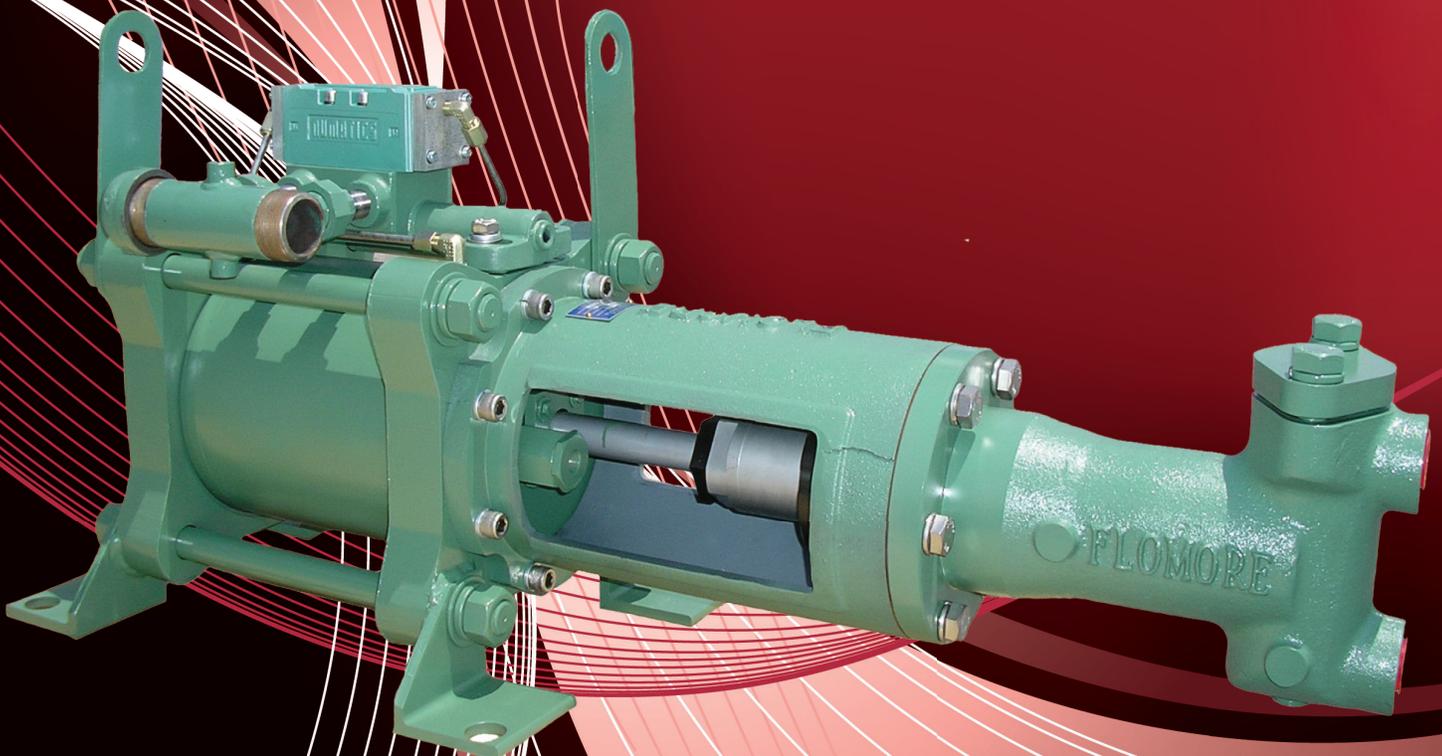


**FLOMORE**

*Different By Design*

# 6200 Series Injector



# ***6200 Series Specifications***

The Flomore 6200 Series Pump line consists of a series of basic pump options all developed from a modular power unit. All units are pneumatically driven positive displacement, single or double acting, reciprocating pumps.

The basic pump is designed for use with three fluid ends, a 1¼” and 2¾” diameter plunger, and a 4” piston. The fluid ends are interchangeable with the modular power unit and can be assembled as single ended units or double ended units in any combination of sizes. All fluid ends are designed to withstand maximum output force of the power unit.

Due to the balanced valving of the power cylinder it is, in theory, possible to operate the pump against a back pressure equal to the inlet power gas pressure; however, a differential in these two pressures must be maintained for the pump to stroke. See *Power to Fluid Ratio* below. When the exhaust gas is piped off to other areas, the pilot valves may also be connected to the pump exhaust manifold system.

Fluid ends are designed with removable check valves. These valves may be replaced without disconnecting the suction and discharge piping.

## ***Material Specifications***

<i><b>Power End</b></i>		<i><b>Fluid End Models 6211, 6212, 6221, &amp; 6222</b></i>		<i><b>Fluid End Models 6241 &amp; 6242</b></i>	
<i><b>Part</b></i>	<i><b>Material</b></i>	<i><b>Part</b></i>	<i><b>Material</b></i>	<i><b>Part</b></i>	<i><b>Material</b></i>
Main Power Cylinder	Carbon Steel	Pump Head Body	Cast Steel (316SS Optional)	Pump Head Body	Cast Steel (316SS Optional)
Power Cylinder End Cap	Carbon Steel	Valve Cover	Carbon Steel	Valve Cover	Carbon Steel
Power Piston	Aluminum	Valve Plug	Stainless Steel	Valve Plug	Stainless Steel
Power Piston Seals	Buna-N	Plunger	Stainless Steel	Roll Pin	Stainless Steel
Power Cylinder Seals	Buna-N	Valve Ball	Stainless Steel	Valve Ball	Stainless Steel
Power Piston Rod	Stainless Steel	Valve Seat Insert	Stainless Steel	Valve Seat Insert	Stainless Steel
Piston Rod Packing Gland	Carbon Steel	Valve Seat Gasket	Teflon	Valve Seat Gasket	Teflon
Piston Rod Packing	Optional	Valve Seat Seals	Buna-N	Piston	Carbon Steel
		Packing	Optional	Piston Cup	Buna-N
		Lantern Ring	Stainless Steel	Piston Rod	Stainless Steel
		Packing Gland	Delrin	Cylinder	Cast Ductile Iron
		Packing Nut	Carbon Steel	Cylinder Sleeve	Stainless Steel

# *Installation and Operating Instructions*

1. Remove pump from shipping container and inspect for possible shipping damage. If damaged, file a claim with the carrier.
2. Mount pump by bolting to a stable foundation. Four legs are supplied on the power unit for this purpose.
3. Connect fluid suction and discharge lines. Caution should be exercised to avoid piping stresses to the fluid head of the pump. A relief valve should be installed in the discharge line between the discharge check valve and the nearest shut off valve or auxiliary check valve.

***Caution: When pump is installed in a closed or hazardous area, power gas exhaust (including pilot devices) must be vented in a safe manner. All gas connections must be checked periodically for leaks. If power gas or air supply pressure exceeds 250 PSIG, a regulator and pressure relief valve of proper size must be installed.***

4. Connect power supply lines as shown in Figure 1. Power supply pressure must not exceed 250 PSIG.
5. Fill lubricator reservoir with 1 quart SAE 10, SAE 20, or SAE 30 non-detergent oil dependent upon operating temperature.
6. For connections where it is necessary to pipe off exhaust gas such as back pressure service or pollution control, refer to Figure 3. Order Exhaust Manifold B-1126 and make all connections shown in Figure 4.
7. Open supply line slowly in order to check pump and system operation.
8. Adjust supply volume and pressure to regulate operating speed to meet desired conditions of discharge pressure and volume.
9. Adjust lubricator to minimum supply rate.
10. On 6200 pumps maintain plunger lubrication by adjusting grease jack periodically.

