UNIVERSAL VALVE & PLUMBING KIT (PARALLEL, OPEN CENTER) 102QX & 104QX LOADERS

VALVE & PLUMBING GENERAL INFORMATION

IMPORTANT: *Additional hoses and fittings—which are NOT included in this kit—are required to complete hydraulic plumbing. Additional hardware will be required to mount valve mounting plate and joystick pedestal.*

Universal valve kit can be used with ROPS or cab model tractors and includes:

- Joystick with pedestal
- Push-pull cables
- Quick couplers and plumbing from valve to loader steel oil lines

Because control handle is linked to valve by cables, it allows some flexibility in placing control handle where it will be most convenient for the operator.

Possible options for plumbing universal valve kit to tractor are:

- To one set of rear remote couplers, or
- Tapping directly into tractor hydraulic system without using any tractor rear remotes.

Because tractors vary, length of hoses and hose end fittings needed to plumb control valve to tractor hydraulics vary by tractor and are not provided in this kit. Hoses which connect to elbows in pressure and tank (return) ports of valve (1) must have female 7/8-14 37° (JIC) swivel threads. If power beyond function of control valve is desired, hose which connects to elbow in valve power beyond port must have female 3/4-16 37° (JIC) swivel threads. You will need to determine how the valve will be plumbed to tractor and what hoses and fittings will be needed to complete hydraulic plumbing.

Valve contained in this kit is an open-center parallel valve. A parallel valve allows performing two functions simultaneously, each at full valve pressure. However, the function requiring lower pressure will take priority.

Example: *When simultaneously operating lift and rollback, bucket may roll back until tilt cylinders are completely retracted before lift cylinders raise loader.*

Each function can be operated separately when desired. Power beyond plug (32, Figure 1) supplied with this kit is an open center plug. For closed center operation, a closed center plug, not provided with this kit, must be ordered.

Valve and plumbing kit can be installed using tools ordinarily available. Valve control handle has been factory pre-assembled for ease of installation. References to left and right used in these instructions refer to position when seated in operating position on tractor. Shut off engine and engage brakes 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 tape 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.*

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

- *DO NOT use your hand 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 treatment immediately or gangrene may result.

Handle Lock Operation

Single lever joystick in this kit has a handle locking feature.

- To lock handle, rotate locking lever on base of joystick assembly approximately 20° to lock position.
- To unlock handle, rotate locking lever to unlock position.

PARTS LIST – UNIVERSAL VALVE KIT WITH SINGLE-HANDLE JOYSTICK CABLE CONTROL

Item	Part No.	Description	Qty.
1	51813	VALVE, Loader Control, 2-Spool, 3000 PSI, Parallel	1
2	51758-3	CABLE ASSEMBLY, Push-Pull, 80” Nominal Length	2
3	51757	CONTROL HANDLE ASSEMBLY, Single Joystick, Dual Axis, Cable	1
4	6137-6	COUPLER, Quick, Male, 1/2” Nominal, 1/2-14 female threads	4
5	6147-8	COUPLER, Quick, Female, 1/2” Nominal, 1/2-14 female threads	4
6	52915	PEDESTAL, Control Handle Stand	1
7	36845-5	HOSE, 1/2 x 120”, 1/2” NPTF x 7/8-14 JIC Female Swivel	4
8	36240-1	BAND, Plastic Spiral, Color Identification, 3/4”, Blue	1
9	36240-2	BAND, Plastic Spiral, Color Identification, 3/4”, Red	1
10	36240-3	BAND, Plastic Spiral, Color Identification, 3/4”, Yellow	1
11	36240-4	BAND, Plastic Spiral, Color Identification, 3/4”, Green	1
12	36240-9	BAND, Plastic Spiral, Color Identification, 1”, Blue	1
13	36240-10	BAND, Plastic Spiral, Color Identification, 1”, Red	1
14	36240-11	BAND, Plastic Spiral, Color Identification, 1”, Yellow	1
15	36240-12	BAND, Plastic Spiral, Color Identification, 1”, Green	1
16	39280-8	FITTING, Straight, 3/4-16 SAE O-ring Male x 1/2-14 NPT Male	4
17	34853-87	SLEEVE, Nylon Hose, 120” Long	2
18	8137-1	STRAP, Tie, Plastic, Adjustable 3/16 x 11”	2
19	41838-81	SCREW, Cap, Hex Head, 5/16-18 x 3-1/2”, Grade 5	2
20	42502-7	WASHER, Flat, 5/16 N-SAE	4
21	41840-2	NUT, Lock, 5/16-18, Type N	2
22	52500	PLATE, Valve Mounting, Bolt-On	1
23	44274-1	PLUG, Plastic, Square Tube	1
24	4838-20	DUST PLUG, Black, 1/2” Quick Coupler	4
25	32844-17	FITTING, Straight, 3/4-16 SAE O-ring Male x 7/8-14 JIC Male	2
26	34128-1	FITTING, Elbow, 90°, 7/8-14 JIC Female Swivel x 7/8-14 JIC Male	2
27	7438-1	STRAP, Rubber, Tarp, With Hooks, 19” Long	1
28	41838-26	SCREW, Cap, Hex Head, 5/16-18 x 3/4”, Grade 5	3
29	41837-2	WASHER, Lock, 5/16	3
30	44743-1	SCREW, Cap, Hex Socket, 1/4-20 x 3/8”	4
31	52242	CLEVIS, Cable End Adapter, To Handle, 6mm-1.00 x 13mm EFF Thread	2
32	6027-6	PLUG, Power Beyond, Open Center	1
33	32845-2	FITTING, Elbow, 90°, 3/4-16 SAE O-ring Male x 3/4-16 JIC Male	1

