

# OPERATOR'S MANUAL

INCLUDING: OPERATION, INSTALLATION AND MAINTENANCE

# 651798

RELEASED: 6-13-25  
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(REV: B)

## 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

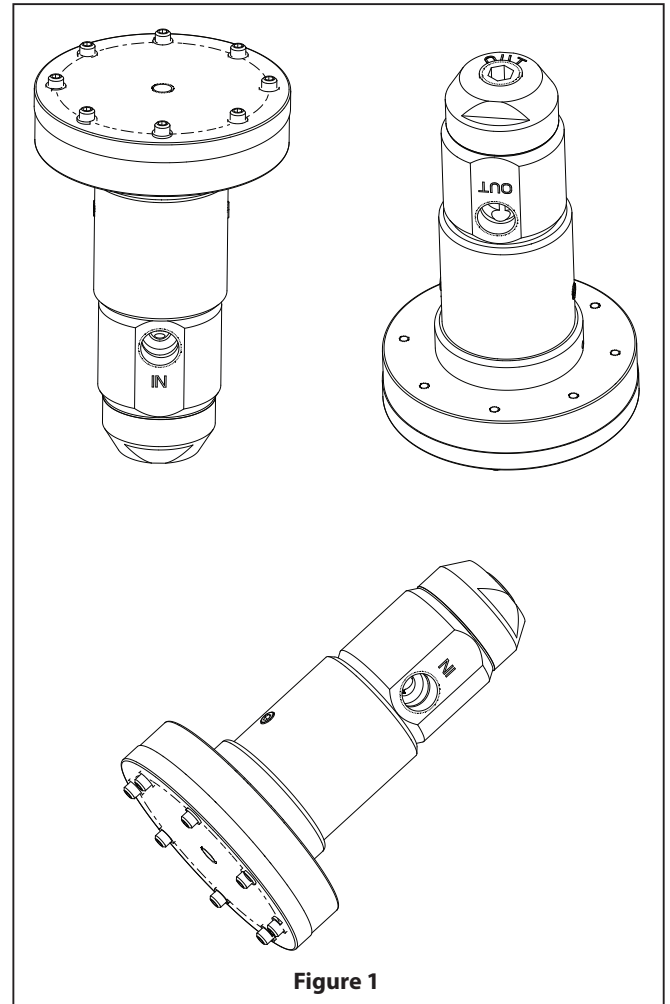
- Use only genuine ARO® replacement parts to assure compatible pressure rating and longest service life.
- Order the **637589** kit (see page 4) for regulators general maintenance. It includes a set of diaphragm kits and a set of valve kits and Other repair parts.
- Valve kit can be ordered separately (see page 4).

### SPECIFICATIONS

**Regulator Type** ..... Downstream  
**Body Material** ..... Aluminum/carbon steel  
**Ball / Seat Material**.... Tungsten Carbide  
**Port Size( Ball size)** ..... 5/16"  
**Air Inlet**..... 1/4-18" NPT (0.250")  
**Material Inlet**..... 3/4-14" NPT (0.750")  
**Material Outlet** ..... 3/4-14" NPT (0.750")  
**Regulated**  
**Pressure Range**..... 100 - 4200 psi (6.9 - 289.7 bar)  
**Maximum**  
**Inlet Pressure** ..... 5000 psi (344.8 bar)  
**Maximum**  
**Air Inlet Pressure** ..... 100 psi (6.89 bar)  
**Maximum**  
**Temperature Limits** .. 0° to +200°F (-18° to +93°C)  
**Dimensional Data** .... see page 6

### GENERAL DESCRIPTION

This equipment is used for transport high-viscosity fluids (and must be equipped with high-pressure piston pump or other high-pressure equipments). The function of this device is to change the size of the internal passage through air pressure, regulating and stabilizing the material pressure.



**Figure 1**

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## OPERATING AND SAFETY PRECAUTIONS

READ, UNDERSTAND, AND FOLLOW THIS INFORMATION TO AVOID INJURY AND PROPERTY DAMAGE.



- Read and heed all warnings, cautions and safety precautions before operation of this unit.
- 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 contaminants.

**⚠ WARNING** = Hazards or unsafe practices which could result in severe personal injury, death or substantial property damage.

