

# Model 5000 Level Controller

## Technical Sales Bulletin



Figure 1 Model 5000 Level Controller

The Dyna-Flo 5000 series level controllers are implemented for use in many demanding applications, including oil and gas production and chemical process industries. Typical applications would be on gas scrubbers and separators, where liquid level control is required as well as natural gas compressors and process control applications.

The 5000 level controller (Figure 1) utilizes an innovative relay manifold design providing easy maintenance and greater safety. The controller provides a pneumatic signal output for use with a control valve. The design allows for operational consistency through high and low pressure applications. Incorporated into the 5000 controllers design is unique access to the seal around the displacer arm, making maintenance easy.

The Dyna-Flo 5000 series level controllers are manufactured to a superior level of quality and design to ensure impeccable performance and customer satisfaction.

## Features

### Multiple Configurations

The 5000 level controller is easily configured for either reverse or direct actions for both pneumatic and electric pilot options. The pneumatic pilot is available in snap acting and throttling designs. The displacer can be easily changed from vertical to horizontal without any parts.

### Rugged, Durable and Simple

Our Model 5000 has proven that it will outperform in demanding applications. The simple design lends itself to these rugged environments and the familiar adjustability makes tuning seamless. Powder coated case for outstanding resistance to weather and corrosion.

### Field Reversible Configuration

The output of the 5000 controller can be field adjusted to be reverse or direct acting without additional parts. Also, this controller features adjustable gain sensitivity.

### No Bleed Relay

The 5000 controller does not bleed supply gas during steady state operation, this helps reduce harmful emissions and lowers operating costs.

### NACE Service

Standard construction materials comply with the recommendations of (NACE) National Association of Corrosion Engineers MR0175.

### ASME Pressure Rating

The vessel connection components are designed and rated for ASME B16.34 Class 1500 service.

### Sealed, Vented Case

Standard sealed doors facilitate the use of flammable supply gases allowing these gases to be vented through tubing to a remote area.

### Easy Maintenance

This model supports efficient access to all internal components for easy inspection and maintenance. Seals can be replaced without disrupting the vessel connection.

### Universal Back Mounting

Versatile back mount design suits all mounting positions.



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### SPECIFICATIONS

#### Configurations

##### Controllers

- Throttling
- Snap-acting

##### Sensors

Pivotal movement of displacer arm is transmitted to the controller by a displacer-style liquid level sensor mounted to the side of tank.

#### Standard Displacer Size

1-7/8" x 12 inches, 33 inches<sup>3</sup> (48 x 305 mm, 541 cm<sup>3</sup>).

#### Minimum Specific Gravity

##### Snap-Acting Controller

Minimum specific gravity (specific gravity differential for interface applications) 0.1

##### Throttling Controller

Minimum specific gravity (specific gravity differential for interface applications) 0.1

| End Connection | Maximum Pressure Rating at 38°C (100°F) |
|----------------|---|
| MNPT           | 3,750 Psig (25,855 kPag)                |
| 150 RF         | 285 Psig (1,965 kPag)                   |
| 300 RF         | 740 Psig (5,102 kPag)                   |
| 600 RF         | 1,480 Psig (10,204 kPag)                |
| 600 RTJ        | 1,480 Psig (10,204 kPag)                |
| 900 RF         | 2,220 Psig (15,306 kPag)                |
| 900 RTJ        | 2,220 Psig (15,306 kPag)                |
| 1500 RF        | 3,750 Psig (25,855 kPag)                |
| 1500 RTJ       | 3,750 Psig (25,855 kPag)                |

#### Pilot

##### Pneumatic (standard)

- **Snap** (on/off) 0-20 / 0-30 psig output
- **Throttle** (modulating) 3-15 / 6-30 psig output

##### Electric (optional)

- **SPDT** - Explosion Proof
- **DPDT** - Explosion Proof

#### Supply Pressure Requirements

##### Snap-Acting Controller

- 3-15 or 0-20 Psig output: 20-30 Psig min.
- 6-30 or 0-30 Psig output: 35-40 Psig min.

**NOTE** - Do Not Use Supply Pressure Below 20 Psig (138 kPag).

#### Maximum Sensor Operating Pressure

Conforming with Class 1500 pressure temperature ratings per ASME B16.34 up to maximum pressure of 3,750 Psig (25,855 kPag).

#### Maximum Displacer Operating Pressure

3,750 Psig (25,855 kPag).

#### Standard Pressure Gauge Indications (Supply and Output)

Triple scale gauges in 0 to 60 Psig / 0 to 0.4 MPa / 0 to 2,758 kPag.

#### Controller Connections

##### Output

1/4 inch NPT female located on back of case.

##### Supply

1/4 inch NPT female located on the back of case.

##### Case Vent

1/4 inch NPT located on bottom of case, vent screen apparatus included.

#### Vessel to Sensor Connection

1-1/2", 2", 3", and 4" threaded (NPT) or flanged.

#### Sensor Temperature Limits

##### PVC Displacer

-29 to 80°C (-20 to 175°F).

##### HSN (Highly Saturated Nitrile) O-Rings

-40 to 204°C (-40 to 400°F).

##### Viton O-Rings

-26 to 204°C (-15 to 400°F).

##### 316 SST Displacer

Non-limiting.

#### Operative Ambient Temperature Limits

For Controller: -29 to 204°C (-20 to 400°F)

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### SPECIFICATIONS - Electric Pilot

**Output** - proportional band adjustment

**SPDT (single pole double throw)**

7 - 55%

**DPDT (double pole double throw)**

20 - 150%

#### Switch Rating

UL and CSA listed: L96

15 amps, 125, 250, or 480 V.A.C.

1/8 Hp, 125 V.A.C.; 1/4 Hp, 250 V.A.C.

1/2 amp, 125 V.D.C.; 1/4 amp, 250 V.D.C.

#### Temperature Rating

-40 to 71°C (-40 to 160°F)

#### Electric Pilot Model Number

**SPDT (single pole double throw)**

EX-Q

**DPDT (double pole double throw)**

EXD-Q

#### Certifications

##### Approvals:

UL, CSA, ATEX (CE), IEC EX

##### Designations:

Div. 1 & 2, Class I, Groups B, C, & D

Div. 1 & 2, Class II, Groups E, F, & G

II 2 G; EEX d IIB + H2 T6

### ELECTRIC PILOT GENERAL INFORMATION

The flame paths of Honeywell's EX explosion-proof switches cool exploding gases below the ignition temperature before they reach explosive gases surrounding the housing. The enclosed replaceable basic switch is accessible when the cover is removed. EX series products are NEMA 1 rated and therefore are not recommended for use in areas when they will be subjected to liquid splash.

