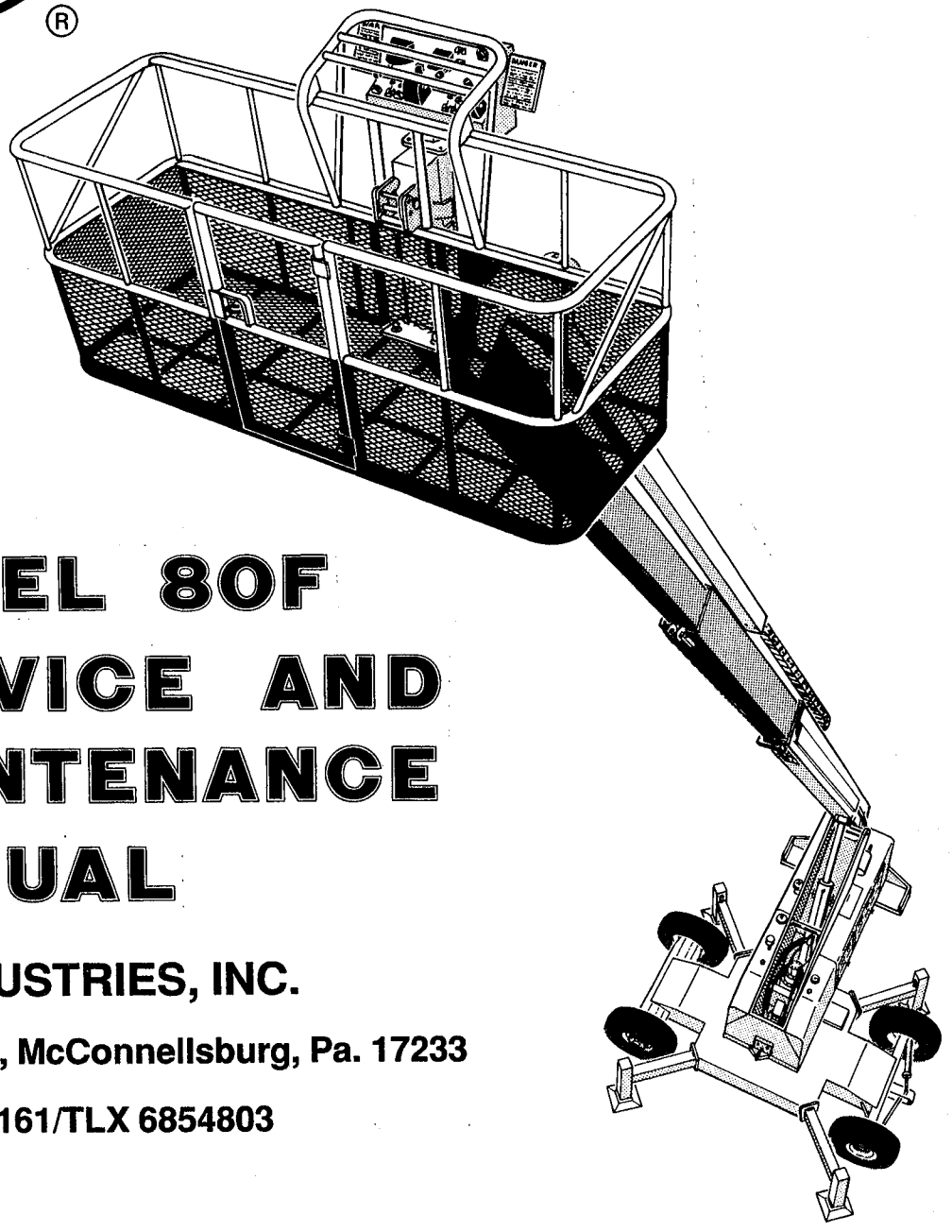
JLG Lift®



MODEL 80F SERVICE AND MAINTENANCE MANUAL

JLG INDUSTRIES, INC.

JLG DRIVE, McConnellsburg, Pa. 17233

(717) 485-5161/TLX 6854803

15 December 1981 3120107 Printed in U.S.A.

TECHNICAL TERMS AND ABBREVIATIONS

The following technical terms and abbreviations appear in this manual. Their respective definitions and meanings are provided for personnel unfamiliar with the type of equipment and associated systems.

Adj.	Adjusting
Amp.	Ampere
Assy.	Assembly
Boom	The telescoping arm pivot-mounted to the revolving turn-table.
Boom angle	The angle above and below horizontal, related to the longitudinal axis of the boom assembly.
CG	Center of Gravity
Chassis	The traveling base upon which the turntable and boom assembly are mounted.
Counterweight	Additional "add on" weight used to supplement the basic weight of the machine in order to provide stability for working loads.
Cowl	Shrouds and/or panels covering engine
Creep	Gravity movement of cylinders motors, etc. in static condition.
Cu. Ft.	Cubic Feet
Cyl.	Cylinder
Dc	Direct current
Deg.	Degrees
Dia.	Diameter
Double acting	A cylinder in which hydraulic fluid is applied to control movement in both directions (extend and retract).
Drift	See "creep"
Ft.	Foot/feet
Gpm	Gallons per Minute
Gr.	Grade
Hd.	Head
I.D.	Inside Diameter
I.E.	That is
In.	Inch/Inches
Lg.	Long
Lbs.	Pounds
Modification	Any change to the machine's hydraulic electrical, mechanical, or structural systems or components, which alters the original design and/or operation as assembled by the manufacturer.
Mph	Miles per hour
Mtg.	Mounting
N/A	Not Applicable
O.D.	Outside Diameter
Pilot-operated	Actuated (operated) by circuit pressure
Psi	Pounds per square inch
Reser.	Reservoir
Rpm	Revolutions per minute
Stability	The ability of the machine to resist tipping.
Std.	Standard
Str.	Straight
Superstructure	See turntable
Swing	The revolving action of the turntable and platform assemblies.
Swing bearing	An anti-friction bearing providing the roational capability for the turntable and boom assembly. Also the connecting component between the turntable and frame assembly.
Swing pinion	The splined, external gear, driven by the speed reducer, which meshes with the external gear of the swing bearing to provide swing motion.
Thd.	Thread
Thk.	Thick
Turntable	The rotating structure and associated components attached to the chassis by the swing bearing.
Turntable lock	A manual pin-type locking device which, when engaged, prevents the turntable from rotating.
U.S.	United States

b. The system also incorporates a series of switches and relays to allow certain functions to operate depending on the axle position. When the axles are retracted the electrical signal from the **LIFT** controller or switch passes through the selector relay, to the axles latch relay, and the horizontal relay, to the lift valve solenoid. This permits the **LIFT** function to raise the boom to horizontal, at which point the normally closed circuit is opened by the horizontal cutout limit switch. With the axles retracted, the boom can be extended approximately eight feet before the telescope limit switch opens the normally closed circuit and stops the boom extension. When the axles are fully extended the electrical signal from the **LIFT** controller or switch to the axles latch relay is not dependent on the horizontal relay. This allows the **LIFT** to function both above and below horizontal. With the axles fully extended the boom may be fully extended because the circuit is completed through the axle latch relay. It should be noted that **LIFT** down is capable in any axle mode.