Figure 1
Valve & Fitting Assembly

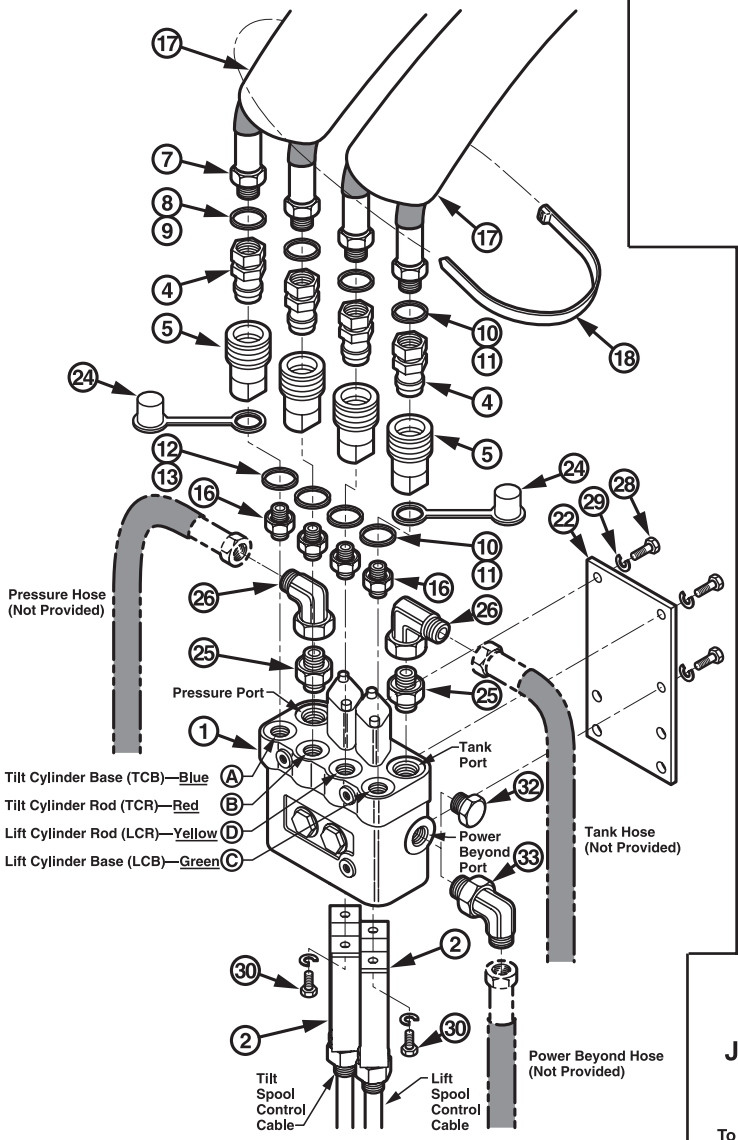


Figure 1A
Loader Control Hose Connections

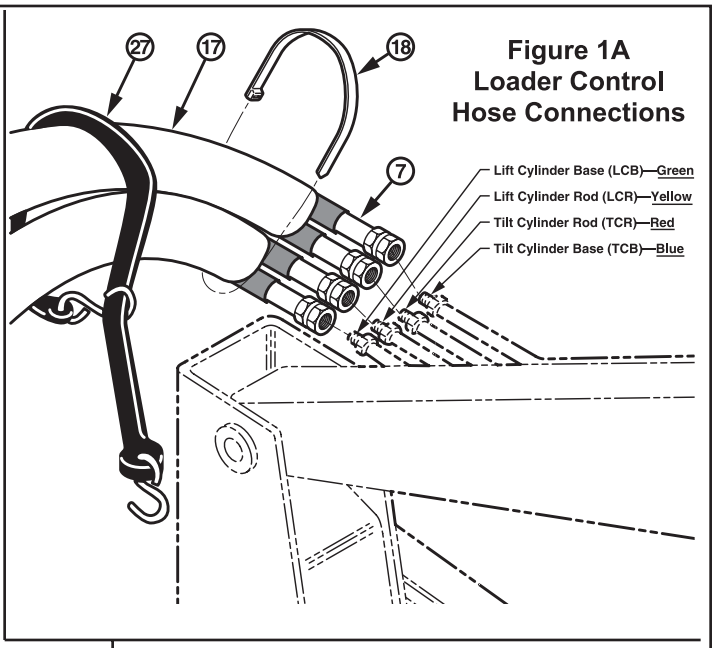


Figure 2
Joystick & Pedestal Assembly

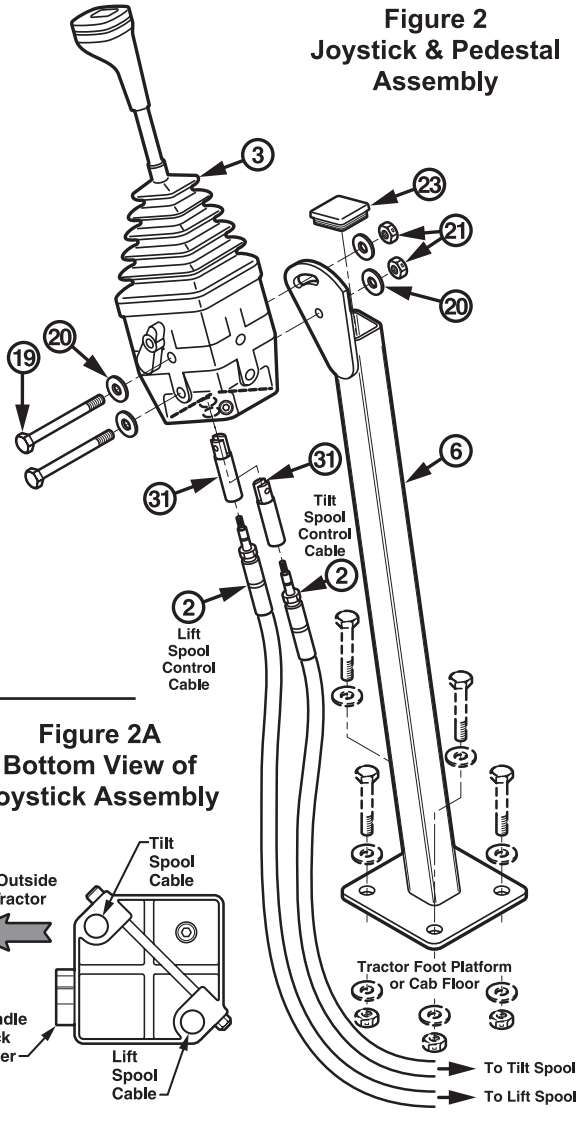


Figure 2A
Bottom View of Joystick Assembly

FASTENING CABLE & HARNESS STRAPS TO VALVE (Figures 1, 4 & 5)

1. Remove and retain cotter pin from clevis pin in harness end of one control cable (2, Figure 1). Push clevis pin out of clevis and slip clevis over end of one spool of valve (1), then reinsert clevis pin to retain spool end in clevis. Reinstall cotter pin into clevis pin. Repeat procedure to secure remaining cable to remaining valve spool.

   NOTE: *Do not remove protective end caps from threaded end of cables (2) until after cables have been routed from control handle assembly to loader control valve.*

