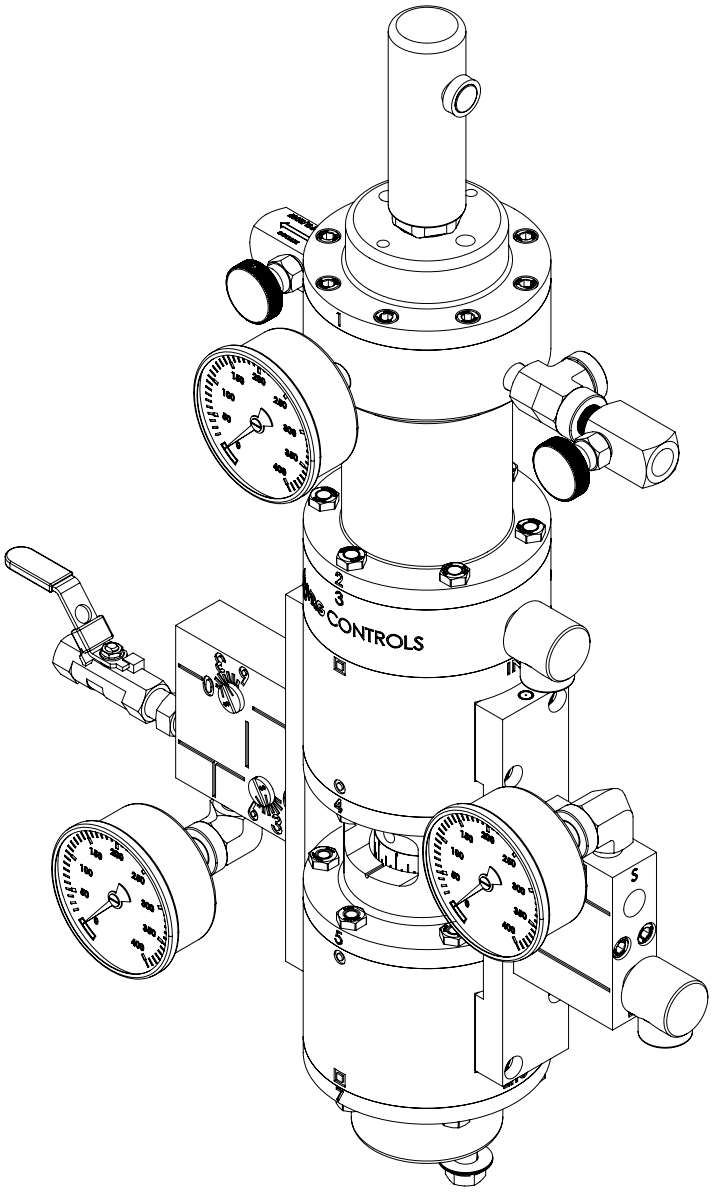


VPC-700-SA-BV-ID_DA Valve Pilot Controller

	Datum	Paraaf
Opsteller (mogelijk extern)		
Gecontroleerd door		
Akkoord (Focal point)		

Table of Contents

1. Overall Composition

1.1. Tech Specification

1.1.1. Table 1.0 – VPC-700-SA-BV-ID_DA Specifications

Base Model	Pressure Series	Output Type	Internal Valve Logic	Additional	
VPC	700 psig Max Sensing	SA - Single Acting	BV – Balanced Valve	ID - ID Control	DA – _DA

1.1.2. VPC-700-SA-BV-ID_DA Valve Pilot Controller Model Number Explanation

Parameter	Value
Type	Variable Output
Logic	Single Acting (_Direct Acting)
Loading Type	NC Balanced Valves (2)
Inputs	Supply / Sensing (Process)
Output	Output (Loading)
Temperature	-29 °C (-20 °F) to 71 °C (160 °F)
Setpoint Range	0.2 barg (3.0 psig) to 48.2 barg (700 psig)
Accuracy	± 0.5% of Control Spring Range
Certifications	PED, CE, ATEX
Supply Gas	1.4 barg (20 psig) to 27.6 barg (400 psig)
Discharge Pressure	0 barg (0 psig) to 17.2 barg (250 psig)
Supply Gas - Discharge Differential	1.38 barg (20 psig) to 10.3 barg (150 psid)
Connections	¼" NPT-F
Weight	10 Kg (22.22 Lbs)
OA Dimensions	555mm x 275mm x 151mm (21.87 in x 10.83 in x 5.95 in)

1.1.3. Table 2.0 – VPC-700-SA-BV-ID_DA Materials

Component	Description
Internals	316 SS
Diaphragms	Nylon Reinforced Buna-N (Std) / Viton (Option)
O-Rings	Buna-N (Std) / Viton (Option)
Control Springs	Fatigue-Free Painted Alloy Steel
External	Military Grade AL Alloy w/ Anti-Corrosion, 304 SS (Option)
Gages	2.5 in Vibration Resistant, SS Case & Body

1.1.4. VPC-700-SA-BV-ID_DA Controller Spring Rates/Performance Specifications

VPC Model	Spring Part	Spring Color	Spring Range	Setpoint Change Per Revolution	Setpoint Accuracy
	CS-0100	Black	0.62-3.1 barg	0.17 barg	±0.03 barg
	CS-0110	Brown	2.07-11.03 barg	0.66 barg	±0.03 barg
	CS-0120	Grey	5.17-21.37 barg	1.69 barg	±0.08 barg
	CS-0130	Orange	10.34-35.85 barg	4.28 barg	±0.19 barg
GASUNIE SPRING	CS-0135	White	16.55-43.78 barg	6.82 barg	±0.3 barg
	CS-0140	Purple	24.13-48.26 barg	9.37 barg	±0.4 barg

1.2. **Main Components**

1.2.1. 700 Sensing Chamber / Spring Cartridge – SEE FIG 1

Item No	Qty	VRG Part Number	Description
24	8	FN-0020	1/4-20 x 5/8 SHCS 316 SS #92185A539
28	1	FN-0290	1/2-20 Jam Nut 316 SS; Machined
34	4	FN-0100	8-32 X 1/2 SHCS ALLOY #91251A194
37	1	BA-0010	THRUST BEARING
48	1	PD-0090	ADJUSTING SCREW CLOSED SPRINGS
49	1	PD-0070	ADJUSTING SCREW GUIDE
50	1	PD-0050	SPRING CARTRIDGE -CLOSED 225, 700, 1500
51	1	PD-0060	CARTRIDGE TOP FLANGE
52	1	PD-0110	TUBE COVER
53	1	PD-0120	BEARING CASE
54	1	PD-0130	BEARING SUPPORT
55	1	PD-0100	SPRING INNER TUBE
56	1	PD-0080	SPRING COVER
57	1	CS-0150	PILOT SPRING MODEL
58	1	EL-0237	O-RING -116 BUNA
59	1	EL-0230	O-RING -109 BUNA
60	1	EL-0240	O-RING -147 BUNA
61	2	FN-0120	8-32 x 1/4 SS ALLOY W/LOCK, #91385A190
62	1	FN-0635	1/2 IDx3/4ODx.060TH. Flat washer 316 SS #97022A543
63	1	FP-0041	1/4NPT vent straight -POLYPROPOLINE #4471K12

EXPLANATION FIG. 1

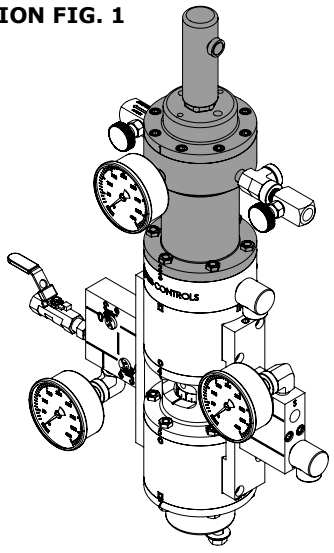
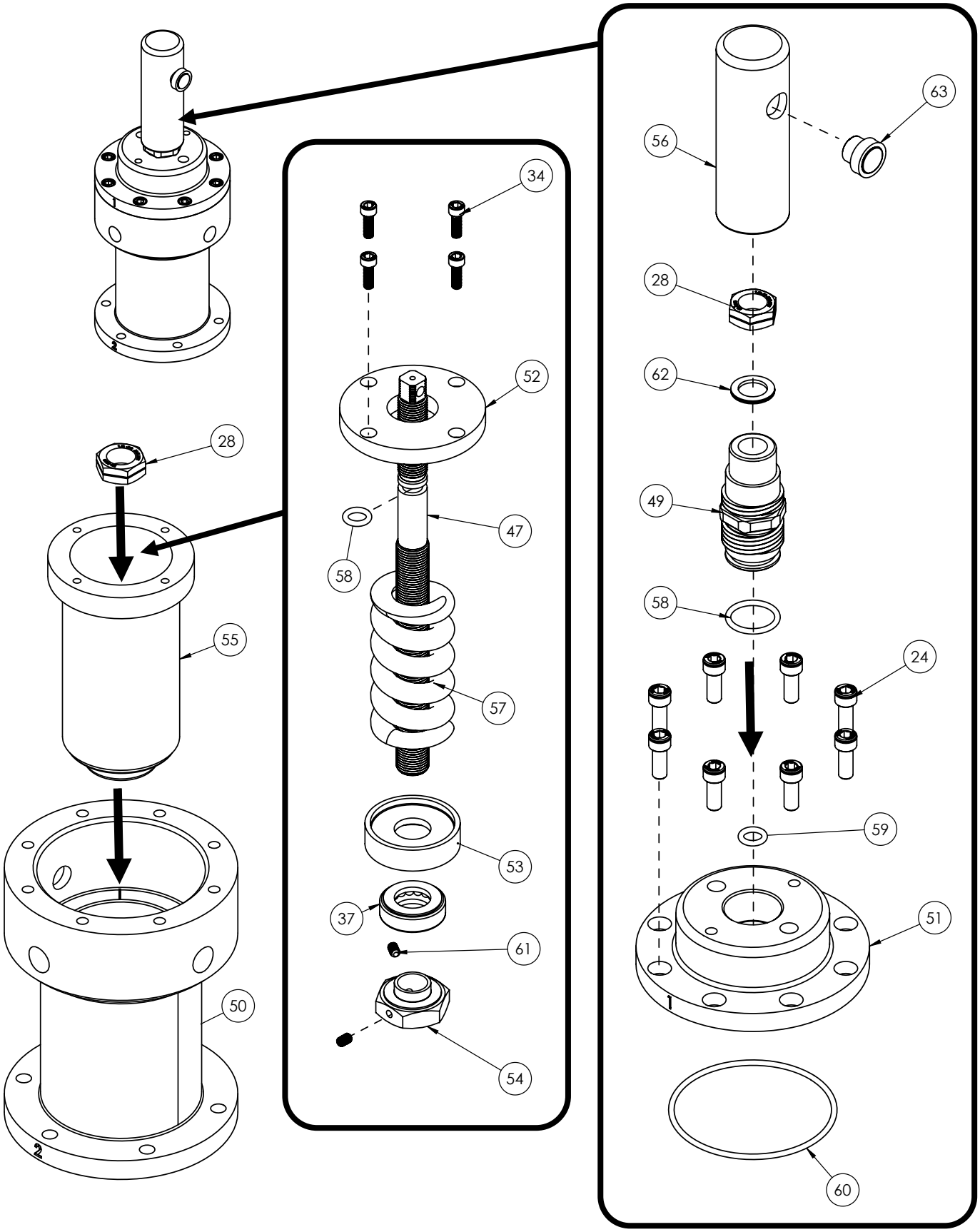


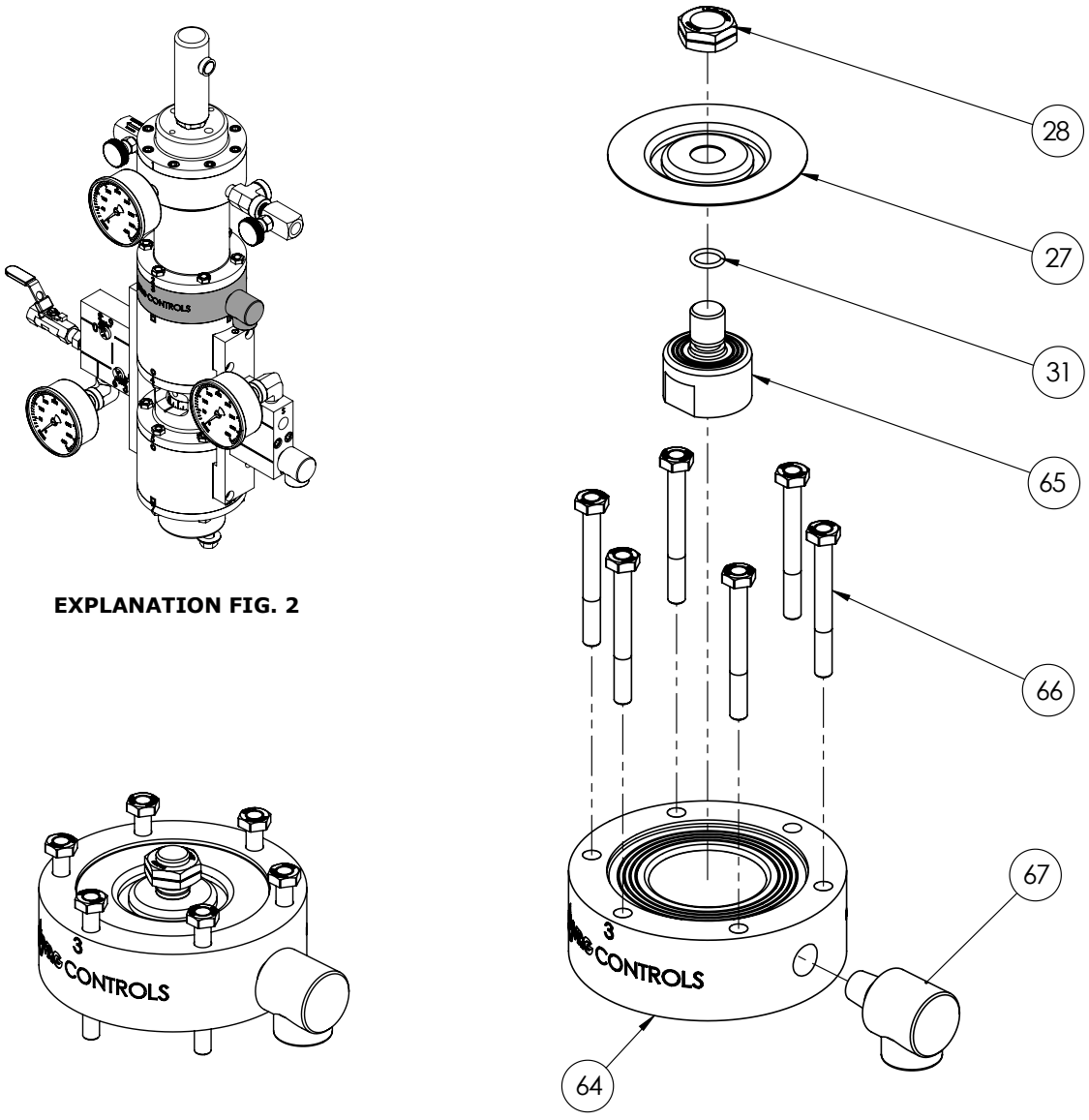
FIG 1



1.2.2. Sensing Assembly Spacer – SEE FIG 2

Item No	Qty	VRG Part Number	Description
27	1	EL-0010	DIAPHRAGM W/HOLE 700 PSI , BUNA
28	1	FN-0290	1/2-20 Jam Nut 316 SS; Machined
31	1	EL-0210	O-RING - 012 BUNA, #9452K21
64	1	PD-0040	SENSING SPACER-700
65	1	PD-0140	PISTON SENSING -700
66	6	FN-0712	1/4-20 x 2-1/4 HHCS 316 SS;#92186A551
67	1	FP-0043	1/4NPT vent elbow -Black Anodized Aluminum

FIG 2



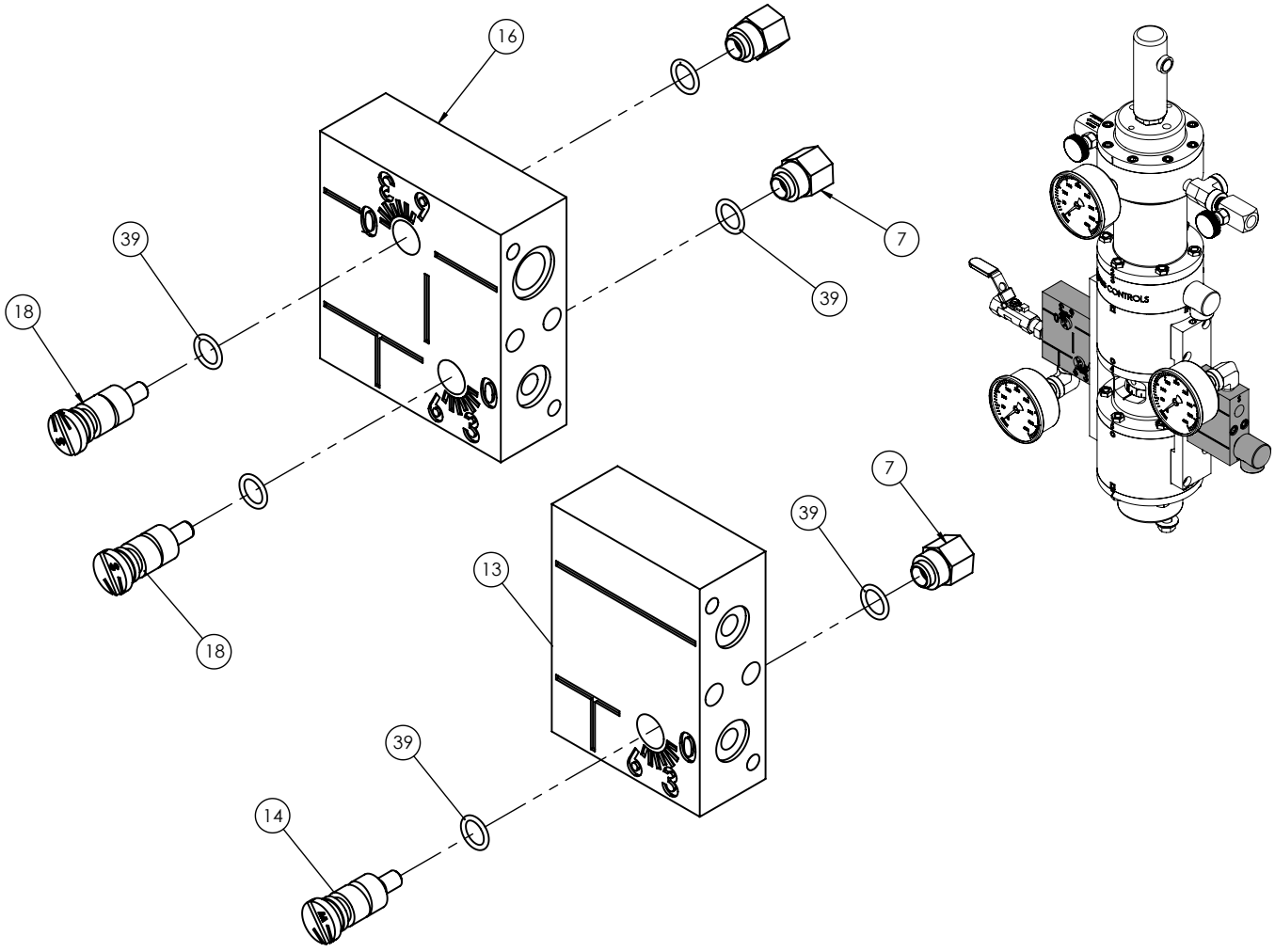
EXPLANATION FIG. 2

1.2.3. Output and Input Manifolds – SEE FIG 3

Item No	Qty	VRG Part Number	Description
13	1	PD-0430	SA INLET MANIFOLD
7	1	PD-0460	ORIFICE NUT
14	1	PD-0453	VARIABLE ORIFICE MEDIUM
39	2	EL-0200	O-RING -010 BUNA, #9452K18

FIG 3

EXPLANATION FIG. 3

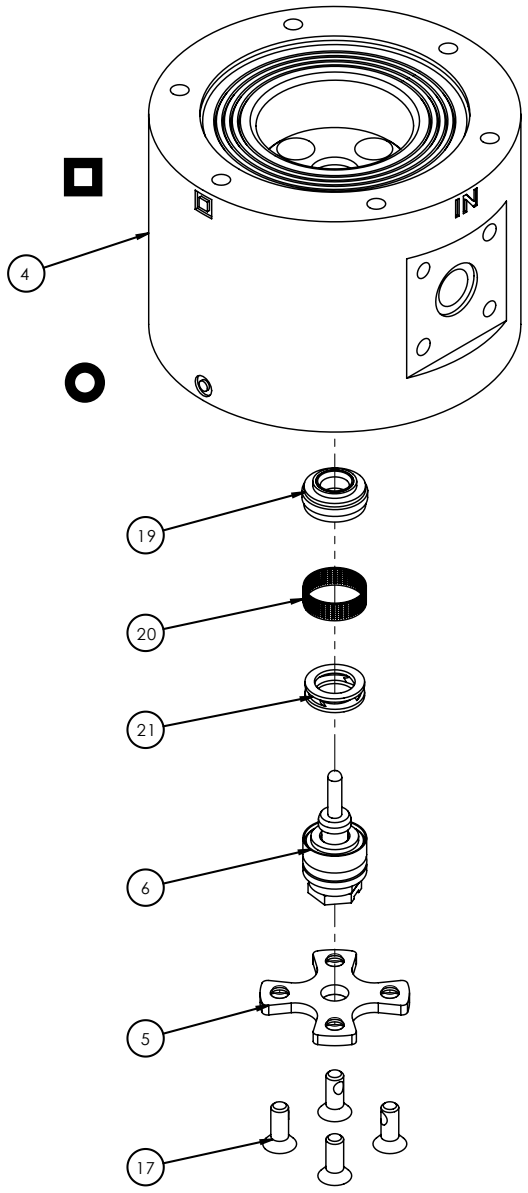


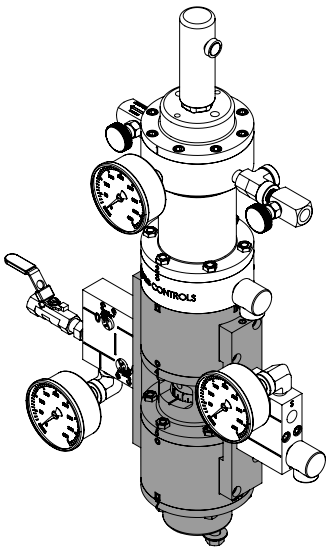
Item No	Qty	VRG Part Number	Description
16	1	PD-0437	ID OUTPUT MANIFOLD
18	2	PD-0450	VARIABLE ORIFICE SMALL
7	2	PD-0460	ORIFICE NUT
39	4	EL-0200	O-RING -010 BUNA, #9452K18

1.2.4. BV Pilot Block (x2) – SEE FIG 4

Item No	Qty	VRG Part Number	Description
4	1	PD-0010	PILOT BLOCK
5	1	PD-0270	BV VALVE COVER
6	1	PD-0170	BALANCE VALVE ASSEMBLY
17	4	FN-0109	10-32 x 1/2 FHMS 18-8 SS; #93082A520 with Thread Locker
19	1	PD-0247-R	Balance Valve Buna-N Insert
20	1	PD-0260	BALANCE VALVE SPACER SCREEN
21	1	PD-0250	BALANCE VALVE SPACER

FIG 4





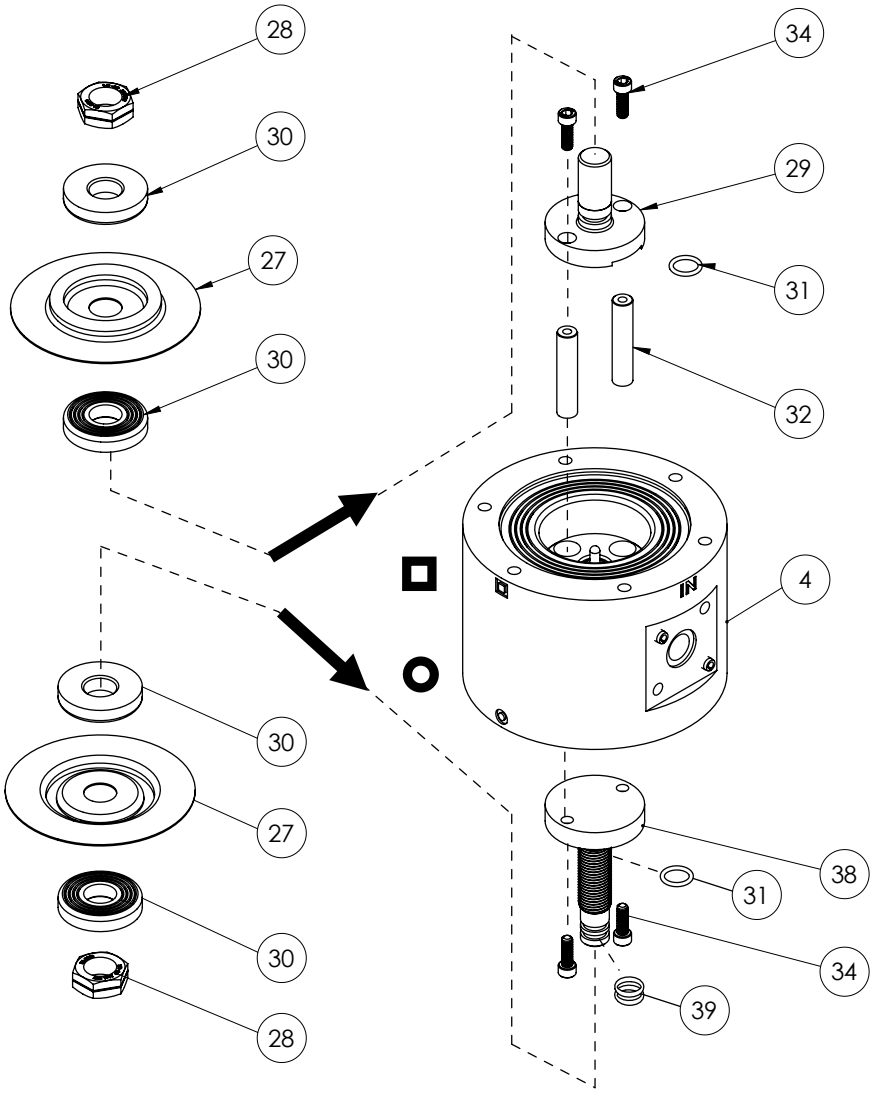
EXPLANATION FIG. 4

1.2.5. VPC-SA-BV Blank Assembly – SEE FIG 5

Top BV Pilot Block assembly

Item No	Qty	VRG Part Number	Description
4	1	PD-0010	PILOT BLOCK
27	2	EL-0010	DIAPHRAGM W/HOLE 700 PSI , BUNA
28	2	FN-0290	1/2-20 Jam Nut 316 SS; Machined
29	1	PD-0160	Balance Valve Piston
30	4	PD-0165	PISTON WASHER-700
31	2	EL-0210	O-RING - 012 BUNA, #9452K21
32	2	PD-0150	CONNECTING POST
34	4	FN-0100	8-32 X 1/2 SHCS ALLOY #91251A194
38	1	PD-0330	LONG INSIDE PISTON
39	2	EL-0200	O-RING -010 BUNA, #9452K18

