ME12002

COMPACT EXCAVATOR

SERVICE MANUAL

PART #909768

Revision B - 12/07

Mustang Manufacturing Company, Inc.

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Tightening Torques

NOTICE: *Use these torque values when tightening Mustang hardware (excluding: locknuts and self-tapping, thread forming and sheet metal screws) unless specified otherwise.*

Port Codes: Main Valve Block

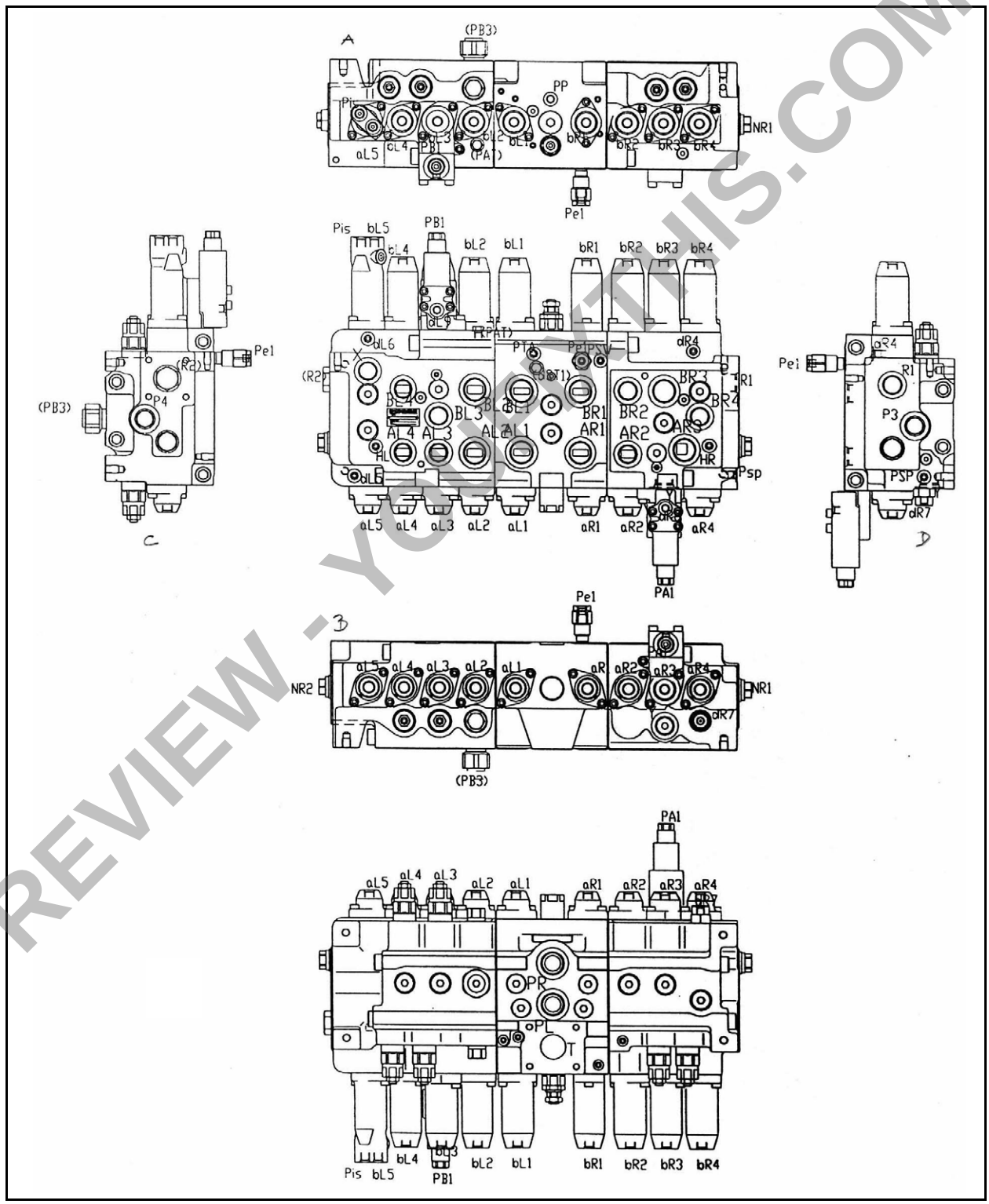


Figure 1-5 Port Codes, Main Valve Block

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CHAPTER 2
MAINTENANCE

Maintenance Chart

Check, Clean and Inspect

Service Activity	Daily	Every 50 Hours	Every 250 Hours	Every 500 Hours	Every 1000 Hours	Annual
Leakage Check (walk-around excavator)	O					
Visual Check (walk-around excavator)	O					
Check Hydraulic Oil Level	O					
Check Engine Oil Level	O					
Check Engine Coolant Level	O					
Check Coolant Thermostat (SN AB00473-AB03158)				O		
Check and Clean Air Filter (damage)	O/X			<>		<>
Check Engine Mounting Bolts		O				
Check Engine Coolant Level	O					
Check Engine Speed Regulation			O			
Check Gearbox Oil Level		O				
Clean Drain Holes in Cab/Canopy					X	
Check Engine/Hydraulic Oil Radiator and Air Conditioning for Contamination. Clean if Necessary	O/X					
Check Cooling and Heating System Hoses for Leaks and Pressure (visual check)	O					
Replace Cab Air Filter for Heating and Air Conditioning				<>		
Check Heating Fan		O				
Air Filter (damage)	O/X			<>		<>
Inspect Water Separator Prefilter, Drain Water	O/X					
Clean Water Separator				X		
Check Water Pump					O	