2-20. TURNTABLE SWING SYSTEM OPERATION.

In operation, oil flow metered by control lever and valve spool position, is supplied to the hydraulic motor and brake, releasing the brake and driving the motor in the selected direction. The hydraulic motor propels the drive hub, which in turn drives the pinion gear at reduced speed. The pinion gear meshing with the swing bearing outer race ring gear is the method whereby turntable rotation is achieved. Returning the control lever to neutral diverts oil flow from the circuit. With no pressure applied to release the brake spring, the brake is engaged, terminating the swing function. The hydraulic oil rotary coupling, located in the center of the swing bearing, is included as part of the swing system and permits oil flow to the chassis mounted hydraulic components (Drive and Steer functions), from the turntable mounted control valves. The collector ring assembly, located on top of the rotary coupling, supplies electrical power from the turntable to the applicable electric components installed on the machine chassis. A two-position, manual, turntable lock is also provided.

2-21. BOOM ELEVATION SYSTEM.

a. The boom elevation system consists of a double-acting hydraulic cylinder, a proportional control valve, a three-position control switch, a proportional control lever, a horizontal cutout limit switch and a manual descent valve. The cylinder, mounted between the turntable side plates, is anchored to the turntable deck at the base, with the rod end anchored to the underside of the boom base section. The control valve is installed on the turntable as part of the Drive, Swing and Telescope valve bank assembly. Operating controls are located on the Ground Control Panel and on the Platform Control Console, providing independent operation of the system. A horizontal cutout limit switch is installed on the turntable back plate and electrically stops the operator from raising the boom above horizontal until the outriggers are set or the extendable axles are fully extended. Auxiliary descent valves are incorporated in the lift and telescope cylinder circuits and are installed on the turntable. When actuated, valve number one opens and relieves pressure from the lift cylinder (piston side) directing pressure to the rod side of the telescope cylinder (static condition). Valve number two releases pressure from the telescoping cylinder allowing the boom to retract and lower at the same time. If the boom will not lower fully, valve number three should be opened to by-pass the telescope cylinder and release lift cylinder pressure directly to the hydraulic tank.

WARNING

AUXILIARY MANUAL DESCENT CONTROL INSTRUCTIONS MUST BE STRICTLY ADHERED TO AND FOLLOWED IN EXACT SEQUENCE.

Note

Close all valves before resuming normal operations.

b. During normal operation, a holding valve functions to retain the boom at the desired elevation (controls in neutral) and also prevents the boom from dropping, should a hydraulic line rupture or a leak occur in the system.

2-22. CAPACITY INDICATOR. (See Figure 2-3.)

WARNING

NEVER EXCEED THE MAXIMUM CAPACITY READING.

a. A capacity indicator is installed on the boom assembly in view of the operator. This indicates to the user the maximum allowable load in accordance with the boom elevation angle and extension of the boom. The color coded decal on the capacity indicator housing and the color tape on the fly boom are color coordinated to ensure correct and easy reading. A pendulum indicator pointer, mounted to the capacity indicator housing, indicates boom angle (left edge of color code decal) and the maximum allowable load for that angle and extension of the boom. The user must ensure that the pointer reading on the color code decal and the appropriate color tape on the fly boom are in agreement to determine load limit.

