3.06 (78) | 3.06 (78) | 3.06 (78) |
| | Max. | EG8, EW8, ER8 | 2 (51) | 2 (51) | 2 (51) | 2.5 (64) | 3 (76) | 4.25 (108) |
| | | EG9, EW9, ER9 | 4 (102) | 4.5 (114) | 5 (127) | 6 (152) | 7.5 (191) | 9.5 (241) |
| | | EG10, EW10, ER10 | 4.06 (103) | 4.06 (103) | 4.06 (103) | 4.56 (116) | 5.06 (129) | 6.31 (160) |
| | | EG13, EW13, ER13 | 6.06 (154) | 6.56 (167) | 7.06 (179) | 8.06 (205) | 9.56 (243) | 11.56 (294) |
| F | Min. | EG8, EW8, ER8, EG10, EW10, ER10 | 4.75 (121) | 4.75 (121) | 4.75 (121) | 4.75 (121) | 5 (127) | 5.75 (146) |
| | | EG9, EW9, ER9, EG13, EW13, ER13 | 6 (152) | 6.25 (159) | 6.25 (159) | 6.5 (165) | 6.5 (165) | 9 (229) |
| | Max. | EG8, EW8, ER8, EG10, EW10, ER10 | 6 (152) | 6.25 (159) | 6.5 (165) | 6.75 (171) | 7.25 (184) | 9 (229) |
| | | EG9, EW9, ER9, EG13, EW13, ER13 | 9 (229) | 9.75 (248) | 10.25 (260) | 11.5 (292) | 13 (330) | 17.5 (445) |
| Water Level Change | Min. | EG8, EW8, ER8, EG10, EW10, ER10 | 1.75 (44) | 1.75 (44) | 1.75 (44) | 1.75 (44) | 2 (51) | 2.75 (70) |
| | | EG9, EW9, ER9, EG13, EW13, ER13 | 3 (76) | 3.25 (83) | 3.25 (83) | 3.5 (89) | 3.5 (89) | 6 (152) |
| | Max. | EG8, EW8, ER8, EG10, EW10, ER10 | 3 (76) | 3.25 (83) | 3.5 (89) | 3.75 (95) | 4.25 (108) | 6 (152) |
| | | EG9, EW9, ER9, EG13, EW13, ER13 | 6 (152) | 6.75 (171) | 7.25 (184) | 8.5 (216) | 10 (254) | 14.5 (368) |

**Figure 10: Float Position 1**

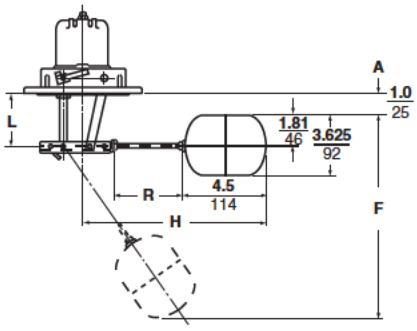



**Figure 11: Float Position 2**

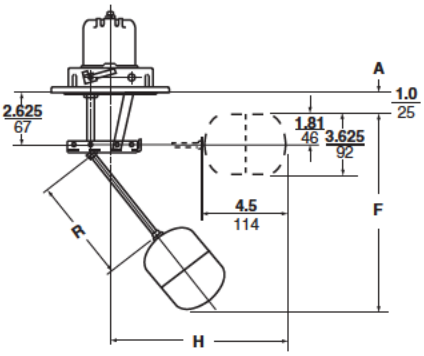
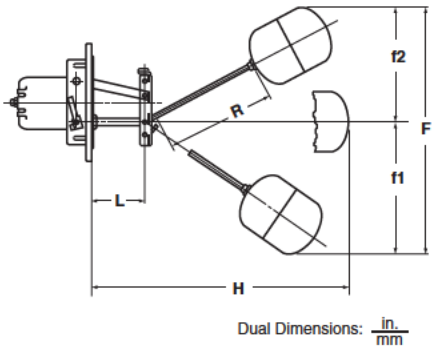



**Figure 12: Float Position 3**




Dual Dimensions: in. / mm

### Position 2 Operation

In Position 2, the contacts **open** when the liquid rises. Select rod kits from Table 17.

**Table 17: Class 9049 Rod Kits—Position 2 Operation (Contacts *Open* on Liquid Rise)**

| Catalog Numbers | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Dimension in. (mm) | | For Use on Float Switch Types | Rod Kits | | | | | |
| | | | 9049ER1 | 9049ER2 | 9049ER3 | 9049ER5 | 9049ER7 | 9049ER12 |
| R | | EG9, EW9, ER9, EG13, EW13, ER13 | 1.75 (44) | 2.50 (64) | 3.25 (83) | 5.25 (133) | 7.25 (184) | 12.25 (311) |
| H | | EG9, EW9, ER9, EG13, EW13, ER13 | 7.50 (191) | 8.25 (210) | 9.00 (229) | 11.00 (279) | 13.00 (330) | 18.00 (457) |
| A | Min. | EG9, EW9, ER9 | 1.00 (25) | 1.00 (25) | 1.00 (25) | 1.00 (25) | 1.00 (25) | 1.00 (25) |
| | | EG13, EW13, ER13 | 3.06 (78) | 3.06 (78) | 3.06 (78) | 3.06 (78) | 3.06 (78) | 3.06 (78) |
| | Max. | EG9, EW9, ER9 | 3.00 (76) | 3.50 (89) | 4.00 (102) | 5.00 (127) | 6.00 (152) | 8.50 (216) |
| | | EG13, EW13, ER13 | 5.06 (129) | 5.56 (141) | 6.06 (154) | 7.06 (179) | 8.06 (205) | 10.56 (268) |
| F | Min. | EG9, EW9, ER9, EG13, EW13, ER13 | 5.25 (133) | 5.75 (146) | 6.00 (152) | 6.75 (171) | 7.75 (197) | 10.25 (260) |
| | Max. | EG9, EW9, ER9, EG13, EW13, ER13 | 7.25 (184) | 8.25 (210) | 9.00 (229) | 10.75 (273) | 12.75 (324) | 17.75 (451) |
| Water Level Change | Min. | EG9, EW9, ER9, EG13, EW13, ER13 | 2.75 (70) | 2.75 (70) | 3.00 (76) | 3.75 (95) | 4.75 (121) | 7.25 (184) |
| | Max. | EG9, EW9, ER9, EG13, EW13, ER13 | 4.25 (108) | 5.25 (133) | 6.00 (152) | 7.75 (197) | 9.00 (229) | 12.25 (311) |

### Position 3 Operation

In Position 3, the contacts can be set to open (standard) or close (sump) on liquid rise by turning the control switch 180° around its horizontal center line. Select rod kits from Table 18.

