



An Oshkosh Corporation Company

Service and Maintenance Manual

Model
100HX
100HX+10
110HX

P/N - 3120636

March 11, 2010

ANSI



An Oshkosh Corporation Company

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1.8 BOOM TAPE

With 4620038 Turntable

110HX Single Capacity

Blue - Not used

Yellow - Not used

Red - 119.5 in. (303.5 cm)

White - 154.5 in. (392.4 cm)

110HX Dual Capacity

Blue - Not used

Yellow - 82.5 in. (209.6 cm)

Red - 119.5 in. (303.5 cm)

White - 154.5 in. (392.4 cm)

100HX+10

Blue - 50 in. (127 cm)

Yellow - Not used

Red - 84 in. (213.4 cm)

White - 135.5 in. (344.2 cm)

With 4620044 or 4620078 Turntable

100HX Dual Capacity

Blue - Not used

Yellow - 62 in. (157.5 cm)

Red - 90 in. (228.6 cm)

White- 118 in. (299.7 cm)

110HX Single Capacity

Blue - Not used

Yellow - Not used

Red - 122.5 in. (311.2 cm)

White - 157.5 in. (400.1 cm)

110HX Dual Capacity

Blue - Not used

Yellow - 85.5 in. (217.2 cm)

Red - 122.5 in. (311.2 cm)

White - 160.5 in. (400.1 cm)

100HX+10.

Blue - 53 in. (134.6 cm)

Yellow - Not used

Red - 87 in. (221.0 cm)

White - 138.5 in. (351.8 cm)

1.9 MAJOR COMPONENT WEIGHTS

Table 1-10. Major Component Weights

Component	Lbs.	KG.
Platform (36x48) w/o Control Box	150	68
Platform (36x60) w/o Control Box	165	75
Platform (36x72) w/o Control Box	180	82
Platform (36x96) w/o Control Box	220	100
Boom - 100HX (Incl. Lift Cylinder)	9920	4,500
Boom - 110HX (Incl. Lift Cylinder)	10960	4,971
Boom - 100HX+10 (Incl. Lift Cylinder)	10680	4,844
Turntable (w/Ford Engine, Less Cwt.)	10300	4,672
Turntable (w/Deutz Engine, Less Cwt.)	10620	4,817
Turntable (w/Cummins Engine, Less Cwt.)	10455	4,742
Frame Complete (incl. Wheels and Tires)	13620	6,178
Complete Machine - 100HX	37000	16,783
Complete Machine - 110HX	40500	18,371
Complete Machine - 100HX+10	38500	17,464

1.10 SERIAL NUMBER LOCATIONS

For machine identification, a serial number plate is affixed to the left side of the frame, below the battery compartment. If the serial number plate is damaged or missing, the machine serial number is stamped on the left side of the frame between the front and rear wheels, below the turntable bearing and on the right side of the turntable in the bottom of the valve compartment. In addition, the last five digits of the serial number are stamped on top of the fly end of the base boom section.