<>	Change/Replace	O	Check/Inspect
X	Clean	<> (1)	Change/Replace the first time

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Hydraulic System Diagram

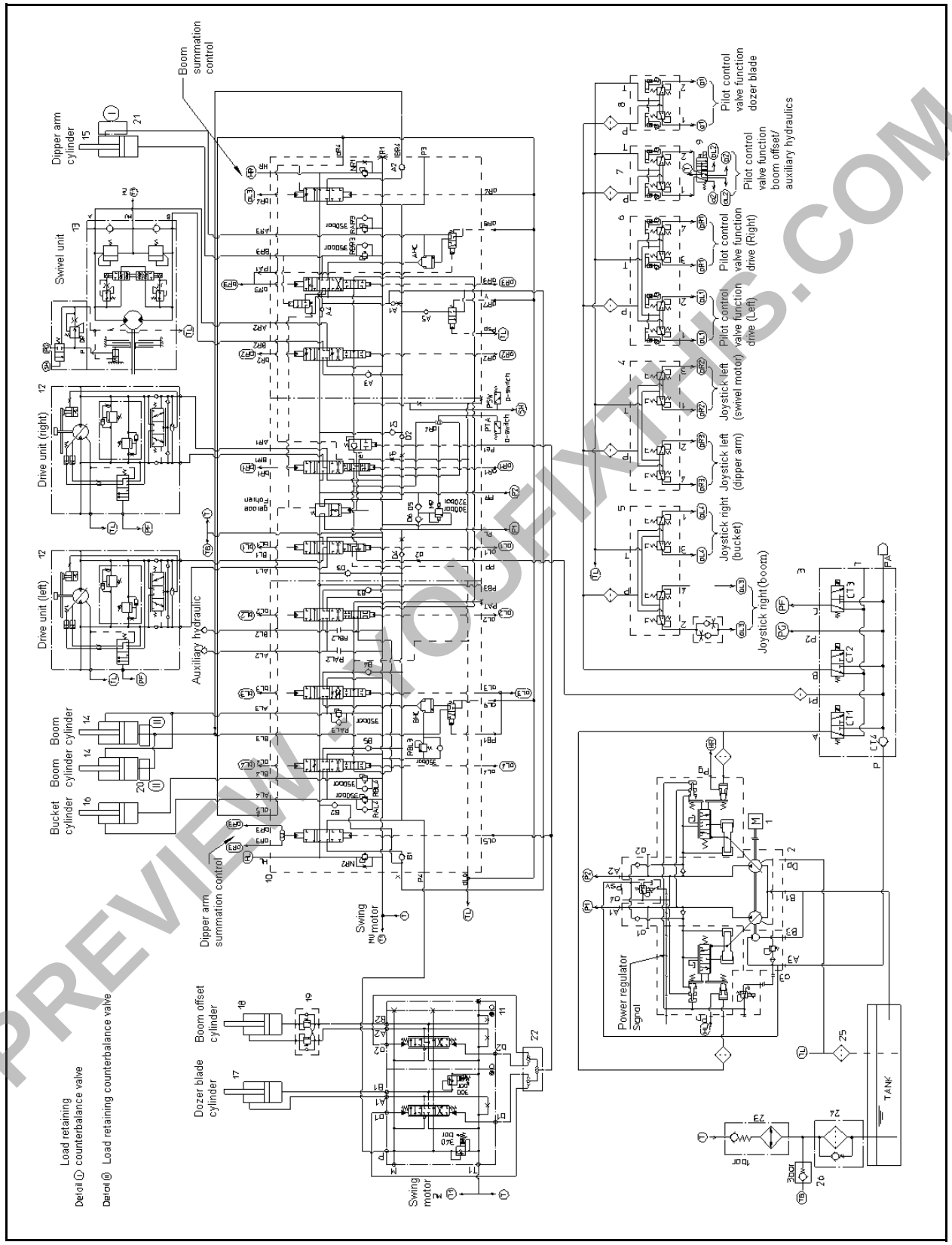


Figure 3-1 Hydraulic System Diagram

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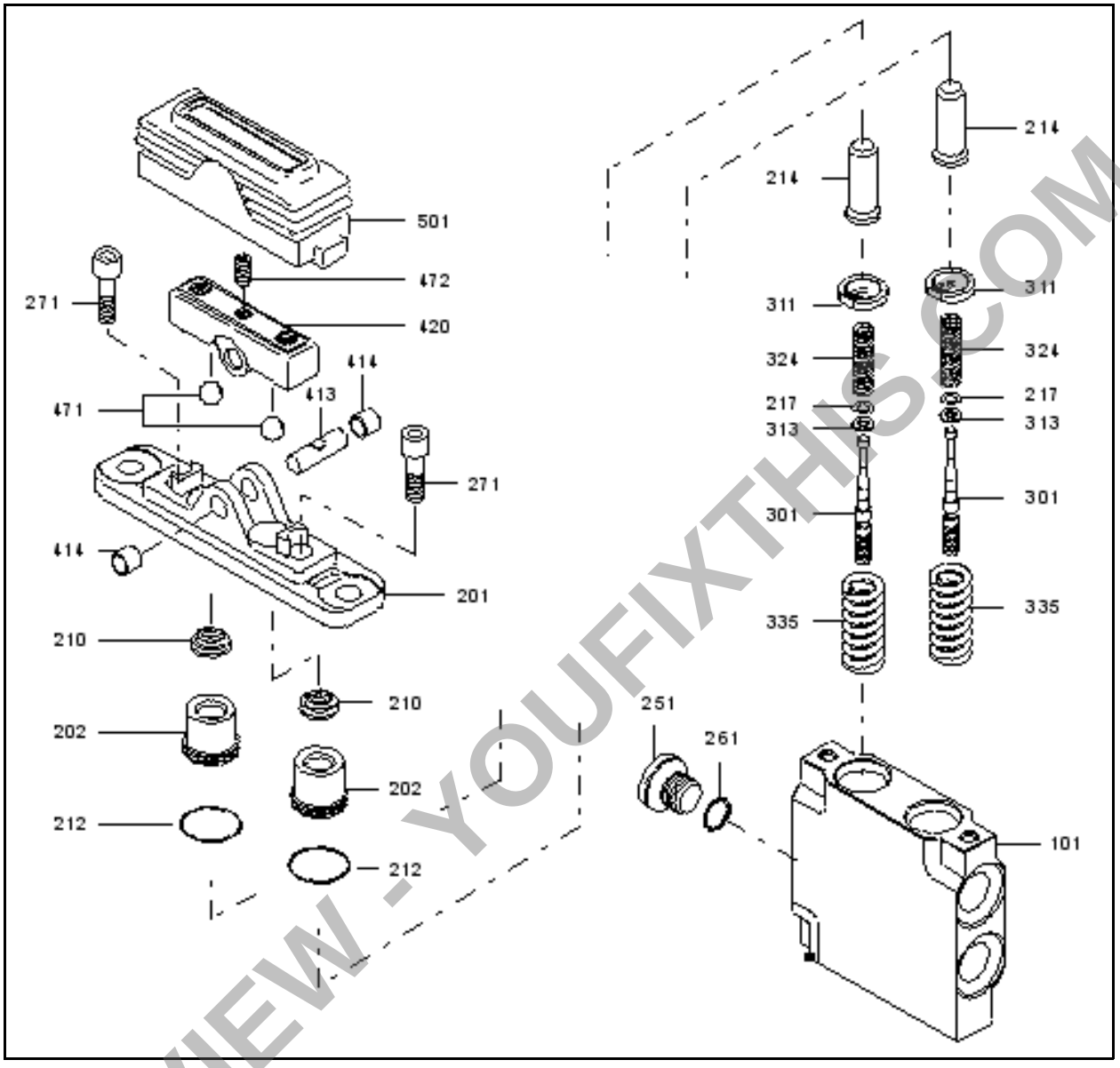


Figure 3-215 Pilot Valve Assembly

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High Quality Screws and M_A High Quality Screw Joints

With coarse-pitch thread. All torque values are in lb.-ft. (Nm) unless marked otherwise.					
Thread	Threads according to DIN 912, DIN 931, DIN 933, etc.			Threads according to DIN 7984	
	8.8	**10.9**	**12.9**	**8.8**	**10.9**
M5	4.1 (5.5)	6 (8)	7 (10)	4 (5)	5 (7)
M6	7 (10)	10 (14)	13 (17)	6.3 (8.5)	9 (12)
M8	18 (25)	26 (35)	31 (42)	15 (20)	22 (30)
M10	33 (45)	48 (65)	59 (80)	30 (40)	44 (59)
M12	64 (87)	81 (110)	108 (147)	51 (69)	74 (100)
M14	100 (135)	133 (180)	170 (230)	81 (110)	118 (160)
M16	155 (210)	203 (275)	258 (350)	125 (170)	184 (250)
M18	207 (280)	302 (410)	354 (480)	181 (245)	254 (345)
M20	302 (410)	420 (570)	509 (690)	251 (340)	361 (490)
M22	406 (550)	575 (780)	686 (930)	339 (460)	487 (660)