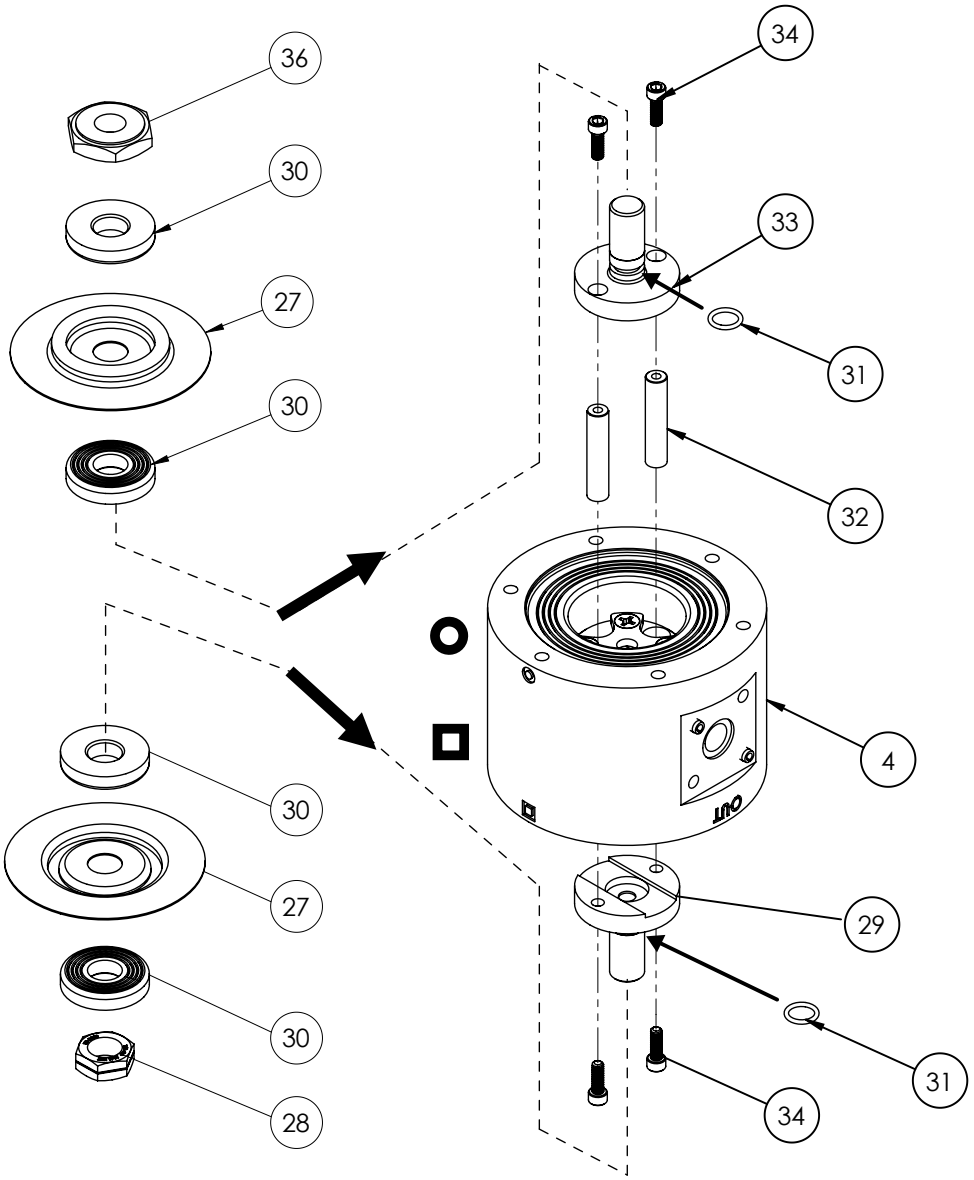
FIG 5



Bottom BV Pilot Block assembly

Item No	Qty	VRG Part Number	Description
27	2	EL-0010	DIAPHRAGM W/HOLE 700 PSI , BUNA
28	1	FN-0290	1/2-20 Jam Nut 316 SS; Machined
29	1	PD-0160	Balance Valve Piston
30	4	PD-0165	PISTON WASHER-700
31	2	EL-0210	O-RING - 012 BUNA, #9452K21
33	1	PD-0340	SHORT INSIDE PISTON
34	4	FN-0100	8-32 X 1/2 SHCS ALLOY #91251A194
36	1	PD-0360	INSIDE BEARING NUT
32	2	PD-0150	CONNECTING POST

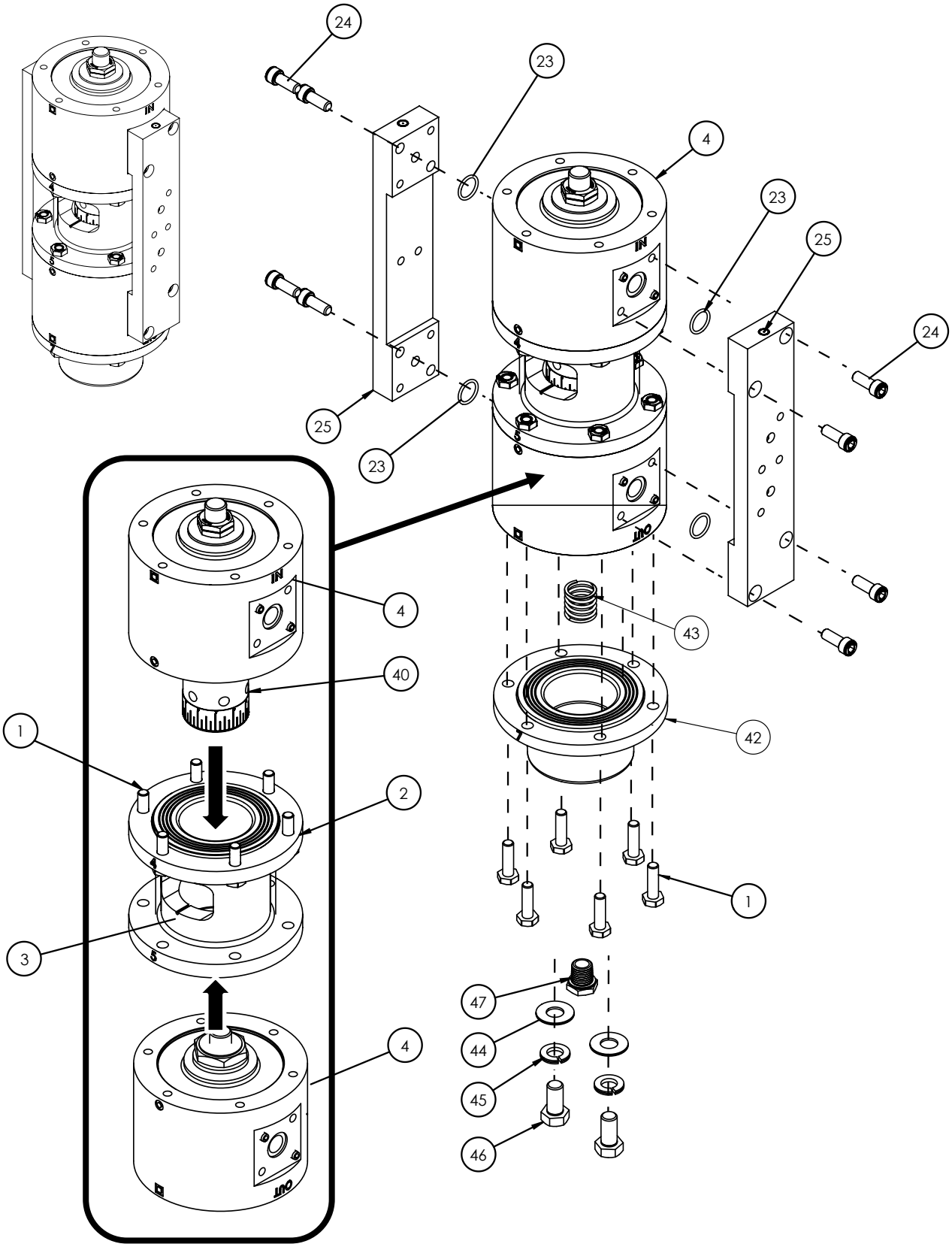
FIG 6



1.2.6. VPC-SA-BV Pilot Block with Connecting Manifolds – SEE FIG 7

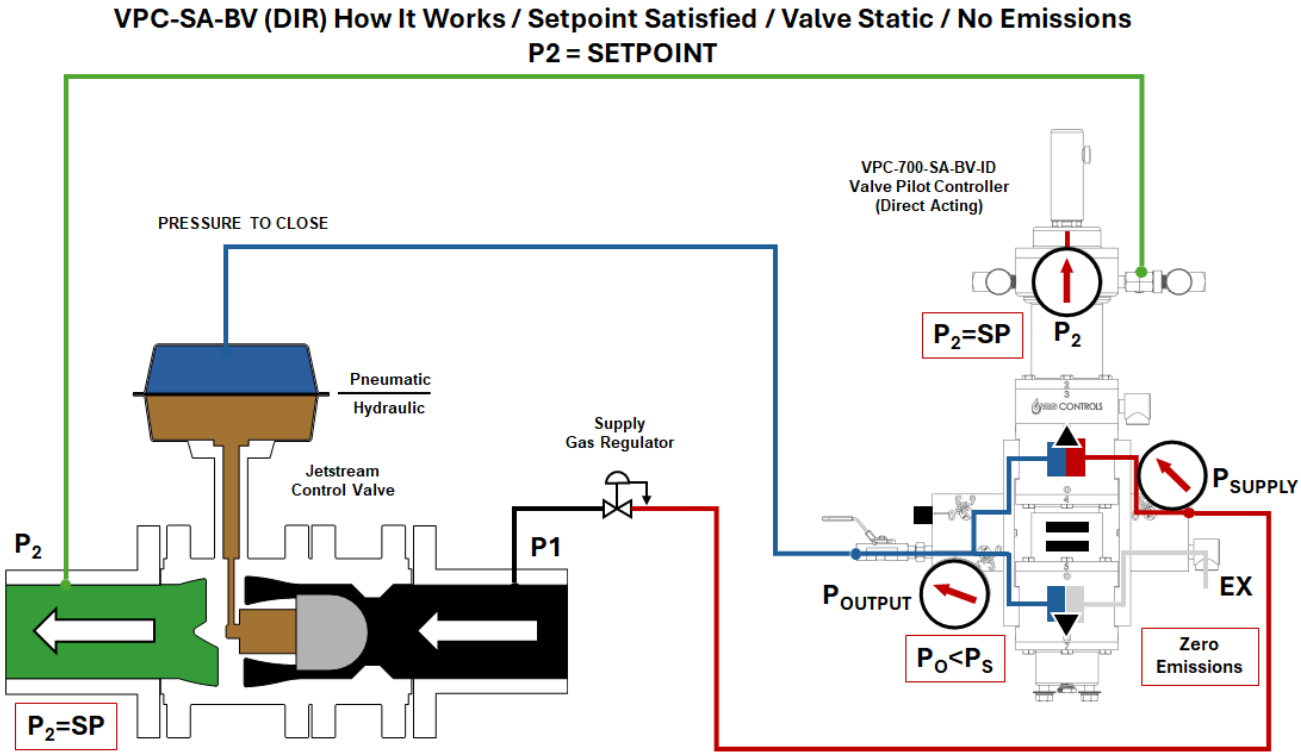
Item No	Qty	VRG Part Number	Description
1	18	FN-0695	1/4-20 x 7/8 HHCS 316 SS #93190A541
2	1	PD-0020	PILOT SPACER
3	1	PD-0370	SPACER LEXAN COVER
4	2	PD-0010	PILOT BLOCK
23	4	EL-0220	O-RING -014 BUNA
24	8	FN-0020	1/4-20 x 5/8 SHCS 316 SS #92185A539
25	2	PD-0425	CONNECTING MANIFOLD
40	1	PD-0350	SENSITIVITY DRUM
42	1	PD-0030	PILOT BOTTOM FLANGE
43	1	CS-0021	Pilot Bottom Spring, 302 SS Precision Compression Spring
44	2	FN-0620	3/8 ID Flat washer 316 SS; #90107A031
45	2	FN-0520	3/8 ID Lock washer 18-8 SS; #92146A031
46	2	FN-0740	3/8-16 x 3/4 HHCS 316 SS; #93190A622
47	1	FP-0047	HEYCO 1/4 NPT Straight Black Vent

FIG 7



1.3. Working Principle

1.3.1. How it Works Narrative – VPC-700-SA-BV-ID_DA



When the sensing pressure (P2) equals the VPC setpoint (SP), the net force on the VPC power module is zero. This is the equilibrium, or balanced, condition in which the downward force from the sensing pressure on the diaphragm matches the upward force of the control spring. At equilibrium, both the SUPPLY (PS) and EXHAUST balanced valve assemblies remain closed, maintaining a constant OUTPUT pressure (PO) to the Jetstream Actuator Loading. In this state, the VPC produces zero emissions.

From equilibrium, two scenarios are possible: the sensing pressure may rise above or fall below the setpoint. If the sensing pressure rises above the VPC setpoint (SP), the net force on the power module becomes downward. The EXHAUST balanced valve closes, and the SUPPLY Pressure (PO) balanced valve opens, allowing additional SUPPLY (PS) gas to flow to the OUTPUT port. These actions increase the OUTPUT pressure (PO).

If the sensing pressure falls below the setpoint, the net force on the power module becomes upward. In this case, the SUPPLY (PS) balanced valve closes, and the EXHAUST balanced valve opens, Directing gas to the EXHAUST port. These actions decrease the OUTPUT pressure (PO).

To regulate the amount of gas passing through the balanced valves, adjustable orifices are installed in the SUPPLY and EXHAUST paths to restrict and control flow.

1.3.2. Overview - Control Logic Summary

The VPC-SA-BV-ID_DA is a Direct-acting pilot that regulates downstream pressure (P2) by modulating Jetstream actuator pressure. It is pressure-to-close, depressure-to-open.

1.3.3. VPC-700-SA-BV-ID_DA Controller Logic Table

- Direct-Acting: Higher P2 → Higher output → Jetstream closes.
- Neutral Condition: When P2 = Setpoint, pilot output is isolated (no supply or exhaust).

Figure	Condition	V	Supply → Output	Output → Exhaust	VPC State
1	Setpoint Satisfied	P2 = SP	Blocked	Blocked	Output Hold (Static)
2	Above Setpoint	P2 > SP	Open	Blocked	Output Increasing
3	Below Setpoint	P2 < SP	Blocked	Open	Output Decreasing
4	Standby Configure	P2 >> SP	Full Open	Blocked	Full Output
5	Monitor Configure	P2 << SP	Blocked	Full Open	Zero Output

1.3.4. Jetstream Actuator Logic

Figure	VPC Output Condition	Actuator Pressure	Actuator Motion	Result
1	Held	Constant	No Movement	Valve Holds Position
2	Increasing	Rising	Pushes Stem Down	Valve Closes
3	Decreasing	Falling	Spring Lifts Stem	Valve Opens
4	Full Output	100%	Fully Loaded	Valve Full Closed
5	Zero Output	Zero	Fully Unloaded	Valve Full Open

1.3.5. Jetstream Valve Behavior Logic

Figure	Actuator Condition	Valve Movement	Effect on P2	Emissions
1	No Motion	Holds Position	P2 stable	ZERO
2	Pressure Increases	Closes	P2 decreases	ZERO
3	Pressure Decreases	Opens	P2 increases	Displacement
4	Fully Loaded	Full Closed	No Flow	ZERO
5	Fully Unloaded	Full Open	Full Flow	ZERO

2. Operation (N/A)

3. Disassembly/Assembly

3.1. Precautions and safety measures

- See Station Manual Measurement and Control Station

3.2. Enter and Report

- See Station Manual Measurement and Control Station

3.3. Special tools and Aids

3.3.1. VRG Controls Control Instrumentation Recommended Tool Kit – STANDARD

Item	Qty	Tool
1	1	5/32 in Tee Handle Hex Wrench Bondhus 15209
2	1	3/16 in Tee Handle Hex Wrench Bondhus 15210
3	1	1/8 in Tee Handle Hex Wrench Bondhus 15207
4	1	9/64 in Tee Handle Hex Wrench Bondhus 15208
5	1	Combo Bit Screwdriver
6	10	#2 Phillips Driver Bits
8	1	Precision Phillips/Slotted Flat Head Combination Screwdriver Set
9	1	1/4 Drive Digital Torque Wrench (22 ft-lbs/30 Nm)
10	2	Drill Guide: Rotary Drill Compatible Magnetic
11	1	1/4 Drive Torque Screwdriver 90 in-lbs w Tee Handle
12	1	Pick Tool Set
13	1	3/8" SAE Combination Wrench
14	1	9/16" SAE Combination Wrench
15	1	7/16" SAE Combination Wrench
16	1	3/4" SAE Combination Wrench
17	1	3/4" SAE Deep Socket - 1/2 Drive
18	1	1-1/8 SAE Deep Socket - 1/2 Drive
19	1	1/2 in Drive Socket Wrench
20	1	1/2 in Drive Socket Extension 8 in
21	2	1/4 F X 1/2 M Socket Adapter
22	1	6 in. Cushion Grip Adjustable Wrench
23	1	8 in. Cushion Grip Adjustable Wrench
24	1	Sharpie Black Permanent Marker
25	2	VRG Test Block w/ 4" Hex Nipple

26	4	¼ - 20 X 5/8 SS, VRG Part FN-0020¼ - 20 X 5/8 SHCS, SS, VRG Part No. FN-0020
27	2	4 in NPT Nipple
28	1	Soft Side Zippered Tool Bag

3.4. Special points of attention

– **Remanufacturing materials**

The table under chapter 3.7 includes all revision materials.

In cases, that AKZESS does not contribute to a part pos. number, the fictitious pos. number is placed in a circle (O) in the instruction if it is named.

– **Dismantling**

During disassembly:

- Remove the parts in the order indicated in the instructions.
- Clean the parts, check for damage and place them in the order of dismantling.
- In case of damaged parts, new installation

– **Mounting**

During assembly:

- Assemble the parts in the order specified in the instructions.
- Lightly grease the parts and contact surfaces. For soft parts, use acid-free silicone grease.

☞ **PLEASE NOTE:**
Keep the contact surface of the valve/valve seat free of grease.

– Make sure that gas supply is guaranteed during disassembly/assembly (see station manual Gas Receiving Station).
– When replacing the control pressure regulator, make sure that the correct pressure level is used, see Model overview, section 1.2.

VPC Pilot Section Identification

The VPC pilot assembly is divided into functional sections identified by numbers (**1–7**) and symbols (**SQUARE, TRIANGLE, CYRCLE**) shown along the left side of the illustration. These identifiers correspond to internal functions and mechanical orientation within the pilot.

3.5. Asssembly

STEP 1 - Assembly Instructions for VPC-SA-BV Pilot Blank – SEE FIG 8

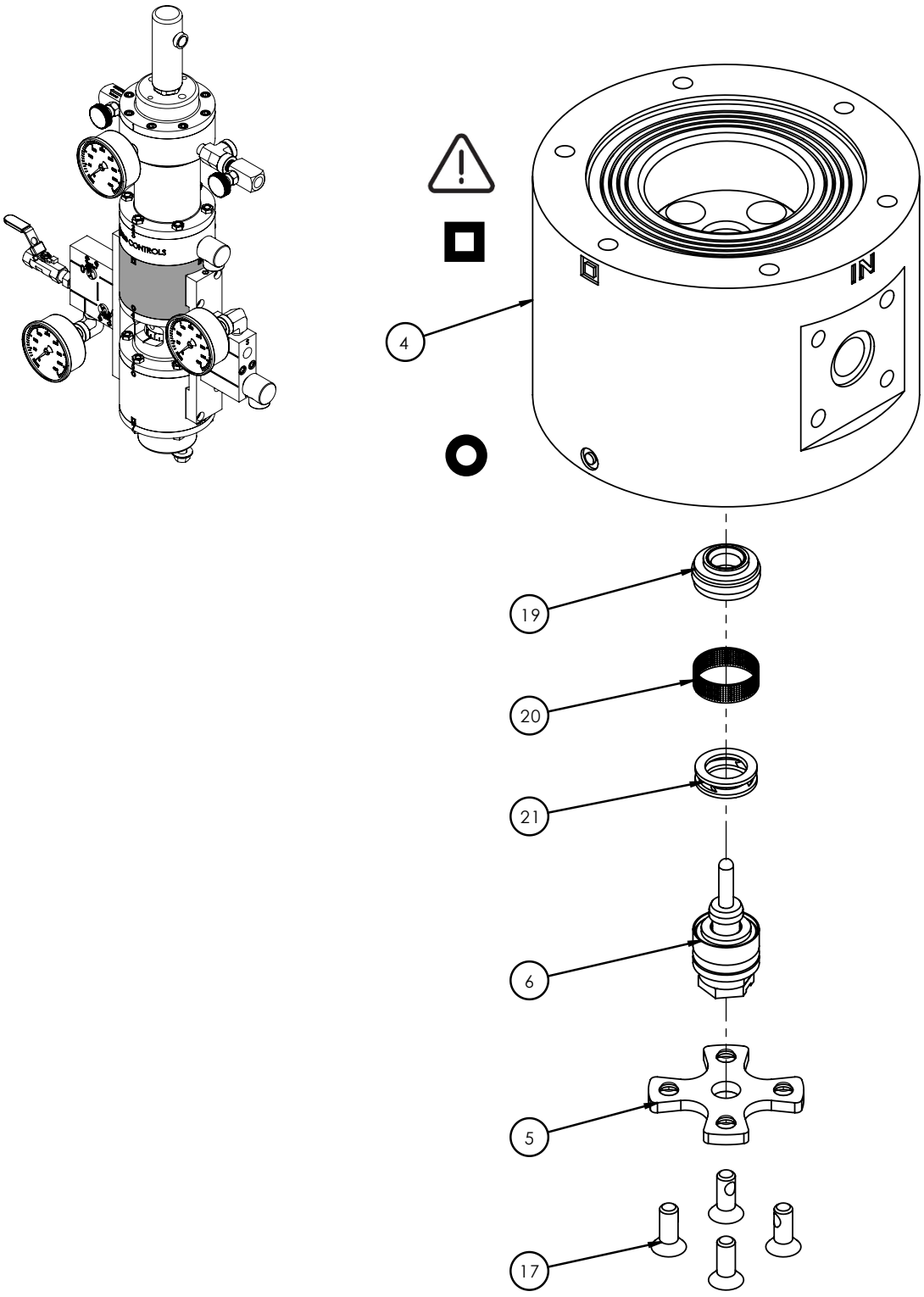
Item No	Qty	VRG Part Number	Description
4	1	PD-0010	PILOT BLOCK
5	1	PD-0270	BV VALVE COVER
6	1	PD-0170	BALANCE VALVE ASSEMBLY
17	4	FN-0109	10-32 x 1/2 FHMS 18-8 SS; #93082A520 with Thread Locker
19	1	PD-0247-R	Balance Valve Buna-N Insert
20	1	PD-0260	BALANCE VALVE SPACER SCREEN
21	1	PD-0250	BALANCE VALVE SPACER

1. Apply light silicon grease to all O-Rings and outer diameter of Balanced Valve Seat.
2. Insert Balance Valve Spacer (21), Balance Spacer Screen (20), and Balance Valve Assembly (6) simultaneously into Seat Block as shown.
3. Install Cover Plate 10-32 × ½ FHFMS SS Phillips Screws with Thread Locker (17) (QTY 4). The screw hold countersink of the BV Valve Cover (5) should face up.
4. Insert 10-32 × ½ FHFMS SS Phillips Screws with Thread Locker (17) into bottom of Pilot Block (4) and tighten using star pattern (Torque XX in-lbs / xx Nm). If torque wrench is not available, drive screws to point where they are fully engaged and the head of all screws is flush with the face of the Cover Plate.
5. Repeat above steps for 2nd Seat Block Assembly.

STEP 2 - Check for Balanced Valve Leakage

1. Apply light silicon grease to all O-Rings and outer diameter of Balanced Valve Seat.
2. Insert Balance Valve Spacer (21), Balance Spacer Screen (20), and Balance Valve Assembly (6) simultaneously into Seat Block as shown.
3. Install Cover Plate 10-32 × ½ FHFMS SS Phillips Screws with Thread Locker (17) (QTY 4). The screw hold countersink of the BV Valve Cover (5) should face up.
4. Insert 10-32 × ½ FHFMS SS Phillips Screws with Thread Locker (17) into bottom of Pilot Block (4) and tighten using star pattern (Torque XX in-lbs / xx Nm). If torque wrench is not available, drive screws to point where they are fully engaged and the head of all screws is flush with the face of the Cover Plate.
5. Repeat above steps for 2nd Seat Block Assembly.

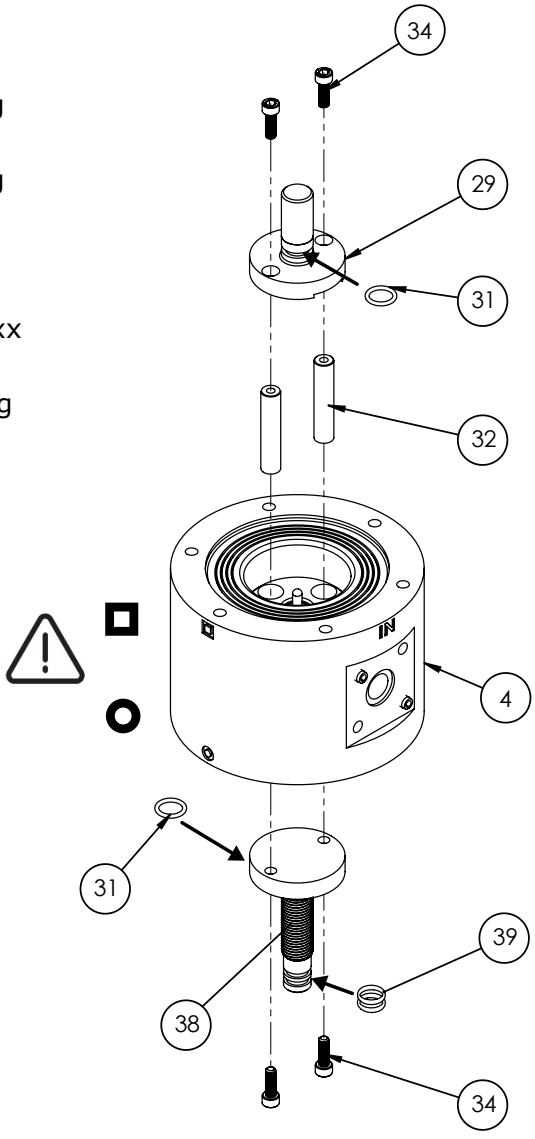
FIG 8



STEP 3 - Install Pistons into Top Seat Block Assembly

Item No	Qty	VRG Part Number	Description
4	1	PD-0010	PILOT BLOCK
29	1	PD-0160	Balance Valve Piston
31	2	EL-0210	O-RING - 012 BUNA, #9452K21
32	2	PD-0150	CONNECTING POST
34	4	FN-0100	8-32 X 1/2 SHCS ALLOY #91251A194
38	1	PD-0330	LONG INSIDE PISTON
39	2	EL-0200	O-RING -010 BUNA, #9452K18

1. Lubricate –012 O-ring (31) and install on BV Piston (29).
2. Lubricate –010 O-rings (31) and install on Long Inside Piston (38).
3. Lubricate –012 O-rings (39) and install on Long Inside Piston (38).
4. Install 8-32 × ½ ALLOY SHCS (34) through BV Piston (29) and install Connecting Posts (32). Insert assembly into Body (Torque XX in-lbs / xx Nm).
5. Install 8-32 × ½ ALLOY SHCS (34) through Long Inside Piston (38) and tighten to Connecting Posts (32) already inserted through block assembly (4)
   (Torque XX in-lbs / xx Nm).

