

HIGH PRESSURE MATERIAL REGULATOR



**READ THIS MANUAL CAREFULLY BEFORE INSTALLING,
OPERATING OR SERVICING THIS EQUIPMENT.**

It is the responsibility of the employer to place this information in the hands of the operator. Keep for future reference.

SERVICE KITS

- Use only genuine ARO® replacement parts to assure compatible pressure rating and longest service life.
- Fluid diaphragm kit 61962-1 can be ordered separately (see page 4).
- Complete rebuild kit 637554 can be ordered separately (see page 4).

SPECIFICATIONS

Model Series 651785
Type Downstream
Material Inlet (female) 3/8 - 18 NPTF - 1
Material Outlet (female) 3/8 - 18 NPTF - 1
Dimensional Data see page 8

PERFORMANCE DATA

Regulated Pressure Range 75 - 450 psig (5.2 - 31.1 bar)
Maximum Regulated Pressure .. 450 psig (31.1 bar)
Maximum Inlet Pressure 3000 psig (206.9 bar)
Maximum Temperature Limits ... 0° to 200°F (-18° to 93°C)

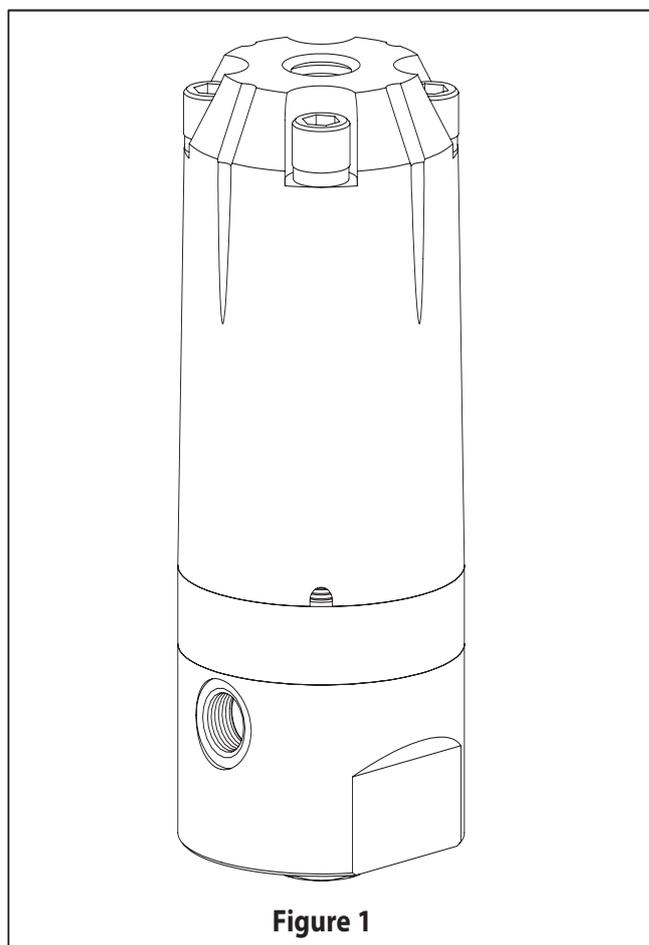


Figure 1

OPERATING AND SAFETY PRECAUTIONS



EXCESSIVE AIR PRESSURE
STATIC SPARK



HAZARDOUS MATERIALS
HAZARDOUS PRESSURE

- ▲ Read and heed all Warnings and Safety Precautions before operation of this unit.
- ▲ Use only genuine ARO replacement parts to assure compatible pressure rating and longest service life.
- ▲ Be certain anyone operating this equipment or fluid system has been trained to use it safely.

⚠ WARNING HIGH PRESSURE DEVICE. IMPROPER USAGE OF THIS EQUIPMENT COULD RESULT IN SERIOUS INJURY. The possibility of injection into the flesh is a potential hazard. Wear approved safety glasses or face shield and other equipment as needed to prevent injury. Never allow any part of the human body to come in front of or in contact with the material outlet, the tip, or the material outlet of the dispensing device. An injection injury can be serious. If an injection accident should occur, it is very important that you contact a qualified physician for immediate treatment.

