

NOTICE: This manual is to remain with truck after pump unit is installed.

Williams®

MACHINE & TOOL

Hydraulic Piston Pump Units

Operating, Mounting and Safety Instructions for:

Model 20 Pump

Model DPF98 Pump

Model 40 Pump

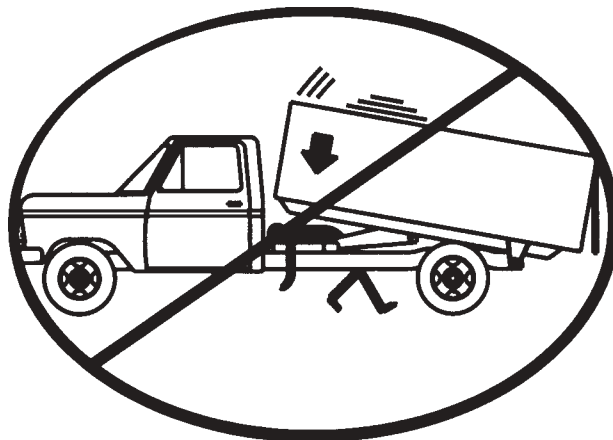
Model DPH98 Pump

Model F98 Pump

#3 & #4 Control Valve

Model H98 Pump

#6, #7 & #8 Control Valve



Read and understand this manual before attempting operation, maintenance or repair.



Williams® Machine & Tool

204 Plastic Lane
Monticello, IA 52310-9472 USA
Phone: (319) 465-3537
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Web Site: www.williamsmachineandtool.com

Pump Serial No. _____

Pump Model No. _____

SAFBOOK1
Williams® p/n 2183
Rev. 9/09



Read and understand this manual before attempting operation, maintenance or repair



TO THE OWNER/OPERATOR:

Read this manual thoroughly. The information presented will prepare you to do a better, safer job. Keep this manual with the truck at all times.

Throughout this manual you will see the following Symbol:



This is the Safety–Alert Symbol meaning ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

The terms CAUTION!, WARNING! and DANGER! are used in conjunction with the Safety–Alert Symbol (as shown above) to indicate the degree of hazard for items of personal safety.



CAUTION

is used for general reminders of good safety practices or to direct attention to unsafe practices.



WARNING

Denotes a specific potential hazard.



DANGER

Denotes the most serious specific potential hazard.

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WARRANTY	INSIDE BACK COVER

CHECK LISTS

PRE-USE CHECK LIST

- Before operating hoist, check the hoist manufacturers' recommended maximum payload. **Do not overload the hoist.**
- Read and understand all the safety **⚠ CAUTION**, **⚠ WARNING** and **⚠ DANGER** signs on the truck hoist and the Williams® Machine & Tool Pump / Valve / Reservoir units.
- Check to make sure that the hoist body prop, pump / valve guard, etc., are in place and operational before attempting to operate the hoist.

GENERAL CHECKLIST BEFORE USE

- Before operating a loaded truck body, make sure the truck is on level, firm ground.
- Before operating the truck hoist, make sure the area is clear of other equipment and personnel.
- Check to make sure that the PTO is disengaged before driving the vehicle on the road.
- Operate the hoist controls from the cab during dumping operations. Release tailgate controls before lifting the body.

GENERAL INFORMATION

The purpose of this manual is to assist the owner/operator in maintaining and operating the hoist hydraulic system using the Williams® Machine & Tool Pump / Valve / Reservoir products. Read it carefully before attempting operation, maintenance or repair.

SAFETY DECALS

⚠ DANGER

KEEP AWAY!

- Serious injury or DEATH will result from truck box falling.
- Truck box will fall in 1 second CRUSHING you if lever is moved.
- Body prop will not hold up a loaded box.
- Understand safety book before servicing or adjusting.
- Replace valve guard if missing or damaged.
- GUARD & SAFETY BOOK AVAILABLE AT:
Williams® Machine & Tool
204 Plastic Lane • Monticello, IA 52310-9472 USA
Phone: (319) 465-3537 • Fax: (319) 465-5279
E-mail: info@energymfg.com
Web Site: www.williamsmachineandtool.com

Williams® p/n 1840

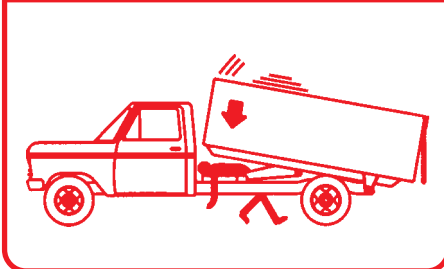
⚠ DANGER

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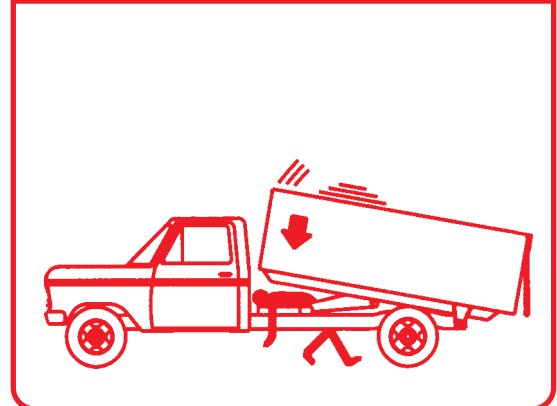
Williams® p/n 1841

⚠ DANGER



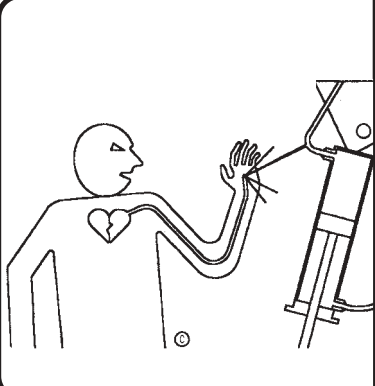
Williams® p/n 1842

⚠ DANGER



Williams® p/n 1843

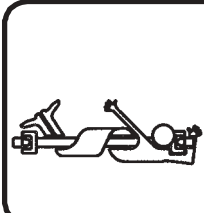
SAFETY DECALS

	! WARNING
	<p>DO NOT GO NEAR LEAKS!</p> <ul style="list-style-type: none">● High pressure oil easily punctures skin causing serious injury, gangrene or death.● If injured, seek emergency medical help. Immediate surgery is required to remove oil.● Do not use finger or skin to check for leaks.● Lower load or relieve hydraulic pressure before loosening fittings.

Williams® p/n 1858

! DANGER	
DO NOT MOVE LEVER	

Williams® p/n 2005

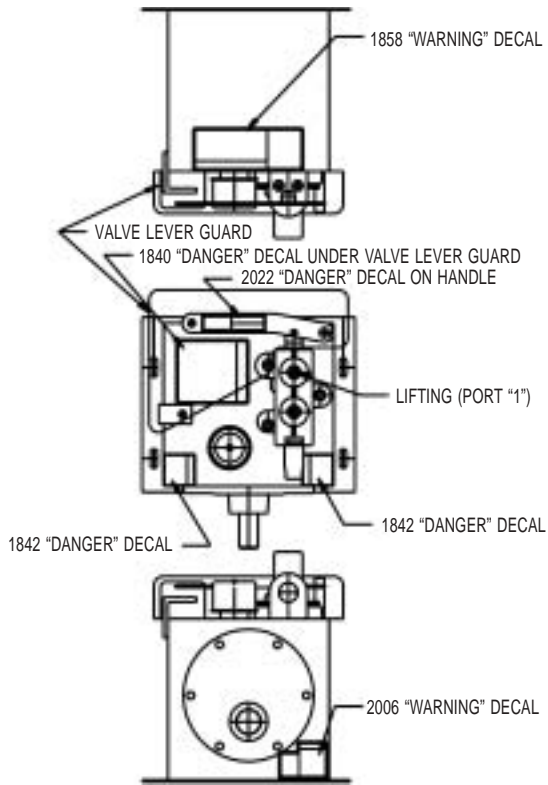
	! WARNING
	<p>DO NOT GET NEAR PTO DRIVELINE!</p> <ul style="list-style-type: none">● Avoid serious injury from moving components● Completely shield input drive to PTO drivelines

Williams® p/n 2006

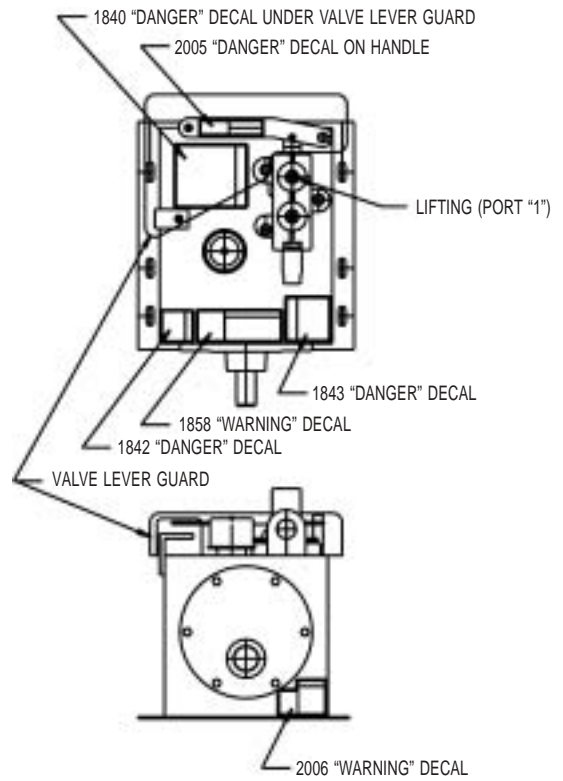
SAFETY DECAL LOCATIONS ON VARIOUS MODELS

(SEE PAGES 3 & 4 FOR DECAL DETAILS AND TEXT)

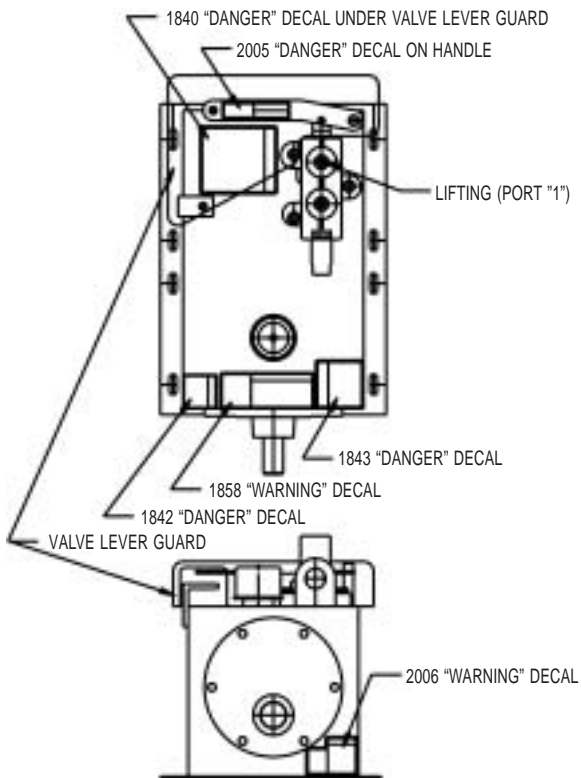
7 QUART (6.6 L) RESERVOIR / PUMP / SMALL VALVE UNIT



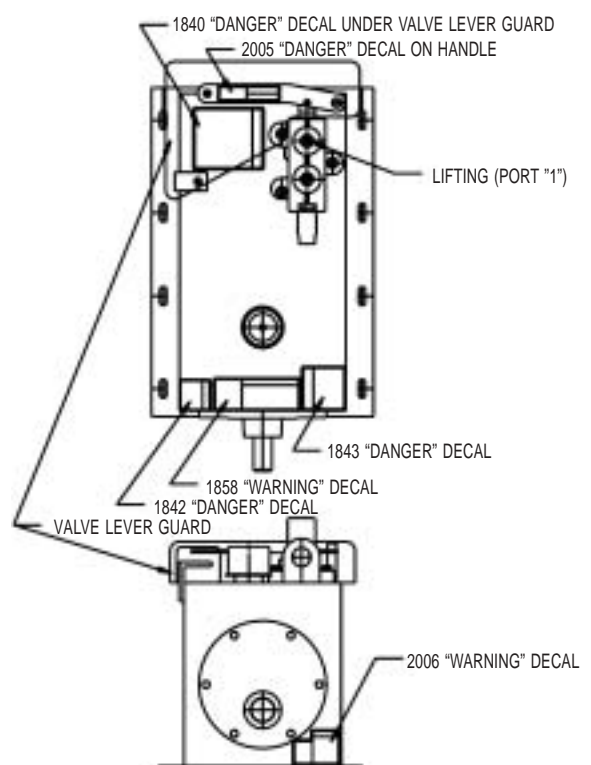
12 QUART (11.4 L) RESERVOIR / PUMP / SMALL VALVE UNIT



15 QUART (14.2 L) RESERVOIR / PUMP / SMALL VALVE UNIT



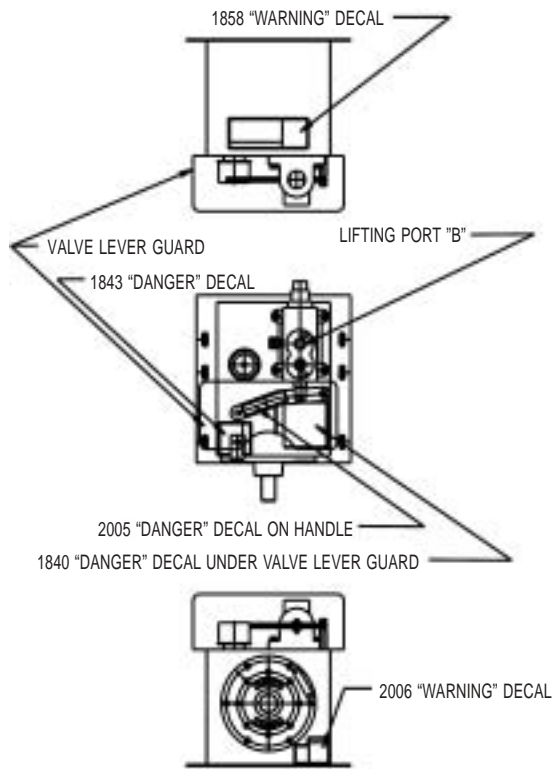
21-60 QUART (19.9-56.8 L) RESERVOIR / PUMP / SMALL VALVE UNIT



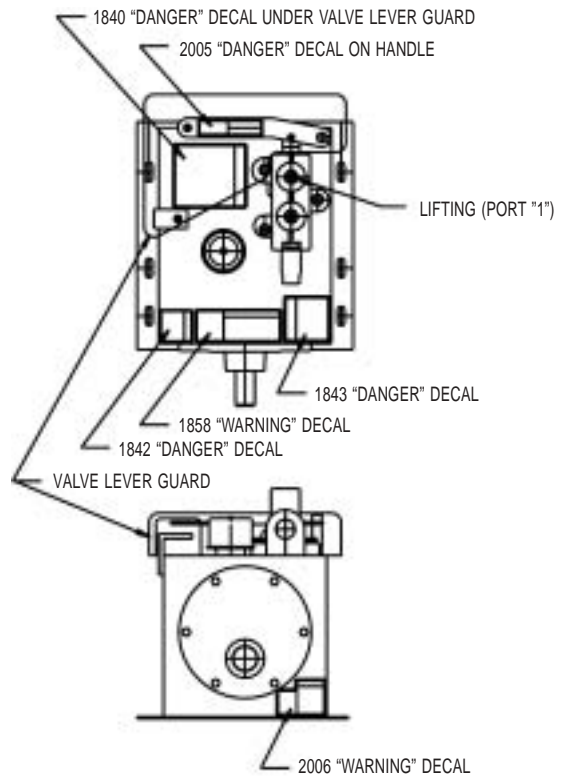
SAFETY DECAL LOCATIONS ON VARIOUS MODELS

(SEE PAGES 3 & 4 FOR DECAL DETAILS AND TEXT)

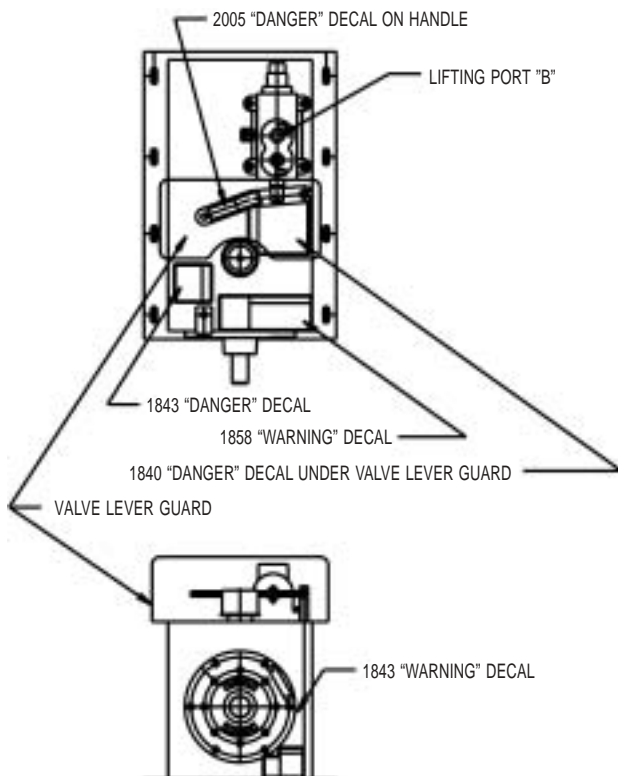
12 QUART (11.4 L) RESERVOIR / PUMP / LARGE VALVE UNIT



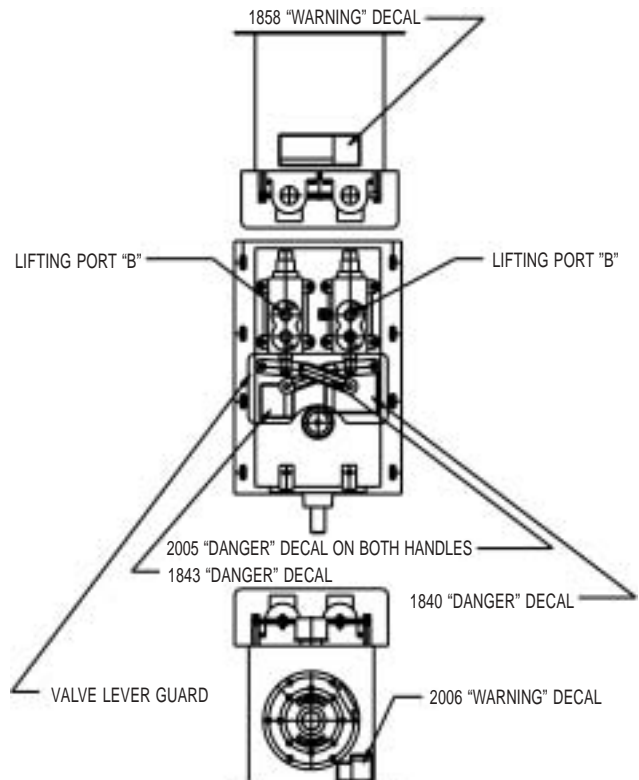
15 QUART (14.2 L) RESERVOIR / PUMP / LARGE VALVE UNIT



21-60 QUART (19.9-56.8 L) RESERVOIR / PUMP / LARGE VALVE UNIT



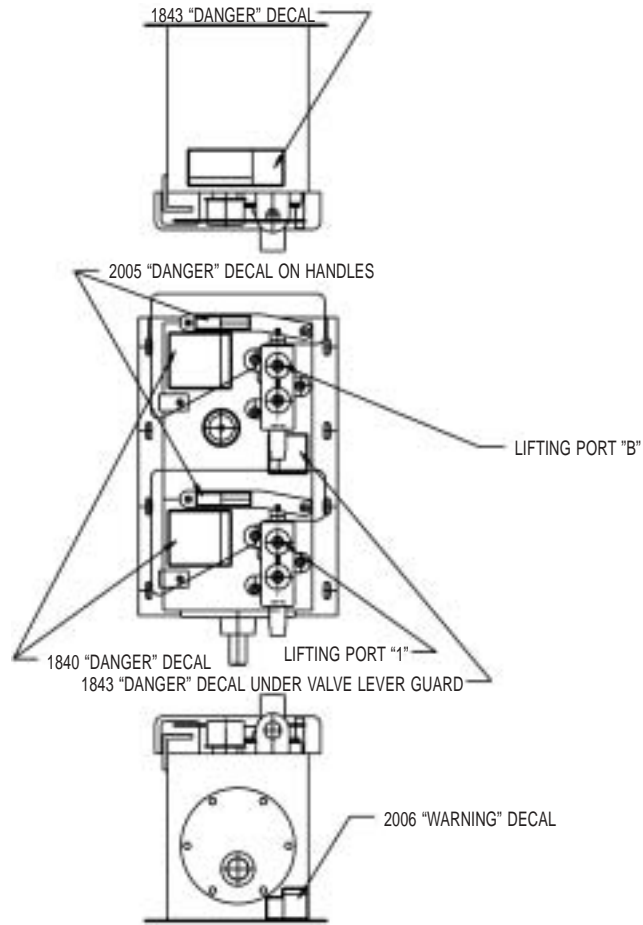
ALL RESERVOIRS / PUMP / DUAL LARGE VALVE UNITS



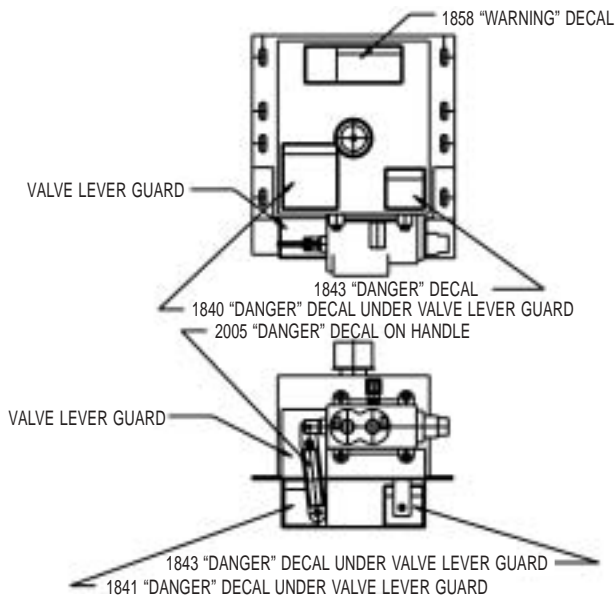
SAFETY DECALS ON VARIOUS MODELS

(SEE PAGES 3 & 4 FOR DECAL DETAILS AND TEXT)

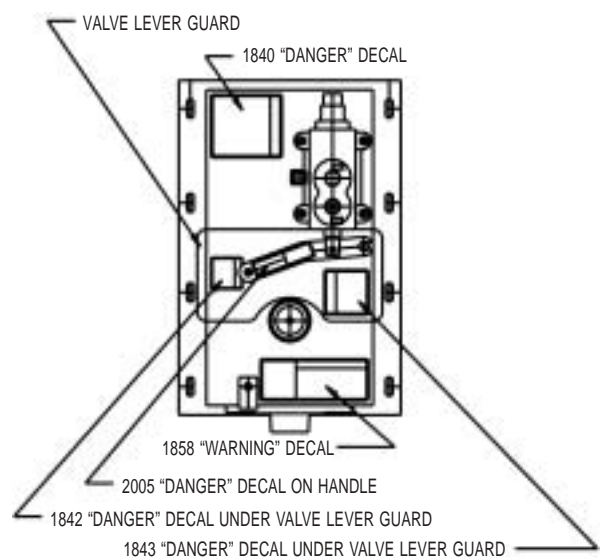
ALL RESERVOIRS / PUMP / DUAL SMALL VALVE UNITS



M8CR9QT RESERVOIR / BIG VALVE UNITS



W10 RESERVOIR / BIG VALVE UNITS

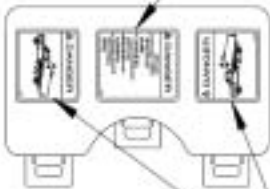


SAFETY DECAL LOCATIONS ON GUARDS

(SEE PAGES 3 & 4 FOR DECAL DETAILS AND TEXT)

1134 VALVE LEVER GUARD ("BIG" VALVE) WITH SAFETY DECALS (4-BOLT MOUNTED VALVE)

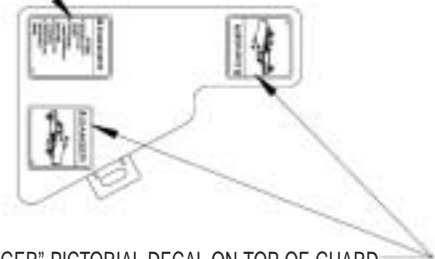
1841 "DANGER" DECAL ON TOP OF GUARD



1843 "DANGER" PICTORIAL ON TOP OF GUARD

1120 VALVE LEVER GUARD ("SMALL" VALVE) WITH SAFETY DECALS

1841 "DANGER" DECAL ON TOP OF GUARD



1843 "DANGER" PICTORIAL DECAL ON TOP OF GUARD

1813 / 1814 VALVE LEVER GUARD WITH SAFETY DECALS

USED ON MODELS:

M6CR9QT

M8CR9QT

M8R9HQT

M8CR9HQT

M8CR9QT

1843 "DANGER" PICTORIAL DECAL ON LEFT HALF GUARD

1813 LEFT HALF GUARD

MOUNTING TAB



1814 RIGHT HALF GUARD

MOUNTING TAB

1843 "DANGER" DECAL UNDER VALVE LEVER GUARD

1841 "DANGER" DECAL UNDER VALVE LEVER GUARD



CAUTION



Unless specifically stated in writing by Williams®, Williams® products are not approved for, and not warranted when used in: high-cycle industrial applications, aerospace applications, applications that lift people, or for any application that may place people in dangerous positions during operation.