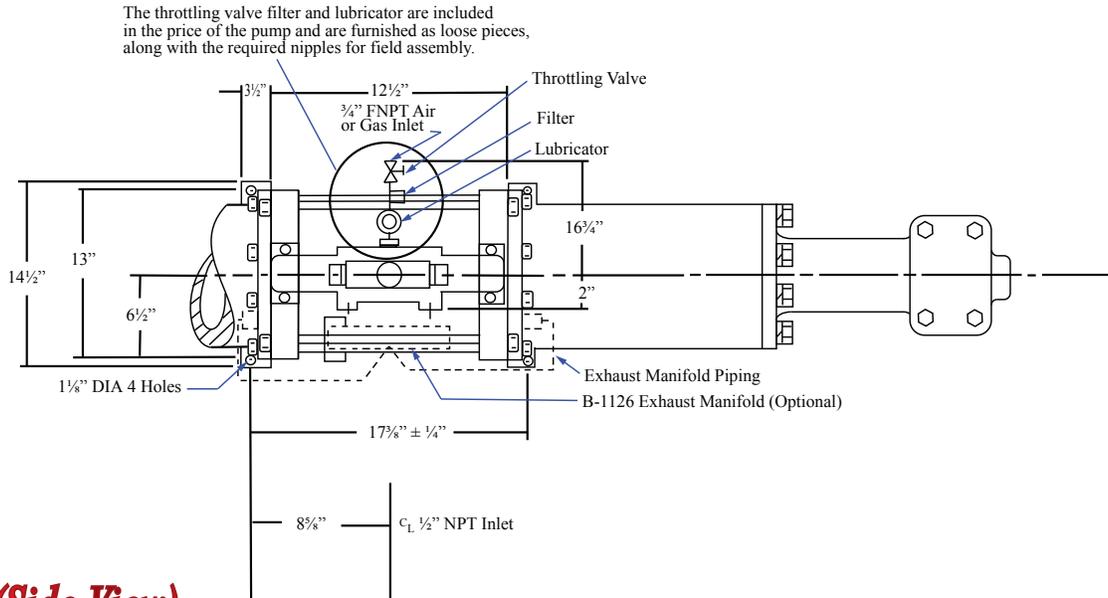
***\*For safe operation, a safety valve sized to meet the maximum capacity of the supply source should be installed in the supply line at or near the pump.***

<b><i>Operational Data</i></b>			
Plunger Size	1¼"	2¾"	4"
Pump Model Number	6211	6221	6241
Fluid Discharge Pressure Maximum	9000 PSI	1800 PSI	900 PSI
Fluid Discharge Volumes up to Maximum Pressure	See Chart Page 12	See Chart Page 12	See Chart Page 12
Operating Speed Maximum and Minimum	See Chart Page 12	See Chart Page 12	See Chart Page 12
Power/Fluid Power Ratio <small>(Inlet Gas Pressure - Exhaust Back Pressure) x Power to Fluid Ratio = Maximum Fluid Discharge Pressure at Stall</small>	40:1	8:1	4:1
Pneumatic Pressure Required to Operate Pump	See Chart Page 12	See Chart Page 12	See Chart Page 12
Maximum Temperature	200°F with Buna-N Trim 400°F with Viton Trim		
Minimum NPSHR	8 Feet of Water		

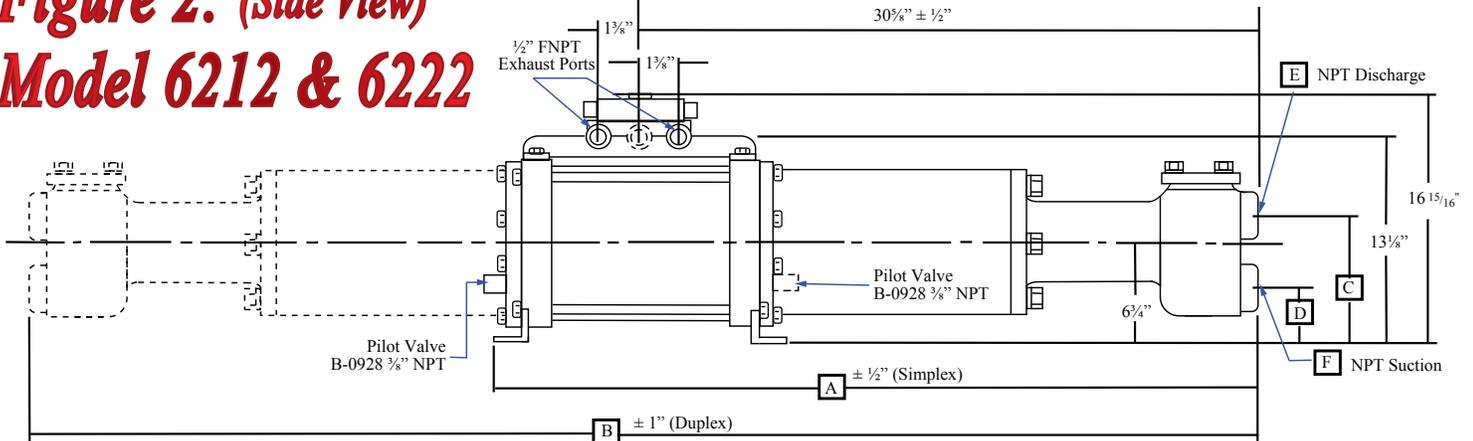
# Dimensional Data

*NOTE: Do not use for construction. Contact factory for certified dimensions when required.*

**Figure 1: Model 6211 & 6221**  
**(Top View)**



**Figure 2: (Side View)**  
**Model 6212 & 6222**



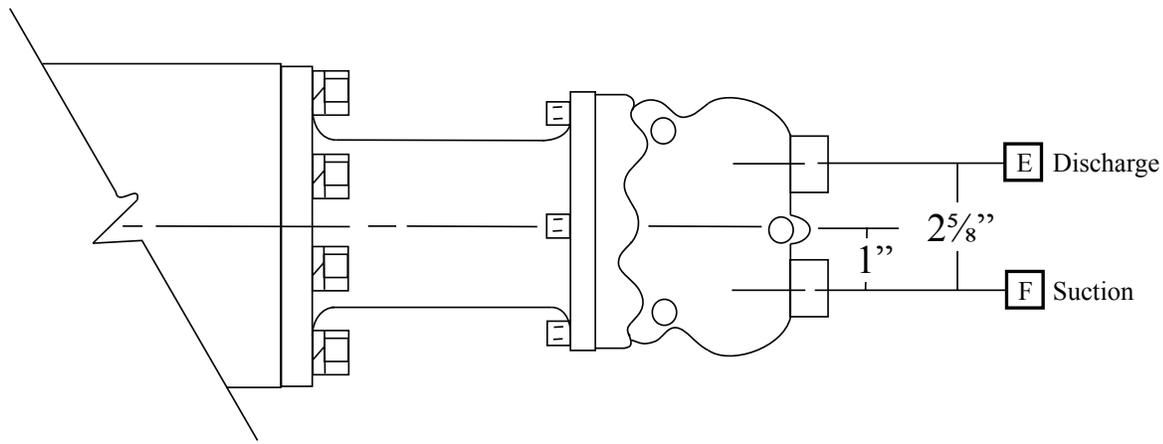
## Weights & Dimensions

Model #	A	B	C	D	E	F	Weight
6211	40 1/4	◆	8 5/8	4 11/16	3/4	3/4	260
6212	◆	61 1/4	8 5/8	4 11/16	3/4	3/4	340
6221	40 1/4	◆	9 5/16	4 1/4	1	1	268
6222	◆	61 1/4	9 5/16	4 1/4	1	1	362
6241	42 1/2	◆	9 23/32	3 5/8	2	2	315
6242	◆	65 5/8	9 23/32	3 5/8	2	2	430

