

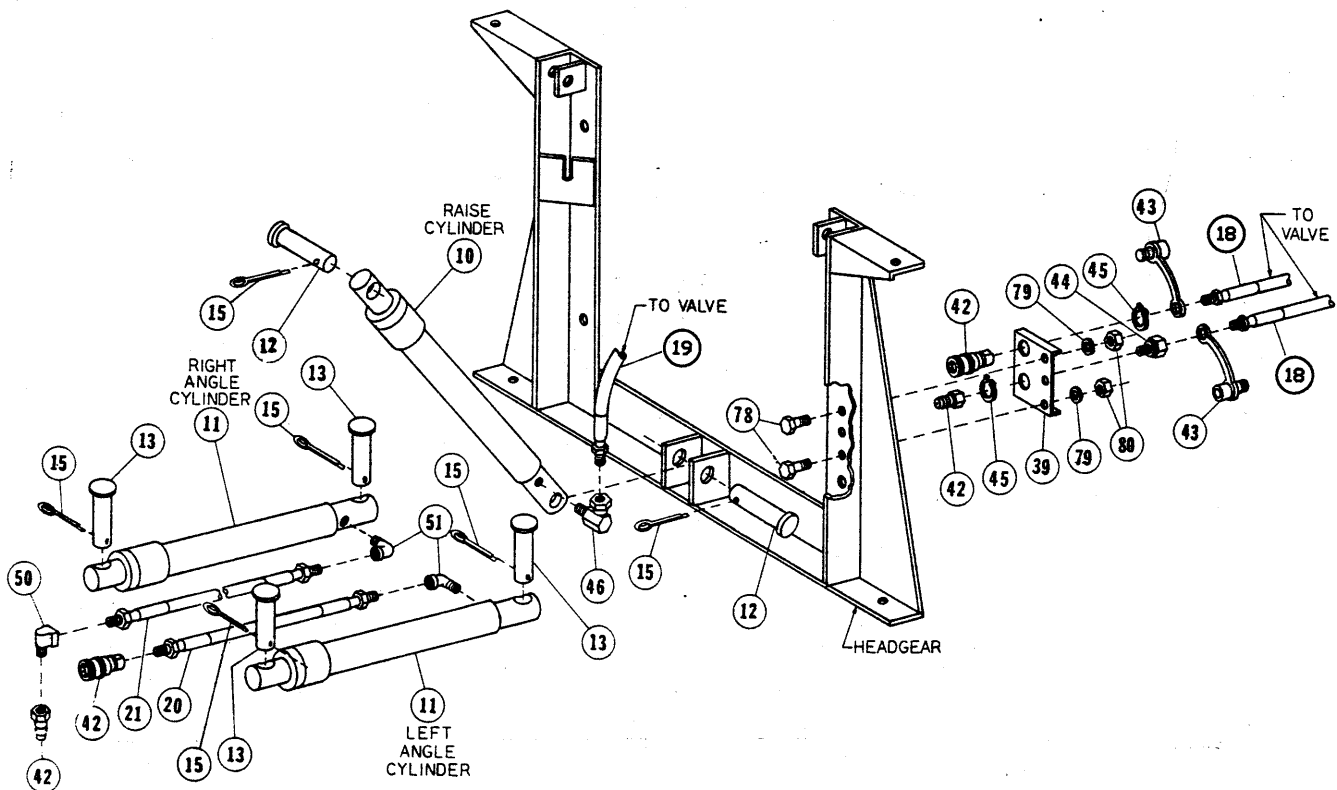