WILLIAMS® PUMP OPERATING SPEED LIMITATIONS:

PUMP MODEL	RATED SPEED	MAXIMUM SPEED
20 RESERVOIR MOUNT	1000 RPM	1000 RPM
40 RESERVOIR MOUNT	1000 RPM	1000 RPM
D58 RESERVOIR MOUNT	1800 RPM	1800 RPM
F98 RESERVOIR MOUNT	1300 RPM	1800 RPM
H98 RESERVOIR MOUNT	1300 RPM	1800 RPM
DPF98 DIRECT MOUNT	1300 RPM	1800 RPM
DPH98 DIRECT MOUNT	1300 RPM	1800 RPM

CAUTION:

1. If the PTO is engaged during road travel, the Model 20 and the Model 40 pumps will overspeed, and the pumps will be severely damaged.
2. If overspeeding is extreme, the pump may lock up causing serious damage to the vehicle, drive shaft or PTO.
3. The F98, H98, DPF98 and the DPH98 pumps will withstand overspeed for some period of time until the temperature rises to an extreme level which will cause pump damage.

OPERATING INSTRUCTIONS

PREFACE

INSTALLATION (NEW OR REPLACEMENT)



1. Before beginning any installation work, make sure that the truck box is empty – if necessary, empty the load. Make sure the empty truck box is properly blocked by using the body props on the hoist unit as well as blocks under the hoist frame. Then, from the cab (not from under the truck box) push the control cable in to lower the truck box onto the body props and blocks to make sure the body props and blocks will hold the empty truck box safely.
2. Install the pump/valve/reservoir unit in line with the PTO output to meet the PTO driveline manufacturers' position and angle recommendations.
3. Use a fully shielded PTO driveline in the installation to avoid serious injury from rotating components.
4. Install the control cable to the pump/valve/reservoir unit per the control cable installation instructions on pages 14-18.
5. Install the hydraulic hoses to the hoist unit using the port "B" on the 4-bolt mount control valve and port "1" on the 3-bolt mount control valve to the lifting port on the hoist cylinder. Use hydraulic hoses with a working pressure rating equal to or greater than the highest pressure at which the system will be operating.
6. Fill reservoir to the recommended level with automobile automatic transmission fluid (ATF).
7. Properly install the control valve guard or guards before operating the hoist system.

NOTE: Use the installation and maintenance check list that follows (page 13) before the operation of the hoist system.

OPERATING INSTRUCTIONS



DANGER

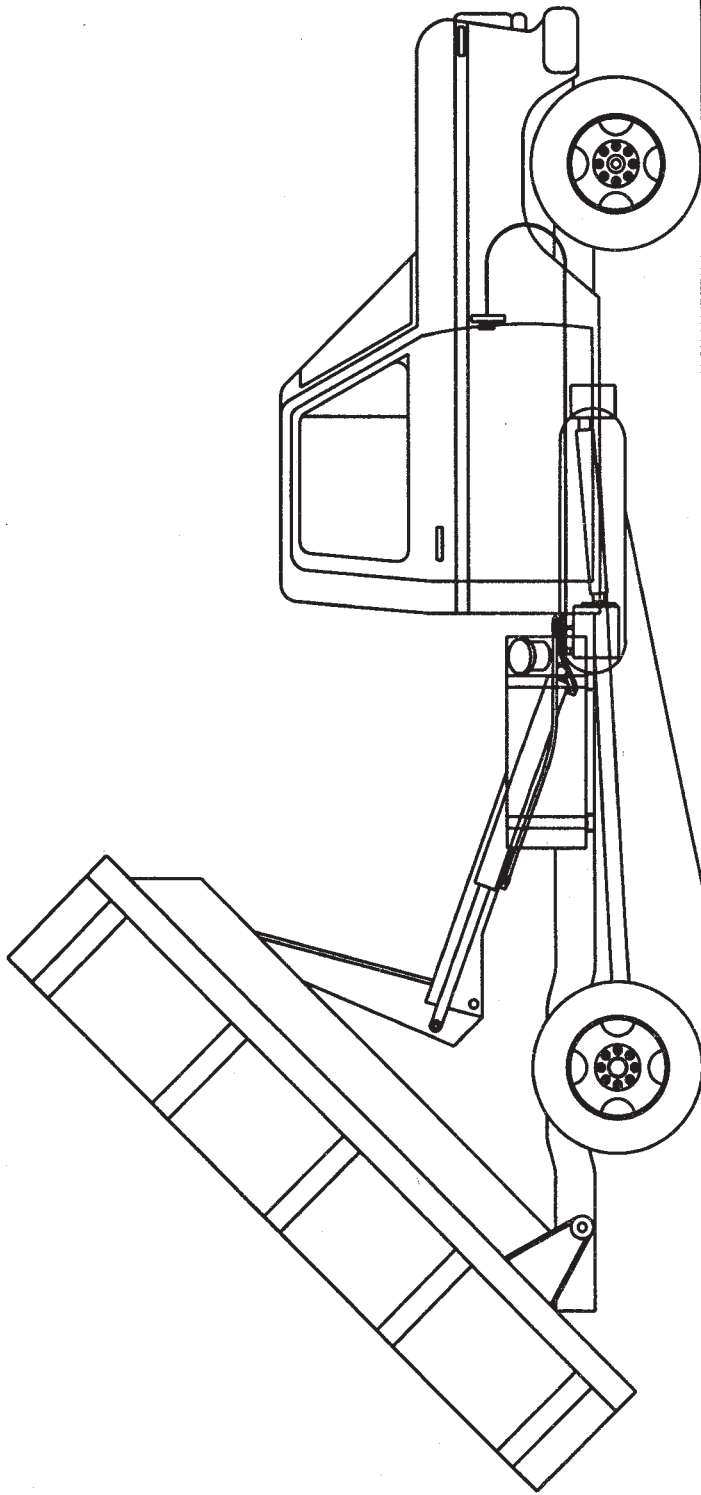
- DO NOT replace the cable with a cable without a neutral lock.
- DO NOT replace the knob with a knob which has no **DANGER WARNING** and picture.
- DO NOT bend or alter the valve lever or cable assembly parts in any way.
- DO NOT remove the control valve lever guard.
- DO NOT cover or paint over any safety decals.
- DO NOT move or adjust the valve lever without the truck box being safely propped and blocked.
- DO NOT step on, push or strike the control valve lever without the truck box being safely propped and blocked.
- DO NOT attempt any repairs or adjustments to the truck hoist, truck box, pump, valve or cable without the truck box being safely propped and blocked.

GENERAL OPERATING INSTRUCTIONS:

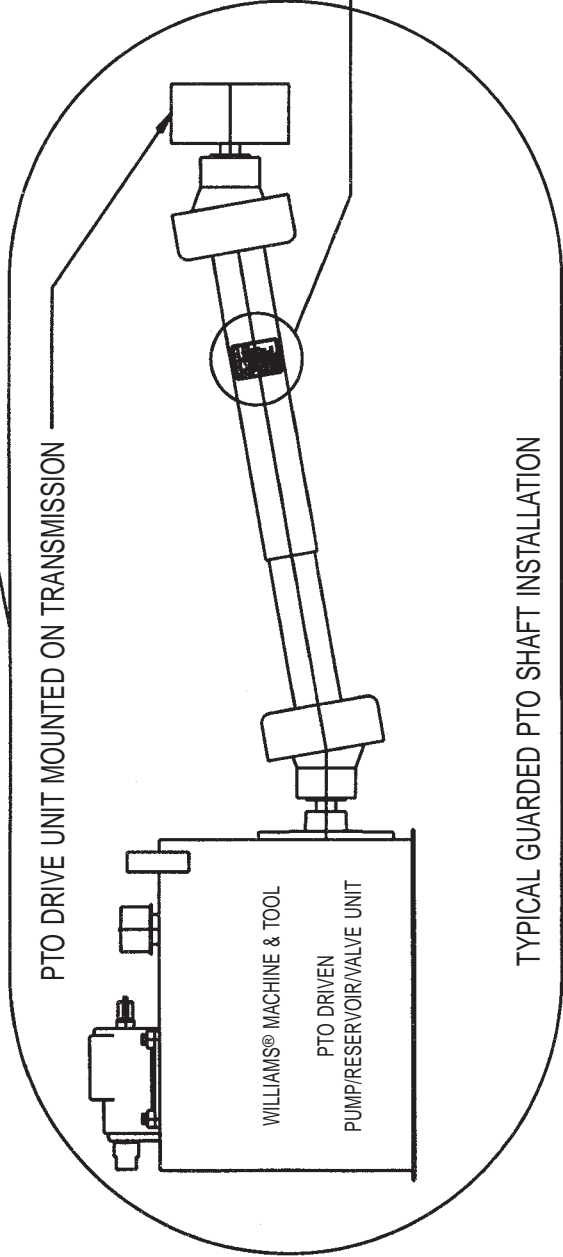
1. Read and understand this complete manual before operating truck hoist!!
2. Never go under a truck box, loaded or unloaded, unless the truck box has been safely propped and blocked!!
3. Check to make sure all persons and equipment are clear of the area before operating the truck hoist!!

NOTE: A LOADED BOX IS LIKE A LOADED GUN!!

4. DO NOT go underneath the truck with the PTO running!!
5. Never reach over the truck frame unless the **EMPTY** box is safely propped and blocked!!
6. Be sure the PTO is disengaged before driving the truck!!
7. Never drive the truck unless the truck box is completely lowered!!
8. Lower truck box slowly – not fast – lowering the truck box rapidly, especially with a loaded box, can cause structural damage to the truck frame!!
9. The neutral lock must be disengaged before the handle can be moved!!
10. Dump a loaded truck box slowly to be careful that the load does not shift!!



PTO DRIVE UNIT MOUNTED ON TRANSMISSION



TYPICAL GUARDED PTO SHAFT INSTALLATION

DANGER

**ROTATING DRIVELINE
CONTACT CAN CAUSE DEATH
KEEP AWAY**

DO NOT OPERATE WITHOUT:

- * ALL DRIVELINE, TRACTOR, AND EQUIPMENT SHIELDS IN PLACE
- * DRIVELINE SECURED
- * ATTACHED AT BOTH ENDS
- * DRIVELINE SHIELDS THAT TURN FREELY ON DRIVELINE

OPERATING INSTRUCTIONS

INSTALLATION & MAINTENANCE CHECK LIST

INSTALLATION CHECK LIST:

CHECK OFF AFTER PROPER INSTALLATION IS COMPLETE:

FIRST  **DANGER:** SAFELY PROP, BLOCK OR BRACE TRUCK BOX BEFORE BEGINNING INSTALLATION.

- 1. Pump/valve/reservoir installed in line with PTO to meet driveline specifications.
- 2. Use a fully shielded PTO driveline installed per manufacturers' specifications.
- 3. Hydraulic hoses installed to the hoist from the proper port.
- 4. The cable casing clamps are not overtightened binding the wire core (see Fig. C Pg. 17).
- 5. The exposed cable wire length is no longer than 1/4" (6.35 mm) (see Fig. C Pg. 17).
- 6. The cable casing is clamped/aligned to minimize pushing force (see Fig. C Pg. 17).
- 7. The wire clamp on the valve lever and the cable casing clamp are capable of swiveling to self-align properly (see Fig. C Pg. 17).
- 8. No bend in the cable is less than 10" (25.4 cm) (see Fig. A Pg. 16).
- 9. The neutral lock is detented when the valve spool is in the neutral or hold position (see Fig. A Pg. 16)
- 10. The knob with **DANGER** sign and picture are installed on the cable.
- 11. The cable is routed away from catalytic converters, tailpipes, exhaust manifolds, or mufflers. These can melt the outer casing exposing the cable wire, and possibly causing failure.
- 12. The outer casing is not crushed or routed where moving parts may crush it during use.
- 13. One cable casing tie per bend or per 3' (91.4 cm) of cable length is securely fastened adequately in secure parts of the frame.
- 14. The valve lever guard is fastened securely according to the installation instructions.

WEEKLY MAINTENANCE CHECK LIST:

- 1. Are all tie downs secure on the cable? If not, replace.
- 2. Is the cable wire moving freely after lubrication? If not, repair or replace.
- 3. Is the valve lever guard and all safety signs in place, clean and legible? If not, replace immediately.
- 4. Is the cable casing wearing through and allowing moisture and rust to corrode the cable assembly? If so, replace.
- 5. Can the cable casing clamp and cable wire clamp on the valve lever still swivel? If not, lubricate both.
- 6. Is the neutral lock button releasing freely after lubrication, and is the cable locked when the valve is in the neutral (hold) position? If not, adjust until proper or replace.
- 7. Check the tightness of the cable wire clamp bolt to be certain it does not slide on the wire. If sliding, tighten or replace.
- 8. Check hydraulic reservoir fluid level. Add fluid if needed. Always use automotive automatic transmission fluid (ATF).

INSTALLATION & SERVICE INSTRUCTIONS

CONTROL CABLE INSTALLATION IMPORTANT INSTRUCTIONS

DANGER

KEEP AWAY!

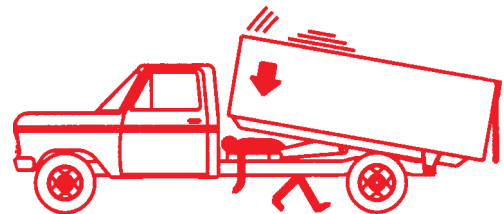
- Serious injury or DEATH will result from truck box falling.
- Truck box will fall in 1 second CRUSHING you if lever is moved.
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- Understand safety book before servicing or adjusting.
- Replace valve guard if missing or damaged.

● **GUARD & SAFETY BOOK AVAILABLE AT:**

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Web Site: www.williamsmachineandtool.com

Williams® p/n 1840

DANGER



Williams® p/n 1843



DANGER

Cables used on truck hoist applications must be of the neutral lock type to meet OSHA Standard 1926. Do not replace your control cable assembly without the neutral lock feature. The neutral lock on the control cable assembly protects those in the truck box area from accidental actuation and serious injury or death.



DANGER

Operator or mechanics shall follow instructions to prevent improper installation that can cause cable to kink. Failure to do so shall result in death or serious injury.

NOTE:

Cable must be properly installed and checked for proper operation (see Fig. B Pg. 17) completely before hydraulic lines are installed to control valve.


**THESE INSTRUCTIONS MUST STAY WITH THE TRUCK
TO WARN FUTURE OWNERS AND OPERATORS!**

INSTALLATION & SERVICE INSTRUCTIONS

CONTROL CABLE INSTALLATION INSTRUCTIONS



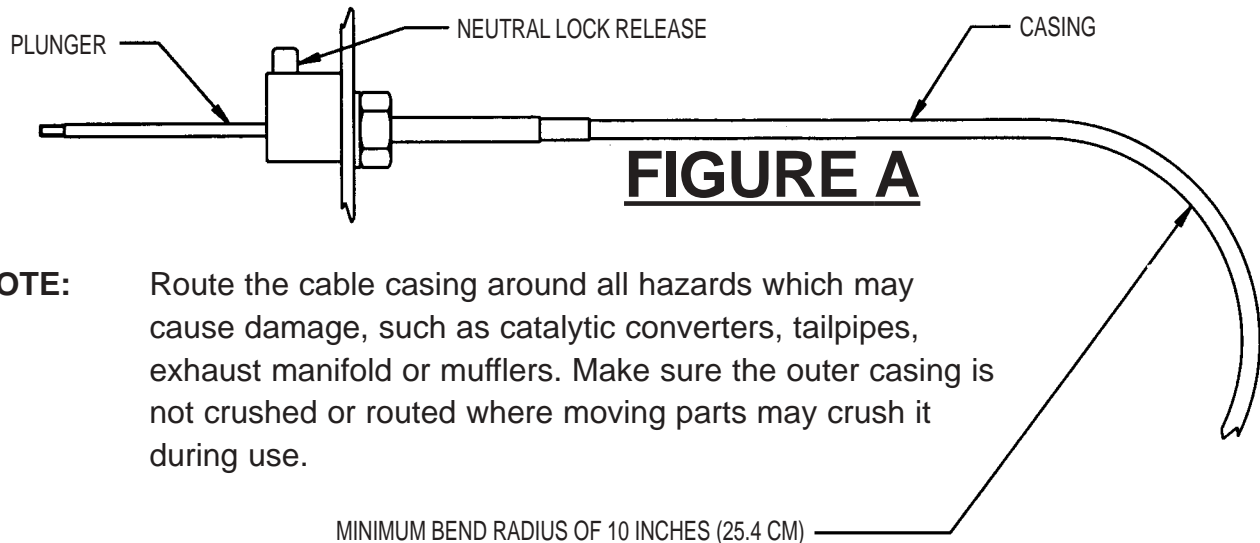
Before beginning any installation work, make sure that the truck box is empty – if necessary, empty the load. Make sure the empty truck box is properly blocked by using the body props on the hoist unit as well as blocks under the hoist frame. Then, from the cab (not from under the truck box) push the control cable in to lower the truck box onto the body props and blocks to make sure the body props and blocks will hold the empty truck box safely.

1. Mount the control cable to the vehicle with special attention that no bends are sharper than a 10 inch (25.4 cm) radius (see Fig. A).
2. Be certain that the cable plunger is locked in the neutral lock groove as shown in Figure A.
3. Route the control cable casing away from catalytic converters, tailpipes, exhaust manifolds or mufflers. These can melt the outer casing exposing the cable wire, and possibly causing failure.
4. Install the stroke limiting spacer nut on the plunger of the control assembly in the cab of the truck to limit the travel of the control cable wire when pushed in (see Fig. D).  **DANGER** failure to install the spacer nut can cause the control cable wire to kink from over-travel and the cable will not operate properly. Failure to follow these instructions may result in serious injury or death.
5. Install the control cable to the control valve and tighten the casing clamp swivel and wire clamp swivel according to Figure C (Pg. 17). Be certain both clamps are free to swivel after tightening and that the wire will freely travel after tightening. Also be certain that there is no more than 1/4" (6.35 mm) of exposed wire with the control lever in the up position. With the control valve in neutral – from the truck cab – test the control cable assembly to be certain the wire will travel the control valve spool lever open and closed without drag or restriction (see Fig. C Pg. 17).
6. Tie down the control cable casing according to Figure B (Pg. 17) with one (1) tie-down per 3 feet (91.4 cm) of cable length or one (1) tie-down per bend.

INSTALLATION & SERVICE INSTRUCTIONS

CONTROL CABLE INSTRUCTIONS

- A. Mount cable to vehicle as needed with special attention that no bends are sharper than a 10 inch (25.4 cm) radius.



NOTE: Route the cable casing around all hazards which may cause damage, such as catalytic converters, tailpipes, exhaust manifold or mufflers. Make sure the outer casing is not crushed or routed where moving parts may crush it during use.

- B. Make sure cable plunger is locked in the neutral lock groove.

DANGER



When installing cable on an existing unit with hydraulic lines already connected ... use **EXTREME CAUTION**. On a truck hoist application, moving the valve control lever can cause the truck box to fall in one second or less. Make sure empty truck box is well **BLOCKED-BRACED** and **PROPPED** to prevent the empty truck box from crushing you. **SERIOUS INJURY OR DEATH WILL RESULT** if you move the control lever while someone is under the truck box, and it is not secured properly in accordance with the truck box/hoist manufacturers' instructions.

- C. Install cable to control valve and tighten clamps per drawing instructions in Figure C Page 17. **NOTE** – extend the casing through the casing clamp to within 1/4" (6.35 mm) of the control lever at the closest position. This will keep the exposed wire to a minimum. Excess wire should be trimmed to 1/2" (12.7 mm) beyond the wire clamp and kept at a maximum of 1/4" (6.35 mm) of exposed wire to prevent possible kinking and causing some to go under the truck box.

INSTALLATION & SERVICE INSTRUCTIONS

CONTROL CABLE INSTALLATION

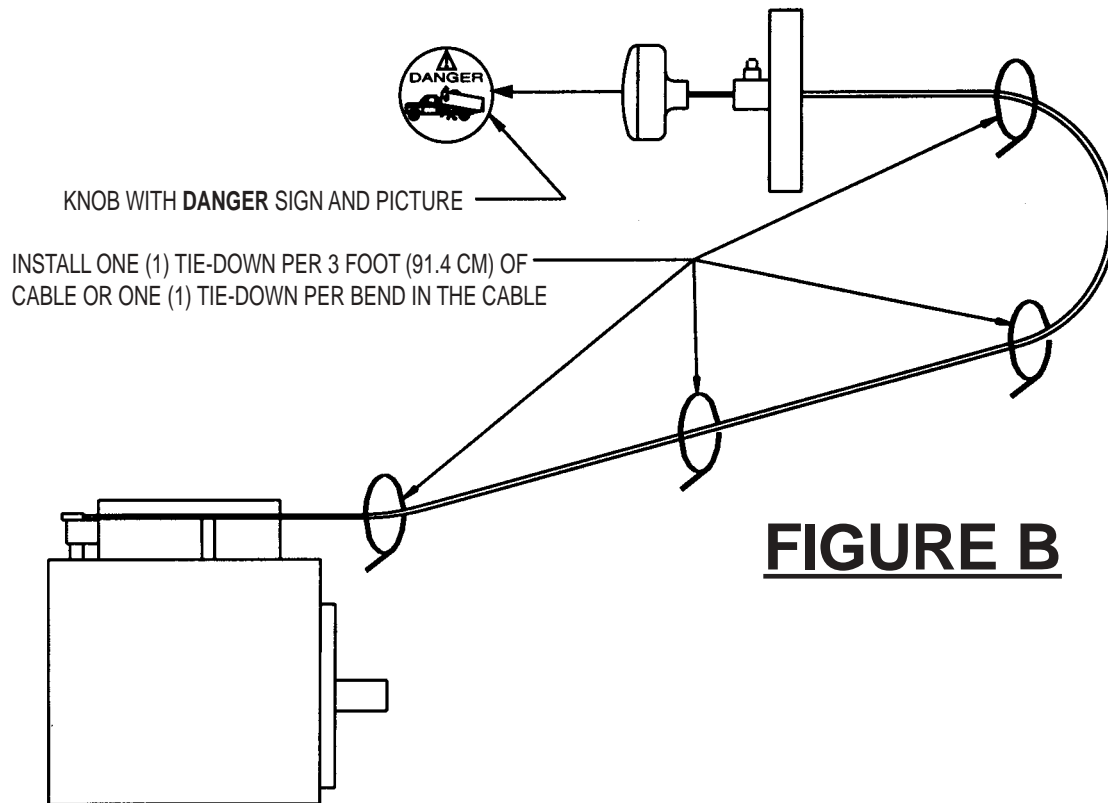


FIGURE B

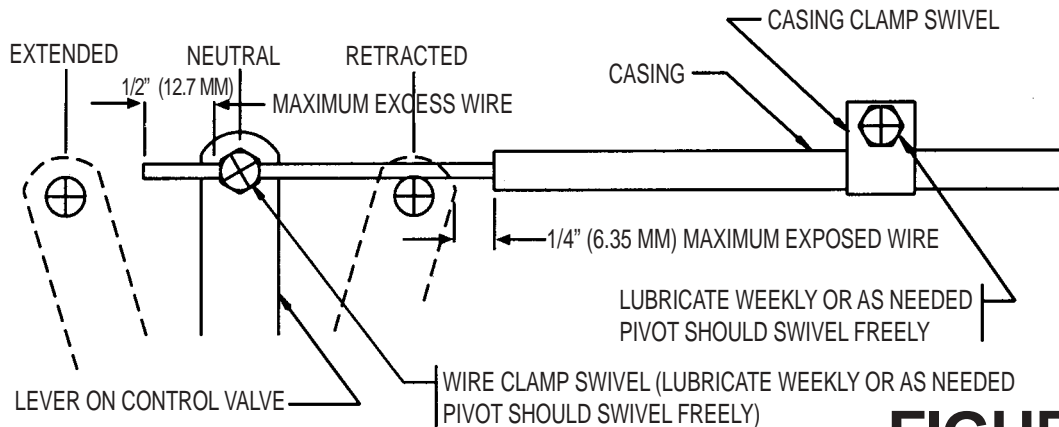


FIGURE C

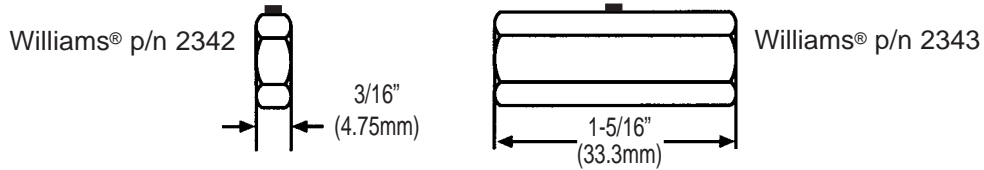
DANGER



Cable alignment is critical, do not bend lever or cause misalignment. Misalignment may cause wire to stick and result in a malfunction.