⚠ WARNING MISAPPLICATION HAZARD. DO NOT USE THE REGULATOR WHEN THE FLUID INLET PRESSURE IS TOO HIGH FOR THE DESIGNED OPERATING RANGE. Excessive inlet pressure can cause a Lock-Out situation. Lock-Out occurs when the inlet pressure is beyond the regulator's spring capacity. THE VALVE WILL NOT OPEN. Attempts to disassemble components while in a Lock-Out condition may result in injury.

⚠ WARNING COMPONENT RUPTURE. DO NOT OPERATE REGULATOR AT AN INLET PRESSURE GREATER THAN SPECIFIED. To avoid possible damage or personal injury, DO NOT operate this unit at pressure higher than the stated operating range as it appears on the model plate.

⚠ WARNING DISASSEMBLY HAZARD. DO NOT DISASSEMBLE THIS REGULATOR WHEN IT IS UNDER PRESSURE. RELIEVE PRESSURE IN THE PUMPING SYSTEM BEFORE ATTEMPTING SERVICE OR DISASSEMBLY PROCEDURES. Disconnect air lines and carefully bleed pressure off the system. Be certain the system is not maintaining pressure due to a material restriction in the hose, line, dispensing device, or the spray or extrusion tip. Failure to relieve pressure both up stream and downstream may result in an injury upon disassembly.

⚠ WARNING BONNET REMOVAL HAZARD. DO NOT ATTEMPT TO REMOVE THE FOUR BONNET RETAINING BOLTS WITHOUT FIRST RELIEVING THE TENSION ON THE MAIN SPRING. Failure to relieve tension could result in an accident upon disassembly.

⚠ WARNING PREVENT FIRES. KEEP SOLVENTS AWAY FROM HEAT, SPARKS OR OPEN FLAME. Keep containers closed when not in use. When pumping, flushing or recirculating volatile solvents, be certain the area is adequately ventilated.

⚠ CAUTION FLUSH SUPPLY LINE. Before installing fluid regulator, blow the supply lines clear and flush to remove contaminates.

INSTALLATION

- Refer to the typical installation view which best applies.
- Locate the regulator as close as possible to the spray gun or dispensing device for best pressure control.
- Identify the regulator INLET / OUTLET (flow direction). The regulator is marked with an arrow on the body base (see figure 8).
- When flexible fluid lines are used, mount the regulator securely using the (2) 1/4" - 20 threaded holes in the base (see figure 8).
- Flush supply line before installing regulator.

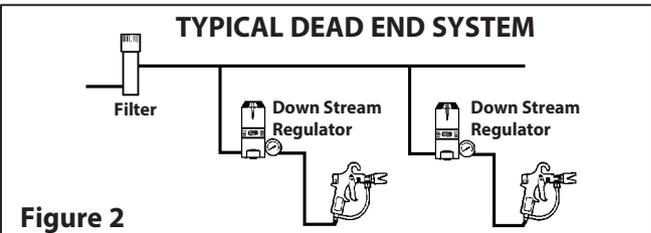


Figure 2

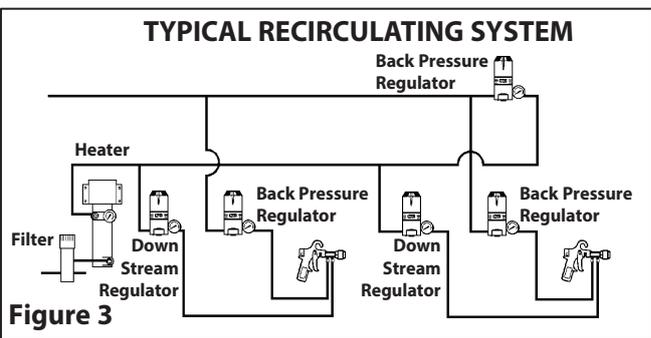


Figure 3

OPERATING INSTRUCTIONS

Refer to page 4 and 5 for parts reference.

- To **INCREASE** outlet pressure, turn the (6) adjusting screw **CLOCKWISE** (see figure 4).
- To **DECREASE** outlet pressure, turn the (6) adjusting screw **COUNTERCLOCKWISE** (see figure 4).