EX series products are listed by Underwriters' Laboratories and CSA for use in hazardous locations NEMA 7, Class I, Groups C & D, and NEMA 9, Class II, Group E, F, and G. This includes vapors of ethyl ether, gasoline, petroleum, alcohol, acetone, lacquer solvent, natural gas, and atmospheres charged with grain dust, metal dust, carbon black, coal, or coke dust. Select EX listings are also listed for Class I, Group B (hydrogen) atmospheres. CSA requires the following statement for Class I, Group B requirements.

#### DANGER

**EMISSION OF HOT PARTICLES - Joint surfaces must be thoroughly cleaned before closing. Failure to comply with these instructions will result in death or serious injury.**

All EX series products comply with UL Standard: UL 894 and UL 1203, CSA Standard: C22.2 no. 25-1966, C22.2 no. 30-M1986. EX series products also meet NEMA 1 enclosure requirements.

Select EX Series products also meet the European Hazardous Locations Designation: Exd IIB + H2 T6 category II 2 G, KEMA 04ATEX2312X and complies with the European Directive on Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres (94/9/EC) commonly referred to as the ATEX Directive. Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN50014:1997, EN50018:2000 and EN50281-1-1:1998. EX series products have a temperature range of -40°C to 70°C (-40°F to 158°F), and when used within the maximum voltage and current specified on the product will have no heating problems.

#### ***Our Commitment to Quality***

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Table 1

### Model 5000 Parts / Construction Materials

| Key | Description            | Standard Material |
|-----|------------------------|-------------------|
| 1   | Case Cover             | Aluminum          |
| 2   | Case Cover Screw       | SST / Plastic     |
| 3   | Gauge Glass            | Lexan             |
| 4   | Gasket                 | Neoprene          |
| 5   | Gasket                 | Neoprene          |
| 6   | Nameplate              | Stainless Steel   |
| 7   | O-ring                 | Nitrile           |
| 8   | Retaining Ring         | Stainless Steel   |
| 9   | Roll Pin               | Stainless Steel   |
| 10  | Cover Sticker          | Vinyl             |
| 11  | Adjusting Thread       | Aluminum          |
| 12  | Body                   | WCC               |
| 13  | Case                   | Aluminum          |
| 14  | Screen Vent            | Steel             |
| 15  | Flapper Shaft          | S30300            |
| 16  | Fulcrum Bar Assembly   | Aluminum          |
| 16A | Fulcrum Bar Pin        | S31600*           |
| 17  | Fulcrum Block Assembly | 18-8 / Nylon      |
| 17A | Thumb Screw            | 18-8              |
| 18  | Gasket                 | Neoprene          |
| 19  | Hex Key                | Steel             |
| 20  | Hex Key Tool Holder    | Magnet            |
| 21  | Mounting Pin           | S30300            |
| 22  | Machine Screw          | Zinc Plated Steel |
| 23  | Nut                    | Stainless Steel   |
| 24  | Retainer Removal Tool  | Stainless Steel   |
| 25  | Retainer Ring          | Zinc Plated Steel |
| 26  | Spring                 | S30200            |
| 27  | Spring Adjuster        | Aluminum          |
| 28  | Spring Seat            | Aluminum          |
| 29  | Sticker                | Vinyl             |
| 30  | Sticker                | Vinyl             |
| 31  | Tag                    | Paper             |
| 32  | Backup Ring            | Carbon Teflon     |
| 33  | Bearing Screw          | S30300            |
| 34  | Jam Nut                | S18800            |
| 35  | O-ring                 | HSN or Viton      |

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Table 1

### Model 5000 Parts / Construction Materials - Continued

| Key | Description                             | Standard Material        |
|-----|---|--------------------------|
| 36  | O-ring                                  | HSN or Viton             |
| 37  | Retainer                                | S30300                   |
| 38  | Seal Carrier                            | S31600*                  |
| 39  | Trunnion                                | Aluminum                 |
| 40  | Trunnion Bearings                       | S44004                   |
| 41  | Displacer                               | PVC or Stainless Steel   |
| 42  | Jam Nut                                 | Stainless Steel          |
| 43  | Lock Washer                             | Zinc Plated Steel        |
| 44  | Nut                                     | Zinc Plated Steel        |
| 45  | Swivel Assembly                         | Stainless Steel          |
| 46  | Ball Bearing                            | S30200                   |
| 47  | Base Adapter                            | Aluminum                 |
| 48  | Cap                                     | Aluminum                 |
| 49  | Explosion Proof Switch (Electric Pilot) | Brass (SST Optional)     |
| 50  | Socket Cap Screw                        | Part of Key 49           |
| 51  | Filter                                  | Stainless Steel          |
| 52  | Gauge                                   | Brass or Stainless Steel |
| 53  | Gasket                                  | Nitrile                  |
| 54  | Gasket                                  | Neoprene                 |
| 55  | O-ring                                  | Nitrile                  |
| 56  | Pilot Body                              | Aluminum                 |
| 57  | Pilot Manifold                          | Aluminum                 |
| 58  | Pilot Thrust Pin                        | S31600*                  |
| 59  | Throttle Pin Valve Assembly             |                          |
| 60  | Throttle Spring                         | Stainless Steel          |
| 61  | Retaining Ring                          | Zinc Plated Steel        |
| 62  | Socket Cap Screw                        | 18-8                     |
| 63  | Socket Cap Screw                        | 18-8                     |
| 64  | Socket Cap Screw                        | 18-8                     |
| 65  | Socket Cap Screw                        | 18-8                     |
| 66  | 1/2" Nipple                             | 18-8                     |
| 67  | Cable                                   | Stainless Steel          |
| 68  | Cable Ferrule                           | Aluminum                 |
| 69  | Eye Bolt                                | Zinc Plated Steel        |
| 70  | Ring                                    | Zinc Plated Steel        |

\* All S31600 barstock is dual grade S31600/S31603 (316/316L).



