

Keep With Operator's Manual

VALVE AND PLUMBING KIT INSTRUCTIONS

2409 LOADER

MASSEY FERGUSON TRACTORS

MODEL	2WD	FWA	ROPS	CAB
231	X		X	
231S	X		X	

TRACTOR AND VALVE KIT GENERAL INFORMATION

Valve and plumbing kit can be installed on tractor using tools ordinarily available. Valve control handle has been factory preassembled for ease of installation. Shut off the tractor engine, engage tractor brakes and completely lower three point hitch during installation.

NOTE: Apply sealant only to all tapered threads unless coupled with swivel adapters. When using Teflon tape, wrap tape clockwise (as viewed from end) and wrap only twice. Keep sealant away from first two threads of tapered end to prevent contamination of hydraulic fluid. Do not use sealant on O-ring or flare adapter threads.

ATTACHING VALVE TO LOADER MOUNTING BRACKET (Figures 1 & 3)

1. Remove power beyond sleeve and install 1-1/16 plug (9) in power beyond port of valve (1). Install adapter fittings (22), female quick couplers (15) and 1" colored bands (16) to working ports of valve (1).
2. Fasten valve mounting plate (23) to valve mounting bracket (24) using 3/8 x 2-1/4 cap screws (2) and 3/8 lock nuts (5).
3. Fasten valve (1) with power beyond port on the bottom to valve mounting plate (23), using 5/16 x 3/4 cap screws (6) and 5/16 lock washers (7)(Figures 1 & 3).
4. Fasten decal mounting plate (4) to valve using 5/16 x 3/4 cap screw (6) and 5/16 lock washer (7). Making sure surface of decal mounting plate is clean and dry, remove backing from decal (20) and apply it to decal mounting plate.
5. Thread nut (13) onto handle (3). Attach handle (3) to valve (1). Slip boot (14) over handle and cover handle assembly. Attach ball (8) to handle.
6. Attach valve mounting tube (24) to right midmounting bracket using 1/2 x 2-1/2 cap screws (26), 1/2 flat washers (25) and 1/2 lock washers (27).



WARNING: Escaping hydraulic fluid under pressure can penetrate skin causing serious injury.

- DO NOT use your hands to check for leaks. Use a piece of cardboard or paper to search for leaks.
- Stop engine and relieve pressure before connecting or disconnecting lines.
- Tighten all connections before starting engine or pressurizing lines.

If any fluid is injected into skin, obtain medical attention immediately or gangrene may result.

Fasten valve to plate using these holes

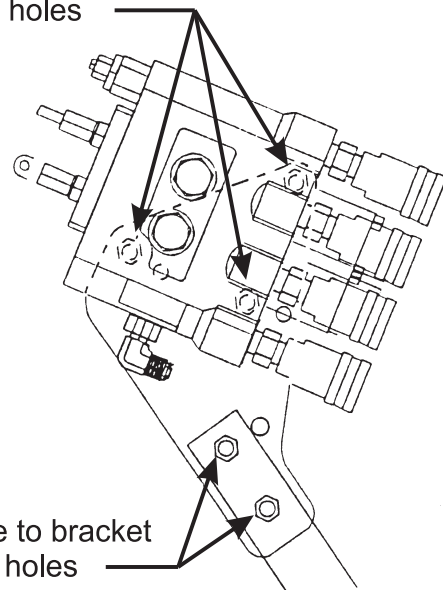


Figure 1

Fasten plate to bracket using these holes

2-7225

PLUMBING CONTROL VALVE TO TRACTOR HYDRAULICS (Figures 2 & 3)