M24	524 (710)	738 (1000)	878 (1190)	435 (590)	620 (840)
M27	767 (1040)	1092 (1480)	1305 (1770)	642 (870)	922 (1250)
M30	1047 (1420)	1482 (2010)	1770 (2400)	885 (1200)	1254 (1700)
With fine-pitch thread. All torque values are in lb.-ft. (Nm) unless marked otherwise.					
Thread	Threads according to DIN 912, DIN 931, DIN 933, etc.			Threads according to DIN 7984	
	8.8	**10.9**	**12.9**	**8.8**	**10.9**
M8x1.0	18 (25)	27 (37)	32 (43)	16 (22)	24 (32)
M10x1.0	37 (50)	55 (75)	65 (88)	32 (43)	48 (65)
M10x1.25	36 (49)	52 (71)	61 (83)	31 (42)	46 (62)
M12x1.25	64 (87)	96 (130)	111 (150)	55 (75)	81 (110)
M12x1.5	61 (83)	92 (125)	107 (145)	53 (72)	77 (105)
M14x1.5	100 (135)	148 (200)	173 (235)	89 (120)	129 (175)
M16x1.5	155 (210)	229 (310)	266 (360)	133 (180)	195 (265)
M18x1.5	232 (315)	332 (450)	391 (530)	199 (270)	284 (385)
M20x1.5	325 (440)	465 (630)	538 (730)	277 (375)	391 (530)
M22x1.5	435 (590)	620 (840)	723 (980)	369 (500)	524 (710)
M24x2.0	546 (740)	789 (1070)	922 (1250)	465 (630)	664 (900)
M27x2.0	811 (1100)	1143 (1550)	1328 (1800)	679 (920)	959 (1300)
M30x2.0	1106 (1500)	1586 (2150)	1844 (2500)	959 (1300)	1364 (1850)

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Replace cylinder bores that contain major flaws.

