

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 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.

Zero Bleed Pilot

5000 controller pilots are zero bleed in steady state for both snap-acting and throttling designs, which 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 inches³ (48 x 305 mm, 541 cm³).

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 (259 bar)
150 RF	285 Psig (20 bar)
300 RF	740 Psig (51 bar)
600 RF	1,480 Psig (102 bar)
600 RTJ	1,480 Psig (102 bar)
900 RF	2,220 Psig (153 bar)
900 RTJ	2,220 Psig (153 bar)
1500 RF	3,750 Psig (259 bar)
1500 RTJ	3,750 Psig (259 bar)

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 (1.38 bar).

Maximum Sensor Operating Pressure

Conforming with Class 1500 pressure temperature ratings per ASME B16.34 up to maximum pressure of 3,750 Psig (259 bar).

Maximum Displacer Operating Pressure

3,750 Psig (259 bar).

Standard Pressure Gauge Indications (Supply and Output)

Triple scale gauges in 0 to 60 Psig / 0 to 0.4 MPa / 0 to 28 bar.

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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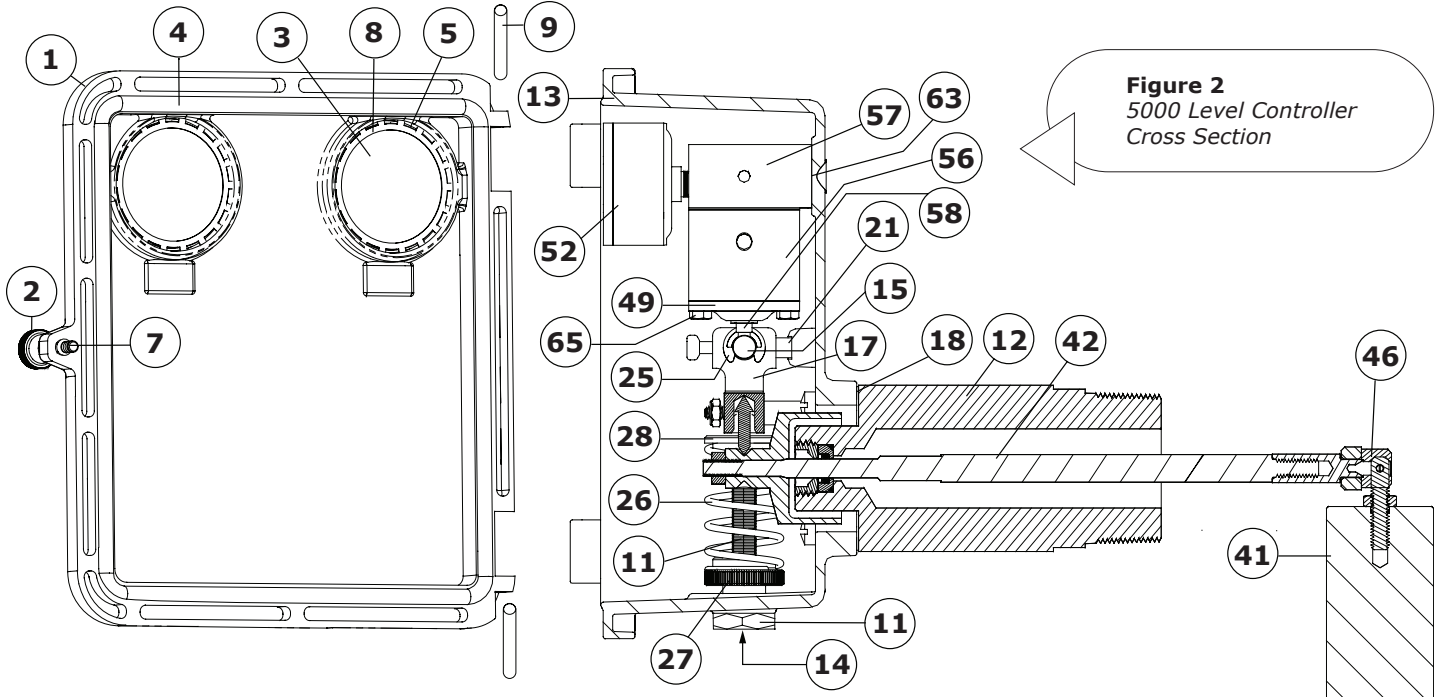
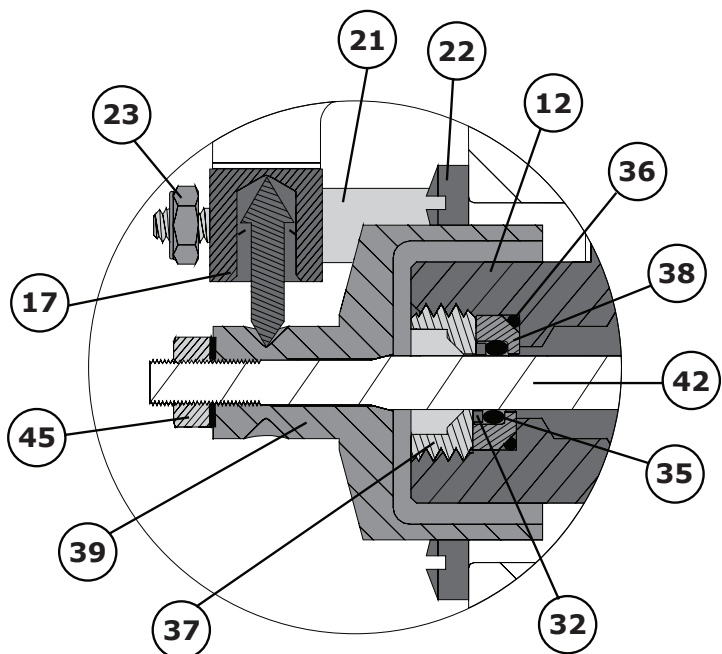
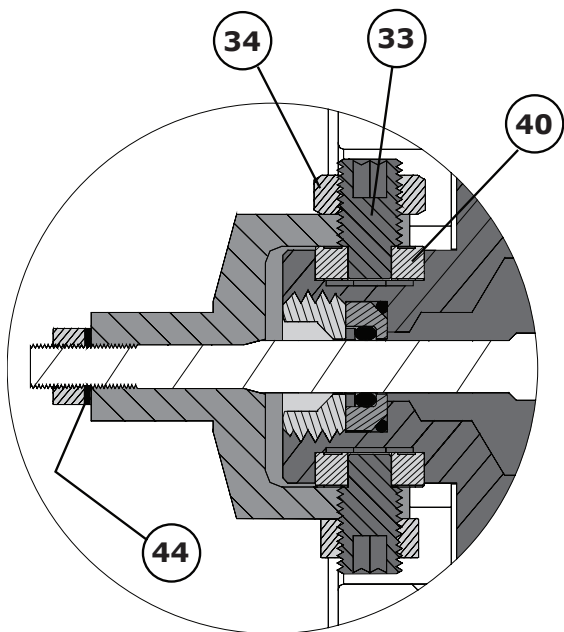