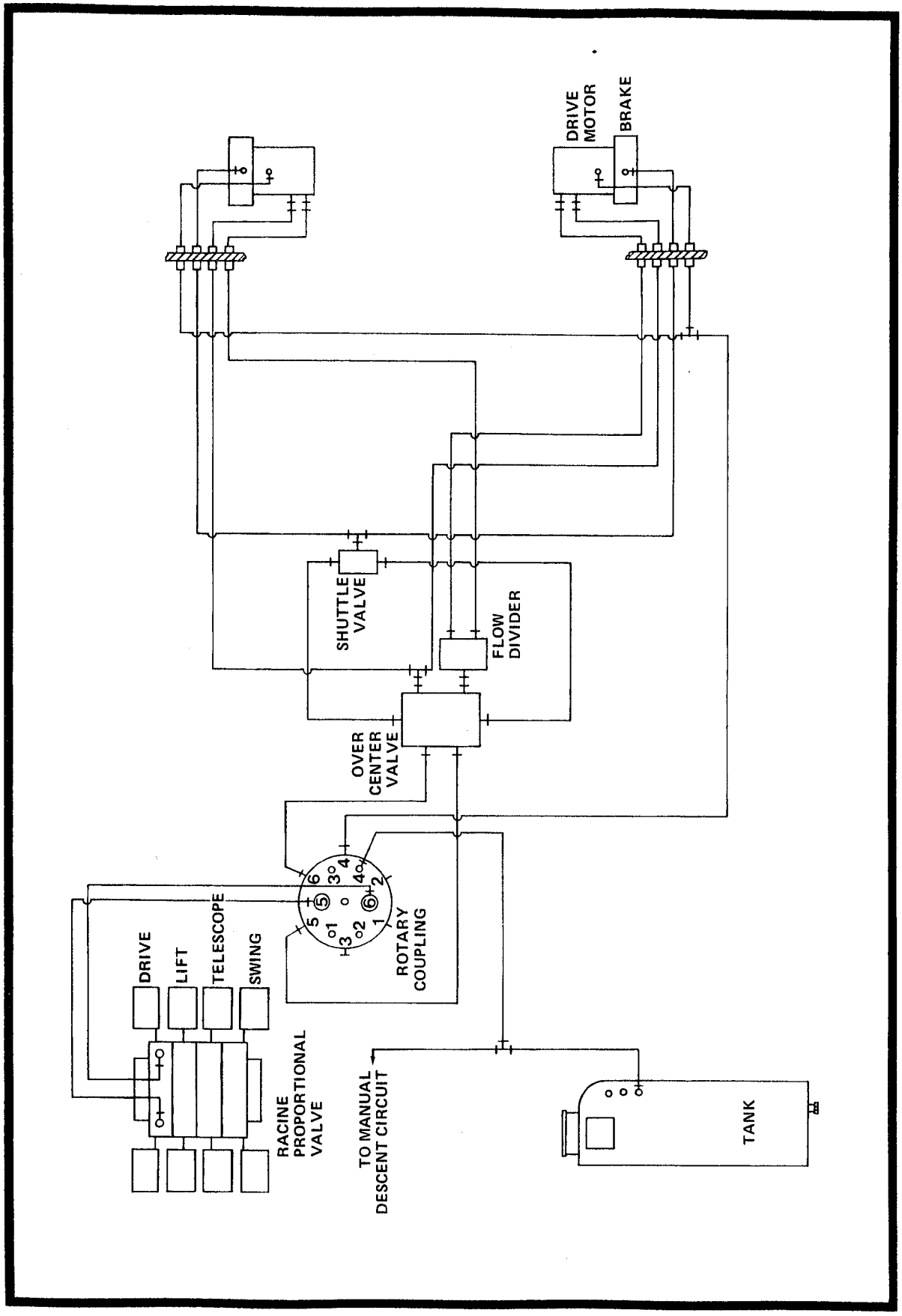


Figure 2-9. Hydraulic Drive Circuit (Extending Axle).

Table 3-1. Platform Assembly Preventive Maintenance Checks and Services.

ITEM NO.	INTERVAL IN HOURS	ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED, REPLACED, AND/OR ADJUSTED AS NECESSARY.
1		Platform Console	
	10		A. Inspect and ensure that control handles are not damaged and operate properly. Repair or replace as necessary.
	10		B. Inspect switches for damage and proper operation. Repair or replace as necessry.
	10		C. Inspect footswitch and connections for damage. Replace or repair as necessary. Ensure switch is free of obstructions.
	50		D. Ensure that lamp(s) functions properly. Repair or replace as necessary (if applicable).
2		Platform Assembly	
	10		A. Ensure all placards are in place and legible. Replace if defaced or missing.
	10		B. Ensure safety belts are not damaged. Replace if damaged.
	10		C. Inspect hydraulic rotator for damage and security. Repair or replace as necessary.
	50		D. Inspect for damaged and missing quick connect pins. Repair or replace as necessary. Ensure pins are properly installed.
	50		E. Inspect hydraulic lines for leaks, damage and security. Repair or replace as necessary.
	50		F. Inspect electrical wiring for damage and proper connections. Repair or replace as necessary.
	100		G. Ensure that access gate operates and latches properly. Repair or replace as necessary.
	100		H. Inspect attaching hardware for loose or missing parts. Replace or adjust as necessary.

3-8 HYDRAULIC SYSTEM CHECKS.

a. This section provides the necessary maintenance checks and services for the hydraulic systems. It should be remembered that time intervals may vary because of climate and conditions, also the list should not be considered all inclusive. Refer to Table 3-6 for the procedures and suggested sequence.

b. Always ensure that applicable safety precautions are strictly observed. While performing the hydraulic system checks and services make certain that damaged items, or those in need of adjustment, are corrected before operation.

Table 4-2. Boom Assembly Troubleshooting.

TROUBLESHOOTING CHART

TROUBLE	PROBABLE CAUSE	REMEDY
Telescope System.		
No response to control.	Circuit breaker open.	Determine and correct cause; reset circuit breaker.
	Hydraulic system oil low.	Replenish oil as necessary.
	Damaged wiring on control switch or solenoid valve.	Repair or replace valve.
	Control valve not functioning properly.	Repair or replace valve.
	Control switch not functioning properly.	Replace switch.
	Restricted or broken hydraulic line or fitting.	Clean, repair or replace line or fitting.
	Telescope cylinder not functioning properly.	Repair or replace cylinder.
Boom extends and retracts erratically.	Hydraulic system oil low.	Replenish oil as necessary.
	Wear pads not adjusted or worn.	Adjust or replace pads as required.
	Control switch not functioning properly.	Replace switch.
	Restricted or broken hydraulic line or fitting.	Clean, repair or replace line or fitting.
	Control valve not functioning properly.	Repair or replace valve.
	Worn seals in telescope cylinder.	Replace seals.
	Cylinder not functioning properly.	Repair or replace cylinder.
	Distorted boom section(s).	Replace distorted section(s).
Boom will not extend more then 8 feet.	Axles or outriggers not extended or set.	Ensure axles or outriggers extended or set.
	Boom limit switch not functioning properly or broken.	Repair or replace limit switch.
Fly section inoperative.	Broken drive chain.	Repair or replace chain.
	Broken drive sprocket or bent sprocket shaft.	Replace shaft assembly.

Table 4-4. Chassis Assembly Troubleshooting.

TROUBLESHOOTING CHART

TROUBLE	PROBABLE CAUSE	REMEDY
Slow or erratic response to control.	Hydraulic system oil low.	Replenish as necessary.
	Damaged cylinder.	Repair or replace as necessary.
	Damaged control valve linkage.	Repair or replace as necessary.
	Restricted or leaking hydraulic lines.	Clean or replace lines.
	Damaged rotary coupling.	Replace o-rings or coupling.
	Damaged hydraulic pump.	Repair or replace pump.
	Damaged cylinder seals.	Replace all seals.
Cylinder extends while traveling.	Defective cylinder piston.	Replace piston and seals.
	Piston loose on rod.	Retorque piston locknut and replace seals.
	Scored cylinder barrel.	Repair or replace cylinder.
Cylinder retracts under load.	Damaged piston seal.	Replace piston seal.
	Scored cylinder barrel.	Replace cylinder.
	Damaged holding valve seals.	Replace seals.
	Damaged holding valve.	Replace valve assembly.
Extending Axle System.		
No response to control.	STEER/AXLE selector in the STEER position.	Actuate control to AXLE position.
	Hydraulic system oil low.	Replenish as necessary.
	Restricted or broken supply line.	Clean or replace line.
	Inoperative control valve.	Replace valve.
	Inoperative hydraulic pump.	Repair or replace pump.