7. Apply the honing fluid to the Flex-Hone and warm-up the electric drill to about 300-1200 rpm.

IMPORTANT:*Do not exceed 1200 rpm, otherwise damage may occur.*

8. Dip the Flex-Hone, attached to the electric drill, into the honing fluid.

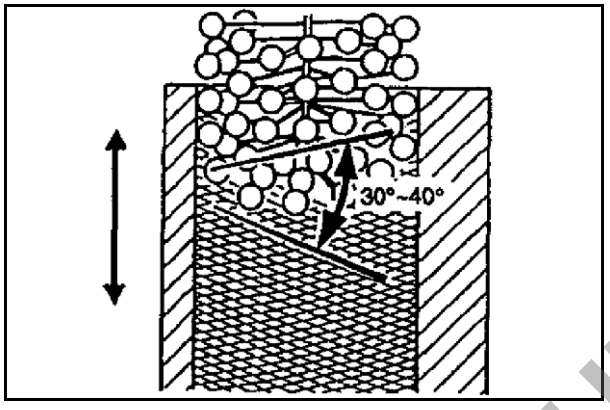


Figure 5-155 Honing Cross Hatch

9. Insert the Flex-Hone into the cylinder bore while rotating the Flex-Hone and moving the electric drill up-and-down for approximately 30 seconds. This process obtains a honing mark with a cross-hatch angle of 30-40°. See Figure 5-155.

IMPORTANT:*Do not insert or extract Flex-Hone into cylinder bore unless the Flex-Hone is rotating, otherwise the cylinder may be damaged.*

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Troubleshooting the Alternator