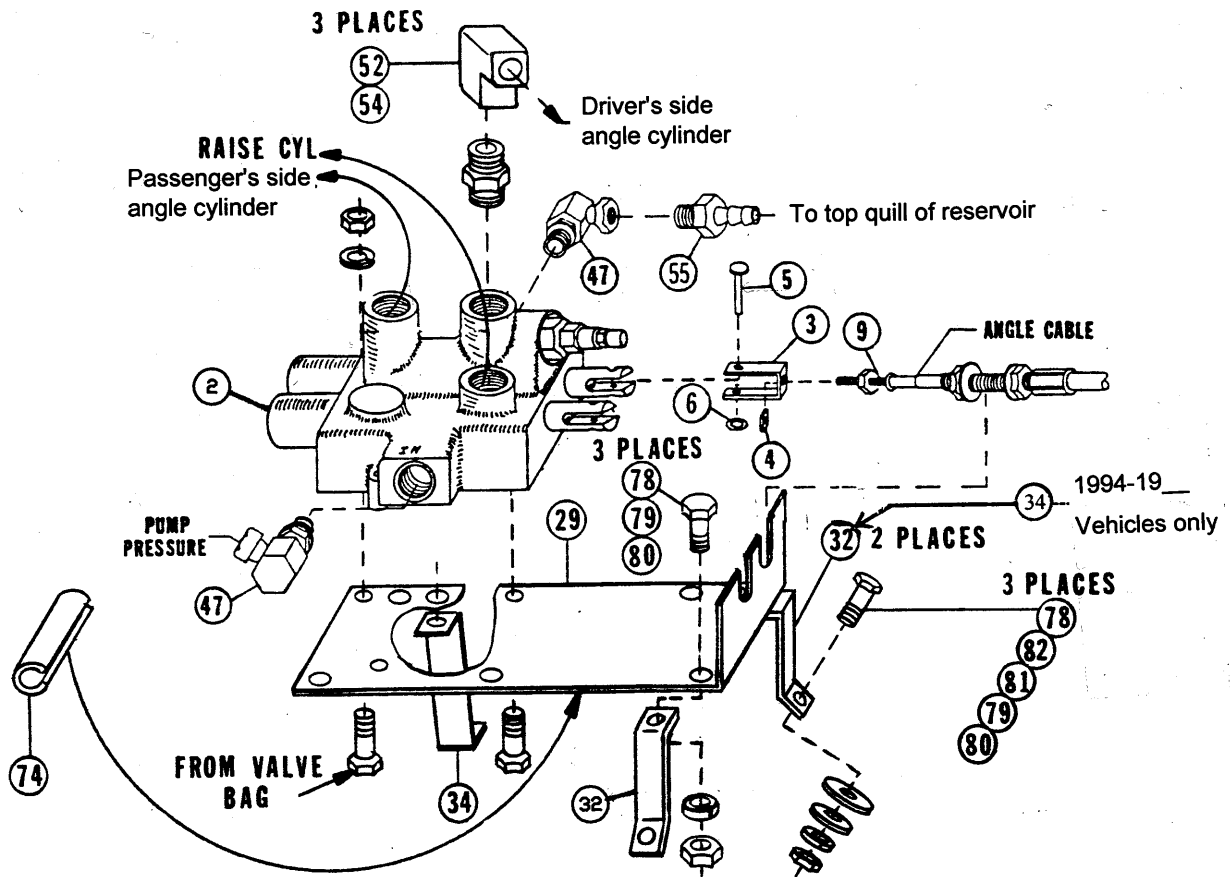
22 1987-93 (10/92 Mfg)

