FLOWSERVE

USER INSTRUCTIONS

Nordstrom Valves®
Hypregun® - Plus 5G

FCD NVENIM2004-00-AQ – (10/14) (Replaces NVAIM2004)

Installation
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Experience In Motion

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Nordstrom Valves Sealants

At Flowserve our primary goal is to serve lubricated valve users with the highest quality sealant and sealant injection equipment.

We offer:

- A broad variety of valve sealants
- A flexible, service-oriented manufacturing facility providing outstanding quality control
- An experienced, dedicated staff ready to serve your needs

Our success comes from customer service. Competent, experienced personnel handle your orders from development, to reorder entry, to manufacturing, to shipping.

We supply the most advanced formulations. Our high-quality sealants range from -85°F to 700°F (-65°C to 371.1°C), and from air and water applications to the most aggressive line fluids.

Consult your Flowserve Nordstrom Valves Authorized Distributor for information on valve sealants.

Functions of Valve Sealants

1. **Drop-Tight Seal** – To secure an absolutely tight seal, the film of the sealant works to form a seal between the sealing surfaces of the valve. The seal is formed by sealant transmitted through a system of passageways around the valve port. With proper selection of sealant for your particular service, the seal can be retained over a wide range of temperatures and pressures.
2. **Lubrication** – Prevents metal-to-metal contact of the valve sealing surfaces by providing a film over bearing irregularities. No matter how finely ground a metal surface may be, the metal is a series of tiny peaks and valleys. As one metal surface slides against another, friction is set up and adhesion, shearing, or plowing may result. A protective film of sealant over the bearing area prevents metal-to-metal rubbing.
3. **Renewable Seat** – There is no need to disassemble a lubricated valve or remove it from service to replace mildly damaged seats. Sealant, as a structural part of lubricated valves, provides a flexible and renewable seat, eliminating the necessity of force fit contact to effect a seal. For this purpose, the sealant not only must have proper plasticity, but also resistance to line fluids such as solvents and chemicals. Sealant forms a seal between the sealing surfaces of the valve, even under pressure.
4. **Plug Jacking** – The fundamental operating principle of the traditional lubricated plug valve design lies in the application of Pascal's Law. The law states that a unit pressure applied to the liquid contained in a sealed vessel is transmitted to every part of the liquid with undiminished force, thus multiplying the force many times, depending on the area of the interior of the vessel. The sealant, under pressure developed by sealant injection, supplies the hydraulic means for lifting the plug from its tapered seat when and if that force is needed to free the plug.

Flowserve Nordstrom Valves offers more than 25 varieties of sealants for plug, ball, and gate valves. Stick and bulk grades are available in most formulas.

Hypregun-Plus 5G

The Nordstrom Hypregun-Plus 5G was developed using the original Nordstrom Hypregun design and modifications as suggested by many Hypregun owners. This design continues to meet field and plant maintenance needs of valve users.

The Hypregun-Plus 5G is ideal for large scale valve servicing in refineries, compressor stations, gasoline plants, cycling plants, pipelines, and manifold installations.

The Hypregun-Plus 5G is a compact, highly efficient, air operated sealant injection device with a 100:1 pressure ratio, double-acting piston and five-gallon can. Continued positive pressure applied to the side cylinders assures intimate contact between the follower plate and sealant. Positive pressure makes it possible for the Hypregun-Plus 5G to pump sealant at a much lower temperature than is possible with dispensing equipment without this feature.

The follower plate is engineered to promote flow of sealant to the foot valve at all workable air pressures, but air pressures between 100 and 125 psi (6.9 to 8.6 bar) give the most efficient operation. Lower air pressure can be used but the gun delivery volume will be reduced accordingly. It is important that the gun not be used on air pressures exceeding the 125 psi (8.6 bar) rating of the air motor. The air motor uses a maximum of 11.4 cubic feet of air per minute when operated at 125 psi (8.6 bar) air pressure and with zero load. Reduced air pressure and increased load reduce air consumption although not linearly.

The amount of sealant delivered by the Hypregun-Plus 5G depends on available air pressure to the gun, type of sealant and the temperature at which the sealant is dispensed.

A moisture trap (not supplied with the gun) for use on air sources containing appreciable amounts of water is quite advantageous for low temperature applications. Moisture, if allowed to reach the air motor, can condense and freeze, causing the air motor to stall. Air line filters for removing moisture from the air supply are available from several manufacturers.

The Hypregun-Plus 5G is designed to use five-gallon (18.9 litre) sealant cans, which have been materially strengthened with welded seams. The five-quart conversion kit provides the option of using a five-quart can in the five-gallon gun. These cans are standard for all Nordstrom Valves bulk sealants. The container shield supplied with each gun gives added strength to the can.

The Hypregun-Plus 5G has been designed to accept a standard five-gallon can with shield. We do not recommend using other containers or sealants developed by other manufacturers.

How to get the most out of your Hypregun-Plus 5G

The following suggestions will ensure efficient and continued operation of the gun:

- If the air motor operates slowly because of low temperatures or other causes, introduce light machine oil into the motor through the air supply. This will, in most cases, free a stalled air motor and permit it to operate more efficiently.
- Remove any service sealant from the exposed portion of the pumping mechanism to reduce drag and prevent sealant from entering portions of the gun not designed for this purpose.
- Provide a means of removing moisture from the air supply to the gun if used at subfreezing temperatures. Use of air filters should accomplish this purpose.
- Do not damage the thin walled cylinder surrounding the piston of the air motor. Any imperfection in this cylinder will reduce the effectiveness of the gun and shorten its life.