2. Fasten harness straps of cable assemblies (2) to valve using 1/4 x 3/8" socket head cap screws (30). Note which cable is for lift spool control and which cable is for tilt spool control—mark opposite end of each cable to identify cable control function.

ASSEMBLING FITTINGS ONTO CONTROL VALVE

NOTE: *You will need to know if power beyond feature of control valve (1, Figure 1) will be used.*

1. If power beyond is desired, install 3/4-16 SAE O-ring end of 3/4 x 3/4 x 90° elbow fitting (33) into power beyond port of valve (1). If power beyond is not desired, install 3/4" SAE O-ring plug (32) into power beyond port of valve (1). Install 90° elbow fitting (33) or plug (32) into power beyond port of valve (1).

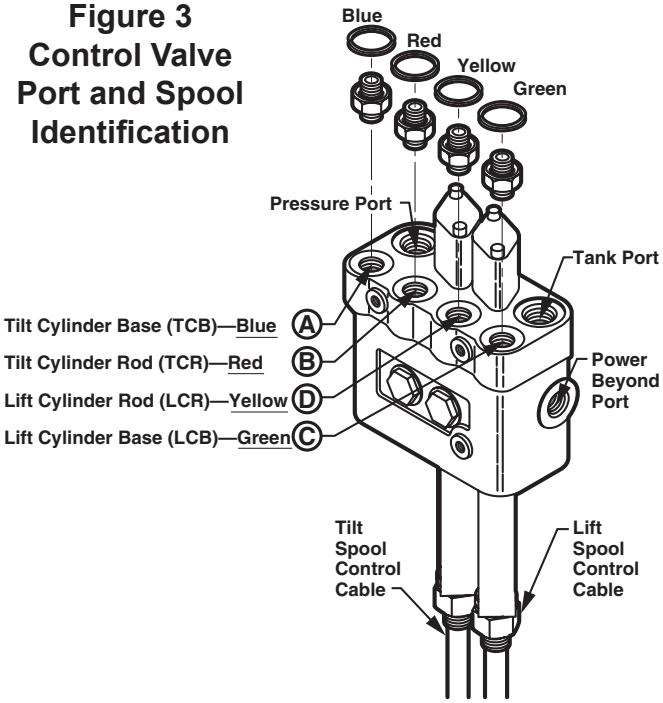
2. Starting with port A and working toward port C, install 1/2 x 3/4 straight fittings (16) into four working ports (A, B, C & D) of valve (1). Install dust plugs (24) and 1" spiral identification bands (12, 13, 14 & 15) with female quick couplers (5) onto 1/2 x 3/4" straight fittings (16).