1. Install 9/16 O-ring plug (35) into manifold block (28). Remove solenoid (31) from cartridge valve (30). Put a small amount of oil onto seals of cartridge valve and screw cartridge valve into manifold block and tighten.
2. Disassemble electrical connector (36) by removing center screw and prying out receptacle portion of connector. Also remove compression nut. Cut off two prong connector on end of wiring harness (37). Slide compression nut and seal onto wiring harness (37), and thread harness into connector housing. Expose about 1" of individual wire and remove about 3/8" of insulation off of each wire. Connect black wire to #1 terminal and white or red wire to #2 terminal of connector receptacle.
3. Install receptacle part of connector into connector housing so position without a terminal is adjacent to wire entrance port of housing. Tightly screw compression nut into connector assembly. Reinstall screw and rubber seal onto connector assembly. Attach connector (36) to solenoid and attach solenoid (31) to cartridge valve (30).
4. Remove manifold plate from under seat of tractor. Make sure oil tube remains in place on tractor. Install O-rings (29) in counterbores on bottom surface on manifold block (28). Slide manifold block (28) into place making sure manifold block slides onto oil tube and mating surfaces are flush (see Figure 3 for orientation). Solenoid should be up slightly at rear of manifold block. Place valve cover plate (34) on top of manifold block (28) and fasten to tractor using 7/16 x 3-1/4 cap screws (32) and 7/16 lock washers (33).
5. Attach 90° short adapter fitting (12) to manifold block (28) at front of block and 90° long adapter fitting (11) at side of block. Attach 3/8 x 76" hoses (10) to pressure and tank ports on valve (1). Mark opposite end of hoses to designate which hose is pressure and which hose is tank. Slide nylon sleeve (38) over hoses.
6. Route hoses and sleeve down along valve mounting tube, along back side of loader mounting and under tractor foot plate. Bring hoses back up to manifold block along inside surface of foot plate.
7. Connect tank hose to long 90° fitting at side (11) of manifold block and pressure hose to shorter 90° fitting (12) at front of manifold block.
8. Secure nylon sleeve to hoses and valve tube bracket using 3/16 x 11" plastic tie straps.
9. Route wiring harness (37) around front of manifold block (28), then back towards back of tractor around arm that holds three-point controls, then follow tractor wiring harness under cover plate and up under tractor hood. Remove cover to access battery and key switch.
10. Use test light to find a source of power on key switch. Source of power must only be available when key switch is in the on position. Allow enough wire on wiring harness to attach to power source at key switch and to battery ground, cut off excess wire. Attach fuse holder (40) to black wire using butt connector (41), attach female spade terminal (42) to opposite end of fuse holder and connect to spade terminal at tractor switch. Install ring terminal (43) on white or red wire on wiring harness and attach to battery ground.
11. On tractor three-point control there is a stop bracket which prevents operator from raising inside control lever to constant pumping position unless operator pushes lever toward outside of tractor to clear stop bracket. Remove cap screw securing stop bracket in place. Attach switch bracket (44) on outside of three-point control bracket using screw removed from stop bracket.
12. Install male connectors (46) and housings (47) to wire leads coming from switch.
13. Install momentary push button switch (45) into switch bracket (44) with button facing front of tractor. Adjust switch so that switch closes when tractor control lever is moved all the way back to the constant pumping position. When moved out of constant pumping, switch should open.
14. Connect male connectors on leads from switch (46 & 47) to wiring harness. Install fuse (48) into fuse holder (40). Secure wiring to tractor using .19 x 11" plastic ties.

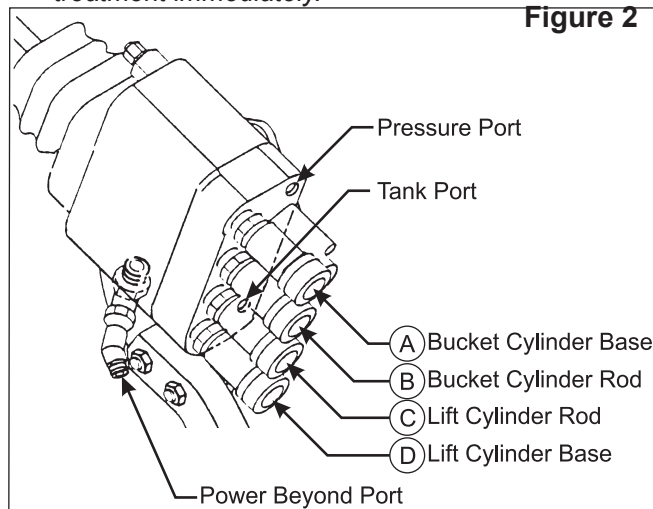
PLUMBING LOADER TO CONTROL VALVE

1. Install 3/8 x 44 hoses (17) onto boom oil line tubes. Install and tighten hose fittings one at a time from the bottom up. Loosening the closest oil line clamp will ease installation.
2. Install spiral bands (18) onto free ends of hoses (17) to match bands on female quick couplers (15). Install male quick couplers (19) onto free ends of hoses.
3. Connect hoses from upper two boom oil lines to upper quick couplers and connect hoses from lower two boom oil lines to lower quick couplers. Slide 40" nylon sleeve (39) over hoses (17). Secure nylon sleeve (39) to hoses (17) using two 3/16 x 11" plastic tie straps (21).

NOTE: When cycling loader, operate loader according to operation decal (20) on valve box. If direction of control lever is wrong, or loader will not lower, recheck connections shown.