**Table 18: Class 9049 Rod Kits—Position 3 Operation (Contact Operation Adjustable)**

| Catalog Numbers | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Dimension in. (mm) | | For Use on Float Switch Types | Rod Kits | | | | | |
| | | | 9049ER1 | 9049ER2 | 9049ER3 | 9049ER5 | 9049ER7 | 9049ER12 |
| R | | EG9, EW9, ER9, EG13, EW13, ER13 | 1.75 (44) | 2.50 (64) | 3.25 (83) | 5.25 (133) | 7.25 (184) | 12.25 (311) |
| H | | EG9, EW9, ER9 | 9.00 (229) | 9.75 (248) | 10.50 (267) | 12.50 (318) | 14.50 (368) | 19.50 (495) |
| | | EG13, EW13, ER13 | 11.00 (279) | 11.75 (298) | 12.50 (318) | 14.50 (368) | 16.50 (419) | 21.50 (546) |
| f1 or f2 | Min. | EG9, EW9, ER9, EG13, EW13, ER13 | 2.75 (70) | 2.75 (70) | 3.00 (76) | 3.50 (89) | 3.75 (95) | 4.50 (114) |
| | Max. | EG9, EW9, ER9, EG13, EW13, ER13 | 4.50 (114) | 4.50 (114) | 5.00 (127) | 6.00 (152) | 7.00 (178) | 9.50 (241) |
| F | Min. | EG9, EW9, ER9, EG13, EW13, ER13 | 5.50 (140) | 5.50 (140) | 6.00 (152) | 7.00 (178) | 7.50 (191) | 8.75 (222) |
| | Max. | EG9, EW9, ER9, EG13, EW13, ER13 | 9.00 (229) | 9.00 (229) | 10.00 (254) | 12.00 (305) | 14.00 (356) | 19.00 (483) |
| Water Level Change | Min. | EG9, EW9, ER9, EG13, EW13, ER13 | 2.25 (57) | 2.25 (57) | 2.75 (70) | 3.75 (95) | 4.25 (108) | 5.5 (140) |
| | Max. | EG9, EW9, ER9, EG13, EW13, ER13 | 5.75 (146) | 5.75 (146) | 6.75 (171) | 8.75 (222) | 10.75 (273) | 15.75 (400) |

## Class 9037 Type H with Screw-in Bushing

9037HG35
Float on the Right

Table 19 contains ordering information for Class 9037 Type H float switches and factory installed modifications. Contact the Sensor Competency Center when using float switches in liquids with a different specific gravity than water (1.0).

When ordering factory installed modifications, add the Form number to the end of the float switch catalog number. For example, to select a 9037HG36 switch with reverse action, order 9037HG36R.

**Table 19: Class 9037 Type H Float Switches**

| **Specifications** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Application** | | Condensate pumps<br>A 2.5 in. cast-iron bushing attaches the float switch to the tank | | | | | | | | | | |
| **Float movement** | | Transmitted through a nitrile rubber seal such as a Buna-N quad ring. Occasional replacement may be necessary. | | | | | | | | | | |
| **Tank Pressure** | | Up to 50 psi | | | | | | | | | | |
| **Temperature** | **Ambient** | Up to 220 °F | | | | | | | | | | |
| | **Media** | Buna-N seal: up to 215 °F. Viton® seal: media up to 250 °F. | | | | | | | | | | |
| **Contact Operation** | | Close on liquid rise (standard)<br>Open on liquid rise (Form R) | | | | | | | | | | |
| **Float Travel** | | Determined by the float rod angle. An external pointer indicates the float position. | | | | | | | | | | |
| **Materials** (Standard) | | #304 SS float, #316 SS rod, 2.5 in. cast iron bushing, brass sealing connector, Buna-N quad ring packing. | | | | | | | | | | |
| **Catalog Numbers** | | | | | | | | | | | | |
| **Float Rod Angle** | | **45°** | | **90° offset** | | | | | | | | |
| **Water Level Change** Minimum–Maximum, in. (mm) | | 2.00–5.00 (52–127) | | 2.50–5.00 (64–127) | | 3.75–7.00 (95–178) | | 4 25–8.25 (108–210) | | 6 00–11.50 (152–292) | | |
| **Float Position** [1] | | Left | Right | Left | Right | Left | Right | Left | Right | Left | Right | |
| **NEMA Type 1** | | **9037HG34** | **9037HG33** | **9037HG36** | **9037HG35** | **9037HG38** | **9037HG37** | **9037HG30** | **9037HG39** | **9037HG32** | **9037HG31** | |
| **NEMA Type 4** | | **9037HW34** | **9037HW33** | **9037HW36** | **9037HW35** | **9037HW38** | **9037HW37** | **9037HW30** | **9037HW39** | **9037HW32** | **9037HW31** | |
| **NEMA Type 7, 9** | | **9037HR34** | **9037HR33** | **9037HR36** | **9037HR35** | **9037HR38** | **9037HR37** | **9037HR30** | **9037HR39** | **9037HR32** | **9037HR31** | |
| **CL to CL** in. (mm) | | — | | 3 (76) | | 4.25 (108) | | 5 (127) | | 7 (178) | | |

| **Modifications** | **Form** |
|---|---|
| Omit 2.5 in. bushing | F3 |
| Omit float | L |
| Reverse action: contacts open on liquid rise | R [2] |
| Viton packing, 5 oz float (diesel fuel, Types HG, HW, HR30, 31, 32, 37, 38, 39 only) | Z19 |
| Viton packing, for media temperature up to 250 F | Z20 |
| Viton packing, #316 SS float | Z21 |

1 Viewed from he front of the switch, facing the indicator scale.

2 Type HG is field modifiable. Type HR and HW **cannot** be modified in the field.

**NOTE:** For replacement floats, see "Class 9049 Accessories" on page 67.

Table 20 lists the float travel distances for the screw-in float switches. Refer to Figure 13.

**Figure 13: Travel Dimensions**

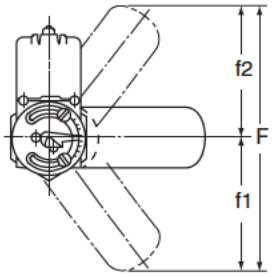



**Table 20: Type H Float Travel Distances, in. (mm)**

| Float Rod Angle | R | H [1] | f1 | | f2 | | F | |
|---|---|---|---|---|---|---|---|---|
| | | | 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) |
| 90 offset | 4 25 (108) | 5.50 (140) | 3.50 (89) | 5.50 (140) | 2.75 (70) | 4.00 (102) | 6.25 (159) | 9.50 (241) |
| 90 offset | 5 00 (127) | 6.25 (159) | 3.75 (95) | 6.25 (159) | 3.00 (76) | 4.50 (110) | 6.75 (171) | 10.75 (273) |
| 90 offset | 7 00 (178) | 8.25 (210) | 4.75 (121) | 8.25 (210) | 3.75 (95) | 5.75 (146) | 8.50 (216) | 14.00 (356) |

[1] Clearance from centerline of hub to side of tank.