CONTROL CABLE INSTALLATION (CONTINUED)

SPACER NUTS – (INCLUDED WITH CABLE HEAD)



DANGER

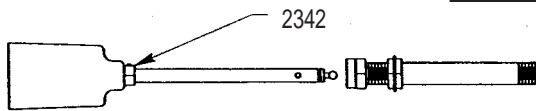


STROKE LIMITING SPACERS FOR CONTROL CABLE INSTALLATION

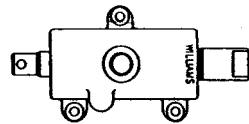
Two stroke limiting spacers have been supplied with your cable head. A stroke limiting spacer must be used on the knob end of the cable head to prevent over-travel of the plunger. Without the proper spacer, the plunger may over-travel causing the cable to kink and the cable will not operate properly. Use the information below to determine which spacer to use with Williams® valves. Failure to follow these instructions may result in serious injury or death. (Each spacer is supplied with a #6-32 set screw to secure the spacer to the cable head plunger.)

- D. Identify the model of control valve on the unit you are installing and the spacer nut to be used on the cable from drawings in Figure D below.

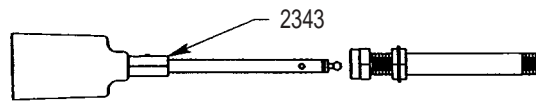
FIGURE D



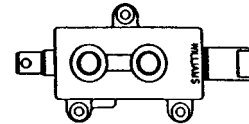
Use the 2342 spacer with a Williams® #3 valve.



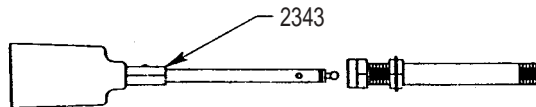
#3 VALVE



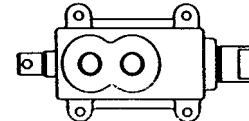
Use the 2343 spacer with a Williams® #4 valve.



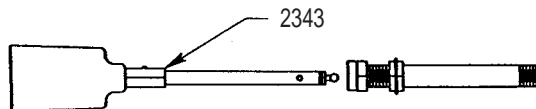
#4 VALVE



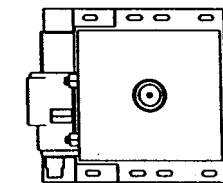
Use the 2343 spacer with a Williams® #6, #7, #8 valve.



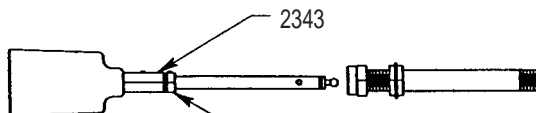
#6, #7, #8 VALVE



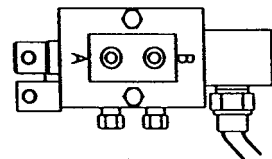
Use the 2343 spacer with a Williams® M-unit.



"M" SERIES

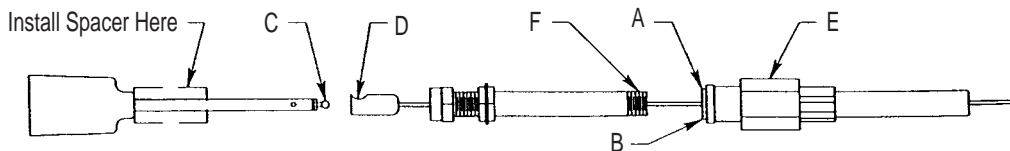


Use the 2342 & 2343 spacers with a Williams® manual electric valve.



MANUAL ELECTRIC VALVE

ASSEMBLY INSTRUCTIONS FOR CABLE AND CABLE HEAD.



- 1) Place O'ring (A) on to seat (B)
- 2) Slide ball (C) into slot (D)
- 3) Push nut (E) onto threads (F) and tighten securely.



DANGER DANGER



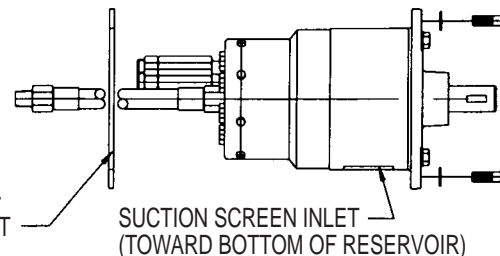
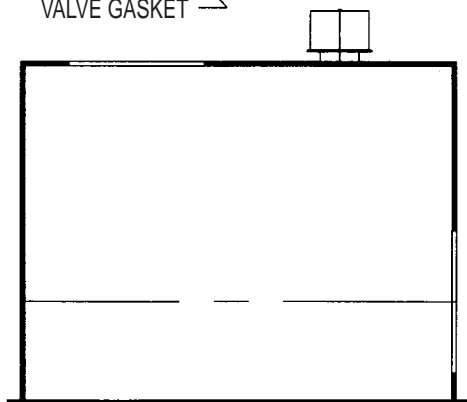
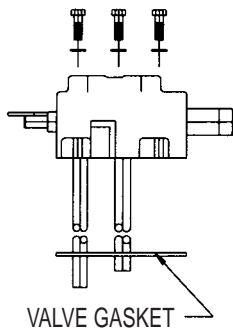
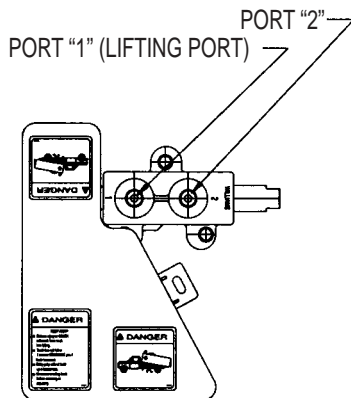
Read and understand these instructions before attempting removal, replacement, maintenance or repair of the hydraulic control valve.




DANGER

Failure to follow these instructions could result in **SERIOUS INJURY OR DEATH.**

PUMP REMOVAL (WITH 3-BOLT MOUNT VALVE)



1. Before beginning any repairs on pump, make sure that the truck box is empty – if necessary, empty the load.  Make sure the empty truck box is properly blocked by using the body props on the hoist unit as well as blocks under the hoist frame. Then, from the cab (not from under the truck box) push the control cable in to lower the truck box onto the body props and blocks to make sure the body props and blocks will hold the empty truck box safely.
2. Remove the two washer head screws from the valve lever guard and remove the guard to gain access to the valve control lever.
3. Disconnect the control cable from the valve lever to allow removal of the control valve.
4. Using a drip pan under the PTO unit, disconnect the hoses from the control valve and cap the hoses to keep dirt from getting in the hydraulic hoses.
5. Remove the three (3) 5/16" (7.9 mm) hex head cap screws holding the control valve to the reservoir. Pull the control valve up and remove the valve control lever. Then disconnect the pressure hose from the control valve that comes from the pump in the reservoir.
6. To remove the pump from the reservoir, remove the six (6) 5/16" (7.9 mm) hex head cap screws (on the outside bolt circle on the pump) and pull the pump from the reservoir.

NOTE: When the pump is being sent to the factory for service or repair, ship the pump only. Pack well to prevent damage in transit. Call Williams® for an RGA Number.



DANGER DANGER



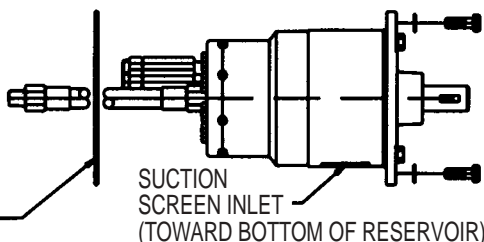
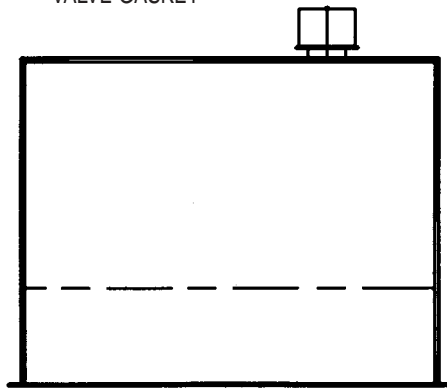
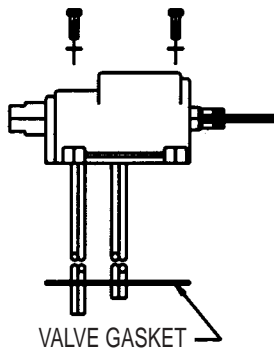
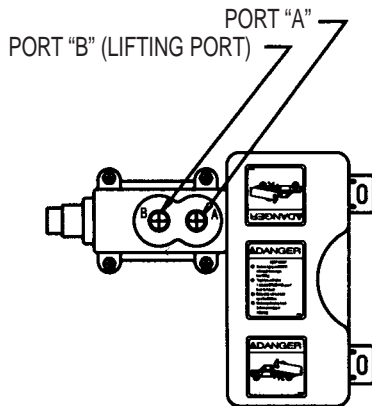
Read and understand these instructions before attempting removal, replacement, maintenance or repair of the hydraulic control valve.




DANGER

Failure to follow these instructions could result in **SERIOUS INJURY OR DEATH.**

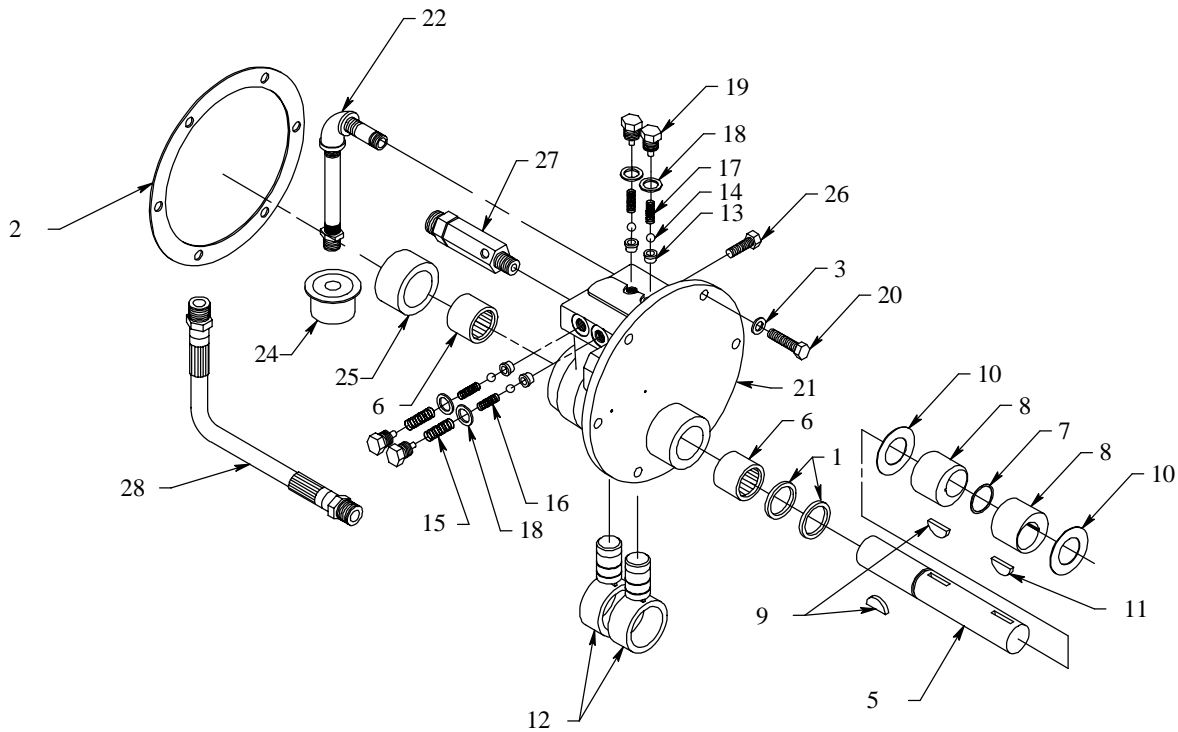
PUMP REMOVAL (WITH 4-BOLT MOUNT VALVE)



1.  Before beginning any repairs on pump, make sure that the truck box is empty – if necessary, empty the load. Make sure the empty truck box is properly blocked by using the body props on the hoist unit as well as blocks under the hoist frame. Then, from the cab (not from under the truck box) push the control cable in to lower the truck box onto the body props and blocks to make sure the body props and blocks will hold the empty truck box safely.
2. Remove the two washer head screws from the valve lever guard and remove the guard to gain access to the valve control lever.
3. Disconnect the control cable from the valve lever to allow removal of the control valve.
4. Using a drip pan under the PTO unit, disconnect the hoses from the control valve and cap the hoses to keep dirt from getting in the hydraulic hoses.
5. Remove the valve control lever. Then remove the four (4) 5/16" (7.9 mm) hex head cap screws holding the control valve to the reservoir. Pull the control valve up and disconnect the pressure hose from the control valve that comes from the pump in the reservoir.
6. To remove the pump from the reservoir, remove the six (6) 5/16" (7.9 mm) hex head cap screws (on the outside bolt circle on the pump) and pull the pump from the reservoir.

NOTE: When the pump is being sent to the factory for service or repair, ship the pump only. Pack well to prevent damage in transit. Call Williams® for an RGA Number.

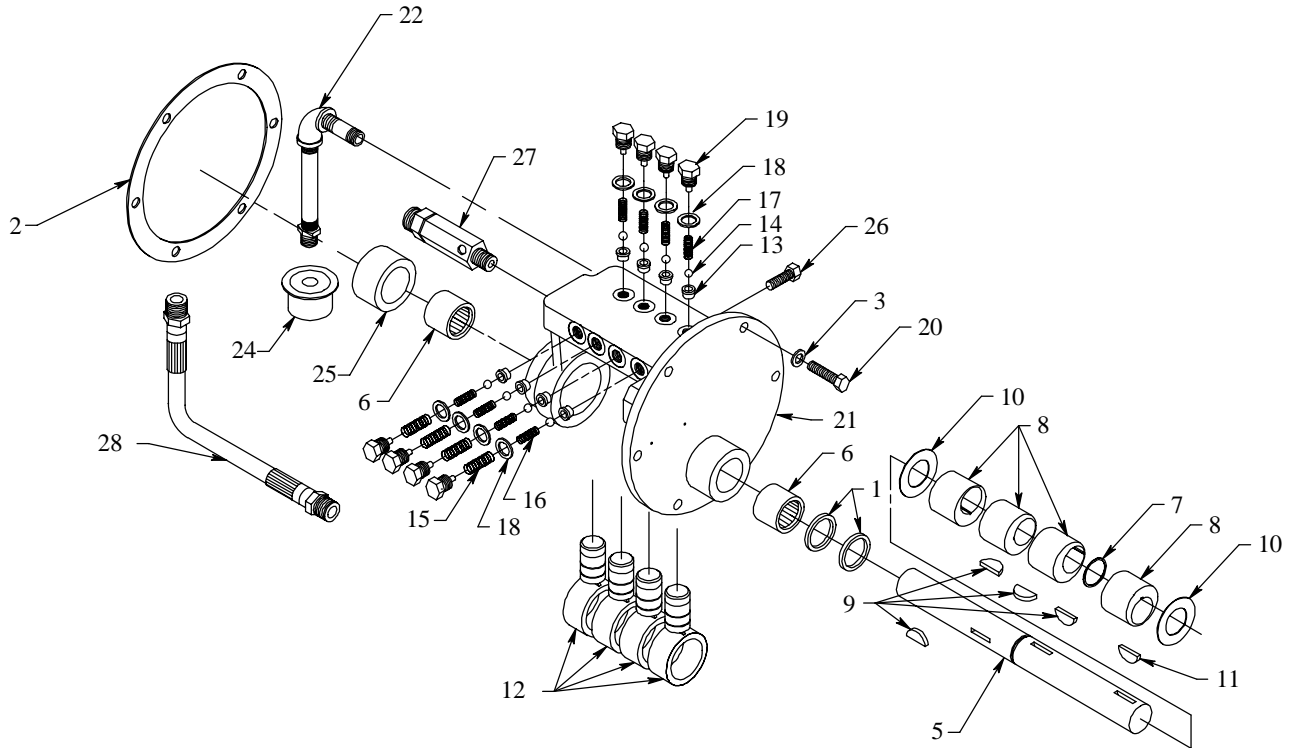
MODEL 20 PUMP PARTS LIST



NO.	PART NO.	QTY. REQ.	PART DESCRIPTION	NO.	PART NO.	QTY. REQ.	PART DESCRIPTION
	1433		SEAL KIT	18	1009	4	WASHER
1	1028	2	OIL SEAL	19	1008	4	PORT STUD
2	1012	1	PUMP GASKET				REMAINING PUMP PARTS
3	1030	6	ALUMINUM WASHER	20	1035	6	CAP SCREWS
	1430		SHAFT AND BEARING KIT	21	1059		PUMP CASTING (Not Sold Separately)
5	1002	1	SHAFT	22	1664	1	INTAKE PIPE
6	1023	2	NEEDLE BEARING	24	2664	1	INTAKE SCREEN
7	29466A	1	SPIROLOX RING	25	1033	1	REAR BEARING HOUSING
8	1004	2	ECCENTRICS	26	1040	1	HOUSING SET SCREW & NUT
9	1026	2	KEY, ECCENTRIC	27	1060	1	RELIEF VALVE (SPECIFY PUMP MODEL, SERIAL#, PRESS. & RPM)
10	1055	3	NYLON THRUST WASHER	28	--		HOSE - SPECIFY RESERVOIR SIZE WHEN ORDERING
11	1027	1	KEY				
	1431		PISTON and CONNECTING ROD KIT				
12	1006	2	PISTON and ROD ASSEMBLY				
	1432		INTAKE and EXHAUST VALVE KIT				
13	1043	4	SEAT				
14	1015	4	BALL				
15	1041	2	CAGE SPRING				
16	2264	2	EXHAUST SPRING				
17	1016	2	INTAKE SPRING				

NOTE: LETTER CODE INDICATES RELIEF PRESS. SETTING AND IS LOCATED ON REAR MAIN BEARING HOUSING. NEW VALVE GASKETS ARE RECOMMENDED WHEN REPLACING PUMP. THE PUMP MODEL # AND SERIAL # ARE LOCATED ON FRONT OF PUMP.

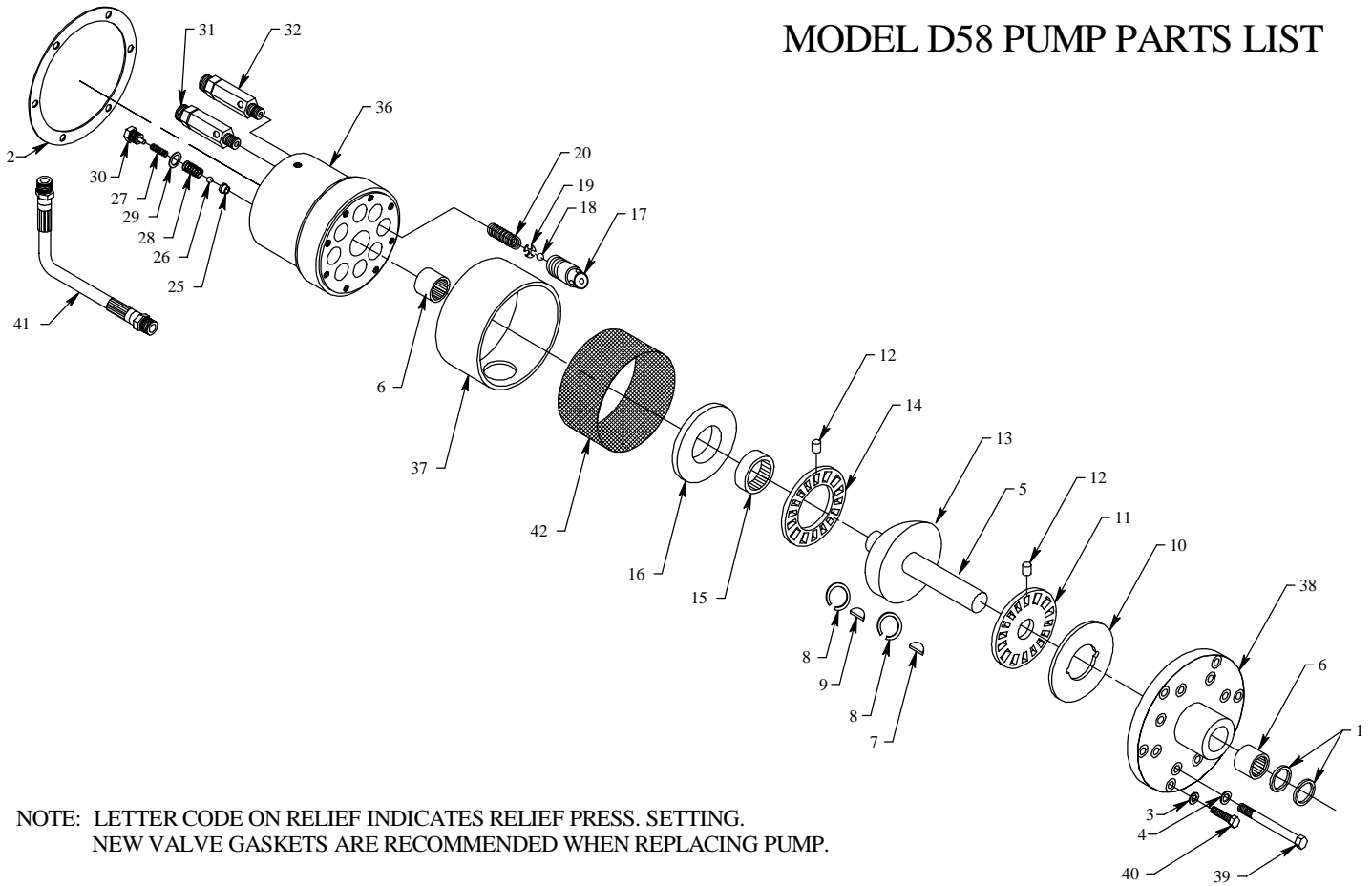
MODEL 40 PUMP PARTS LIST



NO.	PART NO.	QTY. REQ.	PART DESCRIPTION	NO.	PART NO.	QTY. REQ.	PART DESCRIPTION
	1433		SEAL KIT	18	1009	8	WASHER
1	1028	2	OIL SEAL	19	1008	8	PORT STUD
2	1012	1	PUMP GASKET				REMAINING PUMP PARTS
3	1030	6	ALUMINUM WASHER	20	1035	6	CAP SCREWS
	1434		SHAFT AND BEARING KIT	21	1054		PUMP CASTING (Not Sold Separately)
5	1005	1	SHAFT	22	1664	1	INTAKE PIPE
6	1023	2	NEEDLE BEARING	24	2664	1	INTAKE SCREEN
7	29466A	1	SPIROLOX RING	25	1033	1	REAR BEARING HOUSING
8	1004	4	ECCENTRICS	26	1040	1	HOUSING SET SCREW & NUT
9	1026	4	KEY, ECCENTRIC	27	1060	1	RELIEF VALVE (SPECIFY PUMP MODEL, SERIAL#, PRESS. & RPM)
10	1055	3	NYLON THRUST WASHER	28	--		HOSE - SPECIFY RESERVOIR SIZE WHEN ORDERING
11	1027	1	KEY				
	1435		PISTON and CONNECTING ROD KIT				
12	1006	4	PISTON and ROD ASSEMBLY				
	1436		INTAKE and EXHAUST VALVE KIT				
13	1043	8	SEAT				
14	1015	8	BALL				
15	1041	4	CAGE SPRING				
16	2264	4	EXHAUST SPRING				
17	1016	4	INTAKE SPRING				

NOTE: LETTER CODE INDICATES RELIEF PRESS. SETTING AND IS LOCATED ON REAR MAIN BEARING HOUSING. NEW VALVE GASKETS ARE RECOMMENDED WHEN REPLACING PUMP. THE PUMP MODEL # AND SERIAL # ARE LOCATED ON FRONT OF PUMP.