Figure 2
5000 Level Controller
Cross Section

Figure 3 Trunnion Cross Section Top View

Figure 4 Trunnion Cross Section Side View



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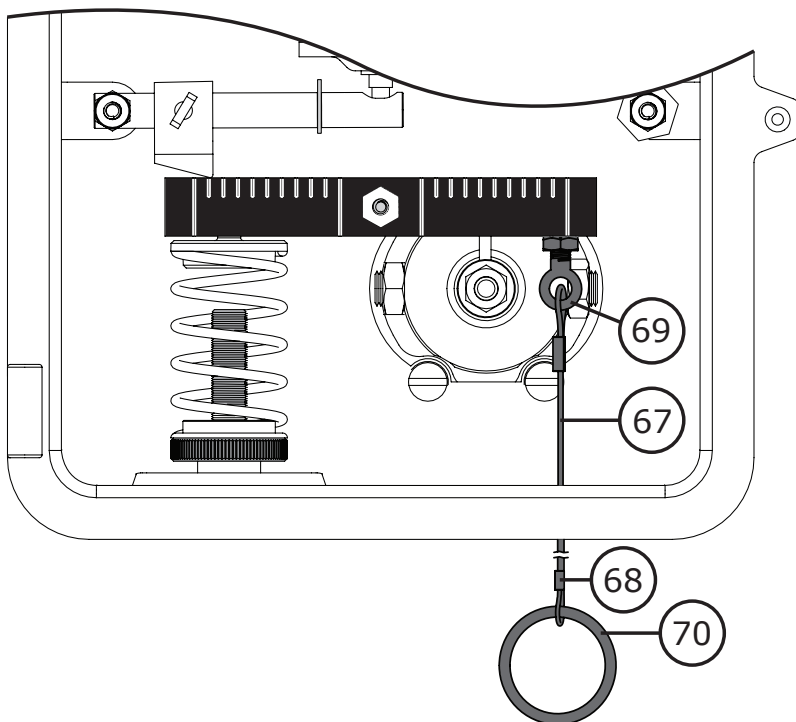
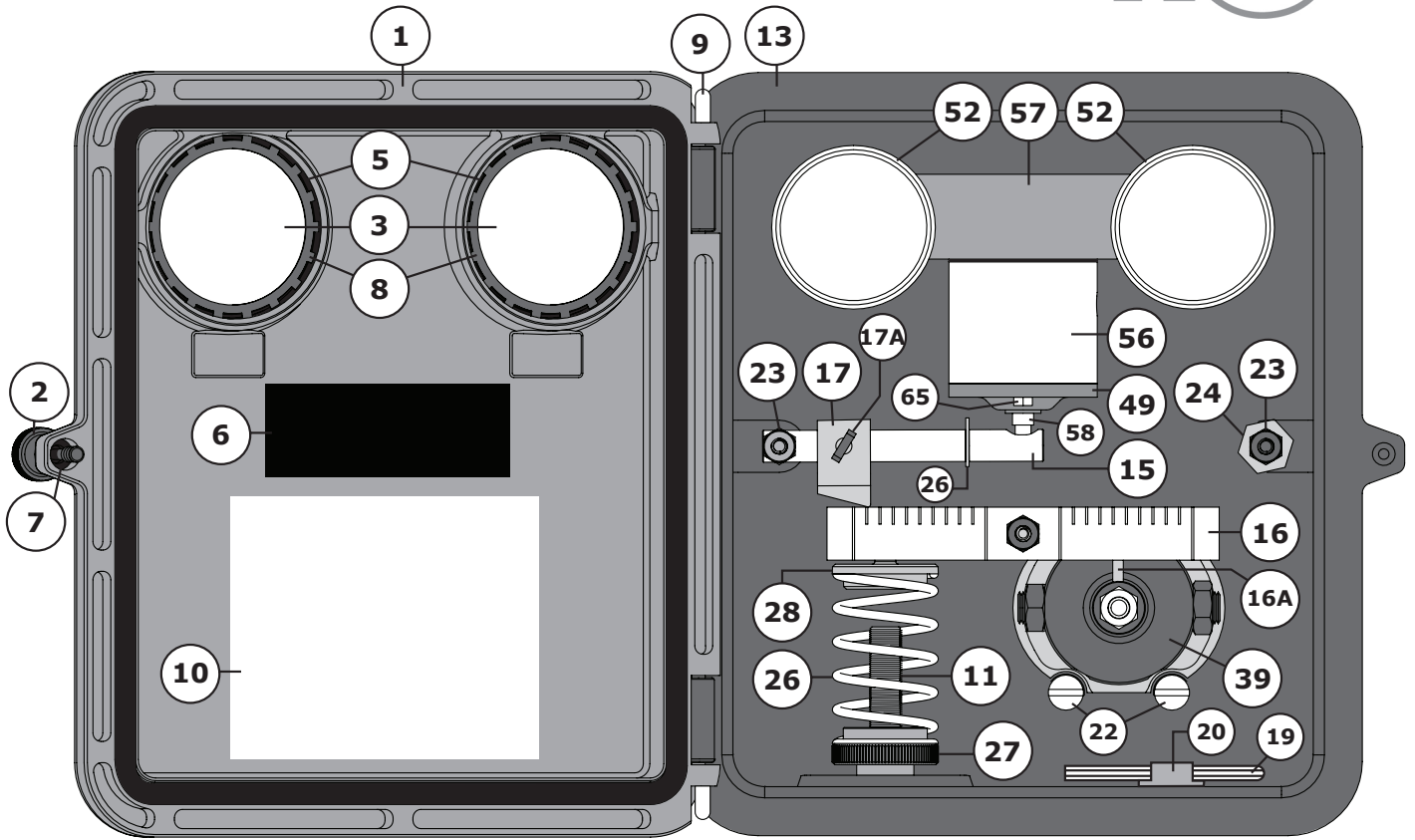