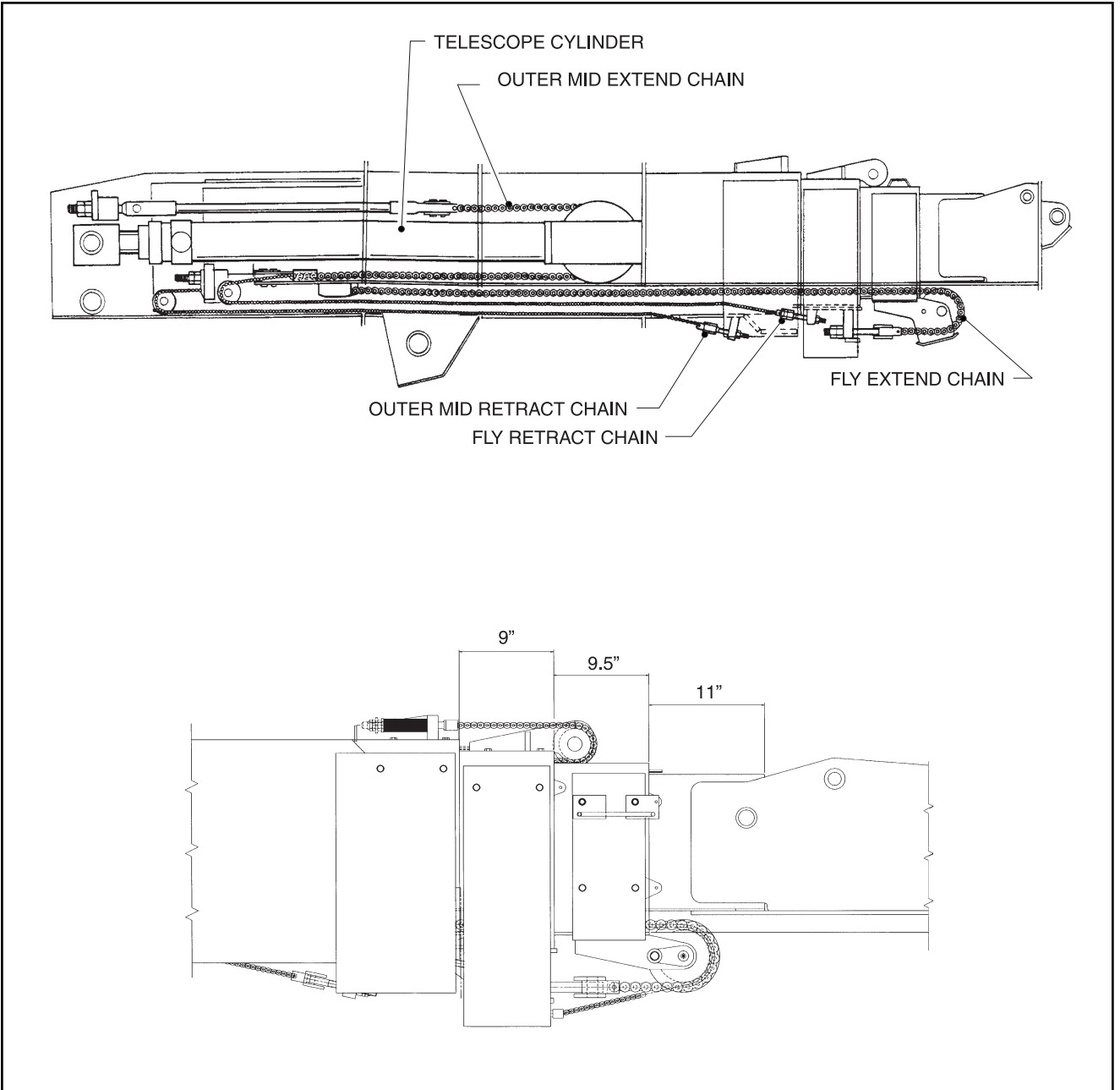


Figure 2-3. Typical Boom Assembly

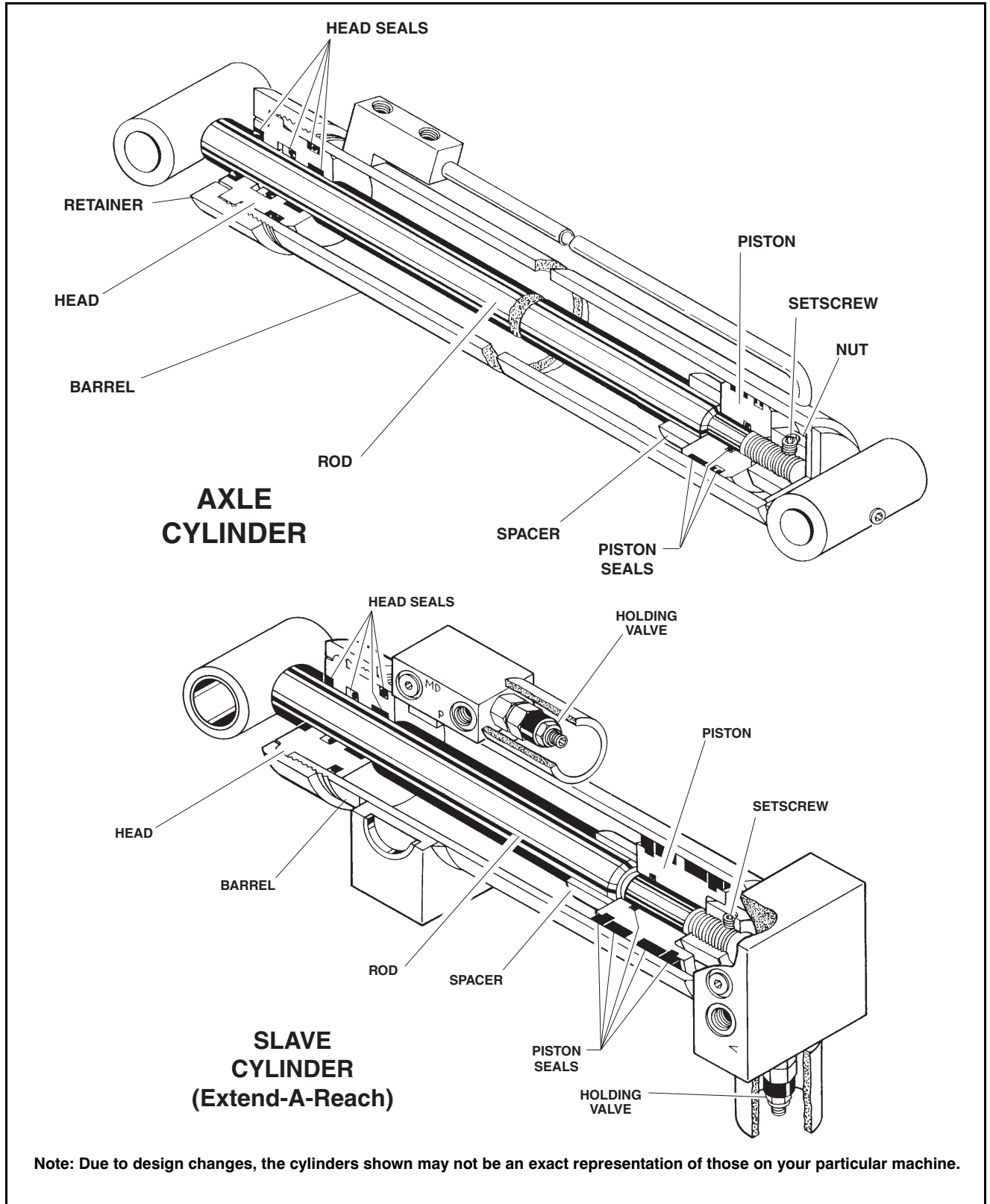


Figure 2-6. Typical Hydraulic Cylinders - Sheet 4 of 5

- | | |
|----------------------------|-------------------------------|
| 1. Boom Base | 10. Tele Cylinder Sheave |
| 2. Inner Mid Boom | 11. Sheave |
| 3. Outer Mid Boom | 12. Chain Extend Rod |
| 4. Fly Boom | 13. Chain Attach Pin |
| 5. Telescope Cylinder | 14. Chain Adjustment Assembly |
| 6. Outer Mid Extend Chain | 15. Chain Adjustment Assembly |
| 7. Fly Extend Chain | 16. Upper Rear Wear Pad |
| 8. Fly Retract Chain | 17. Adjustment & Jam Nuts |
| 9. Outer Mid Retract Chain | 18. Safety Chain |