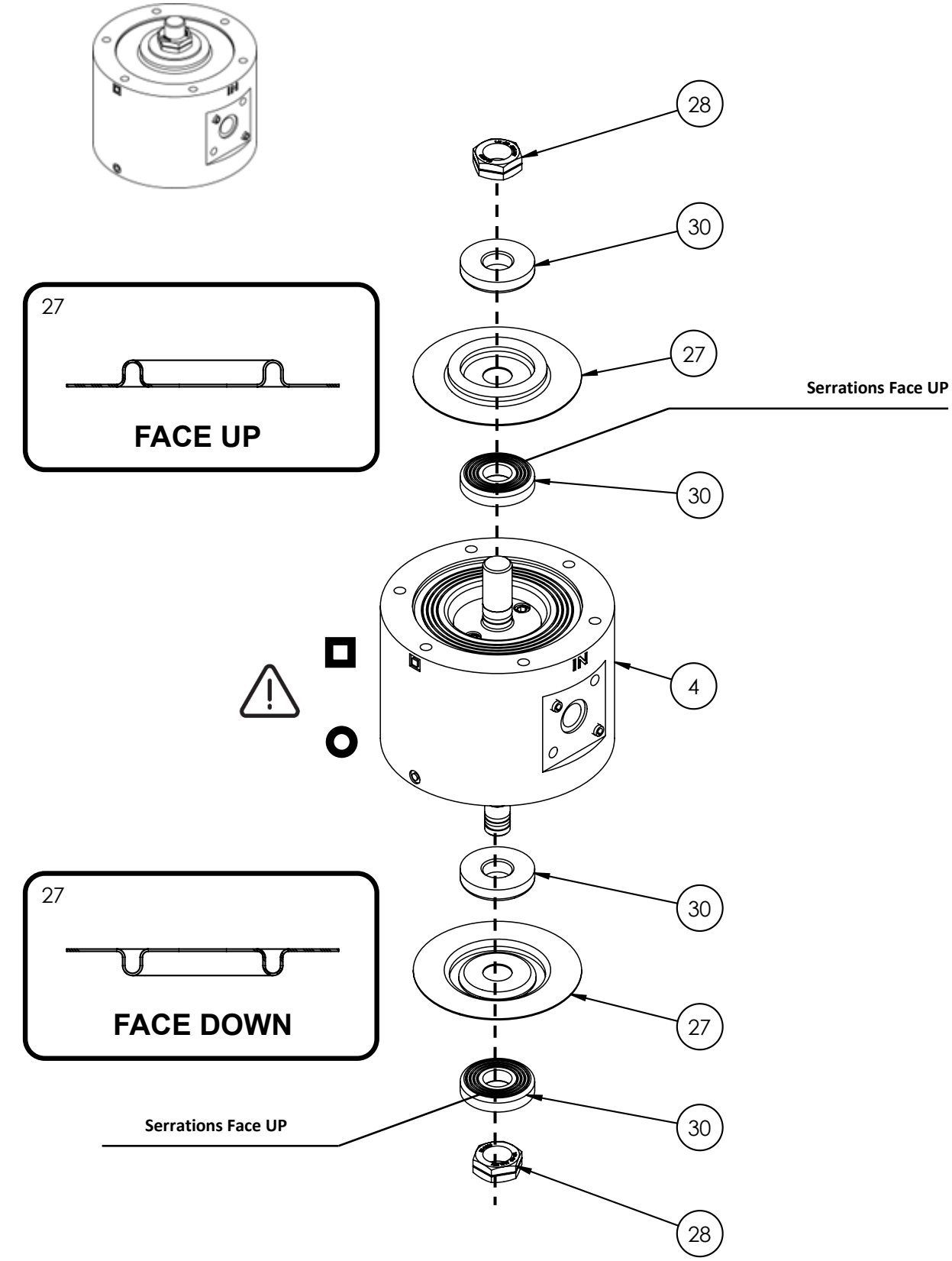


STEP 4 - Install -700 Diaphragms on Top Seat Block Assembly – SEE FIG 10

Item No	Qty	VRG Part Number	Description
4	1	PD-0010	PILOT BLOCK
27	2	EL-0010	DIAPHRAGM W/HOLE 700 PSI , BUNA
28	2	FN-0290	1/2-20 Jam Nut 316 SS; Machined
30	4	PD-0165	PISTON WASHER-700

1. Apply Piston Washer-700 (30) on BV Piston (29) with serrations facing UP away from Pilot Block (4).
2. Install –700 Diaphragm (27) onto BV Piston (29) with convolute facing UP away from Pilot Block (4).
3. Install Piston Washer-700 (30) on BV Piston (29) with serrations facing DOWN against 700 Diaphragm (27).
4. Install ½-20 Machined Nut (28) onto BV Piston (29) and tighten (110 in-lbs / XX Nm).
5. Apply Piston Washer -700 (30) on Long Inside Piston (38) with serrations facing DOWN away from Pilot Block (4).
6. Install –700 Diaphragm (27) onto Long Inside Piston (38) with convolute facing DOWN away from Pilot Block (4).
7. Apply Piston Washer -700 (30) on Long Inside Piston (38) with serrations facing UP against 700 Diaphragm (27)
8. Install ½-20 Machined Nut (28) onto Long Inside Piston (38) and torque to 110 in-lbs(110 in-lbs / XX Nm).

FIG 10

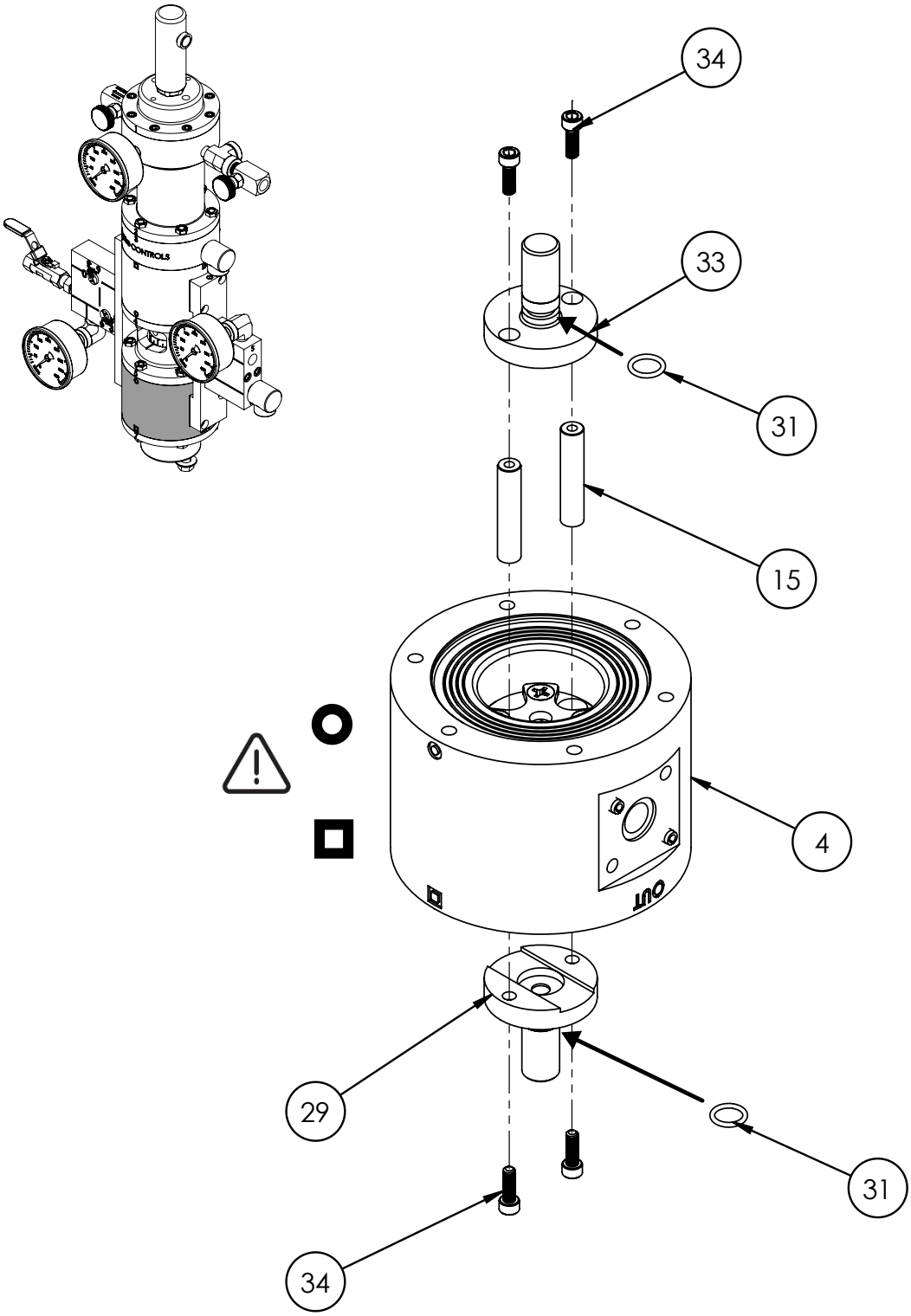

28
30
27
27
FACE UP
Serrations Face UP
30
4
30
27
27
FACE DOWN
Serrations Face UP
30
28

STEP 5 - Install Pistons into Bottom Seat Block Assembly – SEE FIG 11

Item No	Qty	VRG Part Number	Description
4	1	PD-0010	PILOT BLOCK
29	1	PD-0160	Balance Valve Piston
31	2	EL-0210	O-RING - 012 BUNA, #9452K21
32	2	PD-0150	CONNECTING POST
33	1	PD-0340	SHORT INSIDE PISTON
34	4	FN-0100	8-32 X 1/2 SHCS ALLOY #91251A194

1. Lubricate –012 O-ring (31) and install on BV Piston (29).
2. Lubricate –012 O-ring (31) and install on Short Inside Piston (33).
3. Install 8-32 × ½ ALLOY SHCS (34) (XX in-lbs / XX Nm) through BV Piston (29) and install Connecting Posts (15). Insert assembly into Pilot Block (4).
4. Install 8-32 × ½ ALLOY SHCS (34) (XX in-lbs / XX Nm) through Short Inside Piston (33) and tighten to Connecting Posts(15) already inserted through Pilot Block (4).

FIG 11

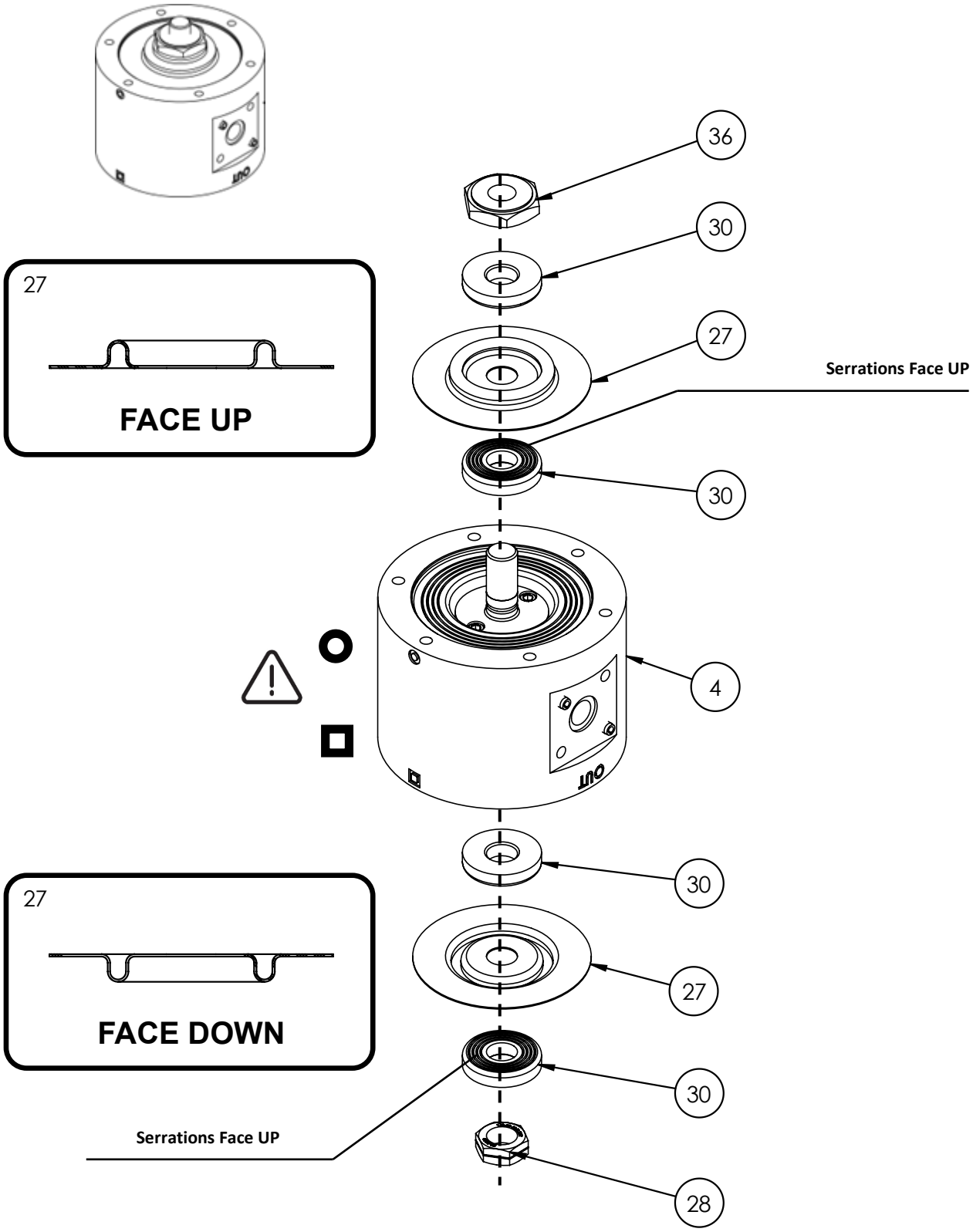


STEP 6 - Bottom Seat Block Assembly with Pistons Installed – SEE FIG 12

Item No	Qty	VRG Part Number	Description
4	1	PD-0010	PILOT BLOCK
27	2	EL-0010	DIAPHRAGM W/HOLE 700 PSI , BUNA
28	1	FN-0290	1/2-20 Jam Nut 316 SS; Machined
30	4	PD-0165	PISTON WASHER-700
36	1	PD-0360	INSIDE BEARING NUT

1. Apply Piston Washer-700 (30) on BV Piston (29) with serrations facing DOWN away from square of Pilot Block (4).
2. Install –700 Diaphragm (27) onto BV Piston (29) with convolute facing DOWN away from square of Pilot Block (4).
3. Install Piston Washer-700 (30) on BV Piston (29) with serrations facing UP toward 700 Diaphragm (27)
4. Install ½-20 Machined Nut onto (28) BV Piston (29) and tighten (XX in-lbs / XX Nm).
5. Piston Washer-700 (30) on Short Inside Piston (33) with serrations facing UP away from Circle of Pilot Block (4).
6. Install –700 Diaphragm (27) onto Short Inside Piston with convolute facing UP away from Circle of Pilot Block (4).
7. Apply Piston Washer-700 (30) on Short Inside Piston (33) with serrations facing DOWN toward 700 Diaphragm (27)
8. Inside Bearing Nut (36) onto Short Inside Piston (33) and tighten (XX in-lbs / XX Nm).

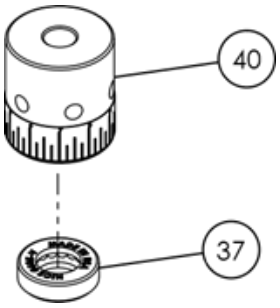
FIG 12


OUT
36
30
27
Serrations Face UP
30
4
OUT
30
27
30
28
Serrations Face UP
27
FACE UP
27
FACE DOWN

STEP 7 - Thrust Bearing & Adjusting Drum – Install Thrust Bearing into Adjusting Drum (If Applicable)– SEE FIG 13

1. Press Thrust Bearing (37) into Sensitivity Drum (40) with stamped letters side first. Bearing case should fit snugly inside Adjusting Drum (40) and bearing surface should face outward and rotate freely.
2. ATTENTION: The Thrust Bearing (37) should fit completely down to inner surface of Adjusting Drum (40) and should be level around perimeter to avoid slant or side load.
3. Lubricate inside threads of Adjusting Drum liberally.

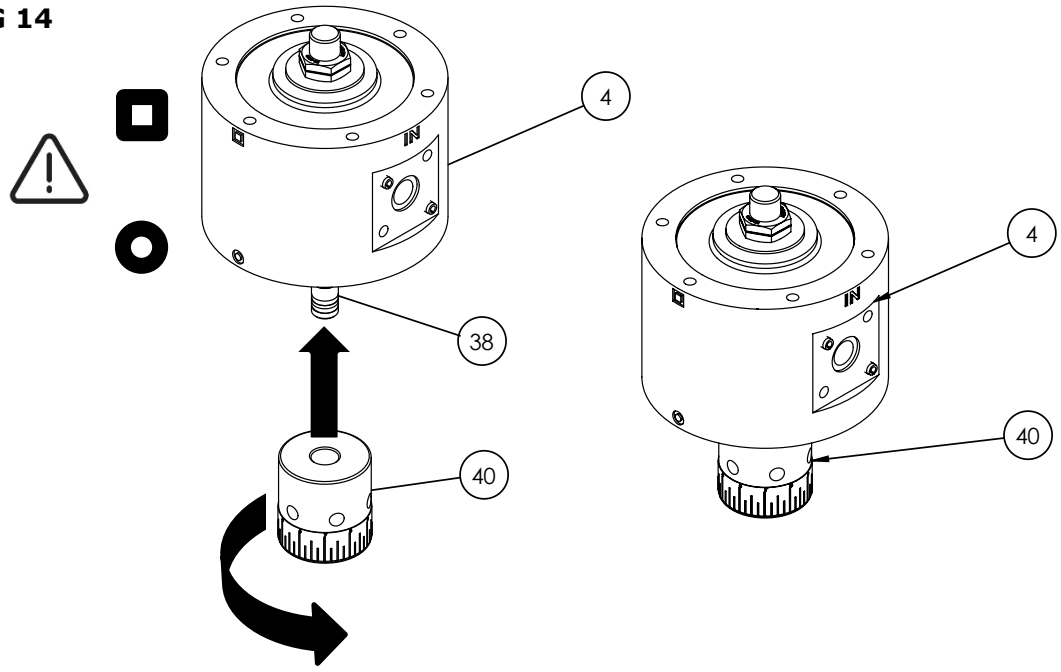
FIG 13



STEP 8 - Adjusting Drum with Thrust Bearing Installed – SEE FIG 14

1. Apply lubrication to Long Inside Piston (38).
2. Install Adjusting Drum (40) onto Top Pilot Block (4) Assembly by threading (CW) onto Long Inside Piston (38) until it just bottoms out against ½-20 JAM Nut (28).
3. Rotate the Adjusting Drum (40) so 1.5 turns of disengagement (CCW) from Long Inside Piston (38).
4. Top Pilot Block (4) Assembly with Adjusting Drum (38) Installed (QTY 1)

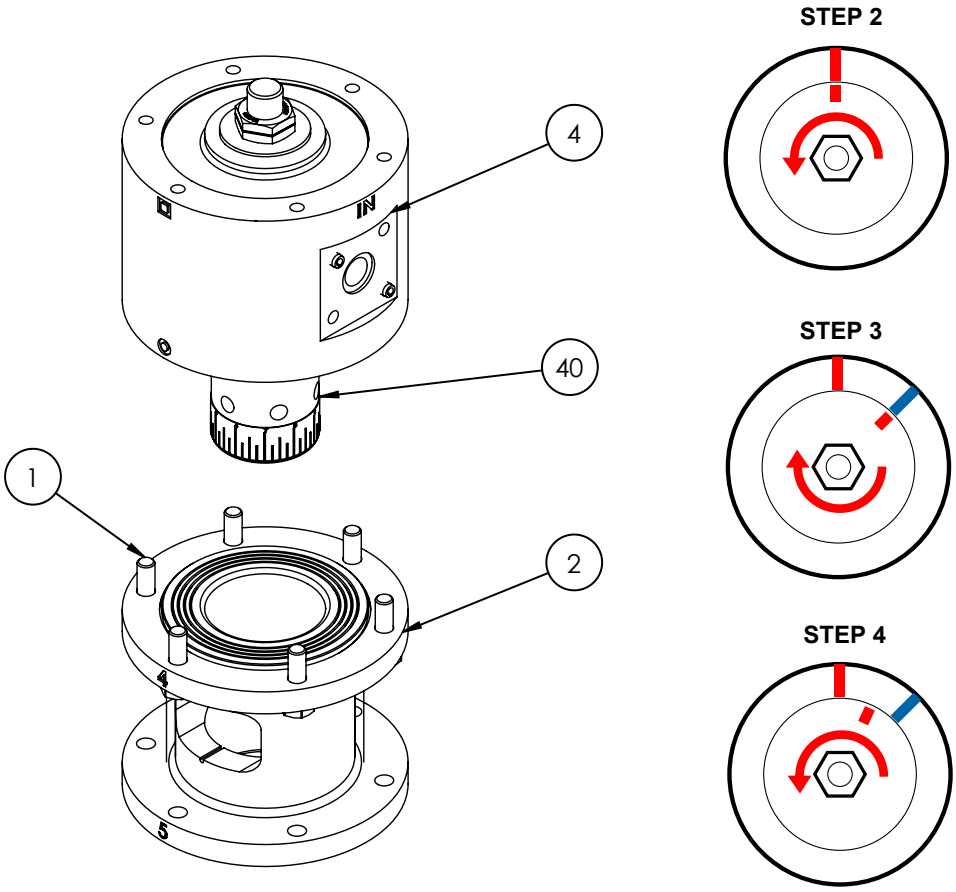
FIG 14



STEP 8 - Adjusting Drum with Thrust Bearing Installed – SEE FIG 15

1. ATTENTION: Center Connecting Posts assemblies within Bottom Pilot Block Assemblies as follows to avoid friction (rubbing):
2. Rotate diaphragm assemblies counter-clockwise (CCW) until it stops & place a single pencil mark across the diaphragm and bottom surface of the Bottom Pilot Block Assembly.
3. Now rotate diaphragm assemblies clockwise (CW) until it stops & place a single pencil mark extended from the first diaphragm mark across the bottom surface of the Bottom Pilot Block Assembly.
4. Now rotate diaphragm assemblies counter-clockwise (CCW) slightly until the single pencil mark on the diaphragm is approximately half-way between the two (2) pencil marks on the bottom surface of the Top Pilot Block Assembly.
5. Keeping the diaphragms securely in centered positions, fasten the Bottom Pilot Block Assembly to the Pilot Spacer using ¼-20 × 7/8 HHCS 316SS (XX in-lbs / XX Nm).
6. This will secure each diaphragm assembly and maintain it in "centered" position.
7. ATTENTION: Be certain to ALIGN VPC Identification Symbols appropriately as shown to ensure proper configuration.

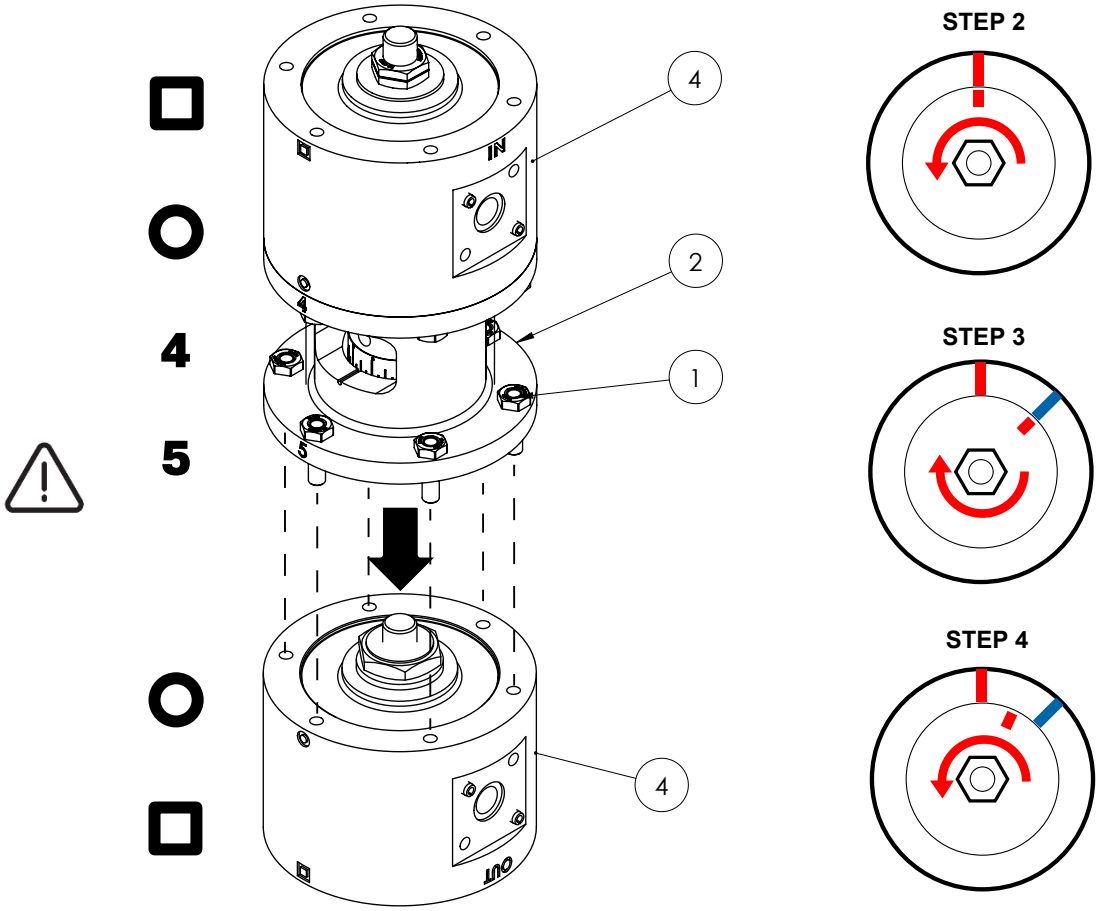
FIG 15



STEP 9 - Adjusting Drum with Thrust Bearing Installed – SEE FIG 16

1. ATTENTION: Center Connecting Posts assemblies within Pilot Block (4) Assembly as follows to avoid friction (rubbing):
2. Rotate diaphragm assemblies counter-clockwise (CCW) until it stops & place a single pencil mark across the diaphragm and top surface of the Top Pilot Block Assembly.
3. Now rotate diaphragm assemblies clockwise (CW) until it stops & place a single pencil mark extended from the first diaphragm mark across the top surface of the Top Pilot Block Assembly.
4. Now rotate diaphragm assemblies counter-clockwise (CCW) slightly until the single pencil mark on the diaphragm is approximately half-way between the two (2) pencil marks on the top surface of the Top Pilot Block Assembly.
5. Keeping the diaphragms securely in centered positions, fasten the Top Pilot Block Assembly to the Pilot Spacer using QTY 6 EA ¼-20 × 7/8 HHCS 316SS (XX in-lbs / XX Nm).
6. This will secure each diaphragm assembly and maintain it in "centered" position.
7. ATTENTION: Be certain to ALIGN VPC Identification Symbols appropriately as shown to ensure proper configuration.

FIG 16



STEP 10 - Iinstall Pilot Bottom Flange onto Power Module Assembly – SEE FIG 17

Item No	Qty	VRG Part Number	Description
1	6	FN-0695	1/4-20 x 7/8 HHCS 316 SS #93190A541
4	1	PD-0010	PILOT BLOCK
42	1	PD-0030	PILOT BOTTOM FLANGE
43	1	CS-0021	Pilot Bottom Spring, 302 SS Precision Compression Spring

1. Flip the Power Module Assembly upside down and install Bottom Pilot Spring (43) as shown onto threaded end of piston.
2. Lubricate Bottom Pilot Spring (43).
3. Install Pilot Bottom Flange (42) onto Power Module Assembly ensuring that Bottom Return
4. Spring fits inside internal cavity of Pilot Bottom Flange, and Pilot Block (4)
5. Secure Pilot Bottom Flange (42) with ¼-20 × 7/8 HHCS 316SS (XX in-lbs / XX Nm).
6. ATTENTION: Be certain to ALIGN VPC Identification Symbols appropriately as shown to ensure proper configuration.