Figure 5 5000 Level Controller Front View

Figure 6
Manual Test Apparatus
Diagram

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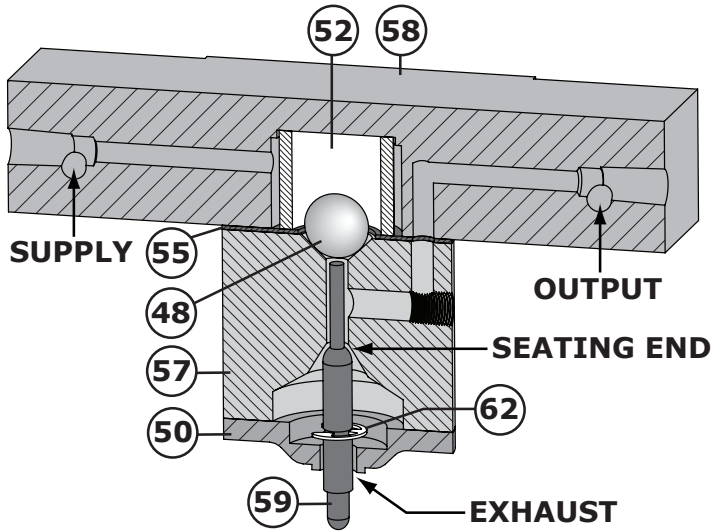


Figure 7 Snap (On / Off) Pilot

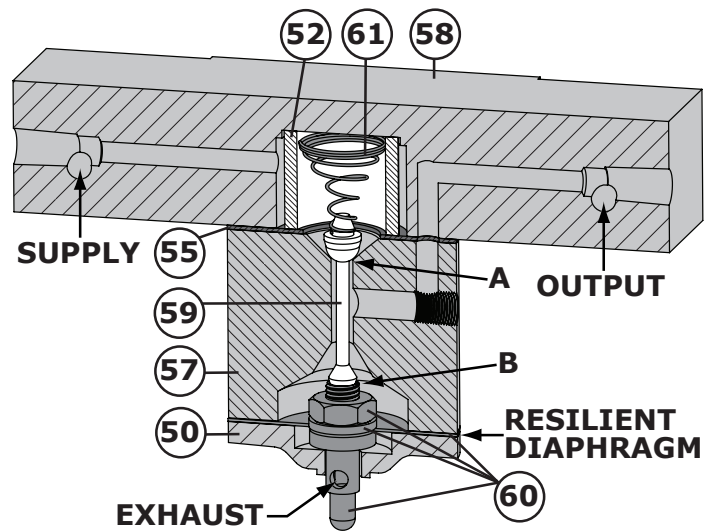
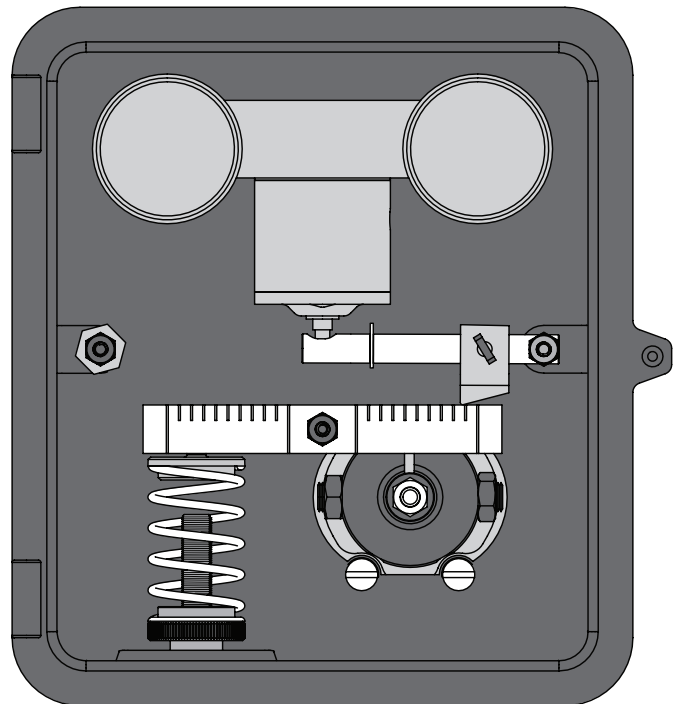
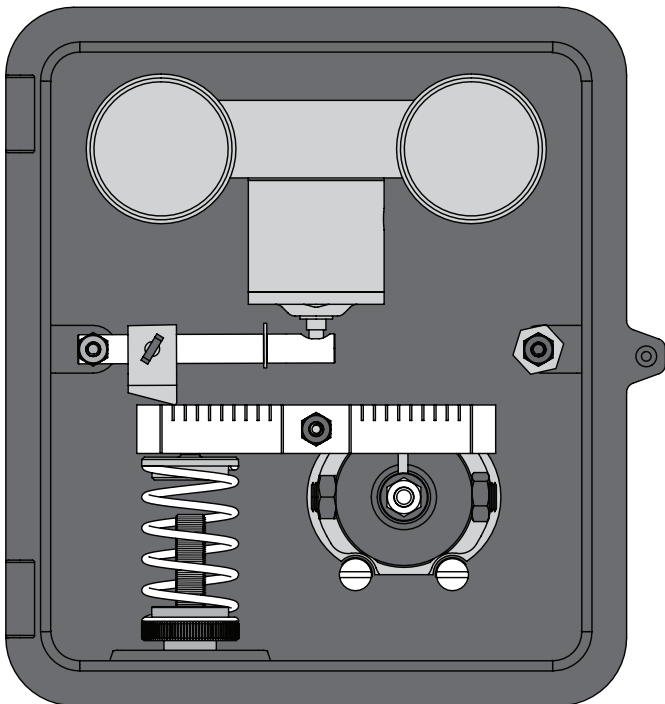