SIZE		BOLT DIAMETER D (IN.)	TENSILE STRESS AREA (SQ. IN.)	SAE GRADE 5 BOLTS			SAE GRADE 8 BOLTS			RECOMMENDED TORQUE WRENCH SIZE (PRODUCTION)		
				CLAMP LOAD P (LB.)	TIGHTENING DRY K = 0.20	TORQUE LUB. K = 0.15	CLAMP LOAD P (LB.)	TIGHTENING DRY K = 0.20	TORQUE LUB. K = 0.15	IN-OZS.	IN-LBS.	FT-LBS.
					LB. IN.	LB. IN.		LB. IN.	LB. IN.			
4	40	0.1120	0.00604	380	8	6	540	12	9	160	10	
	48	0.1120	0.00661	420	9	7	600	13	10	160	10	
6	32	0.1380	0.00909	580	16	12	820	23	17		25	
	40	0.1380	0.01015	610	18	13	920	25	19		25	
8	32	0.1640	0.01400	900	30	22	1260	41	31		25	
	36	0.1640	0.01474	940	31	23	1320	43	32		25	
10	24	0.1900	0.01750	1120	43	32	1580	60	45		50	
	32	0.1900	0.02000	1285	49	36	1800	68	51		50	
1/4	20	0.2500	0.0318	2020	96	75	2860	144	108		100	
	28	0.2500	0.0364	2320	120	86	3280	168	120		200	
					LB. FT.	LB. FT.		LB. FT.	LB. FT.			
5/16	18	0.3125	0.0524	3340	17	13	4720	25	18		200	
	24	0.3125	0.0580	3700	19	14	5220	25	20		200	
3/8	16	0.3750	0.0775	4940	30	23	7000	45	35		300	25
	24	0.3750	0.0878	5600	35	25	7900	50	35		300	50
7/16	14	0.4375	0.1063	6800	50	35	9550	70	55		600	50
	20	0.4375	0.1187	7550	55	40	10700	80	60		600	50
1/2	13	0.5000	0.1419	9050	75	55	12750	110	80		1200	100
	20	0.5000	0.1599	10700	90	65	14400	120	90		1200	100
9/16	12	0.5625	0.1820	11600	110	80	16400	150	110		1200	100
	18	0.5625	0.2030	12950	120	90	18250	170	130		1200	100
5/8	11	0.6250	0.2260	14400	150	110	20350	220	170		1800	150
	18	0.6250	0.2560	16300	170	130	23000	240	180		1800	150
3/4	10	0.7500	0.3340	21300	260	200	30100	380	280		2400	200
	16	0.7500	0.3730	23800	300	220	33600	420	320		2400	200
7/8	9	0.8750	0.4620	29400	430	320	41600	600	460		3600	300
	14	0.8750	0.5090	32400	470	350	45800	660	500		3600	300
1	8	1.0000	0.6060	38600	640	480	51500	900	680		7200	600
	12	1.0000	0.6630	42200	700	530	59700	1000	740		7200	600
1 1/8	7	1.1250	0.7630	42300	800	600	68700	1280	960		7200	600
	12	1.1250	0.8560	47500	880	660	77000	1440	1080		7200	600
1 1/4	7	1.2500	0.9690	53800	1120	840	87200	1820	1360			Mult*
	12	1.2500	1.0730	59600	1240	920	96600	2000	1500			Mult*
1 3/8	6	1.3750	1.1550	64100	1460	1100	104000	2380	1780			
	12	1.3750	1.3150	73000	1680	1260	118100	2720	2040			
1 1/2	6	1.5000	1.4050	78000	1940	1460	126500	3160	2360			Mult*
	12	1.5000	1.5800	87700	2200	1640	142200	3560	2660			Mult*

NOTE: Tensile strength for bolt size 4 to 1 - 120,000 (min. psi), size 1 1/8 to 1 1/2 - 105,000 (min. psi).
*Torque multiplier. Torque specifications are usually given in foot-pounds - - - - lower ranges in inch-pounds or inch-ounces.


Grade 5


Grade 8

Figure 5-1. Torque Application Chart.

5-10. TELESCOPE CYLINDER.

a. Removal.

(1). Activate the machine hydraulic system and fully retract boom.

(2). Remove the cover plate on the forward section of the base boom and check to see that the access holes in the three boom sections are aligned with the telescope cylinder rod-end to telescope cylinder box attach pin. Adjust as necessary to achieve alignment.

(3). Remove forward hose and cable shield from the side of the base boom by removing the self-tapping screws and lifting from boom.

(4). Activate the hydraulic system from the ground controls and elevate the boom to horizontal; shut down the machine and adhere to all applicable safety precautions.

WARNING

PROVIDE ADEQUATE SUPPORT SLING AND/OR BLOCKING FOR BOOM SUPPORT BEFORE BEGINNING ANY REMOVAL PROCEDURES.

(5). Remove the self-tapping screws which attach the boom end cap to the aft end of the base boom section.

CAUTION

HYDRAULIC LINES AND PORTS SHOULD BE CAPPED IMMEDIATELY AFTER DISCONNECTING LINES TO AVOID THE ENTRY OF CONTAMINANTS INTO THE SYSTEM.

(6). Tag and disconnect the hydraulic lines to the telescope cylinder. Use a suitable container to retain any residual hydraulic fluid. Immediately cap lines and ports.

(7). Remove the bolt, lockwasher and flatwasher securing the telescope cylinder rod-end attach pin. Using a suitable drift remove the attach pin from the cylinder and cylinder box.

(8). Using a suitable scribe or punch mark one end of the telescope cylinder base-end attach pin and the base boom section to aid in installation of the pin.

(9). Remove the setscrews securing the telescope cylinder base-end attach pin to the base boom.

(10). Using a suitable brass drift, remove the attach pin from the base of the cylinder and the base boom.

(11). Attach a suitable lifting device and sling to the telescope cylinder and pull the cylinder partially from the rear of the boom. Move the lifting device and sling to the approximate center of gravity of the cylinder; remove the cylinder and place it on a suitable trestle or workstand.