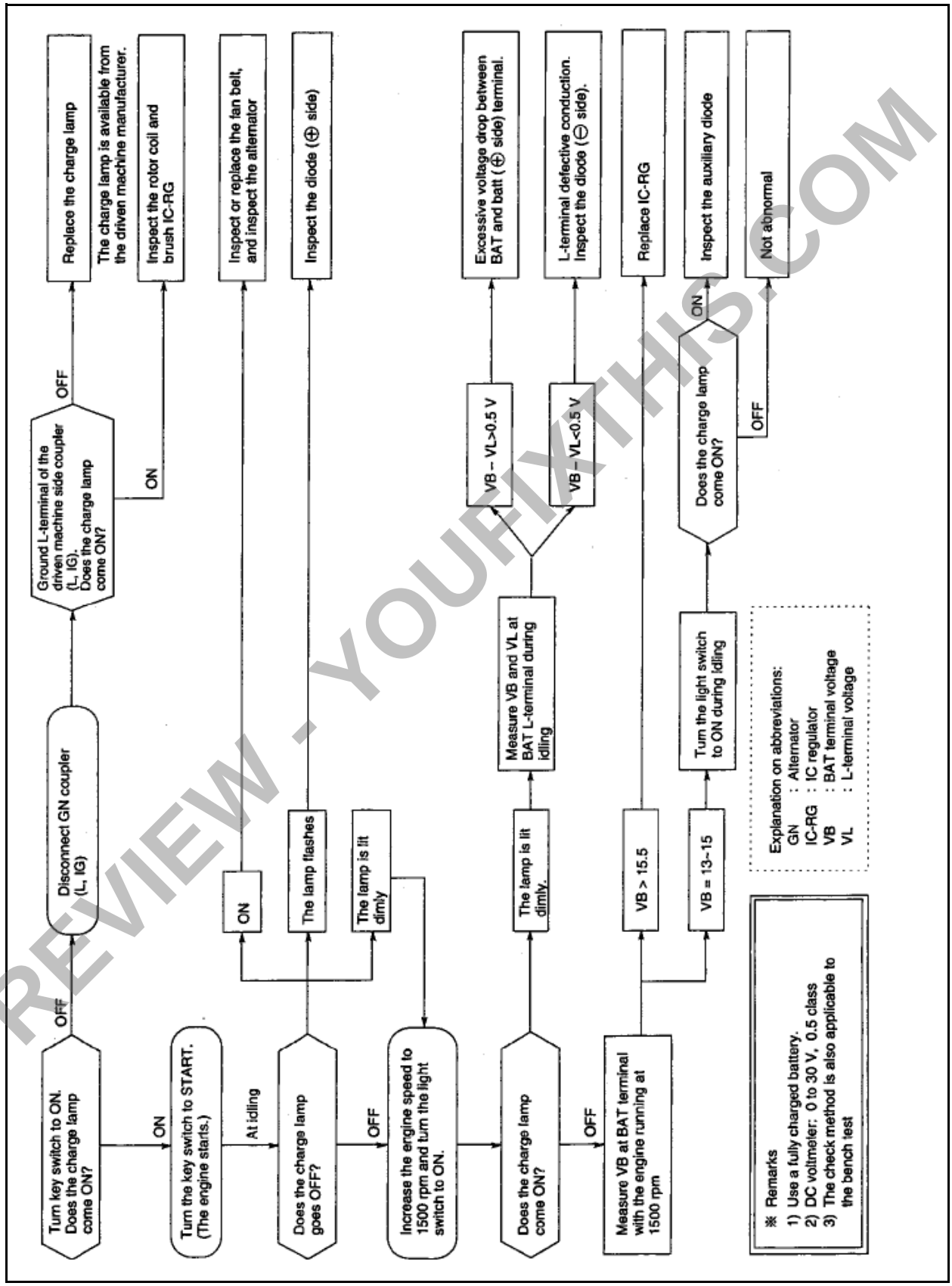


Figure 6-2 Yanmar Alternator Troubleshooting

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General Specifications

Height	9’2” (2790 mm)
Width	7’10” (2400 mm)
Length	23’3” (7087 mm)
Arm Length	8’7” (2610 mm)
Slew Angle – Left	80°
Slew Angle – Right	50°
Front Boom Swing Radius	6’9” (2400 mm)
Ground Clearance	16.5” (420 mm)
Undercarriage width	7’10” (2400 mm)
Undercarriage Length	131” (3320 mm)
Rubber Track Width	19.7” (500 mm)
Max. Boom Height	17’4” (5283 mm)
Max. Dumping Height	19’4” (5885 mm)
Max. Digging Height	26’1” (7946 mm)
Max. Digging Radius	26’2” (7976 mm)
Max. Vertical Digging Depth	9’2” (2810 mm)
Max. Digging Depth	15’8” (4780 mm)
Min. Tail Swing Radius	5’5” (1645 mm)
Min. Arm Clearance	6’11” (2100 mm)
Dozer Blade Width	7’10” (2390 mm)
Dozer Blade Height	1’9” (550 mm)
Maximum Lift Above Ground	24.5” (622 mm)
Maximum Depth Below Ground	18.5” (470 mm)
Number of Track Rollers	6 per side
Operating Weight with Cab	25,397 lbs. (11,520 kg)
Average Ground Pressure	6.1 psi (0.43 bar)
Ground pressure (Rubber Tracks)	5.7 psi (0.39 bar)
Ground pressure (Steel Tracks)	5.8 psi (0.40 bar)
Gradability	30° (58%)
Sound Power	101 dB(A)
Sound Pressure	80 dB(A)
Travel Speed - Low Speed	2.2 mph (3.6 km/h)
Travel Speed - High Speed	3.9 mph (6.2 km/h)
Bucket Tooth Breakout Force	15,512 lbf (69.6 kN)
Arm Force	11,100 lbf (50.3 kN)
Swing Speed	11 rpm

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P1 or P2 Decreases, the Oil Flow Increases