36 1993(11/92-19__)

FAN SPACER KIT
PN 20400; USE ON ALL
TRUCKS WITH S/C
COOLING SYSTEMS
WITH 2.2" RADIATOR

(1995-19
ONLY)

(4 PLACES)



Hydraulics Parts List

Ref #	Qty	In Kit	Part #	Description	Ref #	Qty	In Kit	Part #	Description
#	8500-40	7513C	#	* Part of 8467 Bolt Bag	#	8500-40	7513C	#	* Part of 8467 Bolt Bag
1	1		8356	Pump assembly	50	1		* 765	1/4 Npt x 90 Deg Street Elbow
2	1		A4466-40	Control Valve Assembly	51	2		2780	1/4 Npt x 90 Deg Street Elbow Frgd
3	2		4483	1" Clevis Pin - VM	52	3		* 2318	1/4 Npt x 90 Deg Union Elbow
4	2		4494	10-32 Square Nut - VM	53	1		*8476	1/4 Npt x 45 Deg Street Elbow
5	2		4491	Clevis Pin	54	3		*3058	9/16-18 O-Ring to 1/4 Npt Adpt
6	2		4493	3/16" Push Nut Zp	55	2		1658	Quill - 3/8 Nptm to 3/8 ID Hose
7	1		8389	Oil Reservoir	56				
8		1	4419	SLC Head - Belt Drive	57				
9		2	A4490	90" SLC Cable	58				
10	1		A318	1-1/2" x 10" Cylinder Assembly	59				
11	2		A3660	1-1/2" x 12" Cylinder Assembly	60				
12	2		6814	Clevis Pin - 1 x 3-5/16	61	2		*8391	Quill - 3/8 Nptm to 1/2 ID Hose
13	4		6816	Anchor Pin - 1 x 4	62				
14	1		8764	Filter Kit	63				
15	6		90601	1/4" x 1-1/2" Cotter Pin	64				
16		1	2504	Hose - 60" Hp 1/4P - 3/8P	65				
17		1	4471	3/8" Hose 26" Lp	66				
18		2	5192	Hose - 60" Hp 1/4P - 1/4P	67				
19		1	5193	Hose - 54" Hp 1/4P - 1/4P	68				
20		1	376	Hose - 32" Hp 1/4P - 1/4P	69				
21		1	4424	Hose - 36" Hp 1/4P - 1/4P	70				
22		1	*5588	Fan Spacer - 3/16"	71				
23		1	3769	34" V-Belt 4L 340 (not shown)	72		1	5704	Caution Label - Cab
24		1	5589	Drive Sheave	73		2	3042	Grommet - Rubber, Split
25		1	3696	Pump Sheave	74		1	4477	Grommet - Split Hose
26		1	8474	Pump Bracket	75		3	6	*3666 Hose Tie, nylon 3/16 x 8
27		1	8380	Pump Plate	76				
28		1	8470	Bracket (Pump)	77		1	90054	5/16 x 1-1/2 (NC) Gr. 5 CapScrew
28B		1	8515	Bracket Brace	78		4	9	*90042 5/16 x 1 (NC) Gr. 5 Cap Screw
29		1	5329	Valve Plate	79		6	8	*90360 5/16 Sp Lk Washer
30		1	8468	Splash Guard	80		7	7	*90332 5/16 (NC) Nut
31		1	8469	Brace - Splash Guard	81		4	7	*90313 5/16 Plain Washer
32		2	7965	Brace	82		3	*4433	1/2" Special Washer
33		1	8475	Brace (reservoir)	83				
34		2	7966	Brace	84		1	90614	1/4 x 1-1/4 (NC) Gr. 5 Cap Screw
35		1	8472	Tank PLate	85		1	90359	1/4 Sp Lk Washer
36		1	*8662	Adaptor, Fan	86		1	90330	1/4 (NC) Nut
37		1	20296	Spacer, Drive sheave	87		3	*90124	3/8 x 2 (NC) Gr. 5 Cap Screw
38		1	20284	Spacer, Pump Bracket	88		3	*90432	5/16-12 x 1 TS HX HD W SL ZP
39		1	4467	Disconnect Mounting Plate	89		3	*90436	3/8" x 1-3/4" (NC) Gr. 5 Nylon Insert
40		1	2549	3/8" Hose 48" Lp	90		2	*90648	7/16 x 1-3/4 (NC) Gr. 5 Cap Screw
41		1	8477	1/2" Hose 24" Lp	91		2	*90174	7/16 x 1-1/4 (NC) Gr. 5 Cap Screw
42		2	A1587	Hose Disconnect Assembly	92		2	*90362	7/16 Lock Washer
43		2	1588	Dust Plug - Closure/Male	93				
44		1	* 4486	Adaptor - Bulkhead 1/4" Npt	94		2	*90334	3/8" (NC) Nut
45		2	* 4485	Snap Ring - 7/8" External Bowed	95		4	*90638	3/8 x 5/8 (NC) NY Gr. 5 Cap Screw
46		1	319	1/4 Npt x 90 deg Swivel adt Union	96		2	*90361	3/8 SP LK Washer
47		2	2315	9/16-18 w/O-Ring x 3/8 F Pi Swivel	97		2	*90106	3/8 x 1-1/4 (NC) Gr. 5 Cap Screw
48					98		6	*90315	3/8 Plain Washer
49					99		2	*90111	3/8 x 1-1/2 (NC) Gr. 5 Cap Screw

FASTENER TORQUE (FT-LB)			
DIAMETER-- THREADS PER INCH	GRADE		
	G2	G5	G8
1/4 - 20	6	9	13
5/16 - 18	11	18	28
3/8 - 16	19	31	46
7/16 - 14	30	50	75
1/2 - 13	45	75	115
9/16 - 12	66	110	165
5/8 - 11	93	150	225
9/16 - 12	150	250	370
7/8 - 9	150	378	591
1 - 8	220	583	893