**⚠ CAUTION** = Hazards or unsafe practices which could result in minor personal injury, product or property damage.

**NOTICE** = Important installation, operation or maintenance information.

## INSTALLATION

### TYPICAL RECIRCULATING SYSTEM

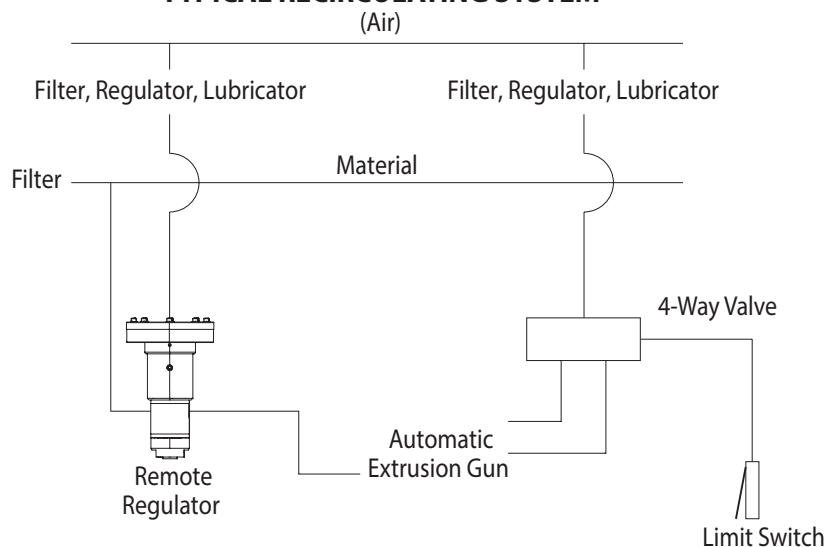


Figure 2

- Refer to the typical installation diagram in Figure 2 above.
- 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 **INLET / OUTLET** on the body base (refer to page 6).
- When flexible fluid lines are used, please install the regulator in a fixed base.
- Flush supply line before installing regulator.
- Remote models require maximum 100 psi (6.9 bar) signal pressure. Start with a signal pressure as low as possible and adjust upward until proper flow is reached.

## OPERATING INSTRUCTIONS

Please refer to pages 4 and 5 for more information about the parts.

- To increase the outlet pressure, please adjust the air inlet regulator to turn clockwise.
- To reduce the outlet pressure, please turn the air inlet regulator counter clockwise.

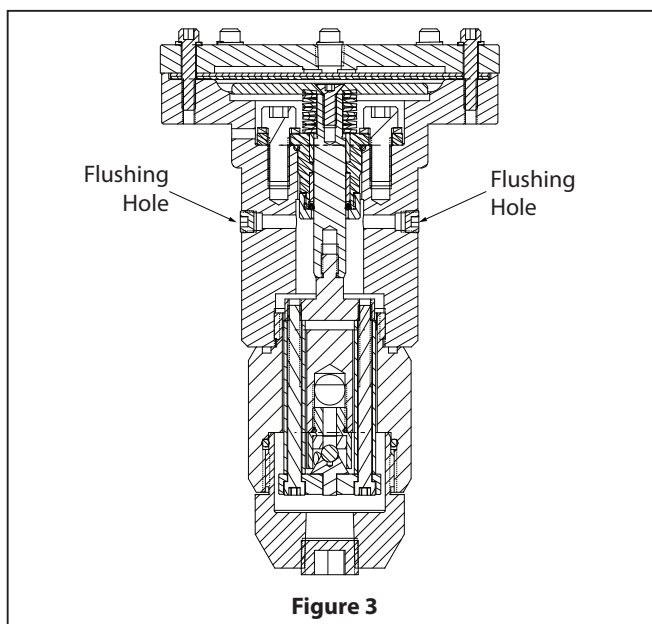
**NOTE:** The air inlet regulator needs to be purchased and connected by the customer themselves.

- Flush the regulator periodically. The interval may vary depending on the amount and type of material used.

**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 the two 1/4" NPTF threaded plugs on the side of the pressure regulating valve housing.
2. Close the feed port and discharge port of the pressure regulating valve.
3. Open the gas regulating valve and introduce the appropriate pressure to keep the ball seat part open.
4. Introduce the flushing solvent from the 1/4 "thread to flush the interior of the pressure regulator.
5. After the flushing is completed, unscrew the two 1/4" plugs back to their original positions and ensure a seal without leakage.