   NOTE: *Install spiral plastic identification bands (12, 13, 14 & 15) so color of band indicates function as shown in Figure 3.*

3. Install 3/4 x 7/8 straight fittings (25) into pressure and tank (return) ports of valve (1). Install 7/8 x 7/8 x 90° elbow fittings (26) onto straight fittings (25) in pressure and tank ports of valve (1), directing free ends of elbows (26) to point outward.

   NOTE: *At this point, hoses for plumbing valve (1) to tractor hydraulics—which are not included in this kit— may be connected to 7/8 x 7/8 x 90° elbow fittings (26) in pressure and return ports of valve (1), and, if applicable, to 3/4 x 3/4 x 90° elbow fitting (33) in power beyond port of valve (1). Refer to Plumbing Control Valve to Tractor Hydraulics section.*

Figure 3 Control Valve Port and Spool Identification



MOUNTING VALVE WITH ASSEMBLED FITTINGS

1. Valve mounting plate (22, Figure 1) may be bolted or welded in place, usually to loader mid mounting bracket. If bolting valve mounting plate, use plate (22) as a template to mark four hole locations and drill for 7/16" diameter attaching cap screws.

2. Fasten valve (1) with assembled fittings to valve mounting plate (22) using three 5/16 x 3/4" cap screws (28) and lock washers (29).

3. Fasten mounting plate to tractor or loader right mid mounting bracket using four 7/16" cap screws, washers, and lock nuts—which are not included with this kit.

CONNECTING VALVE CONTROL CABLES TO SINGLE-HANDLE JOYSTICK CONTROL (Figures 2 & 5)

1. Route control cables (2) from valve (1, Figure 1) to area of cab or operator platform where joystick control (3, Figure 2) will be mounted. Try to find existing grommeted holes through foot platform or cab floor which will work for this. It will likely be necessary to make holes through floor mat and foot platform or cab floor to route cables through.

   NOTE: *When routing cables, make sure cables are not twisted and will not bind or contact any moving parts. Avoid bending cables to a radius of less than 3 inches (8cm).*

2. Assemble cable end clevis adapters (31) onto ends of cables (2).

CONNECTING VALVE CONTROL CABLES TO SINGLE-HANDLE JOYSTICK CONTROL (Cont.)

NOTE: *For normal operation, joystick assembly will be positioned with handle lock lever to right side of joystick base.*

3. Temporarily lift boot (3, Figure 5) from joystick base to access clevis rod ends (6 & 7, Figure 5).

4. Temporarily remove 6mm x 75mm socket head screw (29, Figure 5) and lock nut (10, Figure 5) from lower side hole in base (11, Figure 5) of joystick assembly (3). Temporarily remove 6mm x 30mm socket head cap screws (13, Figure 5) and flat washers (12, Figure 5) from bottom of joystick base.

5. Slide cable (2, Figure 2) for control of lift spool and cable adapter (31, Figure 2) through rear hole in bottom of joystick assembly base (11, Figure 5). Attach cable adapter (31, Figure 2) to rod end (6, Figure 5) using clevis pin (27) and retaining ring (28).

6. Slide cable (2, Figure 2) for control of tilt spool and cable adapter (31, Figure 2) through front hole in bottom of joystick assembly base (11, Figure 5). Attach cable adapter (31, Figure 2) to rod end (7, Figure 5) using clevis pin (27) and retaining ring (28).

7. Lock lift and tilt cables (2, Figure 2) into place by reinstalling 6mm x 30mm socket head cap screws (13, Figure 5) and flat washers (12, Figure 5) into bottom of joystick base (11, Figure 5), and 6mm x 75mm socket head cap screw (29, Figure 5) and lock nut (10, Figure 5) through lower side hole in joystick base (11, Figure 5).

8. Slide boot (3, Figure 5) over joystick base (11, Figure 5), and secure boot to joystick base using plastic tie strap (14, Figure 5) provided with joystick assembly.