(12). For complete disassembly of telescope cylinder refer to Section 6.

b. Installation.

(1). Using a suitable lifting device and sling attached around the telescope cylinder at the approximate center of gravity, lift the cylinder to the rear of the base boom section.

(2). Carefully maneuver the cylinder into the boom; align the rod-end attach hole with the telescope cylinder attach holes in the cylinder box. Install the attach pin and secure in place with the flatwasher, lockwasher and bolt.

(3). Align the base-end attach hole of the cylinder with the telescope cylinder attach holes in the base boom section (If necessary use an auxiliary hydraulic power source to extend or retract the telescope cylinder for proper alignment). Install the attach pin, aligning the scribed marks on the pin and base boom to ensure proper positioning of the set screw bores, through the boom and cylinder; apply Nylock to the setscrew threads and install, securing the pin in place.

(4). Connect the hydraulic lines to the telescope cylinder; ensure that lines are properly connected as tagged prior to removal.

(5). Position the boom end cap on the aft end of the base boom section and install the self-tapping screws.

(6). Remove blocking from the boom and/or slowly release the sling from the boom.

WARNING

ENSURE AREAS IN FRONT OF AND BEHIND OF BOOM EXTENSION PATH ARE CLEAR OF ALL OBSTACLES BEFORE EXTENDING BOOM.

5-13. ENGINE.

a. Removal.

(1). Place the aerial platform into the stowed position and adhere to all applicable safety precautions. Disconnect the battery cables.

WARNING

DO NOT REMOVE THE RADIATOR FILLER CAP UNTIL THE ENGINE COOLANT TEMPERATURE HAS LOWERED SUFFICIENTLY TO AVOID THE POSSIBILITY OF SCALDING.

(2). If applicable, remove the radiator filler cap and, using a suitable container to retain the coolant, open the radiator drain tap. Close drain tap and install filler cap when coolant has drained.

(3). Remove attaching hardware securing the exhaust muffler to the hood assembly.

(4). Loosen the muffler U-clamps; remove the muffler.

(5). Using a suitable wrench remove exhaust manifold pipe from exhaust manifold.

(6). Remove bolts, washers and nuts securing hood to turntable on the forward portion of the hood.

(7). Remove bolts, washers and nuts securing hood to hood extension assemblies.

(8). Using suitable lifting equipment, remove hood assembly.

(9). Remove bolts, washers, and nuts securing hood extension assemblies to gas and oil tanks. Remove extension assemblies.

(10). Remove bolts and washers securing hydraulic pump to adapter; remove hydraulic pump from adapter.

(11). Tag and disconnect all applicable electrical leads and securing devices from the motor to facilitate removal.

(12). Disconnect fuel line from engine and cap immediately. Wipe up any spilled fuel.

(13). If applicable, loosen hose clamps around upper and lower radiator hoses; remove hoses.

(14). If applicable, remove capscrews securing radiator; remove radiator.

(15). Using suitable lifting equipment, adequately support engine assembly.

(16). Remove the shock mount hex head cap screws; motor mounts, tubes, washers and nuts.

(17). Using the lifting equipment, raise the engine assembly until the engine clears the turntable.

(18). Carefully move the complete assembly and place unit on a suitable work stand or bench.

(19). Inspect all items and repair or replace as necessary.

b. Installation.

(1). Attach a suitable lifting device to the engine; raise the assembly and position and secure in place with capscrews, motor mounts, tubes, washers and nuts.

(2). If applicable, install radiator and secure with capscrews.

(3). If applicable, install upper and lower radiator hoses; secure with clamps.

(4). Connect fuel line to engine.

(5). Connect all electrical leads and securing devices to the motor, ensuring leads are connected as tagged at removal.

(6). Align hydraulic pump with adapter; secure pump with bolts and washers.

(7). Position hood extension on the turntable; install bolts, washers and nuts securing hood extensions to gas and oil tank assemblies and turntable.

(8). Using suitable lifting equipment, position hood onto the turntable.

(9). Install bolts, washers and nuts securing hood to the turntable and to hood extensions.

(10). Using a suitable wrench, install exhaust manifold pipe to exhaust manifold.

(11). Install muffler onto pipe and secure with U-clamp.