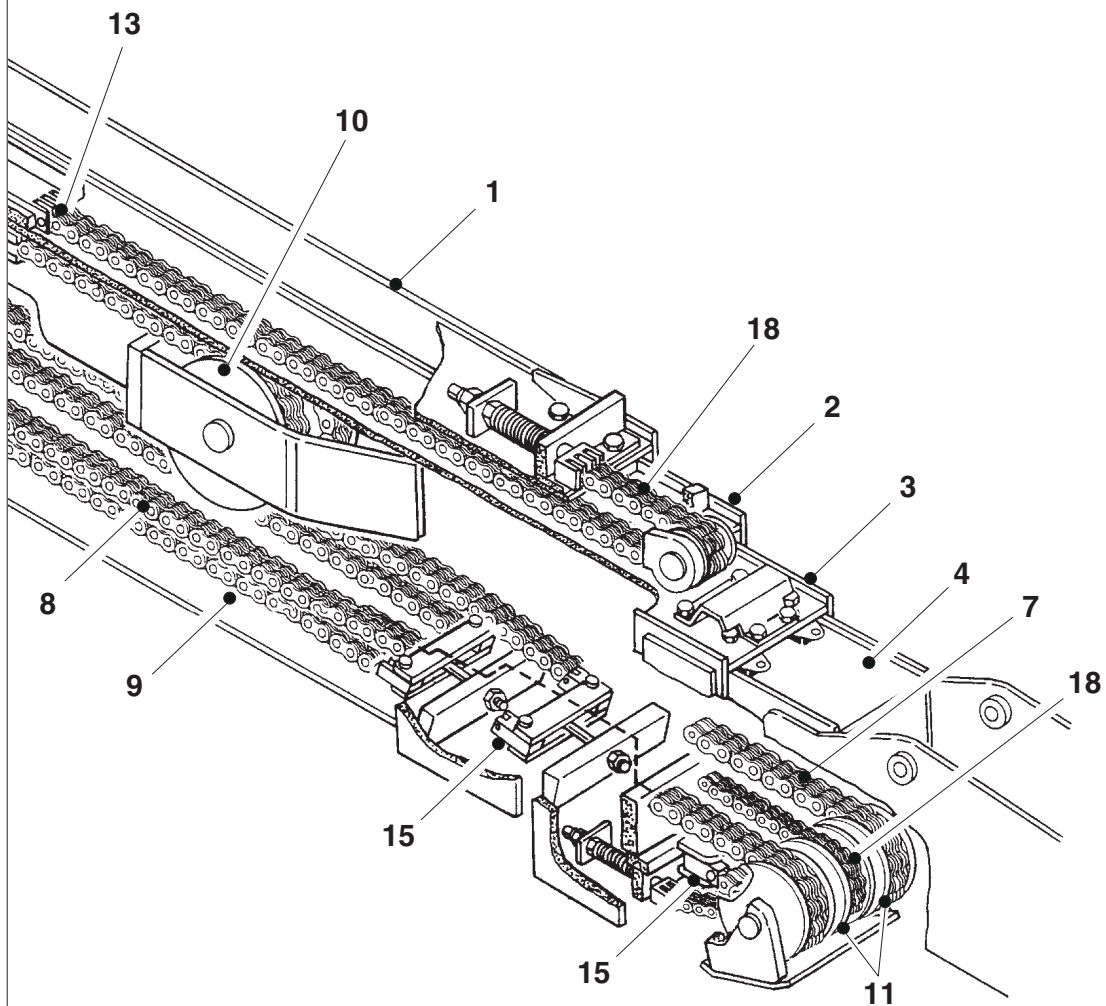


Figure 2-10. Boom Assembly - Sheet 2 of 2

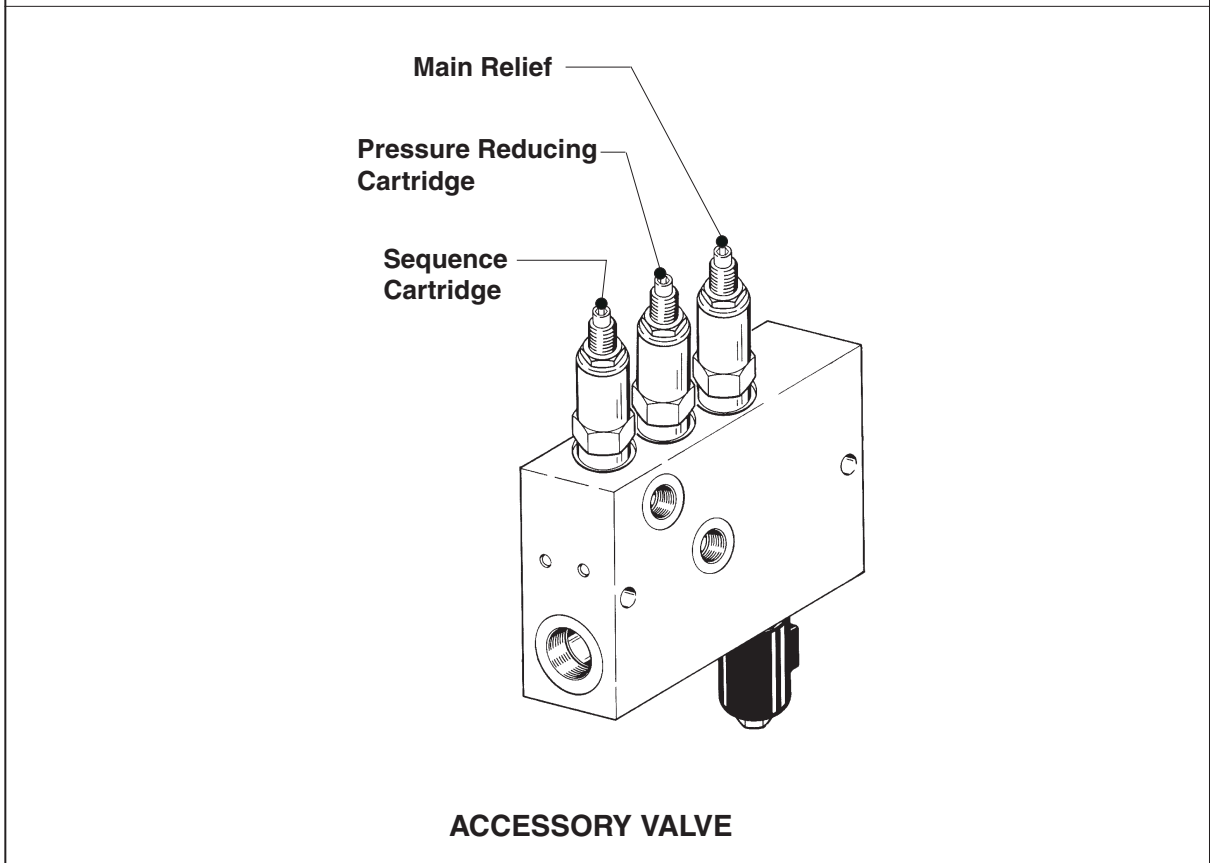
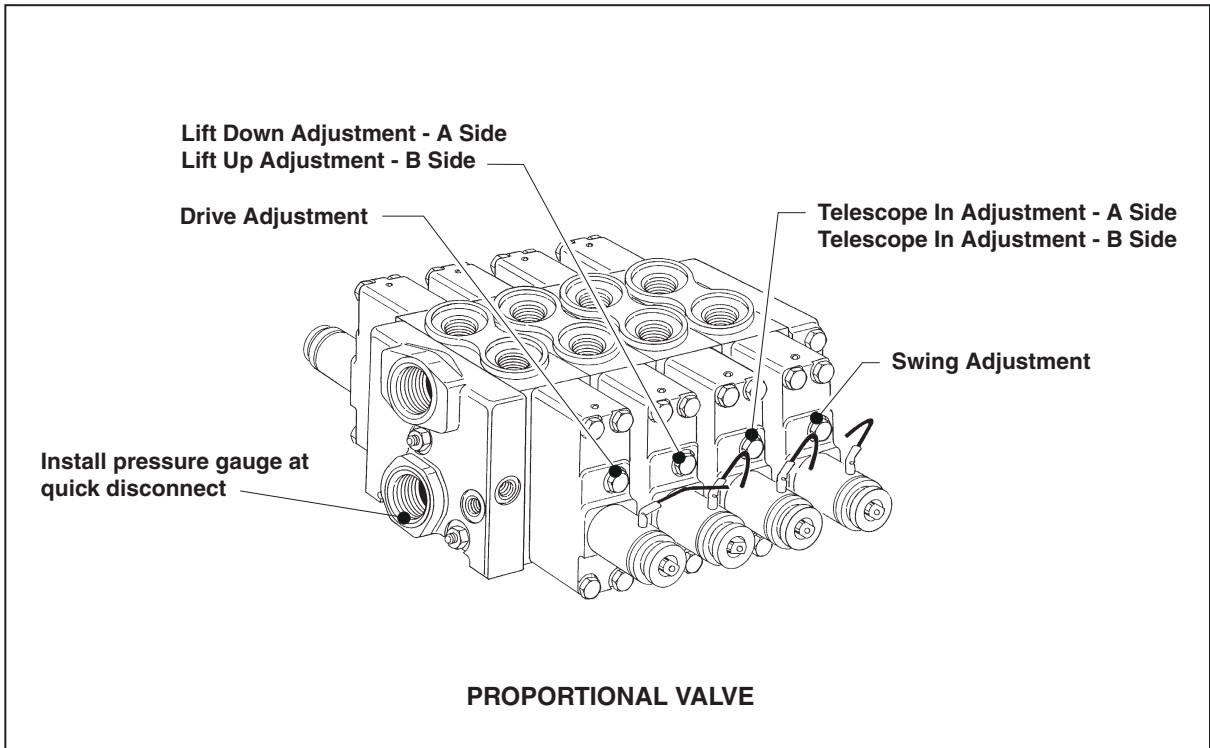