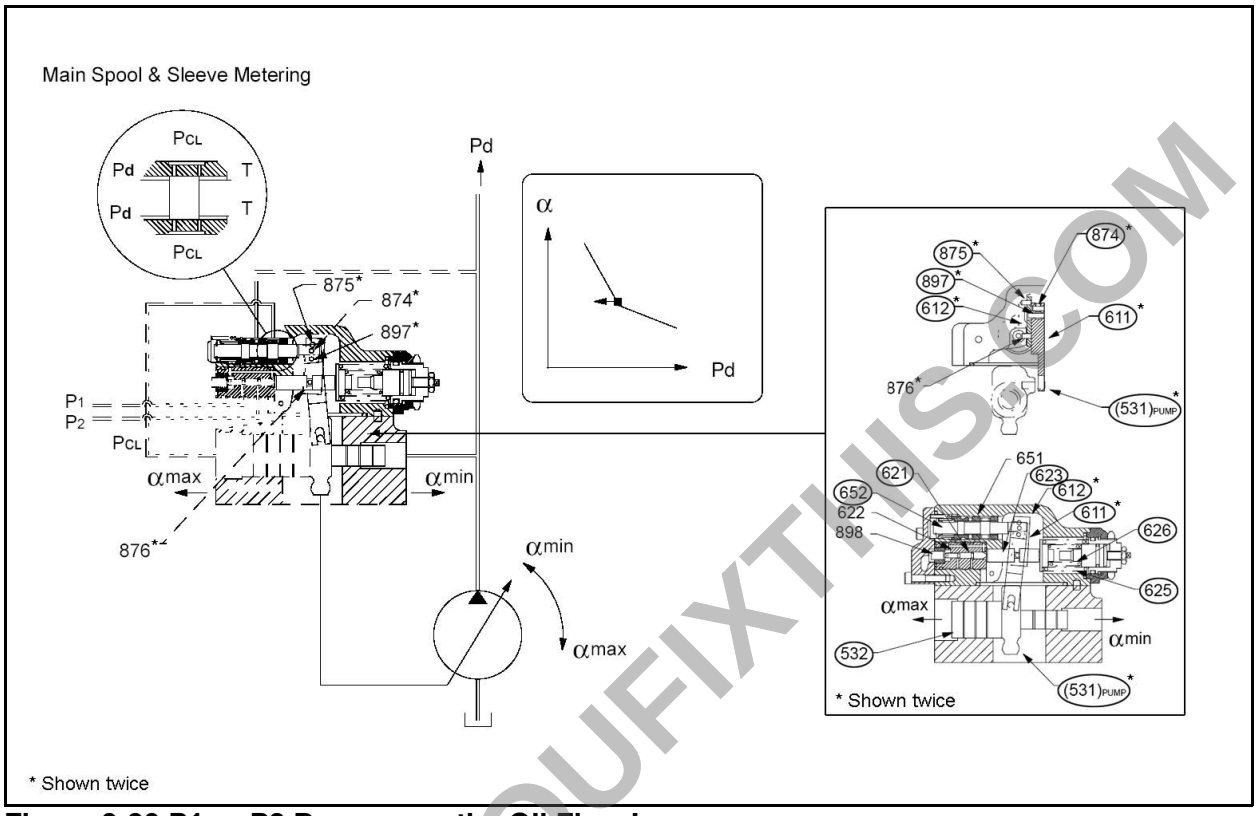


Figure 3-30 P1 or P2 Decreases, the Oil Flow Increases

While P1 and/or P2 pressure decreases, delivery pressure decreases. This decrease causes power spring pack (inner [626] and outer [625] spring) to shift power push rod (623) to the left while reducing the power piston force. See Figure 3-30.

Feedback pivot (897) and main spool (652) compression spring transmit power lever (left side) movement. Main spool (652) compression spring also eliminates feedback by pulling main spool (652) to the left. Main spool (652) movement to the left meters the larger diameter area on the left side of the servo piston (532) pressure to the tank pressure. Because the small side of the servo piston (532) is connected to the pump delivery pressure, when servo piston (532) moves to the left, pump displacement increases toward maximum. See Figure 3-30.

After servo piston (532) moves to the left and reaches its final position, feedback lever (611) shifts main spool (652) to the null position, restoring equilibrium. See Figure 3-30.

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3. Slowly open the filler cap to relieve pressure. Remove cap and clean strainer of any debris.
4. Remove the hydraulic reservoir cover as shown. See Figure 2-22.
5. Open the drain plug and drain oil into a suitable container. Re-install drain plug and tighten securely. See Figure 2-22.

IMPORTANT: *Always dispose of hydraulic fluids according to local regulations or take to a recycling center for proper disposal. DO NOT pour onto the ground or down a drain.*

6. Remove bolts and filter cover. Remove and discard old filter. Put clean hydraulic fluid on the filter gasket and install gasket and new filter into reservoir. See Figure 2-22.
7. Reinstall filter cover and bolts.
8. Fill reservoir with hydraulic oil until oil level is between red and black marks on sight gauge.
9. Re-install hydraulic oil filler cap and tighten securely.
10. Start engine and let idle for a few minutes.
11. Cycle all front attachment hydraulic functions. Re-check hydraulic oil level.

Diesel Engine

Engine Oil/Filter Change Maintenance Schedules

NOTICE:*All of the following prerequisites must be fullfilled in order to perform the 500 hrs. maintenance schedule. Perform the standard maintenance schedule (see below) if the following prerequisites are not fullfilled.*

500 hrs. Maintenance Schedule Requirements

- If operating in extreme working conditions (high dust concentration, high temperature, using the hydraulic hammer [pile driver]), the standard schedule engine oil/filter maintenance must be performed.
- The engine oil/filter has to be changed a minimum of once per year.
- First engine oil/filter change must be performed after 50 hours.
- No modifications to the diesel engine or its cooling system.
- Mustang OEM filter must be used.
- Must use API CI-4, API CH-4, ACEA E3-E4 rated engine oil.
- Applies to units with both Yanmar 4TNE106T-NS engine (SN AB00473-AB03158), and John Deere 4045TF270 engines (SN AC02633 and up).

Engine Oil/Filter Schedule	
Standard Schedule	**500 hrs. Schedule**
First change after 50 hrs.	First change after 50 hrs.
Then every 125 - 250 hrs.	Then every 500 hrs.

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Removing Drive Shafts

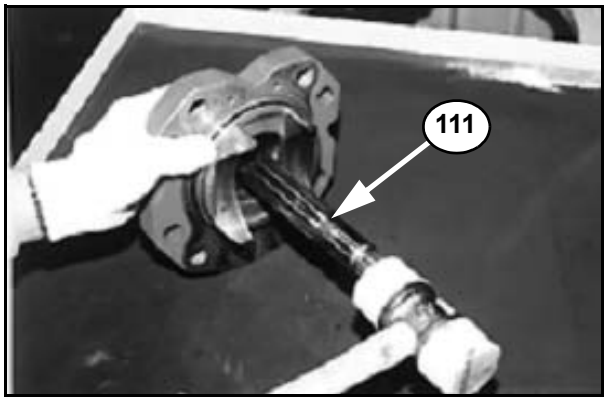


Figure 3-48 Drive Shaft

1. Use plastic-headed hammer to tap lightly on the external shaft end of drive shafts (111). See Figure 3-38 and Figure 3-48.

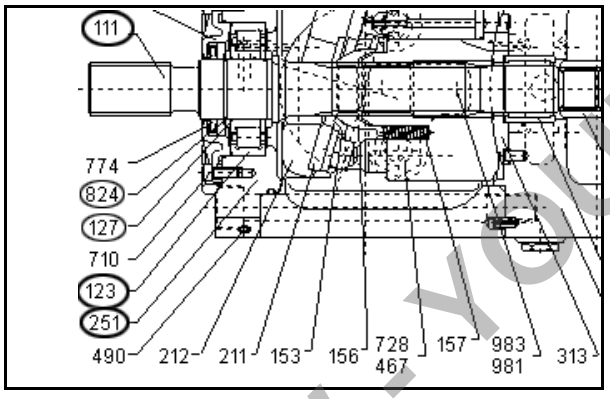


Figure 3-49 Drive Shaft

2. Extract each drive shaft (111) from swash plate support (251). If necessary, extract rolling bearing (123), bearing spacer (127), and snap ring (824) from each drive shaft (111). See Figure 3-38 and Figure 3-48.