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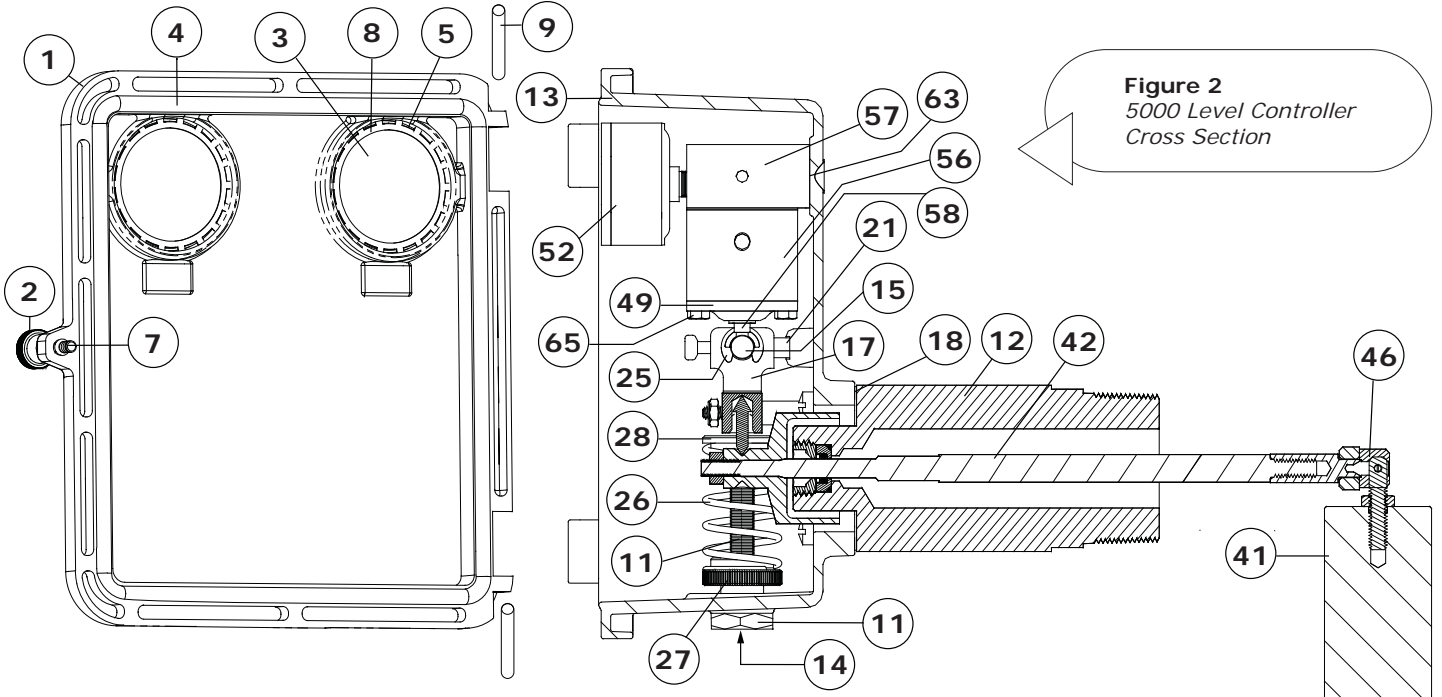
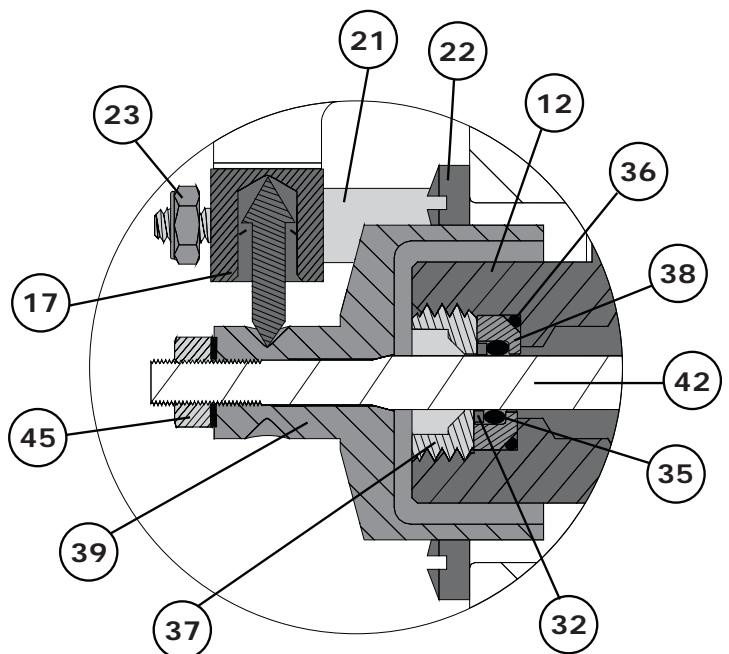
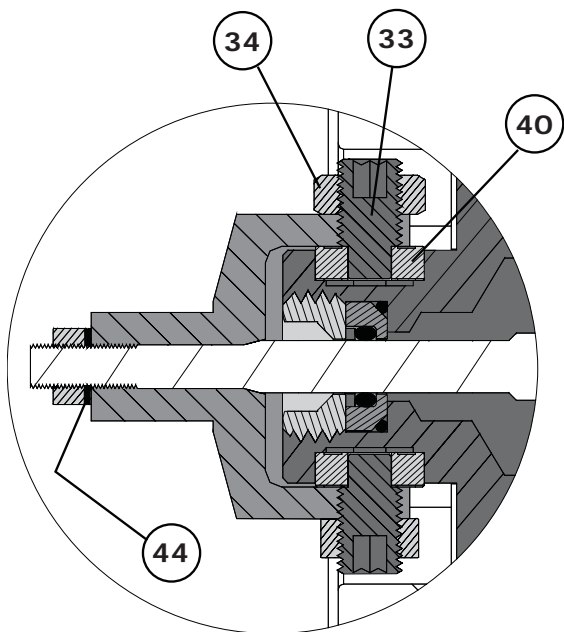