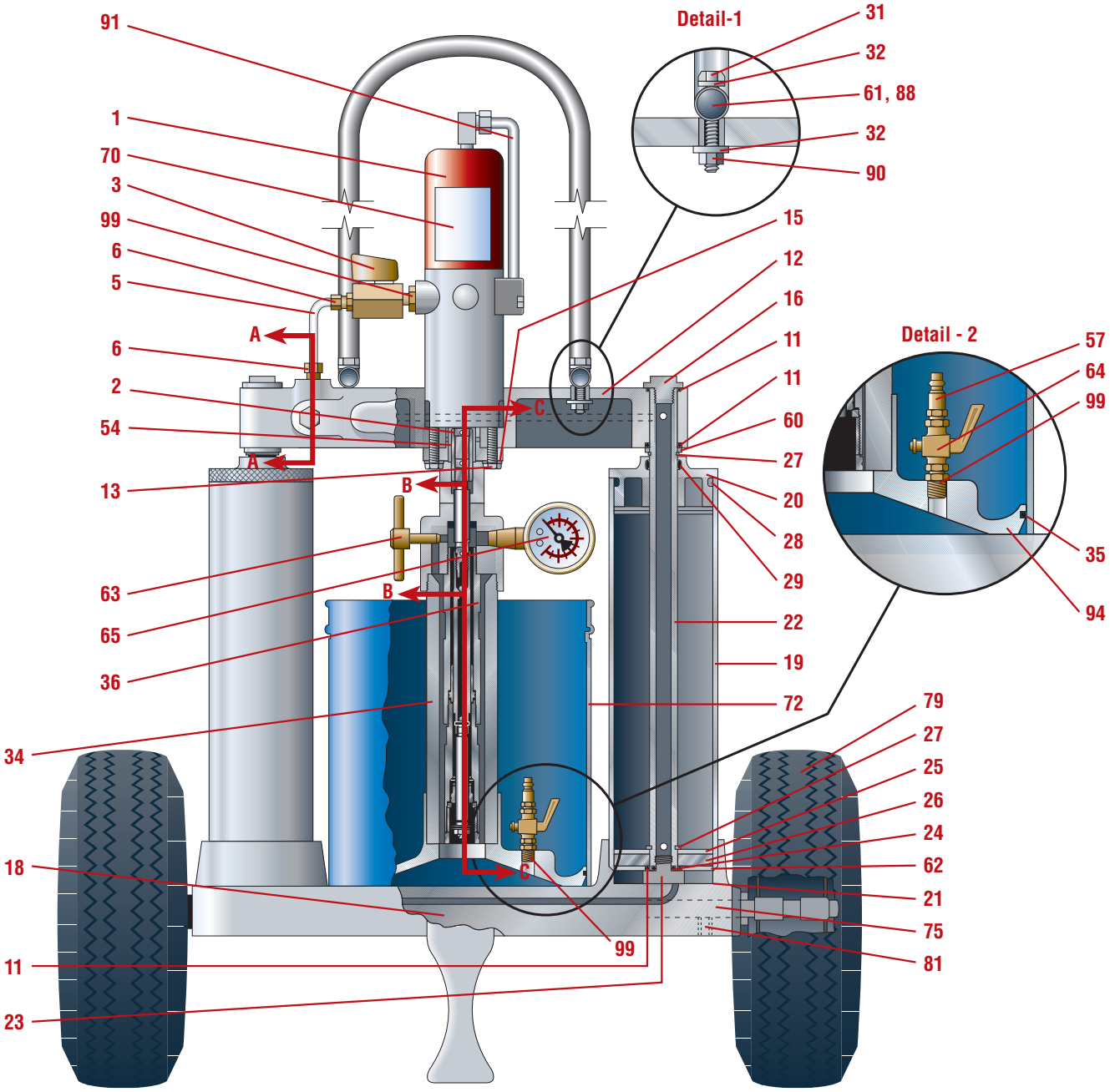
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Figure 1