NOTE: ARO Part Y106-109 Allen wrench is included to make necessary pressure adjustments.

FLUSH-OUT FEATURE (see figure 5).

- Flush the regulator periodically. The interval may vary depending on the amount and type of material used.
- By using a wrench and "flush-out" plug (provided), the operator is able to move the entire spindle downward and force the ball off the seat which should purge the regulator of particle build-up.

NOTE: The flush-out procedure temporarily overrides the adjusted pressure. It will not, however, affect the regulator setting when flushing operation is completed.

FLUSH-OUT PROCEDURE

1. Remove spray gun or dispensing device, this will allow any particles to clear from the system.
2. Insert (30) flush-out plug and turn clockwise until it touches the (4) washer (see view on page 5).
3. Turn up to two turns maximum. This will allow the ball to unseat and pass material at free flow (unregulated). **DO NOT** attempt to turn further to avoid damage.
4. Turn the plug back to its original position.

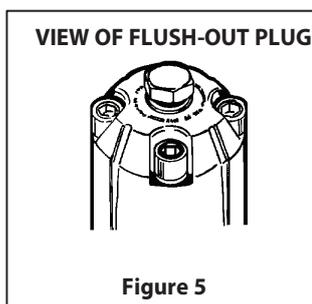
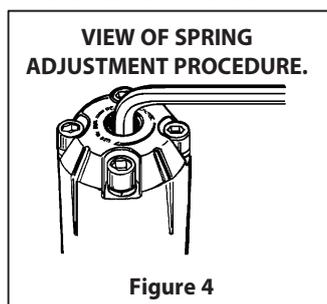
SEAT PLUG FEATURE

The (29) plug located at the base of the regulator can be removed for access to the ball and seat assembly for cleaning and inspection for wear. With this feature, the regulator

does not have to be unthreaded from the pumping system. Be certain to relieve system pressure (See "WARNING: DISASSEMBLY HAZARD").

MAINTENANCE

- Disassembly should be done on a clean work bench and use clean cloths.
- If replacement parts are necessary, refer to the parts list and drawings on pages 4 and 5.
- Upon reassembly, lubricate parts and use Loctite where indicated. Follow the torque specifications as shown.
- Service kits are available which include parts typically needed for an overhaul.
- Keep good records of service activity and include the regulator in a preventive maintenance program.
- Certain ARO "Smart Parts" are indicated with a "□" in the parts list, these parts should be available for fast repair and reduction of down time.



TROUBLE SHOOTING

No fluid pressure.

- Check for damaged or worn diaphragms.
- Look for possible obstruction by hardened material or foreign matter, periodically use the regulator "flush-out" feature. Use a fluid filter upstream from the regulator.

Pressure creeps above the setting when system is dead ended and in a static (no flow) mode.

- Check for dirty seat and clean as appropriate.
- Check for worn or damaged seat and replace if necessary.

Outlet pressure drops below setting.

- Check pump for proper operation and check for possible leakage problems.
- Look for a clogged supply line problem, flush the supply line.

Fluid leakage from spring housing.

- Check the (1) bolts and the (15) cap screws and re-torque as needed.
- Check for damaged diaphragm, replace as needed.

Regulator will not function, even when dispensing device is opened.

- Check for possible obstruction in the fluid line.
- Inlet pressure is too high causing a "Lock-Out" situation. Read "WARNING: MISAPPLICATION HAZARD" found on page 2.

REGULATOR DISASSEMBLY

FOR "WARNINGS", REFER TO "OPERATING AND SAFETY PRECAUTIONS" ON PAGE 2 FOR DETAILS.

BEFORE SERVICING, READ "WARNING: DISASSEMBLY HAZARD". FOUND ON PAGE 2.

TOOLS REQUIRED: Small bench vise, 5/32" allen wrench, 3/8" allen wrench, torque wrench and Loctite 242.

NOTE: It is not always necessary to remove the regulator from the fluid line to service or inspect only the valve section.

BEFORE DOING ANY IN-LINE SERVICE, ALL FLUID PRESSURE MUST BE RELIEVED. HEED ALL WARNINGS FOUND ON PAGE 2.