Figure 2-16. Pressure Setting Adjustments (Sheet 1 of 3)

2.19 DRIVE TORQUE HUB

Disassembly

1. Position hub over suitable container and remove drain plug (37) from unit. Allow oil to completely drain.
2. Remove sixteen bolts (1), four shoulder bolts (2), and twenty lockwashers (3) from cover (4) and lift cover from unit. Remove o-ring (14) from counterbore of cover.
3. Disassemble cover (4) as follows:
 - a. Remove two bolts (12) securing disconnect cap (11) to cover and remove disconnect cover.
 - b. Remove two bolts (12) securing cover cap (7) to cover and remove cap.
 - c. Remove disconnect rod (9) from cover cap and remove o-rings (8 and 10) from cover cap. Discard o-rings.
 - d. If necessary, remove pipe plugs (5 and 6) from cover.
4. Remove two thrust washers (15) and thrust bearing (16) from carrier counterbore. One thrust washer may stick to cover. Inspect thrust washers and bearing for wear and replace if necessary.
5. Lift carrier assembly (22) from hub and spindle assembly (30).
6. Disassemble carrier as follows:

⚠ CAUTION

EYE PROTECTION SHOULD BE WORN DURING RETAINING RING REMOVAL.

- a. Remove retaining ring (25) from planet shaft (23).
 - b. Remove spacer (26) from planet shaft, then, using a suitable drift, drive planet shaft from carrier, shearing off roll pin. Tap remaining roll pin from carrier using a suitable punch.
 - c. Remove cluster gear (27) from carrier and remove bearing cones (29) from cluster gear.
 - d. If necessary, press bearing cups (28) from cluster gear.
7. Lift ring gear (13) from housing (36). Remove o-ring (14) from counterbore of ring gear and discard.
 8. Remove input (sun) gear (17), input spacer (18), and input shaft (20) from spindle (30).
 9. Remove two thrust washers (15) and thrust bearing (16) from end of spindle. One thrust washer may

stick in carrier counterbore. Inspect thrust washers and thrust bearing for wear and replace if necessary.

10. Lift internal gear (21) out of hub.

⚠ CAUTION

EYE PROTECTION SHOULD BE WORN DURING RETAINING RING REMOVAL.

11. Remove keeper ring (40), retaining ring (35), and bearing shim (34) from end of spindle. Remove hub from spindle.
12. Remove bearing cone (32) and seal (31) from spindle (30). Seal will possibly hold bearing cone into hub. If so, remove both from hub. If bearing cups (33) require replacing they can be driven out of hub counterbores. Discard seal and replace with new seal.

⚠ CAUTION

EYE PROTECTION SHOULD BE WORN DURING RETAINING RING REMOVAL.

13. To remove cluster gear (27) from carrier, remove retaining ring (25) from planet shaft (23) and drive planet shaft out of carrier.
14. Cluster gear and bearings (27, 29) can now be slid out of carrier and spacer (18) removed from carrier bore. If bearing cups (28) require replacing they can be driven out of cluster gear counterbores.
15. Repeat steps (12) and (13) for remaining cluster gears.

NOTICE

WHEN REBUILDING THE UNIT, O-RINGS AND RETAINING RINGS SHOULD ALWAYS BE REPLACED.

Cleaning and Inspection

1. Thoroughly clean all parts in an approved cleaning solvent.
2. Inspect geared or splined components in primary and secondary planet carriers, input and output sun gears, ring gear, coupling and input shaft for chipped or broken teeth, and excessive or uneven wear patterns. Replace components as necessary.
3. Inspect all thrust washers for scoring, pitting, erosion, discoloration or excessive wear. Replace thrust washers as necessary.
4. Inspect all bearing cones and cups for scoring, pitting or excessive wear. If necessary, using a suitable press, remove bearing cups from hub and replace bearings as a set.

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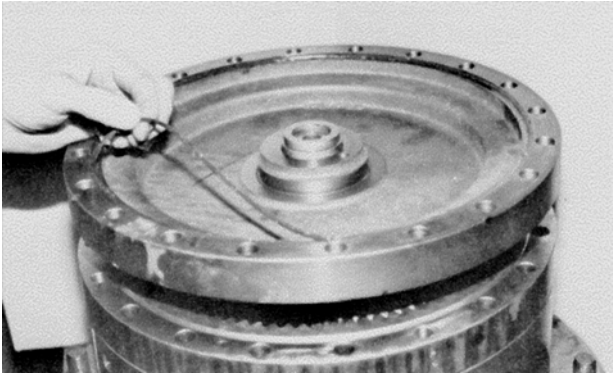
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⚠ CAUTION

BEWARE OF SHARP EDGES OF COUNTERBORE WHILE SEATING THIS O-RING.