Figure 8 Throttle Pilot

Figure 9 Direct Acting Controller

Figure 10 Reverse Acting Controller



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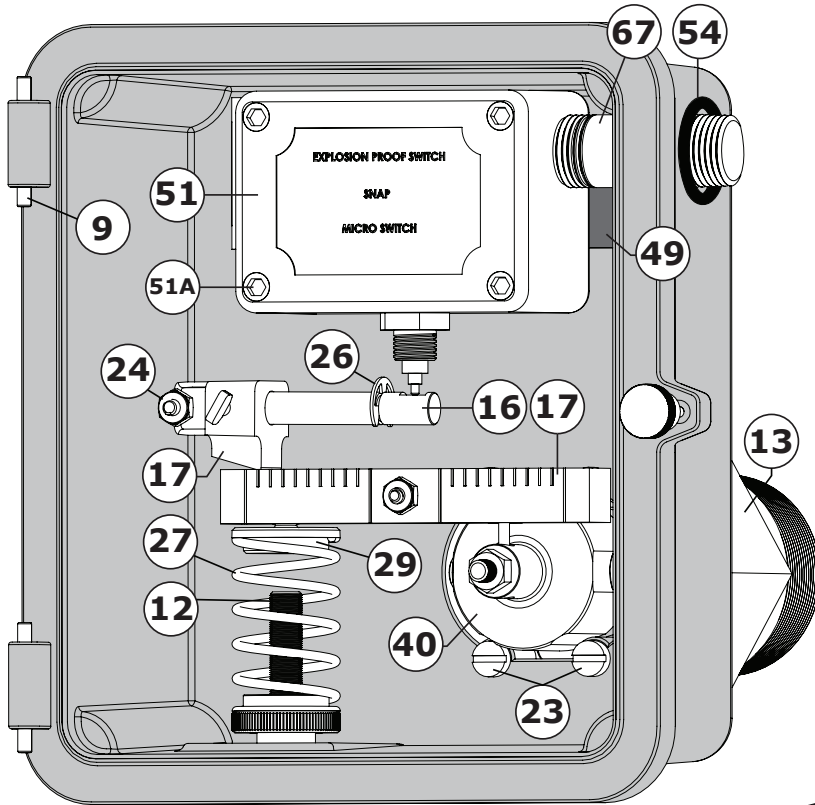