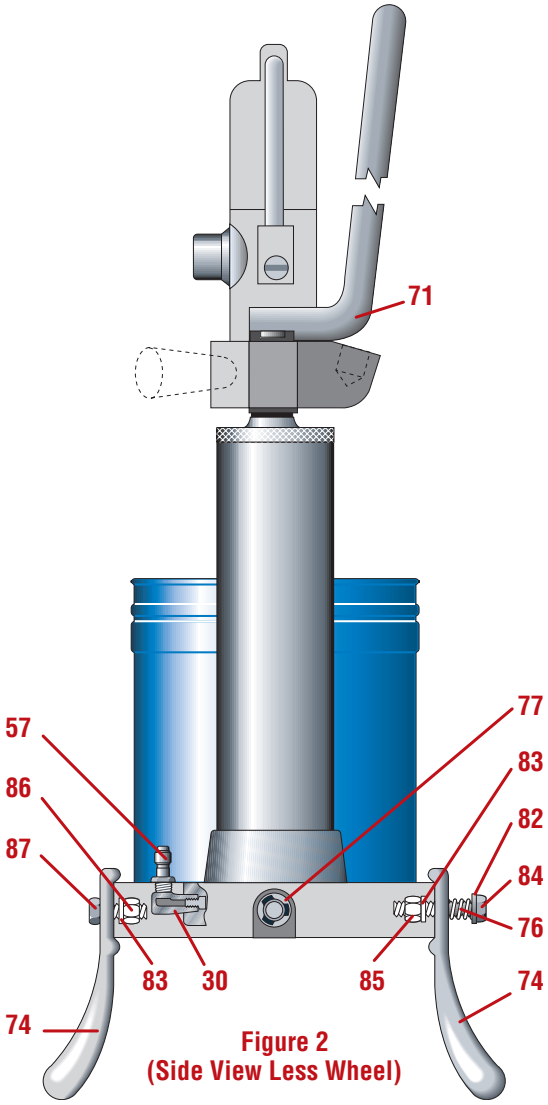
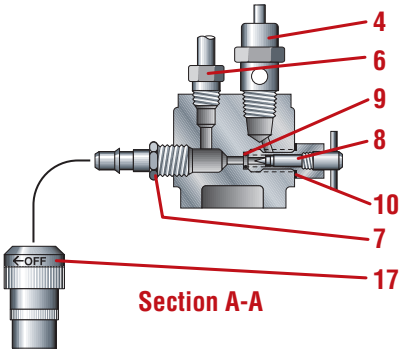
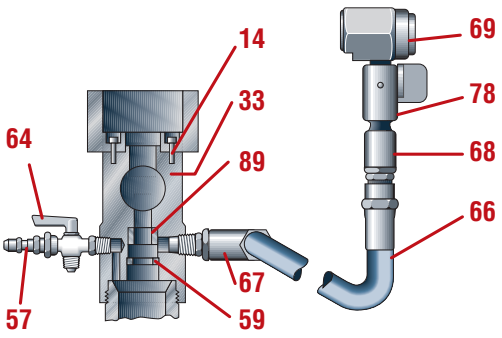


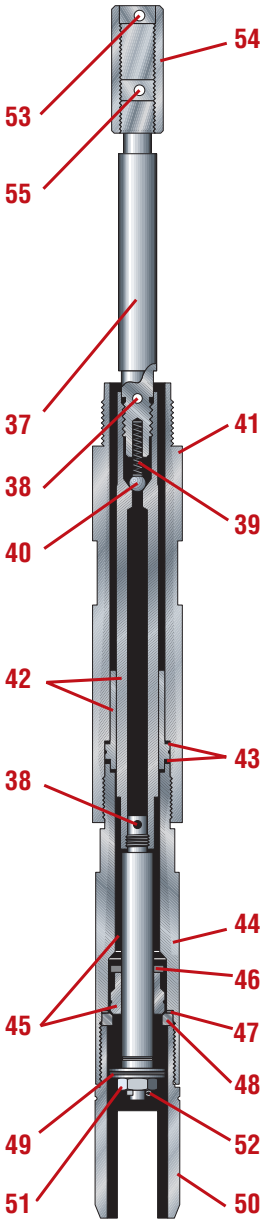
Figure 2
(Side View Less Wheel)



Section A-A



Section B-B



Section C-C

Parts List

Figure 1 Ref.	Part Name	Part Number	Qty. Reqd.
1	Air motor	1900037	1
3	Throttle valve	927325	1
5	Nylon air tube	60023	1
6	Straight male connector	1927418	2
11	O-ring	934014	6
12	Yoke	40966	1
13	Hex head capscrew	910007	2
15	Lock washer	932525	2
16	Yoke retaining screw	40867	2
18	Base	60901	1
19	Cylinder	40969	2
20	Cylinder head	40970	2
21	Cylinder gasket	40971	2
22	Piston rod	40972	2
23	Piston retaining screw	40873	2
24	O-ring	934008	2
25	Piston retaining washer	40974	2
26	Piston packing	40975	2
27	Retaining ring	927338	4
28	O-ring	934909	2
29	O-ring	934015	2
34	Follower tube	40989	1
36	Down tube assembly	60918	1
54	Coupling	1900312	1
60	Yoke retaining washer	40890	2
62	Piston retaining washer for O-ring	41921	2
63	Valve screw	1900051	1
65	Pressure gauge	1900052	1
70	Nameplate	1909200	1
72	Can shield	60903	1
75	Axle	1900018	2
79	Wheel	60012	2
81	3/8” - 16 x 1/2” setscrew	1900034	2
91	Metal air tube assembly	1900132	1
99	Hex bushing	904273	1

Detail 1 Ref.	Part Name	Part Number	Qty. Reqd.
31	Hex capscrew	910334	2
32	Washer	900836	4
61	Spacer	1939100	2
88	Pipe plug	2761011	2
90	Lock nut	1939115	2
Detail 2 Ref.	**Part Name**	**Part Number**	**Qty. Reqd.**
6	Straight male connector	1927418	2
35	O-ring	934077	1
57	Nipple	927309	1
64	Relief valve	927348	1
89	Piston packing	1900064	1
94	Follower plate	40988	1
Section A-A Ref	**Part Name**	**Part Number**	**Qty. Reqd.**
4	Relief valve	1900008	1
6	Straight male connector	1927418	1
7	Nipple	927310	1
8	Ram needle valve	1900039	1
9	O-ring	934003	1
10	Gasket – fiber	927330	1
17	Air coupler	927308	1
Figure 2 Ref.	**Part Name**	**Part Number**	**Qty. Reqd.**
30	Restrictor ell assembly	40876	1
57	Nipple	927309	1
71	Handle	1900068	1
74	Kick stand	60005	2
76	Spring	60008	1
77	Retaining ring	904672	2
82	3/8” steel washer	932602	1
83	3/8” medium steel lock washer	932527	2
84	3/8” x 2” steel hex head capscrew	902278	1
85	3/8” - 16 steel nut	900085	1
86	Hex nut	920402	1
87	5/16” - 18 x 1/4” steel hex head capscrew	909208	1