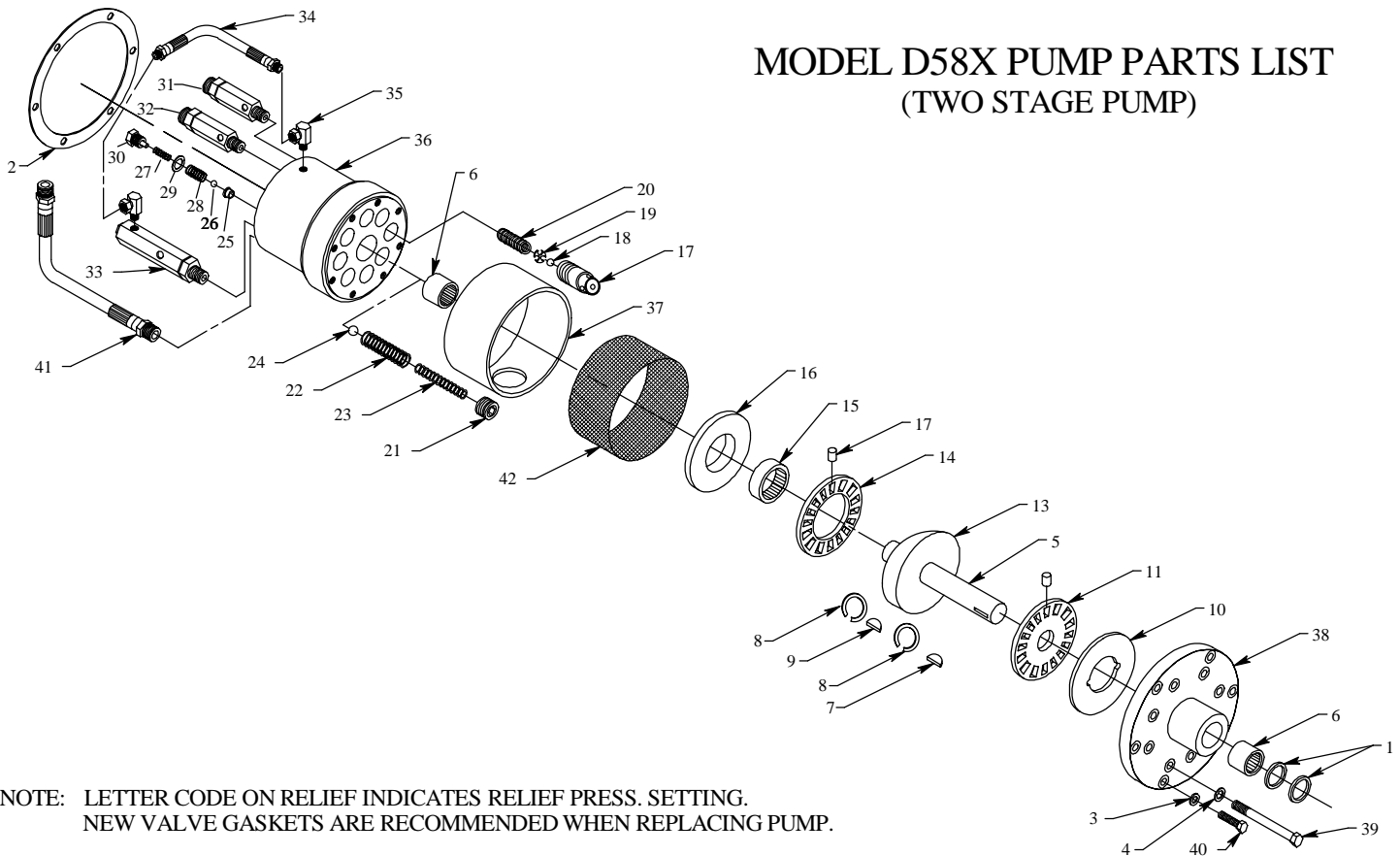
MODEL D58 PUMP PARTS LIST



NOTE: LETTER CODE ON RELIEF INDICATES RELIEF PRESS. SETTING.
NEW VALVE GASKETS ARE RECOMMENDED WHEN REPLACING PUMP.

NO.	PART NO.	QTY. REQ.	PART DESCRIPTION	NO.	PART NO.	QTY. REQ.	PART DESCRIPTION
1359 SEAL KIT				1356 PISTON KIT			
1	1028	2	OIL SEAL	17	1235	8	PISTON
2	1012	1	PUMP GASKET	18	1168	8	BALL
3	1030	6	ALUMINUM WASHER	19	1233	8	BALL STOP
4	1108	8	ALUMINUM WASHER	20	1234	8	SPRING
1358 SHAFT AND BEARING KIT				1354 EXHAUST VALVE KIT			
5	1075	1	SHAFT	25	1043	8	SEAT
6	1023	2	NEEDLE BEARING	26	1015	8	BALL
7	1027	1	SHAFT KEY	27	2264	8	EXHAUST SPRING
8	1118	2	SNAP RING	28	1041	8	CAGE SPRING
9	1117	1	WOBBLE KEY	29	1009	8	WASHER
1357 THRUST BEARING KIT				30	1008	8	PORT STUD
10	1080	1	THRUST RACE	REMAINING PUMP PARTS			
11	1077	1	FRONT ROLLER RETAINER	31,32	1087	2	DUAL RELIEF VALVE (SPECIFY PUMP MODEL, SERIAL#, PRESS. & R.P.M.)
12	1119	32	THRUST ROLLER BEARING	36	1231	1	PUMP CASTING (Not Sold Separately)
13	1232	1	WOBBLE PLATE	37	1237	1	INTAKE HOUSING TUBE
14	1078	1	REAR ROLLER RETAINER	38	1350	1	FRONT CASTING
15	1106	1	THRUST PLATE BEARING	39	1107	8	PUMP ASSEMBLY BOLT
16	1076	1	PISTON THRUST PLATE	40	1035	6	MOUNTING CAP SCREW
				41	--		HOSE - SPECIFY RESERVOIR SIZE WHEN ORDERING
				42	1515	1	INTAKE SCREEN

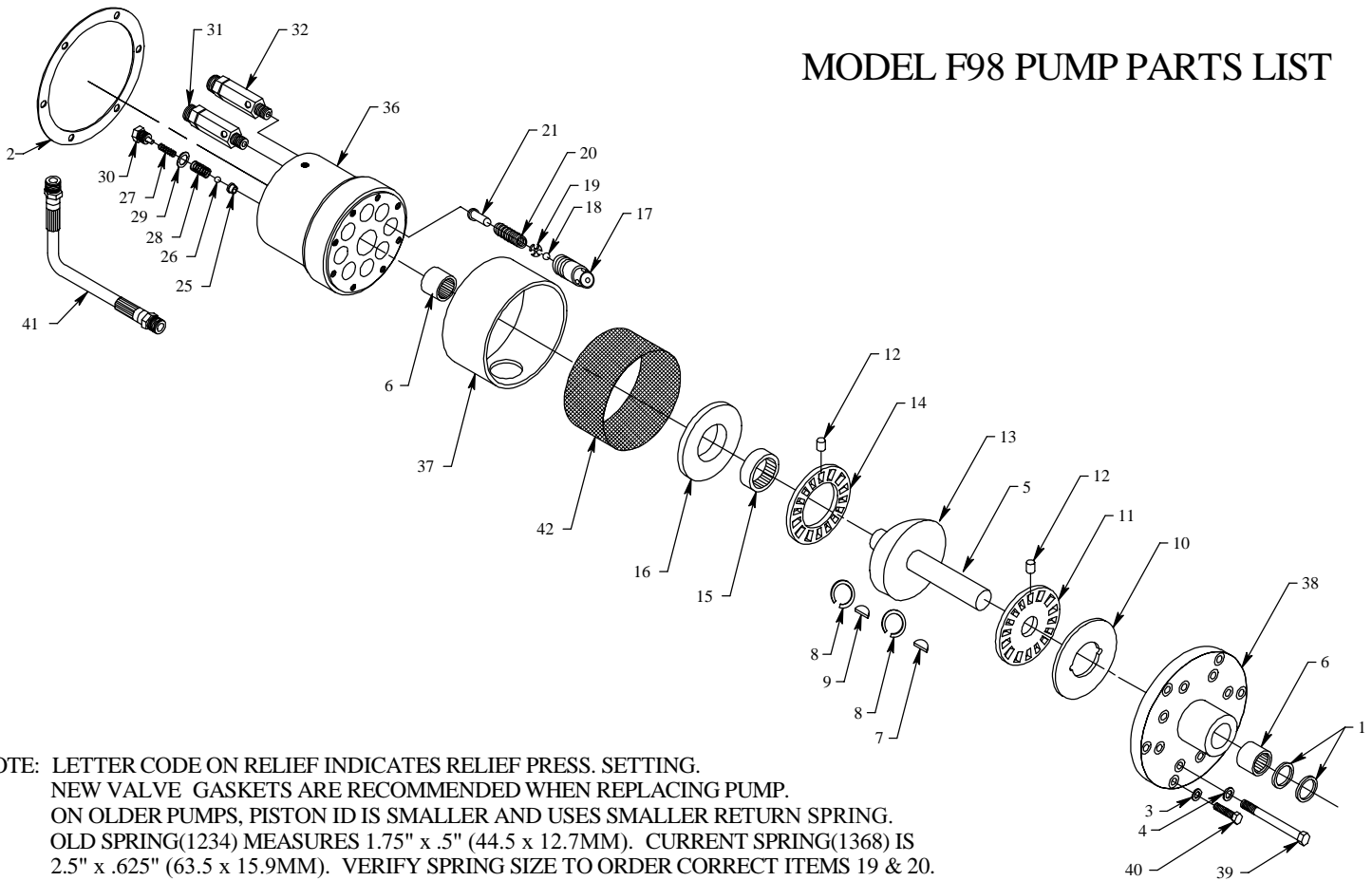
MODEL D58X PUMP PARTS LIST (TWO STAGE PUMP)



NOTE: LETTER CODE ON RELIEF INDICATES RELIEF PRESS. SETTING.
NEW VALVE GASKETS ARE RECOMMENDED WHEN REPLACING PUMP.

NO.	PART NO.	QTY. REQ.	PART DESCRIPTION	NO.	PART NO.	QTY. REQ.	PART DESCRIPTION
	1359		SEAL KIT		1355		CHECK VALVE KIT
1	1028	2	OIL SEAL	21	1221	1	PLUG
2	1012	1	PUMP GASKET	22	2383	1	CAGE SPRING
3	1030	6	ALUMINUM WASHER	23	1216	1	SPRING
4	1108	8	ALUMINUM WASHER	24	1217	1	BALL
	1358		SHAFT AND BEARING KIT		1354		EXHAUST VALVE KIT
5	1075	1	SHAFT	25	1043	8	SEAT
6	1023	2	NEEDLE BEARING	26	1015	8	BALL
7	1027	1	SHAFT KEY	27	2264	8	EXHAUST SPRING
8	1118	2	SNAP RING	28	1041	8	CAGE SPRING
9	1117	1	WOBBLE KEY	29	1009	8	WASHER
	1357		THRUST BEARING KIT	30	1008	8	PORT STUD
10	1080	1	THRUST RACE		1352		UNLOADING VALVE KIT
11	1077	1	FRONT ROLLER RETAINER	33	1245	1	UNLOADING VALVE
12	1119	32	THRUST ROLLER BEARING	34	1351	1	PILOT HOSE
13	1232	1	WOBBLE PLATE	35	1243	2	90° FITTING
14	1078	1	REAR ROLLER RETAINER				REMAINING PUMP PARTS
15	1106	1	THRUST PLATE BEARING	31	2663	1	LOW PRESS. RELIEF } SPECIFY PUMP MODEL, HIGH PRESS. RELIEF } SERIAL#, PRESSURE & R.P.M.)
16	1076	1	PISTON THRUST PLATE	32	1087	1	
	1356		PISTON KIT	36	1238	1	PUMP CASTING (Not Sold Separately)
17	1235	8	PISTON	37	1237	1	INTAKE HOUSING TUBE
18	1168	8	BALL	38	1350	1	FRONT CASTING
19	1233	8	BALL STOP	39	1107	8	PUMP ASSEMBLY BOLT
20	1234	8	SPRING	40	1035	6	MOUNTING CAP SCREW
				41	--		HOSE - SPECIFY RESERVOIR SIZE WHEN ORDERING
				42	1515	1	INTAKE SCREEN

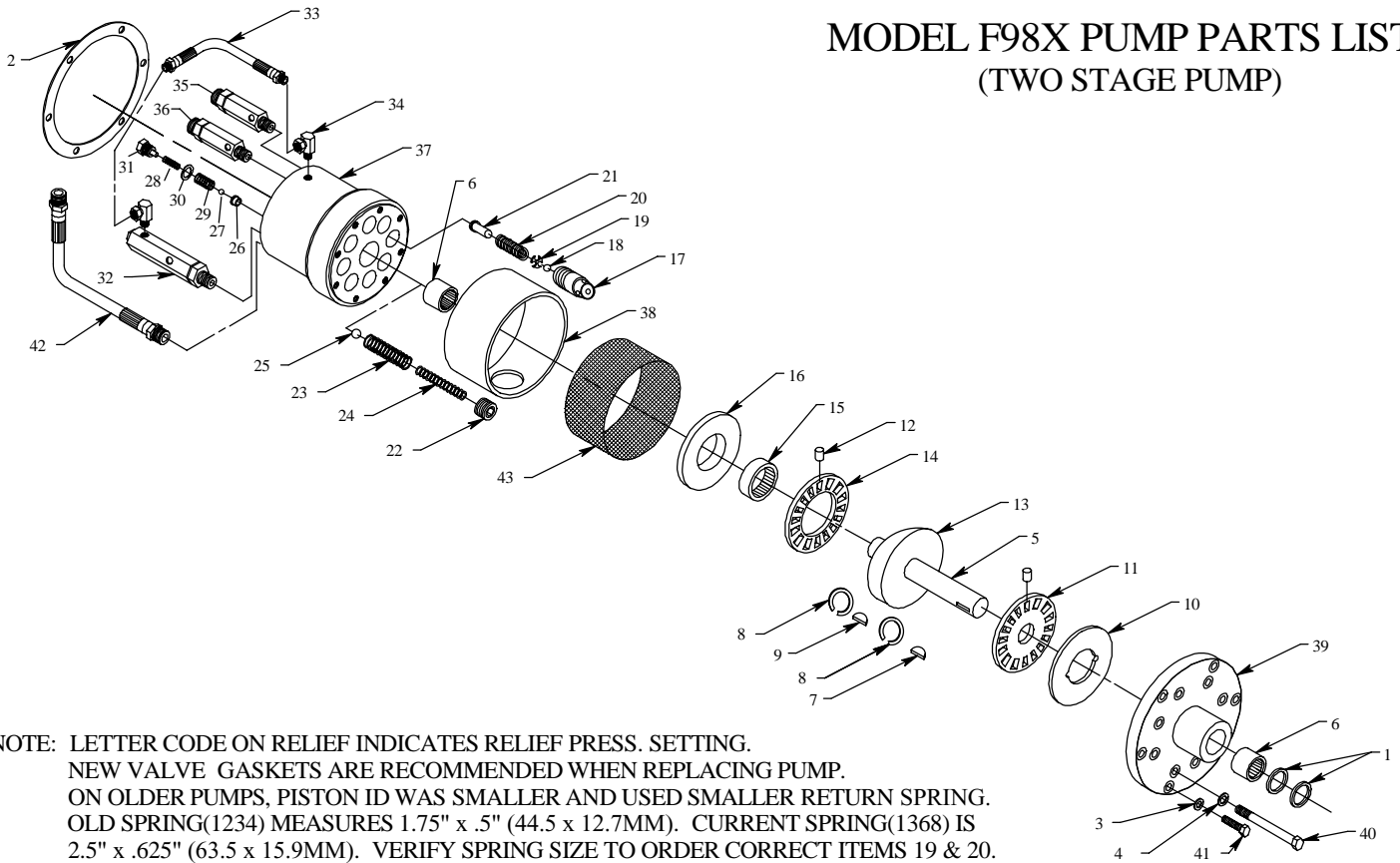
MODEL F98 PUMP PARTS LIST



NOTE: LETTER CODE ON RELIEF INDICATES RELIEF PRESS. SETTING.
 NEW VALVE GASKETS ARE RECOMMENDED WHEN REPLACING PUMP.
 ON OLDER PUMPS, PISTON ID IS SMALLER AND USES SMALLER RETURN SPRING.
 OLD SPRING(1234) MEASURES 1.75" x .5" (44.5 x 12.7MM). CURRENT SPRING(1368) IS
 2.5" x .625" (63.5 x 15.9MM). VERIFY SPRING SIZE TO ORDER CORRECT ITEMS 19 & 20.

NO.	PART NO.	QTY.	PART DESCRIPTION	NO.	PART NO.	QTY.	PART DESCRIPTION
	1359		SEAL KIT		1361		PISTON KIT
1	1028	2	OIL SEAL	17	1367	8	PISTON
2	1012	1	PUMP GASKET	18	1168	8	BALL
3	1030	6	ALUMINUM WASHER	19	1366	8	BALL STOP (1233 old pumps see note)
4	1108	8	ALUMINUM WASHER	20	1368	8	SPRING(1233 old pumps see note)
	1358		SHAFT AND BEARING KIT	21	1369	8	SPRING PIVOT
5	1075	1	SHAFT		1354		EXHAUST VALVE KIT
6	1023	2	NEEDLE BEARING	25	1043	8	SEAT
7	1027	1	SHAFT KEY	26	1015	8	BALL
8	1118	2	SNAP RING	27	2264	8	EXHAUST SPRING
9	1117	1	WOBBLE KEY	28	1041	8	CAGE SPRING
	1360		THRUST BEARING KIT	29	1009	8	WASHER
10	1080	1	THRUST RACE	30	1008	8	PORT STUD
11	1077	1	FRONT ROLLER RETAINER				REMAINING PUMP PARTS
12	1119	32	THRUST ROLLER BEARING	31,32	1087	2	DUAL RELIEF VALVE (SPECIFY PUMP MODEL, SERIAL#, PRESS. & R.P.M.)
13	1131	1	WOBBLE PLATE	36	1240	1	PUMP CASTING (Not Sold Separately)
14	1078	1	REAR ROLLER RETAINER	37	1237	1	INTAKE HOUSING TUBE
15	1106	1	THRUST PLATE BEARING	38	1350	1	FRONT CASTING
16	1076	1	PISTON THRUST PLATE	39	1107	8	PUMP ASSEMBLY BOLT
				40	1035	6	MOUNTING CAP SCREW
				41	--		HOSE - SPECIFY RESERVOIR SIZE WHEN ORDERING
				42	1515	1	INTAKE SCREEN

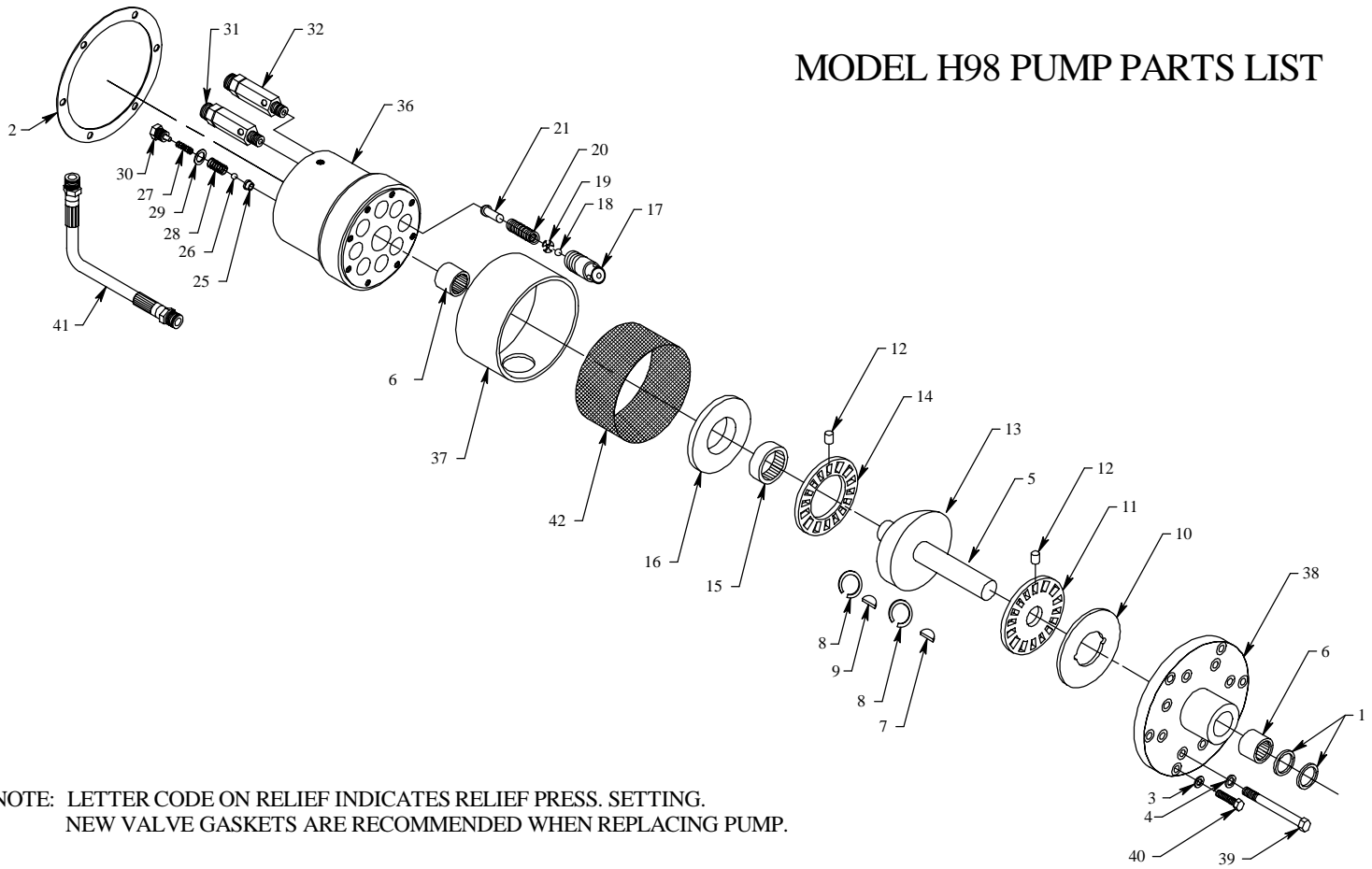
MODEL F98X PUMP PARTS LIST (TWO STAGE PUMP)



NOTE: LETTER CODE ON RELIEF INDICATES RELIEF PRESS. SETTING.
 NEW VALVE GASKETS ARE RECOMMENDED WHEN REPLACING PUMP.
 ON OLDER PUMPS, PISTON ID WAS SMALLER AND USED SMALLER RETURN SPRING.
 OLD SPRING(1234) MEASURES 1.75" x .5" (44.5 x 12.7MM). CURRENT SPRING(1368) IS
 2.5" x .625" (63.5 x 15.9MM). VERIFY SPRING SIZE TO ORDER CORRECT ITEMS 19 & 20.

NO.	PART NO.	QTY. REQ.	PART DESCRIPTION	NO.	PART NO.	QTY. REQ.	PART DESCRIPTION
	1359		SEAL KIT		1355		CHECK VALVE KIT
1	1028	2	OIL SEAL	22	1221	1	PLUG
2	1012	1	PUMP GASKET	23	2383	1	CAGE SPRING
3	1030	6	ALUMINUM WASHER	24	1216	1	SPRING
4	1108	8	ALUMINUM WASHER	25	1217	1	BALL
	1358		SHAFT AND BEARING KIT		1354		EXHAUST VALVE KIT
5	1075	1	SHAFT	26	1043	8	SEAT
6	1023	2	NEEDLE BEARING	27	1015	8	BALL
7	1027	1	SHAFT KEY	28	2264	8	EXHAUST SPRING
8	1118	2	SNAP RING	29	1041	8	CAGE SPRING
9	1117	1	WOBBLE KEY	30	1009	8	WASHER
	1360		THRUST BEARING KIT	31	1008	8	PORT STUD
10	1080	1	THRUST RACE		1352		UNLOADING VALVE KIT
11	1077	1	FRONT ROLLER RETAINER	32	1245	1	UNLOADING VALVE
12	1119	32	THRUST ROLLER BEARING	33	1351	1	PILOT HOSE
13	1131	1	WOBBLE PLATE	34	1243	2	90° FITTING
14	1078	1	REAR ROLLER RETAINER				REMAINING PUMP PARTS
15	1106	1	THRUST PLATE BEARING	35	2663	1	LOW PRESS. RELIEF } SPECIFY PUMP MODEL,
16	1076	1	PISTON THRUST PLATE	36	1087	1	HIGH PRESS. RELIEF } SERIAL#, PRESSURE & R.P.M.)
	1361		PISTON KIT	37	1242	1	PUMP CASTING (Not Sold Separately)
17	1367	8	PISTON	38	1237	1	INTAKE HOUSING TUBE
18	1168	8	BALL	39	1350	1	FRONT CASTING
19	1366	8	BALL STOP (1233 for old pumps, see note)	40	1107	8	PUMP ASSEMBLY BOLT
20	1368	8	SPRING (1234 for old pumps, see note)	41	1035	6	MOUNTING CAP SCREW
21	1369	8	SPRING PIVOT	42	--		HOSE - SPECIFY RESERVOIR SIZE WHEN ORDERING
				43	1515	1	INTAKE SCREEN

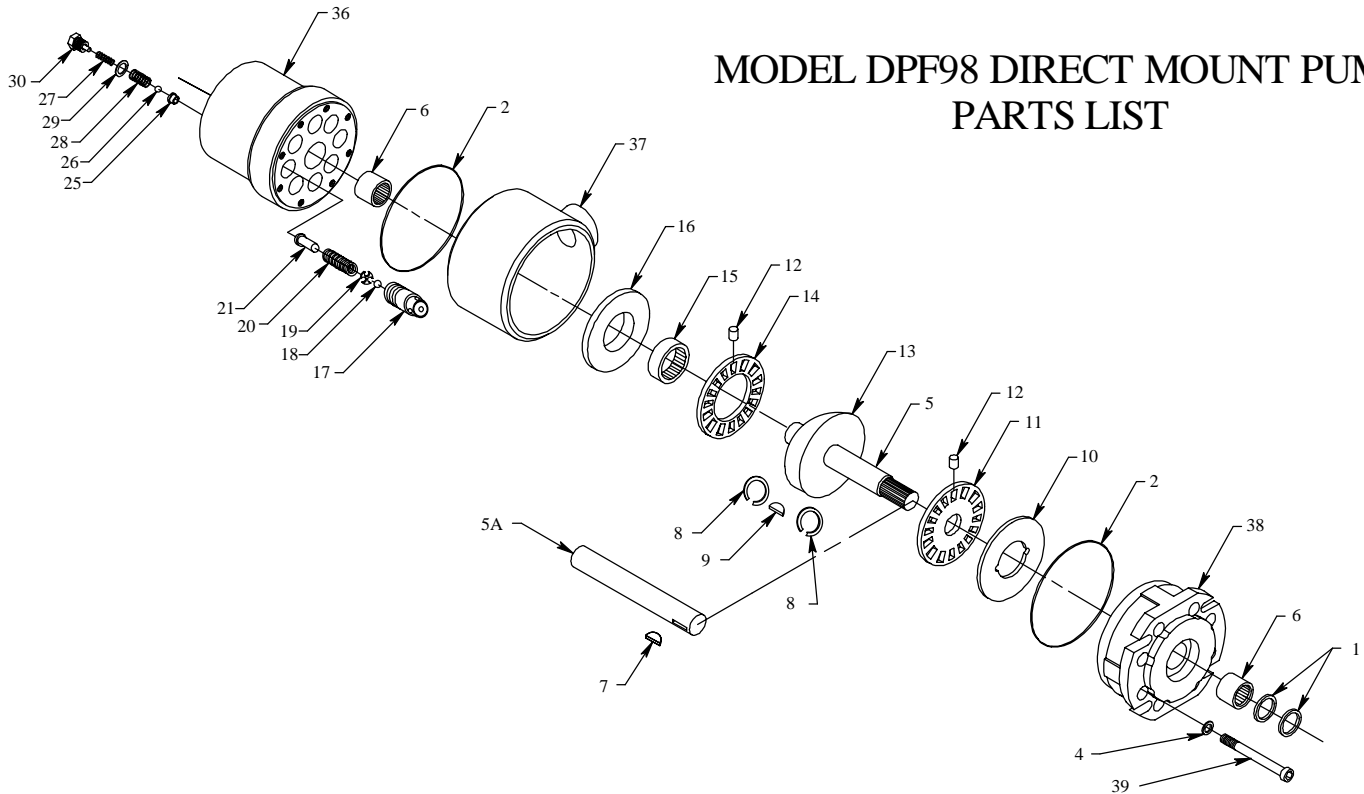
MODEL H98 PUMP PARTS LIST



NOTE: LETTER CODE ON RELIEF INDICATES RELIEF PRESS. SETTING.
NEW VALVE GASKETS ARE RECOMMENDED WHEN REPLACING PUMP.