- g. Place o-ring (5) into cover counterbore. Use petroleum jelly to hold o-ring into place.



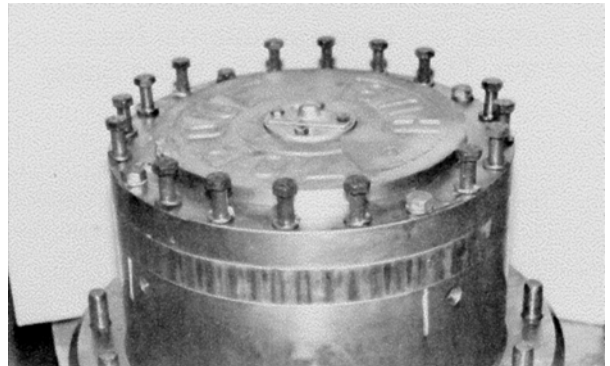
- 17. Place cover assembly (4) onto ring gear (13). Rotate cover assembly until pipe plug (6) is located 90 degrees and 180 degrees from pipe plugs (38) in opposite end of hub.



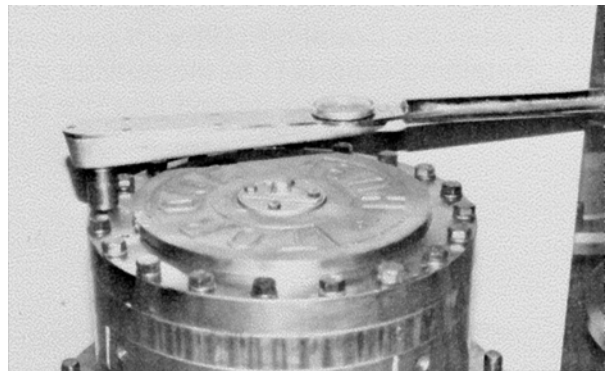
- 18. Secure cover assembly and ring gear to hub with four shoulder bolts (2) and lockwashers 3. Shoulder bolts fit into four counterbored holes in hub. It may be necessary to start bolts into hub by tapping lightly on bolts with a hammer.



- 19. Install sixteen Grade 8 bolts (1) and lockwashers (3) in remaining holes.



- 20. Tighten bolts and shoulder bolts evenly and torque to 100-110 ft.lbs. (14-15 kgm).



- 21. Install coupling (45) into spindle onto input shaft.

2.20 SWING TORQUE HUB

Disassembly

- 1. Remove oil plugs (25 and 26) and drain oil from unit into a suitable container. Replace drain plugs.

NOTE: The screws, hub pinion gear, and retaining plate referenced in steps (2) and (3) are not shown in Figure 2-20, but are attached to the hub output shaft (item 30).

- 2. Remove the two screws which attach the hub pinion gear retaining plate and remove plate.
- 3. Carefully remove pinion gear from splined hub output shaft.
- 4. Using suitable protection, clamp drive hub assembly in a vise or suitable holding fixture.
- 5. Remove four shoulder bolts (3) and lockwashers (4) from counterbored holes in cover of drive hub assembly.

Assembly

NOTE: Lubricate all seals and o-rings with clean hydraulic oil prior to assembly.

1. Clean all parts thoroughly before assembly.
2. Press new rotary oil seal (23) into housing (21). Note direction of the seal.

NOTE: Earlier models did not use retaining ring (22).

3. Install new bearing (19) and retaining ring (22) on shaft (10).
4. Insert shaft assembly and retaining ring (18) in housing (21).

NOTE: Be sure to use the same number of springs and spring pattern as recorded during disassembly. Spring retainer (17) was not used in earlier models.

5. Insert dowel pins (20), spring retainer (17) and springs (15 & 16) in housing (21).
6. Position new large diameter return plate (14) in housing with tabs guided by dowel pins (20) until disc rests on springs (15 & 16).

NOTICE

DISCS (11, 14) AND FRICTION DISCS (12) SHOULD REMAIN DRY DURING INSTALLATION. NO OIL RESIDUE SHOULD BE ALLOWED TO CONTAMINATE DISC SURFACES.

7. Place a new friction disc (12) on shaft (10) until it contacts return plate (14).
8. Add additional new discs (11) and new friction discs (12) as required to complete assembly.
9. Insert separators (13) in holes of return plate.
10. Install new o-ring (5), new backup ring (6), new o-ring (8) and new back-up ring (9) on piston (7). Note order of o-rings and back-up rings. Insert piston (7) into end cover (2) being careful not to shear o-rings or back-up rings.
11. Install new case seal (4) in housing (21) then install bleeder screw (3) in end cover (2).
12. Position end cover (2) on housing (21) aligning dowel pins (20) with holes in end cover.

NOTE: If available, a hydraulic press will simplify installation of end cover on housing. Clamp cover in position while tightening capscrews.

13. Press on inner ring of bearing (37) until it shoulders on shaft (45) to eliminate binding on bearings. Be certain to restrain opposite end of shaft to avoid excessive thrust loading on bearing (54).

NOTICE

IF HYDROSTATIC BENCH TESTING IS PERFORMED ON THE BRAKE ASSEMBLY, RELEASE PRESSURE SHOULD NOT EXCEED 138 BAR UNLESS TWO ADDITIONAL BOLTS ARE USED FOR SUPPLEMENTAL CLAMPING.

2.24 DRIVE BRAKE - AUSCO - MACHINES BUILT PRIOR TO MARCH 1992

Disassembly

1. With shaft protrusion downward, remove bolts (21) alternately, power plate (20) and gasket 2.
2. Bearing (18) is pressed onto shaft (7) and must be removed before removal of rotating discs (11) and stationary discs (12).
3. Remove shaft and stack subassembly from housing by lightly tapping or pressing on the small external spline end of the shaft and removing the shaft, bearings and stack from the housing (1).
4. Remove bearing (18), stationary discs (12), rotating discs (11), springs (10) and primary disc 9.
5. Remove bearing (3) from shaft, using care not to damage seal 4. Remove seal and inspect sealing lip and OD for damage. If damaged, replace per reassembly instructions.
6. Remove springs (6) and spring retainer (5) from housing (1).
7. Remove piston (13) from power plate by introducing low pressure air (15 psi [1 Bar]) into the hydraulic inlet. Make sure piston is directed away from the operator. Remove o-rings (15 and 17) and back-up rings (14 and 16) from piston OD and ID grooves.
8. Pressure relief valve (22) can be removed and inspected to assure spring-loaded ball moves freely and is free of contaminants.