Figure 11
5000E Level Controller
Front View

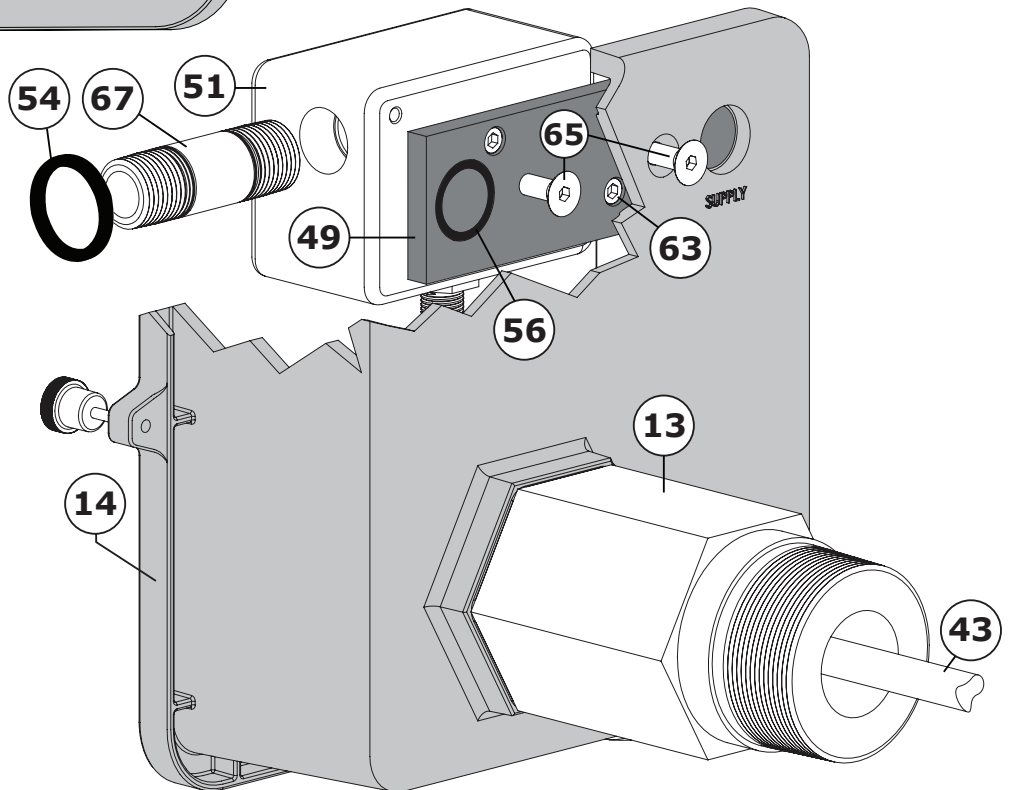


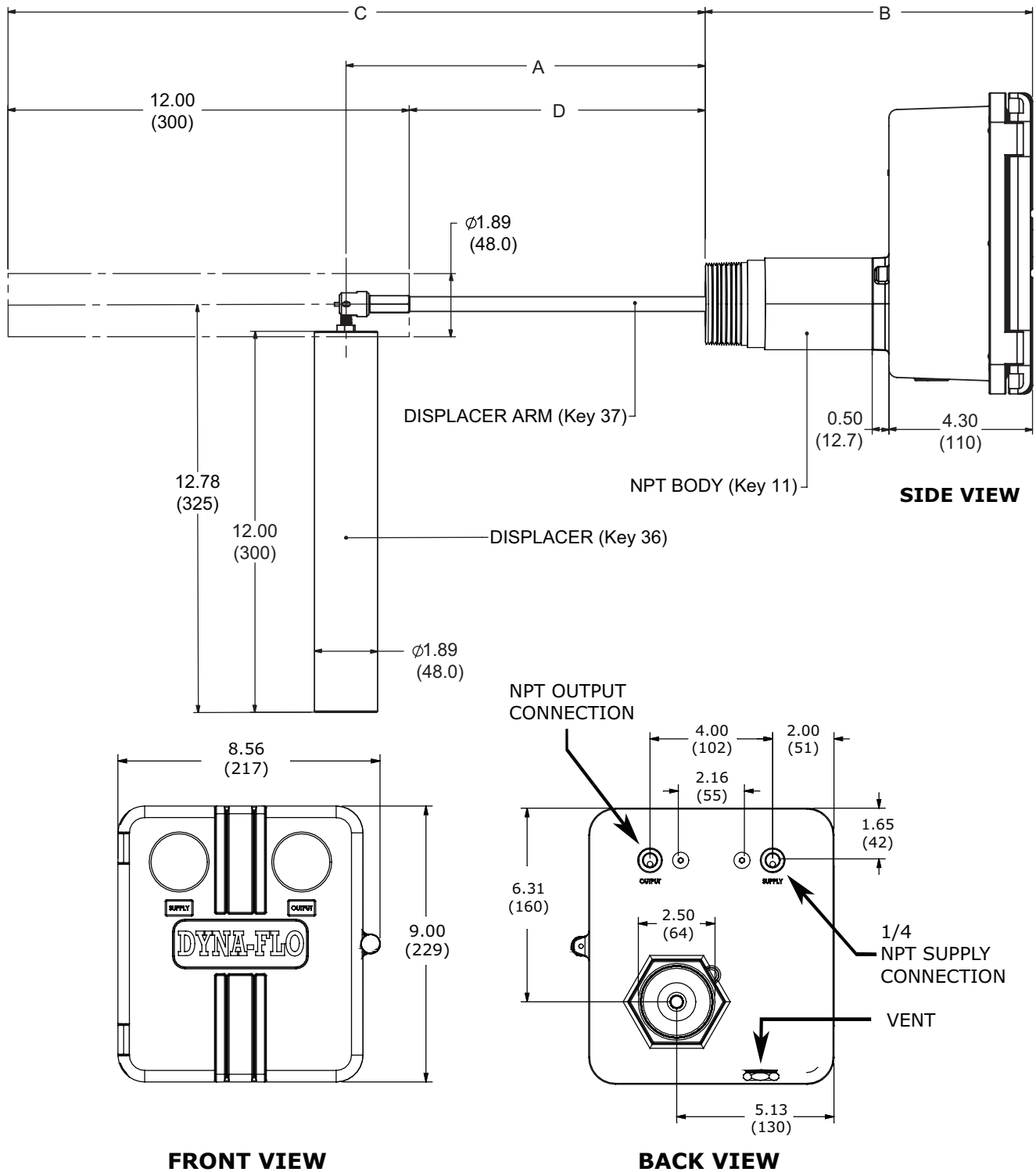
Figure 12
5000E Level Controller
Back View