## 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 "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 material output.

- The material ball valve was closed due to insufficient air supply or pressure.
- The feed pipe or the front-end system is clogged.
- The diaphragm ruptured, causing the ball valve to fail to open.

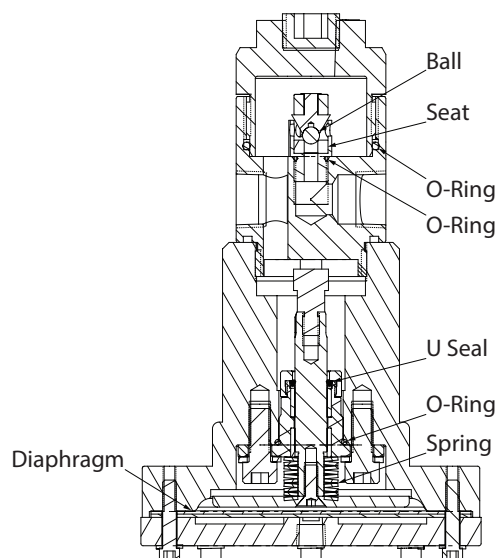
### The outlet pressure drops below the set value or the flow rate cannot be adjusted.

- Check whether the operation of the pump is correct and inspect for potential leakage problems.
- Check the blockage problem of the supply pipeline and carry out flushing.
- Check whether the air supply pressure is sufficient and whether there is any leakage in the inlet pipeline
- The material is solidified inside, blocking the interior of the pressure regulator.
- The ball valve inside the pressure regulating valve is damaged and cannot seal effectively
- The internal spring of the regulator failed
- The air supply regulator is operated incorrectly or fails.

### Even when the distribution device is turned on, the regulator doesn't work.

- Check whether there is any blockage in the fluid pipeline.
- Excessive inlet pressure causes blockage. Please refer to Page 2 **Warning:** Risk of misoperation.

Cross-sectional view of the regulator, in which the main components are listed. These components are included in the service kit.



## PARTS LIST / 651798

Item	Description	Qty	Part No.	Mtl
1	End cap	1	98516	[C]
2	Screw (1/4" - 20 x 3-1/4")	2	Y99-411	[C]
★3	O-Ring (2-1/4 id x 0.139")	2	Y327-228	[V]
4	Upper Plate	1	98512	[C]
★5	Poppet (5/16" dia)	1	98529	[TS]
6	Spacer	2	98513	[SS]
★7	Seat (5/16" dia)	1	98528	[TS]
★8	O-Ring (1/2 id x 0.070")	1	Y327-14	[V]
9	Regulator body	1	98522	[C]
10	Lower Plate	1	98511	[C]
11	Shaft	1	98517	[C]
12	Collar	1	98518	[C]
★13	U Seal	1	98505	[C]
★14	O-Ring (1-1/8 id x 0.103")	1	Y327-122	[C]

Item	Description	Qty	Part No.	Mtl
15	Seal and Bushing retainer	1	98519	[C]
16	Plug (1/8"-27 NPT)	2	Y17-50-S	[SS]
✓★17	Belville Washer	10	98508	[C]
18	Housing	1	98527	[A]
19	Washer	4	Y14-716	[C]
20	Screw	4	Y256-102-E	[T]
21	Diaphragm	1	98515	[C]
22	Screw Fat HD Soc Cap	1	98503	[SS]
✓★23	Diaphragm	2	98509	[V]
24	Cover Plate	1	98510	[A]
25	Washer	8	Y14-416-T	[SS]
26	Screw	8	Y99-43-S	[SS]
★	Service kit parts, see figure 4			

## DISASSEMBLY

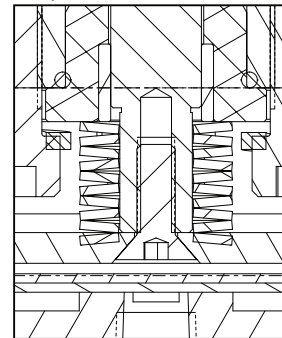
**WARNING:** Remove material pressure from system and turn off air before continuing.