Figure 3 Trunnion Cross Section Top View

Figure 4 Trunnion Cross Section Side View



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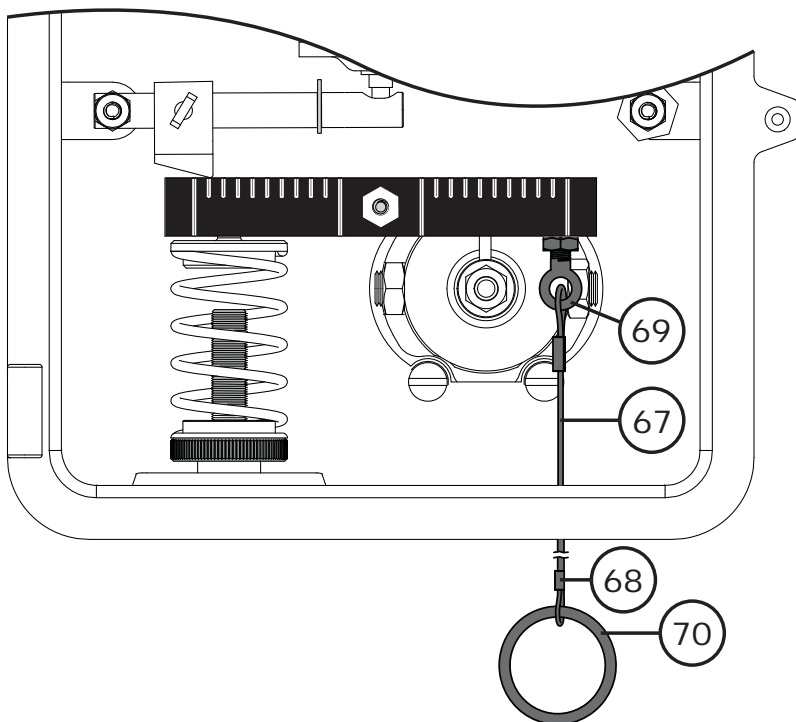
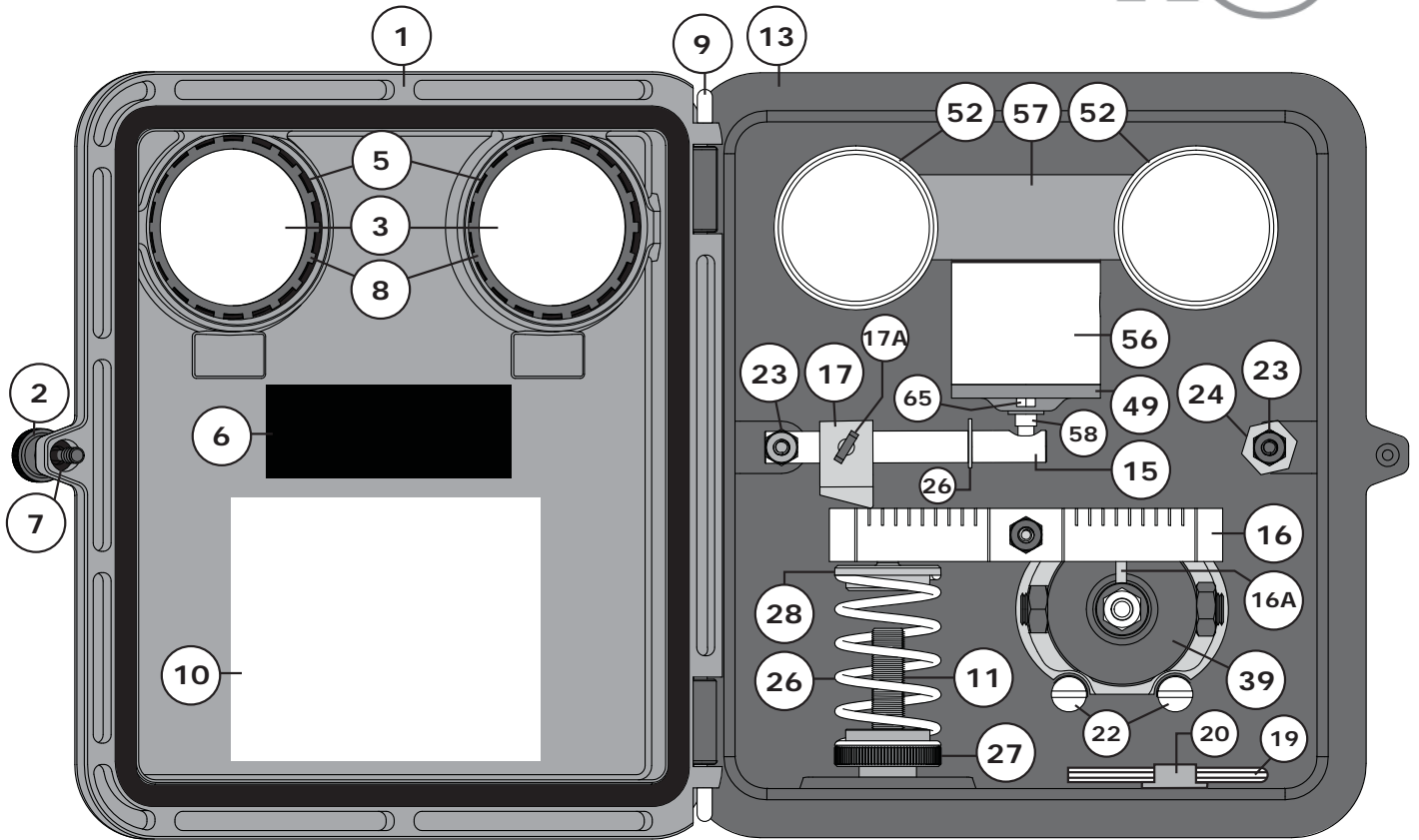


