

# Hard Seat Fluid Pressure Regulator

## Description

The Nordson hard seat fluid pressure regulator is designed for use with abrasive coatings. The regulator body is constructed of stainless steel with a nickel-plated brass bonnet. It is a non-venting regulator used to regulate the output of high-pressure pumps and is available in two output pressure ranges:

0–34.5 bar (0–500 psi)

0.69–103.5 bar (10–1,500 psi)

The standard versions are equipped with Viton O-rings for use with toluene, xylene, and butysol solvents. An optional seal and seat kit includes ethylene propylene O-rings for use with acetone or MEK solvents.

If using extremely abrasive materials, order the optional carbide needle and seat service kit for longer service life. This kit includes both Viton O-rings and ethylene propylene O-rings for use with your specific application. You must also order a new seat pin and seat retainer for the carbide needle and seat to function properly.

## Specifications

Maximum Inlet Pressure:	689.5 bar (10,000 psi)
Output Pressure Range:	0–34.5 bar (0–500 psi) 0.69–103.5 bar (10–1,500 psi)
Inlet, Outlet, and Gauge Ports:	1/4-in. NPT
Weight:	2.26 kg (5 lb)
Dimensions:	See Figure 1

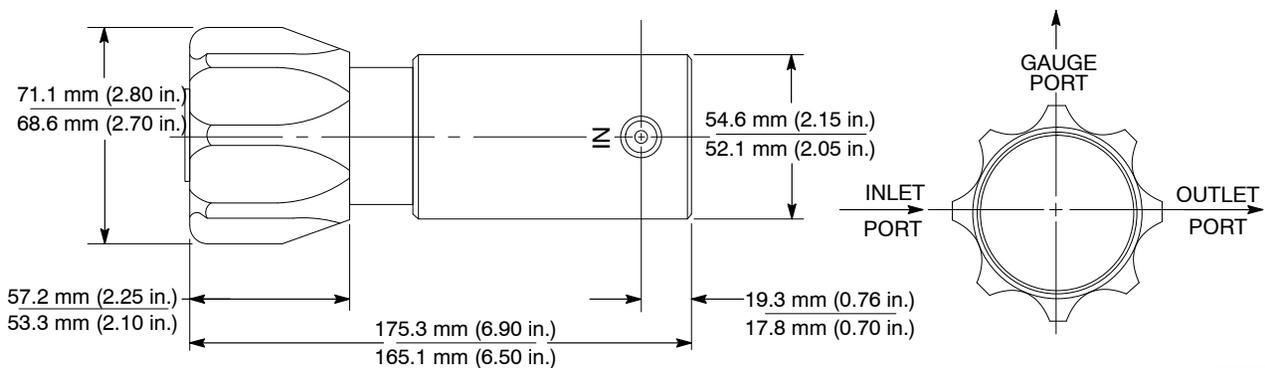


Figure 1 Dimensions

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## Repair



**WARNING:** Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.



**WARNING:** System or material pressurized. Relieve pressure before performing the following tasks. Failure to observe this warning may result in serious injury or death.

The hard seat fluid pressure regulator can be serviced while it is still connected to the line. Be sure to relieve all fluid pressure from the line before servicing the regulator.

## Disassembly

See Figure 2.

1. Pry off the button plug (1) from the top of the hand knob (4) with a flat-head screwdriver.
2. Use external snap-ring pliers to remove the retaining ring (2) from the adjusting screw (9). Remove the hand knob.
3. Place the regulator body (28) in a vise. Unscrew the bonnet (5) using a 1 5/8-in. open-end wrench. Remove the load spring (13) and the spring pad (14) from the regulator body.
4. Unscrew the set screw (12) that secures the adjusting screw assembly (9 through 11) within the bonnet (5).

**NOTE:** The washers and thrust bearing may stick to the bonnet because of the lubricant applied.

5. Remove the adjusting screw assembly, washers (6 and 8), and thrust bearing (7).
6. Pull the piston assembly (15 through 19) out of the regulator body, using pliers if necessary.

**NOTE:** Be careful not to drop the pin (20) because it is loosely placed within the valve assembly seat retainer (21).

7. Remove the pin.
8. Use a 1/2-in. socket wrench to unscrew the valve assembly (21 through 27) from the regulator body.

## Repairing the Valve Assembly

**NOTE:** Be careful not to mar the surface of the valve body. To prevent scratching the valve body, use either a smooth-jawed vise, pliers with the teeth covered with a soft cloth, or the optional wrench listed in the *Options* section.