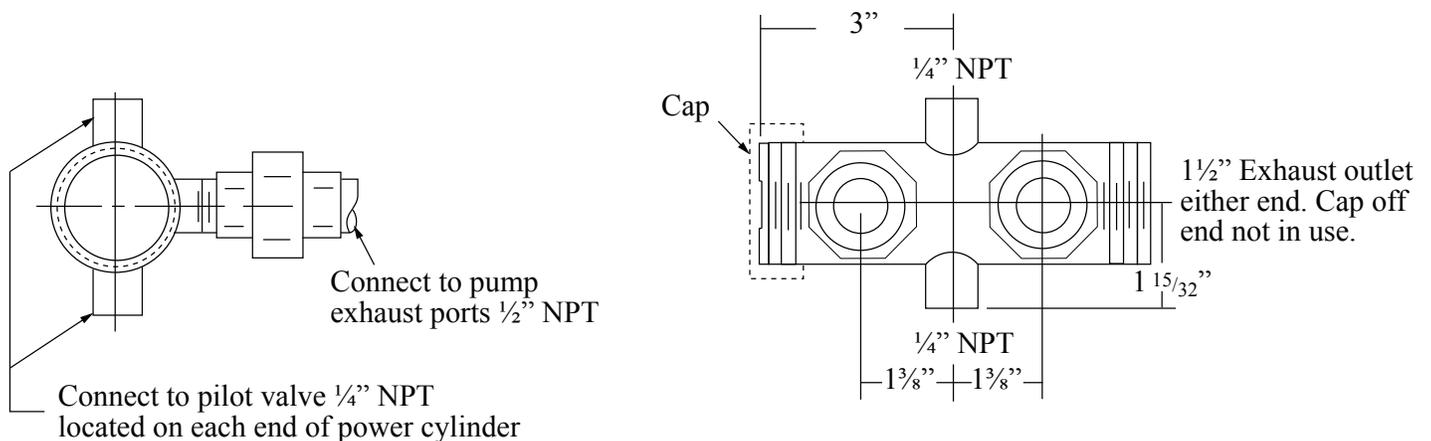
# *Dimensional Data*

*NOTE: Do not use for construction. Contact factory for certified dimensions when required.*