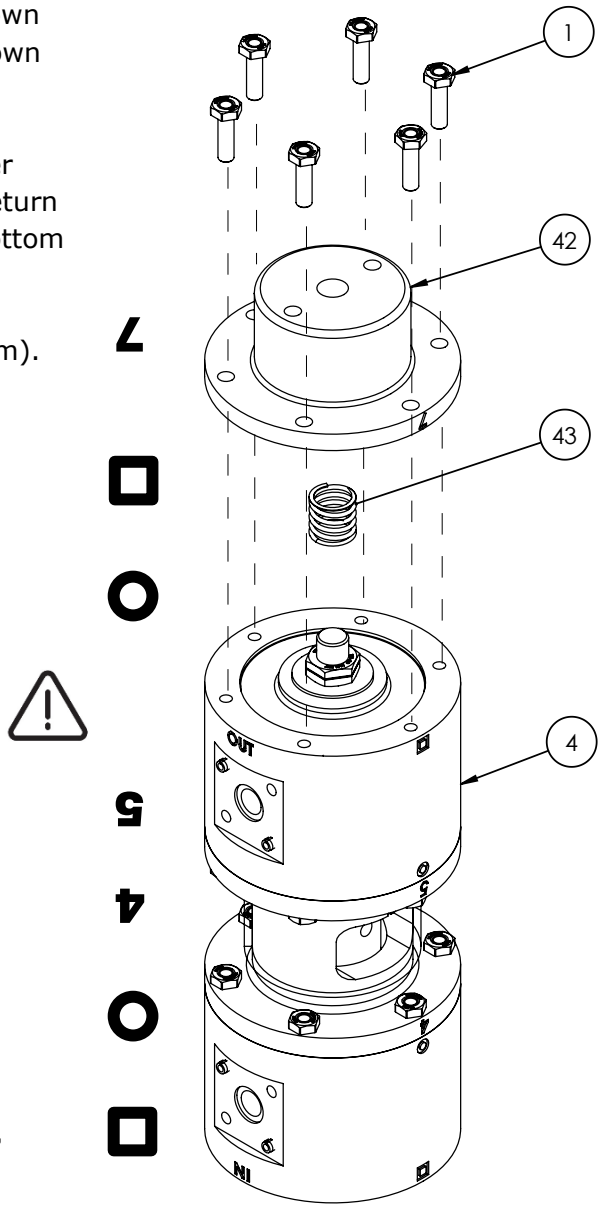


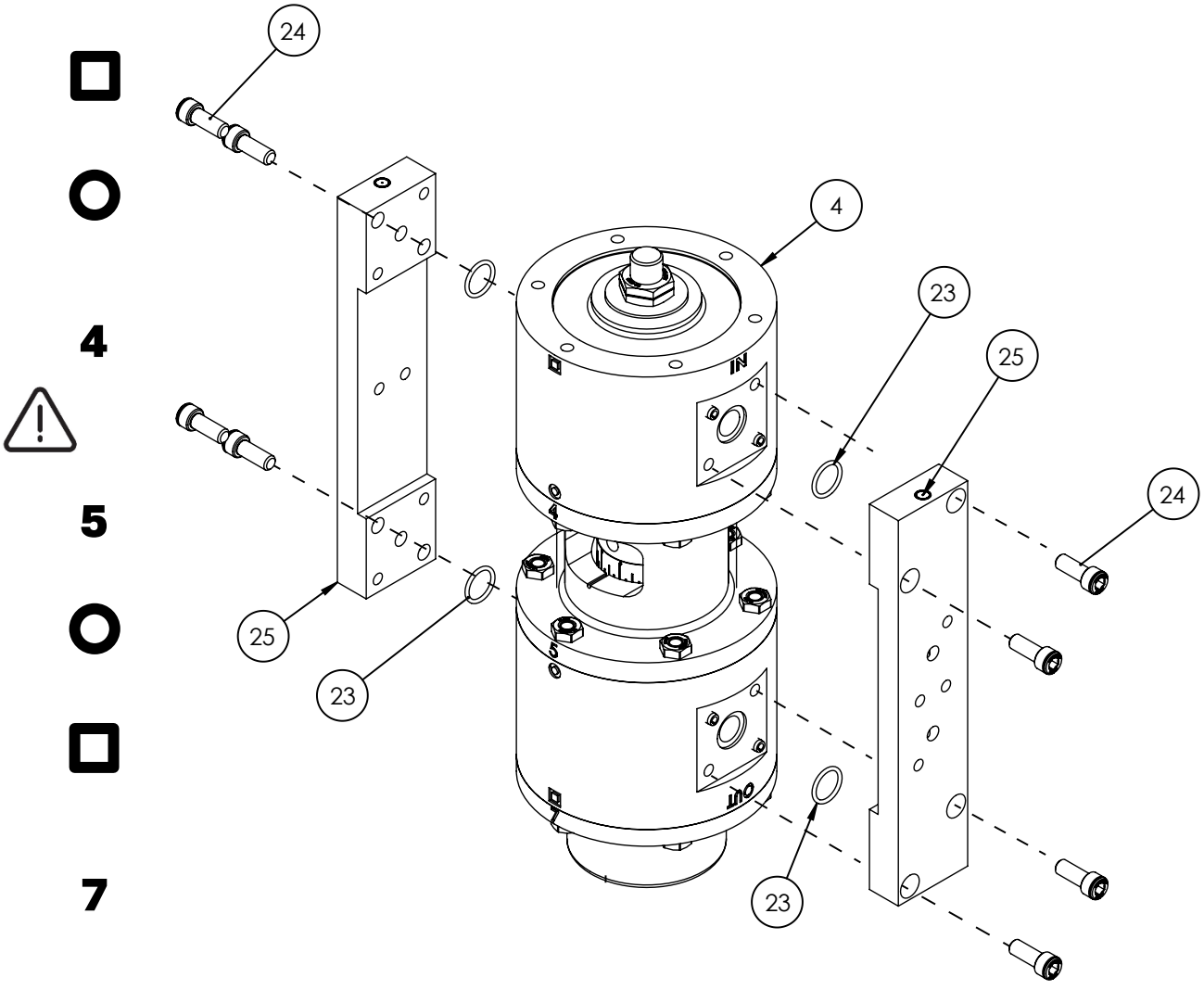
FIG 17

STEP 11 - Install Connecting Manifolds to Power Module Assembly – SEE FIG 18

Item No	Qty	VRG Part Number	Description
4	2	PD-0010	PILOT BLOCK
23	4	EL-0220	O-RING -014 BUNA
24	8	FN-0020	1/4-20 x 5/8 SHCS 316 SS #92185A539
25	2	PD-0425	CONNECTING MANIFOLD

1. Apply thin film of lubricant to .014 O-Rings (23) to facilitate assembly.
2. Adhere .014 O-Rings (23) to cavities on either side of Power Module Assembly (QTY 4).
3. Install Connecting Manifolds (25) (QTY 2) to Power Module Assembly using QTY 8 EA ¼-20 × 5/8 SHCS (24) (XX in-lbs / XX Nm).

FIG 18

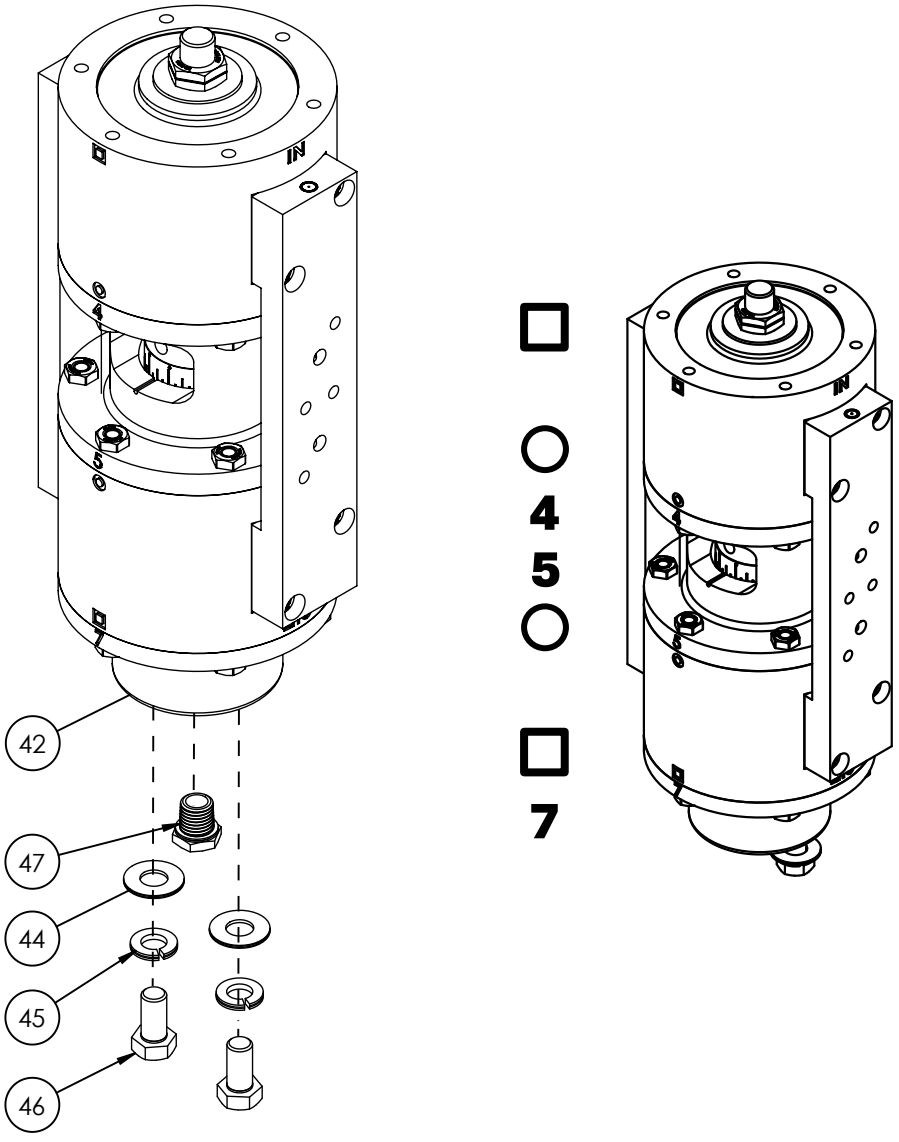


STEP 12 - Install Connecting Manifolds to Power Module Assembly – SEE FIG 19

Item No	Qty	VRG Part Number	Description
42	1	PD-0030	PILOT BOTTOM FLANGE
44	2	FN-0620	3/8 ID Flat washer 316 SS; #90107A031
45	2	FN-0520	3/8 ID Lock washer 18-8 SS; #92146A031
46	2	FN-0740	3/8-16 x 3/4 HHCS 316 SS; #93190A622
47	1	FP-0047	HEYCO 1/4 NPT Straight Black Vent

1. Install ¼ NPT Vent Breather (47) into NPT port on bottom of Pilot Bottom Flange (42)
2. For Mounting: Install Flat Washers (44), Lock Washers (45) and
3. 3/8-16 × ¾ HHCS (46) (XX in-lbs / XX Nm).
4. Maintain Pilot Blank Assembly vertical position to ensure proper alignment of internal components during balance of assembly.

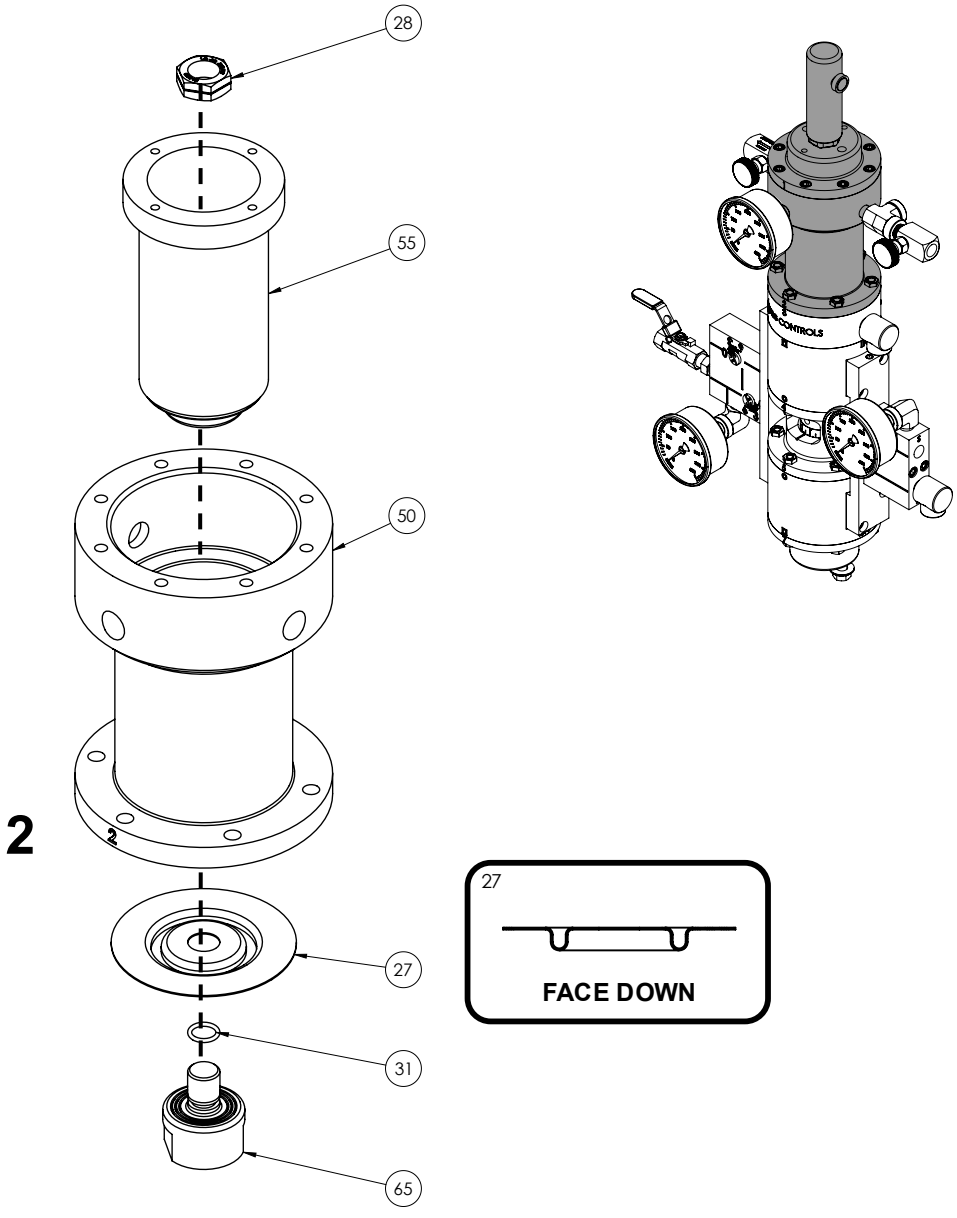
FIG 19



STEP 13 - Assemble Closed Spring Cartridge Assembly – SEE FIG 20

Item No	Qty	VRG Part Number	Description
28	1	FN-0290	1/2-20 Jam Nut 316 SS; Machined
50	1	PD-0050	SPRING CARTRIDGE -CLOSED 225, 700, 1500
55	1	PD-0100	SPRING INNER TUBE
27	1	EL-0010	DIAPHRAGM W/HOLE 700 PSI , BUNA
31	1	EL-0210	O-RING - 012 BUNA, #9452K21
65	1	PD-0140	PISTON SENSING -700

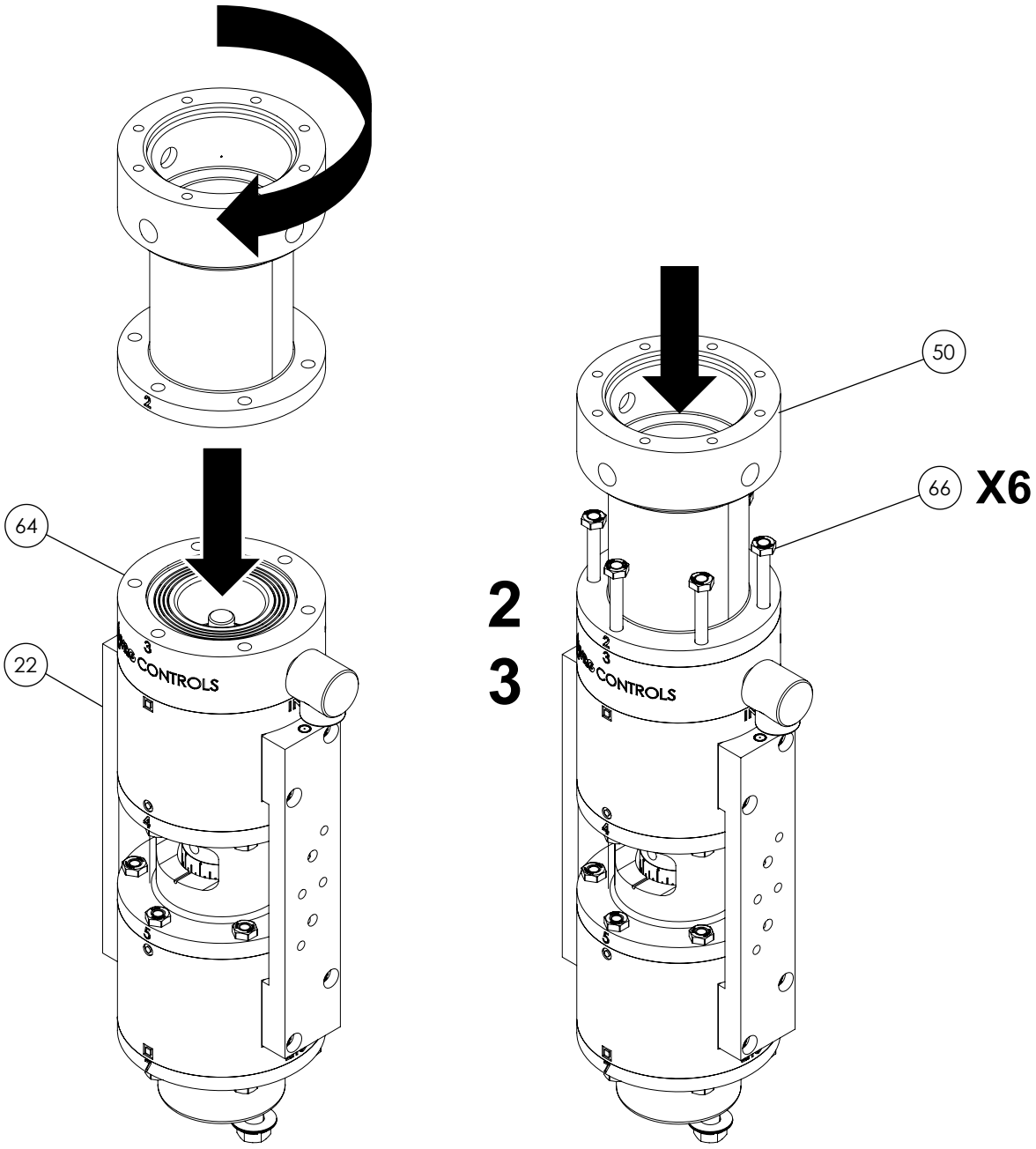
FIG 20



STEP 14 - Install Closed Spring Cartridge Assembly onto Pilot Blank Assembly – SEE FIG 21

Item No	Qty	VRG Part Number	Description
66	6	FN-0712	1/4-20 x 2-1/4 HHCS 316 SS;#92186A551
50	1	PD-0050	SPRING CARTRIDGE -CLOSED 225, 700, 1500
64	1	PD-0040	SENSING SPACER-700
22	1	PD-0055	SA PILOT BLANK ASSY

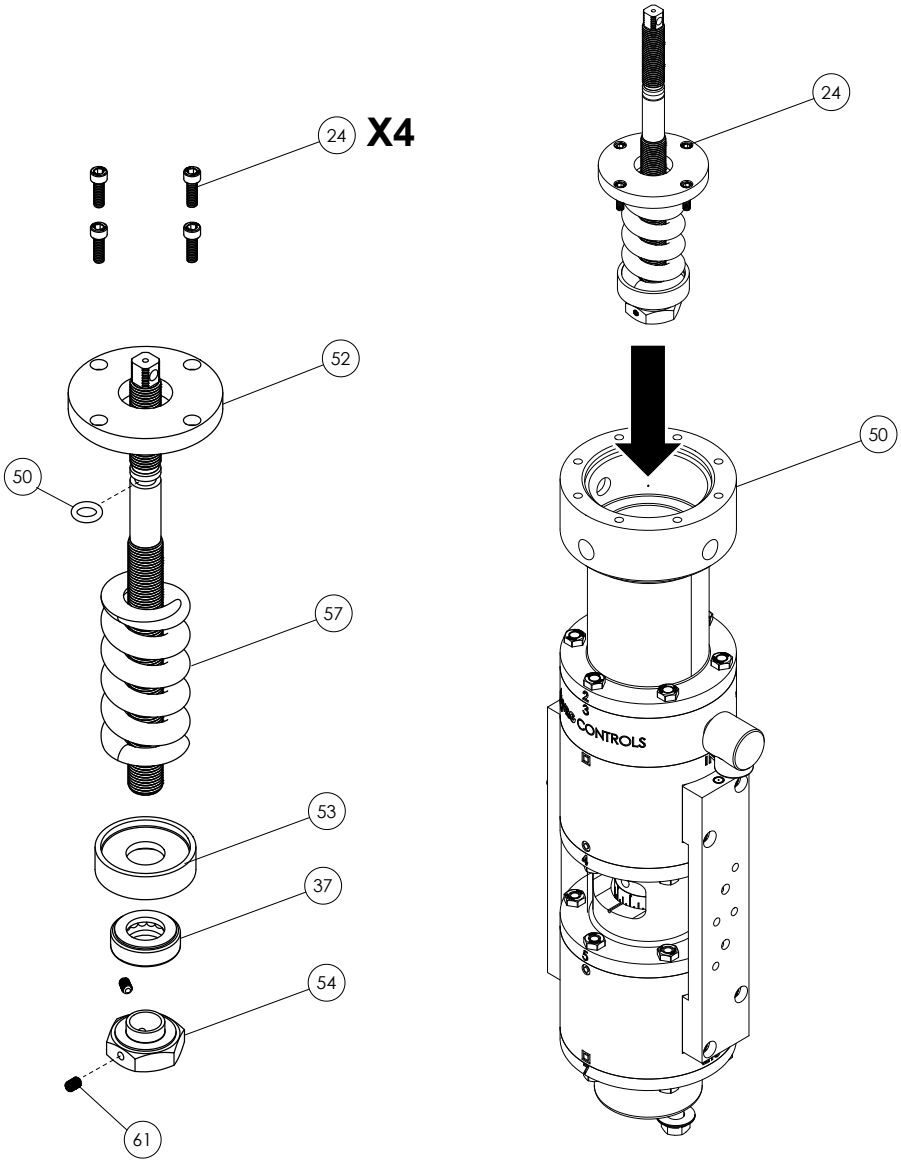
FIG 21



STEP 15 - Assemble Setpoint Screw Assembly – SEE FIG 22

Item No	Qty	VRG Part Number	Description
50	1	PD-0050	SPRING CARTRIDGE -CLOSED 225, 700, 1500
24	4	FN-0020	1/4-20 x 5/8 SHCS 316 SS #92185A539
52	1	PD-0110	TUBE COVER
57	1	CS-0150	PILOT SPRING MODEL
37	1	BA-0010	THRUST BEARING
53	1	PD-0120	BEARING CASE
54	1	PD-0130	BEARING SUPPORT
59	1	EL-0230	O-RING -109 BUNA
61	2	FN-0120	8-32 x 1/4 SS ALLOY W/LOCK, #91385A190

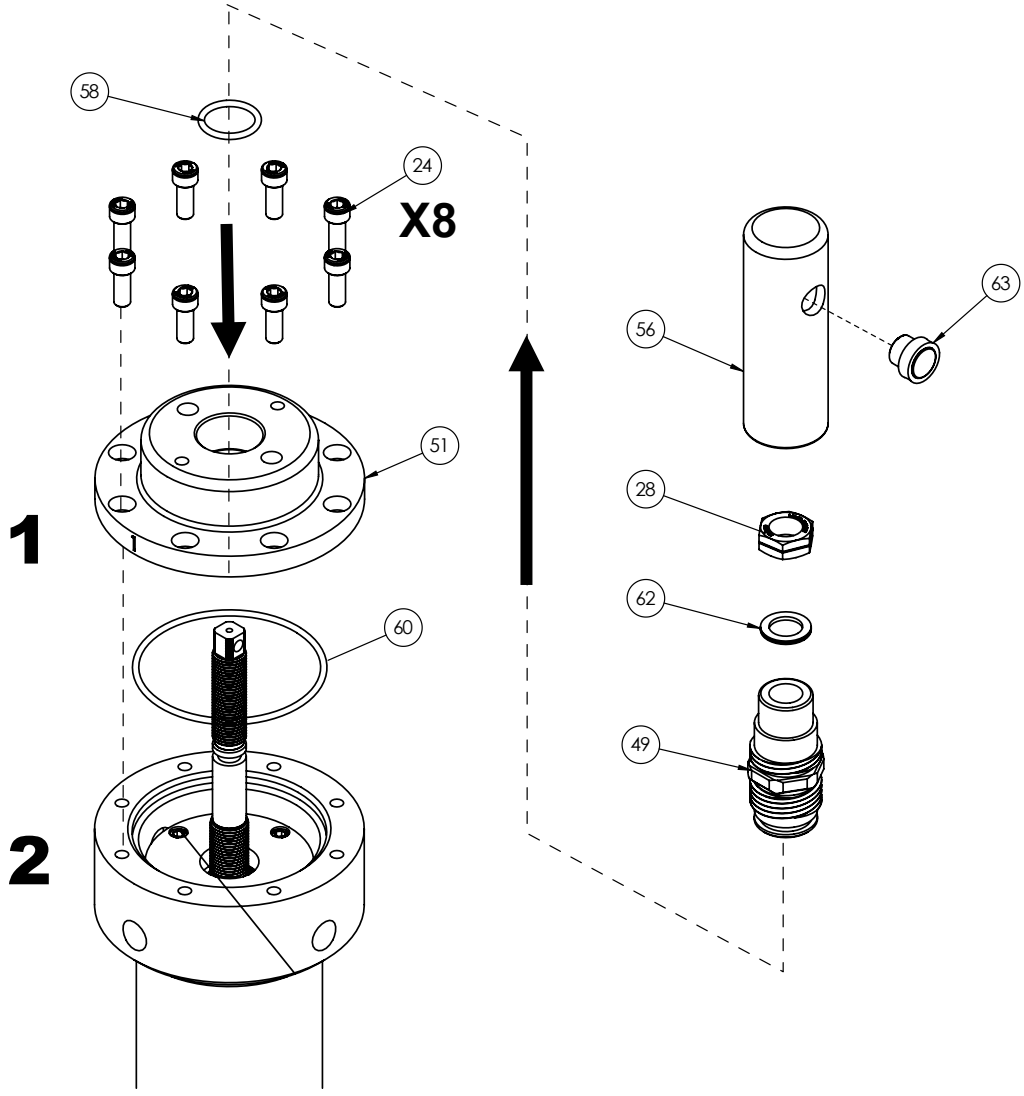
FIG 22



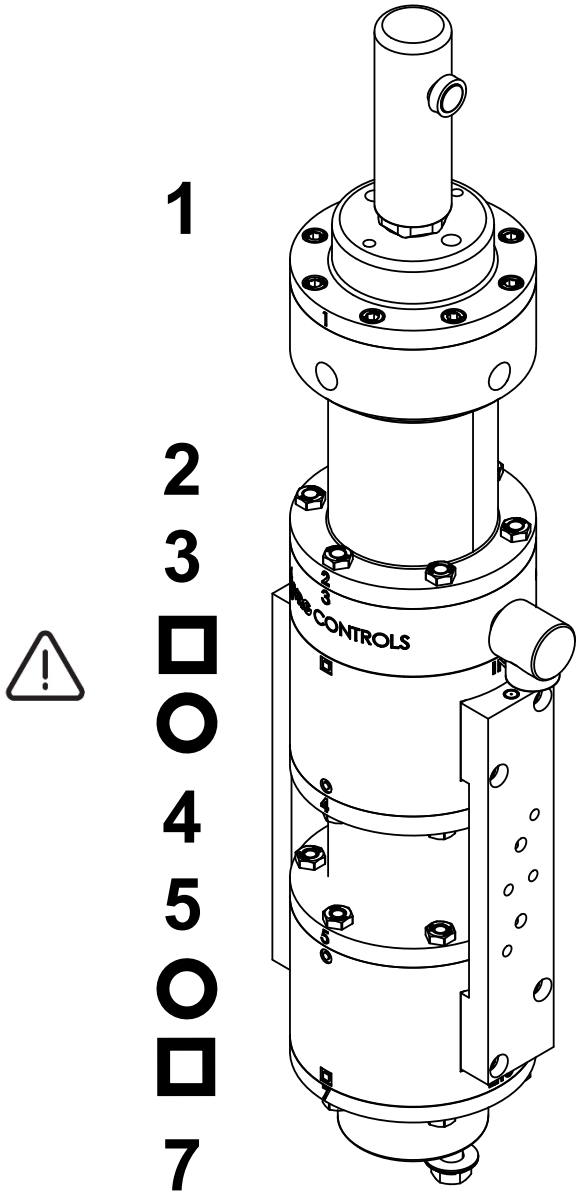
STEP 16 - Install Spring Cartridge Cap Assembly – SEE FIG 23