Figure 5 5000 Level Controller Front View

Figure 6 Manual Test Apparatus Diagram





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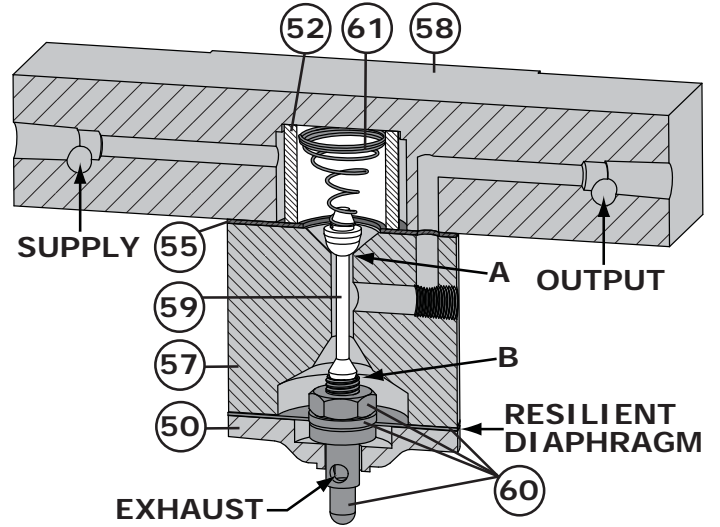
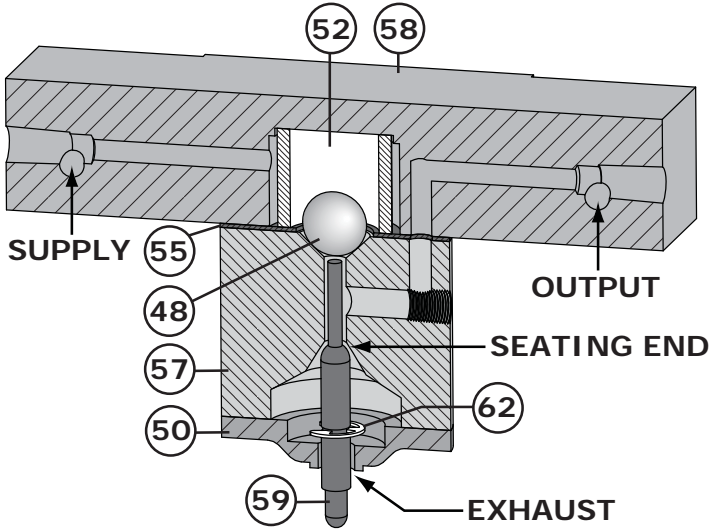
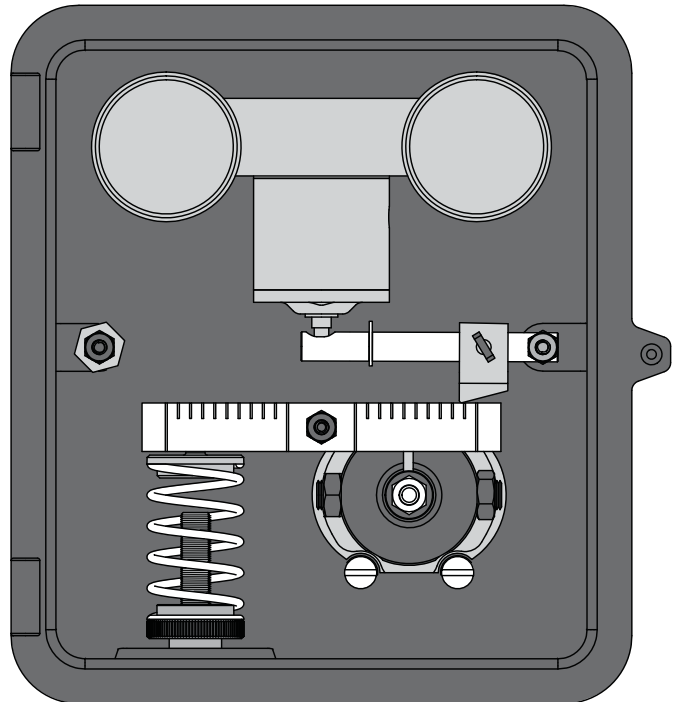
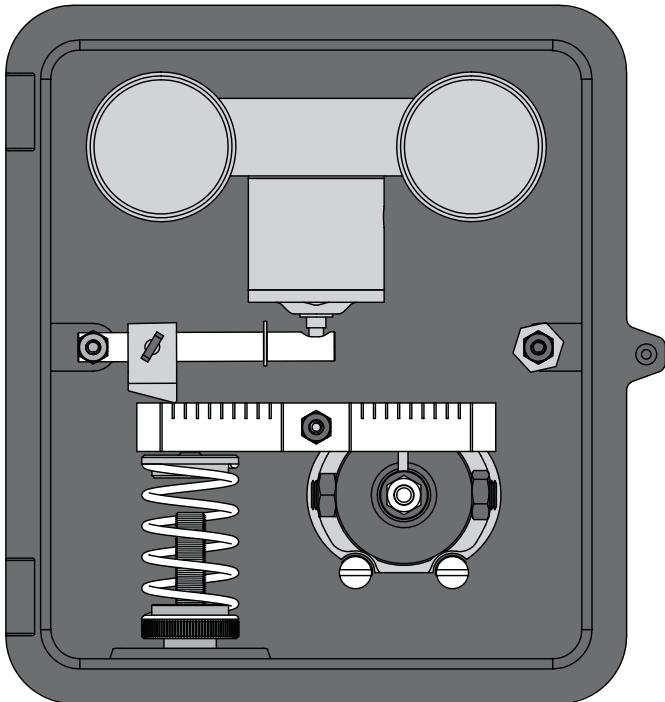