VALVE SEAT NOTE: Before deciding to order a repair kit to service the regulator, check the easiest things first. Remove and inspect the valve seat for dirt, foreign matter, damage or wear (step 1).

1. Remove the (29) seat plug and (28) "O" ring, releasing (27) flow tube, (26) spring, (25) ball, (24) seat and (23) "O" ring.
2. Remove four (1) bolts and (2) lock washers, releasing (3) housing.

NOTE: The (6) adjusting screw [with (8) adjustment nut], (5) thrust bearing and (4) washer are retained by (7) plate, which is pressed into place. It should not be necessary to disassemble these parts during normal service.

3. Remove (11) plate and (10) spring from (3) housing.
4. Remove (15) cap screws, releasing (16) plate.
5. Remove the stem / diaphragm / piston assembly.
6. Place the assembly in a vise, clamping on flats of (21) stem assembly.
7. Using a 5/32" Allen wrench, remove the (12) cap screw, releasing (13) lock washer, (14) piston, (17 and 18) diaphragms and (19) "O" ring.

PARTS LIST / 651785 REGULATOR

Item	Description (size)	Qty	Part No.	[Mtl]
1	Bolt (7/16" - 20 x 5-1/2")	(4)	93487-1	[C]
2	Lock Washer (7/16")	(4)	Y79-716	[C]
3	Housing	(1)	93534-1	[ZA]
4	Washer	(1)	93485-1	[C]
5	Thrust Bearing	(1)	93484-1	[C]
6	Adjusting Screw	(1)	93486-1	[C]
7	Plate	(1)	93818	[SS]
8	Adjustment Nut	(1)	93481-1	[C]
9	Spring Stop	(1)	96348-5	[SS]
10	Spring	(1)	93638-1	[C]
11	Plate	(1)	93820	[C]
12	Cap Screw (#10 - 32 x 7/8")	(1)	Y191-107	[C]
13	Lock Washer (#10)	(1)	Y14-10	[C]
14	Piston	(1)	93821	[C]
15	Cap Screw (7/16" - 20 x 7/8")	(2)	Y157-778	[C]
16	Plate	(1)	93532-1	[C]
✓○17	Diaphragm (0.048" thick, cream)	(1)	93498-1	[H]
✓○18	Diaphragm (0.020" thick, white)	(1)	93497-1	[T]

Item	Description (size)	Qty	Part No.	[Mtl]
✓○19	"O" Ring (1/16" x 9/16" o.d.)	(1)	Y328-13	[T]
✓○20	"O" Ring (3/32" x 1-3/8" o.d.)	(1)	Y328-123	[T]
□21	Stem Assembly	(1)	92985	[SS/TC]
22	Base	(1)	93541-1	[SS]
✓□23	"O" Ring (1/16" x 5/8" o.d.)	(1)	Y328-14	[T]
✓□24	Seat	(1)	93558-1	[TC]
✓□25	Ball (0.2500" dia.)	(1)	93561-1	[TC]
✓□26	Spring	(1)	93881	[SS]
□27	Flow Tube	(1)	93489-1	[SS]
28	"O" Ring (0.097" x 0.949" o.d.)	(1)	93492-1	[T]
□29	Seat Plug (includes item 28)	(1)	62168	[SS]
30	Flush Plug (not shown)	(1)	93819	[C]
31	3/8" Allen Wrench (not shown)	(1)	Y106-109	[C]
○	Items included in Diaphragm Kit		61962-1	
✓	Items included in Diaphragm Kit		637554	

MATERIAL CODE

[C] = Carbon Steel	[T] = PTFE
[H] = Hytrel	[TC] = Tungsten Carbide
[SS] = Stainless Steel	[ZA] = Zinc / Aluminium Alloy