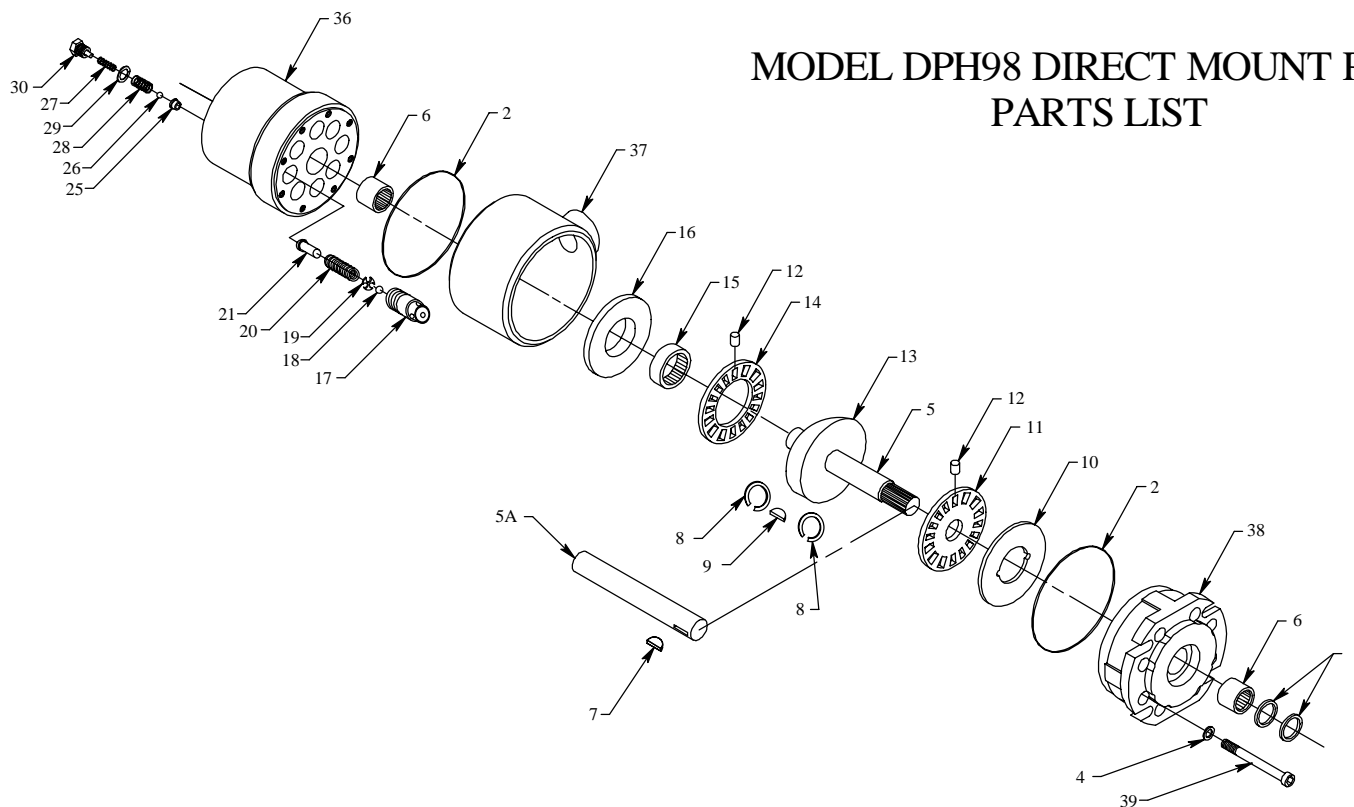
NO.	PART NO.	QTY. REQ.	PART DESCRIPTION	NO.	PART NO.	QTY. REQ.	PART DESCRIPTION
	1359		SEAL KIT		2002		PISTON KIT
1	1028	2	OIL SEAL	17	1909	8	PISTON
2	1012	1	PUMP GASKET	18	1168	8	BALL
3	1030	6	ALUMINUM WASHER	19	1366	8	BALL STOP
4	1108	8	ALUMINUM WASHER	20	1368	8	SPRING
	1358		SHAFT AND BEARING KIT	21	1369	8	SPRING PIVOT
5	1075	1	SHAFT		1354		EXHAUST VALVE KIT
6	1023	2	NEEDLE BEARING	25	1043	8	SEAT
7	1027	1	SHAFT KEY	26	1015	8	BALL
8	1118	2	SNAP RING	27	2264	8	EXHAUST SPRING
9	1117	1	WOBBLE KEY	28	1041	8	CAGE SPRING
	1360		THRUST BEARING KIT	29	1009	8	WASHER
10	1080	1	THRUST RACE	30	1008	8	PORT STUD
11	1077	1	FRONT ROLLER RETAINER				REMAINING PUMP PARTS
12	1119	32	THRUST ROLLER BEARING	31,32	1087	2	DUAL RELIEF VALVE (SPECIFY PUMP MODEL, SERIAL#, PRESS. & R.P.M.)
13	1131	1	WOBBLE PLATE	36	1908	1	PUMP CASTING (Not Sold Separately)
14	1078	1	REAR ROLLER RETAINER	37	1237	1	INTAKE HOUSING TUBE
15	1106	1	THRUST PLATE BEARING	38	1350	1	FRONT CASTING
16	1076	1	PISTON THRUST PLATE	39	1107	8	PUMP ASSEMBLY BOLT
				40	1035	6	MOUNTING CAP SCREW
				41	--		HOSE - SPECIFY RESERVOIR SIZE WHEN ORDERING
				42	1515	1	PUMP INTAKE SCREEN

MODEL DPF98 DIRECT MOUNT PUMP PARTS LIST



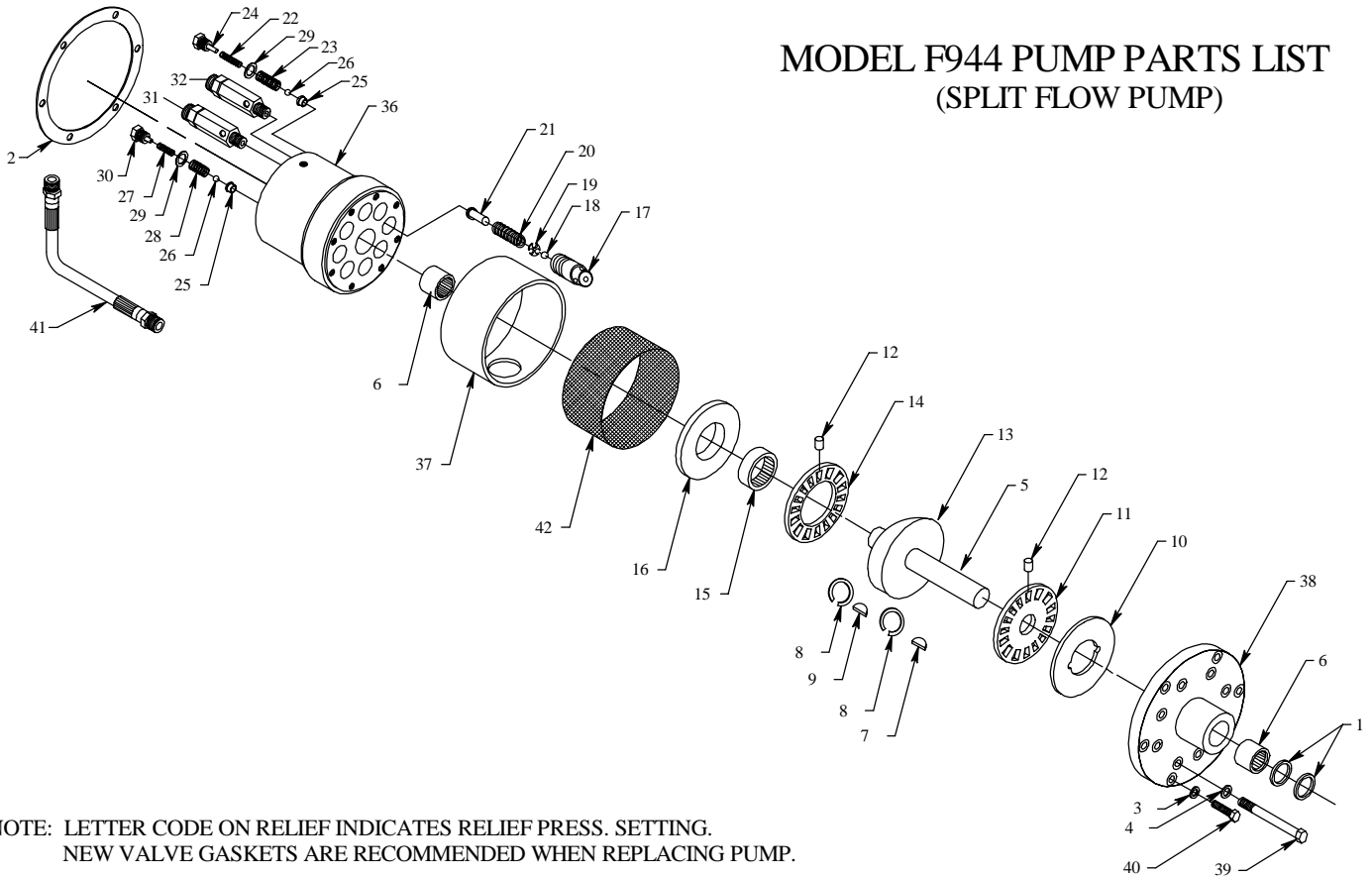
NO.	PART NO.	QTY. REQ.	PART DESCRIPTION	NO.	PART NO.	QTY. REQ.	PART DESCRIPTION
1981 SEAL KIT				1361 PISTON KIT			
1	1028	2	OIL SEAL	17	1367	8	PISTON
2	23226A	2	HOUSING O-RING	18	1168	8	BALL
4	1108	8	ALUMINUM WASHER	19	1366	8	BALL STOP
1986 STRAIGHT SHAFT AND BEARING KIT				20	1368	8	SPRING
5A	1966	1	STRAIGHT SHAFT - 1" (25.4mm) dia. keyed shaft	21	1369	8	SPRING PIVOT
6	1023	2	NEEDLE BEARING	1354 EXHAUST VALVE KIT			
7	1027	1	SHAFT KEY	25	1043	8	SEAT
8	1118	2	SNAP RING	26	1015	8	BALL
9	1117	1	WOBBLE KEY	27	2264	8	EXHAUST SPRING
1982 SPLINED SHAFT AND BEARING KIT				28	1041	8	CAGE SPRING
5	1965	1	SPLINED SHAFT- 7/8" (22.2mm) - 13 tooth spline	29	1009	8	WASHER
6	1023	2	NEEDLE BEARING	30	1008	8	PORT STUD
7			NOT USED	REMAINING PUMP PARTS			
8	1118	2	SNAP RING	36	1978	1	PUMP CASTING (Not Sold Separately)
9	1117	1	WOBBLE KEY	37	1961	1	DIRECT MOUNT PUMP HOUSING
1360 THRUST BEARING KIT				38	1960	1	FRONT CASTING - SAE-B 4 BOLT MOUNT
10	1080	1	THRUST RACE	39	1985	8	PUMP ASSEMBLY BOLT
11	1077	1	FRONT ROLLER RETAINER				
12	1119	32	THRUST ROLLER BEARING				
13	1131	1	WOBBLE PLATE				
14	1078	1	REAR ROLLER RETAINER				
15	1106	1	THRUST PLATE BEARING				
16	1076	1	PISTON THRUST PLATE				

MODEL DPH98 DIRECT MOUNT PUMP PARTS LIST



NO.	PART NO.	QTY. REQ.	PART DESCRIPTION	NO.	PART NO.	QTY. REQ.	PART DESCRIPTION
	1981		SEAL KIT		2002		PISTON KIT
1	1028	2	OIL SEAL	17	1909	8	PISTON
2	23226A	2	HOUSING O-RING	18	1168	8	BALL
4	1108	8	ALUMINUM WASHER	19	1366	8	BALL STOP
	1986		STRAIGHT SHAFT AND BEARING KIT	20	1368	8	SPRING
5A	1966	1	STRAIGHT SHAFT - 1" (25.4mm) dia. keyed shaft	21	1369	8	SPRING PIVOT
6	1023	2	NEEDLE BEARING		1354		EXHAUST VALVE KIT
7	1027	1	SHAFT KEY	25	1043	8	SEAT
8	1118	2	SNAP RING	26	1015	8	BALL
9	1117	1	WOBBLE KEY	27	2264	8	EXHAUST SPRING
	1982		SPLINED SHAFT AND BEARING KIT	28	1041	8	CAGE SPRING
5	1965	1	SPLINED SHAFT- 7/8" (22.2mm) - 13 tooth spline	29	1009	8	WASHER
6	1023	2	NEEDLE BEARING	30	1008	8	PORT STUD
7			NOT USED				REMAINING PUMP PARTS
8	1118	2	SNAP RING	36	1979	1	PUMP CASTING (Not Sold Separately)
9	1117	1	WOBBLE KEY	37	1961	1	DIRECT MOUNT PUMP HOUSING
	1360		THRUST BEARING KIT	38	1960	1	FRONT CASTING - SAE-B 4 BOLT MOUNT
10	1080	1	THRUST RACE	39	1985	8	PUMP ASSEMBLY BOLT
11	1077	1	FRONT ROLLER RETAINER				
12	1119	32	THRUST ROLLER BEARING				
13	1131	1	WOBBLE PLATE				
14	1078	1	REAR ROLLER RETAINER				
15	1106	1	THRUST PLATE BEARING				
16	1076	1	PISTON THRUST PLATE				

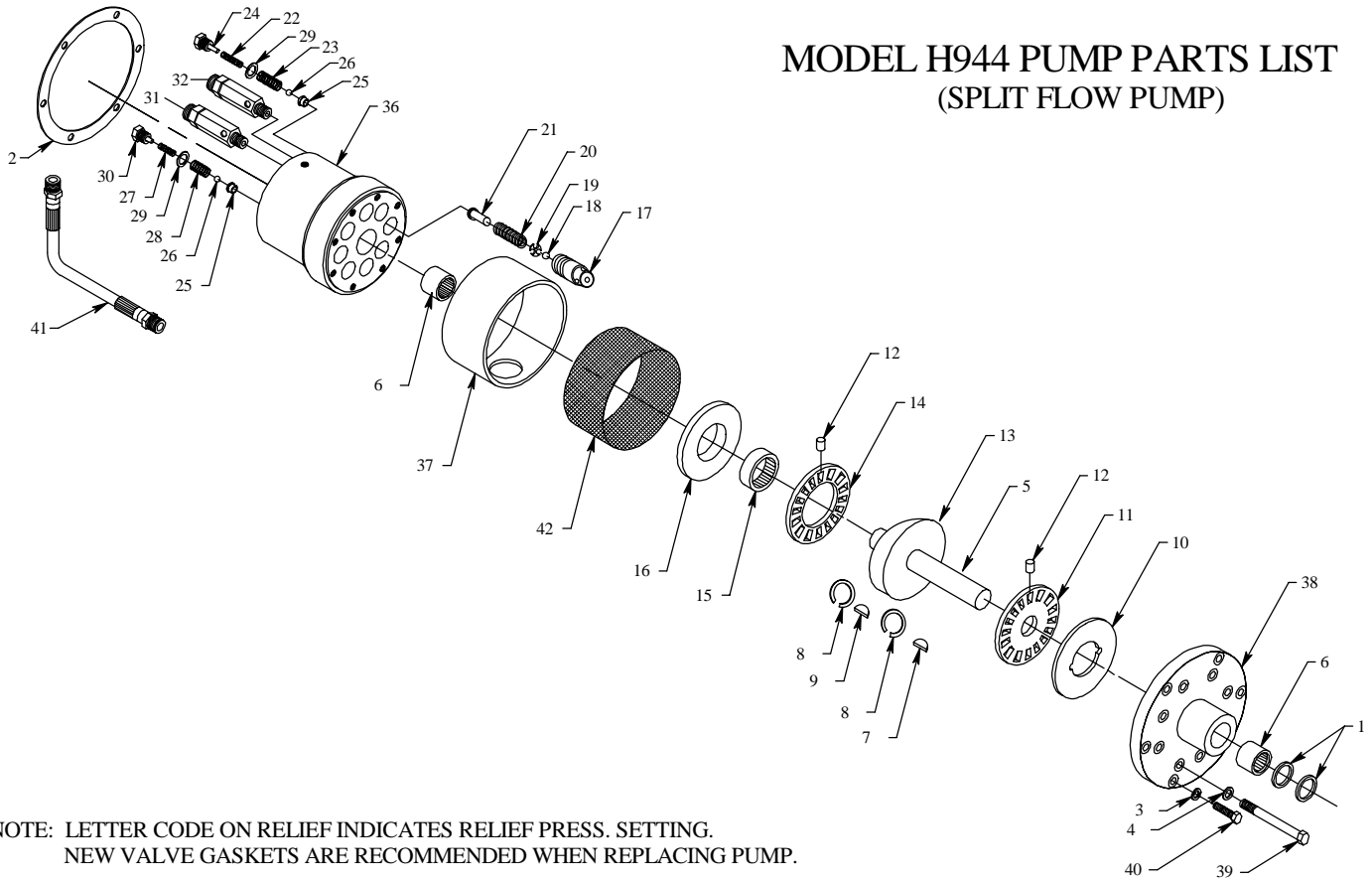
MODEL F944 PUMP PARTS LIST (SPLIT FLOW PUMP)



NOTE: LETTER CODE ON RELIEF INDICATES RELIEF PRESS. SETTING.
NEW VALVE GASKETS ARE RECOMMENDED WHEN REPLACING PUMP.

NO.	PART NO.	QTY. REQ.	PART DESCRIPTION	NO.	PART NO.	QTY. REQ.	PART DESCRIPTION
1359 SEAL KIT				1361 PISTON KIT			
1	1028	2	OIL SEAL	17	1367	8	PISTON
2	1012	1	PUMP GASKET	18	1168	8	BALL
3	1030	6	ALUMINUM WASHER	19	1366	8	BALL STOP
4	1108	8	ALUMINUM WASHER	20	1368	8	SPRING
1358 SHAFT AND BEARING KIT				21	1369	8	SPRING PIVOT
5	1075	1	SHAFT	EXHAUST VALVE PARTS			
6	1023	2	NEEDLE BEARING	22	1322	4	EXHAUST SPRING (LONG)
7	1027	1	SHAFT KEY	23	1321	4	CAGE SPRING (LONG)
8	1118	2	SNAP RING	24	1323	4	PORT STUD (LONG)
9	1117	1	WOBBLE KEY	25	1043	8	SEAT
1360 THRUST BEARING KIT				26	1015	8	BALL
10	1080	1	THRUST RACE	27	2264	4	EXHAUST SPRING (SHORT)
11	1077	1	FRONT ROLLER RETAINER	28	1041	4	CAGE SPRING (SHORT)
12	1119	32	THRUST ROLLER BEARING	29	1009	8	WASHER
13	1131	1	WOBBLE PLATE	30	1008	4	PORT STUD (SHORT)
14	1078	1	REAR ROLLER RETAINER	REMAINING PUMP PARTS			
15	1106	1	THRUST PLATE BEARING	31,32	1087	2	DUAL RELIEF VALVE (SPECIFY PUMP MODEL, SERIAL#, PRESS. & R.P.M.)
16	1076	1	PISTON THRUST PLATE	36	1701	1	PUMP CASTING (Not Sold Separately)
				37	1237	1	INTAKE HOUSING TUBE
				38	1350	1	FRONT CASTING
				39	1107	8	PUMP ASSEMBLY BOLT
				40	1035	6	MOUNTING CAP SCREW
				41	--		HOSE - SPECIFY RESERVOIR SIZE WHEN ORDERING
				42	1515	1	INTAKE SCREEN

MODEL H944 PUMP PARTS LIST (SPLIT FLOW PUMP)



NOTE: LETTER CODE ON RELIEF INDICATES RELIEF PRESS. SETTING.
NEW VALVE GASKETS ARE RECOMMENDED WHEN REPLACING PUMP.

NO.	PART NO.	QTY. REQ.	PART DESCRIPTION	NO.	PART NO.	QTY. REQ.	PART DESCRIPTION
	1359		SEAL KIT		2002		PISTON KIT
1	1028	2	OIL SEAL	17	1909	8	PISTON
2	1012	1	PUMP GASKET	18	1168	8	BALL
3	1030	6	ALUMINUM WASHER	19	1366	8	BALL STOP
4	1108	8	ALUMINUM WASHER	20	1368	8	SPRING
	1358		SHAFT AND BEARING KIT	21	1369	8	SPRING PIVOT
5	1075	1	SHAFT				EXHAUST VALVE PARTS
6	1023	2	NEEDLE BEARING	22	1322	4	EXHAUST SPRING (LONG)
7	1027	1	SHAFT KEY	23	1321	4	CAGE SPRING (LONG)
8	1118	2	SNAP RING	24	1323	4	PORT STUD (LONG)
9	1117	1	WOBBLE KEY	25	1043	8	SEAT
	1360		THRUST BEARING KIT	26	1015	8	BALL
10	1080	1	THRUST RACE	27	2264	4	EXHAUST SPRING (SHORT)
11	1077	1	FRONT ROLLER RETAINER	28	1041	4	CAGE SPRING (SHORT)
12	1119	32	THRUST ROLLER BEARING	29	1009	8	WASHER
13	1131	1	WOBBLE PLATE	30	1008	4	PORT STUD (SHORT)
14	1078	1	REAR ROLLER RETAINER				REMAINING PUMP PARTS
15	1106	1	THRUST PLATE BEARING	31,32	1087	2	DUAL RELIEF VALVE (SPECIFY PUMP MODEL, SERIAL#, PRESS. & R.P.M.)
16	1076	1	PISTON THRUST PLATE	36	1701	1	PUMP CASTING (Not Sold Separately)
				37	1237	1	INTAKE HOUSING TUBE
				38	1350	1	FRONT CASTING
				39	1107	8	PUMP ASSEMBLY BOLT
				40	1035	6	MOUNTING CAP SCREW
				41	--		HOSE - SPECIFY RESERVOIR SIZE WHEN ORDERING
				42	1515	1	INTAKE SCREEN



DANGER DANGER



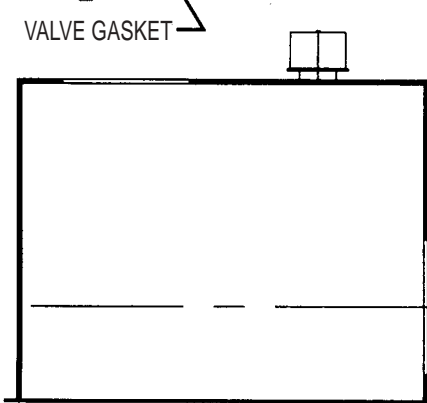
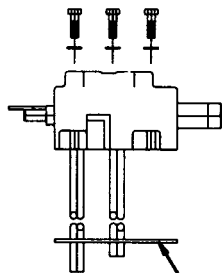
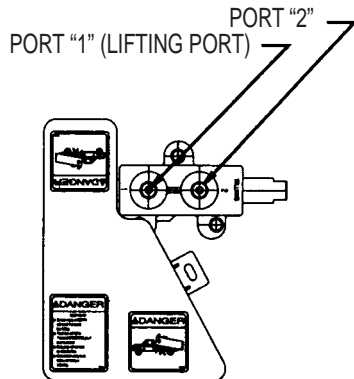
Read and understand these instructions before attempting removal, replacement, maintenance or repair of the hydraulic control valve.