INSTALLING PEDESTAL STAND FOR JOYSTICK CONTROL (Figure 2)

1. Press square plastic plug (23, Figure 2) into top of pedestal stand (6).

2. Loosely fasten joystick assembly (3) to pedestal stand (6) using 5/16 x 3-1/2" cap screws (19), flat washers (20), and lock nuts (21), but do not tighten hardware until final position of pedestal and handle has been determined.

   NOTE: *Plate for attaching joystick control (3) to pedestal stand (6) has a slotted hole to allow adjustment of angle at which joystick is mounted for ease of operation.*

3. Position assembled joystick and pedestal where joystick control will be most convenient for the operator without interfering with any tractor control levers.

4. Using mounting flange of pedestal as a template, mark four holes (usually through tractor foot platform or cab floor) to be drilled and used to fasten pedestal stand (6). Make holes for 1/2" hardware.

5. Fasten mounting flange of pedestal stand (6) to tractor foot platform or cab floor using four 1/2" cap screws, washers, and lock nuts—which are not included with this kit.

   NOTE: *Adjust cables at valve to obtain desired performance from joystick. To adjust cable length, loosen jam nut (17, Figure 4), adjust knurled nut (19, Figure 4) to desired length, and then retighten jam nut (17, Figure 4).*

PLUMBING CONTROL VALVE TO TRACTOR HYDRAULICS

Because of the universal nature of this kit, it is unknown to which tractor or hydraulic system the control valve will be connected or how it will be plumbed. Possible options include plumbing to a set of rear remote couplers or tapping directly into tractor hydraulic system without using tractor rear remotes. Additional hoses and fittings, which are not included in this kit, are required to plumb control valve to tractor hydraulics. You will need to determine how to plumb valve to tractor and what hose lengths and end fittings are needed to plumb control valve to tractor hydraulics.

Hoses which connect to elbows (26, Figure 1) in pressure and tank (return) ports of valve (1) must have female 7/8-14 37° (JIC) swivel threads. If power beyond function of control valve is desired, hose which connects to elbow (33) in power beyond port must have 3/4-16 37° (JIC) swivel threads.

PLUMBING LOADER BOOM OIL LINES TO LOADER CONTROL VALVE (Figure 1A)

1. Install 1/2 x 120" hoses (7) onto boom oil line tubes. Install and tighten hose fittings one at a time from the bottom up. Temporarily loosening closest oil line clamp slightly will ease installation.

2. Install 3/4" spiral identification bands (8, 9, 10 & 11) onto free ends of hoses (7) to match bands at female quick couplers (5). Slide one 120" hose sleeve (17) over hoses (7) to lower two boom oil line tubes, and slide other 120" hose sleeve (17) over hoses (7) to upper two boom oil line tubes. Install male quick couplers (4) onto free ends of hoses (7).

PLUMBING LOADER BOOM OIL LINES TO LOADER CONTROL VALVE (Cont.)

3. Connect hoses (7) from lower two boom oil line tubes to female quick couplers for valve ports D and C, and connect hoses (7) from upper two boom oil line tubes to quick couplers for valve ports A and B. Use tie straps (18) to secure hose sleeves to hoses and to secure hoses and sleeves away from tractor tires and other moving parts. Bundle hoses (7) and sleeves (17) together and wrap one end of rubber tarp strap (27) around hoses (7) and sleeves (17) and hook it onto itself. Hook other end of tarp strap (27) near front right corner of loader side frame channels.

4. After all plumbing has been completed, supply hydraulic power to loader control valve. 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, if necessary. Refer to tractor operator's manual.

NOTE: *When cycling loader using joystick control, operate loader as you normally would. 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.*

PARTS LIST - JOYSTICK AND CABLE HARNESS

ITEM	PART NO.	DESCRIPTION	QTY.
1	51814	HANDLE, Plastic	1
2	G11506909	SCREW, Set, 6mm-1.00 x 8mm LG	1
3	51805	BOOT	1
4	*	HANDLE ASSEMBLY, Joystick	1
5	*	RETAINING RING, External 15/16"	3
6	*	ROD END, Single	1
7	*	ROD END, Double	1
8	51894	BOLT, Pan Head Slotted, 6mm-1.00 x 22mm LG	1
9	*	CLEVIS	1
10	**	NUT, Lock, Nylon Insert, 6mm-1.00	1
11	54740	BASE W/LOCK MECHANISM	1
12	41837-1	WASHER, Lock, 1/4"	1
13	51812-1	SCREW, Socket Head, 6mm-1.00 x 30mm	1
14		CABLE TIE, 3/16" (not available as service part)	1
15	52242	CABLE ADAPTER	2
16		CABLE (not available as service part, see Item 26)	1
17	48948-18	NUT, Jam, 3/4"-16	1
18	51798	WASHER, Lock, Internal Tooth, 3/4"	1
19	51799-1	NUT, Knurled, 3/4"-16	1
20	51800	STRAP, Valve Adapter	1
21	48948-12	NUT, Jam, 5/16"-24	2
22	41903-15	PIN, Cotter, 3/32" x 3/4"	1
23	41902-20	PIN, Clevis, 5/16" x 1"	1
24	51804	CLEVIS	1
25	44743-1	SCREW, Socket Head, 1/4"-20 x 3/8"	4
26	51758-2	CABLE ASSEMBLY 60", (Includes Items 16 - 24)	1
27	**	PIN, 1/4"	2
28	**	RETAINING RING, External, 1/4"	2
29	**	SCREW, Socket Head, 6mm-1.00 x 75mm	1
30	55578	* KIT, ASSY REPAIR (Includes Items 4-7 & 9)	1
31	22279	** KIT, PIN/CABLE RETAINER (Includes Items 10 & 27-29)	1
	51757	JOYSTICK ASSEMBLY (Includes Items 1-14 & 27-29)	1