Inspection

1. Clean all parts thoroughly.
2. Closely inspect all parts for excessive wear, cracks and chips. Replace parts as necessary.
3. Discard seals and o-rings.
4. Closely inspect bearings and bearing contact surfaces. Replace as necessary.

NOTE: Bearings may be reused if, after thorough inspection, they are found to be in good condition.

2.30 BOOM LENGTH/ANGLE SENSOR ADJUSTMENT PROCEDURES

NOTICE

LOAD RADIUS CIRCUIT CARD P/N-0610106 WAS SUPERSEDED WITH LOAD RADIUS CIRCUIT CARD P/N-0610130. ALTHOUGH DIFFERENT IN COMPONENT LAYOUT AND POSITION OF TEST POINTS, THE TEST POINTS ARE LABELED AND FUNCTION EXACTLY THE SAME.

NOTE: *The boom length/angle sensor is factory set and normally does not require adjusting unless it is removed from the base boom for maintenance purposes, etc. The boom length/angle sensor has been built to three different configurations, hereafter referred to as 1st generation, 2nd generation and 3rd generation.*

1st and 2nd Generation Radius Cards

100HX, 110HX

1. Length Indicator Adjustment.
 - a. With the engine running, check test point 10 (TP10).
 - b. Fully retract the boom and place in the 0 (+3/-0) degrees horizontal position.
 - c. Set TP1 on the load radius circuit card to 1.8 Volts by adjusting trimpot TP1, then proceed with the following adjustments.

Loosen Allen screws which anchor the timing belt pulley (1st generation) or timing gear (2nd generation) to the shaft of the 5K pot. On 3rd generation sensor boxes, loosen the three screws holding the pot in place. This enables pot/pot shaft to move freely.

Turn the ignition switch on. Adjust the 5K pot/pot shaft until the proper voltage appears at TP2 on the load radius circuit card and also at the green wire on the 5K pot. (See Table 2-5 for proper voltage.)

Tighten the Allen screws on the timing belt pulley/timing gear or tighten the three screws, as applicable.

2. Boom Angle Sensor Adjustment.
 - a. With the boom completely retracted and in the 0 degrees horizontal position, measure the voltage at TP3 on the load radius circuit card and at the yellow wire on the boom angle sensor.
 - b. Adjust the spring-loaded screw on the boom angle sensor mounting plate (1st generation) or the trimpot on the boom angle sensor (second generation) until the voltage at TP3 on the load radius circuit card and the yellow wire on the boom angle sensor reaches the proper voltage. For third generation sensor boxes, loosen the three screws securing the sensor to the box and rotate the sensor until the proper voltage reading is obtained, then retighten the screws. (See Table 2-5 for proper voltage.)
3. Radius Adjustment.
 - a. With the boom completely retracted and level horizontal, telescope the boom until the yellow marking tape on the mid boom is exposed.
 - b. At this point, measure the voltage at TP6 on the load radius circuit card. This voltage represents the critical radius from the center line of rotation.
 - c. Put the voltmeter probe on TP8 and adjust P2 on the load radius circuit card until the voltage measured at TP6 is obtained at TP8. The yellow light on the "Reach Display" should just turn on.
 - d. Continue extending the boom until the red marking tape on the mid boom is exposed
 - e. Measure the voltage at TP6 on the load radius circuit card. This voltage represents the critical radius from the center line of rotation.
 - f. Adjust P3 on the load radius circuit card until the voltage measured at TP6 is obtained at TP9. The red light on the "Reach Display" should just turn on.

NOTE: *If replacing the boom radius circuit card, P4 must be set at the same voltage as P3. The test point for P4 voltage is TP7.*

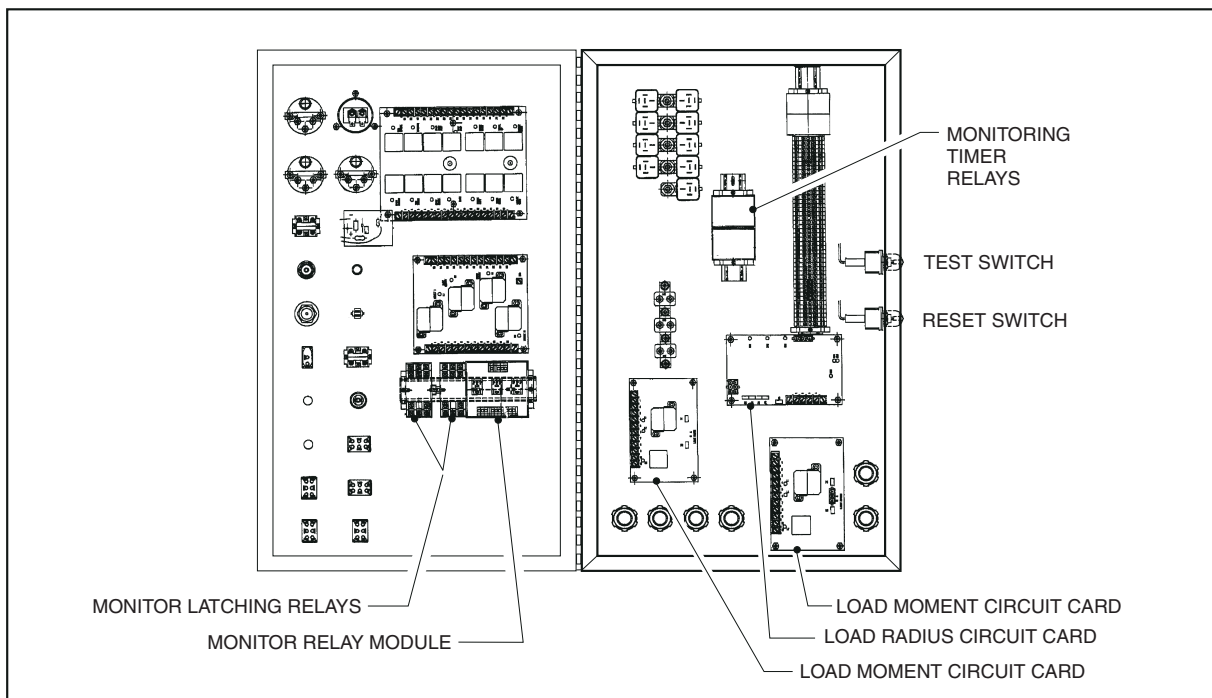


Figure 2-36. Control Box Components

This circuit card operates as follows:

A calibrated dc voltage representing the boom angle is sent from the boom angle sensor to the angle cosine circuit. This voltage is converted to the cosine of the angle and presented to the radius generator circuit.