1. See Figure 2. Place the shoulder of the valve body (24) (where the O-ring (23) and backup ring (22) fit) into a vise, or into the optional wrench listed in the valve parts list.
2. The seat retainer (21) has left-hand threads. Use a 1/2-in. wrench to unscrew the seat retainer from the valve body.
3. Unscrew the spring retainer (27) from the bottom of the valve body (24) and remove the spring (26) and valve stem (25).
4. Clean and inspect all parts. Replace any that are damaged or worn.
5. Screw the spring retainer, spring, and valve stem into the valve body until finger-tight.
6. Place the valve stem in the vise. Screw the seat retainer into the valve body counterclockwise. Tighten the seat retainer to 19.8–22.6 N•m (175–200 in.-lb).
7. Remove the O-ring and backup ring from the valve body. Lubricate the new O-ring and backup ring with O-ring lubricant and install them on the valve body.

## Repairing the Piston Assembly

See Figure 2.

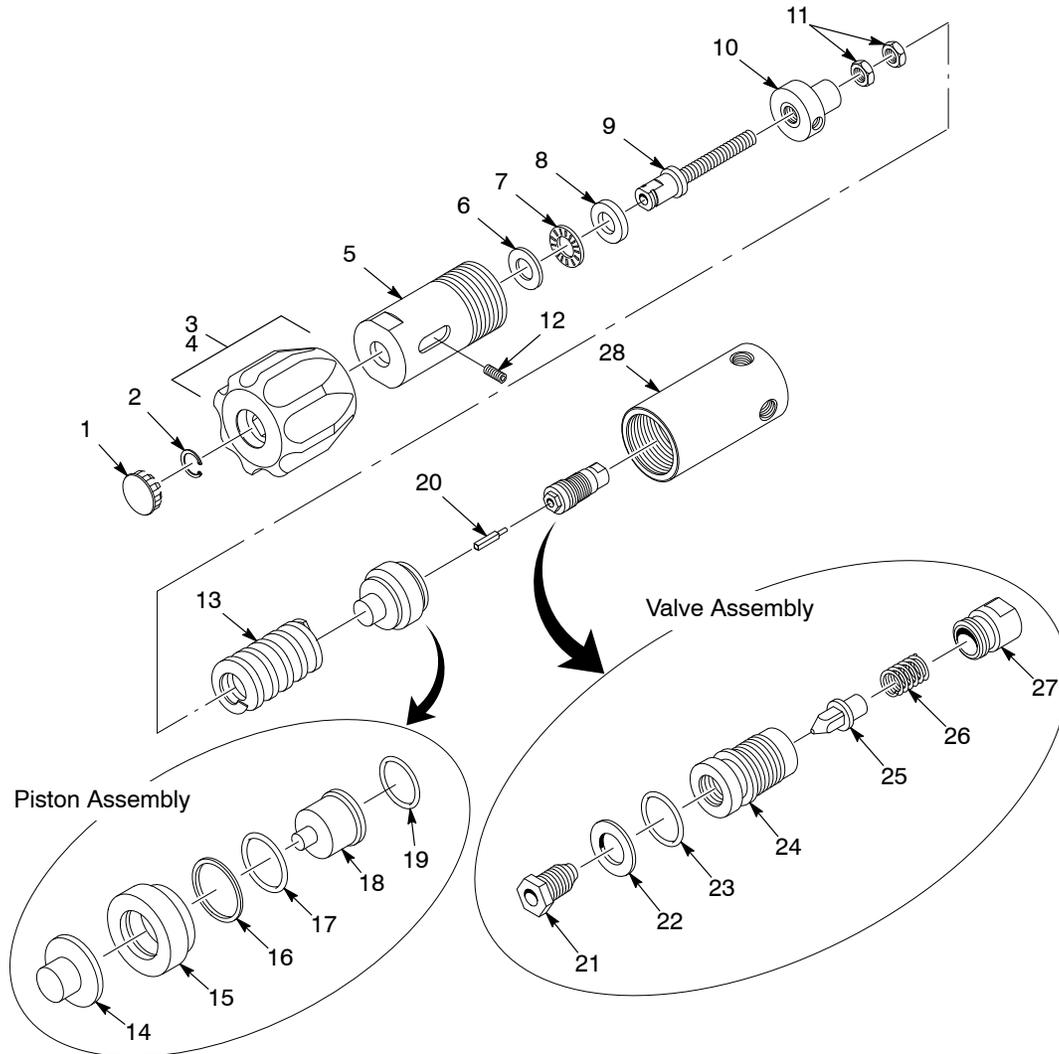
1. Remove the spring pad (14) from the piston assembly (15 through 19), if not already removed.
2. Snap the piston (18) out of the back-up adapter (15).
3. Remove both O-rings (17 and 19) and the back-up ring (16). Lubricate the new O-rings and the back-up ring with O-ring lubricant.
4. Install the back-up ring and smaller O-ring in the groove inside the back-up adapter. Install the larger O-ring on the bottom rim of the back-up adapter.
5. Push the piston through the back-up adapter until it snaps into place.
6. Install the spring pad on the piston assembly.