REGULATOR REASSEMBLY

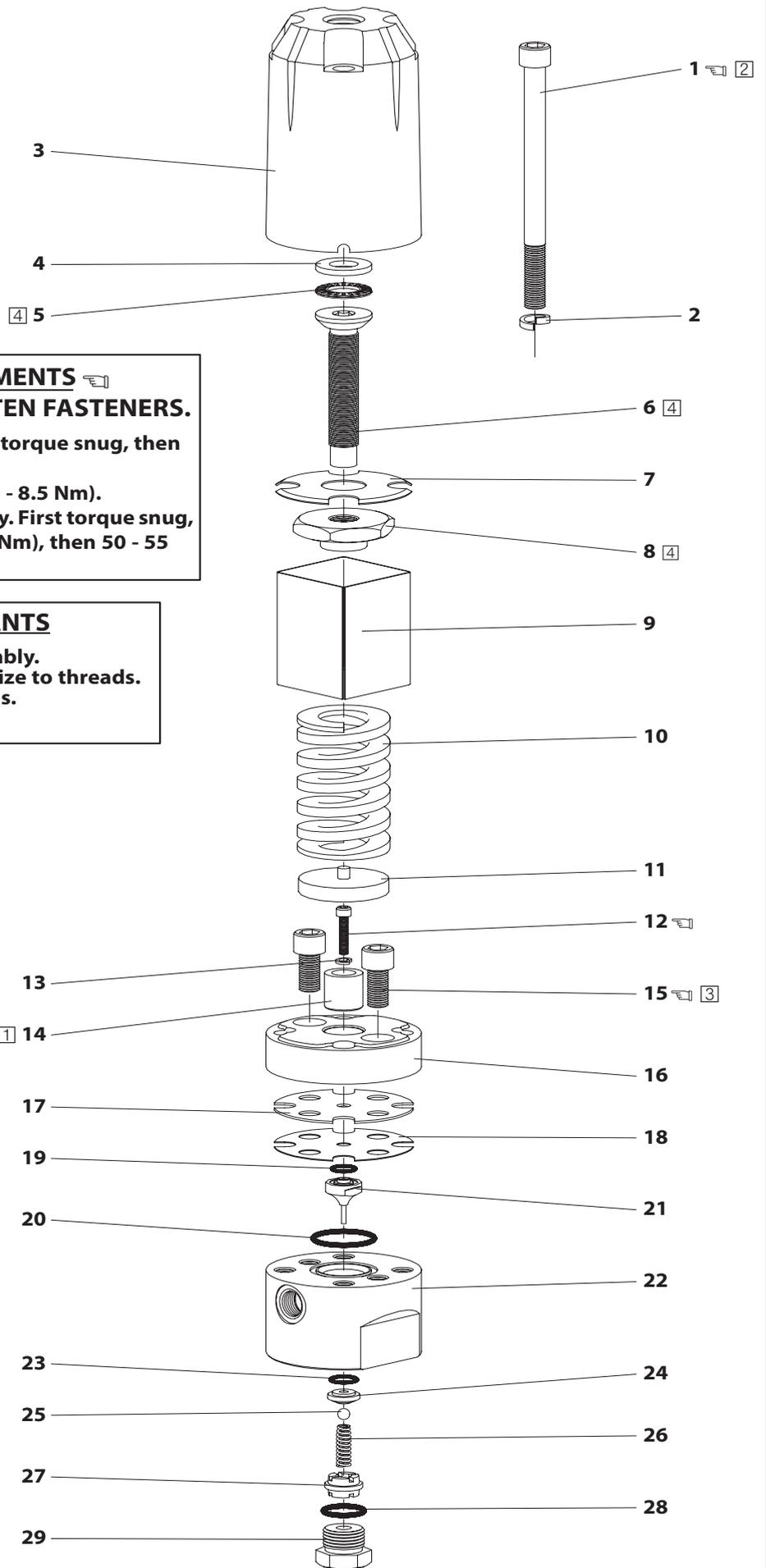
Also refer to parts list and views on pages 4 and 5.

- Place the (21) stem assembly in a vise, clamping on the flats.
 - Assemble the (19) "O" ring to the groove in the (21) stem assembly.
 - Assemble the (18) white diaphragm (0.020" thick) and the (17) cream diaphragm (0.048" thick) onto the (21) stem assembly. **NOTE:** Assemble the white diaphragm onto the stem assembly first.
 - Assemble the (14) piston to the stem assembly.
 - Align the notches in the diaphragms and secure the assembly with the (13) lock washer and (12) cap screw. **NOTE:** Tighten (12) cap screw to 65 - 75 in. lbs (7.3 - 8.5 Nm).
- SERVICE HINT:** Use the (15) cap screw to help align the diaphragms.
- Remove the assembly from the vise.
 - Place the (22) base in a vise, clamping on flats.
 - Place the (20) "O" ring in the groove in the (22) base.
 - Assemble the stem / diaphragm / piston assembly to the (22) base, aligning the bolt holes.
 - Apply Dri-Slide to the (14) piston and assemble (16) plate over piston, aligning bolt holes.