Parts List

Section B-B Ref	Part Name	Part Number	Qty. Reqd.
14	Socket head capscrew	939005	4
33	Pump body	1900019M	1
57	Nipple	927309	1
59	Gasket	1900050	1
64	Relief valve	927348	1
66	Hose, 10 foot	1900053	1
67	Swivel - L type	927343	1
68	Swivel - straight type	927437	1
69	Button head coupler	64584	1
78	Shutoff and relief valve	60010	1
89	Piston packing	1900064	1
Section B-B Ref	Part Name	Part Number	Qty. Reqd.
37	Upper rod	1900900	1
38	Roll pin	1900301	2
39	Spring	1900047	1
40	Steel ball	1900040	1
41	Tube extension	1900902	1
42	Piston and cylinder	1900303	1
43	Gasket	1900049	2
44	Extension	1900304	1
45	Primer rod and foot valve assembly	1900305	1
46	Foot valve stop washer	40886	1
47	Gasket	1900307	1
48	Valve seat	1900306	1
49	Steel washer, special	1900308	1
50	Primer body	1900310	1
51	Hex nut	1900041	1
52	Cotter pin	931000	1
53	Roll pin	1900311	1
54	Coupling	1900312	1
55	Roll pin	1900313	1

Replacement Parts and Kits

Major Repair Kit #1900062		
Qty.	Part Number	Part Description
1	47524	Button head coupler repair kit
1	1900016	Down tube kit
1	1900058	Minor repair kit

Minor Repair Kit #1900058 [1]		
Qty.	Part Number	Part Description
2	40971	Gasket (21)
2	40975	Packing (26)
1	927330	Gasket, fiber (10)
4	927338	Retaining ring (27)
1	934003	O-ring (9)
2	934008	O-ring (24)
6	934014	O-ring (11)
2	934015	O-ring (29)
1	934077	O-ring (35)
2	934909	O-ring (28)
1	1900039	Ram needle valve (8)
1	1900051	Valve screw (63)

Down Tube Kit #1900016 [1]		
Qty.	Part Number	Part Description
1	40886	Foot valve stop washer (46)
1	931000	Cotter pin (52)
1	1900040	Steel ball (40)
1	1900041	Hex nut (51)
1	1900047	Spring (39)
2	1900049	Gasket (43)
1	1900050	Gasket (59)
1	1900064	Piston packing (89)
2	1900301	Roll pin (38)
1	1900303	Piston & cylinder (42)
1	1900305	Primer rod & foot valve assy. (45)
1	1900306	Valve seat (48)
1	1900307	Gasket (47)
1	1900308	Steel washer (49)

Button Head Coupler Repair Kit #47524 [1]		
Qty.	Part Number	Part Description
1	64585	Spring
1	64586	Washer
1	934008	O-ring
1	64582	Valve

Wheel Kit #1900080 (single wheel only)		
Qty.	Part Number	Part Description
1	60012	Wheel (79)
1	904672	Retainer ring (77)
1	1900018	Axle (75)
1	1900034	Setscrew (81)

Kick Stand Kit #1900162 (single kick stand only)		
Qty.	Part Number	Part Description
1	60005	Kick stand (74)
1	60008	Spring (76)
1	900085	Nut (85)
1	902278	Capscrew (84)
1	909208	Capscrew (87)
1	932527	Lock washer (83)
1	932602	Washer (82)
1	920402	Nut (86)

Air Supply Assembly #1900120		
Qty.	Part Number	Part Description
1	60023	Nylon air tube (5)
2	1927418	Straight male connector (6)
Connectors are complete with nut and ferrule		

Five-Quart Conversion Kit #2759694		
Qty.	Part Number	Part Description
1	60003	Can shield
1	40987	Follower plate
1	934068	O-ring

Wheel Kit #1900080 (single wheel only)	
Hose Length	Part Number
6 ft.	47504
10 ft.	1900053
12 ft.	1900032
15 ft.	47535
20 ft.	47505
25 ft.	47506
30 ft.	47507
50 ft.	47508
75 ft.	1900022