Figure 2
Cable Harness

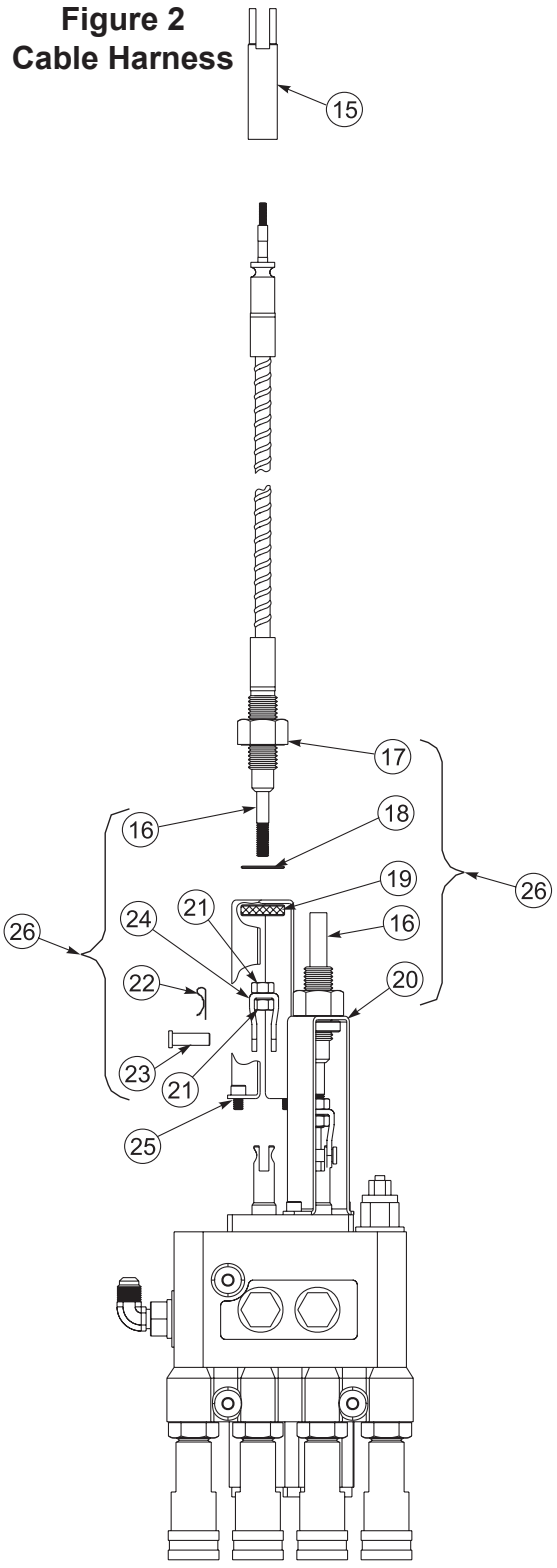
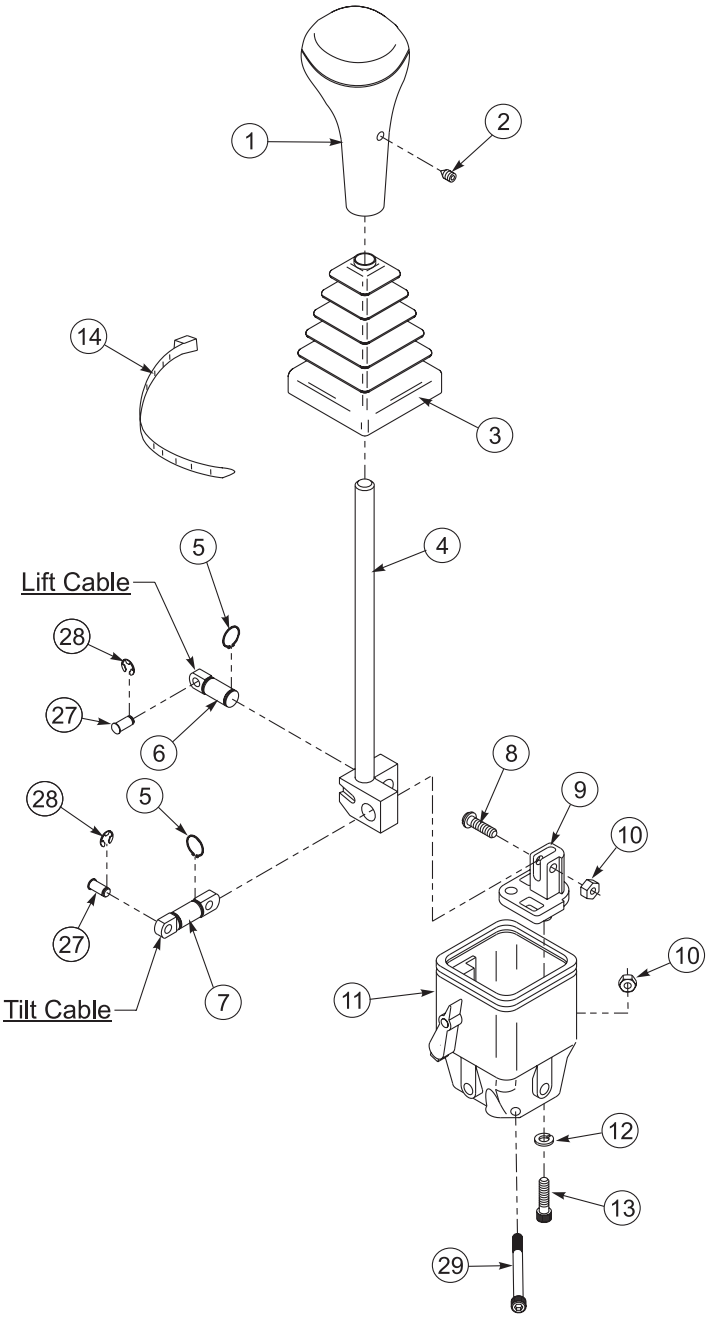