3. Complete steps 1-2 for both the rear and front pumps.

IMPORTANT:*Do not re-use the extracted bearings.*

Removing Valve Plates from Valve Block



Figure 3-50 Valve Plate, Valve Block

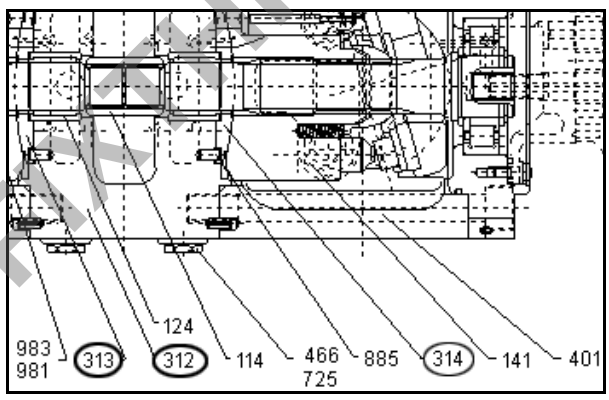


Figure 3-51 Valve Plate, Valve Block

1. Remove valve plates (313, 314) from valve block (312). These may have been removed while completing the steps in “Removing all Plugs, Regulator, and Gear Pump” on page 86. See Figure 3-50 and Figure 3-51.

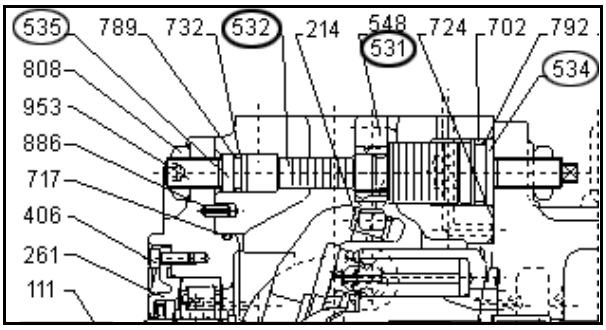


Figure 3-52 Pump Casing

2. Remove stopper (L) (534), stopper (S) (535), servo piston (532), and tilting pin (531) from pump casing. See Figure 3-50 and Figure 3-52.

IMPORTANT:*Use a protection shield to prevent the pin head from being damaged when removing tilting pin (531). See Figure 3-52.*

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Boom Swing Control

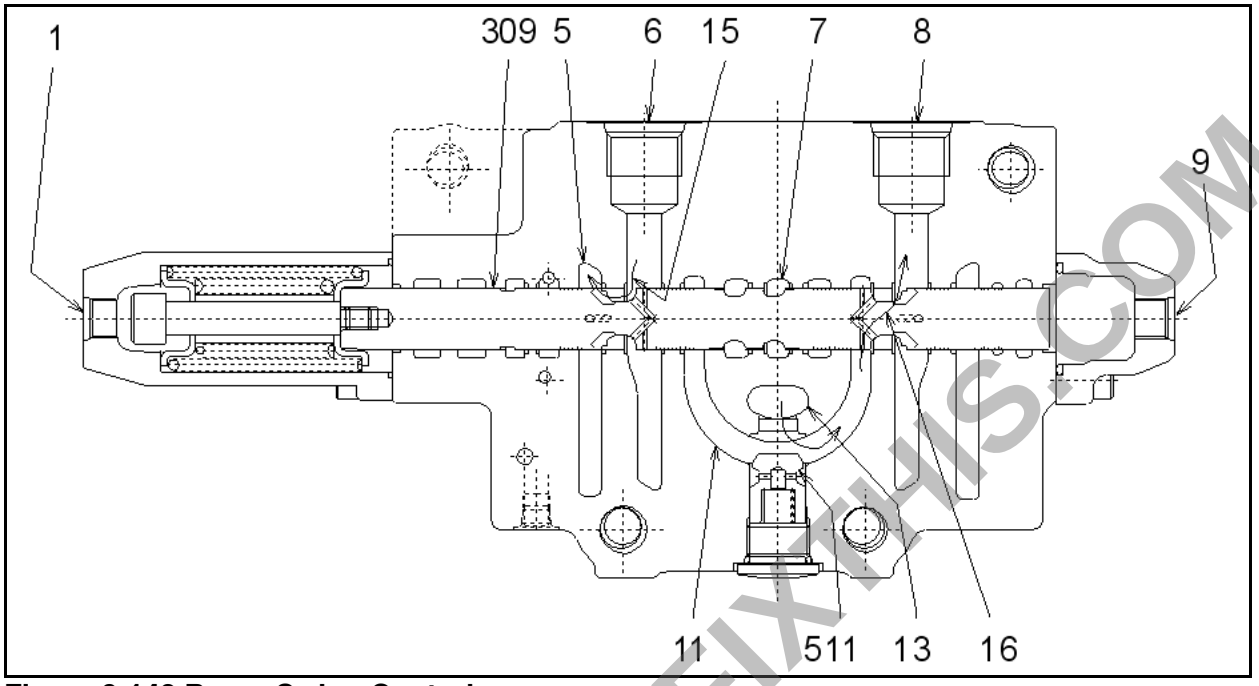


Figure 3-142 Boom Swing Control

While swinging the boom right or left, only rear pump (28) supplies hydraulic fluid into the swing motor. See Figure 3-143.