**Figure 14: Type HG—45° Angle Dimensions**

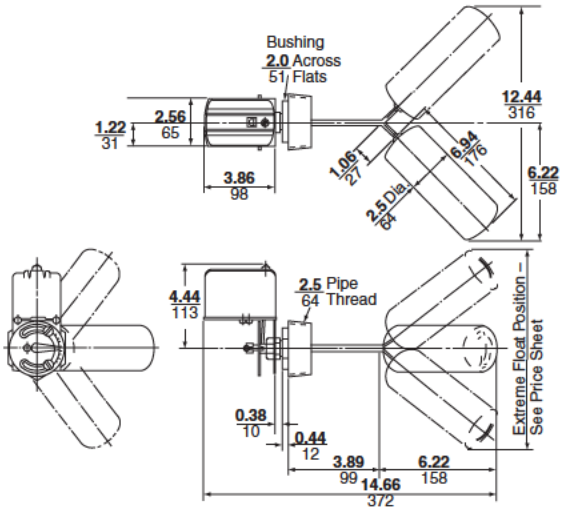



**Figure 15: Type HG—90° Offset Dimensions**

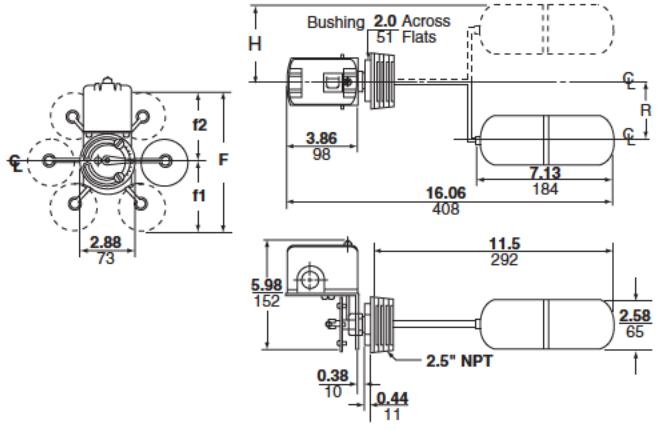



**Figure 16: Type HR/HW—45° Angle Dimensions**

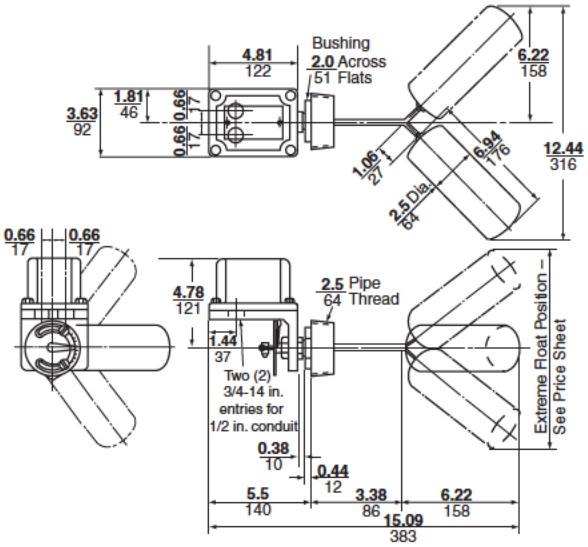
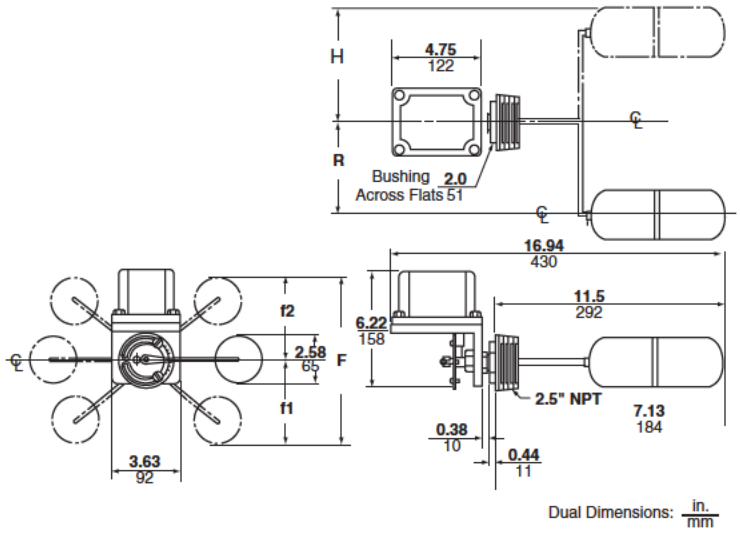



**Figure 17: Type HR/HW—90° Offset Dimensions**



## Class 9038 Type A Mechanical Alternators

Class 9038 mechanical alternators provide a simple, positive means of mechanically alternating two pumps or motors. These alternators are used on devices that are installed in a duplex system with a common tank. There are three types of Class 9038 mechanical alternators:

- Type A (open tank and sump)
- Type C (with bushing)
- Type D (flange mounted, vertical)

When liquid level rises to the first level, one pump turns on. Both pumps automatically turn on when a peak condition occurs and the liquid level continues to rise. If Form N5 or N25 is present, and the water level continues to rise, a high water alarm is activated.

Mechanical alternators can be ordered with a manual transfer selector switch (Form N3), which allows the operator to select which pump cuts in first. The second pump only operates under peak demand conditions or if the first pump fails. When the switch is disengaged, the alternator reverts to normal operation. Another option (Form N4) allows the alternator to be used as a two-level non-alternating unit.

9038AG1

## Class 9038 Type A Open and Sump Tank Mechanical Alternators

Table 21 contains ordering information for Class 9038 Type A mechanical alternators, including factory installed modifications. Order float accessories separately. Contact the Sensor Competency Center when using Class 9038 alternators in liquids with a different specific gravity than water (1.0).

When ordering a factory modification, add the Form number to the end of the mechanical alternator catalog number. For example, to select a 9038AG1 alternator with reverse action, order 9038AG1R.

**Table 21: Class 9038 Type A Mechanical Alternators**

| **Specifications** | |
|---|---|
| **Application** | Open and sump tanks using duplex pumps |
| **Float Movement** | Float operated |
| **Ambient Temperature** | –22 to +200 °F |
| **Contact Operation** | Close on liquid rise (standard)<br>Open on liquid rise (Form R) |

| **Catalog Numbers** | |
|---|---|
| **NEMA 1** | **9038AG1** |
| **NEMA 4** (compensating spring standard) | **9038AW1** |
| **NEMA 7, 9** (compensating spring standard) | **9038AR1** |

| **Modifications**<br>**NOTE:** Factory installed only. | **Form** |
|---|---|
| Compensa ing spring (Type AG) | C (field installable) |
| Two-level, non-alternating unit | N4 |
| High water alarm circuit (single pole) | N5 |
| High water alarm circuit (two pole) | N25 |
| Reverse action: contacts open on liquid rise | R |

| **Accessories** | **Catalog Number** |
|---|---|
| Compensating spring (Type AG) | **9049A15** |

Table 22 lists the operating forces for Class 9038 Type A alternators. Use this table when selecting additional tubing or when selecting floats and rods for accessories made by other manufacturers.