1. Cylinder & Cylinder Hose Assembly

- A. Using bench vise to hold lift cylinder (10), remove closure from port. Screw 90 degree swivel adaptor (46) into port. Place lift cylinder with installed adaptor between ears on underside of lift arm and lower gear ears. Attach cylinder to ears using two clevis pins (12) and cotter pins (15).
- B. Using bench vise to hold 32" Hp hose (20), install female half of hose disconnect assembly (42) directly to hose. Then, holding 36" Hp hose (21), install brass bar street ell (50) and male half of hose disconnect assembly (42) on the same hose end.
- C. Using bench vise to hold angle cylinders (11), remove closures from ports and screw brass forged street ells (51) into ports so that ells are parallel with cylinder and point toward live end. Install 32" Hp hose with female disconnect half to driver's side angle cylinder street ell. Install other Hp hose with male disconnect half to passenger's side angle cylinder street ell. Install angle cylinders to A-frame on their respective sides so that ells are between cylinders and "A" frame. Secure cylinders with anchor pins (13) at port and ram end. Secure anchor pins with cotter pins (15).

2. Control Head & Control Cables

Note: Dash bracket, hardware, drilling guide and mounting instructions will be found in peculiar attachments kit.

- A. Drill three 5/8" holes in the firewall for the control cables and wiring harness using drilling guide as a reference only. **Be sure both sides of the firewall are clear of obstructions before drilling.** Drill 1/2" hole in underside of dash as shown in dash illustration.
- B. Install the dash bracket as per dash bracket instructions.
- C. Loosen the "jam nuts" on control head end of cables (9) and install into slots in control head (8). (Raise cable centers in beginning of lower slot.) Snap cable ends onto ball studs and tighten jam nuts to secure cables to control head. Remove nuts and washers from the valve end of the cables. Route the cables out through the firewall up to the top of the driver side fender well. Attach control head to dash bracket as per dash bracket instructions. Install rubber grommets (73) around cables where they pass through the fire wall.

3. Valve & Valve Plate

- A. Using a bench vise to hold control valve assembly (2), remove closures from valve ports. Screw the 90 degree swivel adapter unions (47) into the "in" and "out" ports. Screw quill (55) into installed adapter in the "out" port.

Note: Valve fittings are installed as described to insure proper operation. First indication of incorrect installation is failure of plow to lift although plow will angle.

Install three 9/16" O-rings to 1/4" pipe adapters (54) in lift and angle ports. Install one 1/4" brass bar ell (52) to each adapter. When tight, ells should point at 2 o'clock, with cables referenced at 12 o'clock.

- B. Mount valve (2) to valve plate (29) using two 1/4" x 1-1/4" cap screws, lock washers and nuts located in the valve bag. Install cap screws from bottom of valve plate, with lock washer and nut on top of valve. Attach the two long valve leg braces (32) to the two holes in the cable attaching end of valve plate. (On 1994-19__ vehicles, the firewall brace will be (34)). Attach with two 5/16" x 1" cap screws Gr. 5 (NC) (78), lock washer (79) and nuts (80). Attach rear leg brace (34) to hole in rear of valve plate on "out" port side with one 5/16" x 1" cap screw Gr. 5 (NC) (78), lock washer (79) and nut (80). Attach split hose (74) to "in" port side of valve plate. For vehicles with a fan bracket assembly on fender, the bracket must be relocated as close as possible to heater motor without rubbing motor. Place valve plate and legs over smog control vacuum on passenger's side of vehicle. Position valve plate so cable bulkhead of valve plate is facing alternator, and cables can come around the front of the alternator. The vacuum can in front of heater fan will have to be relocated rearward so as not to rub against anything. Make sure valve plate braces are not rubbing or chafing and using holes in brace as a guide, mark and drill three 11/32" holes in fender. Attach with three 5/16 x 1" cap screws Gr. 5 (NC) (78), large 1/2" flat washers (82), 5/16" flat washers (81), lock washers (79) and nuts (80).

- C. Install control cables to valve plate by reinstalling jam nuts and washers on cables. Place control cables in respective slots of valve plate bulkhead with one nut and one washer on each side of bulkhead. Center cables in slots so that they are exactly in line with valve spool centers. Attach cable clevis (3) to cables using square nuts (4). Slip cable clevises over spools. Install clevis pin (5) through clevis and spool and secure with push pin (6) on clevis pin. Adjust cables so control lever is centered between both angle and raise/lower positions. If cable clevis does not allow enough adjustment, reposition cable at valve plate bulkhead. After checking to see that the valve spools are in the center position, tighten cable clevis nuts.