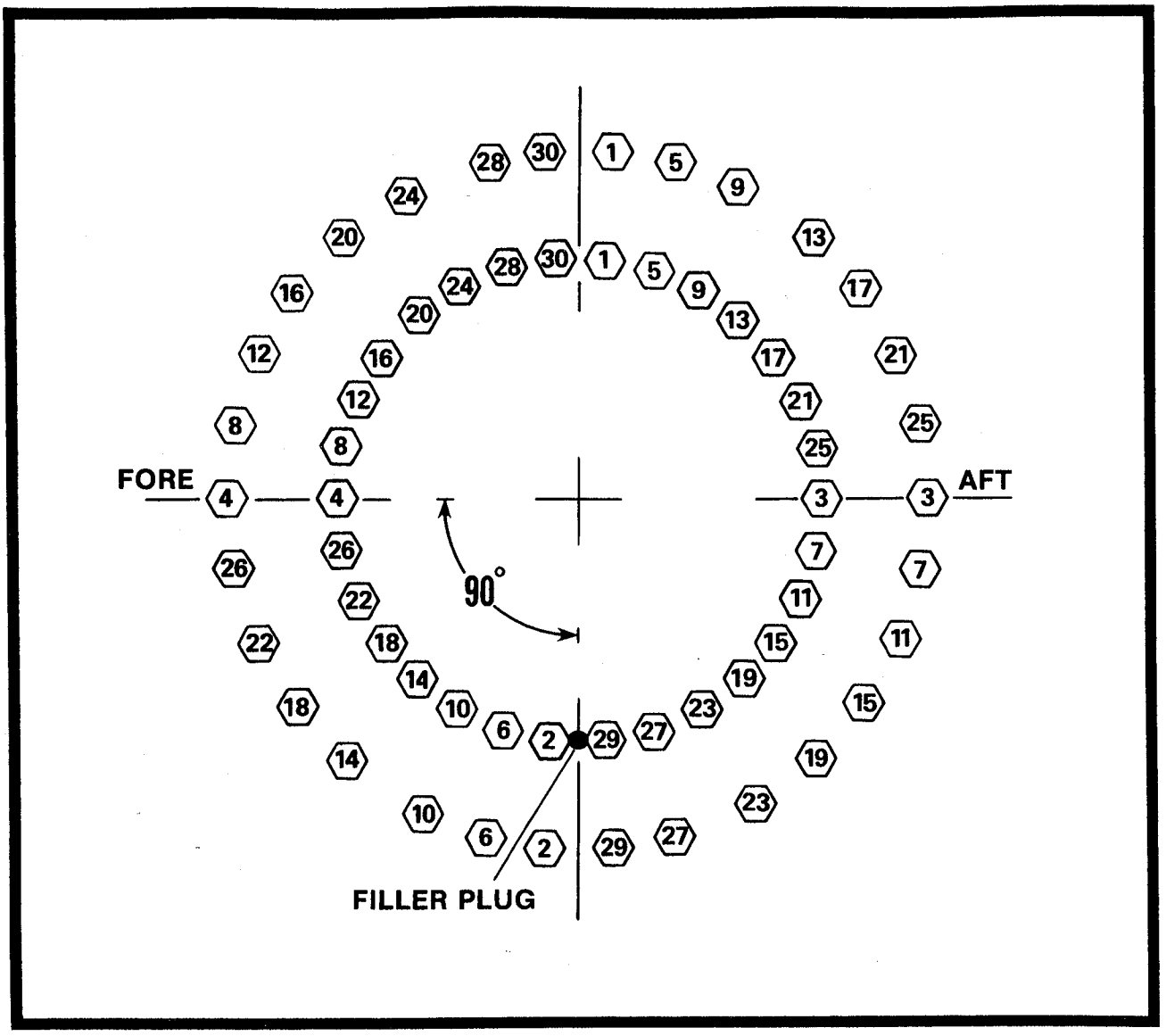
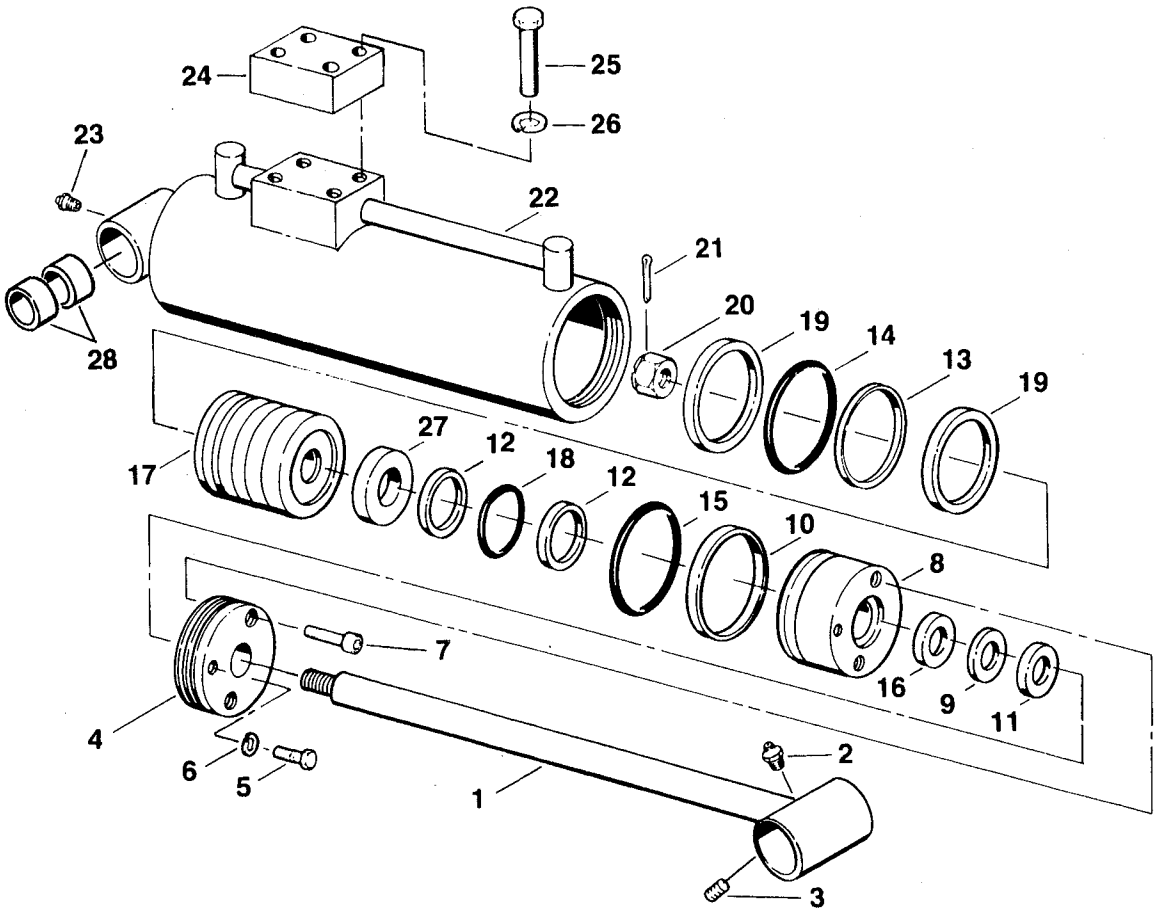


Figure 5-5. Swing Bearing Torque Sequence.



1. Rod
2. Grease Fitting
3. Setscrew
4. Head Retainer
5. Bolt
6. Lockwasher
7. Socket Head Capscrew
8. Head
9. Rod Seal
10. Back-Up Ring
11. Wiper Seal
12. Leather Back-Up
13. Piston Seal
14. O-Ring
15. O-Ring
16. Rod Seal Back-Up
17. Piston
18. O-Ring
19. Piston Ring
20. Special Nut
21. Cotter Pin
22. Barrel
23. Grease Fitting
24. Holding Valve
25. Socket Head Screw
26. Lockwasher
27. Collar
28. Bushing

Figure 5-8. Lift Cylinder - Exploded View.

(3). Disassemble piston assembly as follows:

(a). Remove special nut from the rod assembly.

(b). Slide the piston off of the cylinder rod; remove T-seal and o-ring from piston.