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Figure 13 NPT Body Assembly Dimensions



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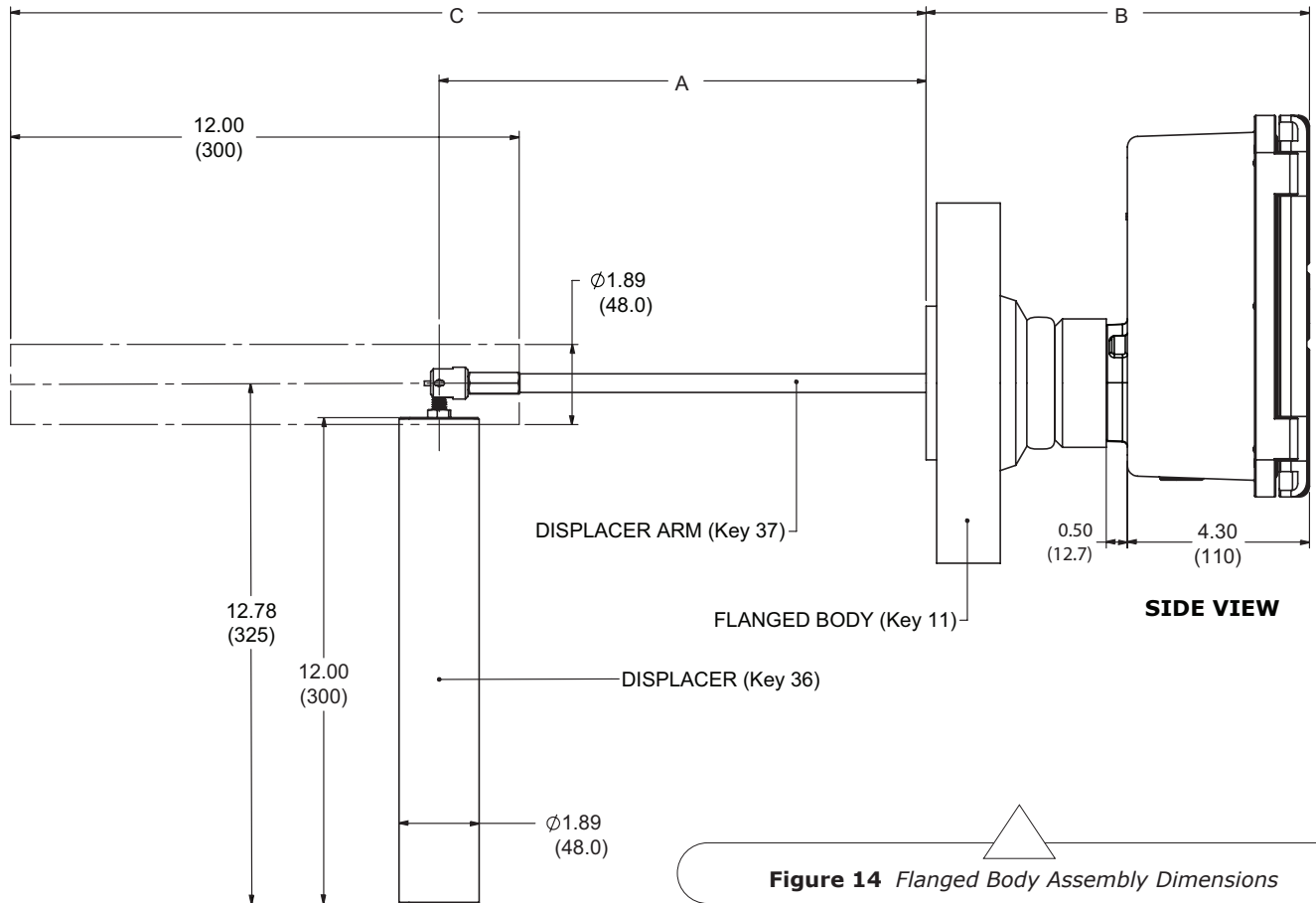