DANGER

Failure to follow these instructions could result in **SERIOUS INJURY OR DEATH.**

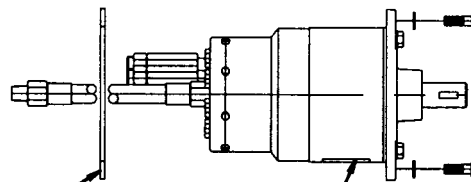
PUMP INSTALLATION (3-BOLT MOUNT VALVE)



PUMP GASKET



DANGER NOTE: Be certain the box area is clear. Operate the valve from the cab only to check the controls and remove the blocks and body props. Do not move the control lever while under the truck box.



SUCTION
SCREEN INLET
(TOWARD BOTTOM OF RESERVOIR)

1. Before remounting the pump in the reservoir, make sure the truck body props on the hoist and the blocks under the hoist frame are in place and will hold the empty truck box safely.
2. Before remounting the pump in the reservoir, be sure that the reservoir is free of foreign matter, including the pump and valve gasket areas.
3. **NOTE:** Make sure pressure hose is on the pump before reinstalling the pump. Using a new pump gasket, install the pump back in the reservoir (making sure the pump inlet is on the bottom) using six (6) new 5/16" (7.9 mm) hex head cap screws and six (6) new aluminum washers and torque the bolts down evenly.
4. Fish the pressure hose out of the reservoir through the valve hole and lay a new valve gasket on the valve mount opening.
5. Reconnect the pressure hose from the pump to the bottom of the control valve and tighten. Reattach the control lever to the control valve as the valve is lowered back down on the valve mounting surface. Then, using three (3) new 5/16" (7.9 mm) hex head cap screws and three (3) new aluminum washers, mount the control valve to the reservoir and torque the bolts evenly.
6. Reconnect the control cable per cable connection installation instructions (pages 15-18) and reinstall the valve lever guard.
7. Reconnect the hydraulic hoses to the proper ports on the control valve with the hose from the base of the cylinder (lifting hose) to port "1" on the control valve and the remaining hose to port "2" on the control valve.



DANGER DANGER



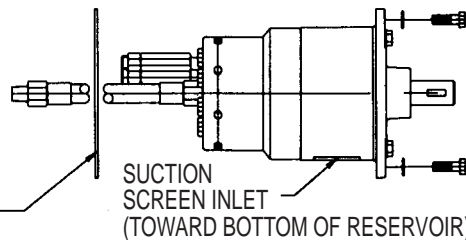
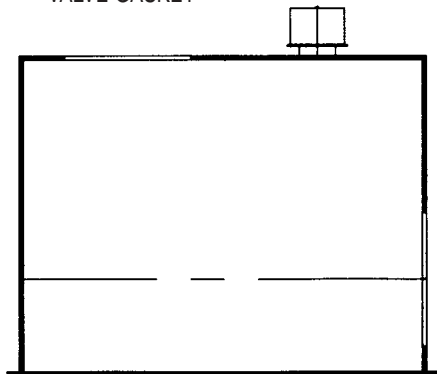
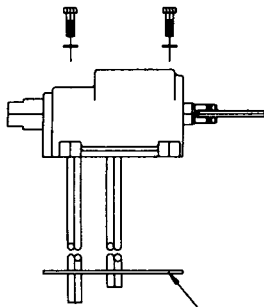
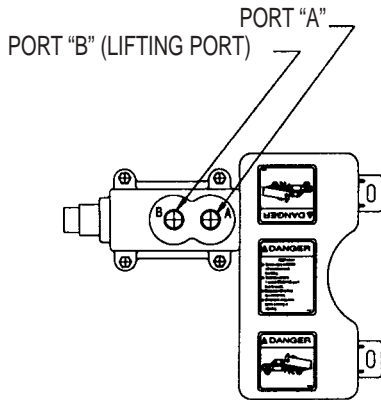
Read and understand these instructions before attempting removal, replacement, maintenance or repair of the hydraulic control valve.



DANGER

Failure to follow these instructions could result in **SERIOUS INJURY OR DEATH.**

PUMP INSTALLATION (4-BOLT VALVE)



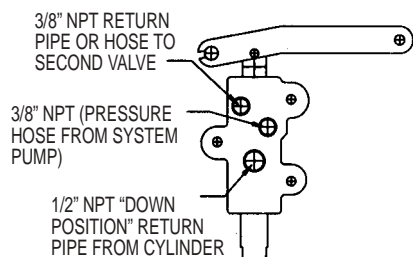
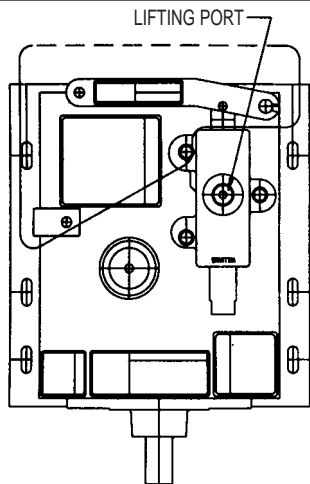
1. Before remounting the pump in the reservoir, make sure the truck body props on the hoist and the blocks under the hoist frame are in place and will hold the empty truck box safely.
2. Before remounting the pump in the reservoir, be sure that the reservoir is free of foreign matter, including the pump and valve gasket areas.
3. **NOTE:** Make sure pressure hose is on the pump before reinstalling the pump. Using a new pump gasket, install the pump back in the reservoir (making sure the pump inlet is on the bottom) using six (6) new 5/16" (7.9 mm) hex head cap screws and six (6) new aluminum washers and torque the bolts down evenly.
4. Fish the pressure hose out of the reservoir through the valve hole and lay a new valve gasket on the valve mount opening.
5. Reconnect the pressure hose from the pump to the bottom of the control valve and tighten. Lower the control valve back down on the mounting surface. Using four (4) 5/16" (7.9 mm) hex head cap screws and four (4) new aluminum washers, mount the control valve to the reservoir and torque the bolts evenly.
6. Reconnect the control cable per cable connection installation instructions (pages 15-18).
7. Reconnect the hydraulic hoses to the proper ports on the control valve with the hose from the base of the cylinder (lifting hose) to port "B" on the control valve and the remaining hose to port "A" on the control valve.



DANGER NOTE: Be certain the box area is clear.

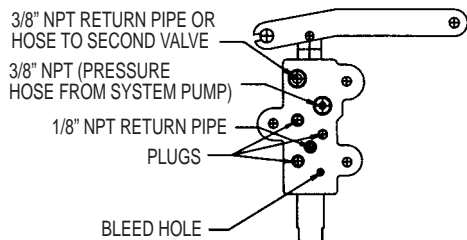
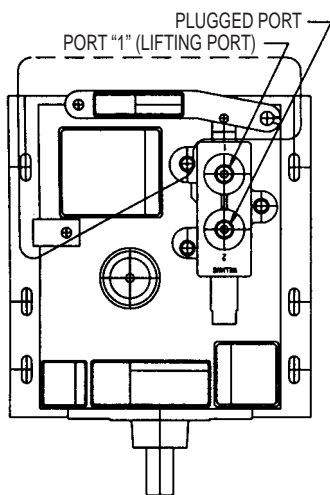
Operate the valve from the cab only to check the controls and remove the blocks and body props. Do not move the control lever while under the truck box.

#3 VALVE INSTALLATION/REPLACEMENT INSTRUCTIONS



BOTTOM VIEW OF #3 VALVE

CONVERT #4 VALVE TO #3 VALVE



BOTTOM VIEW OF #4 VALVE CONVERTED TO #3 VALVE



DANGER  **DANGER**

Read and understand these instructions before attempting removal, replacement, maintenance or repair of the hydraulic control valve.



DANGER

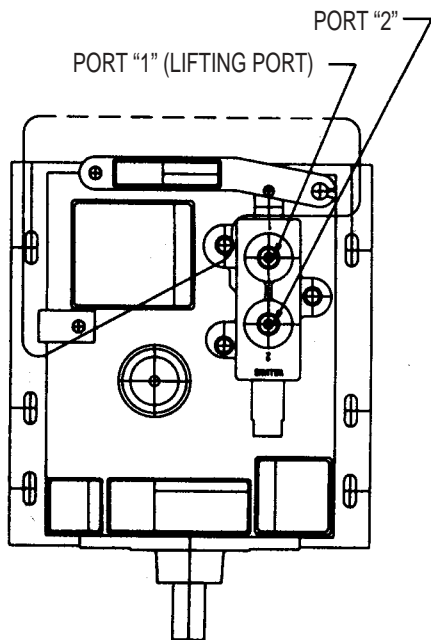
Failure to follow these instructions could result in **SERIOUS INJURY OR DEATH.**

CONTROL VALVE REMOVAL **(3-BOLT MOUNT VALVE)**



1. Before beginning any repairs on the pump or valve, make sure truck box is empty. If necessary, empty the load. Make sure the empty truck box is properly blocked using the body props on the hoist unit as well as blocks under the hoist frame. Then, from the cab, push the cable control in to relieve the pressure from the system and to make sure that the blocks will hold the empty truck box safely.
2. Remove the two washer head screws from the valve lever guard and remove the guard to gain access to the valve control lever.
3. Disconnect the control cable from the valve lever to allow removal of the control valve.
4. Using a drip pan under the PTO unit, disconnect the hose(s) from the control valve and cap the hoses to keep dirt from getting in the hydraulic hoses.
5. Remove the three (3) 5/16" (7.9 mm) hex head cap screws holding the control valve to the reservoir. Pull the control valve up and remove the valve control lever, then disconnect the pressure hose from the control valve that comes from the pump in the reservoir.

#4 VALVE INSTALLATION/REPLACEMENT INSTRUCTIONS



PRESSURE AT PORT "1" & PORT "2" WILL BE THE SAME AS THE PUMP PRESSURE SETTING



DANGER  **DANGER**


Read and understand these instructions before attempting removal, replacement, maintenance or repair of the hydraulic control valve.

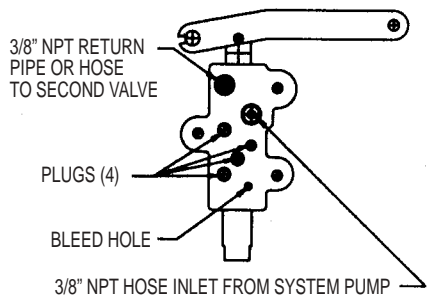


DANGER

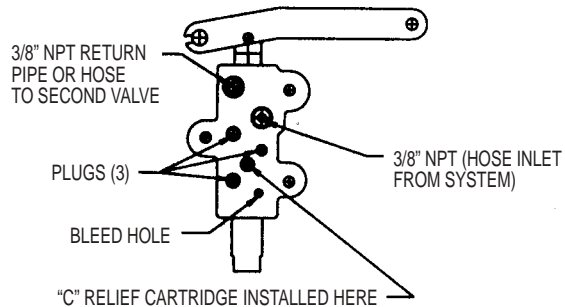
Failure to follow these instructions could result in **SERIOUS INJURY OR DEATH.**

CONTROL VALVE REMOVAL (3-BOLT MOUNT VALVE)

1.  Before beginning any repairs on the pump or valve, make sure truck box is empty. If necessary, empty the load. Make sure the empty truck box is properly blocked using the body props on the hoist unit as well as blocks under the hoist frame. Then, from the cab, push the cable control in to relieve the pressure from the system and to make sure that the blocks will hold the empty truck box safely.
2. Remove the two washer head screws from the valve lever guard and remove the guard to gain access to the valve control lever.
3. Disconnect the control cable from the valve lever to allow removal of the control valve.
4. Using a drip pan under the PTO unit, disconnect the hose(s) from the control valve and cap the hoses to keep dirt from getting in the hydraulic hoses.
5. Remove the three (3) 5/16" (7.9 mm) hex head cap screws holding the control valve to the reservoir. Pull the control valve up and remove the valve control lever, then disconnect the pressure hose from the control valve that comes from the pump in the reservoir.

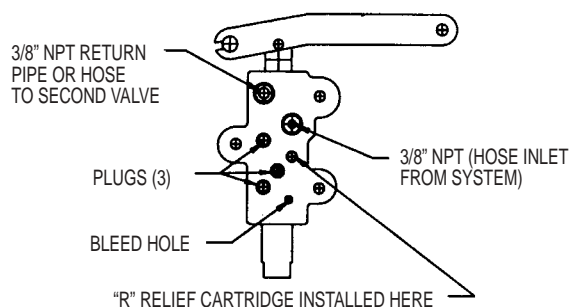


BOTTOM VIEW OF #4 CONTROL VALVE



BOTTOM VIEW OF #4C CONTROL VALVE

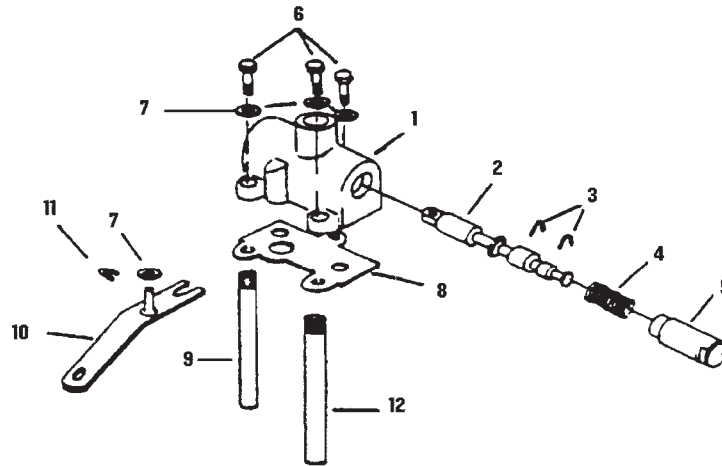
PORT "1" PRESSURE WILL BE THE SAME AS THE PUMP PRESSURE SETTING
PORT "2" PRESSURE WILL BE AT THE "C" CARTRIDGE PRESSURE SETTING



BOTTOM VIEW OF #4R CONTROL VALVE

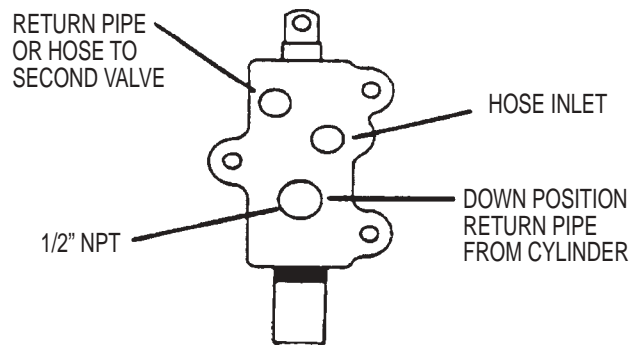
PORT "1" & PORT "2" WILL BE AT THE SAME PRESSURE AS THE "R" RELIEF VALVE SETTING

NO. 3 CONTROL VALVE (3-Way Single Acting)



Drg. No.	Part No.	No. Req.	Part Description
1	1086	1	Casting Valve (Not Sold Separately)
2	1122	1	Spool, Valve (Not Sold Separately)
3	1020	2	Key, Spool Stop
4	1021	1	Spring, Spool Centering
5	1022	1	Cap, Spool
6	1035	3	Cap, Screws

Drg. No.	Part No.	No. Req.	Part Description
7	1030	4	Washer
8	1096	1	Gasket
9	1105	1	Pipe, Oil Return (3/8" NPT)
10	1094	1	Lever, Control
11	1102	1	E-Ring
12	1139	1	Pipe, Oil Return (1/2" NPT)



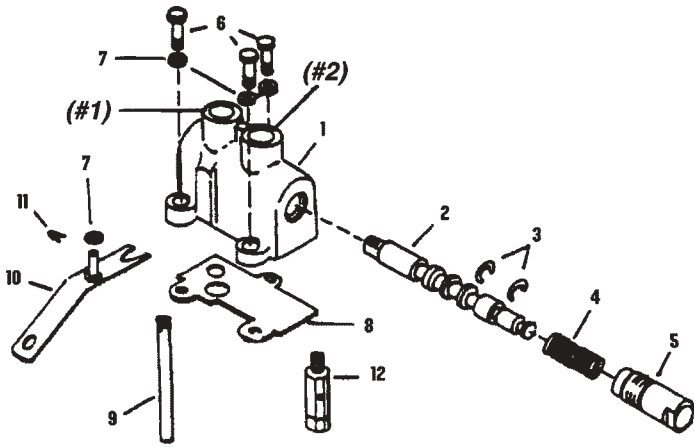
NO. 4 CONTROL VALVE (4-Way Double Acting)

Effective April 1, 1996

These Control Valves are identified in the Pump Unit Model Numbers as **(-4-) (-4C-) (-4R-)**

The Pump Units highest working pressure is regulated by the Relief Cartridge setting that is located on the pump.

The "C" and "R" Relief Cartridges are used at a lower pressure setting to govern only parts of the system.

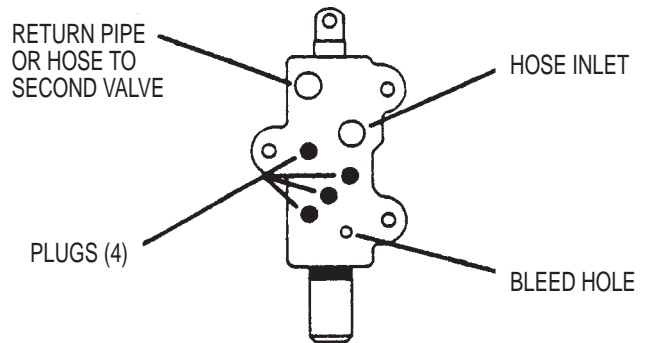


Drg. No.	Part No.	No. Req.	Part Description
1	1095	1	Casting (Not Sold Separately)
2	1064	1	Spool (Not Sold Separately)
3	1020	2	Key, Spool Stop
4	1021	1	Spring, Spool Centering
5	1022	1	Cap, Spool
6	1035	3	Cap, Screws
7	1030	4	Washer
8	1096	1	Gasket
9	1105	1	Pipe, Oil Return
10	1094	1	Lever, Control
11	1102	1	E-Ring
12	1101		Relief Cartridge ("C" or "R")

Specify _____ PSI AT _____ RPM

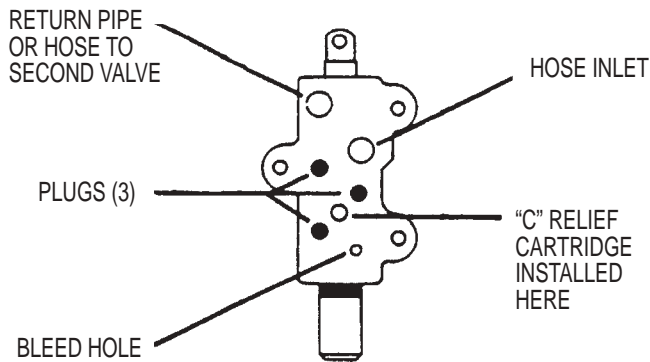
Pump Model No. _____ Serial No. _____

No. 4



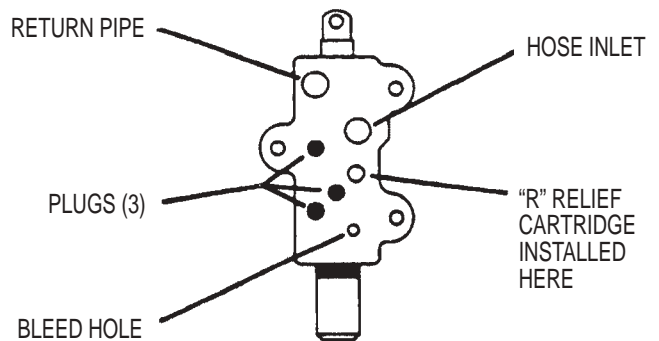
Same Pressure at Both Ports
(Pump Pressure Setting)

No. 4C



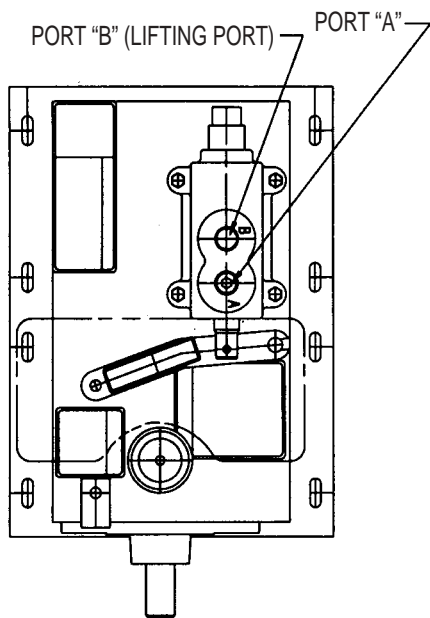
"C" Relief Cartridge can be Installed for Lower Pressure at No. "2" Port Only

No. 4R



When used as Second Valve "R" Relief Cartridge can be Installed for Lower Pressure at Both Ports

#6 VALVE INSTALLATION/REPLACEMENT INSTRUCTIONS



PRESSURE AT PORT "B" & PORT "A" WILL BE THE SAME AS THE PUMP PRESSURE SETTING



DANGER  **DANGER**


Read and understand these instructions before attempting removal, replacement, maintenance or repair of the hydraulic control valve.

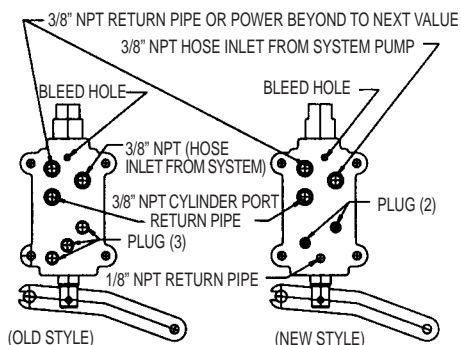


DANGER

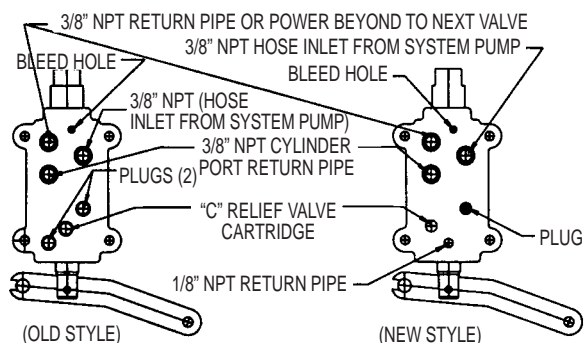
Failure to follow these instructions could result in **SERIOUS INJURY OR DEATH.**

CONTROL VALVE REMOVAL (4-BOLT MOUNT VALVE)

-  Before beginning any repairs on the pump or valve, make sure truck box is empty. If necessary, empty the load. Make sure the empty truck box is properly blocked using the body props on the hoist unit as well as blocks under the hoist frame. Then, from the cab, push the cable control in to relieve the pressure from the system and to make sure that the blocks will hold the empty truck box safely.
- Remove the two washer head screws from the valve lever guard and remove the guard to gain access to the valve control lever.
- Disconnect the control cable from the valve lever to allow removal of the control valve.
- Using a drip pan under the PTO unit, disconnect the hose(s) from the control valve and cap the hoses to keep dirt from getting in the hydraulic hoses.
- Remove the four (4) 5/16" (7.9 mm) hex head cap screws holding the control valve to the reservoir. Remove the valve control lever, pull the valve up and disconnect the pressure hose from the control valve that comes from the pump in the reservoir.

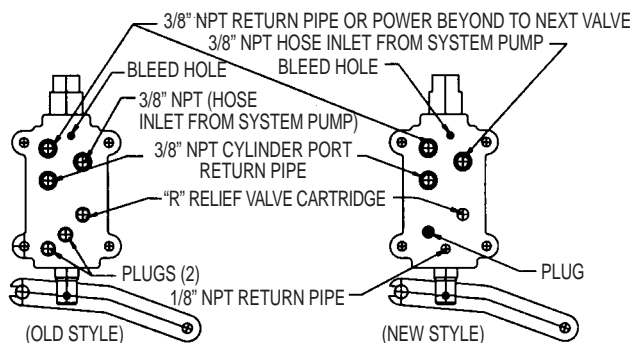


BOTTOM VIEW OF #6 CONTROL VALVE



BOTTOM VIEW OF #6C CONTROL VALVE

PORT "B" PRESSURE WILL BE THE SAME AS THE PUMP PRESSURE SETTING
PORT "A" PRESSURE WILL BE AT THE "C" CARTRIDGE PRESSURE SETTING



BOTTOM VIEW OF #6R CONTROL VALVE

PORT "B" & PORT "A" WILL BE AT THE SAME PRESSURE
AS THE "R" RELIEF VALVE SETTING

#7 VALVE INSTALLATION/REPLACEMENT INSTRUCTIONS



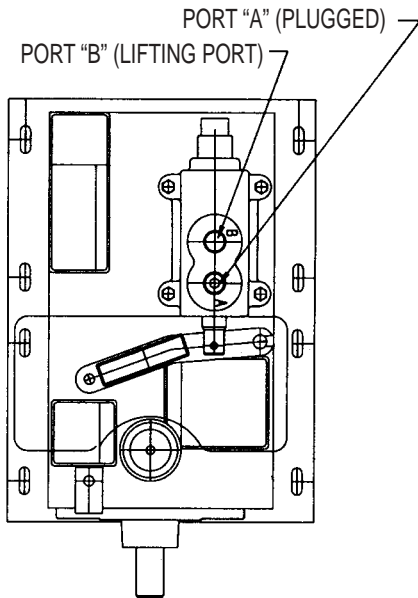
DANGER  **DANGER**

Read and understand these instructions before attempting removal, replacement, maintenance or repair of the hydraulic control valve.