WARNING: Escaping hydraulic fluid under pressure can have sufficient force to penetrate skin causing serious personal injury. If injured by escaping hydraulic fluid, obtain medical treatment immediately.



VALVE OPERATION

The solenoid valve provides easy operation of both the loader and three-point controls.

The tractor three-point hitch is operated as it normally is on the 231 or 231S tractor with the outside lever controlling draft and inside lever used to raise and lower three-point.

In order to use loader valve, the draft control (outside lever) needs to be all the way up and the response control needs to be raised and placed into the constant pumping position. When this is done, the switch will close to energize the cartridge valve solenoid to route oil to the loader valve.

When operator wants to use three-point again, he just moves position lever back out of constant pumping and resets draft.

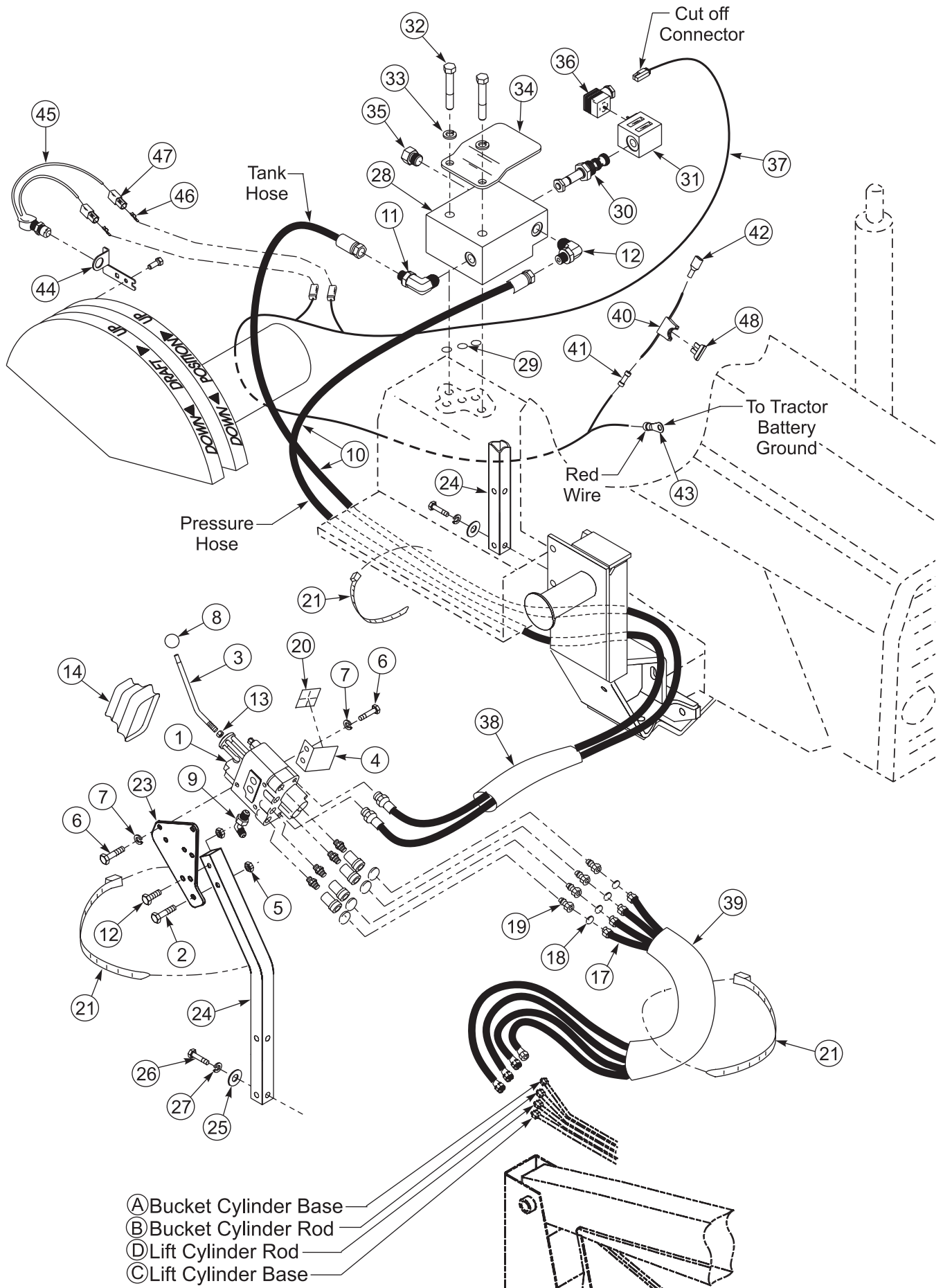
After all plumbing has been completed slowly cycle lift and bucket cylinders several times to purge air from hydraulic system. Retract cylinders and shut off tractor engine. Replenish tractor hydraulic system.