**Table 22: Class 9038 Type A Operating Forces**

| Catalog Number | | 9038AG1 | | 9038AG1R | | 9038AR1/9038AW1 | 9038AR1R/9038AW1R |
|---|---|---|---|---|---|---|---|
| Lever Length Position | | Minimum | Maximum | Minimum | Maximum | Standard | Standard |
| Force Up to Trip (oz), without Form C [1] | | 18 | 16 | 14 | 11 | — | — |
| Force Down to Trip (oz), without Form C [1] | | 20 | 17 | 16 | 12 | — | — |
| Maximum Rod Length Supported by the Compensating Spring ft (m) [2] | Brass | 10 (3.05) | 8 (2.44) | 7 (2.13) | 6 (1.83) | 16 (4.88) | 19 (5.79) |
| | Stainless Steel | 12 (3.66) | 10 (3.05) | 8 (2.44) | 7 (2.13) | 20 (6.1) | 23 (7.01) |
| | Aluminum | 25 (7.62) | 21 (6.4) | 17 (5.18) | 15 (4.57) | 41 (12.5) | 47 (14.33) |
| Maximum Weight of Tubing and Stops Supported by the Compensating Spring (oz) | | 47 | 41 | 33 | 30 | 74 | 85 |

1 Add 2 oz for high water alarm (Form N5 or N25).

2 Rod length determined using Class 9049 rod material (0.38 in. / 10 mm O.D. tubing).
O her types of rod must be weighed and compared to the "Maximum Weight of Tubing and Stops" row above.

## Accessory Kits

Table 23 lists the Class 9049 accessory kits for Class 9038 Type A alternators. The accessories are ordered separately from the alternators. Order tapped-at-top floats for Type AG1 (except form C) and center-hole floats for Types AG1C, AW1, and AR1.

**Table 23: Class 9049 Accessories for Class 9038 Type A Float Switches (weight in oz)**

| Accessory Kits | Tapped-at-Top Floats (#304 SS) | | | Center-Hole Floats (#304 SS) | | | Additional Tubing [1] | | |
|---|---|---|---|---|---|---|---|---|---|
| Catalog Numbers | 9049A6 | 9049A6A | 9049A6S | 9049A6C | 9049A6CA | 9049A6CS | 9049T1 | 9049T1A | 9049T1S |
| Tubing | 5 ft brass | 5 ft Al | 5 ft SS | 5 ft brass | 5 ft Al | 5 ft SS | 2.5 ft brass | 2.5 ft Al | 2.5 ft SS |
| Net buoyancy in water, 7 in. float [2] | 60 | 60 | 60 | 70 | 70 | 70 | — | — | — |
| Total weight of stops | 3 | 3 | 3 | 6 | 6 | 6 | — | — | — |
| Number of stops | 2 | 2 | 2 | 4 | 4 | 4 | — | — | — |
| Weight of 5 ft rod, included | 18.5 | 6 | 16.9 | 18.5 | 6 | 16.9 | — | — | — |
| Weight per ft of extra rod | — | — | — | — | — | — | 3.7 | 1.2 | 3.4 |

1 Additional tubing kits add on to the float accessory kits and include a connector. Maximum recommended tubing length for tapped-at-top float: 12.5 ft (3810 mm).

2 Net buoyancy calculated with float 80% submerged, allowing for a 20% operating margin. Buoyancy data calculated for use in water. Contact the Sensor Competency Center for buoyancy data in media having specific gravity different than water (1.0).

When ordering float accessories, first specify the desired accessory kit, then as a second item, give the catalog number and the quantity of the additional tubing kits required. For example, for a 9049A6C kit with 15 ft of tubing, specify:

A. 9049A6C, quantity = 1 (includes 5 ft of tubing)

B. 9049T1, quantity = 4 (2.5 ft of tubing each, for a total of 10 additional ft)

**Figure 18: Type AG1 Dimensions**

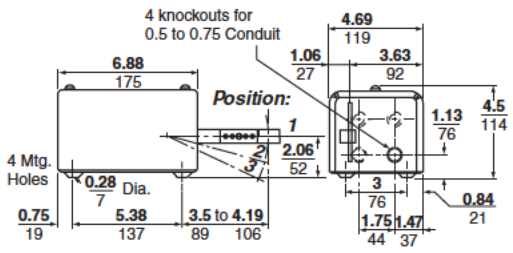
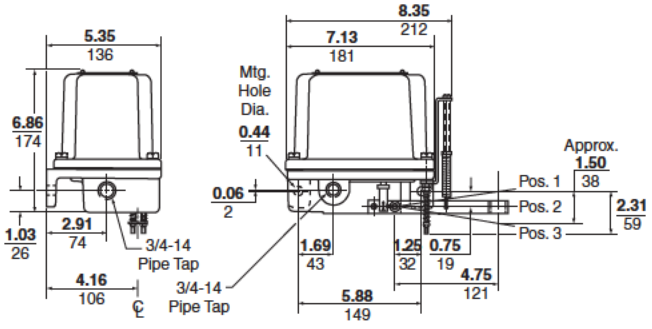


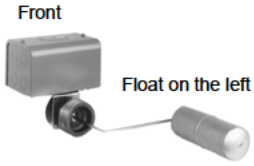

**Figure 19: Type AR1/AW1 Dimensions**



## Class 9038 Type C Mechanical Alternators with Bushing

Table 24 contains ordering information for Class 9038 Type C mechanical alternators. Contact the Sensor Competency Center when using Class 9038 alternators in liquids with a different specific gravity than water (1.0).

When ordering a factory modification, add the Form number to the end of the alternator catalog number. For example, to select a 9038CG36 alternator with reverse action, select 9038CG36R.



9038CG36

**Table 24: Class 9038 Type C Mechanical Alternators**

| Specifications | |
|---|---|
| **Application** | Closed tanks using duplex, condensate pumps<br>A 2.5 in. cast iron bushing attaches the float switch to the tank |
| **Float movement** | Transmitted through a nitrile rubber seal such as a Buna-N quad ring.<br>Occasional seal replacement may be necessary. |
| **Tank Pressure** | Up to 50 psi |
| **Ambient Temperature** | –22 to +200 °F |
| **Media Temperature (Minimum)** | Solidification point of the medium in the tank, down to –22 °F |
| **Contact Operation** | Close on liquid rise (standard)<br>Open on liquid rise (Form R) |
| **Float Travel** | Float travel is determined by the rod length.<br>An external pointer indicates the float position.<br>For more information on float travel and position, see "Float Travel" on page 64. |
| **Materials (Standard)** | #304 SS float, #316 SS rod, 2 5 in. cast iron bushing, brass sealing connector, Buna-N quad ring packing |