DANGER

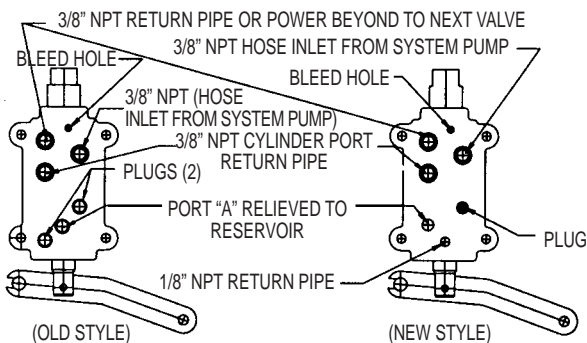
Failure to follow these instructions could result in **SERIOUS INJURY OR DEATH.**



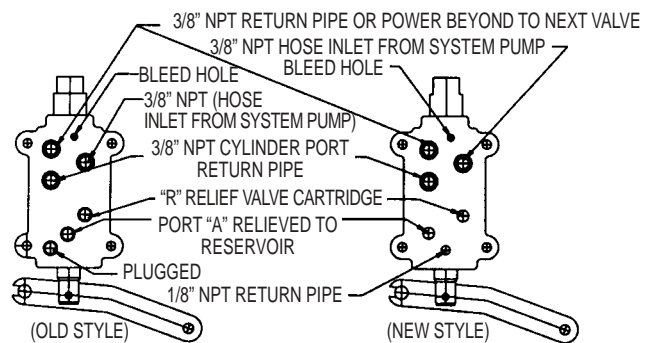
PORT "B" PRESSURE WILL BE THE SAME AS THE PUMP PRESSURE SETTING
PORT "A" WILL BE PLUGGED AND RELIEVED TO RESERVOIR

CONTROL VALVE REMOVAL (4-BOLT MOUNT VALVE)

1.  Before beginning any repairs on the pump or valve, make sure truck box is empty. If necessary, empty the load. Make sure the empty truck box is properly blocked using the body props on the hoist unit as well as blocks under the hoist frame. Then, from the cab, push the cable control in to relieve the pressure from the system and to make sure that the blocks will hold the empty truck box safely.
2. Remove the two washer head screws from the valve lever guard and remove the guard to gain access to the valve control lever.
3. Disconnect the control cable from the valve lever to allow removal of the control valve.
4. Using a drip pan under the PTO unit, disconnect the hose(s) from the control valve and cap the hoses to keep dirt from getting in the hydraulic hoses.
5. Remove the four (4) 5/16" (7.9 mm) hex head cap screws holding the control valve to the reservoir. Pull the control valve up and remove the valve control lever, then disconnect the pressure hose from the control valve that comes from the pump in the reservoir.



BOTTOM VIEW OF #7 CONTROL VALVE



BOTTOM VIEW OF #7R CONTROL VALVE

PORT "B" PRESSURE WILL BE AT THE "R" RELIEF SETTING
PORT "A" IS PLUGGED AND RELIEVED TO THE RESERVOIR

#8 VALVE INSTALLATION/REPLACEMENT INSTRUCTIONS



DANGER **DANGER**

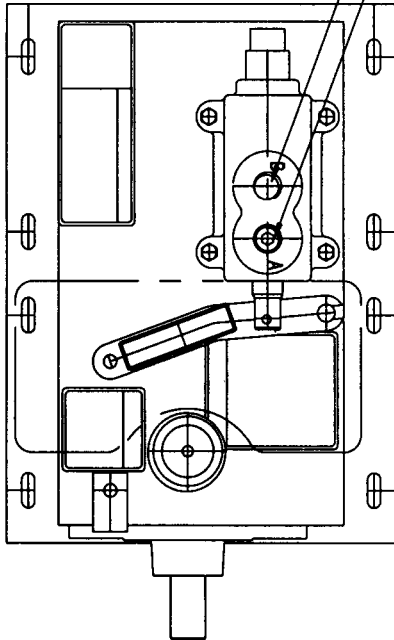
Read and understand these instructions before attempting removal, replacement, maintenance or repair of the hydraulic control valve.



DANGER

Failure to follow these instructions could result in **SERIOUS INJURY OR DEATH.**

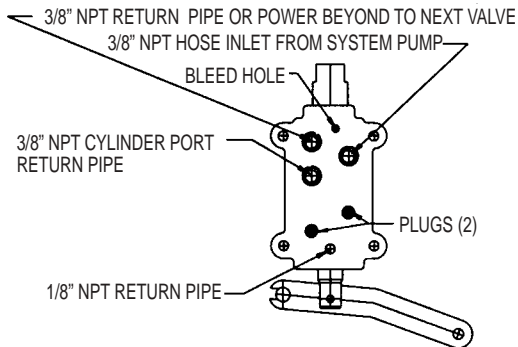
PORT "A"
PORT "B" (LIFTING PORT)



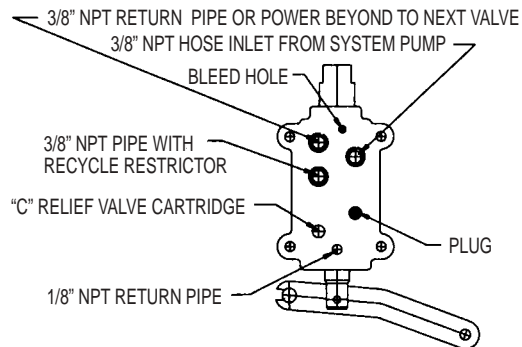
PORT "B" PRESSURE WILL BE THE SAME AS THE PUMP PRESSURE SETTING
PORT "A" PRESSURE WILL BE THE SAME AS THE PUMP PRESSURE SETTING

CONTROL VALVE REMOVAL (4-BOLT MOUNT VALVE)

1. Before beginning any repairs on the pump or valve, make sure truck box is empty. If necessary, empty the load. Make sure the empty truck box is properly blocked using the body props on the hoist unit as well as blocks under the hoist frame. Then, from the cab, push the cable control in to relieve the pressure from the system and to make sure that the blocks will hold the empty truck box safely.
2. Remove the two washer head screws from the valve lever guard and remove the guard to gain access to the valve control lever.
3. Disconnect the control cable from the valve lever to allow removal of the control valve.
4. Using a drip pan under the PTO unit, disconnect the hose(s) from the control valve and cap the hoses to keep dirt from getting in the hydraulic hoses.
5. Remove the four (4) 5/16" (7.9 mm) hex head cap screws holding the control valve to the reservoir. Pull the control valve up and remove the valve control lever, then disconnect the pressure hose from the control valve that comes from the pump in the reservoir.



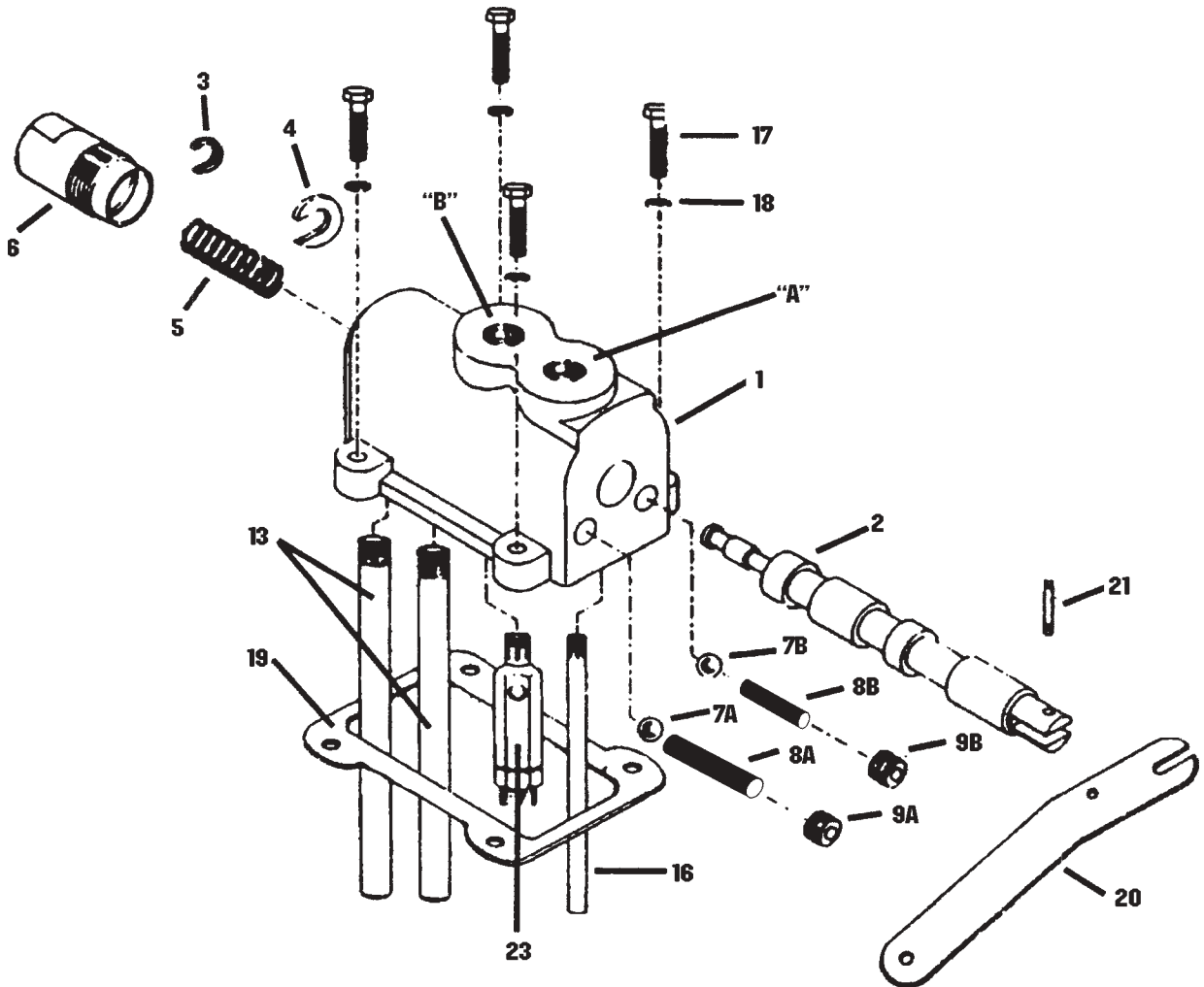
BOTTOM VIEW OF #8 CONTROL VALVE



BOTTOM VIEW OF #8C CONTROL VALVE

PORT "B" PRESSURE WILL BE THE SAME AS THE PUMP PRESSURE SETTING
PORT "A" PRESSURE WILL BE THE SAME AS THE "C" RELIEF VALVE SETTING

NO. 6 LOAD CHECK CONTROL VALVE (4-Way Double Acting)

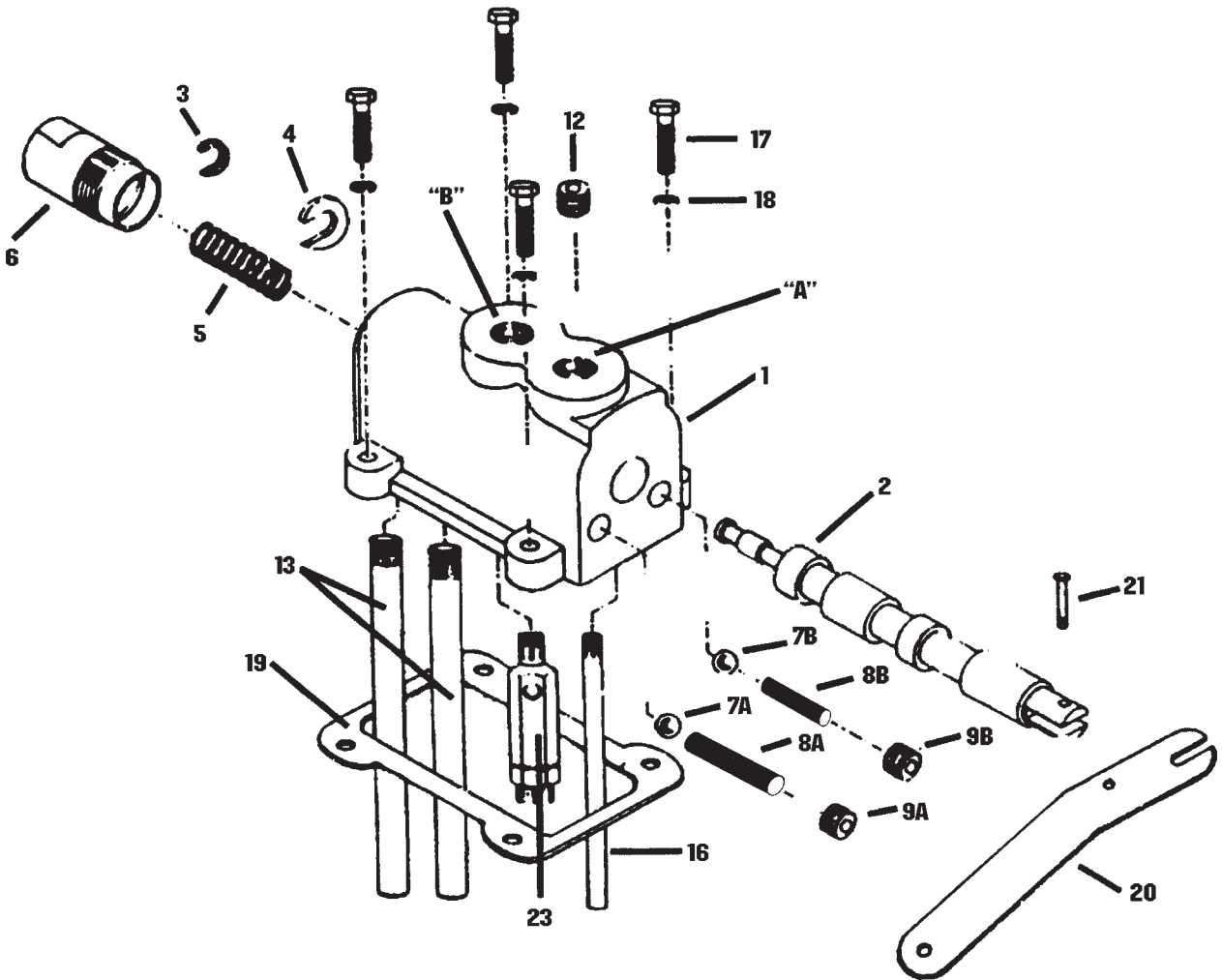


Drg. No.	Part No.	No. Req.	Part Description	Drg. No.	Part No.	No. Req.	Part Description
A			Low Pressure Port	13	1105	1	Pipe, Oil Return
B			High Pressure Port	16	1228	1	Pipe, Flo-By, 1/8 NPT x 6" (15.2cm)
1	2153	1	Casting (Not Sold Separately)	17	1035	4	Cap Screw
2	1210	1	Spool (Not Sold Separately)	18	1030	4	Washer
3	1020	1	Key, Spool Stop 3/4" (19.1mm)	19	1214	1	Gasket
4	1213	1	Key, Spool Stop 7/8" (22.2mm)	20	1219	1	Lever
5	1021	1	Spring, Centering	21	1182	1	Pin, Lever
6	1212	1	Cap, Spool	23	2663	1	Relief Cartridge ("C" or "R")
7A	1217	1	Ball, Load Check				
7B	1217	1	Ball, Re-cycle Check				
8A	3082	1	Spacer, Load Check				
8B	3083	1	Spacer, Re-cycle Check				
9A	2387	1	Plug, Load Check				
9B	2387	1	Plug, Re-cycle Check				

Specify _____ PSI AT _____ RPM
GPM
Pump Model No. _____ Serial No. _____

REV 8/05

NO. 7 LOAD CHECK CONTROL VALVE (3-Way Single Acting)



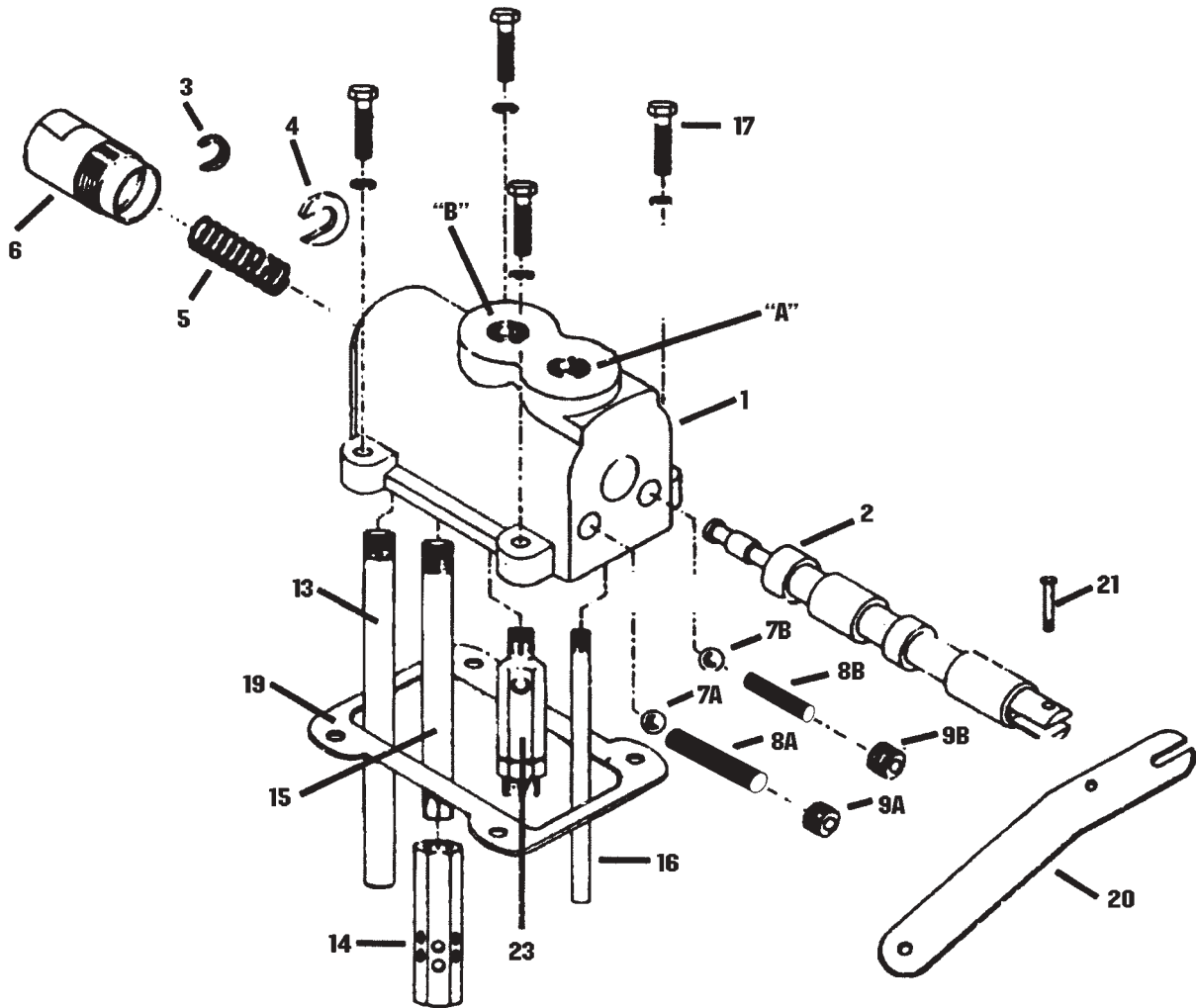
Drg. No.	Part No.	No. Req.	Part Description	Drg. No.	Part No.	No. Req.	Part Description
A			Low Pressure Port	12	1221	1	Plug
B			High Pressure Port	13	1105	1	Pipe, Oil Return
1	2153	1	Casting (Not Sold Separately)	16	1220	1	Pipe, Flo-By, 1/4 NPT x 6" (15.2cm)
2	1210	1	Spool (Not Sold Separately)	17	1035	4	Cap Screw
3	1020	1	Key, Spool Stop 3/4" (19.1mm)	18	1030	4	Washer
4	1213	1	Key, Spool Stop 7/8" (22.2mm)	19	1214	1	Gasket
5	1021	1	Spring, Centering	20	1219	1	Lever
6	1212	1	Cap, Spool	21	1182	1	Pin, Lever
7A	1217	1	Ball, Load Check	23	2663	1	Relief Cartridge ("R")
7B	1217	1	Ball, Re-cycle Check				
8A	3082	1	Spacer, Load Check				
8B	3083	1	Spacer, Re-cycle Check				
9A	2387	1	Plug, Load Check				
9B	2387	1	Plug, Re-cycle Check				

Specify _____ PSI AT _____ RPM
 GPM
 Pump Model No. _____ Serial No. _____

REV 8/05

NO. 8 RE-CYCLE CONTROL VALVE

(4-Way Double Acting - Load Check)

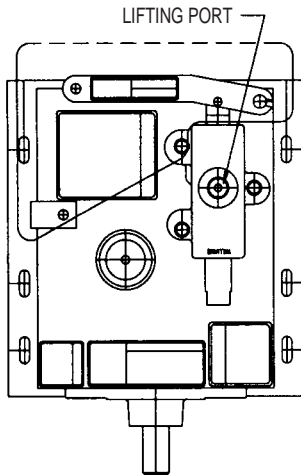


Drg. No.	Part No.	No. Req.	Part Description	Drg. No.	Part No.	No. Req.	Part Description
A			Low Pressure Port	13	1105	1	Pipe, Oil Return
B			High Pressure Port	14	2308	1	Variable Restrictor Assm.
1	2153	1	Casting (Not Sold Separately)	15	1230	1	Pipe Nipple
2	1210	1	Spool (Not Sold Separately)	16	1228	1	Pipe, Flo-By, 1/8 NPT x 6" (15.2cm)
3	1020		Key, Spool Stop 3/4" (19.1mm)	17	1035	4	Cap Screw
4	1213	1	Key, Spool Stop 7/8" (22.2mm)	18	1030	4	Washer
5	1021	1	Spring, Centering	19	1214	1	Gasket
6	1212	1	Cap, Spool	20	1219	1	Lever
7A	1217	1	Ball, Load Check	21	1182	1	Pin, Lever
7B	1217	1	Ball, Re-cycle Check	23	2663		Relief Cartridge ("C")
8A	3082	1	Spacer, Load Check				
8B	3083	1	Spacer, Re-cycle Check				
9A	2387		Plug, Load Check				
9B	2387	1	Plug, Re-cycle Check				

Specify _____ PSI AT _____ RPM
 GPM
 Pump Model No. _____ Serial No. _____

REV 8/05

#3 VALVE INSTALLATION/REPLACEMENT INSTRUCTIONS



DANGER  **DANGER**

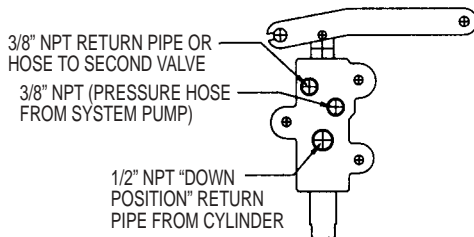
Read and understand these instructions before attempting removal, replacement, maintenance or repair of the hydraulic control valve.