## *Figure 3: Model 6241*

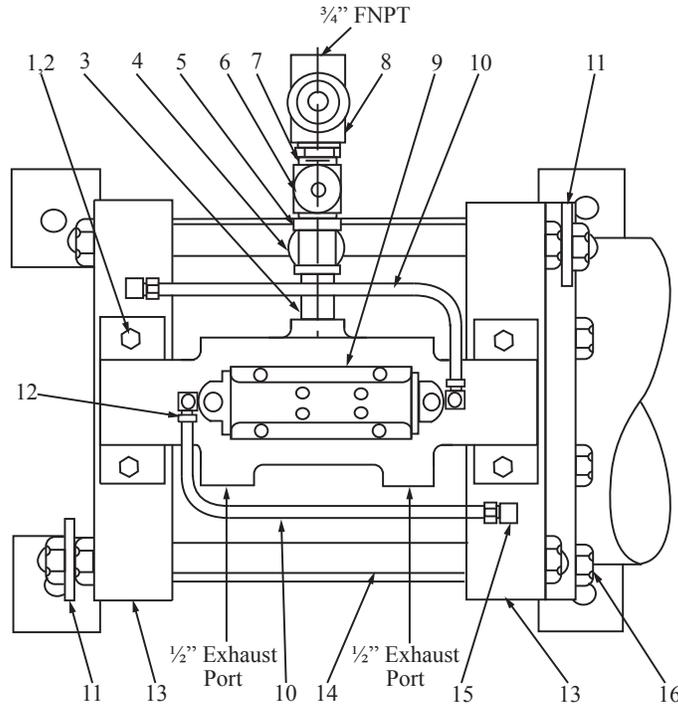


## *Figure 4: Exhaust Manifold B-1126 (optional)*

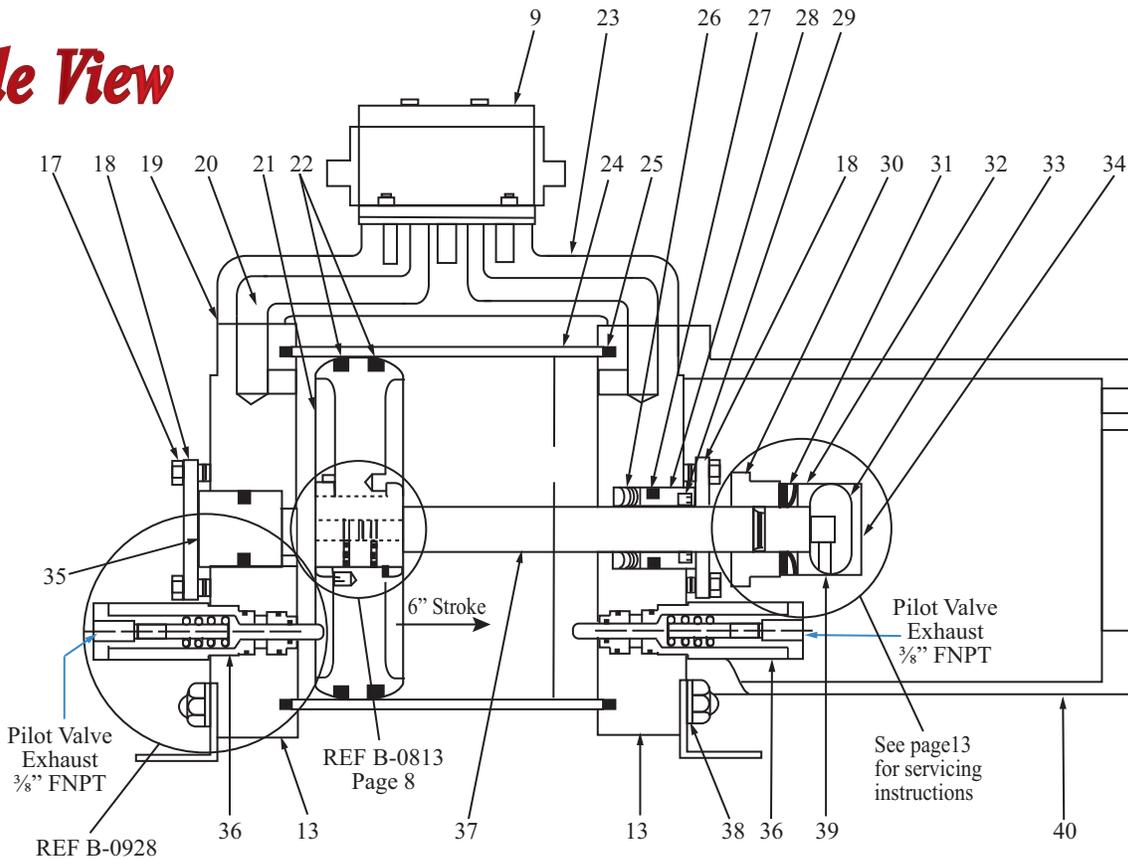


# *6200 Series Power Unit (D-0365)*

## *Top View*



## *Side View*



# Parts List

<i>Item</i>	<i>Part #</i>	<i># Req'd.</i>	<i>Description</i>	<i>Material</i>
1	A-2813	4	Lock Washer	304 Stainless Steel
2	61283P015	4	Hex Head Cap Screw	316 Stainless Steel
3	A-3241	1	Nipple	Steel
4	A-3221	1	Lubricator (1 quart capacity)	Aluminum
5	A-3242	2	Nipple	Steel
6	A-3220	1	Filter	Aluminum
7	A-3243	1	Hex Bushing	Steel
8	A-3209	1	¼" Capacity Control Ball Valve	316 Stainless Steel
9	B-1510	1	Spool Valve Assembly	Various
10	A-5690	2	Line	304 Stainless Steel
11	A-2839	2	Lifting Eye	Steel
12	A-3364	2	90° Male Elbow	Cadmium Plated Steel
13	C-0533	2	End Cap	Steel
14	A-4451	4	Stud and Nut Assembly	304 Stainless Steel / Steel
15	A-3244	2	90° Male Elbow	Cadmium Plated Steel
*16	A-2521	8	Hex Head Cap Screw	304 Stainless Steel / Steel
17	A-0163SS	8	Hex Head Cap Screw	304 Stainless Steel
18	A-2781	2	Packing Plate	Steel
19	A-2898	2	Gasket	Buna-N and Cork
20	A-4517	2	Wire Screen Filter	Brass
21	B-0813	1	Power Piston Assembly	Aluminum
22	A-3761	2	Piston Seals	Buna-N
23	C-2061	1	Manifold	Ductile Iron
24	B-0815	1	Power Cylinder	Steel
25	A-2859	2	O'Ring	Buna-N
*26	A-2860	1	Power Rod Packing	Buna-N
27	A-1962	2	O'Ring	Buna-N
*28	A-2786	1	Gland Bushing	Cast Iron
*29	A-2897	1	Wiper Ring	Buna-N
*30	A-2803	1	Retainer	Steel
*31	A-2854	4	Belleville Washer	Steel
*32	A-2783	1	Back-up Ring	Steel
*33	A-2782	1	Ball Bearing Connection	Carbon Steel
*34	A-2787	1	Thrust Bearing	Carbon Steel
35	A-2830	1	End Plug	Cast Iron
36	B-0928	2	Pilot Valve	See Page 8
*37	B-0810	1	Power Piston Rod	17-4 pH Stainless Steel
38	A-2813LW	8	Lock Washer	304 Stainless Steel
*39	A-3250	1	Set Screw	Steel
*40	D-0310	1	Spacer	Ductile Iron
41	A-0171	2	Pin (not shown)	Brass
42	A-0172	1	Nameplate (not shown)	Stainless Steel

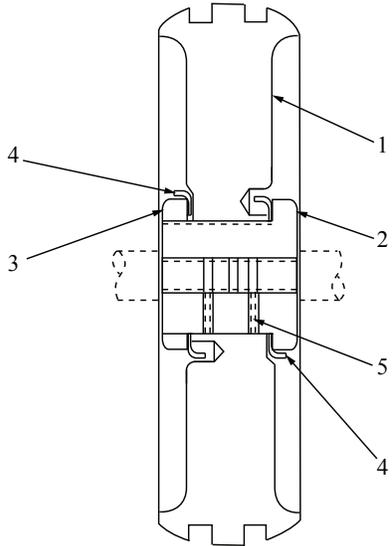
Notes: *Recommended Spare Parts*

*\*Two parts or sets required on double head configurations*

*Required only on single head configuration*

# 6200 Series Components

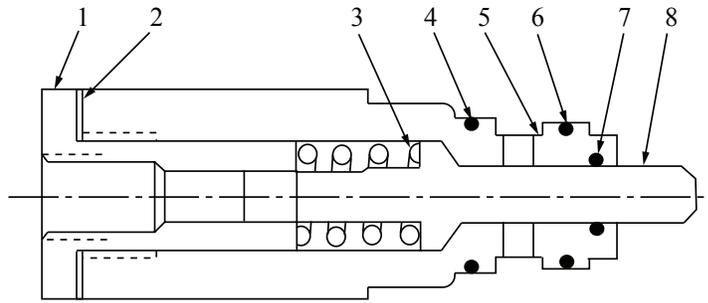
## Power Piston B-0813



(See Servicing Instructions - Page 13 & 14)

Item	Part #	# Reqd.	Description	Material
1	C-0789	1	Piston	Aluminum
2	B-1125	1	Bushing	Steel
3	A-3760	1	Bushing Nut	Steel
4	A-3759	2	Locking Ring	Steel
5	A-3762	1-Simplex 2-Duplex	Set Screw	Steel

## Pilot Valve B-0928 Two Required

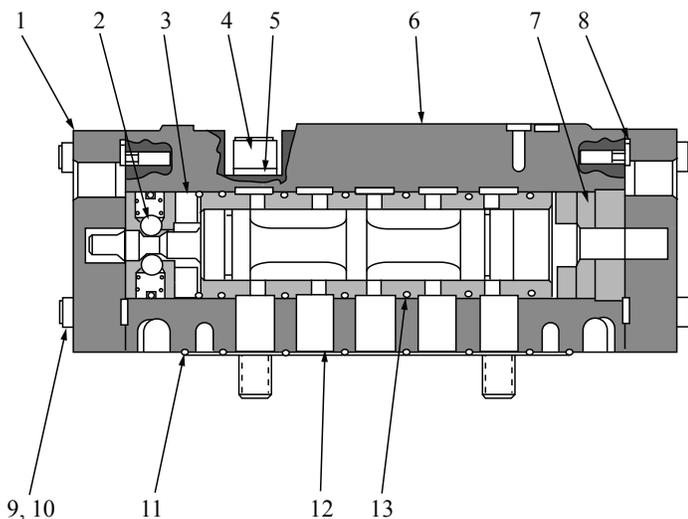


(See Servicing Instructions - Page 13)

Item	Part #	# Reqd.	Description	Material
1	A-2901	1	Sleeve Adapter	Stainless Steel
2	A-3024	1	Gasket	304 Stainless Steel
3	A-1053	1	Spring	Steel
4	A-3219	1	O'Ring	Buna-N
5	B-0817	1	Pilot Valve Body	Steel
6	A-3212	1	O'Ring	Buna-N
7	A-0612	1	O'Ring	Buna-N
8	A-2805	1	Plunger	Delrin