2-7225

PARTS LIST — VALVE AND PLUMBING KIT

Item	Part No.	Description	QTY.
1	53464	VALVE, Prince LVR (2500 PSI)	1
2	41838-19	SCREW, Cap, 3/8-16 x 2-1/4	1
3	43517	HANDLE, Standard	1
4	43451	ANGLE, Decal Mounting	1
5	41840-3	NUT, Lock, 3/8-16	2
6	41838-26	SCREW, Cap, 5/16-18 x 3/4	4
7	41837-2	WASHER, Lock, 5/16	4
8	38902	BALL, Handle	1
9	6027-4	PLUG, 1-1/16-12	1
10	43454-4	HOSE, 3/8 X 76 (Pressure & Tank)	2
11	42959-2	FITTING, Straight Thread, 90° Elbow-Long	1
12	32845-1	FITTING, Straight Thread, 90° Elbow-Short	1
13	41836-14	NUT, Hex, 7/16-20	1
14	43635	BOOT	1
15	6147-4	COUPLER, Female	4
16	36240-9	SPIRAL BAND, Plastic, Blue, 1"	1
	36240-10	SPIRAL BAND, Plastic, Red, 1"	1
	36240-11	SPIRAL BAND, Plastic, Yellow, 1"	1
	36240-12	SPIRAL BAND, Plastic, Green, 1"	1
17	36336-8	HOSE, 3/8 x 44	4
18	36240-5	SPIRAL BAND, Plastic, Blue, 5/8	1
	36240-6	SPIRAL BAND, Plastic, Red, 5/8	1
	36240-7	SPIRAL BAND, Plastic, Yellow, 5/8	1
	36240-8	SPIRAL BAND, Plastic, Green, 5/8	1
19	6137-4	COUPLER, Male	4
20	43453	DECAL, Single Handle Control	1
21	8137-1	STRAP, Adjustable	3
22	39280-7	FITTING, Adapter, 3/4-16 O-ring x 3/8 NPT	4
23	43450	PLATE, Valve Mounting	1
24	44641	TUBE, Valve Mount	1
25	42502-10	WASHER, Flat, 1/2	2
26	41838-25	SCREW, Cap, 1/2-13 x 2-1/2	2
27	41837-5	WASHER, Lock, 1/2	2
28	50438	ADAPTER BLOCK, Hydraulic (includes O-rings)	1
29	6000-20	O-RING, 5/8	2
30	51265	VALVE, Cartridge	1
31	51264	SOLENOID	1
32	41838-91	SCREW, Cap, 7/16-14 x 3-1/4	2
33	41837-4	WASHER, Lock, 7/16	2
34	51259	COVER PLATE	1
35	6027-5	PLUG, O-ring, 9/16-18	1
36	41802	CONNECTOR, 2-Pole	1
37	48403	WIRING HARNESS	1
38	34853-18	NYLON SLEEVE, 72"	1
39	34853-6	NYLON SLEEVE, 40"	1
40	41805	FUSE HOLDER	1
41	22727	CONNECTOR, Wire	1
42	51266-1	TERMINAL, Female Spade	1
43	24082-3	TERMINAL, Vinyl Insulated	1
44	51260	SWITCH BRACKET	1
45	51261	SWITCH, Momentary Switch Button	1
46	48411	CONNECTION TAB	2
47	48420	PLASTIC COVER TAB	2
48	41804-1	FUSE, 10 AMP	1

Figure 3



2-7225

PRINCE LVR VALVE SERVICE

Following is an outline procedure for disassembling and reassembling valve.



WARNING: *The valve has a factory pre-set valve relief setting. Tampering with this setting can cause serious injury to operator and damage to tractor or loader. Unauthorized adjustments or service to valve relief will VOID WARRANTY of both loader and tractor. If adjustments or service to valve relief are required during warranty period, an authorized service department must be consulted for authorization.*

VALVE DISASSEMBLY (Figure 4)

NOTE: *Mark or tag all parts so they are reinstalled in their proper positions.*

1. Slide boot (6) to top of handle (34). Remove hex head cap screws (36) from rod ends (9 & 10). Remove handle with boot and adapter plate (8). Remove nuts (28 & 31) from spool stud (7) and rod end assemblies (10). Remove spool stud (7) and rod end assemblies (10) from valve.