Figure 7 Snap (On / Off) Pilot

Figure 8 Throttle Pilot

Figure 9 Direct Acting Controller

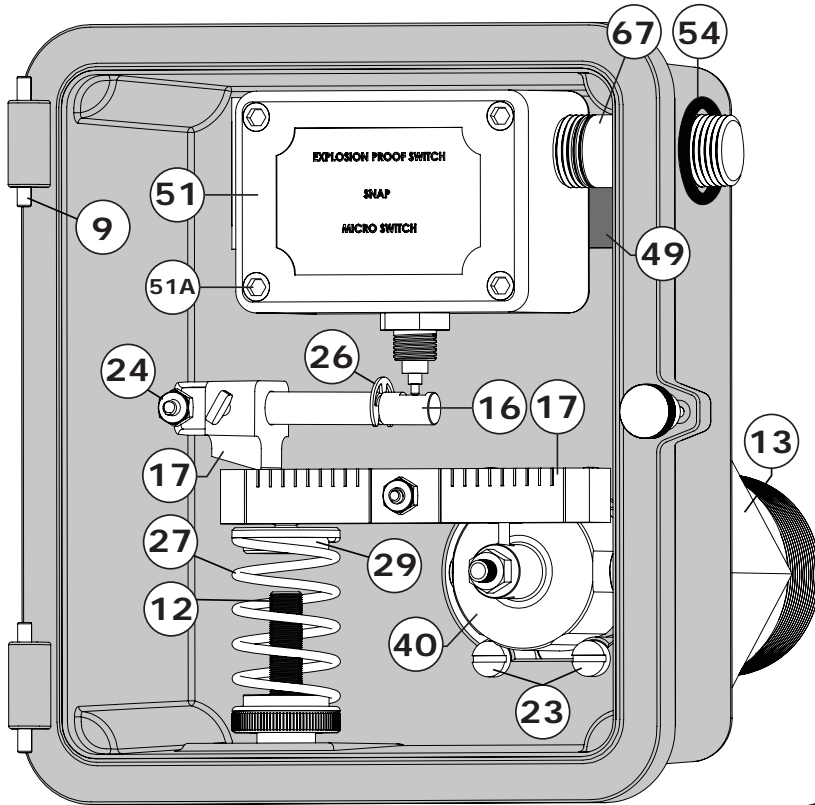
Figure 10 Reverse Acting Controller



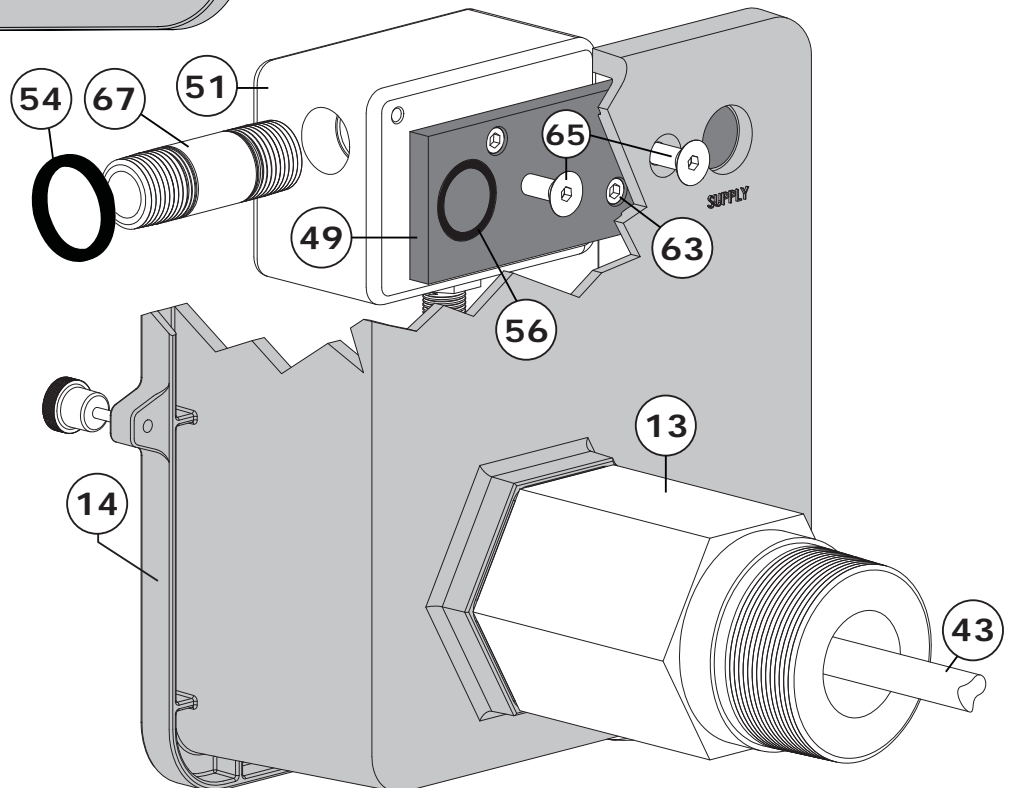


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**Figure 11**  
5000E Level Controller  
Front View



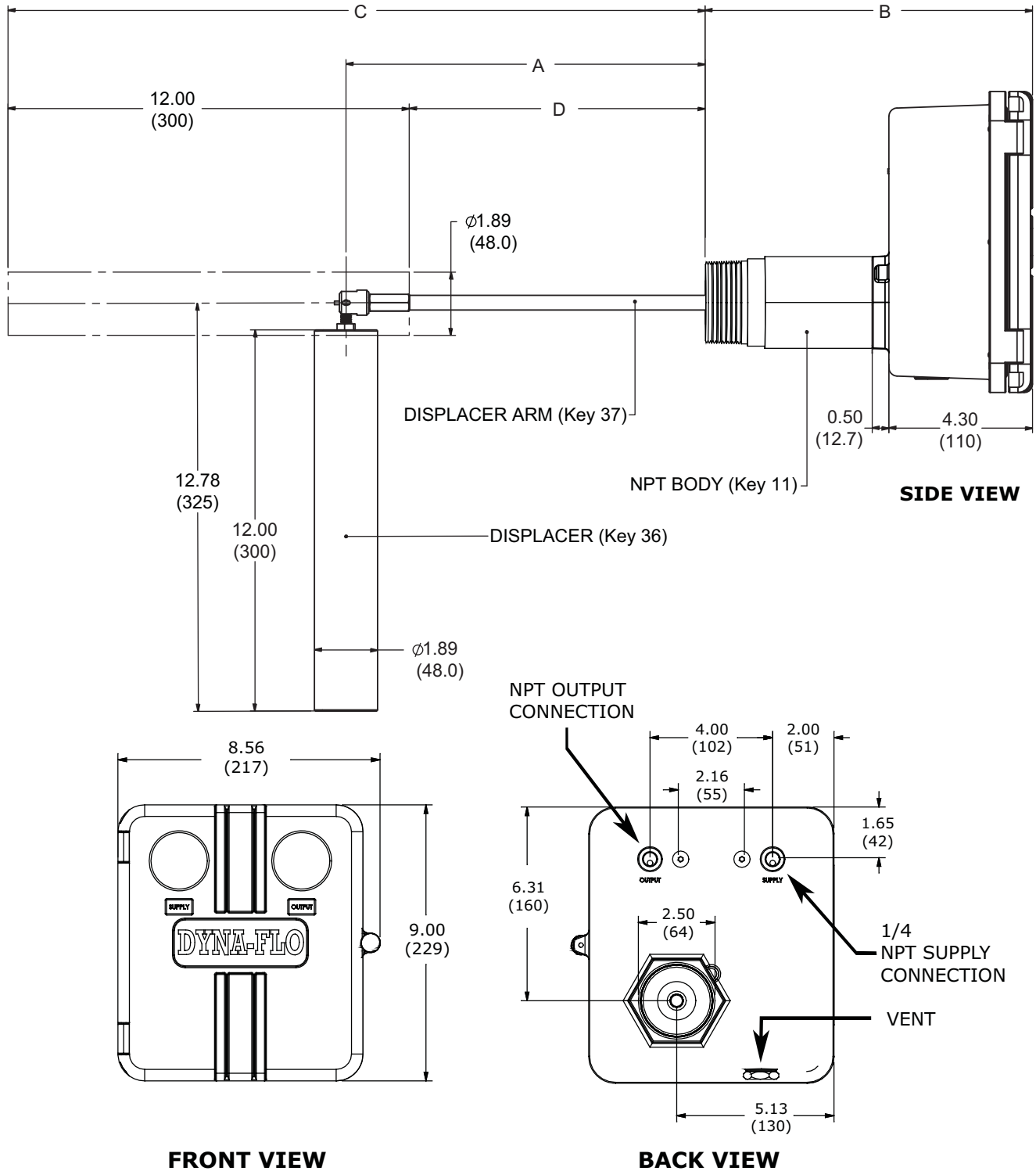
**Figure 12**  
5000E Level Controller  
Back View