1. Disconnect the air supply and unscrew the Air Regulator.
2. Remove the 8 hex socket screws (26) and the locking washers (25) that fix the diaphragm cover (24).
3. Remove the Cover Plate (24) and the two Diaphragms (23).
4. Unscrew the Flat Socket Screw (22) that holds on the Diaphragm Plate (21).
5. Remove the Cover plate Plate (21) and the 10 Belville Washers (17).
6. Unscrew the 4 Socket Screws (20) and Lock Washers (19) that hold the Retainer (15).
7. Remove the Retainer (15) and the Housing (18) can be unscrewed from the Regulator body (9).
8. Unscrew the Shaft (11) from the Lower Plate (10).
9. Unscrew the End Cap (1) from the Regulator body (9).
10. Unscrew the two Socket Screws (2) that hold the Upper Plate (4). Remove the Upper Plate (4), the Poppet Valve (5) and both Spacers (6).
11. The Valve Seat (7) can be removed with a 3/4" socket.
12. Remove the Seal and O-rings from the body and discard.

## REASSEMBLY

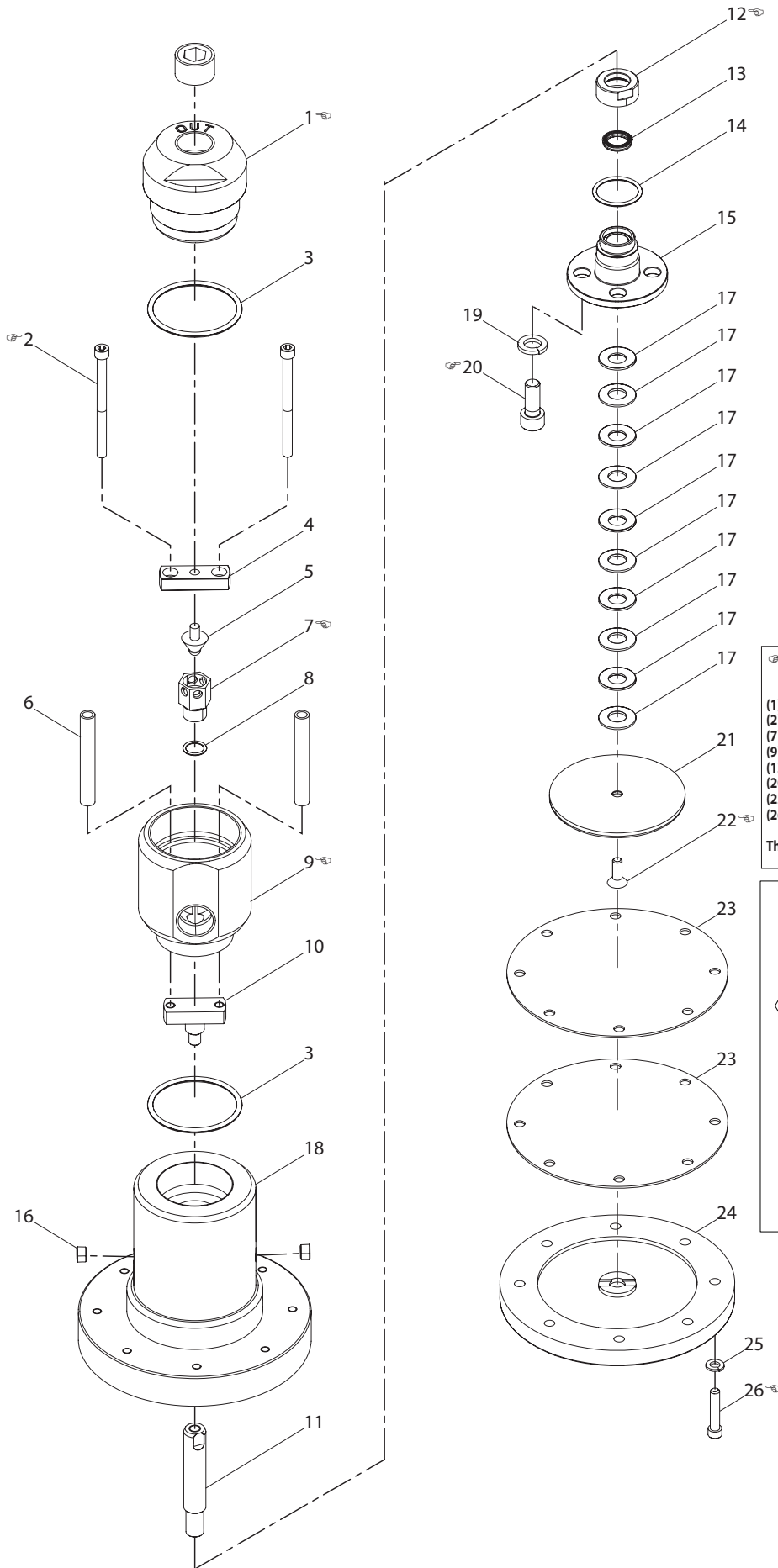
Assembling the material section - inspect and clean all parts carefully and replace if necessary - lubricate all seals and O-Rings.