Item No	Qty	VRG Part Number	Description
24	8	FN-0020	1/4-20 x 5/8 SHCS 316 SS #92185A539
28	1	FN-0290	1/2-20 Jam Nut 316 SS; Machined
49	1	PD-0070	ADJUSTING SCREW GUIDE
51	1	PD-0060	CARTRIDGE TOP FLANGE
56	1	PD-0080	SPRING COVER
58	1	EL-0237	O-RING -116 BUNA
60	1	EL-0240	O-RING -147 BUNA
62	1	FN-0635	1/2 IDx3/4ODx.060TH. Flat washer 316 SS #97022A543
63	1	FP-0041	1/4NPT vent straight -POLYPROPOLINE #4471K12

FIG 23



Pilot Blank Assembly with Spring Cartridge Cap Assembly Installed



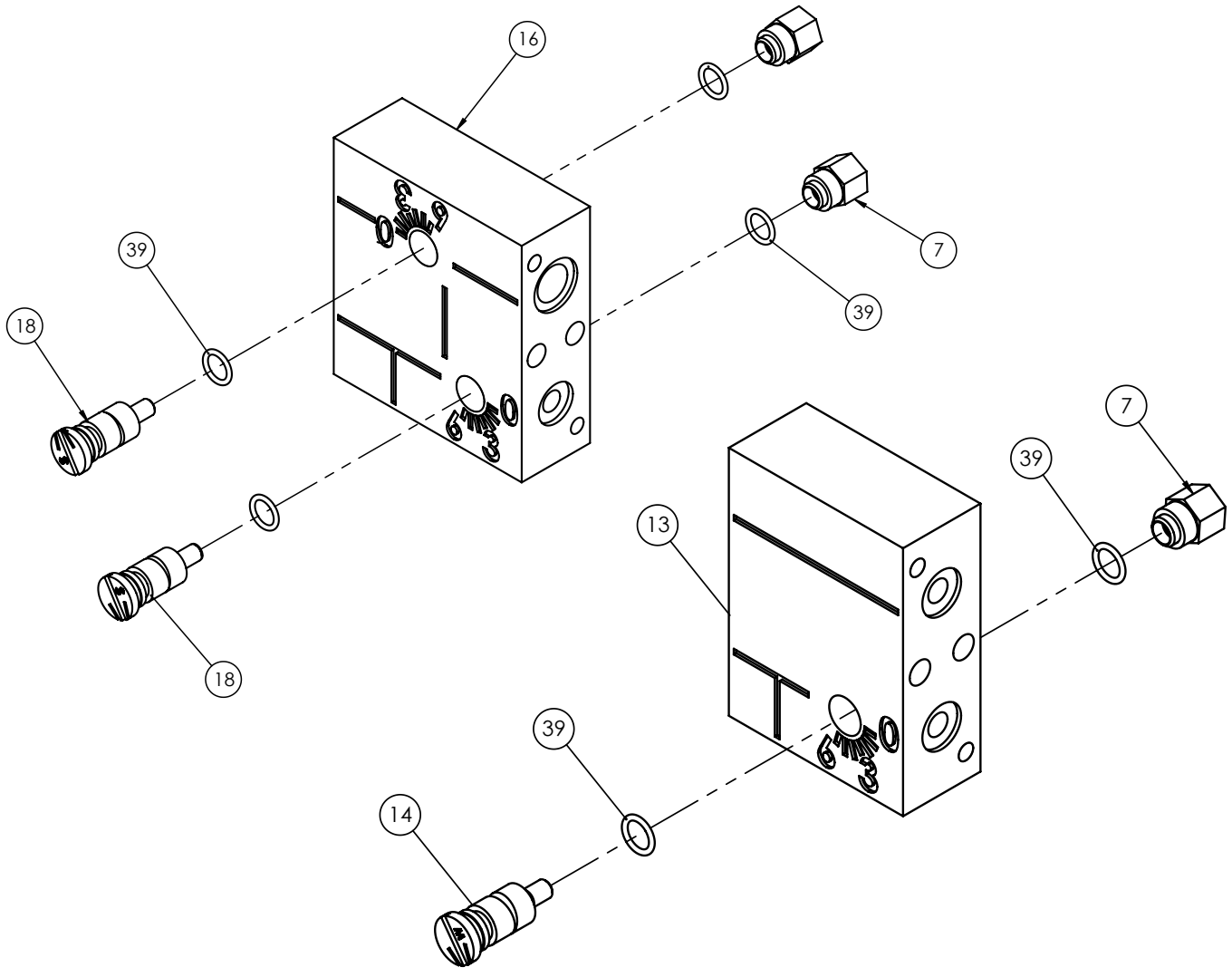
VPC Pilot Section Identification

The VPC pilot assembly is divided into functional sections identified by numbers (**1–7**) and symbols (**SQUARE, TRIANGLE, CYRCLE**) shown along the left side of the illustration. These identifiers correspond to internal functions and mechanical orientation within the pilot.

STEP 17 - Installing Adjustable Orifice into SA Loading Manifolds – SEE FIG 24

Item No	Qty	VRG Part Number	Description
16	1	PD-0437	ID OUTPUT MANIFOLD
18	2	PD-0450	VARIABLE ORIFICE SMALL
7	2	PD-0460	ORIFICE NUT
39	4	EL-0200	O-RING -010 BUNA, #9452K18

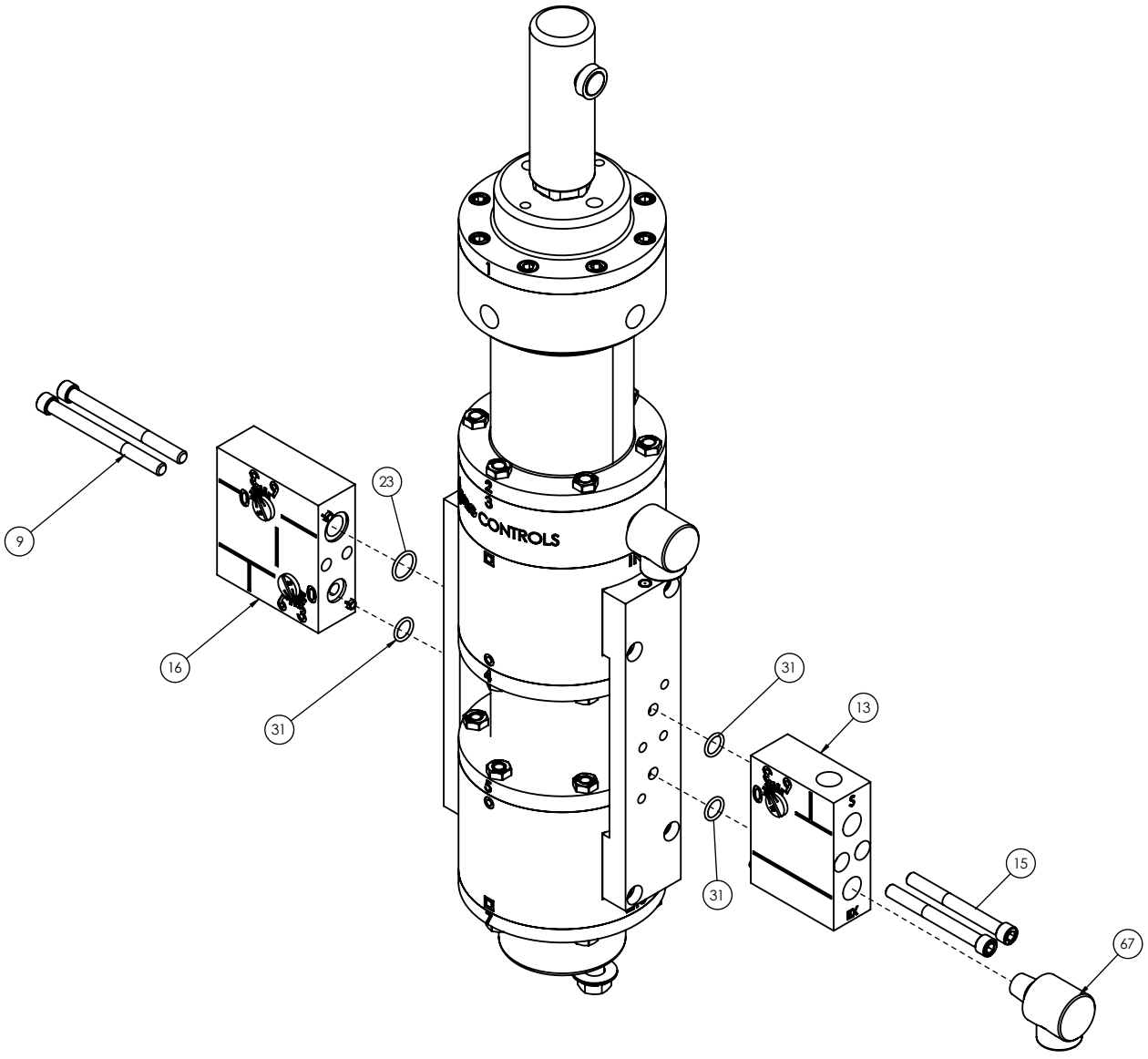
Item No	Qty	VRG Part Number	Description
13	1	PD-0430	SA INLET MANIFOLD
7	1	PD-0460	ORIFICE NUT
14	1	PD-0453	VARIABLE ORIFICE MEDIUM
39	2	EL-0200	O-RING -010 BUNA, #9452K18



STEP 18 - Installing Adjustable Orifice into SA Loading Manifolds – SEE FIG 25

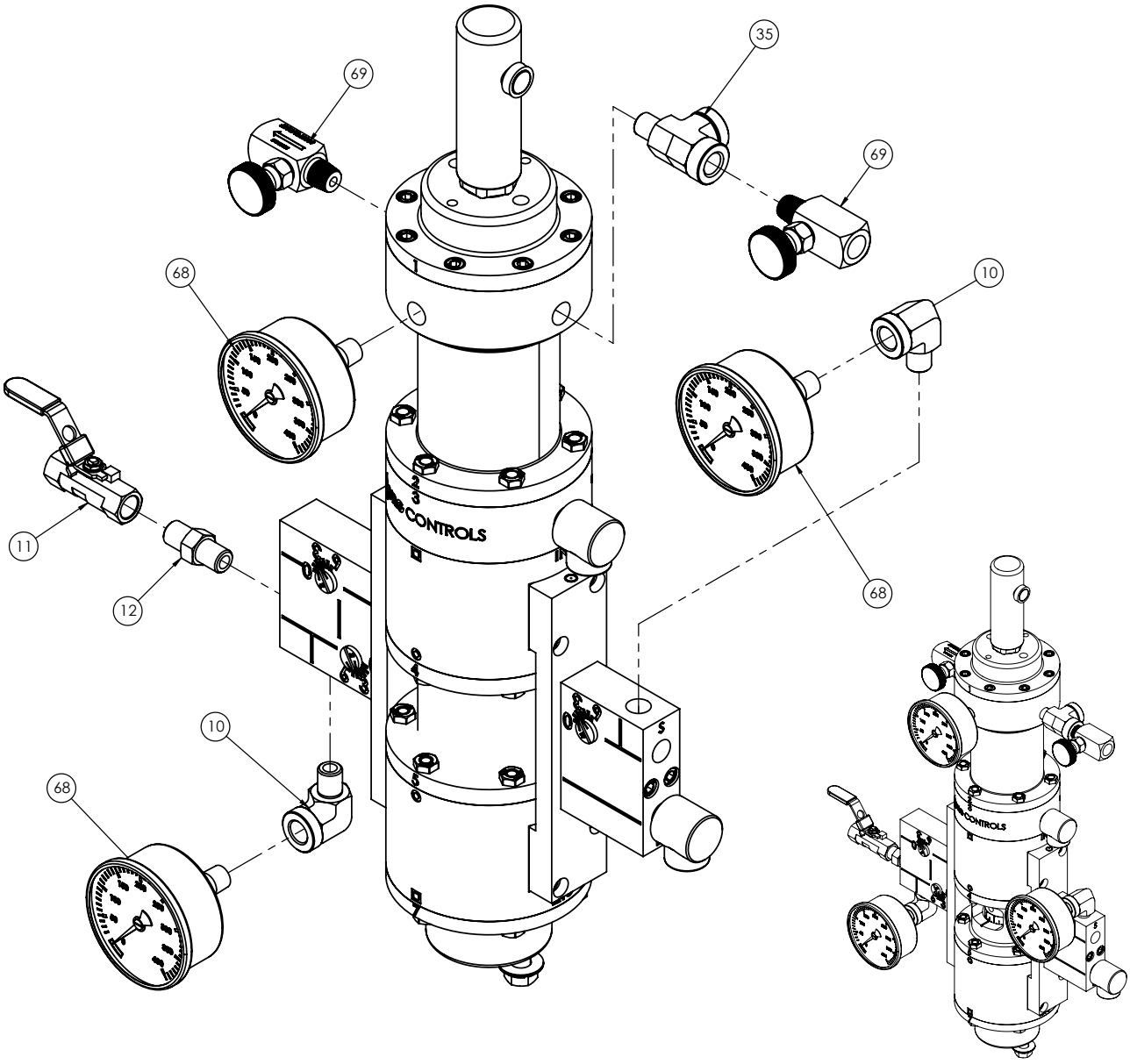
Item No	Qty	VRG Part Number	Description
23	1	EL-0220	O-RING -014 BUNA
31	3	EL-0210	O-RING - 012 BUNA, #9452K21
13	1	PD-0430	SA INLET MANIFOLD
16	1	PD-0437	ID OUTPUT MANIFOLD
67	1	FP-0043	1/4NPT vent elbow -Black Anodized Aluminum
9	2	FN-0035	1/4-20 X 3 SHCS 316 SS #92185A557
15	2	FN-0030	1/4-20 X 2-1/2 SHCS 316 SS #92185A555

FIG 25



STEP 19 - Installing Adjustable Orifice into SA Loading Manifolds – SEE FIG 26

Item No	Qty	VRG Part Number	Description
35	1	FP-0025	1/4 NPT STREET TEE SS; ISS4TST
68	3	GA-0004	1/4NPT CBM SS,2.5 dial
69	2	FV-0020	1/4NPT M x F NEEDLE VALVE
10	2	FP-0030	1/4NPT STREET ELBOW SS; ISST4SE
12	1	FP-0010	1/4 NPT HEX NIPPLE SS; ISST4HN
11	1	FV-0010	1/4NPT FxF Ball VLV SS -lock handle#1017S02;1000psig



3.6. Disassembly

Disassembly Instructions for VPC-700-SA-BV (Direct) Pilot Cartridge

1) Step 1 - Disassembly Preparation

a) Depressurize & isolate. Lockout/tagout all supplies. Vent to 0 psig / 0 Barg – as necessary.

b) Perform all work on clean, stable, flat surface.

c) Clean & protect. Wipe external DAt, set up clean trays/bags for parts.

d) Take a photograph of FRONT and BACK of assembly to facilitate reassembly questions.

e) Optional – Mark the orientation and alignment of mating points of the assembly to facilitate reassembly. Note that all VPC assemblies feature a shape / number reassembly system on all parts.

f) **Step 2 - Attach Pilot Blank Assembly to Mounting Bracket – If Applicable**.

g) Attach Pilot Blank Assembly to VPC Standard Mounting Bracket or other suitable bracket as shown using Flat Washers, Lock Washers and 3/8-16 × ¾ HHCS (XX in-lbs / XX Nm).

h) Maintain Pilot Blank Assembly vertical position to facilitate disassembly.

2) Step 3 - Remove SA Supply/Exhaust and Output Manifold Assemblies

a) Loosen and remove QTY 2 EA ¼-20×2¾ SHCS SS from the SA OUTPUT Manifold (left side).

b) Loosen and remove QTY 2 EA ¼-20×2¾" SHCS SS from the SA SUPPLY/EXHAUST Manifold (right side).

c) Carefully detach both manifolds from connecting manifolds.

d) Remove and discard all .010 O-Rings from cavities on the loading and unloading manifolds.

e) Remove adjustable orifices, and orifice nuts from the SA OUTPUT manifold.

f) Remove adjustable orifices, and orifice nuts from the SA SUPPLY / EXHAUST manifold.

g) Inspect and clean all adjustable orifices

3) Step 4 - Disassemble Spring Cartridge Cap Assembly

a) Remove the ¼ NPT breather vent from the adjusting screw cover.

b) Remove the ½-20 machined nut and flat washer from Setpoint Screw.

c) Loosen and remove 6 EA ¼-20 × 5/8 SHCS 316 SS from Spring Cartridge Cap.

d) Rotate the Setpoint Screw CCW to initiate separation of the Spring Cartridge Cap from the Closed Spring Cartridge Assembly.

e) Continue to rotate the Setpoint Screw CCW to until the Spring Cartridge Cap / Adjusting Screw assembly is free.

f) Remove the spring cartridge cap/adjusting screw guide assembly.

g) Separate the adjusting screw guide from the spring cartridge cap.

h) Remove and inspect the -147 O-Ring (from cap) and -116 O-Ring (from adjusting screw guide).

4) Step 5 - Remove Setpoint Adjusting Screw Assembly

a) Loosen and remove QTY 4 EA 8-32 × ½ alloy SHCS from the tube cover in a star pattern.

b) Carefully lift the tube cover from the top of the assembly.

c) Withdraw the setpoint adjusting screw assembly from the reversing tube.

d) Remove the pilot control spring and -109 O-Ring from the adjusting screw.

e) If applicable, disassemble the bearing support/bearing assembly:

5) Step 6 - Remove Closed Spring Cartridge Assembly

a) Loosen and remove QTY 6 EA ¼-20×2 ¼ " HHCS 316 SS from the -700 sensing spacer in a star pattern.

b) Rotate and lift off the -700 sensing spacer from the pilot blank assembly.

c) Unscrew and remove the closed spring cartridge assembly from the BV piston.

d) Remove the ¼ NPT vent breather from the sensing spacer.

6) Step 7 - Disassemble the closed spring cartridge:

a) Remove the ½-20 machined nut using a ¾" deep well socket.

b) Remove the reversing tube.

c) Extract the -700 sensing piston and -700 diaphragm.

d) Remove the -012 O-Ring from the sensing piston.

7) Step 8 - Final Cleaning and Inspection

a) Clean all threaded and sealing surfaces.

b) Verify that all subassemblies are accounted for and stored properly.

c) Ensure all components are clearly labeled for reassembly.

8) Step 9 - Post-Disassembly Tasks

a) Inspection: Check mating surfaces of parts for damage; threads for damage; bearing rotation; spring free length and straightness.

b) Cleaning: Use compatible solvent; avoid scratching sealing faces. Avoid petroleum based cleaner such as WD-40®.

c) Discard Single Use Parts - The consumable parts below should be removed from the assembly and discarded to avoid contamination with new spares kit:

i) All Diaphragms

ii) All O-Rings

iii) All ½-20 Machined Nuts (All ½-20 Non-Machined Nuts Older Models)

iv) All 8/32 – ½ SHCS, Alloy.

Disassembly Instructions for VPC-SA-BV Pilot Blank Assembly

1) Step 1 - Disassembly Preparation

a) Complete "Disassembly Instructions for VPC-700-SA-BV (Direct) Pilot Assembly"

b) Clean & protect. Wipe external DAt, set up clean trays/bags for parts.

c) Take a photograph of FRONT and BACK of assembly to facilitate reassembly questions.

d) Optional – Mark the orientation and alignment of mating points of the assembly to facilitate reassembly. Note that all VPC assemblies feature a shape / number reassembly system on all parts.

2) Step 2 - Attach Pilot Blank Assembly to Mounting Bracket – If Applicable.

a) Attach Pilot Blank Assembly to VPC Standard Mounting Bracket or other suitable bracket as shown using Flat Washers, Lock Washers and 3/8-16 × ¾ HHCS (XX in-lbs / XX Nm).

b) Maintain Pilot Blank Assembly vertical position to facilitate disassembly.

3) Step 3 — Remove Connecting Manifolds

a) Support Power Module Assembly.

b) Remove the ¼-20 × 5/8 SHCS (QTY 8) securing both Connecting Manifolds.

c) Carefully separate manifolds using non-marking tool such as rubberized adjustable wrench handle.

4) Step 4 — Remove Top Pilot Block Assembly & Adjusting Drum

a) Remove ¼-20 × 7/8 HHCS (316SS) QTY 6 securing Top Pilot Block Assembly to Pilot Spacer.

b) Lift off the Top Pilot Block Assembly.

c) Remove Adjusting Drum by unthreading it CCW from the Long Inside Piston.

d) If applicable, clean lube residue from drum threads; set aside.

e) Step X – Remove Pilot Spacer

f) Remove ¼-20 × 7/8 HHCS (316SS) QTY 6 securing Pilot Spacer to Bottom Pilot Block Assembly

g) Lift off the Pilot Spacer from the Bottom Pilot Block Assembly.

5) Step 5 — Remove Bottom Pilot Block Assembly

a) Support the assembly, then remove ¼-20 × 7/8 HHCS (316SS) that fasten Bottom Pilot Block Assembly to the Pilot Bottom Flange.

b) Ease the Bottom Pilot Block Assembly from the Pilot Bottom Flange while capturing the Bottom Return Spring inside the cavity; clean and inspect parts.

6) Step 6 — Bottom Seat Block Disassembly — Diaphragms & Nuts

a) Remove ½-20 Machined Nut from the BV Piston.

b) Remove Inside Bearing Nut from the Short Inside Piston.

c) Remove all Piston Washers (-700) and -700 Diaphragms from Short Inside Piston and BV Piston.

7) Step 7 — Bottom Seat Block Disassembly — Pistons

a) Remove 8-32 × ½ ALLOY SHCS from the Short Inside Piston to disconnect it from the connecting posts.

b) Withdraw the Short Inside Piston.

c) Remove 8-32 × ½ ALLOY SHCS from the BV Piston, then withdraw the BV Piston and the connecting posts.

8) Step 8 — Top Seat Block Disassembly — Diaphragms & Nuts

a) Remove ½-20 Machined Nut from the BV Piston.

b) Remove ½-20 Machined Nut from the Long Inside Piston.

c) Remove all Piston Washers (-700) and -700 Diaphragms from Long Inside Piston and BV Piston.

9) Step 9 — Top Seat Block Disassembly — Diaphragms & Nuts

a) Remove ½-20 Machined Nuts from the BV Piston and Long Inside Piston.

b) Lift off Piston Washer-700 / –700 Diaphragm / Piston Washer-700 in order (note original serration Directions).

c) Keep "Top BV" and "Top Long Inside" stacks separate and labeled.

10) Step 10 — Top Seat Block Disassembly — Pistons

a) Remove 8-32 × ½ ALLOY SHCS from the Long Inside Piston to disconnect it from the connecting posts.

b) Withdraw the Long Inside Piston.

c) Remove 8-32 × ½ ALLOY SHCS from the BV Piston, then withdraw the BV Piston and the connecting posts.

11) Step 11 — Seat Block Assemblies

a) From each Seat Block, remove the 10-32 × ½ FHFMS SS Phillips Screws (QTY 4) from the body bottom (installed in a star pattern).

b) Remove the Cover Plate.

c) Carefully withdraw the Balanced Valve Assembly, Spacer Screen, and Balanced Valve Spacer and Balanced Valve Seat together.

12) Step 12 - Post-Disassembly Tasks

a) Inspection: Check mating surfaces of parts for damage; threads for damage; bearing rotation; spring free length and straightness.

b) Cleaning: Use compatible solvent; avoid scratching sealing faces. Avoid petroleum-based cleaner such as WD-40®.

c) Discard Single Use Parts - The consumable parts below should be removed from the assembly and discarded to avoid contamination with new spares kit:

- All Diaphragms, All O-Rings
- Balanced Valve Seat Assemblies
- Balanced Valve Spacer Screens
- All ½-20 Machined Nuts (All ½-20 Non-Machined Nuts Older Models)
- All 8/32 – ½ SHCS, Alloy

3.7. Revision Materials (Repair Kit)

3.7.1. See Annex 1 (PAGE 53) for Repair Kit RK-0100 - N/A for VPC-700-SA-BV

Item	Qty	VRG Part Number	Description	Ex	*
27	5	EL-0010	DIAPHRAGM W/HOLE 700 PSI , BUNA		1
N/A	1	EL-0020	Diaphragm w/hole -1500 psig, Buna	N/A	2
N/A	1	EL-0030	Diaphragm w/Hole-225 psig, Buna	N/A	3
8	8	EL-0200	O-RING -010 BUNA, #9452K18		4
31	3	EL-0210	O-RING - 012 BUNA, #9452K21		5
23	4	EL-0220	O-RING -014 BUNA		6
59	1	EL-0230	O-RING -109 BUNA		7
N/A	2	EL-0235	O-Ring,-112, Buna, 11/16 x ½ x 3/32	N/A	8
58	1	EL-0237	O-RING -116 BUNA		9
60	1	EL-0240	O-RING -147 BUNA		10
6	2	PD-0170	BALANCE VALVE ASSEMBLY		11
N/A	2	PD-0247	Balance Valve Seat-SS	N/A	12
20	2	PD-0260	BALANCE VALVE SPACER SCREEN		13
N/A	1	N/A	Mobilith SHC 220 Standard VRG Lubricant		14
N/A	1	PD-0490	NPT Block Test Manifold		15
34	8	FN-0100	8-32 X 1/2 SHCS ALLOY #91251A194		16
17	8	FN-0109	10-32 x 1/2 FHMS 18-8 SS; #93082A520 with Thread Locker		17
28	3	FN-0290	1/2-20 Jam Nut 316 SS; Machined		18

***** Indicates RK-0100 Repair Kit Part Number

EX – Indicates The RK-0100 Repair Kit Part Number is Exempted from the VPC-700-SA-BV

4. Testing (N/A)

5. Adjustment - VPC-SA-BV-ID_DA — Initial Adjustment Procedure

5.1. Purpose

This procedure describes the steps to properly adjust a VRG Controls VPC-SA-BV-ID Direct-Acting Valve Pilot Controller for accurate pressure control operation.