# Model 5000 Level Controller

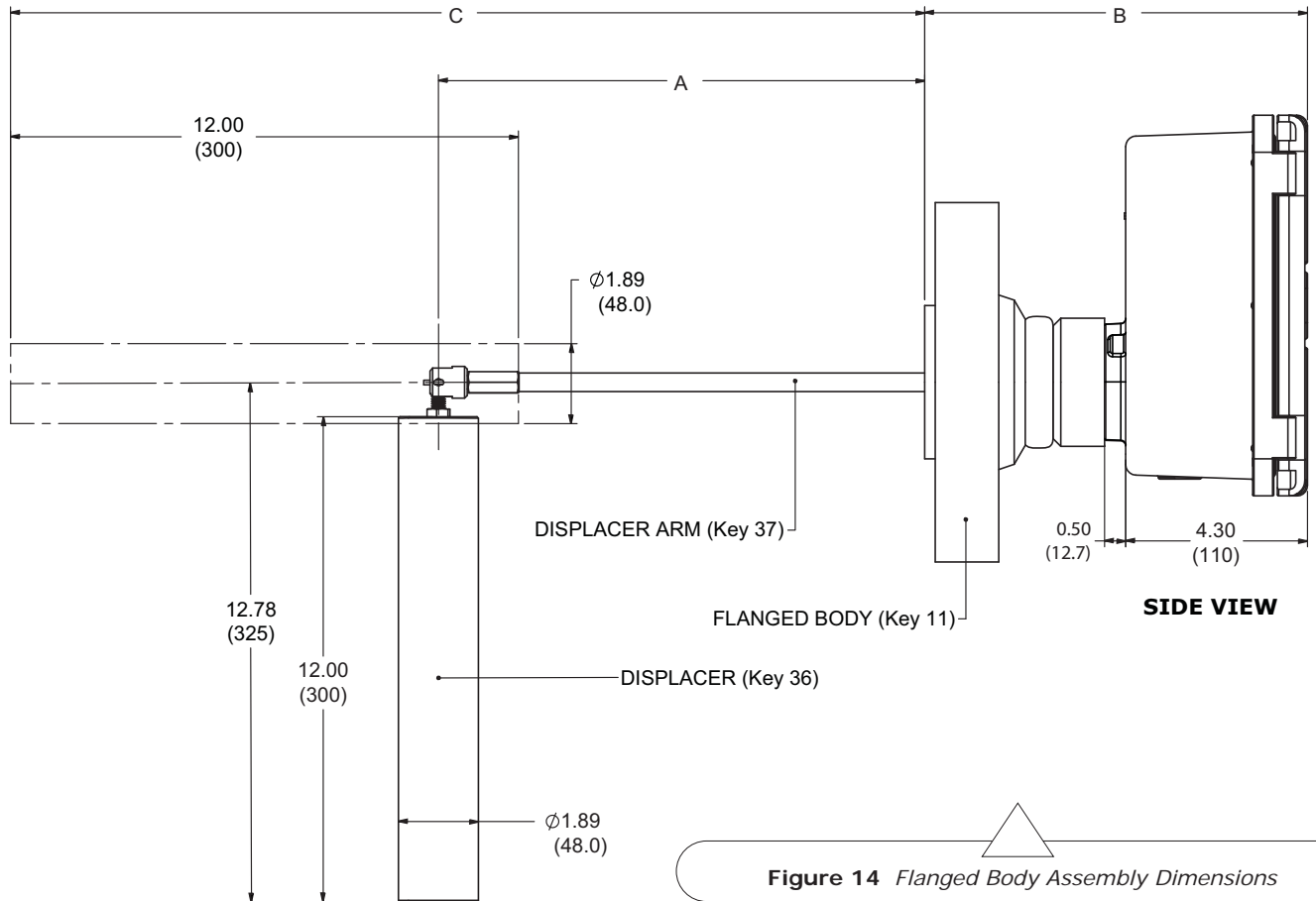
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Figure 13 NPT Body Assembly Dimensions



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**Figure 14** Flanged Body Assembly Dimensions

**Table 2**

**NPT Body Dimensions with Standard Displacer Arm and Displacer Inch (mm)**

| Body Size | A           | B          | C           | D           |
|-----------|-------------|------------|-------------|-------------|
| 1.5 Inch  | 12.10 (307) | 8.48 (215) | 24.10 (612) | 10.40 (264) |
| 2 Inch    | 11.00 (279) | 9.58 (243) | 23.00 (584) | 9.30 (236)  |

**Table 3**

**Flanged Body Dimensions with Standard Displacer Arm and Displacer Inch (mm)**

| ASME Rating and End Connection | A           | B             |             | C           |
|--------------------------------|-------------|---------------|-------------|-------------|
|                                |             | 1.5 Inch Body | 2 Inch Body |             |
| 150 RF                         | 12.80 (325) | 7.60 (193)    | 7.82 (199)  | 22.85 (580) |
| 300 RF                         | 12.56 (319) | 7.85 (199)    | 8.07 (205)  | 22.60 (574) |
| 600 RF                         | 12.42 (315) | 8.04 (204)    | 8.20 (208)  | 22.47 (571) |
| 600 RTJ                        | 12.36 (314) | 8.10 (206)    | 8.26 (210)  | 22.40 (569) |
| 900 / 1500 RF                  | 11.56 (294) | 8.29 (211)    | 9.07 (230)  | 21.60 (549) |
| 900 / 1500 RTJ                 | 11.49 (292) | 8.35 (212)    | 9.13 (232)  | 21.54 (547) |