Caution: Valve spools must be free and self centering when cables and control head are attached. Failure to center spools will restrict fluid flow through valve. This may cause hydraulic hose failure. Hose failures can cause engine fires.

When adjusted, the control lever must be in the neutral position to allow enough spool travel each way for proper valve actuation. Use three nylon ties (75) to run cables along air intake hoses.

4. Drive Sheave Installation

- A. Remove vehicle fan by unscrewing right hand threaded hub from end of water pump shaft (it may be necessary to obtain special tools from vehicle manufacturer to remove fan). Place 3/16" spacer (22) on over threaded water pump shaft. Put loctite on threads then replace and tighten fan. Fan adaptor (36) will have to be used without spacer (22) on 11/92 manufactured 1993 and later models with larger threaded water pump hub. **NOTE: On all trucks equipped with super duty cooling systems (S/C cooling systems with 2.2" thick radiator), the fan MUST be spaced back away from the radiator using PN 20400, 'Fan Spacer Kit'. This kit is not included in the peculiar hydraulic kit and must be ordered separately.**
- B. **For 1987 - 1994 models:** Install drive sheave (24) into crankshaft pulley with machined end of pipe spacer against crankshaft pulley and over the three 3/8" tapped holes. Secure the drive sheave with (3) 3/8" x 1-3/4" (NC) Gr. 5 nylon cap screws (89) torqued to 31 ft.-lbs. **Do not use spacer washer for 1987-1994 engines.**
For 1995-19__ models: Place spacer washer (37) inside vehicle sheave and line up holes with the three 3/8" tapped holes. Place drive sheave (24) in line with the spacer holes with machined end of pipe spacers against the spacer washer. Install three 3/8" x 2" cap screws (87) (place a drop of loctite on threads). Torque these fasteners to 31 ft.-lbs.

5. Remote Pump and Pump Bracket

- A. Remove two bolts below air conditioner beside oil pan cover (no bolts on vehicles without air conditioner). Remove bottom and forwardmost bolt on air conditioner. Save bolts. (Also do same to bracket frame on vehicles without air conditioner). Attach pump bracket brace (28) to air conditioner. (Use pump bracket brace (28B) on vehicle without air conditioner.) Reattach bolt. If bolt on air conditioner or bracket frame is too large, ream out 7/16" hole in brace (28 or 28B) before reinstalling. Fasten pump bracket tab to brace with one 5/16" x 1" (NC) GR. 5 cap screw (78), 5/16 flat washer (81), lock washer (79) and nut (80). Place pump bracket (26) up against engine bracket. Use two 7/16" x 1-3/4" cap screws (90) and lock washers (92) to fasten bracket (on 1994-19__ vehicles use 7/16" x 1-1/4" cap screws (91).
- B. Place pump (1) in vise with relief quill up. Install a 3/8" x 26" low pressure hose (17) onto quill. Install a 1/2" quill (61) into 3/8" Npt on rear of pump and attach a 1/2" x 24" low pressure hose (41). Install a 1/4" x 45 degree street elbow (53) into 1/4" Npt hole at rear of pump. Place elbow at 10 o'clock position from relief quill on top of pump and to it attach 60" Hp 1/4" to 3/8" hose (16). Attach pump face plate (27) so that slots on plate are at 9 o'clock to relief quill (see illustration). Use four 3/8" x 5/8" (NC) Gr. 5 nylon patched cap screws (95) with flat washers (98) to attach pump face plate. Install pump sheave (25) onto pump shaft using lock nut and key supplied with pump.
- C. From bottom of engine, place 1/2" Lp hose and Hp hose up behind power steering pump and air conditioner. Place 3/8" Lp hose in front of power steering pump and air conditioner. Place 3/8" Lp hose in front of brace on pump bracket and up beside air conditioner. Attach pump plate (27) to front of pump bracket with two 3/8" x 1-1/4" (NC) Gr. 5 cap screws (97), flat washers (98), lock washers (96) and nuts (94). Do not fully tighten at this time. **(For 1995-19__ models: When attaching pump plate to pump bracket, align pump bracket spacer (38) between pump bracket and pump plate and fasten with two 3/8" x 1-1/2" cap screws (99), flat washers (98), lock washers (96) and nuts (94).)** Install 34" V-belt (23) over drive sheave and pump sheave. Tighten belt and pump plate fasteners. Place split hose grommet (74) around 3/8" low pressure hose and tie wrap (75) around pump bracket brace going to air conditioner. Line up three holes on splash guard (30) to lip on radiator. Using holes in plate as a guide, drill three 9/32" holes. Install three 5/16" x 1" hex head self tapping screws (88). Tighten. Remove bolt holding tubing in front of engine cross member.