** Numbers in parentheses denote illustration number*

[1] Component of Major Repair Kit 1900061

Replacement Parts and Kits

Miscellaneous Repair Parts		
Illustration Number	Part Number	Part Description
Figure 1, Page 5		
1	1900037	Air motor
	47510	Air motor repair kit
3	927325	Throttle valve
5	60023	Nylon air tube (7)
6	1927418	Straight male connector
11	934014	O-ring (2)
12	40966	Yoke
13	910007	Hex head capscrew
15	932525	Lock washer
16	40867	Yoke retaining screw
18	60901	Base
19	40969	Cylinder
20	40970	Cylinder head
21	40971	Cylinder gasket (2)
22	40972	Piston rod
23	40873	Piston retaining screw
24	934008	O-ring (2)
25	40974	Piston retaining washer
26	40975	Piston packing (2)
27	927338	Retaining ring (2)
28	934909	O-ring (2)
29	934015	O-ring (2)
34	40989	Follower tube
35	934077	O-ring (2)
36	60918	Down tube assembly
54	1900312	Coupling
57	927309	Nipple
60	40890	Yoke retaining washer
62	41921	Piston retaining washer for O-ring
63	1900051	Valve screw (2)
65	1900052	Pressure gauge - 15,000 psi
70	1909200	Nameplate (2)
72	60903	Can shield
75	1900018	Axle (4)
79	60012	Wheel (4)
81	1900034	Setscrew (4)
91	1900132	Metal air tube assembly (8)
99	904273	Hex bushing

Illustration Number	Part Number	Part Description
Section A-A, page 6		
4	1900008	Relief valve
6	1927418	Straight male connector
7	927310	Nipple
8	1900039	Ram needle valve [2]
9	934003	O-ring [2]
10	927330	Gasket, fiber [2]
17	927308	Air coupler
Figure 2, page 6		
30	40876	Restrictor ell assembly
57	927309	Nipple
71	1900068	Handle
74	60005	Kick stand [5]
76	60008	Spring [5]
77	904672	Retaining ring [4]
82	932602	Washer [5]
83	932527	Lock washer [5]
84	902278	Capscrew [5]
85	900085	Nut [5]
86	920402	Nut [5]
87	909208	Capscrew [5]
Section B-B, page 6		
14	939005	Socket head capscrew
33	1900019M	Pump body
57	927309	Nipple
59	1900050	Gasket (3)
64	927348	Relief valve
66	1900053	Hose - 10 foot
67	927343	Swivel - L type
68	927437	Swivel - straight type
69	64584	Button head coupler
78	60010	Shut off & relief valve
89	1600064	Piston packing (3)

Replacement Parts and Kits

Illustration Number	Part Number	Part Description
Section C-C, page 6		
37	1900900	Upper rod
38	1900301	Roll pin (3)
39	1900047	Spring (3)
40	1900040	Steel ball (3)
41	1900902	Tube extension
42	1900303	Piston & cylinder (3)
43	1900049	Gasket (3)
44	1900304	Extension
45	1900305	Primer rod & foot valve assembly (3)
46	40886	Foot valve stop washer (3)
47	1900307	Gasket (3)
48	1900306	Valve seat (3)
49	1900308	Steel washer (3)
50	1900310	Primer body
51	1900041	Hex nut (3)
52	931000	Cotter pin (3)
53	1900311	Roll pin
54	1900312	Coupling
55	1900313	Roll pin
Detail-1, page 5		
31	910334	Hex capscrew
32	900836	Washer
61	1939100	Spacer
88	2761011	Pipe plug
90	1939115	Lock nut
Detail-2, page 5		
6	1927418	Straight male connector
35	934077	O-ring
57	927309	Nipple
64	927348	Relief valve
94	40988	Follower plate
99	904273	Hex bushing

* Numbers in parentheses denote illustration number
(1) Component of Major Repair Kit 1900061
(2) Component of minor repair kit 1900058
(3) Component of down tube kit 1900016
(4) Component of wheel kit 1900080
(5) Component of kick stand kit 1900162
(6) Not available as repair part
(7) Nylon air tube not available with nuts and ferrules - see air supply assembly 1900120 on page 9
(8) Complete with nuts and ferrules

Assembly Instructions

Numbers in parentheses note the illustration numbers as located on pages 5 and 6 of this document. Refer to this illustration to assist in assembling your Hypregun-Plus 5G.

Your Hypregun-Plus 5G is shipped disassembled. The contents of the shipping container include:

Qty.	Part Number	Illustration Number
2	Wheel	79
2	Axle	75
2	Retaining ring	77
2	Setscrew	81
1	Handle	71
2	Capscrew	31
4	Steel washer	32
2	Lock nut	90
2	Spacer	61
2	Pipe plug	88
2	Kick stand	74
2	Washer	83
1	Hex nut	85
1	Hex nut	86
1	Capscrew	87
1	Capscrew	84
1	Spring	76
1	Washer	82
1	10 Foot hose sub-assembly	
1	Gun sub-assembly	

Tools

Tools required for assembly of the Nordstrom Valves Hypregun-Plus 5G:

- Adjustable wrench
- 3/16” Allen wrench
- 1/2” socket (two required)
- Socket ratchet (two required)
- Socket extension (if needed)
- Pliers

Assembly

The following instructions reference the front and back of the Hypregun-Plus 5G. The integral handle of the yoke (12) is considered the front of the gun.

Handle Assembly

1. Locate the two drilled holes in the top of the yoke (12).
2. Remove from the parts bag two 5/16” stainless steel hex head capscrews (31), two 5/16” stainless steel washers (32), two 5/16” stainless steel lock nuts (90), two spacers (61), and two pipe plugs (88).
3. Position the horseshoe-shaped handle (71) with the bend upward and extending toward the back of the yoke (side opposite the yoke handle).
4. Install the handle spacers (61) into the open ends of the handle.
5. Secure the handle using the parts as described in Step 2 and as illustrated on page 5. The steel washers are to be positioned between the head of the capscrew and the handle and the lock nut and the yoke.
6. Tighten using the socket wrenches and socket extension.
7. Insert the pipe plugs (88) into the opens ends of the handle.