## Repairing the Adjusting Screw Assembly

Typically, you do not need to disassemble the adjusting screw assembly (9 through 11). Be sure that the threads of the screw (9) are well lubricated and that the two hex nuts (11) are tightened against each other. If they are not tight, they could vibrate loose during operation.

See Figure 2. To tighten the adjusting screw hex nuts (11), follow these steps:

1. Turn the top nut clockwise.
2. Turn the bottom nut counterclockwise until it is no more than 2.5 cm (1 in.) from the bottom of the adjusting screw (9) threads.
3. Tighten the top nut against the bottom nut.



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Figure 2 Exploded View of Hard Seat Fluid Pressure Regulator

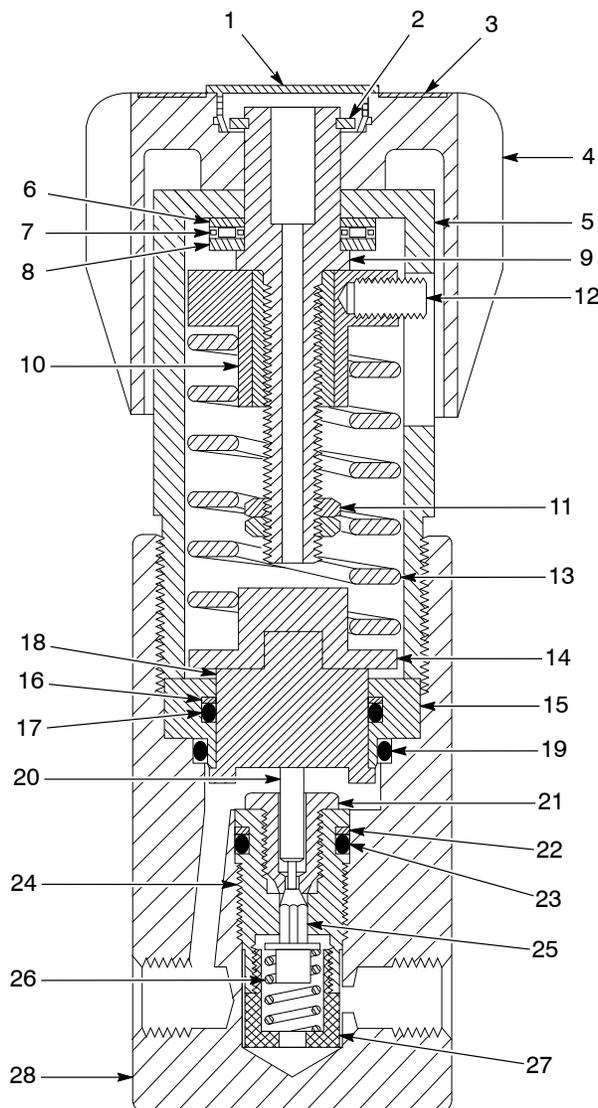
- |                    |                     |                     |
|--------------------|---------------------|---------------------|
| 1. Button plug     | 11. Hex nuts        | 20. Pin             |
| 2. Retaining ring  | 12. Set screw       | 21. Seat retainer   |
| 3. Label           | 13. Load spring     | 22. Back-up ring    |
| 4. Hand knob       | 14. Spring pad      | 23. O-ring          |
| 5. Bonnet          | 15. Back-up adapter | 24. Valve body      |
| 6. Thin washer     | 16. Back-up ring    | 25. Valve stem      |
| 7. Thrust bearing  | 17. O-ring          | 26. Spring          |
| 8. Thick washer    | 18. Piston          | 27. Spring retainer |
| 9. Adjusting screw | 19. O-ring          | 28. Regulator body  |
| 10. Spring cap     |                     |                     |