A calibrated dc voltage representing the boom length is sent from the boom length sensor to the boom length circuit and presented to the radius generator circuit.

The length and cosine dc voltages are multiplied together in the radius generator circuit. The output dc voltage from this circuit is passed to a radius limiting circuit. This circuit is set to detect a specific boom radius dimension. The resultant output signal is sent to a logic network circuit which determines which of the indicator lamps (blue or red) should be energized.

There should be a signal from the sensors at all times, however, if the signal line from the angle, or the boom length sensor is cut a failure circuit detects this and activates an audible warning horn mounted in the console panels.

The boom length circuit also produces output dc voltage when the boom is within a predetermined critical boom length. This signal energizes a 12 volt dc solenoid flow control valve (via a relay in the overmoment control circuit card) to enable the descend function to operate at full speed. When this signal is removed, the descent function defaults to a creep speed.

Also, when an overmoment condition is sensed by the overmoment control circuit, a signal is sent to the logic circuit network. This causes either the red or blue lamp to flash indicating that an overmoment condition exists in that region. This condition also causes the audible warning to sound at the control consoles.

Overmoment Control System

The turntable is pivoted at the lower front area and compression springs, mounted towards the rear, provide a reaction force to the moment produced by boom extension. The force produced by the springs is adjusted to balance the moment produced when the boom is extended to the maximum permitted radius.

SECTION 3. TROUBLESHOOTING

3.1 GENERAL

This section contains troubleshooting information to be used for locating and correcting most of the operating problems which may develop. If a problem should develop which is not presented in this section or which is not corrected by listed corrective actions, technically qualified guidance should be obtained before proceeding with any maintenance.

Troubleshooting and maintenance information pertaining to the engine that are not contained in this manual are contained in the applicable engine maintenance manual.

3.2 TROUBLESHOOTING

The troubleshooting procedures applicable to the aerial platform are listed and defined in Tables 3-1 through 3-6. As an aid to table use, the aerial platform is divided into four major groups, each covered separately within this section. These groups are as follows: elevation system, chassis assembly, hydraulic system and electrical system.

Each malfunction within an individual group or system is followed by a listing of probable causes which will enable determination of the applicable remedial action. The probable causes and the remedial action should, where possible, be checked in the order listed in the tables.

It should be noted that there is no substitute for a thorough knowledge of the equipment and related systems.

It should be recognized that the majority of the problems arising in the machine will be centered in the hydraulic and electrical systems. For this reason, every effort has been made to ensure that all likely problems in these areas are given the fullest possible treatment. In the remaining machine groups, only those problems which are symptomatic of greater problems which have more than one probable cause and remedy are included. This means that problems for which the probable cause and remedy may be immediately obvious are not listed in this section.

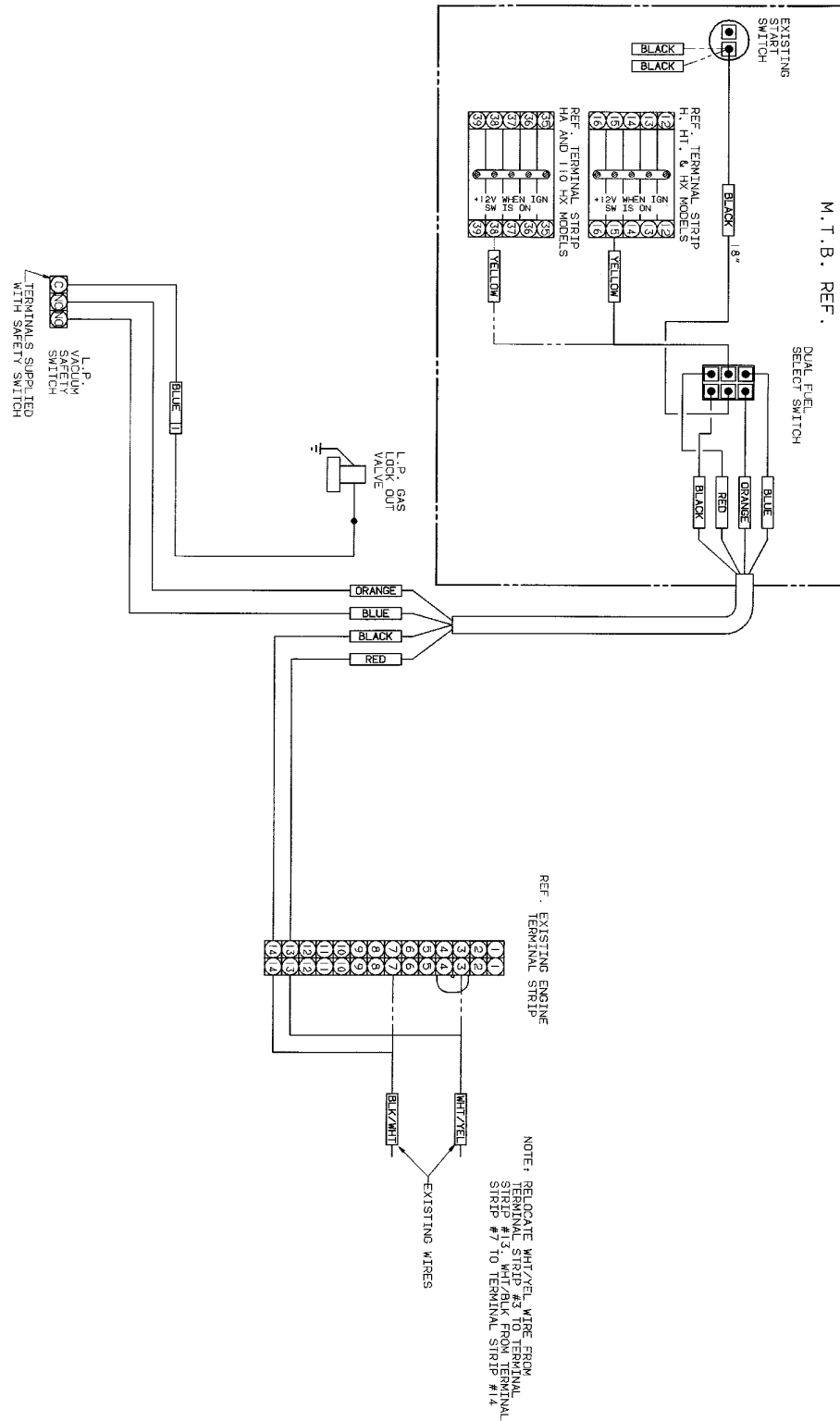
The first rule for troubleshooting any circuit that is hydraulically operated and electrically controlled is to determine if the circuit is lacking hydraulic oil and electrical control power. This can be ascertained by overriding the bypass valve (mechanically or electrically) so that oil is available to the function valve, then overriding the function valve mechanically. If the function performs satisfactorily, the problem exists with the control circuit.