**Catalog Numbers**

| Float Position [1] | | Left | | | Right | | |
|---|---|---|---|---|---|---|---|
| **Water Level Change, Minimum–Maximum** | **in. (mm)** | 6.5–13 (165–330) | 4–7.75 (102–197) | 4.75–9.25 (121–235) | 6.5–13 (165–330) | 4–7.75 (102–197) | 4.75–9.25 (121–235) |
| **NEMA 1** | | **9038CG32** | **9038CG34** | **9038CG36** | **9038CG31** | **9038CG33** | **9038CG35** |
| **NEMA 4** | | **9038CW32** | **9038CW34** | **9038CW36** | **9038CW31** | **9038CW33** | **9038CW35** |
| **NEMA 7, 9** | | **9038CR32** | **9038CR34** | **9038CW36** | **9038CR31** | **9038CR33** | **9038CW35** |

| Modifications | Form |
|---|---|
| Omit 2.5 in. cast iron bushing | F3 |
| Omit float | L |
| Two-level, non-alternating unit | N4 [2] |
| High water alarm circuit, single pole (Type CG only) | N5 [2] |
| High water alarm circuit, two pole (Type CG only) | N25 [2] |
| Reverse action: contacts open on liquid rise | R [2] |
| Fluorocarbon polymer such as Viton® packing, 5 oz float (diesel fuel, Type CG only) | Z19 |
| Fluorocarbon polymer such as Viton packing, for media temperature up to 250 F | Z20 |
| Fluorocarbon polymer such as Viton packing, #316 SS float for liquid temperatures up to 250 F | Z21 |

1 Viewed from front of alternator, facing indicator scale.

2 Factory installed only.

**NOTE:** For replacement floats, refer to page 67.

Table 25 lists the float travel distances for the screw-in float switches. Refer to Figure 20.

**Table 25: Type C Float Travel Adjustments, in. (mm)**

| R | A | | B | | C | | D | | F | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| 4.25 (108) [1] | 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) |
| 5 (127) [2] | 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) |
| 7 (178) [3] | 2.5 (64) | 5 (127) | 5 (127) | 7 (178) | 2 (51) | 4 (102) | 5 (152) | 7 (178) | 10 (254) | 14 (495) |

1 CG33, CG34, CW33, CW34, CR33, CR34

2 CG35, CG36, CW35, CW36, CR35, CR36

3 CG31, CG32, CW31, CW32, CR31, CR32

**Figure 20: Travel Dimensions**

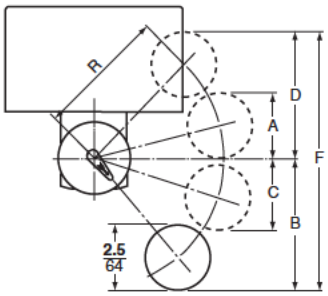



**Figure 21: Type CG Dimensions**

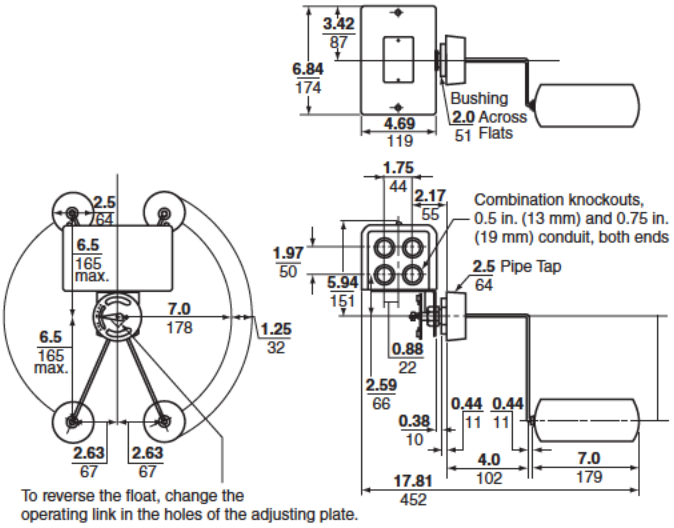
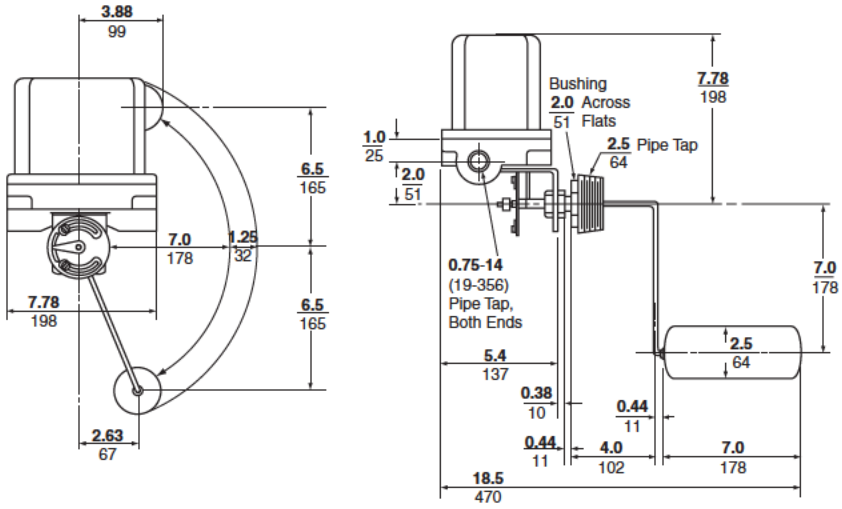



**Figure 22: Type CR/CW Dimensions**



# Class 9038 Type D Flange-Mounted Mechanical Alternators

## Flange Mounted

9038DG
9049ER5
9049EF1

Table 26 contains ordering information for Class 9038 Type D alternators, factory modifications, and float kits. Order rod and float accessory kits separately. Contact the Sensor Competency Center when using Class 9038 alternators in liquids with a different specific gravity than water (1.0).

When ordering a factory modification, add the Form number to the end of the alternator Type number. For example, to select a 9038DG7 alternator with manual transfer, order 9038DG7N3.

**Table 26: Class 9038 Type D Mechanical Alternators**

| Specifications | |
|---|---|
| **Application** | Industrial closed tanks using duplex, condensate pumps<br>Top mounted only |
| **Float movement** | Transmitted through a quad ring seal (occasional replacement may be necessary) |
| **Tank Pressure** | Up to 50 psi |
| **Media Temperature** | Viton® seal: up to 250 °F |
| **Contact Operation** | Close on liquid rise or open on liquid rise (field reversible) |
| **Float Travel** | Determined by the length of the hinge post and rod and by the float position<br>For more information on float travel and position, see “Float Travel” on page 64. |

| Catalog Numbers | | | | |
|---|---|---|---|---|
| **Hinge Post Length (V)** in. (mm) | **2.63 (67)** | | **4.69 (119)** | |
| **Water Level Change** | **Minimum** | **Maximum** | **Minimum** | **Maximum** |
| **NEMA 1** | **9038DG7** | **9038DG8** | **9038DG9** | **9038DG10** |
| **NEMA 4** | **9038DW7** | **9038DW8** | **9038DW9** | **9038DW10** |
| **NEMA 7, 9** | **9038DR7** | **9038DR8** | **9038DR9** | **9038DR10** |

| **Modifications**<br>**NOTE:** Factory installed only. | **Form** |
|---|---|
| Two-level, non-alternating unit | N4 |
| High water alarm circuit (Type DG only) | N5 |

| Float Kits | | | |
|---|---|---|---|
| **Material** | **Diameter in. (mm)** | **Length in. (mm)** | **Catalog Number** |
| #304 stainless steel | 3.62 (92) | 4.5 (114) | **9049EF1** |
| #316 stainless steel | 3.62 (92) | 4.5 (114) | **9049EF2** |
| **NOTE:** The following float kits are available but are not recommended for use wi h 9038D mechanical alternators. The float travel dimensions shown in this catalog for 9038D devices do not apply when using these floats. A correction factor appears in the footnote of Tables 27–30 on pages 64 and 66. | | | |
| #304 stainless steel | 2.5 (64) | 7 (178) | **9049HF3** |
| #316 stainless steel | 2.5 (64) | 7 (178) | **9049HF4** |

## Class 9049 Rod Kits for Class 9038 Type D

### Float Travel

Float travel is determined by the length of the hinge post and rod and by the float position. The float may be operated in three different positions. In Position 1, the contacts close when the liquid rises. In Position 2, the contacts open when the liquid rises. Use Table 27 to select the appropriate rod kit when ordering Class 9038 Types DG7, DW7, or DR7 alternators.