Wheel Assembly

1. Locate two wheels (79), two axles (75), two retaining rings (77), and two setscrews (81).
2. Lay the Hypregun-Plus 5G on its back.
3. Using pliers, install the retaining ring (77) into the groove on the end of the axle (75).
4. Place the axle through the hub of the wheel (79) making sure the axle is inserted from the side of the wheel with the air valve stem.
5. Insert the axle into the axle hole on the side of the base (18).
6. Insert the setscrew into the drilled and tapped hole in the bottom of the base and tighten securely using a 3/16” hex head Allen wrench.

Kick Stand Assembly

1. Locate two kick stands (74), one hex nut (85), one hex nut (86), two washers (83), one capscrew (87), one capscrew (84), one spring (76), and one washer (82).
2. Locate the kick stand mounting hole on the front of the base (18).
3. Align the hole in the kick stand with the hole in the yoke. Secure the kick stand into position using capscrew (87), lock washer (83), and nut (86). The lock washer is to be positioned between the base and nut.
4. Tighten firmly using the adjustable wrench and socket. Locate the kick stand mounting hole on the back of the base (18).
5. Align the hole in the kick stand with the hole in the yoke.
6. Secure the kick stand into position using capscrew (87), washer (82), spring (76), lock washer (83), and nut (85). The washer (82) is to be placed on the capscrew and the spring against the washer. This assembly is to be placed through the kick stand and base holes. Install the lock washer and hex nut. The nut should be threaded onto the capscrew until the threads appear through the nut. If the nut is tightened too much, the kick stand spring will be too compressed to allow for free movement of the kick stand.
7. Stand the Hypregun-Plus 5G upright.

Preparing the Hypregun-Plus 5G for Use

1. Using an adjustable wrench, install the hose assembly by attaching the L-type swivel to the pump body (33).
2. Raise the follower (34) by connecting the air supply hose to the nipple (57) located on the base (18) of the gun.
3. Remove the can shield (72) and install a new five-gallon (18.9 litre) can of Nordstrom valve sealant. To prevent the can from splitting at the seam, the opening on the side of the can shield should be opposite the seam on the can and the top and bottom of the can shield should not overlap the lip of the can.
4. Apply a coating of light machine oil to the follower wiper (35) before loading the gun with a can of sealant. This will lubricate the seal and allow for easy entry into the can.
5. The spring loaded kick stand is “kicked” to one side to allow the gun to be tilted backward and rolled.

Operation

The numbers in parentheses refer to Hypregun-Plus 5G parts as illustrated on pages 5 and 6 of this manual.

1. The air coupler (17) will be found attached to the nipple (7) as shown in Section A-A. The air hose connector should be connected to the air supply hose.
2. Fasten the can shield (72, Figure 1) in place around the five-gallon (18.9 liter) sealant can below the reinforcing rib and with the can seam covered by the retainer.
3. Slightly mound the sealant in the container so that the concave shaped follower plate can be brought down on the sealant with a minimum entrapment of air.
4. Raise the pump mechanism and sealant follower plate prior to inserting the sealant container into the gun. By connecting the air supply hose to the air supply nipple (57, Figure 2) in the base of the pump and opening the ram needle valve (8, Section A-A) the follower (34, Figure 1) will rise sufficiently to clear the top of the sealant container.
5. Place the can with the can shield in the operating position in the Hypregun-Plus 5G. The relief valve tested on the follower plate can be left open initially to quickly remove air trapped between the follower and the sealant in the can. It should be closed once the follower makes contact with the sealant in the pail to ensure proper priming of the down tube and to prevent sealant from accumulating on top of the follower plate.
6. Be sure the valve screw (63, Figure 1) in the pump body is closed. Connect the air supply hose to the nipple (7, Section A-A). The ram needle valve should be opened slowly causing the air pressure to force the follower plate (34, Figure 1) down toward the sealant container.

   ⚠ CAUTION: Keep fingers clear as the follower plate descends into the sealant container.

   Care should be exercised that the sealant container is directly under the follower plate as the two are brought into contact. Once the follower plate has entered the top of the sealant container, open the ram needle valve $2^{1}/_{2}$ turns from closed position.
7. As shown in Section B-B, the relief valve (64) is opened fully while the valve screw (63, Figure 1) is opened two turns.
8. With the air motor throttle valve closed (3, Figure 1), allow the column between the sealant container and relief valve (64, Section B-B) to fill with sealant with the pressure of the follower plate alone. After a steady flow of sealant is obtained at the relief valve, open the throttle valve and pump sealant through the vent valve until there are no air bubbles. (If the available line pressure is not sufficient to push sealant through the relief valve by the follower plate pressure alone, open the air motor throttle valve before the sealant comes out the vent valve.)
9. After venting of the air is complete, close the valve screw (63, Figure 1) and the relief valve (64, Section B-B) and read the pressure gauge (65, Figure 1). If the pressure gauge does not read several thousand pounds sealant pressure, the relief valve (64) and the valve screw (63) should be opened again to allow further venting. Repeat this operation as required. Occasionally, the Hypregun-Plus 5G may become air bound during operation. If this occurs, repeat the procedure for air venting as outlined above.
10. With the shutoff and relief valve (78, Section B-B) in the closed position, the button head coupler (69, Section B-B) should be slipped over the button head fitting on the valve to be injected. Open the shut-off valve (a small wrench may be required). Adjust the air throttle valve (3, Figure 1) on the air motor and observe sealant pressure on the gauge (65, Figure 1) to ensure proper sealant flow and pressure for plug valves.