- Apply Loctite 242 to threads of (15) cap screws and assemble to (22) base, securing (16) plate. **NOTE:** Tighten the cap screws alternately and evenly. First tighten snug, then tighten to 20 - 25 ft lbs (27.1 - 33.9 Nm), then tighten to 50 - 55 ft lbs (67.8 - 74.6 Nm).
- Place the (11) plate (ball side down) into the hex of the (12) cap screw.
- Assemble the (10) spring to the (11) plate and assemble the (9) spring stop over the spring.
- Assemble the (3) housing and components to the (16) plate, securing with (2) lock washers and (1) bolts. **NOTE:** Apply Loctite nickel anti-seize to threads of bolts then tighten alternately until snug, then torque to 20 - 25 ft lbs (27.1 - 33.9 Nm).
- Assemble (23) "O" ring, (24) seat and (27) flow tube into (22) base.
- Assemble the (25) ball and (26) spring (small end against ball) into (27) flow tube.
- Assemble (28) "O" ring to (29) seat plug and assemble seat plug to (22) base.

□ "Smart Parts" keep these items on hand in addition to the Service Kits for fast repair and reduction of down time.

SERVICE NOTE: "Dri-Slide", FXR is a commercially available Anti-Rust Lubricant (contains 9% Molybdenum Disulfide) or Molybdenum Disulfide Powder with or without light oil carrier.



TORQUE REQUIREMENTS

NOTE: DO NOT OVERTIGHTEN FASTENERS.

(1) Bolt, torque alternately. First torque snug, then to 20 - 25 ft lbs (27.1 - 33.9 Nm).

(12) Cap screw 65 - 75 in. lbs (7.3 - 8.5 Nm).

(15) Cap screw, torque alternately. First torque snug, then to 20 - 25 ft lbs (27.1 - 33.9 Nm), then 50 - 55 ft lbs (67.8 - 74.6 Nm).

LUBRICATION - SEALANTS

- 1 Apply Dri-Slide upon assembly.
- 2 Apply Loctite nickel anti-seize to threads.
- 3 Apply Loctite 242 to threads.
- 4 Apply 40036 grease.

MATERIAL CODE

- [C] = Carbon Steel
- [H] = Hytrel
- [SS] = Stainless Steel
- [T] = PTFE
- [TC] = Tungsten Carbide
- [ZA] = Zinc / Aluminum Alloy