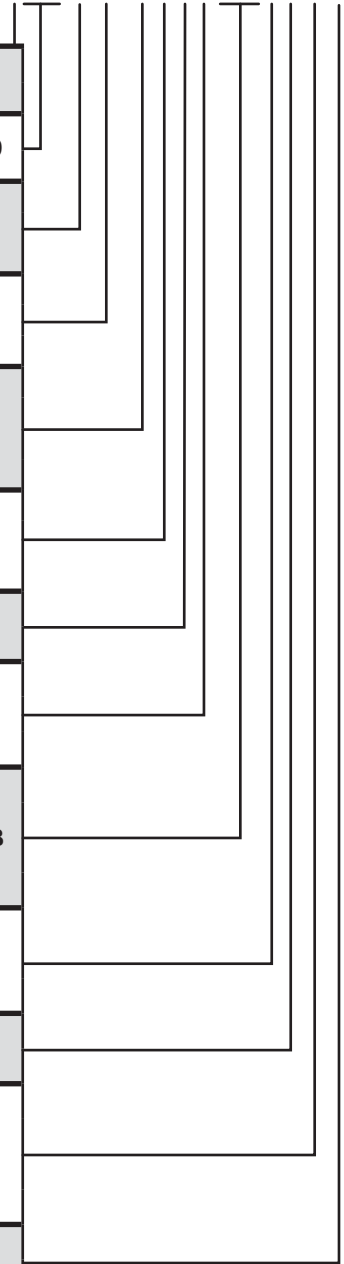


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## MODEL NUMBERING SYSTEM

**SAMPLE PART NUMBER: 5000-20MS-0S-B3B-VDP**

|                                    |  |    |         |                                       |         |    |         |
|------------------------------------|--|----|---------|---------------------------------------|---------|----|---------|
| <b>MODEL</b>                       |  |    |         |                                       |         | -  |         |
| -                                  | PNEUMATIC                                    |    | E       | ELECTRIC                              |         | -  |         |
| <b>END CONNECTION SIZE</b>         |  |    |         |                                       |         | 20 |         |
| 15                                 | 1.5 INCH                                     | 20 | 2 INCH  | 30                                    | 3 INCH  | 40 | 4 INCH  |
| <b>END CONNECTION TYPE</b>         |  |    |         |                                       |         | M  |         |
| F                                  | RAISED FACE (RF) FLANGE                      |    | J       | RING TYPE JOINT (RTJ) FLANGE          |         | M  |         |
| M                                  | SCREWED MNPT                                 |    | S       | SPECIAL                               |         | M  |         |
| <b>SPRING CHOICE</b>               |  |    |         |                                       |         | S  |         |
| L                                  | LIGHT (GREEN)                                |    | M       | MEDIUM (WHITE)                        |         | S  |         |
| S                                  | HEAVY (YELLOW)                               |    | E       | EXTRA HEAVY (RED)                     |         | S  |         |
| <b>PRESSURE RATING</b>             |  |    |         |                                       |         | 0  |         |
| 0                                  | MNPT (3,750 PSIG / 25,855 KPAG)              |    | 1       | ASME 150 (285 PSIG / 1,965 KPAG)      |         | 0  |         |
| 3                                  | ASME 300 (740 PSIG / 5,102 KPAG)             |    | 6       | ASME 600 (1,480 PSIG / 10,204 KPAG)   |         | 0  |         |
| 9                                  | ASME 900 (2,220 PSIG / 15,306 KPAG)          |    | 5       | ASME 1500 (3,750 PSIG / 25,855 KPAG)  |         | 0  |         |
| <b>PILOT</b>                       |  |    |         |                                       |         | S  |         |
| D                                  | DPDT (ELECTRIC PILOT)                        |    | P       | SPDT (ELECTRIC PILOT)                 |         | S  |         |
| S                                  | SNAP (PNEUMATIC ON/OFF PILOT)                |    | T       | THROTTLE (PNEUMATIC MODULATING PILOT) |         | S  |         |
| <b>SPECIAL CONSTRUCTION</b>        |  |    |         |                                       |         |    |         |
| -                                  | NONE   |    | T       | MANUAL TEST APPARATUS (5000E ONLY)    |         |    |         |
| <b>SEAL MATERIAL / BACKUP RING</b> |  |    |         |                                       |         | B  |         |
| B                                  | HSN (HIGHLY SATURATED NITRILE)(NACE) / CPTFE |    | V       | VITON / CPTFE                         |         | B  |         |
| X                                  | SPECIAL                                      |    |         |                                       |         | B  |         |
| <b>GAUGE TYPE</b>                  |  |    |         |                                       |         | 3B |         |
| 3B                                 | 0-30 PSI (0-207 KPA) BRASS INTERNALS         |    | 3S      | 0-30 PSI (0-207 KPA) SST INTERNALS    |         | 3B |         |
| 6B                                 | 0-60 PSI (0-414 KPA) BRASS INTERNALS         |    | 6S      | 0-60 PSI (0-414 KPA) SST INTERNALS    |         | 3B |         |
| 00                                 | MODEL 5000E                                  |    |         |                                       |         | 3B |         |
| <b>DISPLACER ARM</b>               |  |    |         |                                       |         | -  |         |
| -                                  | STANDARD (17 INCH)                           | C  | 11 INCH | D                                     | 14 INCH | E  | 20 INCH |
| F                                  | 24 INCH                                      |    |         |                                       |         |    |         |
| <b>DISPLACER TYPE</b>              |  |    |         |                                       |         | V  |         |
| V                                  | VERTICAL                                     |    | H       | HORIZONTAL                            |         | V  |         |
| <b>DISPLACER SIZE</b>              |  |    |         |                                       |         | D  |         |
| B                                  | 6 INCH                                       |    | C       | 9 INCH                                |         | D  |         |
| D                                  | 12 INCH (STANDARD)                           |    | E       | 6 INCH + 12 INCH                      |         | D  |         |
| F                                  | 4 INCH + 4 INCH + 4 INCH (2 CHAIN LINKS)     |    | X       | SPECIAL                               |         | D  |         |
| <b>DISPLACER MATERIAL</b>          |  |    |         |                                       |         | P  |         |
| P                                  | PVC  |    | S       | STAINLESS STEEL                       |         | P  |         |



**5000**

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