Required Tools and Equipment

- 3/8-Inch Open End Wrench or Small Adjustable Wrench
- Medium Flathead Screwdriver
- ¼-Inch Allen Wrench
- Leak Check Solution
- Digital Test Gauge

- Calibration Pump (Optional)

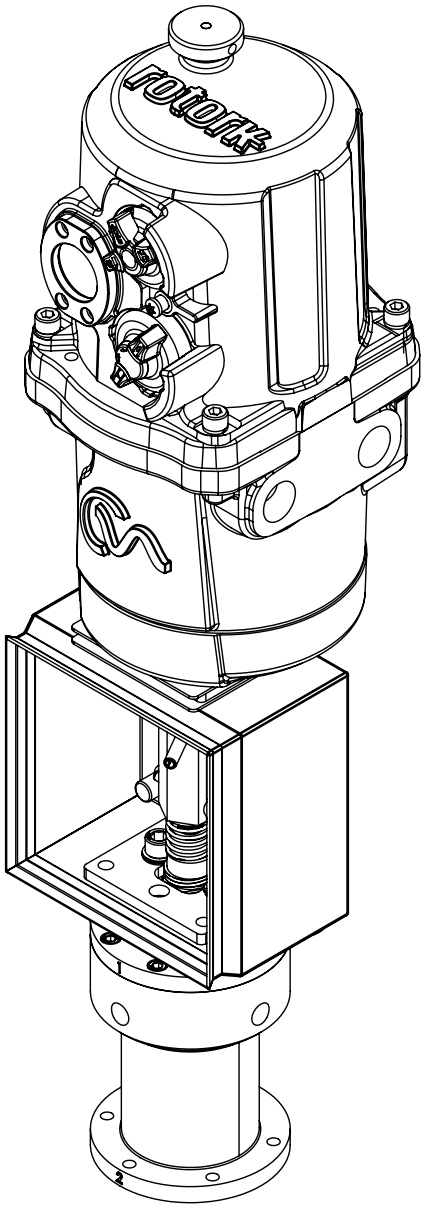
Safety Warning
The VPC Pilot Controller operates using high-pressure, flammable natural gas or other pneumatic supplies. Improper installation, adjustment, or maintenance can cause property damage, serious injury, or death. Only qualified personnel should perform this procedure. Always follow facility safety and lockout/tagout procedures.

Component References
- SENSING Gauge
- SUPPLY Gauge
- OUTPUT Gauge
- Supply Valve (Isolation)
- Output Valve (Isolation)
- ID Tank Valve (If Applicable)
- Setpoint Adjustment Screw
- Deadband Adjustment Drum
- Sensing Needle Valves

5.2. Initial Adjustment Procedure

1. Step 1 – Depressurize sensing chamber: Isolate Sensing Pressure from Process and Vent Trapped Sensing Pressure from the VPC-SA-BV-ID Sensing Chamber using the Sensing Needle Valves. Remove Setpoint Adjustment Cap and Loosen Jam Nut on Setpoint Adjustment Screw
2. Step 2 – Close OUTPUT and TANK isolation valves: Close the OUTPUT valve. If a TANK isolation valve is present (system-specific), close it as well. (If no tank is used, skip this sub-step.)
3. Step 3 – Set the supply regulator: Adjust the supply regulator to the designated supply pressure per system requirements.
4. Step 4 – Unload and preset control spring: Turn the set-point adjustment screw counterclockwise until the control spring is fully unloaded (A drop in Torque should be noticeable). Then, turn the screw clockwise two full rotations to establish a preliminary preload. OUTPUT Gauge should drop to ZERO.
5. Step 5 – Preset DEADBAND Adjustment drum: Turn the Deadband adjustment drum fully to the right until it stops (numbers decrease). Then, rotate it back to the left 3.0 turns (numbers increase).
6. Step 6 – Pressurize sensing chamber: Using the needle valve assembly and calibration pump (or other pressure source), introduce the desired sensing pressure to the sensing chamber equivalent to the desired setpoint. OUTPUT Gage will increase equal to full SUPPLY pressure.

6. ESC-CMR-24VDC-ATEX-MTR Valve Pilot Controller



7. Overall Composition

7.1. Tech Specification

7.1.1. ESC CMR-200-VPC-CS-with Display-SS Box Specifications

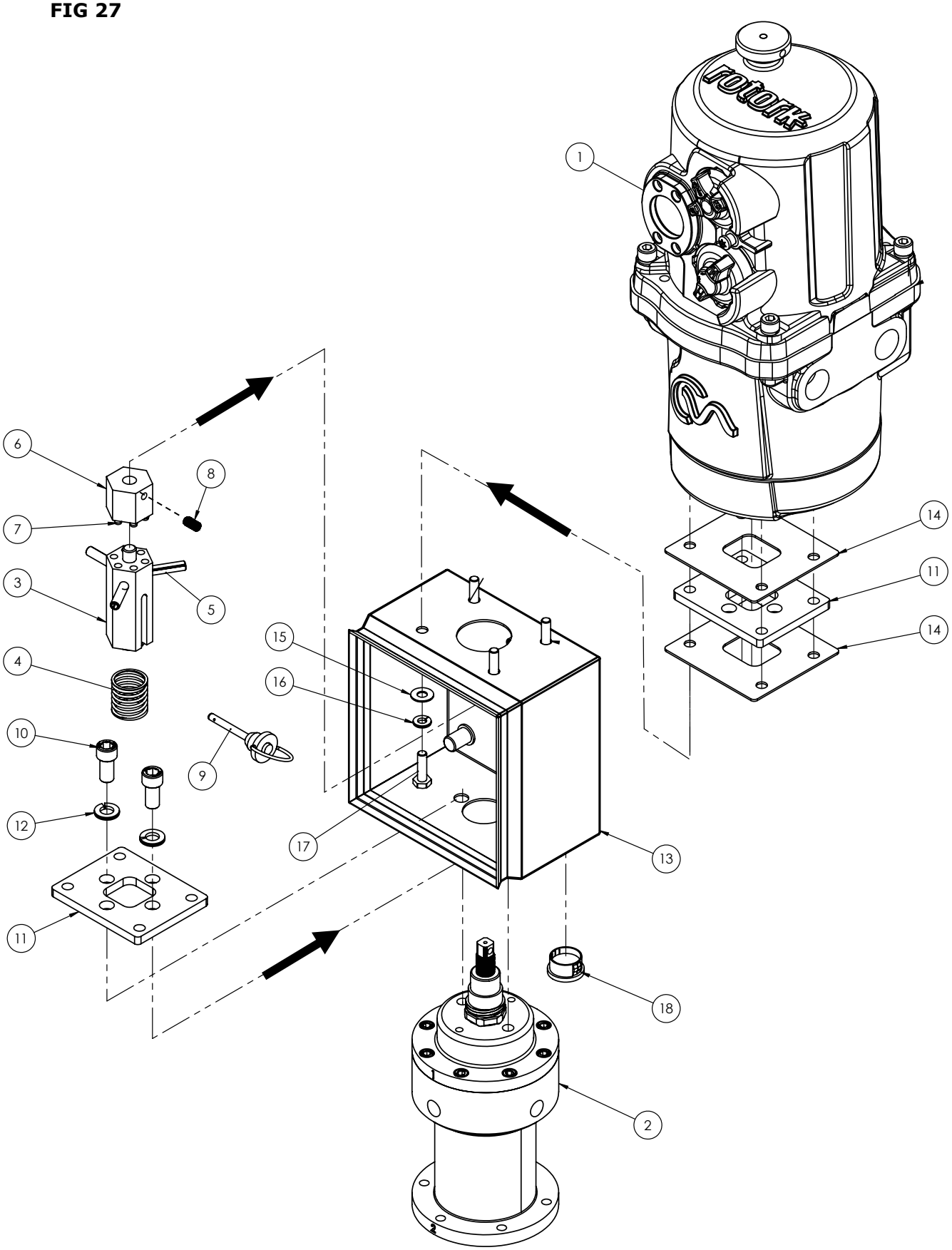
Parameter	Value
Compatible Devices	VPC Controllers, RP Pilots, Mooney Series 20, 20S, 20L Pilots
Voltage	24 VDC (Standard) / 120 VAC (Option)
Max Wattage	XX Watts
Input Signal	4-20 mA (Analogie) or ±24 VDC (Discret)
Motor Position Feedback	4-20 mA
Motor Speed	2.5 to 5.0 RPM w Interrupt Timer (Adjustable)
Rotation / Torque	90° To 20 Turns (Adjustable) / 80-200 in-lbs (Adjustable, Typ. Limited to 120 in-lbs Max)
Design Life Rating	20 million 1.0% Movements 75% Load / 5.0 million 10% Movements 100% Load
Display	LCD Display, Local Controls - Menu Driven Pushbutton
Mounting	Includes Mounting Hardware, Drive Interface / Enclosure
Temperature	-40° C to +65° C (-40° F to +149° F)
Body Materials	Aluminum Enclosure, RAL5010 (blue) Polyester Power Coat
21Electrical Rating	Ex Proof, Cl 1, Div 1, Groups C, D, E, F, G, CSA Approved (Standard)
	CE ATEX0011X FM ATEX0012X (EU Specification Option)
Manual Override	External Manual Knob, Menu Driven Pushbutton, De-clutchable Interface Manual Override
Limit Switches	Menu Configurable Position Limit Switches
Weight	10 kg (21.71 Lbs) (Motor + BOX) / 21kg (48.86 Lbs) (Motor + Interface)
Approx OAD	533 mm X 177 mm X 177 mm (Motor + BOX) / 950 mm X 304 mm X 177 mm (Motor + Interface) 21 in X 7 in X 7 in (Motor + BOX) / 37.375 in X 12 in X 7 in (Motor + Interface)
Ports	3/4" FNPT Electrical Conduit Entries – Qty 4 Total
Available Accessories	PRM Process Readout Module Dual Display. 4-20 mA Input Loop-Powered

7.2. **Main Components**

7.2.1. ESC CMR-200-VPC-CS-with Display-SS Box – SEE FIG 27

Item No	Qty	VRG Part Number	Description
1	1	BA-0334	ROTORK CMR-200 with DISPLAY
2	1	PA-0072	CLOSED CARTRIDGE ASSY FOR ESL
3	1	BR-0520	BOTTOM COUPLING
4	1	CS-0025	MOTOR SPRING # C0975-074-1500-S
5	3	FN-1049	1/4 x 1-1/2 ROLL PIN 18-8 SS; #92373A380
6	1	BR-0510	TOP COUPLING
7	6	FN-1000	3/16 x 1/2 Roll Pin 420 SS #92383A724
8	1	FN-0150	1/4-20 x 1/2 SS Alloy Self Lock; #91385A537
9	1	BA-0020	3/16 QUICK RELEASE PIN #92384A015
10	2	FN-0078	3/8-16 x 3/4 SHCS 18-8 SS; #92196A622
11	2	PD-1035	VPC ESM BOTTOM RING
12	2	FN-0520	3/8 ID Lock washer 18-8 SS; #92146A031
13	1	BR-0503-1	VPC CMR200 STD MNTG BOX-SS
14	2	GS-0010	GASKET-JORDAN SM1100
15	4	FN-0600	1/4 ID Flat washer 18-8 SS; #92141A029
16	4	FN-0500	1/4 ID Lock washer 18-8 SS; #92146A029
17	4	FN-0695	1/4-20 x 7/8 HHCS 316 SS #93190A541
18	1	FP-0045	7/8 DIA Plastic Flat Vent

FIG 27



8. Asssembly

STEP 1 - installation of Electronic Setpoint Control (ESC) Rotork CMR-200 Motor on any VRG VPC-700-SA-BV-ID – SEE FIG 28

Item No	Qty	VRG Part Number	Description
2	1	PA-0072	CLOSED CARTRIDGE ASSY FOR ESL
10	2	FN-0078	3/8-16 x 3/4 SHCS 18-8 SS; #92196A622
11	2	PD-1035	VPC ESM BOTTOM RING
12	2	FN-0520	3/8 ID Lock washer 18-8 SS; #92146A031
13	1	BR-0503-1	VPC CMR200 STD MNTG BOX-SS
18	1	FP-0045	7/8 DIA Plastic Flat Vent

1. Initial Preparation:

a. Confirm that all parts are available as outlined in the Bill of Materials on VRG Drawing PA-0508-1. See Annex 2 (PAGE 81) for Drawing PA-0508-1

b. Position the ROTORK CMR-200 MOTOR (1) to half travel / 50% Position prior to mounting VPC Valve Pilot Controller or RP Regulator Pilot.

c. Perform appropriate Initial Adjustment Procedures on the intended VPC Valve Pilot Controller / RP Regulator Pilot prior to mounting CMR Motor. when you start you have to put the VPC at 50% of its range. For Gasunie it's between 25 and 41bar. So Set VPC at setting 33barg. Than you have to travel the CMR to also 50% of its range. When at setting, disconnect Power supply and mA control signal

2. Mounting Box

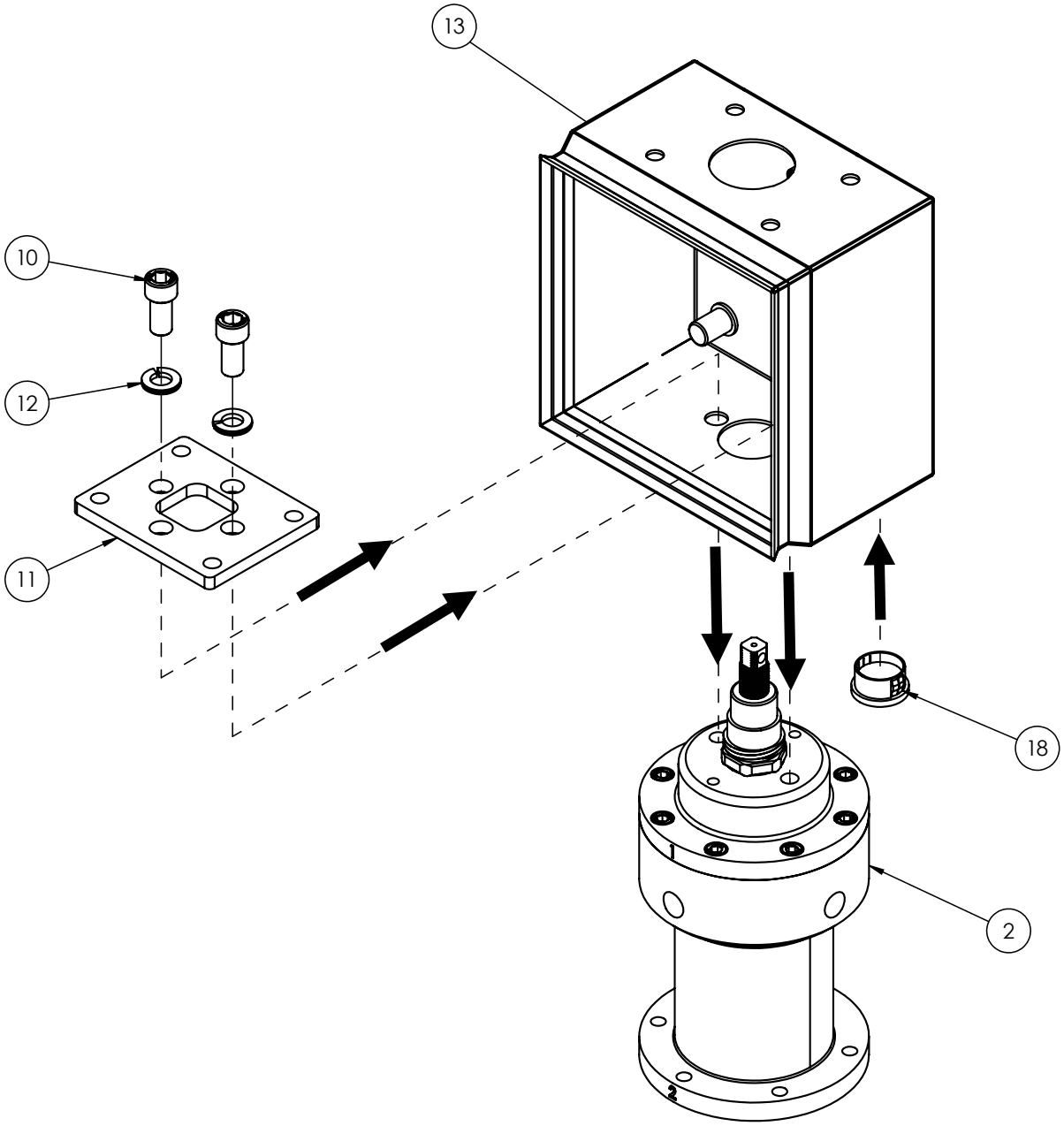
a. Place the VPC ESC BOTTOM RING (11) in the bottom of the VPC CMR-200 STD MOUNTING BOX (13).

b. Lower the VPC CMR-200 STD MOUNTING BOX (13) on to the VPC/RP top cartridge over the VPC/RP Setpoint Adjustment Screw

c. Align with the bolt holes. Insert two 3/8-16 × 3/4 SHCS (10) with 3/8” lock washers (12) through the VPC ESC BOTTOM RING (11) and VPC CMR-200 MOUNTING BOX (13) and tighten evenly to XX in-lbs / XX Nm.

d. install 7/8 DIA PLASTIC FLAT VENT (18) into bottom of VPC CMR200 STD MNTG BOX-SS (13) port on the box wall to allow enclosure breathing during operation.

FIG 28



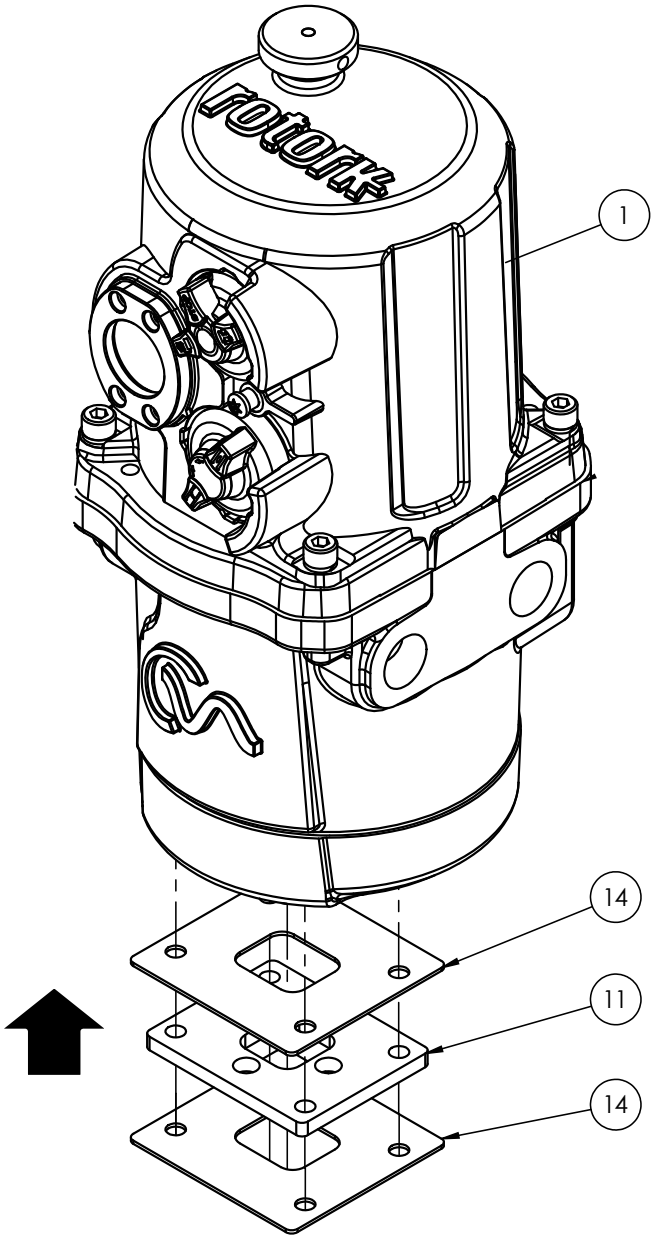
STEP 2 - CMR Preparation – SEE FIG 29 AND FIG 30

Item No	Qty	VRG Part Number	Description
1	1	BA-0334	ROTORK CMR-200 with DISPLAY
6	1	BR-0510	TOP COUPLING
8	1	FN-0150	1/4-20 x 1/2 SS Alloy Self Lock; #91385A537
11	2	PD-1035	VPC ESM BOTTOM RING
14	2	GS-0010	GASKET-JORDAN SM1100

a. Place the GASKET-JORDAN SM1100 gaskets (14) in tandem with the VPC ESM BOTTOM RING (11) on the bottom surface of the ROTORK CMR-200 Motor (1).

b. Insert the TOP COUPLING (6) on the drive shaft of the ROTORK CMR-200 (1). Align TOP COUPLING (6) setscrew hole with flat portion of drive shaft and secure using ¼-20X1/2 SSS Socket Head Setscrew (8) tightening to XX in-lbs / XX Nm, as shown in FIG 4.

FIG 29



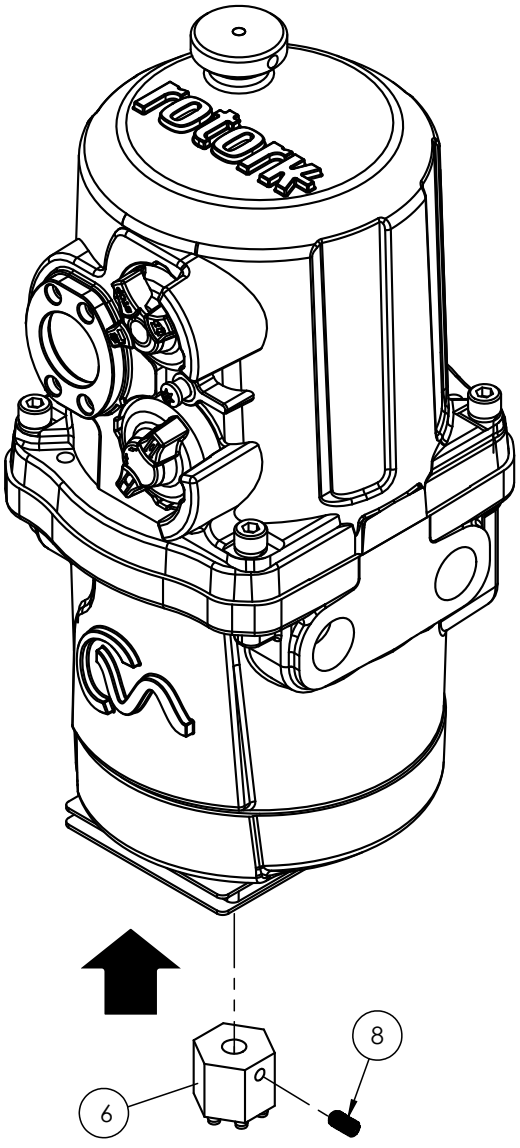


FIG 30

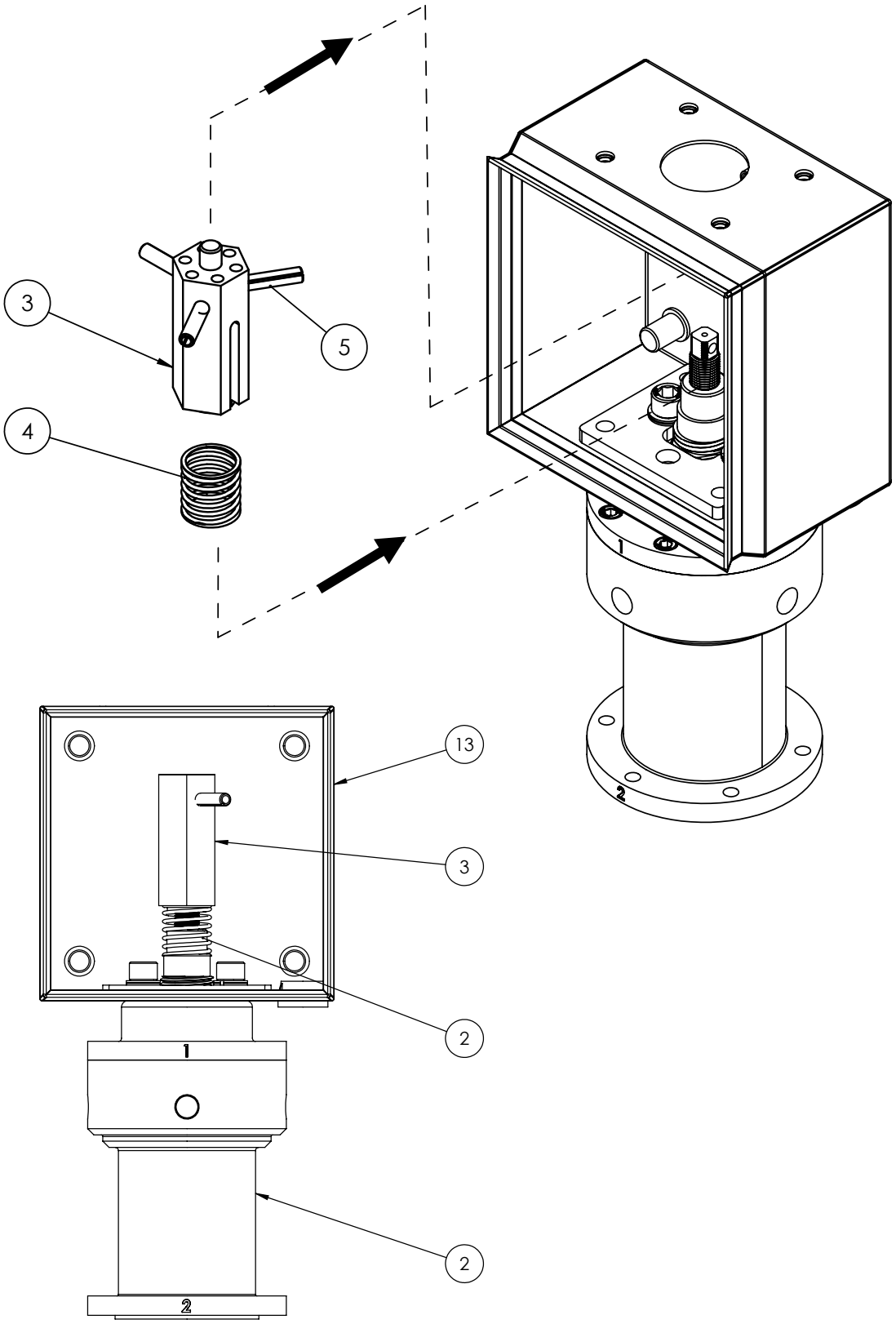
STEP 4 - Install Drive Assembly on VPC-700-SA-BV-ID– SEE FIG 31

Item No	Qty	VRG Part Number	Description
2	1	PA-0072	CLOSED CARTRIDGE ASSY FOR ESL
3	1	BR-0520	BOTTOM COUPLING
4	1	CS-0025	MOTOR SPRING # C0975-074-1500-S
5	3	FN-1049	1/4 x 1-1/2 ROLL PIN 18-8 SS; #92373A380
13	1	BR-0503-1	VPC CMR200 STD MNTG BOX-SS

a. Place the MOTOR SPRING (4) and BOTTOM COUPLING (3) over the VPC/RP Setpoint Adjustment Screw, keeping the coupling stack centered.

b. Ensure the entire coupling assembly and the MOTOR SPRING (4) sits squarely and is not cocked.

FIG 31



STEP 5 - Install CMR Motor onto Drive Assembly on VPC/RP– SEE FIG 32

Item No	Qty	VRG Part Number	Description
1	1	BA-0334	ROTORK CMR-200 with DISPLAY
15	4	FN-0600	1/4 ID Flat washer 18-8 SS; #92141A029
16	4	FN-0500	1/4 ID Lock washer 18-8 SS; #92146A029
17	4	FN-0695	1/4-20 x 7/8 HHCS 316 SS #93190A541
3	1	BR-0520	BOTTOM COUPLING
6	1	BR-0510	TOP COUPLING
9	1	BA-0020	3/16 QUICK RELEASE PIN #92384A015
11	2	PD-1035	VPC ESM BOTTOM RING
14	2	GS-0010	GASKET-JORDAN SM1100

a. Place the ROTORK CMR-200 Motor (1) with GASKET-JORDAN SM1100 gaskets (14) in tandem with the VPC ESM BOTTOM RING (11) and TOP COUPLING (6) on the top surface of the VPC CMR200 STD MNTG BOX-SS (13) and align with the bolt holes.

b. Install hardware including ¼ ID Lock Washer (16), ¼ ID Flat Washer (15), and ¼-20 X 7/8 HHCS(17). Tighten all four bolts in a cross pattern to XX in-lbs / XX Nm, ensuring the gasket is uniformly compressed and the ring is fully seated.

c. Adjust BOTTOM COUPLING (3) until it the slot aligns with the through hole of the VPC / RP Setpoint Adjustment Screw Drive Hole.

d. Install the QUICK RELEASE PIN (9) at the designated location to enable manual disengagement as designed. Confirm the QUICK RELEASE PIN (9) is appropriately engaged to avoid interference with inside surfaces.

e. The BOTTOM COUPLING (3) and the TOP COUPLING (6) should NOT be engaged with each other at this point.

f. The TOP COUPLING (6) and BOTTOM COUPLING (3) should be full engaged and rotate freely.