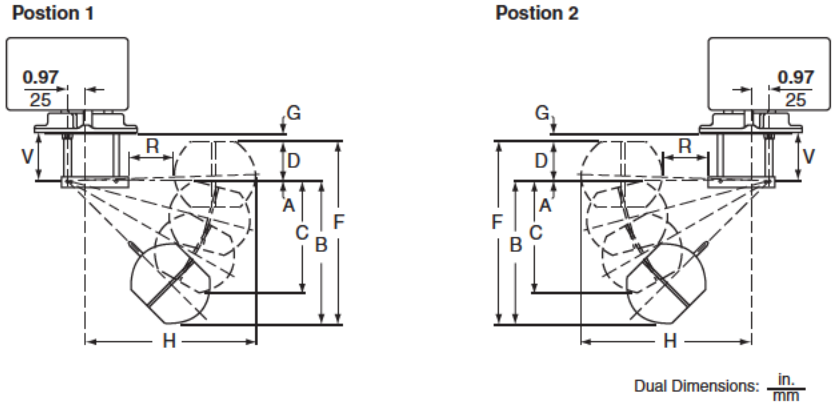
**Table 27: Class 9049 Rod Kits for Class 9038 Type DG7, DW7, and DR7 Alternators**

**Float Travel for Class 9038 Types DG7, DW7, and DR7 Alternators**
**Minimum Water Level Change (V = 2.63 in. / 67 mm)**

| Catalog No. | | 9049ER1 | 9049ER2 | 9049ER3 | 9049ER5 | 9049ER7 | 9049ER12 |
|---|---|---|---|---|---|---|---|
| Dimensions in. (mm) | | | | | | | |
| R | | 1.75 (44) | 2.5 (64) | 3.25 (83) | 5.25 (133) | 7.25 (184) | 12.25 (311) |
| H [1] | | 8.25 (210) | 9 (229) | 9.5 (241) | 11.75 (298) | 13.75 (349) | 18.75 (476) |
| A | Min. | 0.75 (19) | 0.63 (16) | 0.5 (13) | 0.13 (3) | 0.25 (6) | 0.38 (10) |
| | Max. | 0.63 (16) | 0.38 (10) | 0.25 (6) | 0.0 (0) | 0.5 (13) | 1.5 (38) |
| B | Min. | 5 (127) | 5.38 (137) | 5.5 (140) | 6.38 (162) | 7 (178) | 8.63 (219) |
| | Max. | 5 (127) | 5.25 (133) | 5.5 (140) | 6.25 (159) | 7 (178) | 8.75 (222) |
| C | Min. | 4 (102) | 4.25 (108) | 4.38 (111) | 5 (127) | 5.5 (140) | 6.75 (171) |
| | Max. | 4.25 (108) | 4.5 (114) | 4.63 (118) | 5.13 (130) | 5.75 (146) | 7.75 (197) |
| D | Min. | 1.75 (44) | 1.75 (44) | 1.75 (44) | 1.75 (44) | 1.75 (44) | 1.75 (44) |
| | Max. | 1.5 (38) | 1.38 (35) | 1.25 (32) | 1 (25) | 0.88 (22) | 0.63 (16) |
| F | Min. | 6.75 (171) | 7.13 (181) | 7.25 (184) | 8.13 (207) | 8.75 (222) | 10.38 (264) |
| | Max. | 6.5 (165) | 6.63 (168) | 6.75 (171) | 7.25 (184) | 7.88 (200) | 9.38 (238) |
| G | Min. | 1 (25) | 1 (25) | 1 (25) | 1 (25) | 1 (25) | 1 (25) |
| | Max. | 1.5 (38) | 1.5 (38) | 1.5 (38) | 1.75 (44) | 2 (51) | 2.5 (64) |

1 Add 2.5 in. (64 mm) to **H** when using HF3 or HF4 floats.

**Figure 23: Travel Dimensions**



Use the following table to select the appropriate rod kit when ordering Class 9038 Types DG8, DW8, or DR8 alternators.

**Table 28: Class 9049 Rod Kits for Use on Class 9038 Types DG8, DW8, and DR8 Alternators**

**Float Travel for Class 9038 Types DG8, DW8, and DR8 Alternators**
**Minimum Water Level Change (V = 2.63 in. / 67 mm)**

| Catalog No. | | 9049ER1 | 9049ER2 | 9049ER3 | 9049ER5 | 9049ER7 | 9049ER12 |
|---|---|---|---|---|---|---|---|
| Dimensions in. (mm) | | | | | | | |
| R | | 1.75 (44) | 2.5 (64) | 3.25 (83) | 5.25 (133) | 7.25 (184) | 12.25 (311) |
| H [1] | | 7.5 (191) | 8.25 (210) | 9 (229) | 11 (279) | 13 (330) | 18 (457) |
| A | Min. | 0.0 (0) | 0.5 (13) | 1 (25) | 2 (51) | 3 (76) | 5.5 (140) |
| | Max. | 1.25 (32) | 1.5 (38) | 2 (51) | 3 (76) | 4 (102) | 6.5 (165) |
| B | Min. | 8 (203) | 8.75 (222) | 9.5 (241) | 11.5 (292) | 13.5 (343) | 18.5 (470) |
| C | Min. | 6.5 (165) | 7 (178) | 7.75 (197) | 9.5 (241) | 11 (279) | 14.75 (375) |
| | Max. | 6.5 (165) | 7 (178) | 7.5 (1910 | 9 (229) | 10.75 (273) | 15 (381) |
| D [2] | Min. | 2 (51) | 1.75 (44) | 1.5 (38) | 1.25 (32) | 0.75 (19) | 0.5 (13) |
| | Max. | 0.5 (13) | 0.25 (6) | 0.0 (0) | 0.75 (19) | 1.75 (44) | 4.25 (108) |
| F | Min. | 10 (254) | 10.5 (267) | 11 (279) | 12.75 (324) | 14.25 (362) | 19 (483) |
| | Max. | 8.5 (216) | 9 (229) | 9.5 (241) | 10.75 (273) | 11.75 (298) | 14.25 (362) |
| G | Min. | 1.5 (38) | 1.5 (38) | 1.75 (44) | 2 (51) | 2 (51) | 2.25 (57) |
| | Max. | 2.5 (64) | 2.75 (70) | 3 (76) | 3.75 (95) | 4.5 (114) | 6.25 (159) |

1 Add 2.5 in. (64 mm) to **H** when using HF3 or HF4 floats.

2 **D** is negative when the top of the float is below the horizontal centerline.