(4). Remove collar and head form cylinder rod; remove o-ring, poly-pak seal and wiper seal from the head.

b. Cleaning and Inspection.

(1). Clean all parts thoroughly in an approved cleaning solvent.

(2). Inspect cylinder rod for scoring and damage; if necessary dress with Scotch Brite or equivalent. Check threads for nicks and burrs; dress if necessary.

(3). Inspect cylinder barrel for scoring, damage and ovality. Check threads for nicks and burrs; dress if necessary.

(4). Inspect piston surface for scoring, distortion, ovality and tapering; dress if necessary. Check o-ring and seal grooves for nicks, burrs and sharp edges; dress as necessary.

(5). Inspect cylinder head surface for scoring, ovality and tapering. Check poly-pak seal, wiper seal and o-ring grooves for nicks, burrs and sharp edges; dress as necessary.

c. Assembly.

Note

Apply a light film of hydraulic oil to all components prior to assembly.

(1). Install new poly-pak seal, wiper seal and o-ring on cylinder head. Place head on cylinder rod; ensure polypak and wiper seals are not damaged or dislodged.

(2). Place collar on cylinder rod.

(3). Install new T-seal and o-ring onto piston. Place piston onto cylinder rod; ensure o-ring is not damaged or dislodged.

(4). Apply Nylock to the threads of the cylinder rod and install the special nut.

CAUTION

EXTREME CARE SHOULD BE TAKEN WHEN INSTALLING THE CYLINDER ROD, PISTON AND HEAD ASSEMBLY. AVOID PUSHING THE ROD OFF-CENTER, THUS PREVENTING DAMAGE TO THE HEAD AND PISTON SURFACES AND/OR TO THE INSIDE SURFACE OF THE BARREL.

(5). Insert cylinder rod, head and piston assembly into the barrel, ensuring that seals are not damaged or dislodged.

(6). Apply Nylock to the threads of the cylinder barrel and install the cylinder end cap.

5-42. ROTARY OIL COUPLING. (See Figure 5-15.)

a. Disassembly.

(1). Remove rotary coupling as outlined in Section 4.

(2). Remove retaining ring from body using snap ring pliers.

(3). Remove housing from body remove and discard seals and o-ring.

b. Cleaning and Inspection.

(1). Clean all parts thoroughly in an approved cleaning solvent.

(2). Inspect body for damage, scoring and distortion. Dress body or replace as necessary.

(3). Inspect o-ring and seal grooves for burrs and sharp edges. Dress applicable surfaces as necessary.

(4). Inspect housing inside diameter for scoring or other damage.

c. Assembly.

(1). Install new o-ring and seals onto body.

(2). Install housing onto body; install retaining ring.

(3). Install rotary coupling as outlined in Section 4.

(7). Inspect all threaded components for damage including stretching, thread deformation or twisting. Replace as necessary.

(8). Inspect wheel studs for thread damage or cracks, replace as necessary.

d. Assembly.

(1). Using an arbor type press if available, press bearing cups with large inside diameters facing out into hub counterbores.

(2). If any wheel studs were removed install at this time. Assure wheel mounting face is adequately supported and using a suitable hammer, properly seat wheel studs.

(3). Place bearing cone into bearing cup in small end of hub.

(4). Press seal into hub counterbore with the flat metal side facing in. Use a flat object to assure that seal is pressed evenly and is flush with the hub face.

(5). Lower hub onto spindle with large open end upward.

(6). Place bearing cone over end of spindle and into bearing cup.

(7). Place bearing shim over end of spindle and against bearing cone.

WARNING

EYE PROTECTION SHOULD BE WORN DURING RETAINING RING INSTALLATION.

(8). Secure retaining ring completely into spindle groove and against bearing shim. Be sure that retaining ring is entirely in groove.

(9). Place internal gear onto end of spindle.

(10). Place input shaft assembly into spindle bore with unsplined end facing out.

(11). Place thrust spacer over input shaft with counterbore side facing spindle.

(12). Position o-ring into hub counterbore. Use petroleum jelly or grease to hold o-ring in position. Slight stretching of the o-ring may be necessary to ensure proper seating.

(13). Place carrier assembly on a flat surface with the large gears upward. Find the punch marked tooth on each large gear and locate at 12 o'clock (straight up) from each planet pin. Marked tooth will be located just under the carrier on upper two gears.

(14). With shoulder side of ring gear facing downward, place ring gear over (into mesh with) large gears. Be sure that punch marks remain in correct location during ring gear installation.

(15). Turn over carrier assembly and ring gear while keeping gears in mesh. Place thrust washers and thrust bearing into carrier counterbore. Use petroleum jelly or grease to hold washers and bearing in place.

(16). While holding ring gear and cluster gears in mesh, place small side of cluster gears into mesh with the internal gear. On the ring gear locate the hole marked X over one of the counterbored holes in hub. Mark these holes on outside diameter for later use.

Note

If gears do not mesh easily or carrier assembly does not rotate freely, then remove the carrier and ring gear and check the cluster gear housing.

(17). Lubricate thrust washers and thrust bearing and place into carrier counterbore.

(18). The input gear is now installed into the carrier, meshing with the large diameter cluster gear. The counterbore in the bore of the input gear must be to the inside of this assembly.

(19). Place o-ring into cover assembly counterbore. Use petroleum jelly or grease to hold o-ring in place.

(20). Place cover assembly over ring gear with oil level check plug in cover located approximatley 90 degrees from oil fill plug in hub.

(21). Locate shoulder bolts with flatwashers, 90 degrees apart into counterbored holes in hub. Torque shoulder bolts to 23-27 foot pounds.

5-51. GENERAL INFORMATION.

a. Electrical components used in the Model 80F aerial platform are for the most part standard units performing normal electrical functions for this type of equipment. Maintenance procedures will normally consist of troubleshooting and defective component replacement. Constant reference should always be made to the applicable wiring diagram or schematic during the performance of any maintenance, so that correct interconnection between the various components is assured. Standard installation practices for most electrical units have been maintained throughout the manufacturing process and for this reason, lengthy procedures are not included in this section.

b. The starting motor, alternator and voltage regulator form a part of the engine assembly and maintenance procedures for these components are outlined in the applicable engine maintenance manual.

5-52. BATTERY.

a. Servicing.