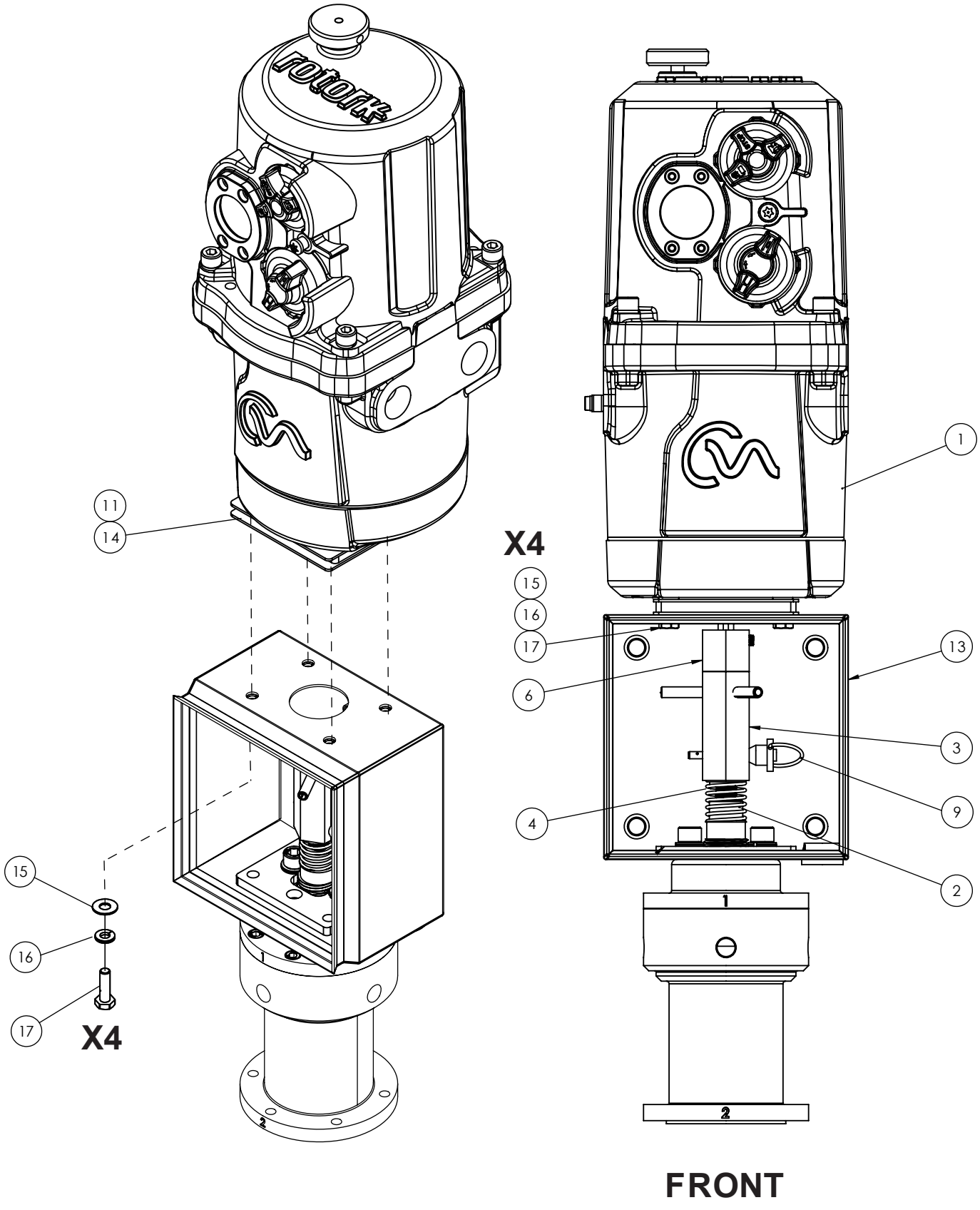
3. Final Checks and Testing

a. Perform verification of alignment, motion, and sealing, then finalize installation.

b. Conduct a gentle manual rotation or jog to confirm smooth coupling motion, no interference, and correct spring preload action. Re-check all fasteners for even seating.

c. Proceed to CMR-200 Adjustment Procedure.

FIG 32



9. Adjustment - CMR-200 Motor — Initial Adjustment Procedure

Description: This procedure outlines procedure for Initial setup Electronic Setpoint Control (ESC) Rotork CMR-200 Motor on any VRG Controls' VPC Valve Pilot Controller or RP Series Regulator Pilot. Refer to Rotork - CMA Range Quick Start Guide, Rotork - CMA Range Motor - IOM for additional information.

Connect Wiring – Reference Rotork Drawing No. A M10-DO SHT 1 OF 2:

Connection	Input/Output	Location	Terminal
POWER	+24 VDC	SK1 – LOWER LEFT POWER SUPPLY BOARD	+
POWER	-24 VDC	SK1 – LOWER LEFT POWER SUPPLY BOARD	-
COMMAND	+ 4-20 MA (Powered)	UPPER RIGHT MAIN PCB BOARD	COMMAND INPUT +
COMMAND	- 4-20 MA (Powered)	UPPER RIGHT MAIN PCB BOARD	COMMAND INPUT 1
FEEDBACK (OPTIONAL)	+ 4-20 MA (Powered)	UPPER RIGHT MAIN PCB BOARD	CPT OUTPUT +VEI
FEEDBACK (OPTIONAL)	- 4-20 MA (Powered)	UPPER RIGHT MAIN PCB BOARD	CPT OUTPUT -VEI

CLOSE LIMIT / 4.0 MA / LOW SETPOINT / CCW ROTATION
OPEN LIMIT / 20 mA / HIGH SETPOINT / CW ROTATION

1) **ADD POWER / SUPPLY**
   a) Add 24 VDC Power
   b) Connect Pneumatic Sense pressure with position gage
   c) Connect Pneumatic supply pressure with position gage
   d) Connect 4 – 20mA signal
   e) Once power is connected press Enter to check if meter is set to 50%. Press (X) Cancel to exit

2) **Motor and Control Configuration**
   a) POSIT Menu.
   b) Press the Down Arrow (↓) to navigate to LOC REM.
   c) Press Enter once to select it.
   d) Press Enter again to enter edit mode. This allows adjustment or toggling of the Local/Remote mode setting.
   e) Once in edit mode, press the Down Arrow (↓) to navigate to LR LOC (Local/Remote setting value).
   f) Press Enter once to confirm the selection.
   g) Press Enter again to save the setting.
   h) Press (X) Cancel twice to exit editing when finished

3) **SET MOTOR SPEED**

a) From the Main Menu, navigate to POSIT.
b) Press the Down Arrow (↓) to highlight ADVANCE.
c) Press Enter to open the ADVANCE menu.
d) Press the Down Arrow (↓) again to move to SPEED.
e) Press Enter once to select SPEED.
f) Press Enter again to enter edit mode.
g) Use the Down Arrow (↓) to highlight the desired speed value to (GU setting: 50%).
h) Press Enter to save the new speed setting.
i) If you wish to exit without saving, press (X) Cancel.

4) **CHECK TURN**

a) From POSIT, navigate to TURNS.
b) Press the Down Arrow (↓) to highlight ADVANCE.
c) Press Enter to open the ADVANCE menu.
d) Press the Down Arrow (↓) again to move to TURNS.
e) Press Enter once to select the TURNS menu.
f) Press Enter again to confirm or save the current value.
g) Verify that the Turn setting is set to "2."
h) If the value is not "2," adjust the setting to "2."
i) Press Enter to save the new setting

5) **SET TORQUE – Close Direction (TORQ C)**

a) From the POSIT, navigate to TORQ C.
b) Press Enter once to select TORQ C.
c) Press Enter again to enter edit mode.
d) Use the Up (↑) or Down (↓) arrow buttons to adjust the torque to (GU Setting 60%).
e) Press Enter to save the new setting.
f) Press (X) Cancel to exit.

6) **SET TORQUE – Open Direction (TORQ O)**

a) From the POSIT, navigate to TORQ O.
b) Press Enter once to select TORQ O.
c) Press Enter again to enter edit mode.
d) Press the Down Arrow (↓) until the torque value reads GU Setting 60%.
e) Press Enter to save the new setting.

f) Press (X) Cancel to exit.

7) **SET DBAND**

a) From the POSIT, navigate to DBAND.

b) Press Enter once to select DBAND.

c) Press Enter again to enter edit mode.

d) Press the Down Arrow (↓) until the value reads 0.2%.

e) Press Enter to save the new setting.

f) Press (X) Cancel to exit.

8) **Calibrate Limit behaviors and Functional Settings**

a) Access the Advance Menu

b) From POSIT, navigate to ADVANCE. then press Enter.

c) Press the Down Arrow (↓) to highlight INTTIM, then press Enter. Until it shows CL TIE

9) **ST CLS (Start Close)**

a) Press the Down Arrow (↓) to highlight ST CLS, then press Enter

b) Press Enter twice to enter edit mode.

c) Use the Down Arrow (↓) to set the value to (GU setting: 100%).

d) Press Enter to save.

e) Press (X) Cancel to exit.

10) **SP CLS (Stop Close)**

a) From ST CLS, press the Down Arrow (↓) to move to SP CLS.

b) Press Enter twice to enter edit mode.

c) Use the Down Arrow (↓) to set the value to (GU setting: 100%).

d) Press Enter to save.

e) Press (X) Cancel to exit.

11) **ST OPN (Start Open)**

a) From SP CLS, press the Down Arrow (↓) to reach ST OPN.

b) Press Enter twice to enter edit mode.

c) Use the Down Arrow (↓) to set the value to (GU setting: 0%).

d) Press Enter to save.

e) Press (X) Cancel to exit.

12) **SP OPN (Stop Open)**

a) From ST OPN, press the Down Arrow (↓) to select SP OPN.
b) Press Enter twice to enter edit mode.
c) Use the Down Arrow (↓) to set the value to (GU setting: 0%).
d) Press Enter to save.
e) Press (X) Cancel to exit.

Configure Close/Open On & Off Settings

13) **CL ON (Close On)**

a) From SP OPN, press the Down Arrow (↓) to select CL ON.
b) Press Enter twice to enter edit mode.
c) Use the Down Arrow (↓) to set the value to (GU setting: 0.1%).
d) Press Enter to save.
e) Press (X) Cancel to exit.

14) **OP ON (Open On)**

a) From CL ON, press the Down Arrow (↓) to reach OP ON.
b) Press Enter twice to enter edit mode.
c) Use the Down Arrow (↓) to set the value to (GU setting: 0.1%).
d) Press Enter to save.
e) Press (X) Cancel to exit.

15) **CL OFF (Close Off)**

a) From OP ON, press the Down Arrow (↓) to reach CL OFF.
b) Press Enter twice to enter edit mode.
c) Use the Up Arrow (↑) to set the value to (GU setting: 0.3%).
d) Press Enter to save.
e) Press (X) Cancel to exit

16) **OP OFF (Open Off)**

a) From CL OFF, press the Down Arrow (↓) to reach OP OFF.
b) Press Enter twice to enter edit mode.
c) Use the Up Arrow (↑) to set the value to (GU setting: 0.3%).
d) Press Enter to save.
e) Press (X) Cancel to exit.

17) **Set Lost Action LOS LO**

a) From the Main Menu, Press (X) Cancel until POSIT is displayed.
b) Press the Down Arrow (↓) to highlight ADVANCE, then press Enter.
c) Continue down to CTRCFG, then press Enter.
d) Navigate to LOS LO, then press Enter.
e) Confirm that LL 3.6 is displayed.
f) Press Enter twice to save.
g) Press (X) Cancel to exit.

18) **Set Lost Action LOS ACT**

a) Press the Down Arrow (↓) to highlight LOS ACT, then press Enter.
b) Continue down to LA SPT
c) Press Enter twice to save.
d) Press (X) Cancel to exit.

19) **Configure Command and RC Settings**

a) Return to the ADVANCE menu by Press (X) Cancel.
b) Press the Down Arrow (↓) down to CMDRC, then press Enter.
c) Continue down to RICTL, then press Enter twice to enter edit mode.
d) Scroll down to RC DIO.
e) Press Enter twice to save.
f) Press (X) Cancel to exit back to ADVANCE.

20) **Switch to Remote Mode**

a) From the Main Menu, enter REMOTE MODE.
b) Navigate to POSIT, then press the Down Arrow (↓) to highlight LOC REM.
c) Press Enter twice to enter edit mode.
d) Scroll down to LR REM.
e) Press Enter twice to save.
f) Press (X) Cancel to return to POSIT.
g) Press (X) Cancel again to display the number screen.

21) **Testing and Verification for RIRO CARD**

a) Connect all corresponding wires to the RIRO card according to the approved wiring diagram.

b) Ensure that all wiring connections are secure and properly matched to the terminal designations.

c) Set Initial Conditions

d) Confirm that the display shows a starting value of 50 before beginning the test.

e) Test OPEN (UP) Function

f) Apply 24 volts to the OPEN (Increasing) input terminal.

g) Verify that the number on the display increases gradually and consistently.

h) This confirms proper functionality of the open circuit.

i) Test CLOSE (DOWN) Function

j) Apply 24 volts to the CLOSE (Decreasing) input terminal.

k) Confirm that the number on the display decreases.

l) This verifies correct operation of the close circuit.

m) Verify Communication Stability

n) Observe the display and signal behavior during both tests.

o) Ensure that communication remains stable with no interruptions or erratic responses.

p) Finalize and Record Results

q) When both open and close functions operate correctly, and communication is stable, mark the RIRO card as "OK TESTED."

r) Record the result on the test report for documentation.

22) **LOCAL MODE**

a) From the Main Menu, go to POS IT.

b) Press the Down Arrow (↓) to highlight LOC REM.

c) Press Enter twice to enter edit mode.

d) Press the Down Arrow (↓) to select LR LOC.

e) Press Enter twice to save the setting.

f) Press (X) Cancel to exit.

g) Continue pressing the Cancel button until POSIT is displayed on the screen

h) Return to the ADVANCE menu. Then press Enter.

i) Press the Down Arrow (↓) down to CMD RC, then press Enter.

j) Continue down to RICTL, then press Enter twice to enter edit mode.

k) Scroll down to RC POC.

l) Press Enter twice to save.

m) Press (X) Cancel to exit back to ADVANCE.

23) **SET UP High Set point 41.00 Bar/ 20 mA**

a) Establish High Setpoint. Write down Desired Setpoint Bar.

24) **REMOTE MODE**

a) From the Main Menu, go to POS IT.
b) Press the Down Arrow (↓) to highlight LOC REM.
c) Press Enter twice to enter edit mode.
d) Press the Down Arrow (↓) to move to LR REM.
e) Press Enter twice to save the setting.
f) Press (X) Cancel to exit.

25) **OPEN 20 mA → 41.00 bar**

a) Send a 20 mA signal to the CMR motor to verify response and signal calibration. Adjust the sense pressure to 41.00 bar and ensure it is correctly applied to the VPC pilot controller. Confirm that the system responds as expected under these conditions.

26) **LOCAL MODE**

a) From the Main Menu, go to POS IT.
b) Press the Down Arrow (↓) to highlight LOC REM.
c) Press Enter twice to enter edit mode.
d) Press the Down Arrow (↓) to select LR LOC.
e) Press Enter twice to save the setting.
f) Press (X) Cancel to exit.

27) **Setting SPAN (20 mA) Position**

a) From the Main Menu, navigate to POSIT.
b) Press the Down Arrow (↓) to highlight OPLIM.
c) Press Enter twice to enter edit mode.
d) Verify that the gauge reads 50%.
e) If the reading is above 50%, press the Up Arrow (↑) to rotate clockwise and decrease the percentage.
f) If the reading is below 50%, press the Down Arrow (↓) to rotate counterclockwise and increase the percentage.
g) Monitor the supply pressure closely and adjust as needed to maintain a stable reading.
h) Once the output remains steady at 50%, observe the exhaust port for a 10–30 second soap bubble to confirm proper sealing and operation.

i) When the output is stable and verified, press Enter to save the setting.

28) **SET UP Low Set point bar 25.00 / 4 mA**

a) Establish Low Setpoint. Write down Desired Setpoint Bar.

29) **REMOTE MODE**

a) From the Main Menu, go to POS IT.
b) Press the Down Arrow (↓) to highlight LOC REM.
c) Press Enter twice to enter edit mode.
d) Press the Down Arrow (↓) to move to LR REM.
e) Press Enter twice to save the setting.
f) Press (X) Cancel to exit.

30) **CLOSE 4 mA → supply 25.00 bar**

a) Send a 4mA signal to the CMR motor to verify response and signal calibration. Adjust the supply pressure to 25.00 bar and ensure it is correctly applied to the VPC pilot controller. Confirm that the system responds as expected under these conditions.

31) **LOCAL MODE**

a) From the Main Menu, go to POS IT.
b) Press the Down Arrow (↓) to highlight LOC REM.
c) Press Enter twice to enter edit mode.
d) Press the Down Arrow (↓) to select LR LOC.
e) Press Enter twice to save the setting.
f) Press (X) Cancel to exit.

32) **Setting OPEN (4mA) Position**

a) From the Main Menu, navigate to POSIT.
b) Press the Down Arrow (↓) to highlight CL LIM.
c) Press Enter twice to enter edit mode.
d) Verify that the gauge reads 50%.
e) If the reading is above 50%, press the Up Arrow (↑) to rotate clockwise and decrease the percentage.
f) If the reading is below 50%, press the Down Arrow (↓) to rotate counterclockwise and increase the percentage.
g) Monitor the supply pressure closely and adjust as needed to maintain a stable reading.

h) Once the output remains steady at 50%, observe the exhaust port for a 10–30 second soap bubble to confirm proper sealing and operation.

i) When the output is stable and verified, press Enter to save the setting.

j) Set **Remote Mode** From the Main Menu, go to POS IT.

k) Press the Down Arrow (↓) to highlight LOC REM.

l) Press Enter twice to enter edit mode.

m) Press the Down Arrow (↓) to move to LR REM.

n) Press Enter twice to save the setting.

o) Press (X) Cancel to exit.

33) **Send a 20 mA signal** to the CMR motor to verify response and signal calibration.

a) Observe for a **10–30 second soap bubble** on the exhaust to confirm proper sealing and operation.

b) Validate the remaining signal and pressure (bar) input-to-pressure mapping by applying the following:

34) **CLOSE 4 mA → Sense 25.00 bar**

a) Send a **4 mA** signal to the CMR motor to verify response and signal calibration.

b) Adjust the sense pressure to **25.00 bar** and ensure it is correctly applied to the VPC pilot controller.

c) Confirm that the system responds as expected under these conditions.

d) Observe for a **10–30 second soap bubble** on the exhaust to confirm proper sealing and operation.

35) **CLOSE 8 mA → Sense 29.00 bar**

a) Send an **8 mA** signal to the CMR motor to verify response and signal calibration.

b) Adjust the sense pressure to **29.00 bar** and ensure it is correctly applied to the VPC pilot controller.

c) Confirm that the system responds as expected under these conditions.

d) Observe for a **10–30 second soap bubble** on the exhaust to confirm proper sealing and operation.

36) **CLOSE 12 mA → Sense 33.00 bar**

a) Send a **12 mA** signal to the CMR motor to verify response and signal calibration.

b) Adjust the sense pressure to **33.00 bar** and ensure it is correctly applied to the VPC pilot controller.

c) Confirm that the system responds as expected under these conditions.

d) Observe for a **10–30 second soap bubble** on the exhaust to confirm proper sealing and operation.

37) **OPEN 16 mA → Sense 37.00 bar**

a) Send a **16 mA** signal to the CMR motor to verify response and signal calibration.

b) Adjust the sense pressure to **37.00 bar** and ensure it is correctly applied to the VPC pilot controller.

c) Confirm that the system responds as expected under these conditions.

d) Observe for a **10–30 second soap bubble** on the exhaust to confirm proper sealing and operation.

38) **OPEN 12 mA → Sense 33.00 bar**

a) Send a **12 mA** signal to the CMR motor to verify response and signal calibration.

b) Adjust the sense pressure to **33.00 bar** and ensure it is correctly applied to the VPC pilot controller.

c) Confirm that the system responds as expected under these conditions.

d) Observe for a **10–30 second soap bubble** on the exhaust to confirm proper sealing and operation.

39) **MANUAL OVERRIDE**

a) Test the Manual Override Switch

b) Activate the manual override switch and confirm that the actuator responds correctly in both open and close directions.

c) B. Local Mode Operation and Setpoint Adjustment

d) Return to POSIT Menu

e) Press the Cancel (X) button repeatedly until POSIT is displayed on the screen.

f) Connect to Display Board.

g) Plug the top connector of the CMR motor into the computer interface.

h) Switch to Local Mode - Turn the Mode knob counterclockwise (2 Clicks) to set LOCAL MODE.

i) Adjust the Setpoint - To increase the setpoint, turn the Set Point knob clockwise.

j) To decrease the setpoint, turn the Set Point knob counterclockwise.

k) Make fine adjustments as necessary until the desired value is reached.

l) After completing the adjustment, turn the Mode knob clockwise (2 Clicks) to return to REMOTE MODE.

m) Rotate the lock up to secure the mode setting.

40) **Ensure the Close/Open Time Interrupter is set to ON.**

a) From the Main Menu, navigate to **POSIT**.

b) Press the Down Arrow (↓) to highlight **ADVANCE**.

c) Press Enter to open the **ADVANCE** menu.

d) Press the Down Arrow (↓) again to move to **INTTIM**.

e) Press Enter twice to enter edit mode.

f) Press the Down Arrow (↓) to move to **CL TIE**.

g) Press the Down Arrow (↓) to move to **ON**

h) Press Enter twice to save the setting.

i) Press (X) Cancel to exit.

j) From the Main Menu, navigate to **POSIT**.

k) Press the Down Arrow (↓) to highlight **ADVANCE**.

l) Press Enter to open the **ADVANCE** menu.

m) Press the Down Arrow (↓) again to move to **INTTIM**.

n) Press Enter twice to enter edit mode.

o) Press the Down Arrow (↓) to move to **OP TIE**.

p) Press the Down Arrow (↓) to move to **ON**

q) Press Enter twice to save the setting.

r) Press (X) Cancel to exit.

41) **GASUNIE SETTINGS**

Parameter	Set Value
Motor speed	50%
Motor torque OP / CL	60/60%
ST CLS / SP CLS	100/100%
ST OPN / SP OPN	0/0%
CL ON / OP ON	0.1 / 0.1 sec
CL OFF / OP OFF	0.3 / 0.3 sec
Lost ACT	LA SPT
CL / OP Time Interrupter	ON

a) If the unit is to ship with a non-default bias, set the ship condition to **16 mA**.
b) From the Main Menu, navigate to **POS IT**.
c) Press the down arrow to highlight **LOC REM**.
d) Press **Enter** twice to enter edit mode.
e) Use the down arrow to move to **LR LOC**.
f) Press **Enter** twice to save the setting.
g) Press **(X) Cancel** to exit.
h) From the Main Menu, navigate to **POSIT**.
i) Press **Enter** and verify that **75%** is shown.
j) If **75%** is not shown, update the signal to **16 mA**.
k) Once **16 mA** is achieved, press **Enter**.
l) Press the down arrow to highlight **DEFLTS**.
m) Press **Enter**.
n) Press the down arrow to highlight **ST CUST**.
o) Press **Enter** twice to save the setting.
p) Press **Enter** three times until **STORED** appears.
q) Press **(X) Cancel** to exit.

r) **SET TO REMOTE**
s) From the Main Menu, navigate to **POSIT**.
t) Press the Down Arrow (↓) to highlight **LOC REM**.
u) Press **Enter** twice to enter edit mode.
v) Use the Down Arrow (↓) to move to **LR REM**.
w) Press **Enter** twice to save the setting.
x) Press **(X) Cancel** to exit.

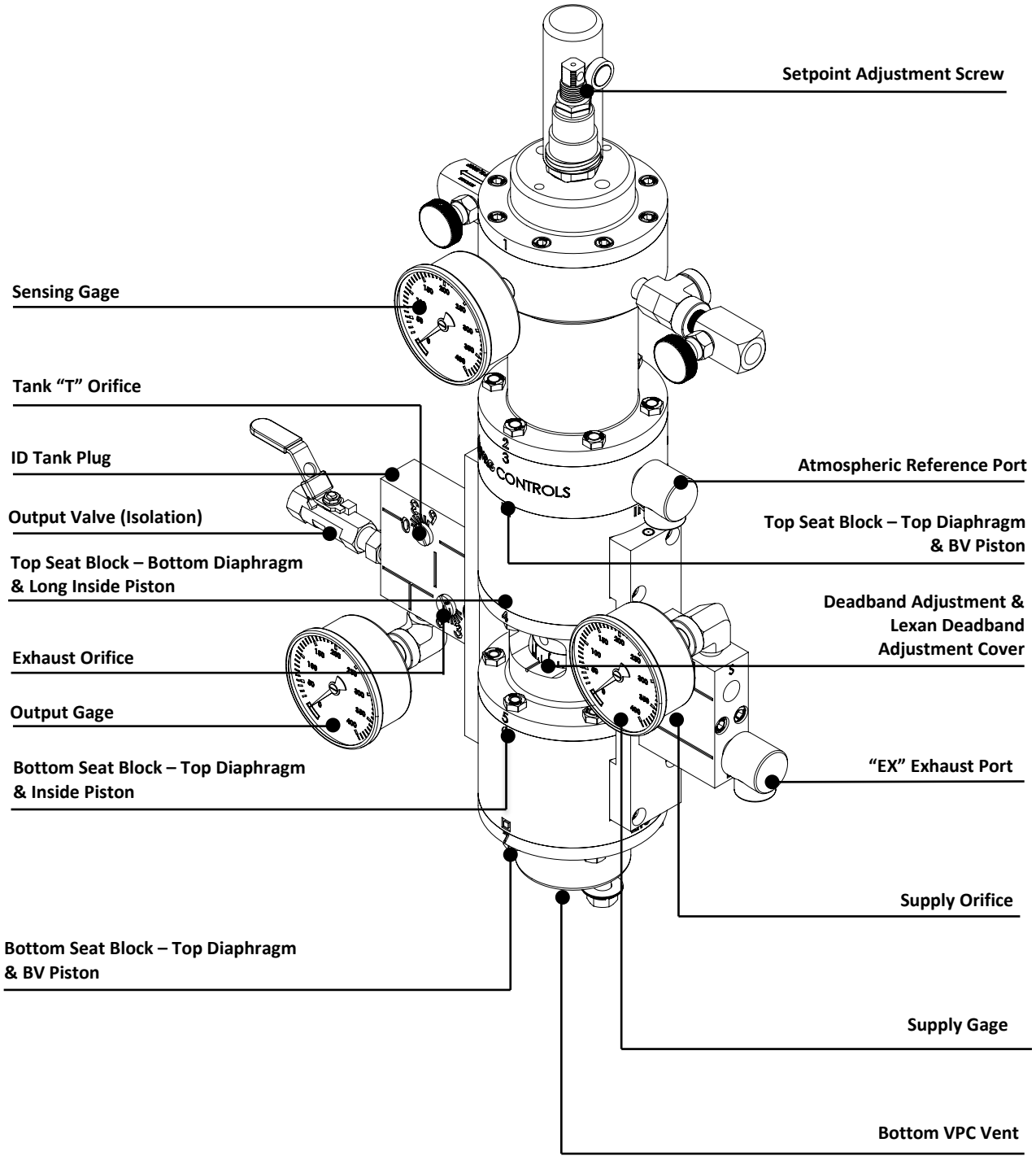
42) **HOW TO RESET TO VRG / GASUNIE SETTINGS**

a) From the Main Menu, navigate to **POSIT**.
b) Press the Down Arrow (↓) to highlight **DEFLTS**.
c) Press **Enter** twice to enter edit mode.
d) Use the Up Arrow (↑) to move to **LD CUS**.
e) Press **Enter** CONFRM.
f) Press **Enter** LOADED.
g) Press **(X) Cancel** to exit.