    ⚠ WARNING: High pressure injection of sealant into low pressure iron and semi-steel bodied valves may deform or destroy certain valve parts which could result in personal injury. Follow the valve manufacturers recommended procedures for sealant injection.
11. After the valve is injected with sealant, close the shutoff and relief valve (78, Section B-B). Remove the button head coupler (69, Section B-B) from the fitting on the valve. This may be done without turning off the air supply to the air motor. By using the shut off valve, the user can attach the coupler or remove it from the fitting with the gun retaining positive pressure.
12. When all of the sealant has been pumped from the sealant container, close the throttle valve (3, Figure 1) and transfer the air supply hose to the air supply nipple (57, Figure 2) on the base of the gun. With the ram needle valve (8, Section A-A) open, the gun mechanism is raised, lifting the sealant container off of the gun base. Close the ram needle valve.
13. Unclip the can shield and remove. Remove the can from the follower. It may be necessary to attach the air supply to the relief valve nipple (57, Section B-B) and slowly open the relief valve (64, Section B-B) 1/4 turn to allow air to enter the can. The can will be forced from the follower. Additionally, air can be connected to the follower plate relief valve nipple (57, Figure 1).
14. In changing from one service sealant to another, it is advisable to purge the gun sealant system. To do this, pump the new sealant through the delivery hose, with the coupler removed, until the old sealant has been purged.

15. The pressure relief valve (4, Section A-A) is adjusted at the factory to 125 psi (8.6 bar) cylinder pressure. Use of the Hypregun-Plus 5G at higher pressures can result in damage to the gun.

16. The air motor is rated at 125 psi (8.6 bar). Do not use the Hypregun-Plus 5G on air pressures greater than this figure. Lower air pressures are recommended where delivery capacity will be adequate. Do not leave air pressure on the gun indefinitely when not in use.

Care and Maintenance

Suggested Hypregun-Plus 5G Care

The following suggestions will ensure efficient and continued operation of the Hypregun-Plus 5G.

1. Avoid damage to the thin walled cylinder surrounding the piston of the air motor. Imperfections in this cylinder will reduce the effectiveness of the gun and shorten its life.

2. Handle the Hypregun-Plus 5G with care. Prevent any bending or denting of the pistons or operating parts.

3. Use a clean, dry air source. If air is wet, use a filter on the air line to remove the water. Install an oiler in the air supply line using light oil in summer and methanol in the winter.

4. Do not use over 125 psi (8.6 bar) air supply pressure. The gun will work best between 100 psi (6.9 bar) and 125 psi (8.6 bar).

5. Always use the can shield and five-gallon (18.9 liter) cans that are crimped and welded. The vertical welded seam on the can should be placed opposite the opening on the shield. If the opening on the shield is placed over the seam in the can, the can seam may separate from the pressure created by the piston.

⚠ **CAUTION: When inserting a new five-gallon (18.9 liter) can of sealant, be extremely careful. Keep fingers clear as the follower plate descends into the sealant container.**

6. Be sure to bleed or vent the Hypregun-Plus 5G before using. The more the curvature of the mounded sealant matches the curvature of the follower plate, the less air will be entrapped when changing cans. The relief valve (64, Section B-B) should be opened until a steady stream of sealant is obtained. If the pressure gauge needle continues to bounce, remove the valve screw (63, Figure 1) to free entrapped air in that area and, in rare occasions, remove the pressure gauge to be sure there is no air entrapped in the connection to it. Improper bleeding is indicated by a very bouncy action of the pressure gauge needle at relatively low pressures. If this continues, additional bleeding is necessary.

7. Store the Hypregun-Plus 5G and sealant in a reasonably warm place so that not only the gun but the sealant is at an operable temperature.

Repair Reassembly

There are two places in the reassembly of the Hypregun-Plus 5G pumping mechanism where the parts should not be rigidly assembled:

1. When the piston and cylinder (42, Section C-C) are attached to the air motor piston rod (37, Section C-C), they should only be hand tight (not wrench tight), the holes aligned, and the roll pin installed to secure in place.

2. In assembling the primer rod and foot valve assembly (45, Section C-C) into the piston, it should be pinned in place with roll pin (38, Section C-C) before it becomes tight. There should be some “wobble” evident for self-alignment of the parts. The primer rod and foot valve assembly (45, Section C-C) and valve seat (47, Section C-C) should be replaced as a single unit.

Factory Repair Service

Factory repair service is available from the Flowserve Sulphur Springs operation. Consult your Authorized Distributor or Customer Service Representative for more details.

Sealant Delivery

Hypregun-Plus 5G sealant delivery is affected by the loading pressure, ambient temperature, and the viscocity of the sealant being pumped. The chart below provides laboratory test data which illustrates sealant delivery under common operating conditions. Also provided in the chart is comparison data illustrating the improved performance of the Hypregun-Plus 5G over the Hypregun.