1. Install the O-ring (8) on the Valve Seat (7) and thread it into the Body (9) and tighten 20 Ft-Lbs. (27.1 N-m).
2. Install the two Socket Screws (2) into the Upper Plate (4).
  - Slide the Spacers (6) over the Socket Screws (2).
  - Install the Poppet Valve (5) into the Upper Plate (4).
  - Push the above assembly into the Body (9) until the Poppet Valve and Seat are mated.
  - Hold the Lower Plate (10) against the Socket Screws (2) and tighten to 10 Ft-Lbs. (13.6 N-m).
3. Install the O-ring (3) into both ends of the Body (9).
4. Thread the End Cap (1) into the Body (9) and tighten to 30 Ft-Lbs. (40.7 N-m).
5. Thread the Housing (18) onto the Body (9) and tighten to 40 Ft-Lbs. (54.2 N-m).
6. Install the Seal (13) into the Retainer (15) Lip Facing Material.
  - Thread the Collar (12) onto the Retainer (15) and tighten to 10 Ft-Lbs. (13.6 N-m).
  - Install the O-ring (14) on the Retainer (15) and lubricate.
7. Install the Retainer (15) into the Housing (18) and tighten the Socket Screws (20) and Lock Washers (19) to 30 Ft-Lbs. (40.7 N-m).
8. Hold the Shaft (11) in the up position. Install the 10 Belville Washers (17) onto the Shaft (11).
  - The spring installation openings face each other in pairs. Start with the opening of the first piece facing the Retainer (15), with the first piece facing (the specific direction).
9. Place the Diaphragm Plate (21) on the Shaft (11) and tighten the Flat Socket Screw (22).
10. Install the Piston Assembly (step 9) and push the Shaft (11) into the Retainer (15) and thread the Shaft (11) onto the Lower Plate (10) and tighten the Flat Socket Screw (22) to 12 Ft-Lbs. (16.3 N-m).
11. Install the two Diaphragms (23) in the Housing (18) and align the holes.
12. Install the Cover Plate (24) and thread the eight Socket Screws (26) and Lock Washers (25) to 10 Ft-Lbs (13.6 N-m).



**MATERIAL CODE**

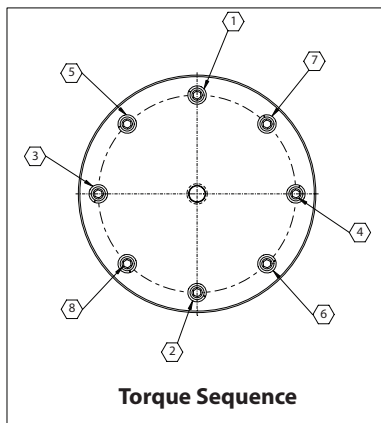
[A]	= Aluminum
[C]	= Carbon Steel
[SS]	= Stainless Steel
[T]	= PTFE
[TS]	= Tungsten steel
[V]	= Viton


**ASSEMBLY TORQUE REQUIREMENTS**

**NOTE: DO NOT OVERTIGHTEN FASTENERS.**

- (1) Tighten to 30 ft lbs (40.7 Nm).
- (2) Tighten to 10 ft lbs (13.6 Nm).
- (7) Tighten to 20 ft lbs (27.1 Nm).
- (9) Tighten to 40 ft lbs (54.2 Nm).
- (12) Tighten to 10 ft lbs (13.6 Nm).
- (20) Tighten to 30 ft lbs (40.7 Nm).
- (22) Tighten to 12 ft lbs (16.3 Nm).
- (26) Alternate tighten to 10 ft lbs (13.6 Nm).