\*Recommended Spare Parts

## Spool Valve B-1510

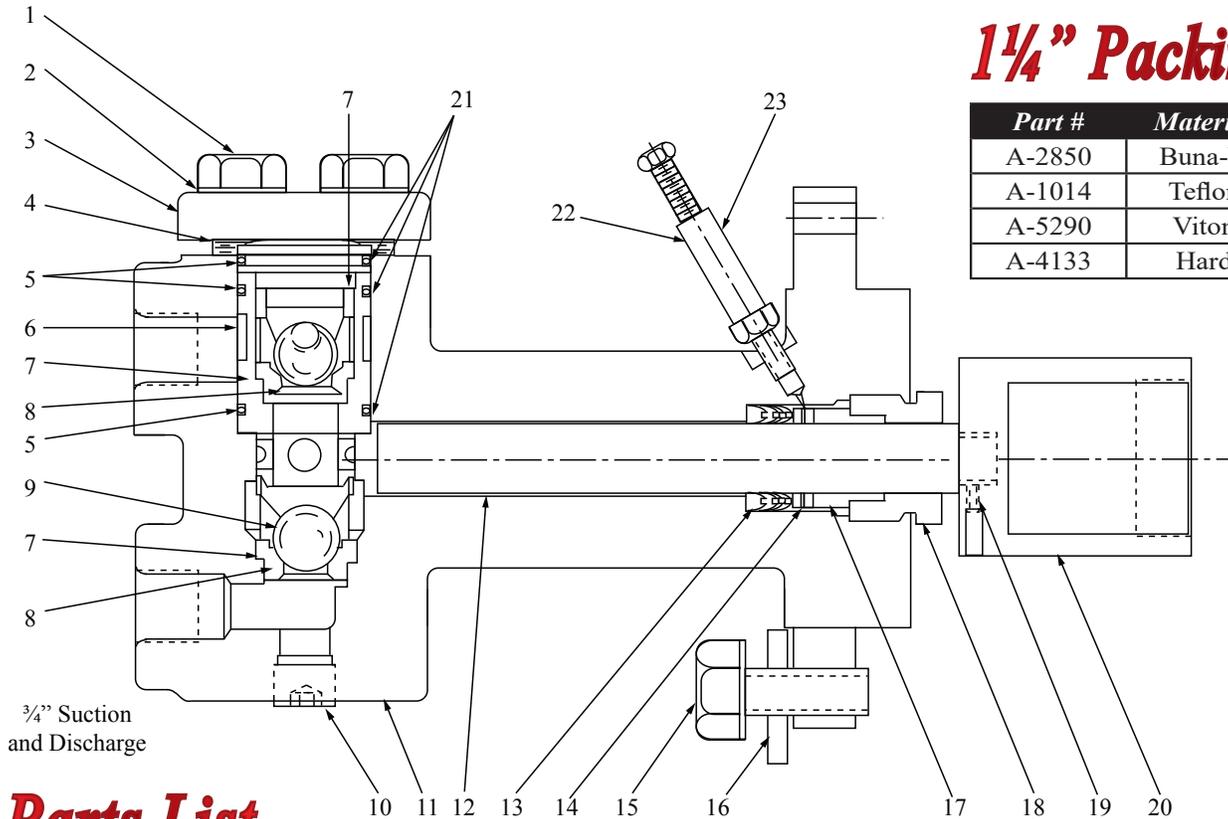


Item	Part #	# Reqd.	Description	Material
1	A-6191	2	End Cap	Aluminum
2	A-6175	1	Detent Assembly	Aluminum
3	A-6176	2	Bumper	Urethane
4	A-6177	4	Screw	Carbon Steel
5	A-6178	4	Lock Washer	Carbon Steel
6	♦	1	Body Assembly	Aluminum
7	A-6179	1	Bumper	Urethane
8	A-6180	2	O'Ring	Buna-N
9	A-6181	8	Screw	Carbon Steel
10	A-6185	8	Lock Washer	Carbon Steel
11	A-6182	1	Gasket	Buna-N
12	A-6184	1	Sleeve Assembly	Stainless Steel
13	A-6183	6	O'Ring Seal	Buna-N

# Models 6211 & 6212

## 1 1/4" High Pressure Pump Head Assembly

(D-0318 Cast Steel) (C-1980-0 Stainless Steel)



### 1 1/4" Packing Chart

Part #	Material	Max W.P.
A-2850	Buna-N	3000
A-1014	Teflon	500
A-5290	Viton	3000
A-4133	Hard	9000

### Parts List

Item	Part #	# Req'd.	Description	Material
1	A-2868	4	Hex Head Cap Screw	316 Stainless Steel
2	A-2756	4	Washer	316 Stainless Steel
3	B-0816	1	Cover	Steel
4	A-2849	1	Valve Plug	Stainless Steel
5	A-2852	5	Back-up Ring	Teflon
6	B-0812	1	Spacer	316 Stainless Steel
7	61421P004	3	Gasket	Teflon
8	61437P023	2	Valve Seat Insert	316 Stainless Steel
9	61265P041	2	7/8" Valve Ball	440C Stainless Steel
10	A-2152	1	Pipe Plug	Steel
11	D-0500	1	Pump Head Body	Cast Steel
11.1	D-0500-SS	1	Pump Head Body	Stainless Steel
12	B-1609	1	Plunger	17-4 pH Stainless Steel
13	See Packing Chart	1	Packing	See Packing Chart
14	A-2855	1	Lantern Ring	304 Stainless Steel
15	A-3239	6	Cap Screw	316 Stainless Steel
16	A-3060	6	Lock Washer	316 Stainless Steel
17	A-2788	1	Packing Gland	Delrin
18	A-2789	1	Packing Nut	Steel
19	A-3250	1	Set Screw (S.H.)	303 Stainless Steel
20	A-2780	1	Ball Cup Connection	Steel
21	A-2856 or A-4479	3	O'Ring	Buna-N Viton
22	A-3179-1 A-3179-2	◆	1 Lube Stick 72 Stick Carton	◆
23	A-0558	1	Grease Jack	Steel

\*Recommended Spare Parts

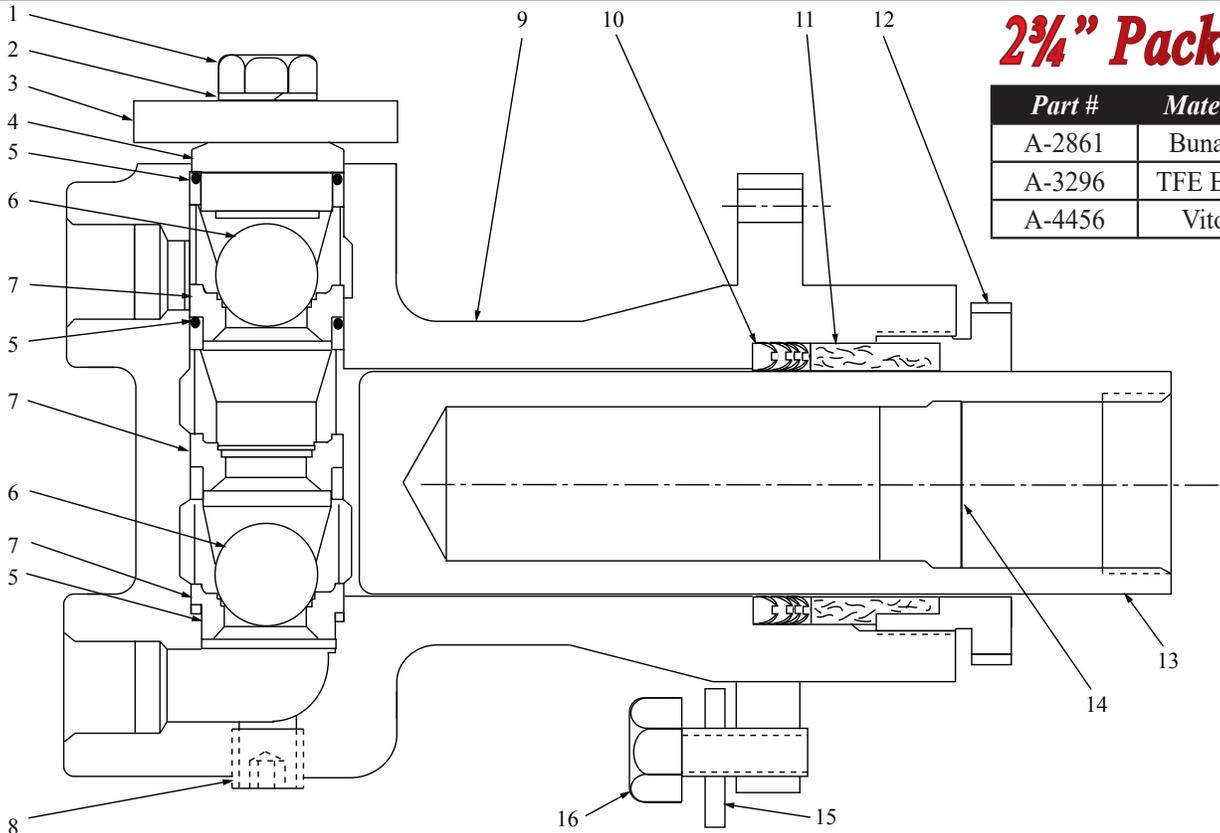
Not Included in Assembly

# Models 6221 & 6222 2 3/4" Pump Head Assembly

(D-0314 Cast Steel) (C-1979-0 Stainless Steel)