NOTE: *Spool adapters (33) are factory assembled. Removal from spools is not necessary. If replacing a damaged adapter, clean threads with loctite primer and install using loctite 262.*

2. Remove hex head cap screws (13) and end caps (14) from both spools. Remove detent sleeve (12) from regen spool. Remove steel balls (20), poppet (21), and poppet spring (19) from detent retainer (24). Remove retaining flat (15) and detent spacer (16) from regen spool.
3. Secure handle end of regen spool. Using a rod through retainer ball holes, remove detent retainer (24) from regen spool.

NOTE: *Detent retainers (18 & 24) are installed on spools using Loctite 222 or equivalent. If spool adapter comes loose instead of detent retainer, pull spool completely out of valve and secure spool using vice grips on land section of spool not machined for valve bore.*

4. Remove washer (17), centering spring (26), and stop cup (23) from regen spool.
5. Holding in on float detent sleeve (22), push in float spool from handle end and remove steel balls (20) from float detent retainer (18). Remove float detent sleeve (22), poppet (21), poppet spring (19), retaining

flat (15) and spacer (16) from float spool.

6. Secure handle end of float spool. Using a rod through retainer ball holes, remove detent retainer (18) from float spool.

NOTE: *Detent retainers (18 & 24) are installed on spools using Loctite 222 or equivalent. If spool adapter comes loose instead of detent retainer, pull spool completely out of valve and secure spool using vice grips on land section of spool not machined for valve bore.*

Remove washer (17), centering spring (26) and stop cup (23) from float spool.

7. Push spools in from handle end until rear spool seals (1) are exposed. Using wire hook and screwdriver remove rear spool seals. Push spools in from the rear until front spool seals (1) are exposed. Using wire hook and screwdriver remove front spool seals.
8. Clean all parts, including valve body, in suitable cleaning solvent. After cleaning parts with solvent, use air pressure to blow any dirt or excess solvent from all parts including inside of valve body.

VALVE REASSEMBLY

1. Examine all parts for wear and damage and replace if necessary.
2. Lubricate all O-rings and spools with oil to prevent damage when assembling.
3. Lubricate all detent and spring centering parts with a light coat of grease before assembling.
4. Reassemble all parts in reverse order of disassembly.

NOTE: *Use Loctite 222 or equivalent when installing detent retainers (18 & 24).*

RELIEF VALVE, LOAD CHECK PLUGS, AND POWER BEYOND SLEEVE

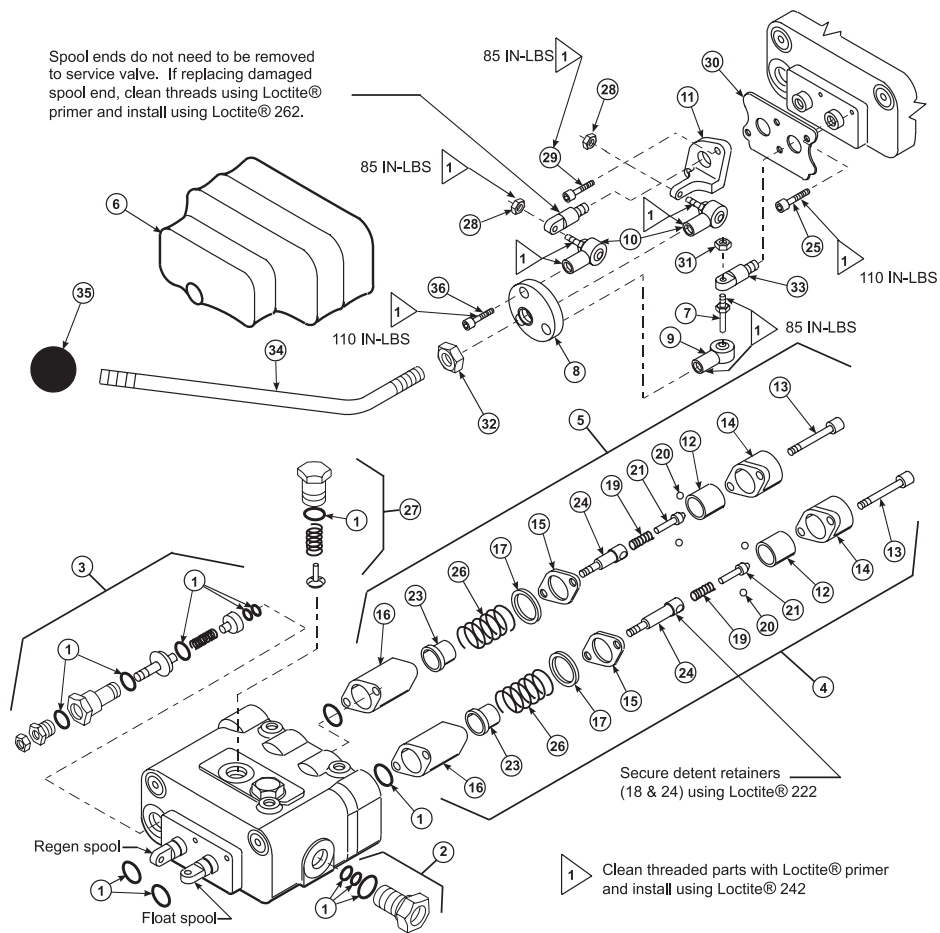
NOTE: *Relief valve (3), load check plugs (27) and power beyond sleeve (2) may be removed separately to clean inspect or replace parts without removing valve spools.*