The torque sequence is shown in the right figure.



**Figure 5**

## DIMENSIONAL DATA

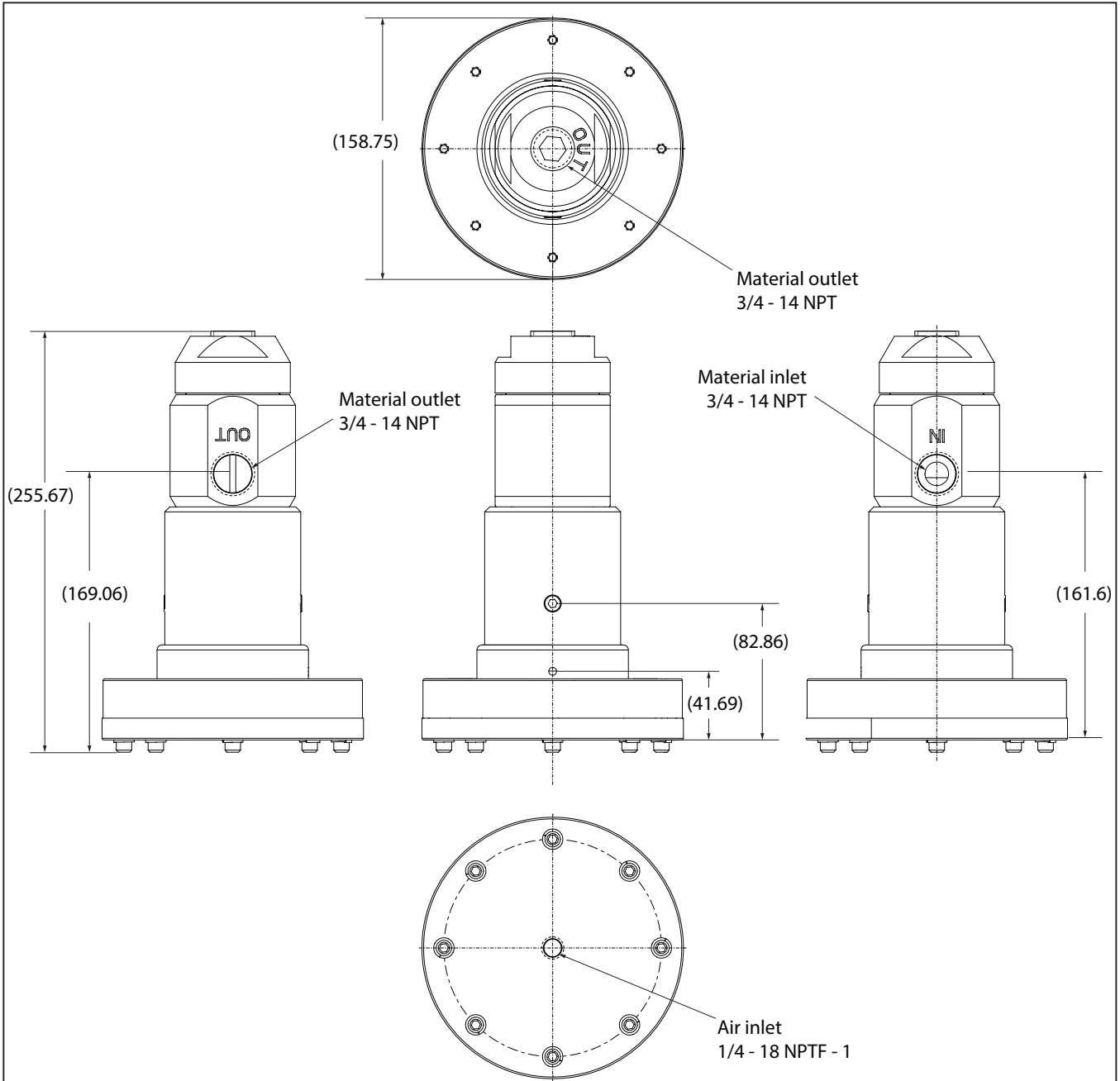


Figure 6