## 2 3/4" Packing Chart

Part #	Material	Max W.P.
A-2861	Buna-N	1800
A-3296	TFE Buna	1800
A-4456	Viton	1800



## Parts List

Item	Part #	# Req'd.	Description	Material
1	A-2868	2	Hex Head Cap Screw	316 Stainless Steel
2	A-2756	2	Washer	316 Stainless Steel
3	A-2800	1	Cover	Steel
4	A-3213	1	Valve Plug	Stainless Steel
5	A-3853 or A-4457	3	O'Ring	Buna-N
	Viton			
6	61265P061	2	1 1/4" Valve Ball	440C Stainless Steel
7	B-1022	3	Valve Seat Insert	316 Stainless Steel
8	A-2152	1	Pipe Plug	Steel
9	D-0501	1	Pump Head Body	Cast Steel
9.1	D-0501-SS	1	Pump Head Body	Stainless Steel
10	See Packing Chart	1	Packing	See Packing Chart
11	A-2784	1	Packing Gland	Delrin
12	B-0809	1	Packing Nut	Steel
13	B-0808	1	Plunger	17-4 pH Stainless Steel
14	A-2785	1	Thrust Plate	Steel
15	A-3060	6	Lock Washer	316 Stainless Steel
16	A-3239	6	Cap Screw	316 Stainless Steel

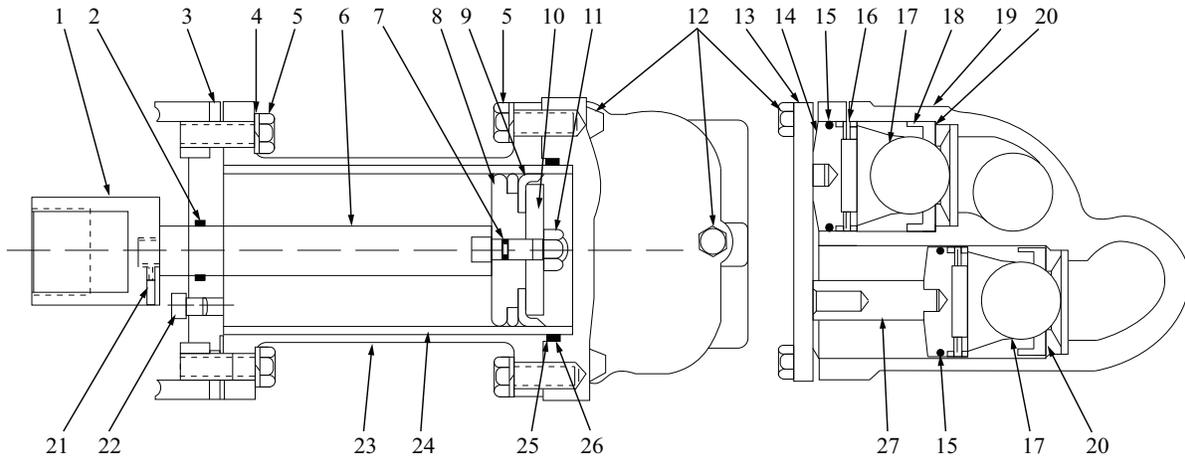
*\*Recommended Spare Parts*

*Not Included in Assembly*

# *Models 6241 & 6242*

## *4" Pump Head Assembly*

*(D-0348 Cast Steel) (C-1978-0 Stainless Steel)*



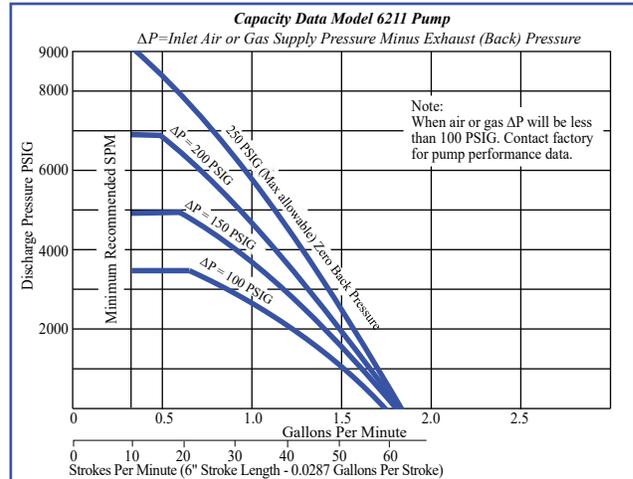
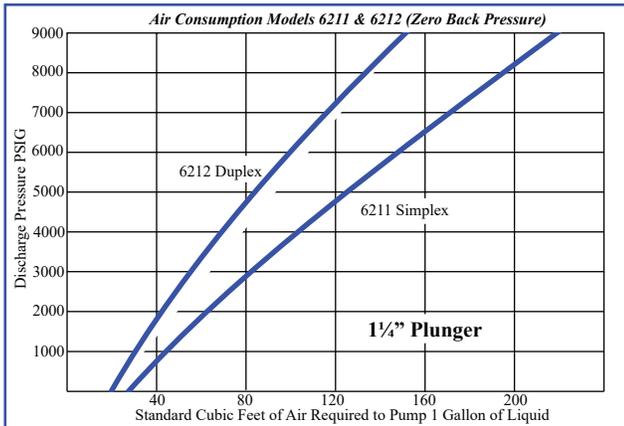
### *Parts List*

<i>Item</i>	<i>Part #</i>	<i># Req'd.</i>	<i>Description</i>	<i>Material</i>
1	A-2780	1	Connector Cup	Steel
2	A-2897	1	Wiper Ring	Buna-N
3	B-0856	1	End Plug	Steel
4	A-3060	12	Lock Washer	304 Stainless Steel
5	A-3240	6	Hex Head Screw	304 Stainless Steel
6	B-0854	1	Armaly Piston Rod	17-4 pH Stainless Steel
7	A-3226 or A-4254	1	O'Ring	Buna-N Viton
8	B-0857	1	Piston	Carbon Steel
9	A-3202	1	Piston Cup	Buna-N
10	A-3248	1	Backup Retainer	304 Stainless Steel
11	A-3246	1	Hex Nut	304 Stainless Steel
12	A-3245	3	Hex Head Screw	304 Stainless Steel
13	B-0855	1	Cover	Steel
14	A-3490	2	Valve Plug	316 Stainless Steel
15	A-2104 or A-2171	2	O'Ring	Buna-N Viton
16	A-3514	4	Roll Pin	316 Stainless Steel
17	61265P071	2	2" Valve Ball	440C Stainless Steel
18	B-1023	2	Valve Seat Insert	316 Stainless Steel
19	D-0504	1	Pump Head Body	Cast Steel
19.1	D-504-SS	1	Pump Head Body	Stainless Steel
20	61421P006	2	Gasket	Teflon
21	A-3250	1	Set Screw	304 Stainless Steel
22	A-1835	1	Breather	Assembly
23	C-0390	1	Cylinder	Cast Ductile Iron
24	B-0950	1	Sleeve	304 Stainless Steel
25	A-2148	1	Backup Ring	Buna-N
26	A-3218 or A-2155	1	O'Ring	Buna-N Viton
27	A-3051	1	Plug Extension	303 Stainless Steel