The Hypregun-Plus 5G has also been tested for durability. After 100 hours of continuous operation at atmospheric pressure the Hypregun-Plus 5G performed flawlessly.

Injecting sealant at ambient temperatures much lower than that represented by the chart is accomplished by using the practical approach of keeping the gun and sealant in a warm place and only exposing them to extremely cold conditions during valve injection.

Sealant Output Test Data		
	Hypregun-Plus 5G	Hypregun
Oz./Min.	13.84	3.34
Strokes/Min.	175.00	92.00
Oz. Per Stroke	.08*	.04
Test Sealant	1033 bulk	
Temperature	70°F	
Air Supply Pressure	100 psi	

*13 strokes per ounce

Troubleshooting Guide

These troubleshooting tips are provided as a means of assisting the consumer in overcoming difficulties encountered with prolonged use of a Hypregun-Plus 5G. Part numbers in parentheses denote illustration numbers as listed on pages 5 and 6 of this brochure.

⚠ **WARNING: Never attempt to repair a Hypregun-Plus 5G without first disconnecting the air supply.**

Problem	Cause	Solution
The air motor (1) is operating but sealant is not being dispensed.	Air is trapped within the down tube assembly.	Bleed the system as described in sections 7 through 9 on page 12 of this manual.
	Loose down tube assembly.	Tighten as needed.
	Primer rod and foot valve assembly (45) is worn or pitted.	Rebuild the assembly using down tube kit 1900016.
The sealant can is difficult to remove from the follower.	Dimensional tolerances of the can and follower are restricting can movement	Remove air supply and attach to nipple (57, Section B-B). Slowly open the relief valve (64) 1/4 turn to allow air to enter the can. The can will be forced from the follower.
The air motor (1) does not operate when the throttle valve (3) is opened.	The movement of internal parts of the air motor is restricted due to debris being entrapped in the motor.	Replace the air motor.
	The thin wall of the air motor cyclinder has been dented thus restricting movement of internal parts.	Replace the air motor.
	The nylon air tube (5) is cracked	Replace the nylon air tube.
	Air supply pressure to gun is too low.	Check output pressure of the air supply
	Air passages to air motor are blocked.	Clean air passages of obstructions.
	Obstruction in down tube assembly.	Disassemble the down tube assembly (36), clean, and reassemble.
	Down tube assembly not assembled to proper length.	Disassemble down tube assembly and assemble to proper length by aligning roll pins (38 - two locations).
	Metal air tube (91) on the air motor is crushed.	Remove the metal air tube assembly and replace.
The air motor will operate only 1/2 stroke.	The air motor slide valve is worn or damaged.	Install new air motor repair kit 47510.
	Obstruction in down tube assembly (36).	Disassemble the down tube assembly, clean and reassemble
The follower movement into the can is restricted.	Can too small.	Use Nordstrom five-gallon (18.9 liter) can with welded seam.
	Follower wiper (35) is too large.	Install new wiper.
As follower enters can, sealant bypasses the follower O-ring.	Follower wiper (35) is too small.	Install new wiper.
	Can is too large or bent.	Use Nordstrom five-gallon (18.9 litre) can with welded seam.
	Can swells or distorts.	Install can shield (72).
The follower (34) will not go completely to the bottom of the can.	The bottom of the cylinders (19) contain water.	Remove air pressure from the unit, unscrew the cylinders and drain the water. Dry the cylinders and check for oxidation before reassembly.

Problem	Cause	Solution
The air motor (1) operates slowly even with 125 psi (8.6 bar) air supply pressure.	Air flow is being restricted to the air motor.	Replace the nylon air tube (5) or the metal air tube (91).
Yoke will not move.	Nipple (7) blocked.	Remove obstruction from air passages making sure the air supply is of a clean source.
	The ram needle valve (8) is closed.	Slowly open the ram needle valve. Once the follower has made contact with the can, open the ram needle valve to $2^{1}/_{2}$" turns.
	The ram needle valve (8) is blocked.	Remove obstruction from the ram needle valve passage.
	Air passages in the yoke (12) are blocked.	Clear obstruction from air passages or replace the yoke.
Yoke will not raise or lower evenly.	Cylinder (19) is dry of lubrication.	Introduce a light air tool oil into the air system. Use an oil which is compatible with rubber to prevent swelling of the piston packing.
	Piston rods (22) are bent or scored.	Replace damaged piston rod(s).
	Piston packing (26) has swollen and is too tight in cylinder (19	Replace the piston packing.
	Piston packing (26) is too tight in cylinder (19) due to cylinder distortion	Replace the cylinder.
	Air passages of the base (18) are blocked.	Clean air passages using a stiff wire or replace the base.
The yoke will not raise when the air supply is connected to the nipple (57).	The restrictor ell assembly (30) air passage is blocked.	Clean the air passage using a small, stiff wire or redrill the air passage hole using a #55 wire gauge drill bit.

Flowserve - Nordstrom Valves
1511 Jefferson Street
Sulphur Springs, TX 75482
Telephone: (903) 885-3151
Quotes Email:
nordstromquotes@flowserve.com
Orders Email:
nordstromorders@flowserve.com

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To find your local Flowserve representative
or for more information about Flowserve Corporation, visit www.flowserve.com.