DANGER

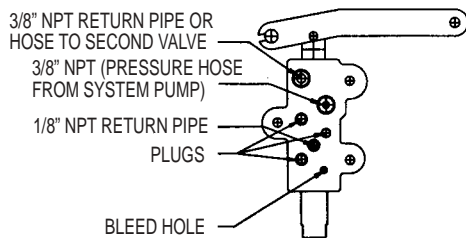
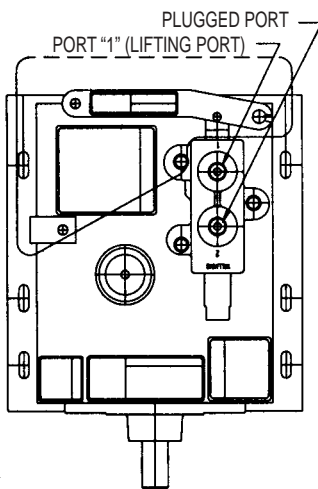
Failure to follow these instructions could result in **SERIOUS INJURY OR DEATH.**

CONTROL VALVE INSTALLATION (3-BOLT VALVE)



BOTTOM VIEW OF #3 VALVE

CONVERT #4 VALVE TO #3 VALVE



BOTTOM VIEW OF #4 VALVE CONVERTED TO #3 VALVE

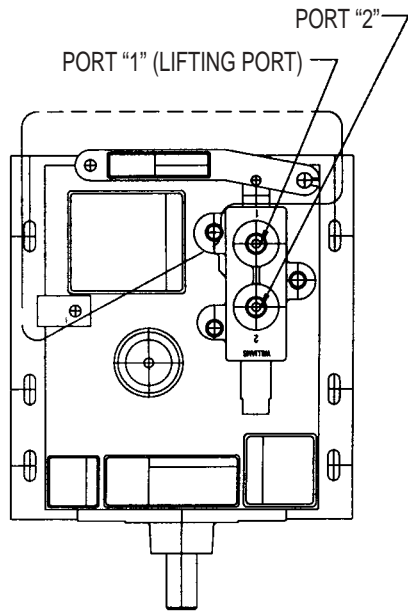


1. Before remounting the control valve, make sure that the truck body props on the hoist and the blocks under the hoist frame are in place to hold the empty truck box safely.
2. Before remounting the control valve on the reservoir, be sure that the valve gasket area is free of foreign matter.
3. Lay a new valve gasket on the valve mounting area and reconnect the pressure hose from the pump to the bottom of the control valve and tighten. Reattach the control lever to the control valve as the control valve is lowered down on the mounting surface. Then, using three (3) new 5/16" (7.9 mm) hex head cap screws and three (3) new aluminum washers, mount the control valve to the reservoir and torque the bolts evenly.
4. Reconnect the control cable per cable connection instructions (pages 15-18) and reinstall the valve lever guard.
5. Reconnect the hose from the base of the cylinder (lifting hose) to the only port on the #3 control valve or to port "1" on the #3 control valve which has been converted from a #4 control valve.



DANGER: Operate the control valve from the cab only to check the controls and lift bed to remove blocks. Do not under any circumstances get under the hoist to move the box.

#4 VALVE INSTALLATION/REPLACEMENT INSTRUCTIONS



PRESSURE AT PORT "1" & PORT "2" WILL BE THE SAME AS THE PUMP PRESSURE SETTING



DANGER  **DANGER**


Read and understand these instructions before attempting removal, replacement, maintenance or repair of the hydraulic control valve.



DANGER

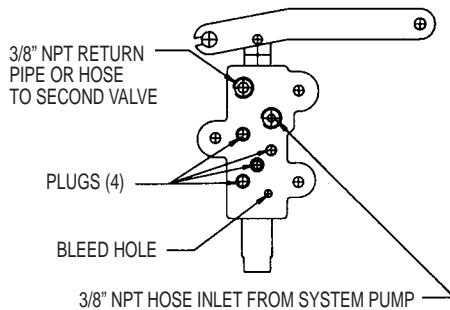
Failure to follow these instructions could result in **SERIOUS INJURY OR DEATH.**

CONTROL VALVE INSTALLATION (3-BOLT VALVE)

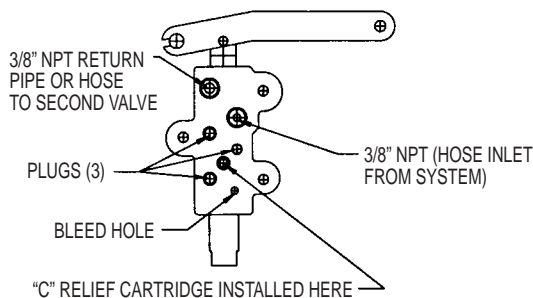
1.  Before remounting the control valve, make sure that the truck body props on the hoist and the blocks under the hoist frame are in place to hold the empty truck box safely.
2. Before remounting the control valve on the reservoir, be sure that the valve gasket area is free of foreign matter.
3. Lay a new valve gasket on the valve mounting area and reconnect the pressure hose from the pump to the bottom of the control valve and tighten. Reattach the control lever to the control valve as the control valve is lowered down on the mounting surface. Then, using three (3) new 5/16" (7.9 mm) hex head cap screws and three (3) new aluminum washers, mount the control valve to the reservoir and torque the bolts evenly.
4. Reconnect the control cable per cable connection instructions (pages 15-18) and reinstall the valve lever guard.
5. Reconnect the hose from the base of the cylinder (lifting hose) to port 1, the only port on the #4 control valve or to port "1" on the #3 control valve which has been converted from a #4 control valve.



DANGER: Operate the control valve from the cab only to check the controls and lift bed to remove blocks. Do not under any circumstances get under the hoist to move the box.

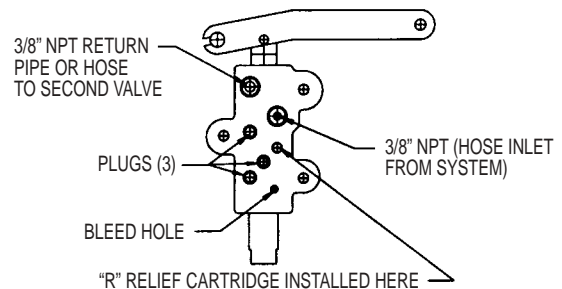


BOTTOM VIEW OF
#4 CONTROL VALVE



BOTTOM VIEW OF #4C CONTROL VALVE

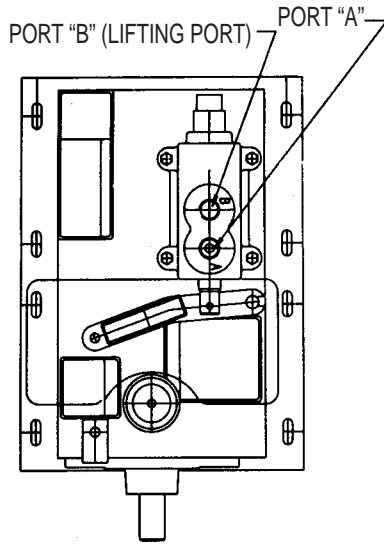
PORT "1" PRESSURE WILL BE THE SAME AS THE PUMP PRESSURE SETTING
PORT "2" PRESSURE WILL BE AT THE "C" CARTRIDGE PRESSURE SETTING



BOTTOM VIEW OF #4R CONTROL VALVE

PORT "1" & PORT "2" WILL BE AT THE SAME PRESSURE
AS THE "R" RELIEF VALVE SETTING

#6 VALVE INSTALLATION/REPLACEMENT INSTRUCTIONS



PRESSURE AT PORT "B" & PORT "A" WILL BE THE SAME AS THE PUMP PRESSURE SETTING



DANGER  **DANGER**

Read and understand these instructions before attempting removal, replacement, maintenance or repair of the hydraulic control valve.



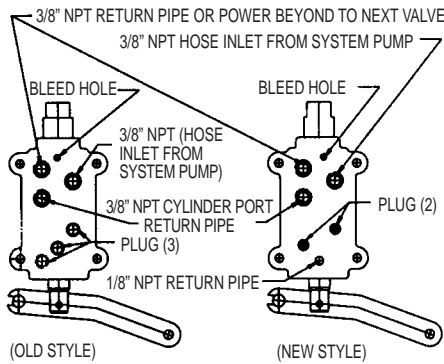
DANGER Failure to follow these instructions could result in **SERIOUS INJURY OR DEATH.**

CONTROL VALVE INSTALLATION (4-BOLT VALVE)

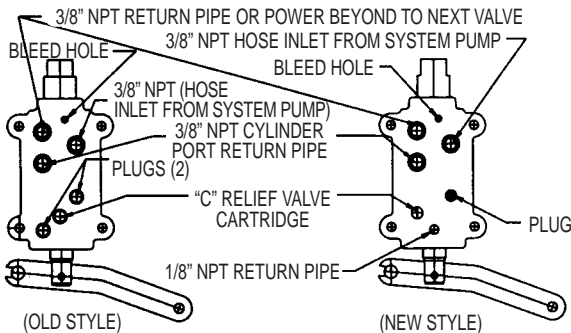
1. Before remounting the control valve, make sure that the truck body props on the hoist and the blocks under the hoist frame are in place to hold the empty truck box safely.
2. Before remounting the control valve on the reservoir, be sure that the valve gasket area is free of foreign matter.
3. Lay a new valve gasket on the valve mounting area and reconnect the pressure hose from the pump to the bottom of the control valve and tighten. Lower the control valve back down on the valve mounting surface and using four (4) new 5/16" (7.9 mm) hex head cap screws and four (4) new aluminum washers, mount the control valve to the reservoir to the reservoir and torque the bolts evenly. Reinstall the valve control lever.
4. Reconnect the control cable per cable connection instructions (pages 15-18) and reinstall the valve lever guard.
5. Reconnect the hose from the base of the cylinder (lifting hose) to port "B" on the control valve and the remaining hose to port "A" on the control valve.



DANGER: Operate the control valve from the cab only to check the controls and lift bed to remove blocks. Do not under any circumstances get under the hoist to move the box.

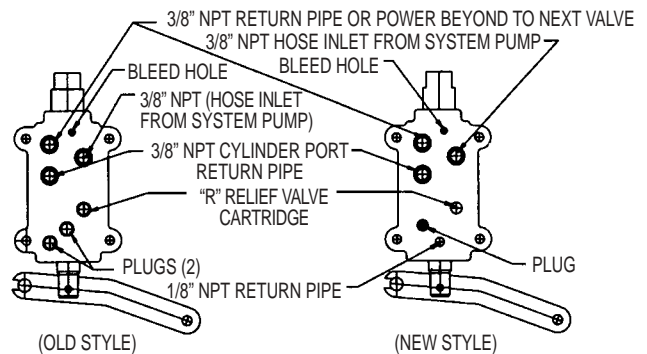


BOTTOM VIEW OF #6 CONTROL VALVE



BOTTOM VIEW OF #6C CONTROL VALVE

PORT "B" PRESSURE WILL BE THE SAME AS THE PUMP PRESSURE SETTING
PORT "A" PRESSURE WILL BE AT THE "C" CARTRIDGE PRESSURE SETTING



BOTTOM VIEW OF #6R CONTROL VALVE

PORT "B" & PORT "A" WILL BE AT THE SAME PRESSURE
AS THE "R" RELIEF VALVE SETTING

#7 VALVE INSTALLATION/REPLACEMENT INSTRUCTIONS



DANGER  **DANGER**

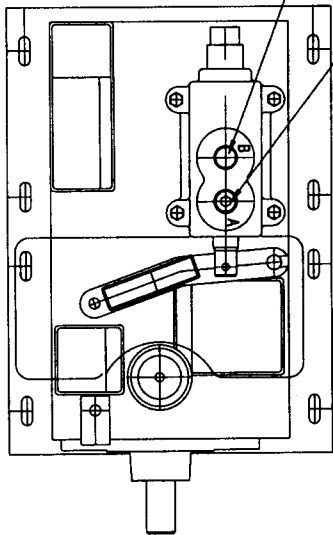
Read and understand these instructions before attempting removal, replacement, maintenance or repair of the hydraulic control valve.



DANGER

Failure to follow these instructions could result in **SERIOUS INJURY OR DEATH.**

PORT "A" (PLUGGED)
PORT "B" (LIFTING PORT)

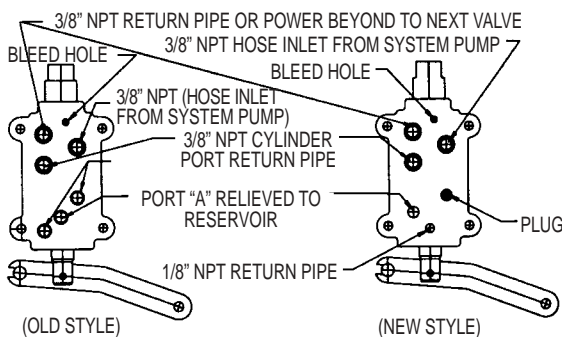


CONTROL VALVE INSTALLATION (4-BOLT VALVE)

1. Before remounting the control valve, make sure that the truck body props on the hoist and the blocks under the hoist frame are in place to hold the empty truck box safely.
2. Before remounting the control valve on the reservoir, be sure that the valve gasket area is free of foreign matter.
3. Lay a new valve gasket on the valve mounting area and reconnect the pressure hose from the pump to the bottom of the control valve and tighten. Lower the control valve back down on the valve mounting surface and using four (4) new 5/16" (7.9 mm) hex head cap screws and four (4) new aluminum washers, mount the control valve to the reservoir and torque the bolts evenly. Reinstall the valve control lever.
4. Reconnect the control cable per cable connection instructions (pages 15-18) and reinstall the valve lever guard.
5. Reconnect the hose from the base of the cylinder (lifting hose) to port "B" on the control valve and the remaining hose to port "A" on the control valve.

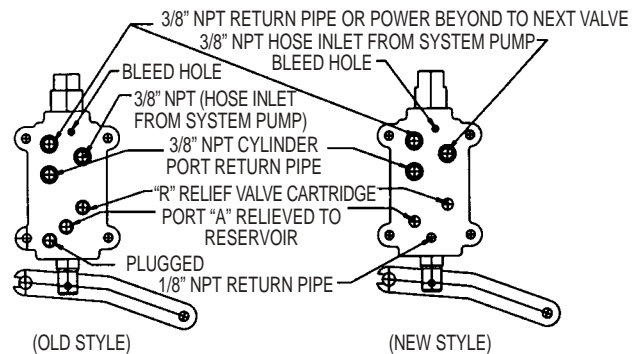


DANGER: Operate the control valve from the cab only to check the controls and lift bed to remove blocks. Do not under any circumstances get under the hoist to move the box.



BOTTOM VIEW OF #7 CONTROL VALVE

PORT "B" PRESSURE WILL BE THE SAME AS THE PUMP PRESSURE SETTING
PORT "A" WILL BE PLUGGED AND RELIEVED TO RESERVOIR



BOTTOM VIEW OF #7R CONTROL VALVE

PORT "B" PRESSURE WILL BE AT THE "R" RELIEF SETTING
PORT "A" IS PLUGGED AND RELIEVED TO THE RESERVOIR

#8 VALVE INSTALLATION/REPLACEMENT INSTRUCTIONS



DANGER  **DANGER**

Read and understand these instructions before attempting removal, replacement, maintenance or repair of the hydraulic control valve.



DANGER

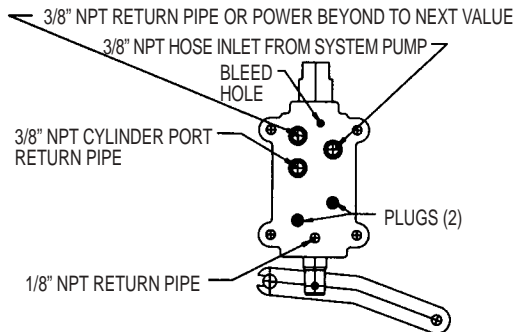
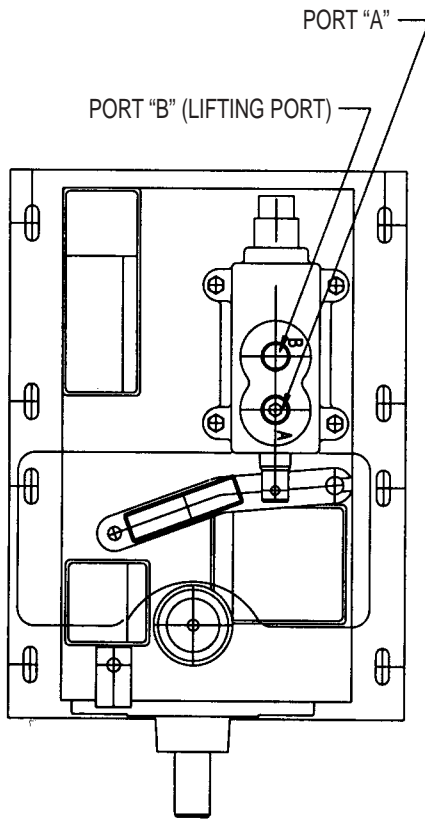
Failure to follow these instructions could result in **SERIOUS INJURY OR DEATH.**

CONTROL VALVE INSTALLATION (4-BOLT VALVE)

1. Before remounting the control valve, make sure that the truck body props on the hoist and the blocks under the hoist frame are in place to hold the empty truck box safely.
2. Before remounting the control valve on the reservoir, be sure that the valve gasket area is free of foreign matter.
3. Lay a new valve gasket on the valve mounting area and reconnect the pressure hose from the pump to the bottom of the control valve and tighten. Lower the control valve back down on the valve mounting surface and using four (4) new 5/16" (7.9 mm) hex head cap screws and four (4) new aluminum washers, mount the control valve to the reservoir and torque the bolts evenly. Reinstall the valve control lever.
4. Reconnect the control cable per cable connection instructions and reinstall the valve lever guard.
5. Reconnect the hose from the base of the cylinder (lifting hose) to port "B" on the control valve and the remaining hose to port "A" on the control valve.

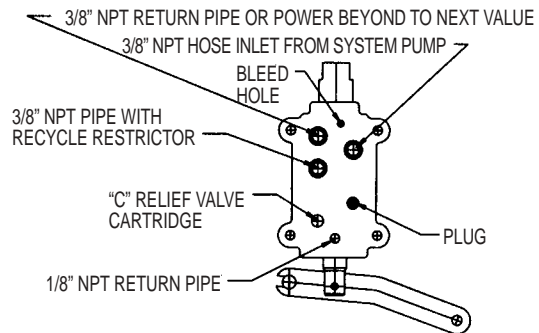


DANGER: Operate the control valve from the cab only to check the controls and lift bed to remove blocks. Do not under any circumstances get under the hoist to move the box.



BOTTOM VIEW OF #8 CONTROL VALVE

PORT "B" PRESSURE WILL BE THE SAME AS THE PUMP PRESSURE SETTING
PORT "A" PRESSURE WILL BE AT THE "C" CARTRIDGE PRESSURE SETTING



BOTTOM VIEW OF #8C CONTROL VALVE

PORT "B" PRESSURE WILL BE AT THE "R" RELIEF SETTING
PORT "A" IS PLUGGED AND RELIEVED TO THE RESERVOIR



Warranty

Energy Manufacturing Co., Inc., and its division, Williams Machine & Tool (hereafter collectively referred to as "Energy"), warrants its products against defects in materials and / or workmanship for a period of one (1) year from Energy's date of manufacture. No other warranty is expressed, implied, or made. Energy's Warranty does not extend beyond the cost of the goods sold as shown on Energy's sales invoice. Normal in-service "wear and tear" of products and components are not covered under this Warranty. Specifically, Energy makes no warranties of merchantability of the goods or their fitness for a particular purpose. However, Energy does warrant that goods sold shall be free from defects in materials and workmanship at the time of manufacture. Energy's Warranty does not extend to goods or materials produced by others which are incorporated into goods produced by Energy. Any claim under the Warranty contained within this document must be stated in writing to Energy within ten (10) days of the customer's receipt of any applicable goods. Energy's warranty liability is limited to the repair of, replacement of, credit for, or payment for, as Energy may elect, any goods determined by Energy to be defective in materials and / or workmanship. Notwithstanding any other provision contained herein, Energy will not be liable for any amount in excess of the sales price received by Energy for the goods which are determined to be defective under the provisions of this Warranty.

Energy products are not covered under this, or any other warranty when used in: aerospace applications, applications involving high duty-cycle industrial use, applications involving the lifting of people, or any other application that may place persons in dangerous positions during operation. Any exceptions to these exclusions must be specifically agreed-to in writing by Energy per the terms and conditions of this document. Critical customer functions require review and special application sign-off by Energy's product engineering group in writing in order for this Warranty to be valid and in force. Energy shall not be responsible for unacceptable conditions, operation, or performance that results from Energy products being applied without specific written application review and approval by Energy. The purchaser of any Energy product is responsible for the testing of such product for all matters concerned with its use, including but not limited to: safety testing, endurance testing and performance testing. The purchaser is further responsible for determining if the product is suitable for the purchaser's particular use or application.

Energy warrants that the title to all goods sold shall be free from any security interest, other lien, or encumbrance, and that the transfer of all goods shall be rightful. Energy further warrants that goods which are shown in Energy's price list, and which are not modified in any manner at the request of customer, shall not be subject to a claim by third parties by way of infringement.

The Warranty set forth herein is the exclusive warranty for all products produced by Energy, and there is no other warranty, expressed or implied. Energy hereby expressly disclaims any and all other warranties, including implied warranties of merchantability and fitness for a particular purpose and non-infringement. Warranty coverage is dependant on buyer complying with the then-current warranty procedures and failure to comply will void this warranty in its entirety.

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Written authorization for the return of products for warranty consideration must be obtained from Energy prior to return shipment. Any alleged nonconforming products shall be shipped to Energy, freight prepaid by the Shipper, along with a complete explanation of the alleged problem. Potential warranty items must be returned to Energy within thirty (30) days of receiving written authorization for return. If the products returned are not found to be nonconforming, the owner / shipper shall be responsible for and shall pay to Energy normal inspection and / or repair, and / or shipping charges.

No Warranty contained herein shall be enlarged or modified, nor shall any additional warranties be applicable, unless contained in writing and signed by a corporate officer of Energy at its headquarters in Monticello, Iowa, USA.

Energy Manufacturing Company, Inc.

Designers & Manufacturers of Hydraulic Cylinders, Valves, Pumps, and Power Systems

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- Compact (Gear)
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DIRECT MOUNT PUMPS

Piston Pumps

Gear Pumps

- 900 Series
- 1500 Series
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- Manual Single and Double-Acting
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VALVE / TANK

- “M” Series
- “W” Series

REMOTE DIRECTIONAL CONTROL VALVES

- 1000/2000 Series
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CONTROLS

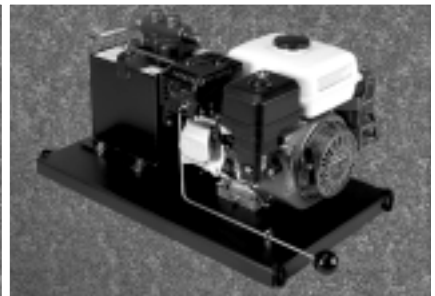
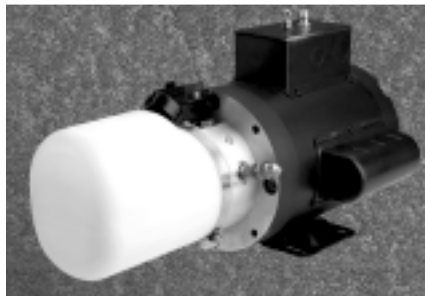
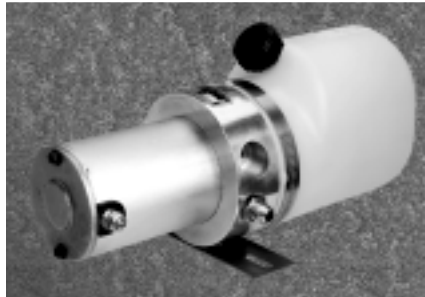
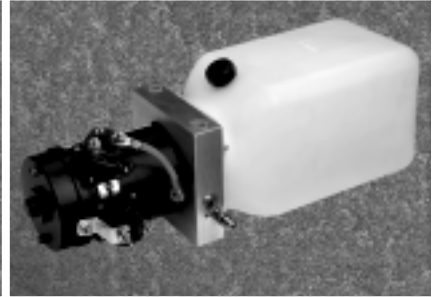
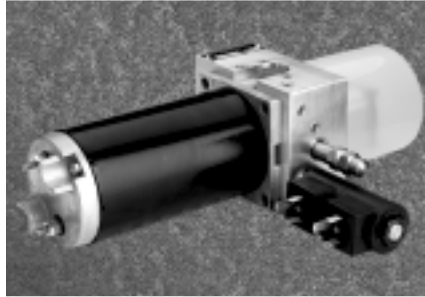
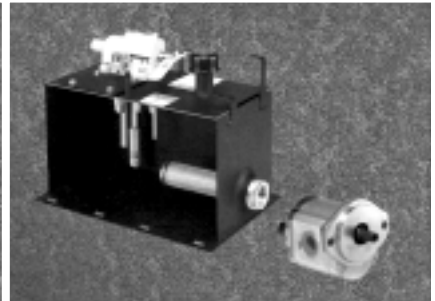
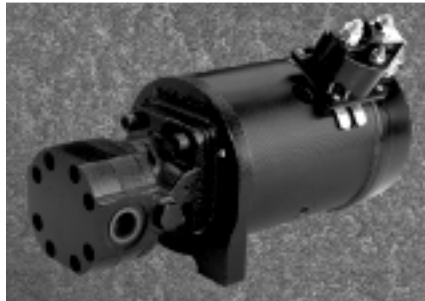
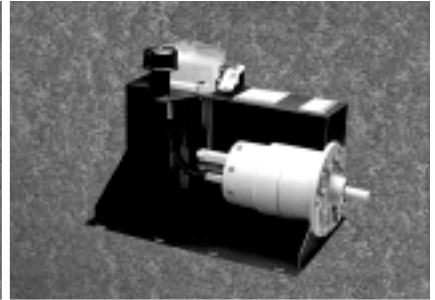
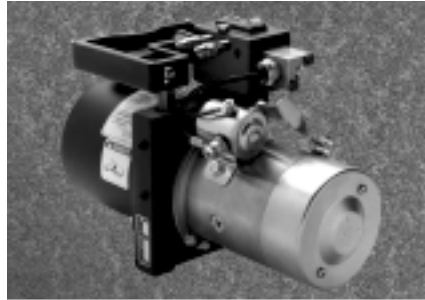
- Manual Cable
- Electric Valve w/Toggle
- Bonnet Style
- Air Shift

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