## Assembly

1. See Figure 2. Screw the valve assembly (21 through 27) into the regulator body (28) and tighten to 11.3–12.4 N•m (100–110 in.-lb).
- NOTE:** Do not overtighten the valve assembly. You might loosen the left-hand threaded seat retainer (21).
2. Place the pin (20) into the seat retainer (21).
  3. Insert the spring pad (14) and piston assembly (15 through 19) into the regulator body (28).
  4. Lubricate the thrust bearing (7) and washers (6 and 8) and install them on the adjusting screw (9 through 11).

5. Insert the adjusting screw assembly into the bonnet (5).
6. Align the threaded hole of the spring cap (10) with the opening in the bonnet. Install and tighten the set screw (12).
7. Set the load spring (13) on the spring pad.
8. Screw the bonnet into the regulator body (28).
9. Place the regulator body into a vise and tighten the bonnet to 67.8 N•m (50 ft-lb).
10. Place the hand knob (4) over the adjusting screw (9). Install a new retaining ring (2) on the adjusting screw. Install the button plug (1).

## Parts



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Figure 3 Hard Seat Fluid Pressure Regulator Parts

## Standard Regulator Parts

See Figure 3.

If you need assistance in ordering parts, contact your Nordson Corporation representative.

New regulators contain Viton O-rings. If you are using acetone or MEK, order and install the optional EPR (ethylene propylene) seal and hard seat service kit listed in *Options*.

Item	Part	Description	Quantity	Note
—	-----	REGULATOR, pressure, fluid, hard seat, 0–34.5 bar (0–500 psi)	1	
—	248830	REGULATOR, pressure, fluid, hard seat, 0.7–103.4 bar (10–1,500 psi)	1	
1	900768	• BUTTON, plug, 1.00 in.	1	
2	986106	• RETAINING RING, external, 62, basic	1	A
3	145354	• LABEL, hand knob, increase/decrease	1	
4	145355	• KNOB, hand, regulator	1	
5	145356	• BONNET, regulator	1	
6	983030	• WASHER, thrust, thin, pressure regulator	1	
7	145357	• BEARING, thrust	1	
8	983031	• WASHER, thrust, thick, pressure regulator	1	
9	981486	• SCREW, adjusting, non-venting	1	
10	145408	• CAP, spring, regulator	1	
11	342294	• NUT, hex, jam, 3/8-24 in., left-hand threads	2	
12	227414	• SCREW, socket set, 1/4 x 20 x 0.50 in., flat, zinc	1	
13	328732	• SPRING, compression (0–500 psi)	1	B
13	145358	• SPRING, compression (10–1,000 psi)	1	B
14	145407	• PAD, spring, hard seat/soft seat	1	
15	145410	• ADAPTER, back-up, hard seat/soft seat	1	C
16	954120	• BACK-UP RING, single, 1.00-in. ID	1	A, C
17	941203	• O-RING, Viton, black, 1.000 x 1.188 in.	1	A, C
18	145359	• PISTON, regulator, hard seat/soft seat	1	C
19	941225	• O-RING, Viton, black, 1.125 x 1.313 in.	1	A, C
20	109440	• PIN, hard seat	1	
21	227412	• RETAINER, seat	1	
22	954043	• BACK-UP RING	1	
23	941136	• O-RING, Viton, black, 0.562 x 0.750 in.	1	A
24	145362	• BODY, valve, soft seat regulator	1	
25	323649	• STEM, valve	1	A
26	987040	• SPRING, compression, 0.630 x 0.290 OD x 0.034 in.	1	A
27	145372	• RETAINER, spring, soft seat regulator	1	
28	145537	• BODY, ported, hard seat regulator	1	

NOTE A: These parts (or their equivalents) are included in both of these optional kits:

Kit 106421: seal/hard seat service kit with Viton O-rings

Kit 106422: seal/hard seat service kit with EPR (ethylene propylene) O-rings

B: Use the 382732 spring in the 771219 regulator and the 145358 spring in the 248830 regulator.