NOTE: *If repairing or replacing relief valve (3), torque larger hex nut (relief body) to 20-25 ft-lbs.*

REPLACING HANDLE PARTS

If replacing damaged handle parts, clean threads with loctite primer and install using loctite 242. Torque parts as shown in Figure 4.

Figure 4

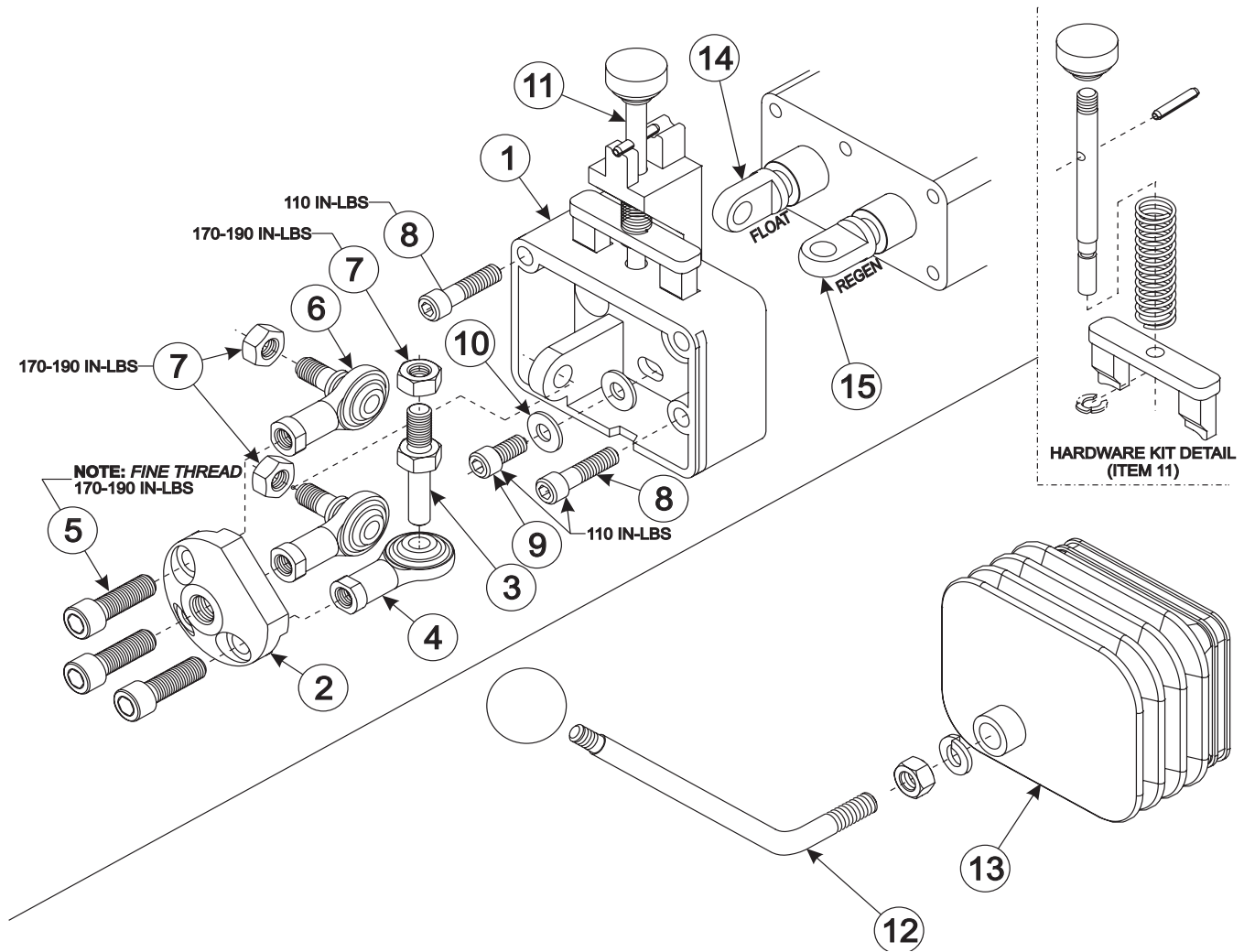


PARTS LIST – PRINCE LVR VALVE

Item	Part No.	Description	Qty.
1	43633	SEAL KIT	1
2	43636	POWER BEYOND SLEEVE	1
3	43637-2	RELIEF VALVE (2500 PSI)	1
4	43638	FLOAT KIT, (Includes 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, and 26)	1
5	43639	REGEN KIT, (Includes items 12, 13, 14, 15, 16, 17, 19, 20, 21, 24, and 26)	1
6	43635	BOOT, Rubber, Valve Handle	1
7	51076	STUD, Spool	1
8	51078	ADAPTER PLATE	1
9	38900-4	ROD END	1
10	51075	ROD END, Assembly	2
11	51079	CLEVIS	1
14	44476-2	END CAP (Manufacturer's part number (HC-V-AA26) stamped on end cap identifies valve and relief setting)	2
25	44743-5	SCREW, Cap,Socket Head, 1/4-20 x 1/2"	2
26	44460	PLUG, Load Check	2
28	41836-2	NUT, Hex, 5/16"	3