Figure 3
Joystick Control Assembly



PRINCE LVR SERVICE

Following is an outline procedure for disassembling and reassembling valve.

WARNING: *Valve has a relief setting preset at the factory. 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 6)

NOTE: *It is advisable to mark or tag all parts so they will be reinstalled in their proper position.*

1. Remove hex head cap screws (13) and detent 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.

2. 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 clamping pliers on land section of spool which is not machined for valve bore.*

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

4. Holding in on float detent sleeve (22), push in on 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.

5. 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 clamping pliers on land section of spool which is not machined for valve bore.*

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

6. Push spools in from cable end until rear spool seals (1) are exposed. Using wire hook and screwdriver, remove rear spool seals. Push spools in from rear until front spool seals (1) are exposed. Using wire hook and screwdriver, remove front spool seals.

7. 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 reassembling.

4. Reassemble all parts in reverse order of disassembly.

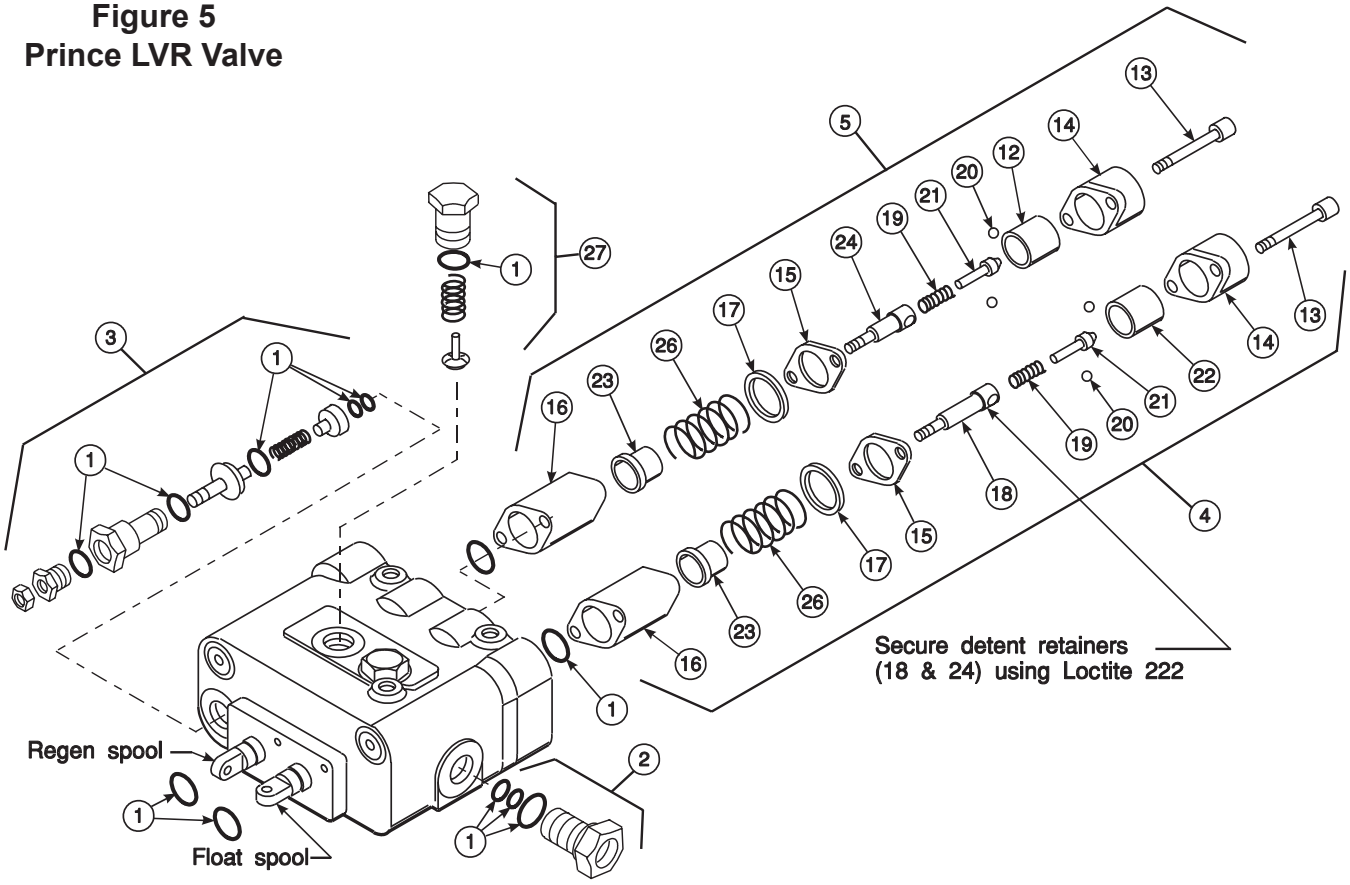
   NOTE: *Use Loctite 222 or equivalent when installing detent retainers (18 & 24).*