43) **HOW TO RESET TO ROTORK FACTORY SETTINGS**

a) From the Main Menu, navigate to **POSIT**.
b) Press the Down Arrow (↓) to highlight **DEFLTS**.
c) Press **Enter** twice to enter edit mode.
d) Use the Up Arrow (↑) to move to **LD FAC**.
e) Press **Enter** CONFIM.
f) Press **Enter** LOADED.
g) Press **(X) Cancel** to exit.

10.Troubleshooting



Jet Regulator will not close	
– Check Output Gage:	Verify Output Gage exhibits full output pressure equal to 100% Supply Gas Pressure
– Supply Gas Pressure:	Confirm adequate Supply Gas Pressure is available to fully close the Jet Regulator
– Supply Orifice Clogged:	Depressurize VPC-700-SA-BV-ID_DA and inspect Supply Orifice for obstruction
– Supply Gas System Restricted:	Confirm Supply Gas System regulator, filter, and valving are not restricted

Jet Regulator does not react quickly enough	
– Check Output Gage:	Verify Output Gage exhibits full output pressure equal to 100% Supply Gas Pressure
– Supply Gas Pressure:	Confirm adequate Supply Gas Pressure is available to fully close the Jet Regulator
– Supply Orifice Clogged:	Depressurize VPC-700-SA-BV-ID_DA and inspect Supply Orifice for obstruction
– Supply Gas System Restricted:	Confirm Supply Gas System regulator, filter, and valving are not restricted
– Deadband Adjustment:	Evaluate Deadband Adjustment per VPC-700-SA-BV-ID_DA Initial Adjustment Procedures
– Internal Friction:	Evaluate VPC-700-SA-BV-ID_DA for Internal Friction per Procedure XXXX Partially or fully reassemble/rebuild the VPC-700-SA-BV-ID_DA to correct.
– Increase Supply and/or Exhaust Adjustable Orifice Settings:	Increasing the Supply Adjustable Orifice Setting will increase closing speed. Increasing the Exhaust Adjustable Orifice Setting will increase opening speed.
– Increase Supply and/or Exhaust Adjustable Orifice Size	Increasing the Supply Adjustable Orifice Size will increase closing speed. Increasing the Exhaust Adjustable Orifice Size will increase opening speed.
– Possible Need to add ID Tank and Volume Booster (VB-150)	In some cases, with larger Jet Regulators with a large volume of Supply space, OR rapid response applications such as power plants, fuel gas feed, industrial loads, and interstage (1st cut) pressure control, high volume output is required from the VPC-700-SA-BV-ID _DA. In these cases, it may be necessary to add an "ID Tank" and a VB-150 Volume Booster or equal on the VPC-700-SA-BV-ID_DA output. Adjust the "ID" Orifice to optimize performance after adding new components.

Jet Regulator Cycling Excessively	
– Adjust Deadband:	Increase deadband slightly by rotating adjustment to the LEFT
– Check Output Gage:	Verify full output pressure equals 100% Supply Gas Pressure
– Supply Gas Pressure:	Confirm adequate Supply Gas Pressure
– Supply Orifice Clogged:	Depressurize and inspect Supply Orifice
– Supply Gas System Restricted:	Confirm regulator, filter, and valving are not restricted
– Deadband Adjustment:	Minor deadband changes may improve performance
– Internal Friction:	Evaluate and rebuild as necessary
– Adjust Supply and/or Exhaust Adjustable Orifice Settings	Adjusting the Supply Adjustable Orifice Setting will affect closing speed. Adjusting the Exhaust Adjustable Orifice Setting will affect opening speed.
– Change Supply and/or Exhaust Adjustable Orifice Size	Changing the Supply Adjustable Orifice Size will impact closing speed. Changing the Exhaust Adjustable Orifice Size will impact opening speed.
– Add ID Tank if application is challenging	In some cases, challenging applications may benefit from adding an "ID Tank" and adjusting the "ID" Orifice to optimize performance.
– Add ID Tank and VB-150 for high volume or rapid response applications	In some cases, with larger Jet Regulators with a large volume of Supply space, OR rapid response applications such as power plants, fuel gas feed, industrial loads, and interstage (1st cut) pressure control, high volume output is required from the VPC-700-SA-BV-ID _DA. In these cases, it may be necessary to add an "ID Tank" and a VB-150 Volume Booster or equal on the VPC-700-SA-BV-ID_DA output. Adjust the "ID" Orifice to optimize performance after adding new components.

VPC-700-SA-BV-ID_DA Venting from Atmospheric Reference Port:	
– Ruptured Sensing Diaphragm causing continual venting	A ruptured sensing diaphragm will result in poor control and continual venting from the Atmospheric Reference Port. To confirm a ruptured sensing diaphragm, isolate the process control and depressurize the Supply Gas Pressure. If venting continues from the Atmospheric Reference Port, the Sensing Diaphragm is likely affected.
– Ruptured Top Seat Block Top Diaphragm	A ruptured Top Seat Block Top diaphragm will result in poor control and continual venting from the Atmospheric Reference Port. To confirm a ruptured Top Seat Block Top diaphragm, isolate the process control and depressurize the Supply Gas Pressure. If venting stops from the Atmospheric Reference Port, the Top Seat Block Top diaphragm is likely affected.
– Damaged O-Ring on Sensing Piston	A damaged O-Ring on the Sensing Piston will result in poor control and continual venting from the Atmospheric Reference Port. To confirm a damaged O-ring on the Sensing Piston, isolate the process control and depressurize the Supply Gas Pressure. If venting continues from the Atmospheric Reference Port the O-Ring on the Sensing Piston is likely affected.
– Damaged O-Ring on Top Seat Block BV Piston	A damaged O-Ring on Top Seat Block BV Piston will result in poor control and continual venting from the Atmospheric Reference Port. To confirm the damaged O-Ring on the Top Seat Block BV Piston, isolate the process control and depressurize the Supply Gas Pressure. If venting stops from the Atmospheric Reference Port, the O-Ring on the Top Seat Block BV Piston is likely affected.
– Inadequate Nut Torque on Clamping Washers Sensing Diaphragm	Inadequate Nut Torque on Clamping Washers Sensing Diaphragm will result in poor control and continual venting from the Atmospheric Reference Port. To confirm Inadequate Nut Torque on Clamping Washers Sensing Diaphragm, isolate the process control and depressurize the Supply Gas Pressure. If venting continues from the Atmospheric Reference Port, the Nut Torque on Clamping Washers Sensing Diaphragm is likely affected.
– Inadequate Nut Torque on Clamping Washers Top Seat Block Top Diaphragm	Inadequate Nut Torque on Clamping Washers Top Seat Block Top Diaphragm will result in poor control and continual venting from the Atmospheric Reference Port. To confirm Inadequate Nut Torque on Top Seat Block Top Diaphragm, isolate the process control and depressurize the Supply Gas Pressure. If venting stops from the Atmospheric Reference Port, the Nut Torque on the Top Seat Block Top Diaphragm is likely affected.

VPC-700-SA-BV-ID_DA Venting from Bottom Vent Port:	
– Ruptured Bottom Seat Block Bottom Diaphragm	A ruptured Bottom Seat Block Bottom Diaphragm will result in poor control and continual venting from the Bottom Vent Port. To confirm a ruptured Bottom Seat Block Bottom Diaphragm, isolate the process control and depressurize the Supply Gas Pressure. If venting stops from the Bottom Vent Port, the Bottom Seat Block Bottom Diaphragm is likely affected.
– Damaged O-Ring on Bottom Seat Block Bottom Piston	A damaged O-Ring on Bottom Seat Block Bottom Piston will result in poor control and continual venting from the Bottom Vent Port. To confirm the damaged O-Ring on the Top Seat Block BV Piston, isolate the process control and depressurize the Supply Gas Pressure. If venting stops from the Bottom Vent Port, the O-Ring on the Top Seat Block BV Piston is likely affected.
– Inadequate Nut Torque on Clamping Washers Bottom Seat Block BV Piston	Inadequate Nut Torque on Clamping Washers Bottom Seat Block BV Piston will result in poor control and continual venting from the Bottom Vent Port. To confirm Inadequate Nut Torque on Bottom Seat Block BV Piston, isolate the process control and depressurize the Supply Gas Pressure. If venting stops from the Bottom Vent Port, the Nut Torque on the Bottom Seat Block BV Piston is likely affected.

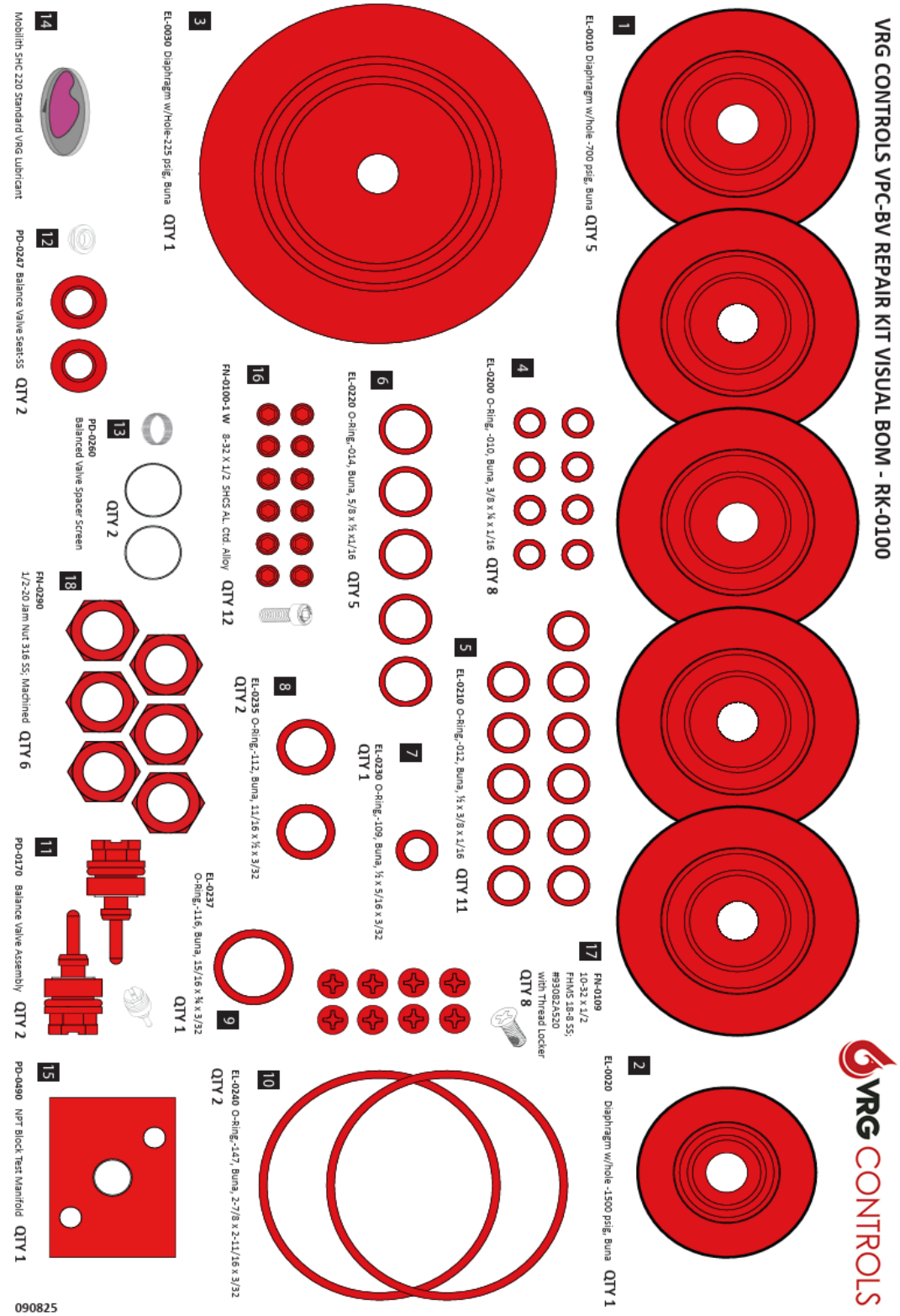
VPC-700-SA-BV-ID_DA Venting from Lexan Deadband Adjustment Cover	
– Ruptured Top Seat Block Bottom Diaphragm	A ruptured Top Seat Block Bottom Diaphragm will result in poor control and continual venting from the Lexan Deadband Adjustment Cover. To confirm a ruptured Top Seat Block Bottom Diaphragm, isolate the process control and depressurize the Supply Gas Pressure. If venting from the Lexan Deadband Adjustment Cover stops, the Top Seat Block Bottom Diaphragm is likely affected.
– Damaged O-Ring on Top Seat Block Long Inside Piston	A damaged O-Ring on Top Seat Block Long Inside Piston will result in poor control and continual venting from the Lexan Deadband Adjustment Cover. To confirm the damaged O-Ring on the Top Seat Block Long Inside Piston, isolate the process control and depressurize the Supply Gas Pressure. If venting stops from the Lexan Deadband Adjustment Cover, the O-Ring on the Top Seat Block Long Inside Piston is likely affected.
– Inadequate Nut Torque on Top Seat Block Long Inside Piston	Inadequate Nut Torque on Top Seat Block Long Inside Piston will result in poor control and continual venting from the Lexan Deadband Adjustment Cover. To confirm Inadequate Nut Torque on Top Seat Block Long Inside Piston, isolate the process control and depressurize the Supply Gas Pressure. If venting from the Lexan Deadband Adjustment Cover stops, the Inadequate Nut Torque on the Top Seat Block Long Inside Piston is likely affected.
– Ruptured Bottom Seat Block Top Diaphragm	A Ruptured Bottom Seat Block Top Diaphragm will result in poor control and continual venting from the Lexan Deadband Adjustment Cover. To confirm a Ruptured Bottom Seat Block Top Diaphragm, isolate the process control and depressurize the Supply Gas Pressure. If venting stops from the Lexan Deadband Adjustment Cover, the Ruptured Bottom Seat Block Top Diaphragm is likely affected.
– Damaged O-Ring on Bottom Seat Block Inside Piston	A damaged O-Ring on Bottom Seat Block Inside Piston will result in poor control and continual venting from the Lexan Deadband Adjustment Cover. To confirm the damaged O-Ring on the Bottom Seat Block Inside Piston, isolate the process control and depressurize the Supply Gas Pressure. If venting stops from the Lexan Deadband Adjustment Cover, the O-Ring on the Top Seat Block Long Inside Piston is likely affected.
– Inadequate Nut Torque on Clamping Washers Bottom Seat Block Inside Piston	Inadequate Nut Torque on Clamping Washers on Bottom Seat Block Inside Piston will result in poor control and continual venting from the Lexan Deadband Adjustment Cover. To confirm Inadequate Nut Torque on Clamping Washers on Bottom Seat Block Inside Piston, isolate the process control and depressurize the Supply Gas Pressure. If venting stops from the Lexan Deadband Adjustment Cover, the Inadequate Nut Torque on Clamping Washers on Bottom Seat Block Inside Piston is likely affected.

VPC-700-SA-BV-ID_DA Venting Continuously from EX Port:	
– Negative Deadband Applied	Evaluate Deadband Adjustment to confirm appropriate setting per VPC-700-SA-BV-ID_DA Initial Adjustment Procedures. If a negative deadband has been applied, the VPC-700-SA-BV-ID_DA will not be capable of achieving zero steady-state emissions.
– Output BV Balanced Valve Failed	To test the integrity of the Output BV Balanced Valve, isolate the VPC-700-SA-BV-ID_DA from active process control while maintaining normal supply gas pressure. Decrease the Sensing Pressure "false signal" at least 5.0% below the setpoint. The Output Gage should drop and remain at ZERO. No gas should be emitted from the EX exhaust port.
– Exhaust BV Balanced Valve Failed or Debris	To test the integrity of the Exhaust BV Balanced Valve, isolate the VPC-700-SA-BV-ID_DA from active process control while maintaining normal supply gas pressure. Increase the Sensing Pressure "false signal" at least 5.0% above the setpoint. The Output Gage should increase to full Supply Gas pressure. No gas should be emitted from the EX exhaust port.
– Internal Friction	Evaluate VPC-700-SA-BV-ID_DA for Internal Friction per Procedure XXXX. Partially or fully reassemble/rebuild the VPC-700-SA-BV-ID_DA to correct.

VPC-700-SA-BV-ID_DA Not Responsive	
– Excessive Deadband	Evaluate Deadband Adjustment to confirm appropriate setting per VPC-700-SA-BV-ID_DA Initial Adjustment Procedures. Excessive deadband may result in a lack of response of VPC-700-SA-BV-ID _DA. Decrease deadband by turning the deadband adjustment drum to the right (decreasing numbers) very slightly while in control to achieve better response. Any deadband adjustment will affect the setpoint of the VPC-700-SA-BV-ID _DA. Alternatively, the VPC-700-SA-BV-ID_DA can be isolated from the process, and Initial Adjustment Procedures may be performed to establish confirmation of appropriate deadband adjustment.
– Internal Friction	Evaluate VPC-700-SA-BV-ID_DA for Internal Friction per Procedure XXXX. Partially or fully reassemble/rebuild the VPC-700-SA-BV-ID_DA to correct.

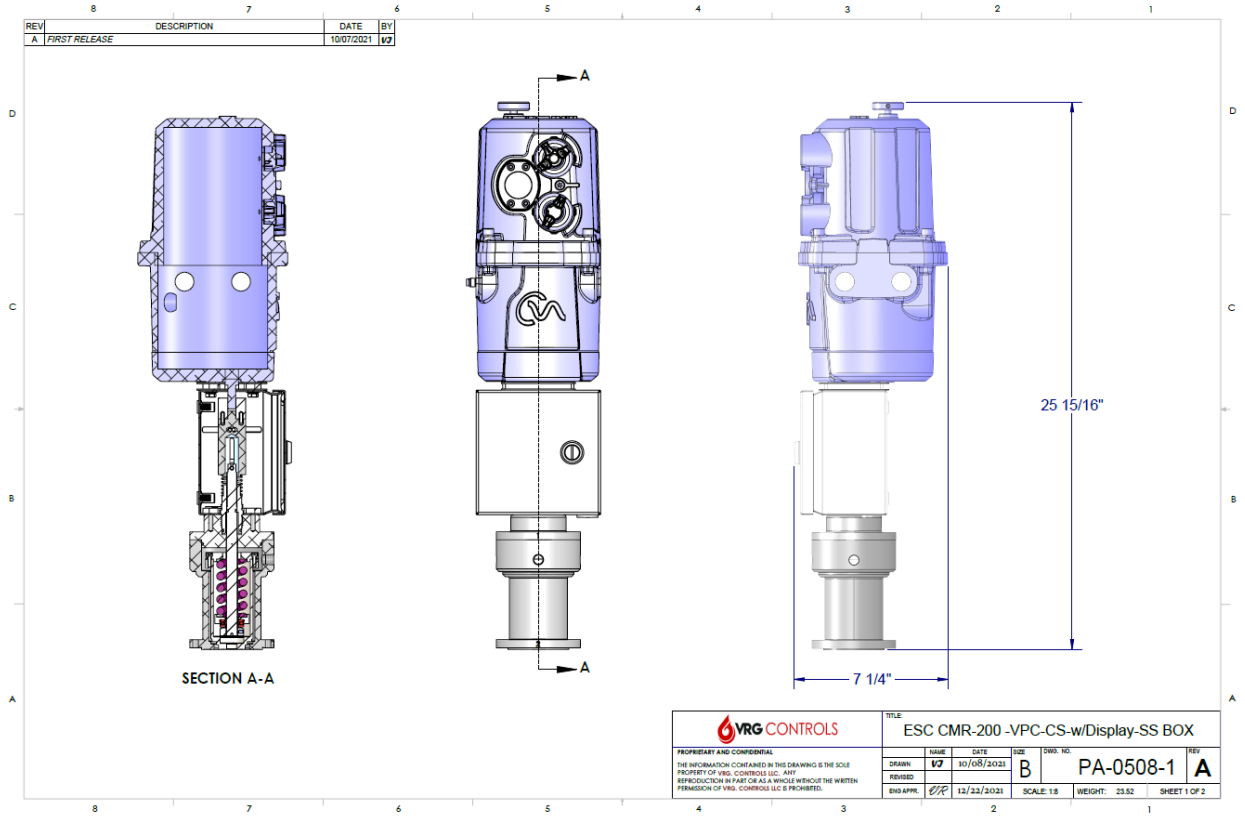
VPC-700-SA-BV-ID_DA Control Not Within Accuracy Band	
– Check Output Gage	Verify Output Gage exhibits full output pressure equal to 100% Supply Gas Pressure
– Supply Gas Pressure	Confirm adequate Supply Gas Pressure is available to fully close the Jet Regulator.
– Supply Orifice Clogged	Depressurize VPC-700-SA-BV-ID_DA and inspect Supply Orifice for obstruction.
– Supply Gas System Restricted	Confirm Supply Gas System regulator, filter, and valving are not restricted.
– Deadband Adjustment	Evaluate Deadband Adjustment to confirm appropriate setting per VPC-700-SA-BV-ID_DA Initial Adjustment Procedures.
– Internal Friction	Evaluate VPC-700-SA-BV-ID_DA for Internal Friction per Procedure XXXX. Partially or fully reassemble/rebuild the VPC-700-SA-BV-ID_DA to correct.
– Increase Supply and/or Exhaust Adjustable Orifice Settings	Increasing the Supply Adjustable Orifice Setting will increase closing speed. Increasing the Exhaust Adjustable Orifice Setting will increase opening speed.
– Increase Supply and/or Exhaust Adjustable Orifice Size	Increasing the Supply Adjustable Orifice Size will increase closing speed. Increasing the Exhaust Adjustable Orifice Size will increase opening speed.
– Add ID Tank if required	In some cases, challenging applications may benefit by to adding an "ID Tank" and adjusting the "ID" Orifice to optimize performance.

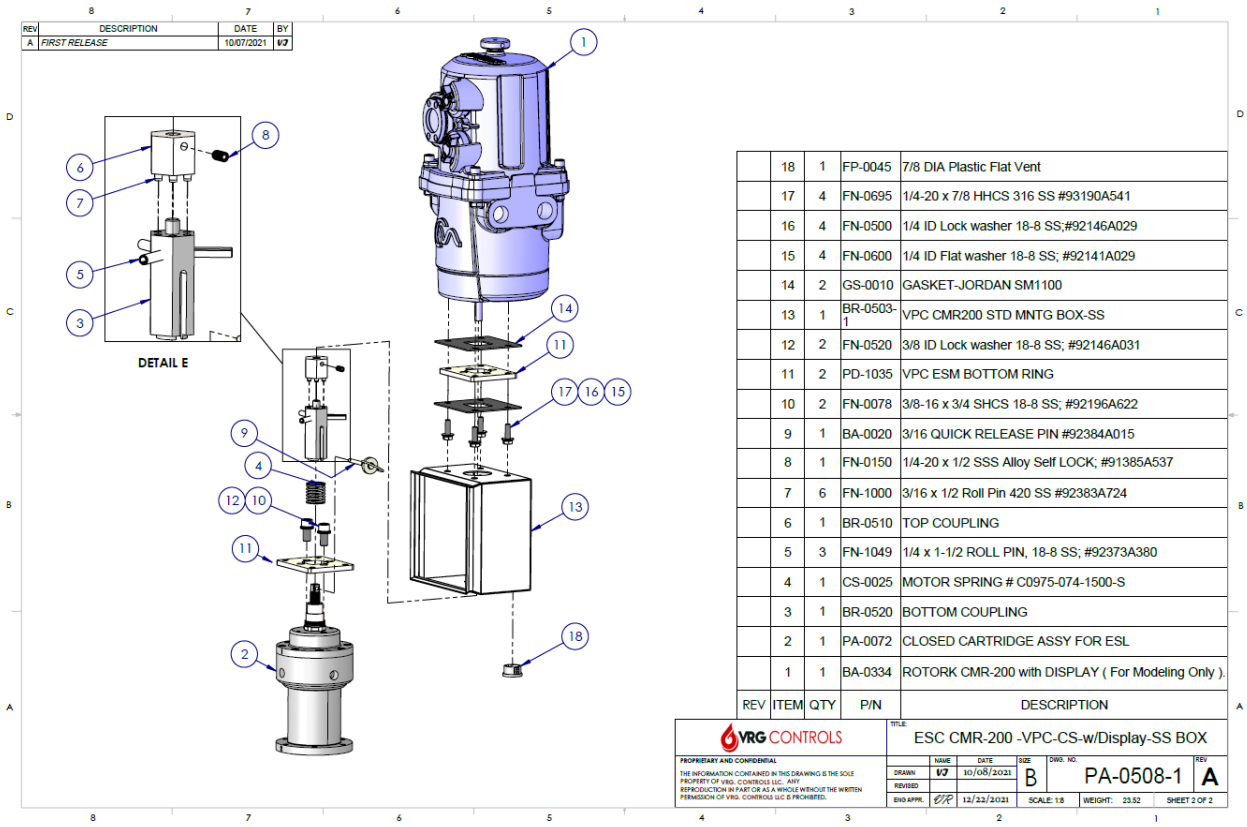
11. ANNEX 1 – VRG Controls Repair Kit RK-0100



NOTE: 1:1 SCALE SHEET PROVIDED WITH KIT. IMAGE NOT SCALE

12. ANNEX 2 – VRG Controls Drawing PA-0508-1





REV	ITEM	QTY	P/N	DESCRIPTION
	18	1	FP-0045	7/8 DIA Plastic Flat Vent
	17	4	FN-0695	1/4-20 x 7/8 HHCS 316 SS #93190A541
	16	4	FN-0500	1/4 ID Lock washer 18-8 SS;#92146A029
	15	4	FN-0600	1/4 ID Flat washer 18-8 SS; #92141A029
	14	2	GS-0010	GASKET-JORDAN SM1100
	13	1	BR-0503-1	VPC CMR200 STD MNTG BOX-SS
	12	2	FN-0520	3/8 ID Lock washer 18-8 SS; #92146A031
	11	2	PD-1035	VPC ESM BOTTOM RING
	10	2	FN-0078	3/8-16 x 3/4 SHCS 18-8 SS; #92196A622
	9	1	BA-0020	3/16 QUICK RELEASE PIN #92384A015
	8	1	FN-0150	1/4-20 x 1/2 SSS Alloy Self LOCK; #91385A537
	7	6	FN-1000	3/16 x 1/2 Roll Pin 420 SS #92383A724
	6	1	BR-0510	TOP COUPLING
	5	3	FN-1049	1/4 x 1-1/2 ROLL PIN, 18-8 SS; #92373A380
	4	1	CS-0025	MOTOR SPRING # C0975-074-1500-S
	3	1	BR-0520	BOTTOM COUPLING
	2	1	PA-0072	CLOSED CARTRIDGE ASSY FOR ESL
	1	1	BA-0334	ROTORK CMR-200 with DISPLAY (For Modeling Only).

VRG CONTROLS
ESC CMR-200 -VPC-CS-w/Display-SS BOX
PROPRIETARY AND CONFIDENTIAL
DRAWN VJ 10/08/2021
ENG APPR. 12/22/2021
SIZE B
DWG. NO. PA-0508-1
REV A
SCALE: 1:8
WEIGHT: 23.52
SHEET 2 OF 2