C: These parts are included in the hard seat/soft seat regulator piston service kit, part 188035.

## Standard Viton Seal and Hard Seat Service Kit

See Figure 3.

This kit includes replacement seals for standard regulators used with toluene, xylene, and butysol.

Item	Part	Description	Quantity	Note
—	106421	SERVICE KIT, seal/hard seat, Viton	1	
2	986106	• RETAINING RING, external, 62, basic	1	
16	954120	• BACK-UP RING, single, 1.00-in. ID	1	
17	941203	• O-RING, Viton, black, 1.000 x 1.188 in.	1	
19	941225	• O-RING, Viton, black, 1.125 x 1.313 in.	1	
21	227412	• RETAINER, seat	1	
22	954043	• BACK-UP RING	1	
23	941136	• O-RING, Viton, black, 0.562 x 0.750 in.	1	
25	323649	• STEM, valve	1	
26	987040	• SPRING, compression, 0.630 x 0.290 x 0.034 in.	1	

## Hard Seat/Soft Seat Regulator Piston Service Kit

Order this service kit only if your regulator has the old piston design. This kit contains a replacement piston to convert your regulator to the new design.

See Figure 4 to find out if your regulator already has the new piston. If it does, you do not need this kit.

See Figure 3 to identify the item numbers in the following parts list.

Item	Part	Description	Quantity	Note
—	188035	SERVICE KIT, regulator, piston, hard seat/soft seat	1	
15	145410	• ADAPTER, back-up, hard seat/soft seat	1	
16	954120	• BACK-UP RING, single, 1.00-in. ID	1	
17	941203	• O-RING, Viton, black, 1.000 x 1.188 in.	1	A
18	145359	• PISTON, regulator, hard seat/soft seat	1	
19	941225	• O-RING, Viton, black, 1.125 x 1.313 in.	1	A

NOTE A: When using acetone or MEK, order EPR O-rings, parts 941202 and 941223. Refer to the EPR seal and hard seat service kit in *Options*.

## Gauges

Item	Part	Description	Quantity	Note
NS	1600090	GAUGE, fluid pressure, 0–70 bar (0–1000 psi)	1	A
NS	901265	GAUGE, fluid pressure, 0–140 bar (0–2000 psi)	1	B

NOTE A: Use with the 771219 regulator (0–500 psi).  
 B: Use with the 248830 regulator (10–1500 psi).  
 NS: Not Shown