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.*

Figure 5
Prince LVR Valve



PARTS LIST - Prince LVR Valve

ITEM	PART NO.	DESCRIPTION	QTY.
1	43633	SEAL KIT, Valve, Prince LVR (3000 psi)	1
2	43636	POWER BEYOND SLEEVE	1
3	51813	RELIEF Valve (3000 psi)	1
4	43638	FLOAT KIT (Includes items 13,14, 15, 16, 17, 18, 19, 20, 21, 22, 23 & 26)	1
5	43639	REGEN KIT (Includes items 12, 13, 14, 15, 16, 17, 19, 20, 21, 24, & 26)	1
14	44476-6	END CAP (MFR's P/N, HC-V-AA23, stamped on end cap with valve & relief setting)	2

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

GENERAL TORQUE SPECIFICATIONS

USE THE FOLLOWING TORQUES WHEN SPECIAL TORQUES ARE NOT GIVEN

Standard American and Metric Cap Screws

AMERICAN STANDARD CAP SCREWS								
SAE Grade	5				8			
Typ. Head Markings								
Cap Screw	TORQUE				TORQUE			
Size	FT·LBS		N·m		FT·LBS		N·m	
Inches	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
1/4 - 20	6.25	7.25	8.5	10	8.25	9.5	11	13
1/4 - 28	8	9	11	12	10.5	12	14	16
5/16 - 18	14	15	19	20	18.5	20	25	27
5/16 - 24	17.5	19	23	26	23	25	31	34
3/8 - 16	26	28	35	38	35	37	47.5	50
3/8 - 24	31	34	42	46	41	45	55.5	61
7/16 - 14	41	45	55.5	61	55	60	74.5	81
7/16 - 20	51	55	69	74.5	68	75	92	102
1/2 - 13	65	72	88	97.5	86	96	116	130
1/2 - 20	76	84	103	114	102	112	138	152
9/16 - 12	95	105	129	142	127	140	172	190
9/16 - 18	111	123	150	167	148	164	200	222
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

METRIC CAP SCREWS								
Metric Class	8.8				10.9			
Typ. Head Markings								
Cap Screw	TORQUE				TORQUE			
Size	FT·LBS		N·m		FT·LBS		N·m	
Millimeters	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
M6 x 1.00	6	8	8	11	9	11	12	15
M8 x 1.25	16	20	21.5	27	23	27	31	36.5
M10 x 1.50	29	35	39	47	42	52	57	70
M12 x 1.75	52	62	70	84	75	91	102	123
M14 x 2.00	85	103	115	139	120	146	163	198
M16 x 2.50	130	158	176	214	176	216	238	293
M18 x 2.50	172	210	233	284	240	294	325	398
M20 x 2.50	247	301	335	408	343	426	465	577
M22 x 2.50	332	404	450	547	472	576	639	780
M24 x 3.00	423	517	573	700	599	732	812	992
M27 x 3.00	637	779	863	1055	898	1098	1217	1488
M30 x 3.00	872	1066	1181	1444	1224	1496	1658	2027

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 molysulphide 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_f·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