Place bent end of splash guard brace (31) behind tubing and reinstall bolt. Attach tab to splash guard with one 5/16" x 1" (NC) Gr. 5 cap screw (78), lock washer (79) and nut (80).

6. Oil Reservoir

Caution: Pump tank fill must be vertical to engine.

- A. Remove engine mount bolt under steering columns. Install brace (33) and reinstall bolt (see illustration). Place tank plate (35) over brace and fender. Fasten plate to brace with one 5/16" x 1" cap screw (78), lock washer (79) and nut (80). Using plate as a guide, drill two 1 1/32" holes in fender. Install one 5/16" x 1" (NC) Gr. 5 cap screw (78) through forward hole and fasten with one 5/16" flat washer (81), lock washer (79) and nut (80). On rear hole use a 5/16" x 1-1/2" (NC) Gr. 5 cap screw (77), five 5/16" flat washers (81) between plate and fender to level, then fasten cap screw with one 5/16" flat washer (81), lock washer (79) and nut (80). Tighten all fasteners. Relocate oil reservoir as per illustration on front page for vehicles with standard transmission.
- B. Install 1/2" quill (61) into threaded hole on oil reservoir (7). Place reservoir with quills facing the back of the power steering pump. Attach to plate with two 5/16" x 1" (NC) Gr. 5 cap screw (78), lock washers (79) and nuts (80). Attach 3/8" low pressure (17) hose to bottom quill of tank from relief on pump. Attach 1/2" low pressure hose(41) to quill (61) on reservoir. **DO NOT SHORTEN HOSE. BENDS IN ALL HOSES MUST HAVE SUFFICIENT RADIUS TO PREVENT CRIMPING.**

Caution: Keep hoses away from hot or moving engine components. Failure to do so may cause hose to burst resulting in a possible fire.

- C. Attach 3/8" x 48" low pressure hose (40) to quill on reservoir. Route low pressure hose(40) over top of engine to "out" port on valve. Route high pressure hose (16) from pump to "in" port. Tie hoses (75) but allow good bends - no crimps - in hoses.

7. Hydraulic Hose Installation

- A. Install 54" Hp hose (19) to brass ell in lift cylinder port of valve (Spool #1). Install two 60" hoses (18) to brass ells in angle ports of valve (Spool #2). Hoses may now be routed out between radiator and radiator web, then through the grille near the center of vehicle. Tie these hoses to valve inlet Hp hose to keep all hoses from rubbing battery.
- B. Install the in-line oil filter (14) as per instructions located in the common hydraulics kit.

8. Disconnect Assembly

- A. With disconnect mounting plate (39) held in bench vise, install disconnect halves as shown in illustration. Bulkhead adaptor (44) and male disconnect half (42) go in bottom hole. Female disconnect half (42) goes in top hole. Secure both with 7/8" snap rings (45). Attach mounting plate to back of driver's side headgear post with two 5/16" x 1" cap screws (78), lock washers (79) and nuts (80). Install dust plugs (43) over ends of hoses routed to front of vehicle in the previous step. Connect 60" right angle hose (Spool #2, cyl B) to back of female disconnect installed in top of disconnect bracket. Connect 60" left angle hose (Spool #2, Cyl. A) to bottom (male) disconnect. Tighten by holding hose and rotating the disconnect halves in the bracket.

9. Operations

- A. Check all fittings and fasteners for tightness. Secure hoses with nylon tie wraps (75). Place caution label (72) on the dash beside the control head.
- B. Fill reservoir with type "A" automatic transmission fluid. Start the engine, lift and angle the blade. **If the blade angles opposite from the control lever position, reverse the two Hp hose connections on the back of the disconnect bracket.** Raise the front end of the vehicle until the plow is clear of the ground with the lift cylinder fully retracted. Check the reservoir oil level. Angle the blade (with the lift cylinder retracted) to remove air from the system. Recheck the reservoir oil level.

Note: The installer must inform the end user of the proper procedure for removing any residual hydraulic pressure that may be trapped in the raise or angle hoses. The plow will be much easier to install or remove if the proper procedures are followed. Before coupling or uncoupling the hydraulic disconnects you must first turn off the ignition. Move the control to all four plowing positions and return the control to lower. You may then remove or install the plow.