29	44743-3	SCREW, Cap, Socket Head, 1/4-20 x 7/8"	2
30	51080	PLATE	1
31	51081	WASHER, Shim, 5/16"	1
32	G271506	NUT, Hex, 7/16-20	1
33	51077	END, Spool	2
34	43517	HANDLE, Valve, Standard	1
35	38902	BALL, Handle	1
36	44743-4	SCREW, Cap, Socket Head, 5/16-24 x 3/4"	3
37	G120383	WASHER, Lock, 7/16"	1

NOTE: Individual items not listed in repair parts listing are not available separately.

Figure 5
VALVE EQUIPPED WITH LOCKOUT FEATURE



PARTS LIST - JOYSTICK SUB-ASSY WITH DUAL SPOOL LOCK

Item	Part No.	Description	Qty.
1	*	CLEVIS, Spool Lock	1
2	*	PLATE, Adapter	1
3	55821	STUD, Spool	1
4	55822	END, Rod	1
5	*	SCREW, Cap	3
6	55823	ASSY, Rod End	2
7	*	NUT, Hex	3
8	*	SCREW, Cap	2
9	*	SCREW, Cap	1
10	*	WASHER, Flat	1
11	55824	KIT, Spool Lock Hardware	1
12	56004	KIT, Bent Handle	1
13	55826	KIT, Boot/Cable Tie	1
14	55917	ADAPTER, Float Spool	1
15	55918	ADAPTER, Regen Spool	1
16	55827	KIT, Sub-Assy, Includes Items 1-11	1

* **NOTE:** Individual items not listed in repair parts listing are not available separately.
For valve block service parts, see previous page.