3.3 HYDRAULIC CIRCUIT CHECKS

The reference for improper function of a hydraulic system, where the cause is not immediately apparent, should be the Troubleshooting Chart. The best place to begin the problem analysis is at the power source (pump). Once it is determined that the pump is serviceable, then a systematic check of the circuit components, beginning with the control, would follow. For aid in troubleshooting, refer to the Illustrated Parts Manual for hydraulic diagrams of the various circuits

Table 3-4. Chassis Assembly - Troubleshooting

TROUBLE	PROBABLE CAUSE	REMEDY
Machine will not travel in forward.		
	Hydraulic system oil low. Restricted or broken hydraulic line or fitting. Control valve not functioning properly. Drive motor(s) not functioning properly. Circuit breaker open. No power to wheel motor speed switch. Two speed valve sticking. Counterbalance valve sticking on return side.	Replenish oil as necessary. Clean, repair or replace line or fitting. Repair or replace valve. Repair or replace motor(s). Determine and correct cause; reset circuit breaker. See proper wiring diagram. Repair or replace valve. Adjust return counterbalance out 3 turns - cycle drive - return to original position.
Motor turns slowly in the direction of the last command.		
	Valve not returning to neutral. Function speed switch malfunction. Sticking spool due to contamination.	Check neutral springs. Replace function switch. Remove end cap and check spool freedom. Repair as necessary.
Motor turns slowly at maximum command.		
	Valve spool is not traveling far enough due to: Worn, leaking drive motor(s). Engine RPM's set too low. Low control pressure supply. Function speed switch malfunction. Amperage too low on controller. Defective pump, low oil volume.	Repair or replace drive motor(s). Repair or replace drive motor(s). Properly adjust engine RPM's. Replace pressure regulator if necessary. Replace switch. Correctly adjust controller. Repair or replace pump.
Poor response, function shuts off slowly when command is removed.		
	Low spool spring preload. Sticking spool due to contamination. Ramp set too high in controller. Sticking control handle.	Check for correct spring and shims in end caps. Remove end cap and check spool freedom. Adjust controller. Repair or replace controller.



4932813 —

Figure 3-2. Wiring Diagram - Dual Fuel (Ford Engine)

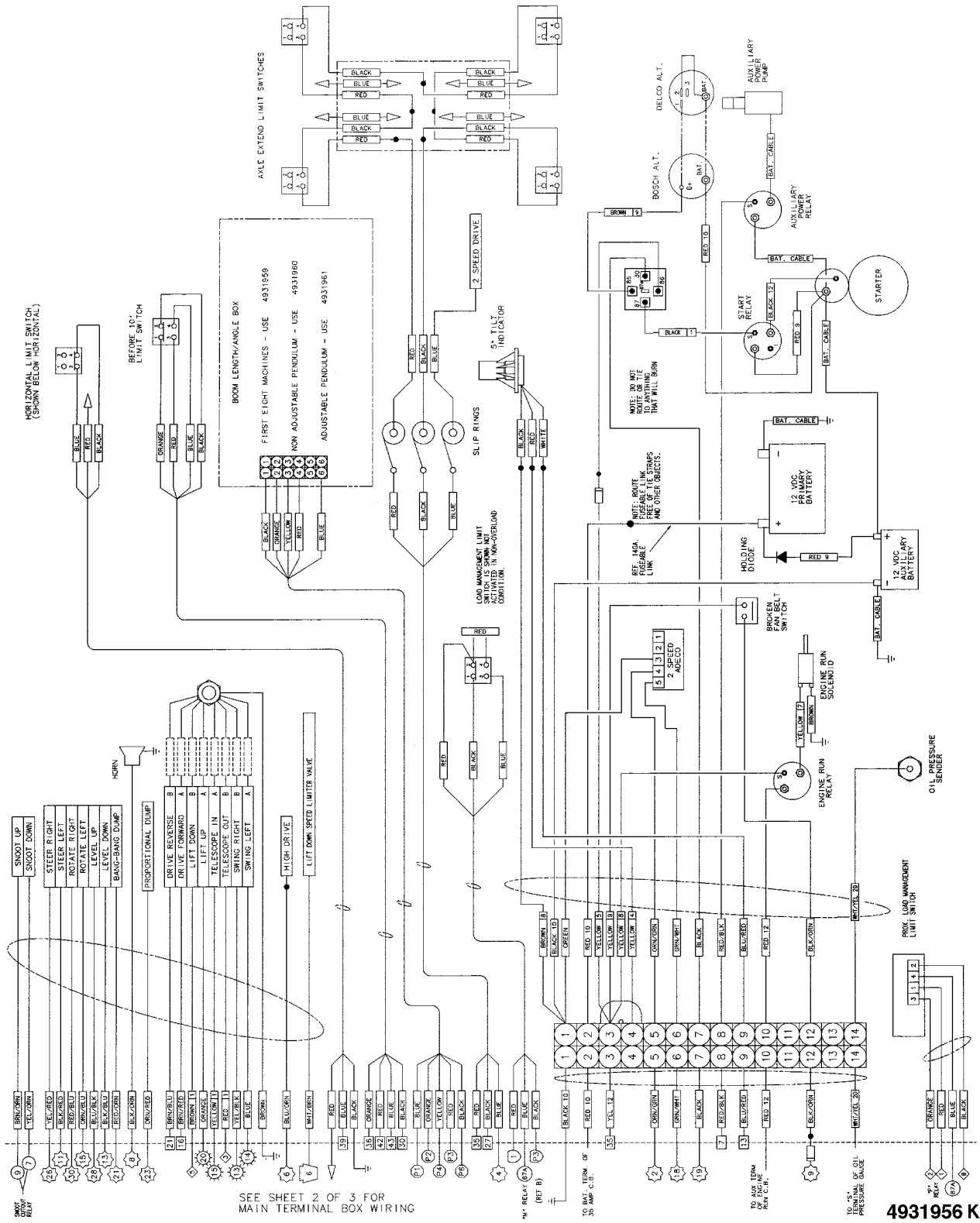


Figure 3-12. Wiring Diagram - 100HX+10 w/Deutz Engine (Sheet 3 of 3)

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