Use the following table to select the appropriate rod kit when ordering Class 9038 Types DG9, DW9, or DR9 alternators.

**Table 29: Class 9049 Rod Kits for Class 9038 Type DG9, DW9, and DR9 Alternators**

**Float Travel for Class 9038 Types DG9, DW9, and DR9 Alternators**
**Minimum Water Level Change (V = 4.69 in. / 119 mm)**

| Catalog No. | | 9049ER1 | 9049ER2 | 9049ER3 | 9049ER5 | 9049ER7 | 9049ER12 |
|---|---|---|---|---|---|---|---|
| Dimensions in. (mm) | | | | | | | |
| R | | 1.75 (44) | 2.5 (64) | 3.25 (83) | 5.25 (133) | 7.25 (184) | 12.25 (311) |
| H [1] | | 8.25 (210) | 9 (229) | 9.5 (241) | 11.75 (298) | 13.75 (349) | 18.75 (476) |
| A | Min. | 1 (25) | 1 (25) | 0.88 (22) | 0.63 (16) | 0.25 (6) | 0.13 (3) |
| | Max. | 0.5 (13) | 0.13 (3) | 0.0 (0) | 0.88 (22) | 1.63 (41) | 2.88 (73) |
| B | Min. | 5.25 (133) | 5.75 (146) | 6 (152) | 7.25 (184) | 8.25 (210) | 10.75 (273) |
| | Max. | 5.25 (133) | 5.63 (143) | 5.88 (149) | 7.13 (181) | 8.25 (210) | 11 (279) |
| C | Min. | 4.5 (114) | 4.75 (121) | 5 (127) | 5.75 (146) | 6.5 (165) | 8.38 (213) |
| | Max. | 4.5 (114) | 4.75 (121) | 5 (127) | 5.88 (149) | 6.75 (171) | 8.5 (216) |
| D | Min. | 2 (51) | 2 (51) | 2 (51) | 2 (51) | 1.88 (48) | 1.63 (41) |
| | Max. | 1.5 (38) | 1.25 (32) | 1.13 (29) | 0.75 (19) | 0.5 (13) | 0.5 (13) |
| F | Min. | 7.25 (184) | 7.75 (197) | 8 (203) | 9.25 (235) | 10.13 (257) | 12.38 (314) |
| | Max. | 6.75 (171) | 6.88 (175) | 7 (178) | 7.88 (200) | 8.75 (222) | 11.5 (292) |
| G | Min. | 3 (76) | 3 (76) | 3 (76) | 3 (76) | 3.25 (83) | 4 (102) |
| | Max. | 3.75 (95) | 4 (102) | 4 (102) | 4.38 (111) | 4.63 (117) | 5.75 (146) |

1 Add 2.5 in. (64 mm) to **H** when using HF3 or HF4 floats.

Use the following table to select the appropriate rod kit when ordering Class 9038 Type DG10, DW10, or DR10 alternators.

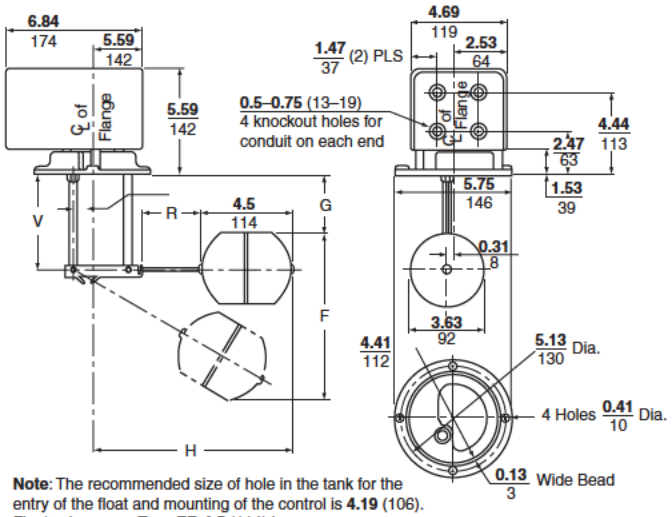
**Table 30: Class 9049 Rod Kits for Class 9038 Type DG10, DW10, and DR10 Alternators**

| Float Travel for Class 9038 Types DG10, DW10, and DR10 Alternators Minimum Water Level Change (V = 4.69 in. / 119 mm) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Catalog No.** | | **9049ER1** | **9049ER2** | **9049ER3** | **9049ER5** | **9049ER7** | **9049ER12** |
| **Dimensions in. (mm)** | | | | | | | |
| **R** | | 1.75 (44) | 2.5 (64) | 3.25 (83) | 5.25 (133) | 7.25 (184) | 12.25 (311) |
| **H** [1] | | 7.5 (191) | 8.25 (210) | 9 (229) | 11 (279) | 13 (330) | 18 (457) |
| **A** | **Min.** | 0.5 (13) | 1 (25) | 1.5 (38) | 2.5 (64) | 3.25 (83) | 6 (152) |
| | **Max.** | 1.5 (38) | 2 (51) | 2.5 (64) | 4 (102) | 5.5 (140) | 9.25 (235) |
| **B** | **Min.** | 8 (203) | 8.75 (222) | 9.5 (241) | 11.5 (292) | 13.5 (343) | 18.5 (470) |
| **C** | **Min.** | 7 (178) | 7.75 (194) | 8.25 (210) | 10 (254) | 11.5 (292) | 15.5 (394) |
| | **Max.** | 7 (178) | 7.5 (191) | 8.25 (210) | 10 (254) | 12 (305) | 17 (432) |
| **D** [2] | **Min.** | 1.75 (44) | 1.75 (44) | 1.5 (38) | 1.25 (32) | 1 (25) | 0.5 (13) |
| | **Max.** | 0.5 (13) | 0.25 (6) | 0.0 (0) | 1 (25) | 1.5 (38) | 2.75 (70) |
| **F** | **Min.** | 8.75 (222) | 10.5 (267) | 11 (279) | 12.75 (324) | 14.5 (368) | 19 (483) |
| | **Max.** | 8.5 (216) | 9 (229) | 9.5 (241) | 10.5 (267) | 12 (305) | 15.75 (400) |
| **G** | **Min.** | 3.25 (83) | 3.5 (89) | 3.5 (89) | 3.75 (95) | 4 (102) | 4.75 (121) |
| | **Max.** | 4.75 (121) | 5 (127) | 5.25 (133) | 6 (152) | 6.75 (171) | 8.5 (216) |

1 Add 2.5 in. (64 mm) to **H** when using HF3 or HF4 floats.

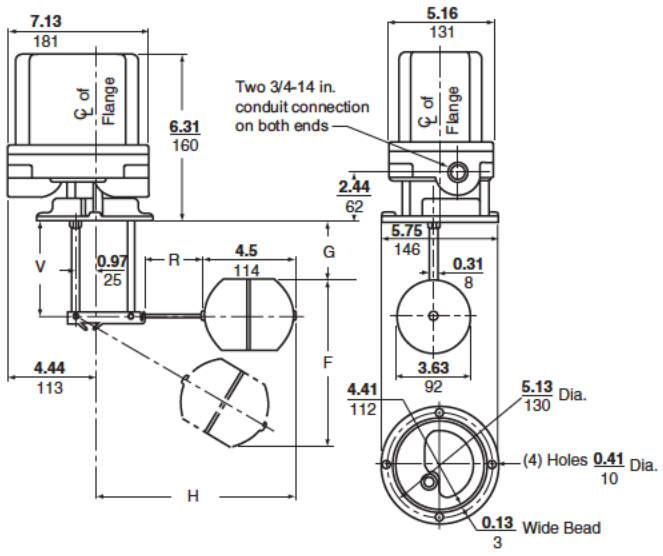
2 **D** is negative when the top of the float is below the horizontal centerline.