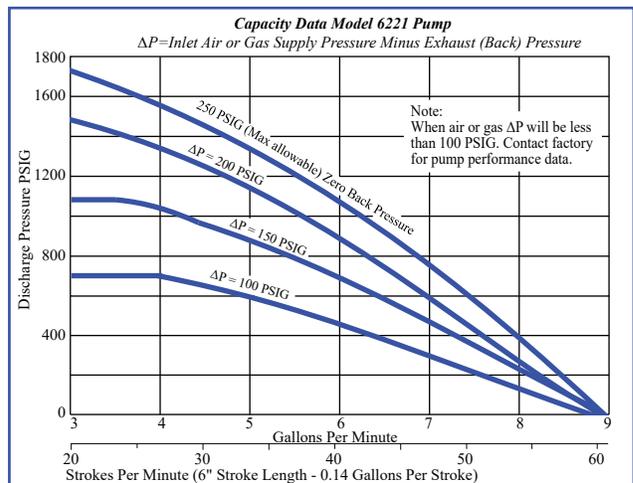
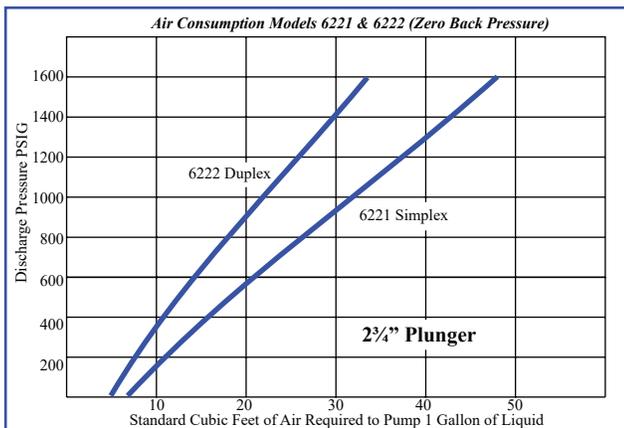
*\*Recommended Spare Parts*

# Performance Data

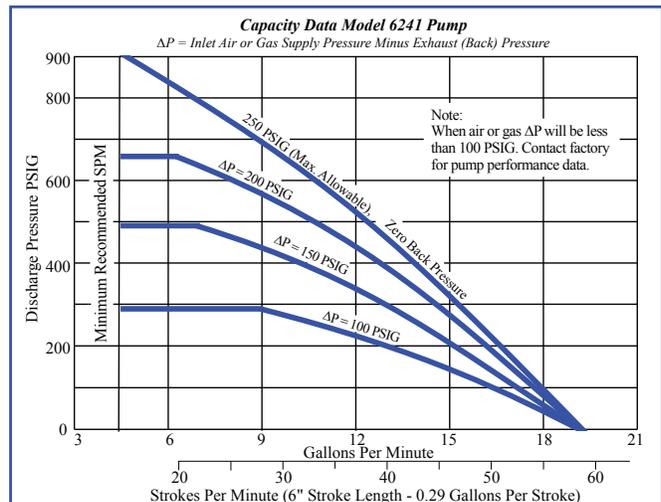
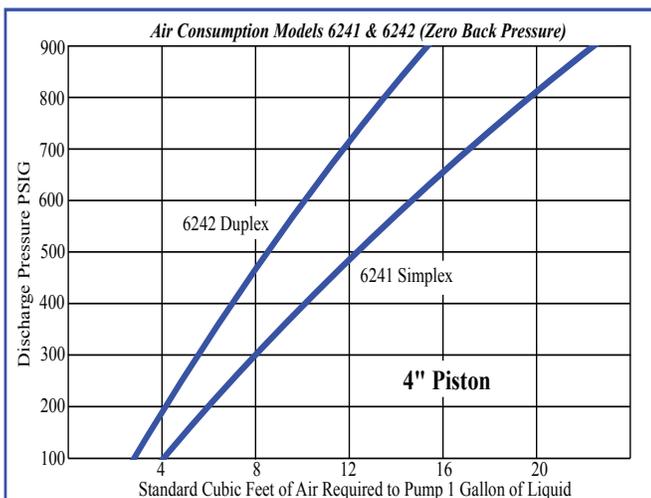
## Models 6211 & 6212



## Models 6221 & 6222



## Models 6241 & 6242



# Servicing Instructions

## **Power Unit D-0365, Page 6 & 7**

**CAUTION:** Prior to performing any maintenance on the power or fluid end of this pump, all pneumatic and hydraulic pressure must be removed and isolated from the unit.

Item #9 B-1510 (page 8) valve is a 2-position, 4-way spool valve with internal parts for bleeder pilot operation. To inspect, proceed as follows:

1. Remove 4 allen head cap screws #9 from pilot end caps.
2. Remove pilot end cap. (One end cap contains the detent body springs and balls.)
3. Remove bumper #7.
4. Remove spool and examine.
5. If required, the sleeve assembly #12 can be removed; however, this assembly contains the static o'ring seals and may be difficult to reassemble.
6. To remove valve from pump, loosen 4 cap screws.

**NOTE:** When reassembling, extreme care must be exercised to eliminate damage to the static o'rings, to eliminate contamination on the sleeve and/or spool, and to protect end gaskets.

Item #11 Control Lines: All connections must be tight and leak free.

Item #23: Manifold must be securely fastened at both end cap connections and to the spool valve. When reassembling this unit, care must be exercised to protect o'ring seals as leakage in this area will cause unit to short stroke or make unit entirely inoperative.

Pilot valve assembly may be removed from the power end cap #13 as a unit. In reassembling this unit, care must be exercised to protect o'ring seals as leakage in this area will cause unit to short stroke or make unit entirely inoperative.

## **Disassembly of Pilot Valve B-0928, Page 8**

1. Remove adapter #1 from sleeve #5.
2. Remove spring #3 and examine for set and stress failure.
3. Remove plunger #8 and examine angled seat face and O.D. surface of probe end. Probe end must be smooth enough to effect a pneumatic seal with o'ring #7.
4. Examine all o'rings and replace if necessary.

## **Disconnect Fluid Head from Power Cylinder Page 6**

1. Position pump in discharge position if possible.
2. Remove retainer #30 from cup (this is a right hand thread).

## **Disconnect Fluid Head from Power Cylinder Page 6 Continued**

3. Slowly apply power to withdraw power piston rod #37 from cup. If pump does not operate this connection may be pried apart.

## **Disassembly of Power Cylinder (Power Unit D-0365, Page 6 & 7)**

1. Loosen set screw #39 and remove connector bearing ball #33 from end of rod #37.
2. Remove back-up ring #32, Belleville washers #31 and retaining nut #30.
3. Remove 4 hex head screws #17 and packing plate #18.
4. Disconnect both pilot control lines #10.
5. Remove 4 manifold bolts #2. The valve and manifold assembly may be removed from the power cylinder.
6. Remove tie down bolts.
7. Remove hex nuts #1 from one end of each tie rod #14.
8. Remove end caps #13 from cylinder #24.
9. Remove piston #21 and power piston rod #37 from cylinder #24.

## **Disassembly of Power Piston B-0813, Page 8**

1. Bend down tab on both locking rings #4.
2. Remove bushing nut #3 from bushing #2.
3. Remove bushing #2 (with piston rod attached) from piston #1.
4. Remove set screw #5 from bushing #2.
5. Remove power piston rod from bushing #2.

## **Assembly of Power Piston B-0813, Page 8**

1. Install B-0810 power piston rod/rods into bushing #2 using Loctite #242 and tighten securely.
2. Install set screw/screws #5 using Loctite #242 and tighten firmly against power piston rod/rods.
3. Bend one (1) tab on each of two (2) locking rings #4, 90° to the plane of the ring.
4. Place one (1) locking ring #4 over bushing #2 (bent tab positioned away from bushing shoulder) and install assembly into piston #1 using Loctite #242. Position locking ring #4 with bent tab engaged in hole in piston #1. Tighten bushing assembly into piston as tightly as possible.

# ***Servicing Instructions***

## ***Assembly of Power Piston B-0813, Page 8 Continued***

3. Place other locking ring #4 over exposed thread on bushing #2 with bent tab positioned to engage hole in piston #1. Install bushing nut #3 and tighten as tight as possible.
4. Bend one exposed tab on each locking ring #4 up against a flat surface of the hex on both the bushing #2 and bushing nut #3.
5. Allow assembly to set one hour minimum for Loctite to fix.