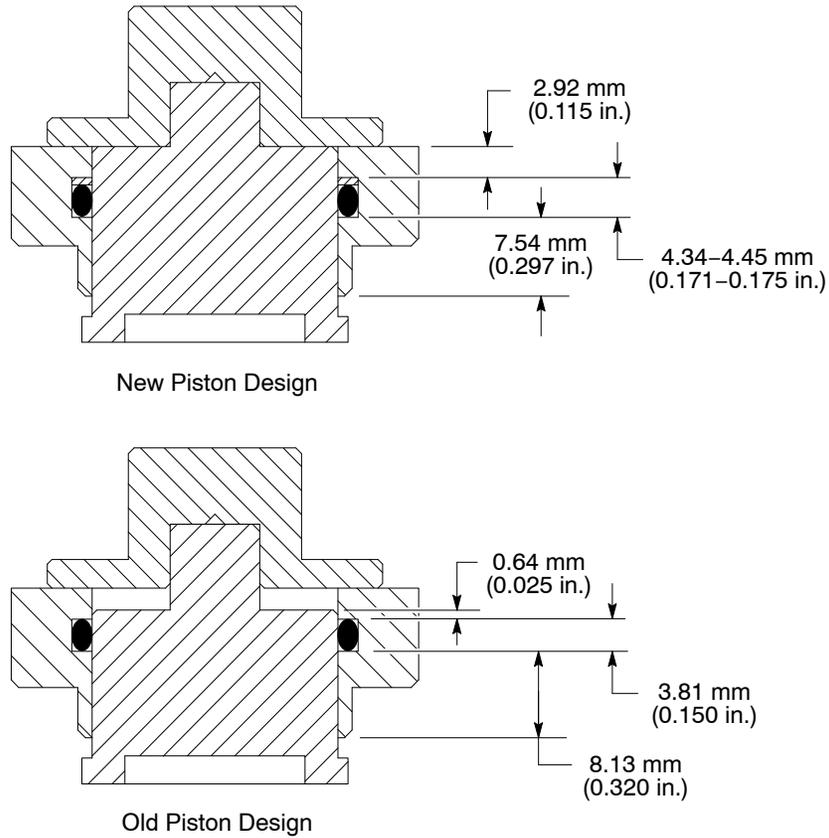


Figure 4 Old and New Piston Designs

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## Options

### Ethylene Propylene Seal and Hard Seat Service Kit

See Figure 3.

Install this kit when using acetone or MEK.

Item	Part	Description	Quantity	Note
—	106422	SERVICE KIT, seal/hard seat, EPR	1	
2	986106	• RETAINING RING, external, 62, basic	1	
16	954120	• BACK-UP RING, single, 1.00-in. ID	1	
17	941202	• O-RING, EPR, 1.000 x 1.188 x 0.094 in.	1	
19	941223	• O-RING, EPR, 1.125 x 1.313 x 0.094 in.	1	
21	227412	• RETAINER, seat	1	
22	954043	• BACK-UP RING	1	
23	941135	• O-RING, EPR, 0.562 x 0.750 x 0.094 in.	1	
25	323649	• STEM, valve	1	
26	987040	• SPRING, compression, 0.630 x 0.290 OD x 0.034 in.	1	

## Carbide Needle and Soft Seat Service Kit

If you use extremely abrasive materials, installing a carbide needle and seat will provide longer service life. The service kit includes a carbide needle and seat and both Viton O-rings for use with toluene, xylene, or butysol, and ethylene propylene O-rings for use with acetone or MEK.

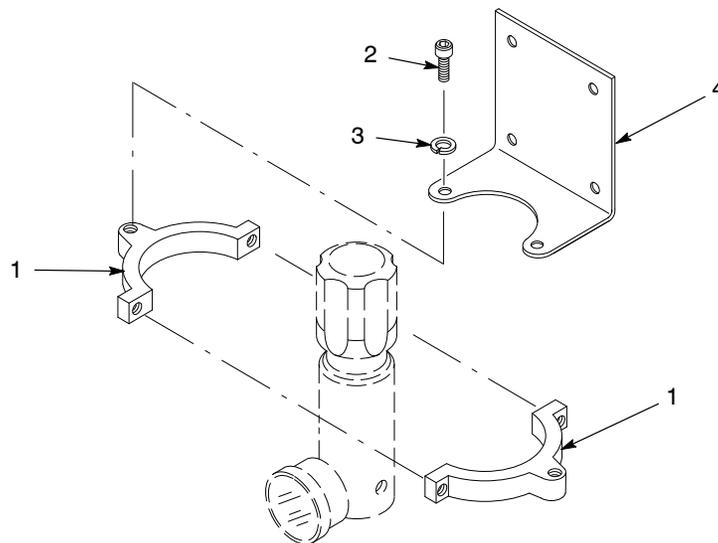
**NOTE:** Order all parts listed to convert to a carbide needle and seat. The pin for the carbide seat (19.38 mm (0.763 in.) is shorter than the regular hard seat pin (20.24 mm (0.797 in.).

Part	Description	Note
324784	SERVICE KIT, regulator, needle and seat, carbide	
145361	RETAINER, seat, soft seat regulator	
109439	PIN, soft seat	

## Mounting Bracket

See Figure 5.

Item	Part	Description	Quantity	Note
—	243537	MOUNTING, fluid regulator	1	
1	145393	• BRACKET, mounting, back pressure regulator	1	
2	981208	• SCREW, hex, 1/4-20 x 0.625 in., zinc	2	
3	983140	• WASHER, lock, e, split, 0.250 in.	2	
4	1009071	• BRACKET, regulator, diaphragm	1	



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Figure 5 Regulator Mounting Bracket

## Main Valve Rebuild Wrench

Part	Description	Note
901940	WRENCH, rebuild, main valve	

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