**Figure 24: Type DG Dimensions**




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

**Figure 25: Type DR/DW Dimensions**



## Class 9049 Accessories and Class 9998 Renewal Parts Kits

**Table 31: Class 9049 Accessories**

| Catalog Number | Description | Equipment To Be Serviced |
|---|---|---|
| **9049A6** | 7 in. Tapped at Top #304 Stainless Steel Float, 5 ft Brass Rod, 2 Stops | All 9036, 9038A |
| **9049A6A** | 7 in. Tapped at Top #304 Stainless Steel Float, 5 ft Aluminum Rod, 2 Stops | All 9036, 9038A |
| **9049A6C** | 7 in. Center Hole #304 Stainless Steel Float, 5 ft Brass Rod, 4 Stops | All 9036, 9038A |
| **9049A6CA** | 7 in. Center Hole #304 Stainless Steel Float, 5 ft Aluminum Rod, 4 Stops | All 9036, 9038A |
| **9049A6CS** | 7 in. Center Hole #316 Stainless Steel Float, 5 ft Stainless Steel Rod, 4 Stainless Steel Stops | All 9036, 9038A |
| **9049A6S** | 7 in. Tapped at Top #316 Stainless Steel Float, 5 ft Stainless Steel Rod, 2 Stainless Steel Stops | All 9036, 9038A |
| **9049AF1** | 7 in. Round Center Hole #304 Stainless Steel Replacement Float *(do not remove ballast)* | 9049A6C, A6CA, DRA31 |
| **9049AF2** | 7 in. Round Center Hole #316 Stainless Steel Replacement Float *(do not remove ballast)* | 9049A6CS, DRA32 |
| **9049AF3** | 7 in. Round Tapped at Top #304 Stainless Steel Replacement Float *(do not remove ballast)* | 9049A6, A6A, DCA1, DCA3 |
| **9049AF4** | 7 in. Round Tapped at Top #316 Stainless Steel Replacement Float *(do not remove ballast)* | 9049A6S, DCA2, DCA4 |
| **9049A13** | Compensating Spring | 9036GG |
| **9049A15** | Compensating Spring | 9038AG |
| **9049A19** | Compensating Spring | 9036DG |
| **9049A20** | Compensating Spring | 9036DR, DW |
| **9049A54** | Mounting Bracket—Replacing Obsolete 9036A with 9036G | 9036GG |
| **9049A55** | Mounting Bracket—Replacing 9036A (S or F1) with 9036G | 9036GG |
| **9049A58** | Form R Lever | 9036DG |
| **9049EF1** | #304 Stainless Steel Float *(do not remove ballast)* | 9037E, 9038D |
| **9049EF2** | #316 Stainless Steel Float *(do not remove ballast)* | 9037E, 9038D |
| **9049ER1** | 1-3/4 in. Stainless Steel Rod | 9037E, 9038D |
| **9049ER2** | 2-1/2 in. Stainless Steel Rod | 9037E, 9038D |
| **9049ER3** | 3-1/4 in. Stainless Steel Rod | 9037E, 9038D |
| **9049ER5** | 5-1/4 in. Stainless Steel Rod | 9037E, 9038D |
| **9049ER7** | 7-1/4 in. Stainless Steel Rod | 9037E, 9038D |
| **9049ER12** | 12-1/4 in. Stainless Steel Rod | 9037E, 9038D |
| **9049GF1** | #304 Stainless Steel Float *(do not remove ballast)* | 9037G |
| **9049GF2** | #316 Stainless Steel Float *(do not remove ballast)* | 9037G |
| **9049HF3** | #304 Stainless Steel Float *(do not remove ballast)* | 9037H, 9038C, D [1] |
| **9049HF4** | #316 Stainless Steel Float *(do not remove ballast)* | 9037H, 9038C, D [1] |
| **9049T1** | Additional Rod Kit: One 2-1/2 ft Section of Brass Rod, Connector | 9049A6, A6C |
| **9049T1A** | Additional Rod Kit: One 2-1/2 ft Section of Aluminum Rod, Connector | 9049A6A, A6CA |
| **9049T1S** | Additional Rod Kit: One 2-1/2 ft Section of Stainless Steel Rod, Connector | 9049A6S, A6CS |
| **9049UMS1** | Universal Mounting Bracket | All 9036; 9038AG, AR, AW |

1 Not recommended for 9038D mechanical alternators. 9049EF1 (#304 SS) and 9049EF2 (#316 SS) are recommended instead.

Renewal parts are generally available for Pump Control products with a current date code or with a numerical date code (such as 172, which corresponds to the first quarter of 1972). Parts are no longer available for devices manufactured before 1965.

**Table 32: Class 9998 Renewal Parts Kits for Class 9036–9038 Devices**

| Catalog Number | Description | Equipment To Be Serviced |
|---|---|---|
| **9998AO1** | Replacement High-Level Alarm, Single-Pole Snap Switch, SPDT | Form **N5** |
| **9998CO3** | Replacement High-Level Alarm, Double-Pole Snap Switch, DPDT | Form **N25** |
| **9998PC213** | Replacement Switch Mechanism | 9036GR, GW, Series C (All Except Form **H** and **R**) |
| **9998PC214** | Replacement Switch Mechanism | 9036GR, GW, Series C (Form **R** Only) |
| **9998PC215** | Replacement Switch Mechanism | 9036GR, GW, Series C (Form **H** Only) |
| **9998PC216** | Cover Gasket | 9036, 9037 GW Only |
| **9998PC242** | Replacement Contact Kit | 9036, 9037, 9038 (2 required) |
| **9998PC286** | Replacement Switch Mechanism | 9036DR1, DW1, Series B, Form **C** |
| **9998PC287** | Replacement Switch Mechanism | 9036DR1, DW1, Series B, Form **R** |
| **9998PC319** | Replacement Switch Mechanism | 9035DG11 |
| **9998PC334** | Replacement Switch Mechanism | 9035DR10, DW10, DR30, DW30 |
| **9998PC335** | Replacement Switch Mechanism | 9035DR11, DW11, DR31, DW31 |

# INDEX

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