## ***Assembly of Power Unit D-0365, Page 6 & 7***

1. Lubricate I.D. of cylinder #24 and examine for surface defects.
2. Install piston seals ring #22 into last groove to inner cylinder #24 and insert piston #21 into cylinder.
3. Pass piston #21 through cylinder #24 until second groove is exposed.
4. Install other piston seal ring #22 and draw piston #21 back into cylinder #24.
5. Examine ends of cylinder for possible damage. Place o'ring #25 into groove in end cap #13 and install cylinder #24 into recess taking care not to pinch or otherwise damage o'ring.
6. Place o'ring #25 into groove in other end cap #13.
7. Insert power piston rod #37 through center hole in end cap #13.
8. Install tie rods #14. Torque hex nuts to approximately 130 ft/lbs. Make sure end plates #13 are brought up uniformly.
9. Position manifold gaskets #19 and manifold #23 over ports in end caps #13 making sure that gaskets do not block ports.
10. Secure manifold #23 with hex head cap screws #2 by tightening to approximately 20-25 ft/lbs.
11. Install valve gasket and spool valve #9 and secure to manifold #23 with 4 socket head cap screws #4.
12. Install pilot control lines #10.
13. Lubricate center bore of end cap #13 and O.D. of power piston rod #37 and install rod packing #26.
14. Install o'ring #27 and wiper ring #29 into gland bushing #28.
15. Place gland bushing #28 over power piston rod #37 and seat into place against packing #26.
16. Position packing plate #18 against gland bushing #28 and tighten into place with 4 hex head cap screws #17. Do not over-tighten.

## ***Assembly of Power Unit D-0365, Page 6 & 7 Continued***

17. For double ended pumps, repeat steps 14 through 17 for opposite end. For single ended pumps, place o'rings #27 onto end plug #35. Lubricate with a suitable grease and install end plug into end cap #13.
18. Secure end plug #35 with packing plate #18 and 4 hex head cap screws #17 at approximately 10 ft/lbs. torque.
19. Assemble 2 pilot valves B-0928, Page 8, steps (a) through (e)
  - (a) Install o'ring #7 into I.D. of sleeve #5.
  - (b) Install o'rings #6 and #4 onto O.D. of sleeve #5.
  - (c) Lubricate plunger #8 and insert into sleeve #5.
  - (d) Place spring #3 over exposed end of plunger #8.
  - (e) Install gasket #2 over end of adapter #1 and install adapter into sleeve #5.
20. Lubricate O.D. seals of adapter #36 and install one pilot valve assembly into each end cap #13.
21. Place retainer #30, 3 Belleville washers #31 and a back-up ring #32 over the end of the power piston rod #37.
22. Install spacer #40 onto end cap #13 using 8 cap screws #16. Spacer should be oriented with 1/2" drain on bottom. (Two spacers required for double ended pumps.)

## ***Assembly of 6211 Head Assembly, Page 9***

1. Examine head body #11 to make sure valve cage seating surface and packing areas are free of nicks and burrs. Check all thread areas for condition of threads.
2. Install seal #7 onto seal surface.
3. Install lower valve cage #8 and ball #9 into valve bore of pump head #11.
4. Install o'rings #21 and back-up rings #5 onto spacer cage #6 and lubricate seal area.
5. Install spacer cage #6 from step 4 into pump head #11.
6. Install seal #7 onto seal surface inside spacer cage #6.
7. Install upper valve cage #8 and ball #9 into spacer cage.
8. Install o'ring #21 and back-up ring #5 onto valve plug #4.
9. Place seal #7 on top surface of upper valve cage #9.
10. Install valve plug #4 from step 8 into top of pump body.

# *Servicing Instructions*

## *Assembly of 6211 Head Assembly, Page 9 Continued*

11. Place cover plate #3 over valve plug #4 and secure cover using 4 hex head cap screws #1 with lock washers #2. Torque to approximately 30-40 ft/lbs.
12. Install pipe plug #10 using Loctite pipe sealant or equal.
13. Install packing #13 and lantern ring #14.
14. Place packing gland #17 into packing gland nut #18 and thread assembly into pump body #11. Do not tighten more than hand tight.
15. Assemble ball connector cup #20 onto plunger #12 using Loctite #222 if available. Secure connection with set screw #19.
16. Lubricate plunger #12 and insert through packing end of pump head #11.
17. Install grease jack #23, containing 2 sticks of Chennola lubricant.

**NOTE:** *When using teflon packing, replace grease jack with pipe plug.*

## *Assembly of 6221 Head Assembly, Page 10*

1. Examine head body #9 to insure valve cage seating surfaces and packing areas are free of nicks and burrs. Check threaded areas for thread condition.
2. Install seal #5 onto lower seal surface.
3. Install lower valve cage #7 and valve ball #6 into pump head #9.
4. Install spacer cage #7.
5. Install seal #5 onto top surface of spacer cage #7.
6. Install top valve cage #7 and valve ball #6 into pump head #10.
7. Place top seal #5 onto top surface of top valve cage #7.
8. Install valve plug #4.
9. Position cover plate #3 over valve plug #4 and secure using 2 hex head cap screws #1 with locknuts #2. Torque to approximately 30-40 ft/lbs.
10. Install pipe plug #8 using Loctite pipe seal or equal.
11. Insert packing #10 into packing bore of pump body #9.
12. Install packing gland #11 into packing gland nut #12 and thread assembly into pump body #9. Do not tighten more than hand tight.
13. Lubricate O.D. of plunger #13 and insert through packing end of pump head #19.

## *Assembly of 6241 Head Assembly, Page 11*

1. Examine pump head #19 to insure valve cage sealing surfaces and cylinder sealing surface are free of defects. Check thread areas for thread condition.
2. Install seals #21 onto lower seal surfaces of each cavity in pump head #19.
3. Install valve ball #17 into valve cage #18. Insert valve plug #14 into valve cage #18 and fasten with roll pin #16. Install o'ring #15 onto valve plug #14 and lubricate each cavity in pump head #19.
4. Insert plug and insert assembly into each cavity of pump head #19.
5. Install plug #27 as shown.
6. Position cover plate #13 and secure using 3 hex head cap screws #12. Torque to approximately 20-30 ft/lbs.
7. Assemble bell connector #1 onto end of piston rod #6 and secure with set screw #21.
8. Install breather #22 and wiper ring #2 into end plug #3.
9. Insert piston rod #6 through end plug #3 as shown.
10. Position end plug #3 onto spacer and position cylinder #23 using 6 screws #5 and 6 washers #4. Flat end of cylinder must be used. Do not tighten this joint, leave at least 1/4" gap.
11. Install sleeve #24 into cylinder #23.
12. With piston rod #6 moved to full forward position, install o'ring #7, piston #8, piston cup #9, back-up retainer #10 and nut #11.
13. Install o'ring #26 and back-up #25 onto end of sleeve #24.
14. Place assembled pump head from step 10 over end of sleeve #24. Secure cylinder #23 to pump head using 6 screws #5 and 6 washers #4. This joint should be brought face to face. If a gap exists, loosen joint made in step 13.
15. After tightening cylinder to head connection, then tighten cylinder to spacer connection. A gap will exist at this joint - do not overtighten.

## *Assembly of Fluid End to Power Units, Page 6*

1. Insert ball joint thrust bearing #33 into connector cup.
2. Insert connector bearing ball #32 (on end of preassembled power piston rod #35) into connector cup and tighten retainer #29. Retainer should shoulder against end of connector cup without excessive pressure.

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