GENERAL TORQUE SPECIFICATIONS

USE THE FOLLOWING TORQUES WHEN SPECIAL TORQUES ARE NOT GIVEN

Standard American and Metric Cap Screws

AMERICAN STANDARD CAP SCREWS										METRIC CAP SCREWS							
SAE Grade	5				8				Metric Class	8.8				10.9			
Typ. Head Markings									Typ. Head Markings								
Cap Screw	TORQUE				TORQUE				Cap Screw	TORQUE				TORQUE			
Size	FT-LBS		N-m		FT-LBS		N-m		Size	FT-LBS		N-m		FT-LBS		N-m	
Inches	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	Millimeters	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
1/4 - 20	6.25	7.25	8.5	10	8.25	9.5	11	13	M6 x 1.00	6	8	8	11	9	11	12	15
1/4 - 28	8	9	11	12	10.5	12	14	16	M8 x 1.25	16	20	21.5	27	23	27	31	36.5
5/16 - 18	14	15	19	20	18.5	20	25	27	M10 x 1.50	29	35	39	47	42	52	57	70
5/16 - 24	17.5	19	23	26	23	25	31	34	M12 x 1.75	52	62	70	84	75	91	102	123
3/8 - 16	26	28	35	38	35	37	47.5	50	M14 x 2.00	85	103	115	139	120	146	163	198
3/8 - 24	31	34	42	46	41	45	55.5	61	M16 x 2.50	130	158	176	214	176	216	238	293
7/16 - 14	41	45	55.5	61	55	60	74.5	81	M18 x 2.50	172	210	233	284	240	294	325	398
7/16 - 20	51	55	69	74.5	68	75	92	102	M20 x 2.50	247	301	335	408	343	426	465	577
1/2 - 13	65	72	88	97.5	86	96	116	130	M22 x 2.50	332	404	450	547	472	576	639	780
1/2 - 20	76	84	103	114	102	112	138	152	M24 x 3.00	423	517	573	700	599	732	812	992
9/16 - 12	95	105	129	142	127	140	172	190	M27 x 3.00	637	779	863	1055	898	1098	1217	1488
9/16 - 18	111	123	150	167	148	164	200	222	M30 x 3.00	872	1066	1181	1444	1224	1496	1658	2027
5/8 - 11	126	139	171	188	168	185	228	251									
5/8 - 18	152	168	206	228	203	224	275	304									
3/4 - 10	238	262	322	355	318	350	431	474									
3/4 - 16	274	305	371	409	365	402	495	544									
7/8 - 9	350	386	474	523	466	515	631	698									
7/8 - 14	407	448	551	607	543	597	736	809									
1 - 8	537	592	728	802	716	790	970	1070									
1 - 14	670	740	908	1003	894	987	1211	1337									

NOTE: These values apply to fasteners as received from supplier, dry or when lubricated with normal engine oil. They do not apply if special graphite or moly sulphide greases or other extreme lubricants are used.

37° JIC Fittings

Size	Thread Size	Assembly Torque		Tube Connection F. F. F. T.	Swivel Nut or Hose Connection F. F. F. T.
		in.·lb.	ft.·lb.		
-4	7/16 - 20	140 ± 10	12 ± 1	2	2
-5	1/2 - 20	180 ± 15	15 ± 1	2	2
-6	9/16 - 18	250 ± 15	21 ± 1	1 1/2	1 1/4
-8	3/4 - 16	550 ± 25	45 ± 5	1 1/2	1
-12	1 1/16 - 12	1000 ± 50	85 ± 5	1 1/4	1
-16	1 5/16 - 12	1450 ± 50	120 ± 5	1	1
-20	1 5/8 - 12	2000 ± 100	170 ± 10	1	1
-24	1 7/8 - 12	2400 ± 150	200 ± 15	1	1
-32	2 1/2 - 12	3200 ± 200	270 ± 20	1	1

O-Ring Face Seal Tube/

Hose Swivel Nut

Metric Tube O.D. (mm)	Dash Size	Thread Size (in.)	Swivel Nut Hex Size (in.)	Swivel Nut Torque	
				N-m	lb _r ·ft
5	-3	--	--	--	--
6	-4	9/16 - 18	11/16	16	12
8	-5	--	--	--	--
10	-6	11/16 - 16	13/16	24	18
12	-8	13/16 - 16	15/16	50	37
16	-10	1 - 14	1-1/8	69	51
20	-12	1-3/16 - 12	1-3/8	102	75
22	-14	1-3/16 - 12	--	102	75
25	-16	1-7/16 - 12	1-5/8	142	105
32	-20	1-11/16 - 12	1-7/8	190	140
38	-24	2 - 12	2-1/4	217	160
50.8	-32	--	--	--	--

SAE O-Ring Fittings

Size	Swivel Nut or Hose	Assembly Torque		F. F. F. T.
		in.·lb.	ft.·lb.	
2	5/16 - 24	90 ± 5	7.5 ± 0.5	1 ± .25
3	3/8 - 24	170 ± 10	14 ± 1	1 ± .25
4	7/16 - 20	220 ± 15	18 ± 1	1 ± .25
5	1/2 - 20	260 ± 15	22 ± 1	1 ± .25
6	9/16 - 18	320 ± 20	27 ± 2	1.5 ± .25
8	3/4 - 16	570 ± 25	48 ± 2	1.5 ± .25
10	7/8 - 14	1060 ± 50	90 ± 5	1.5 ± .25
12	1 1/16 - 12	1300 ± 50	110 ± 5	1.5 ± .25
14	1 3/16 - 12	1750 ± 75	145 ± 6	1.5 ± .25
16	1 5/16 - 12	1920 ± 125	160 ± 6	1.5 ± .25
20	1 5/8 - 12	2700 ± 150	225 ± 12	1.5 ± .25
24	1 7/8 - 12	3000 ± 150	250 ± 12	1.5 ± .25
32	2 1/2 - 12	3900 ± 200	325 ± 15	1.5 ± .25

INSTALLATION INSTRUCTIONS