Figure 6

CROSS SECTION

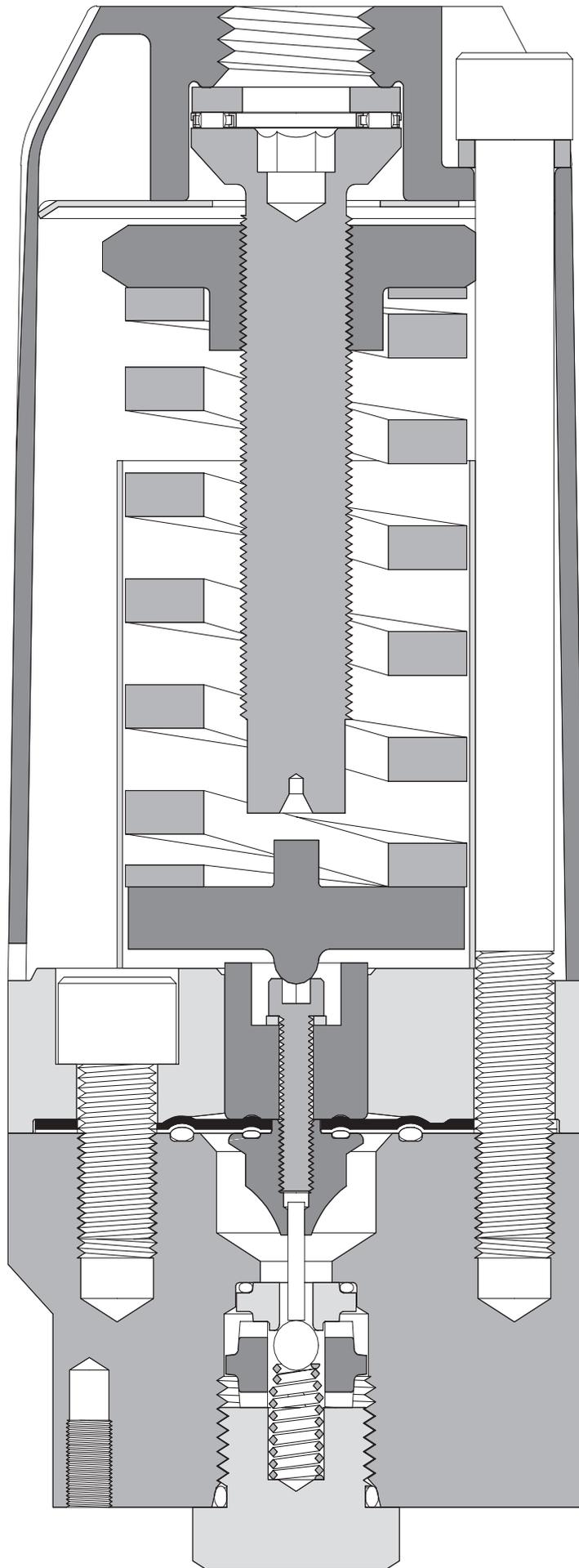


Figure 7

DIMENSIONAL DATA

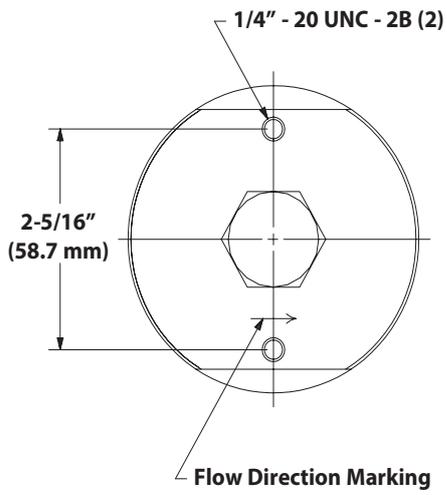
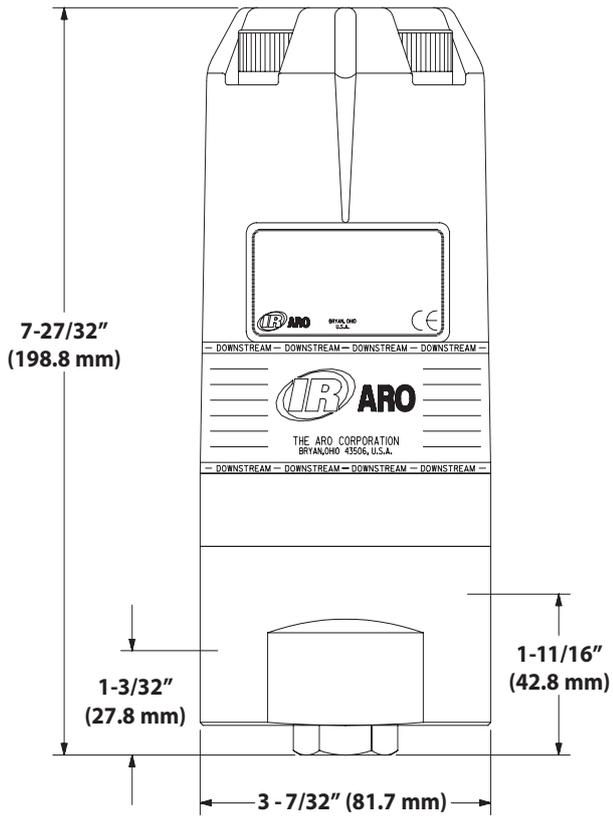


Figure 8