(1). Open the engine access door on the left side of the machine.

(2). Disconnect the battery cables with the negative terminal cable disconnected first.

(3). Using a suitable wire brush, clean cable terminals with an acid neutralizing solution of ammonia or baking soda with water. Replace cables or cable terminal clamp bolts as necessary.

(4). Remove the battery hold-down and remove the battery.

(5). Position the battery over a suitable drain.

(6). Wash the entire exterior of the battery with an acid neutralizing solution of ammonia or baking soda with water. Ensure that no cleaning solution is allowed to enter the battery cells.

(7). Rinse the battery with clean water and dry using a source of low pressure compressed air.

(8). If necessary, wash the battery cradle with an acid neutralizing solution and rinse with clean water.

(9). Scrape off any excess corrosion or rust deposits and ensure that any water drain holes in the bottom of the cradle are open.

(10). If necessary, paint the cradle with a suitable acid resistant paint.

(11). Test the battery as outlined in subparagrph b below.

(12). Clean the battery terminal posts with a suitable wire brush.

(13). Install the battery and battery holddown.

(14). If necessary, replace any terminal post felt washers.

(15). Coat battery and cable terminals other than contact surfaces with vaseline.

(16). Connect battery cables with the positive terminal cable being connected first.

(17). If necessary, add distilled water to bring the electrolyte level of each cell to the correct level.

b. Testing.

(1). **Specific Gravity Test.**

Testing the specific gravity of a battery is accomplished through the use of a bulb-type hydrometer having a range of between 1.100 and 1.300 specific gravity points. Check the specific gravity as follows:

Note

Hydrometer readings should not be taken immediately after adding water. If necessary, thoroughly mix any added water by either allowing the battery to stand idle for several hours or by charging the unit at a slow rate of charge for a short period.

(a). Remove all battery vent plugs and ensure that the electrolyte level is high enough to enable withdrawal of the proper amount into the hydrometer barrel. If necessary, add distilled water to bring the electrolyte to the correct level. Charge the battery at a slow rate of charge to thoroughly mix the electrolyte.

(b). Depress the hydrometer bulb and insert the pick-up tube into the cell.

(c). Slowly release pressure on the bulb until the bulb is fully expanded and the float is freely suspended. Hold the hydrometer such that the float does not contact the sides of the barrel.

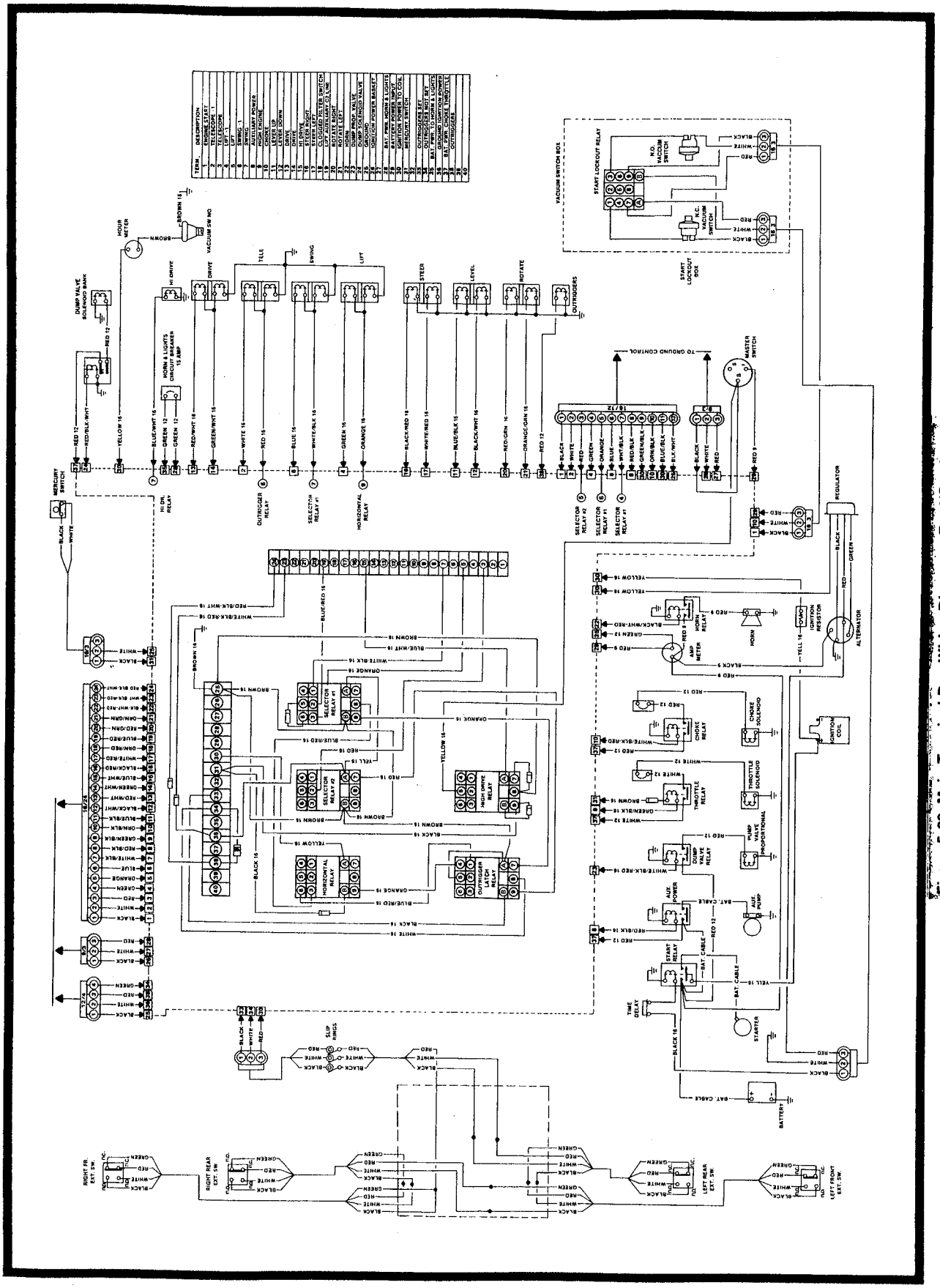


Figure 5-29. Main Terminal Box Wiring Diagram - Ford/Outriggers.