Figure 14 Flanged Body Assembly Dimensions

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)

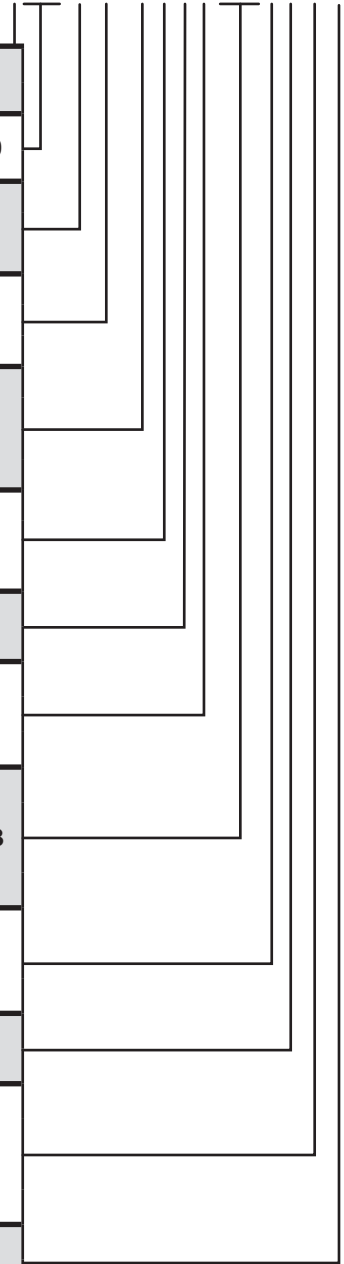


Model 5000 Level Controller

MODEL NUMBERING SYSTEM

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

MODEL						-	
-	PNEUMATIC		E	ELECTRIC		-	
END CONNECTION SIZE						20	
15	1.5 INCH	20	2 INCH	30	3 INCH	40	4 INCH
END CONNECTION TYPE						M	
F	RAISED FACE (RF) FLANGE		J	RING TYPE JOINT (RTJ) FLANGE		M	
M	SCREWED MNPT		S	SPECIAL		M	
SPRING CHOICE						S	
L	LIGHT (GREEN)		M	MEDIUM (WHITE)		S	
S	HEAVY (YELLOW)		E	EXTRA HEAVY (RED)		S	
PRESSURE RATING						0	
0	MNPT (3,750 PSIG / 259 BAR)		1	ASME 150 (285 PSIG / 20 BAR)		0	
3	ASME 300 (740 PSIG / 51 BAR)		6	ASME 600 (1,480 PSIG / 102 BAR)		0	
9	ASME 900 (2,220 PSIG / 153 BAR)		5	ASME 1500 (3,750 PSIG / 259 BAR)		0	
PILOT						S	
D	DPDT (ELECTRIC PILOT)		P	SPDT (ELECTRIC PILOT)		S	
S	SNAP (PNEUMATIC ON/OFF PILOT)		T	THROTTLE (PNEUMATIC MODULATING PILOT)		S	
SPECIAL CONSTRUCTION							
-	NONE		T	MANUAL TEST APPARATUS (5000E ONLY)			
SEAL MATERIAL / BACKUP RING						B	
B	HSN (HIGHLY SATURATED NITRILE)(NACE) / CPTFE		V	VITON / CPTFE		B	
X	SPECIAL					B	
GAUGE TYPE						3B	
3B	0-30 PSI (0-2.07 BAR) BRASS INTERNALS		3S	0-30 PSI (0-2.07 BAR) SST INTERNALS		3B	
6B	0-60 PSI (0-4.14 BAR) BRASS INTERNALS		6S	0-60 PSI (0-4.14 BAR) SST INTERNALS		3B	
00	MODEL 5000E					3B	
DISPLACER ARM						-	
-	STANDARD (17 INCH)	C	11 INCH	D	14 INCH	E	20 INCH
F	24 INCH						
DISPLACER TYPE						V	
V	VERTICAL		H	HORIZONTAL		V	
DISPLACER SIZE						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	
DISPLACER MATERIAL						P	
P	PVC		S	STAINLESS STEEL		P	



5000

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