When the pilot control lever is in neutral position, the pilot control valve does not supply any pilot pressure to either pilot port (1) or pilot port (9). Springs (322) and (328) maintain swing spool (309) in neutral position. Rear pump (28) hydraulic fluid flows through center bypass (7) and into the tank. See Figure 3-142, Figure 3-143 and Figure 3-139 on page 134.

When using the pilot control lever for swinging the boom right or left, pilot pressure is supplied into port (9), shifting swing spool (309) to the right or left. Center bypass (7) shuts-off and path (16) opens while path (15) flows into return path (5). See Figure 3-142.

Hydraulic fluid flows into parallel path (13) and then through load check valve (511), path (11), path (16), and into port (8). See Figure 3-142.

The swing motor turns to the right or left, depending on the swinging direction, and the return flow from the swing motor flows into port (6). Hydraulic fluid then flows through path (15), return path (5), and into the tank. See Figure 3-142.

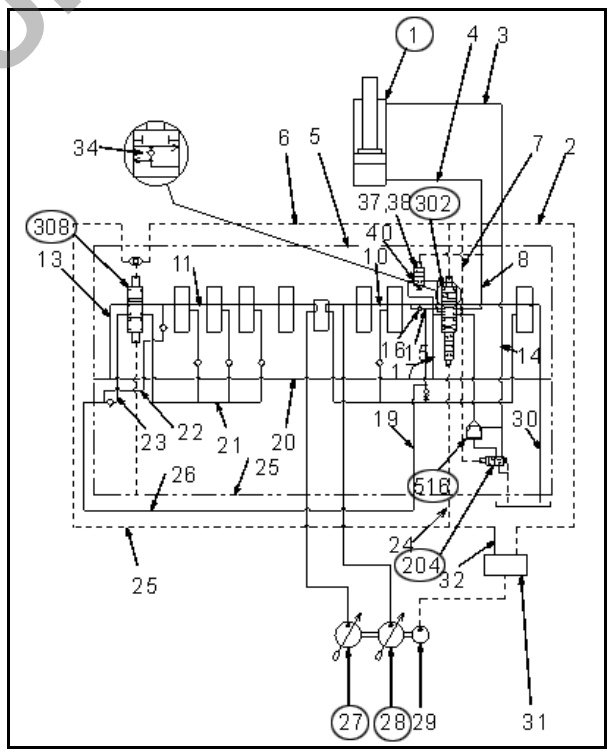


Figure 3-143 Dipper Arm Control

For a larger view of Figure 3-143, see Figure 3-128 on page 128.

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Hydraulic Diagram

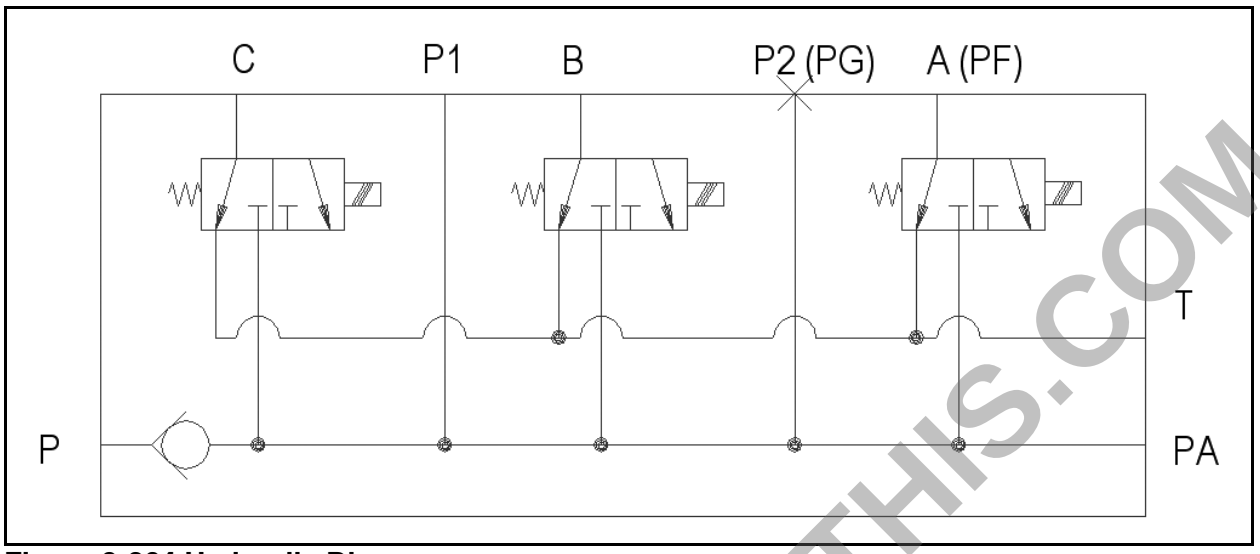


Figure 3-264 Hydraulic Diagram

Side Valve Block

Functions: Dozer blade, boom offset.

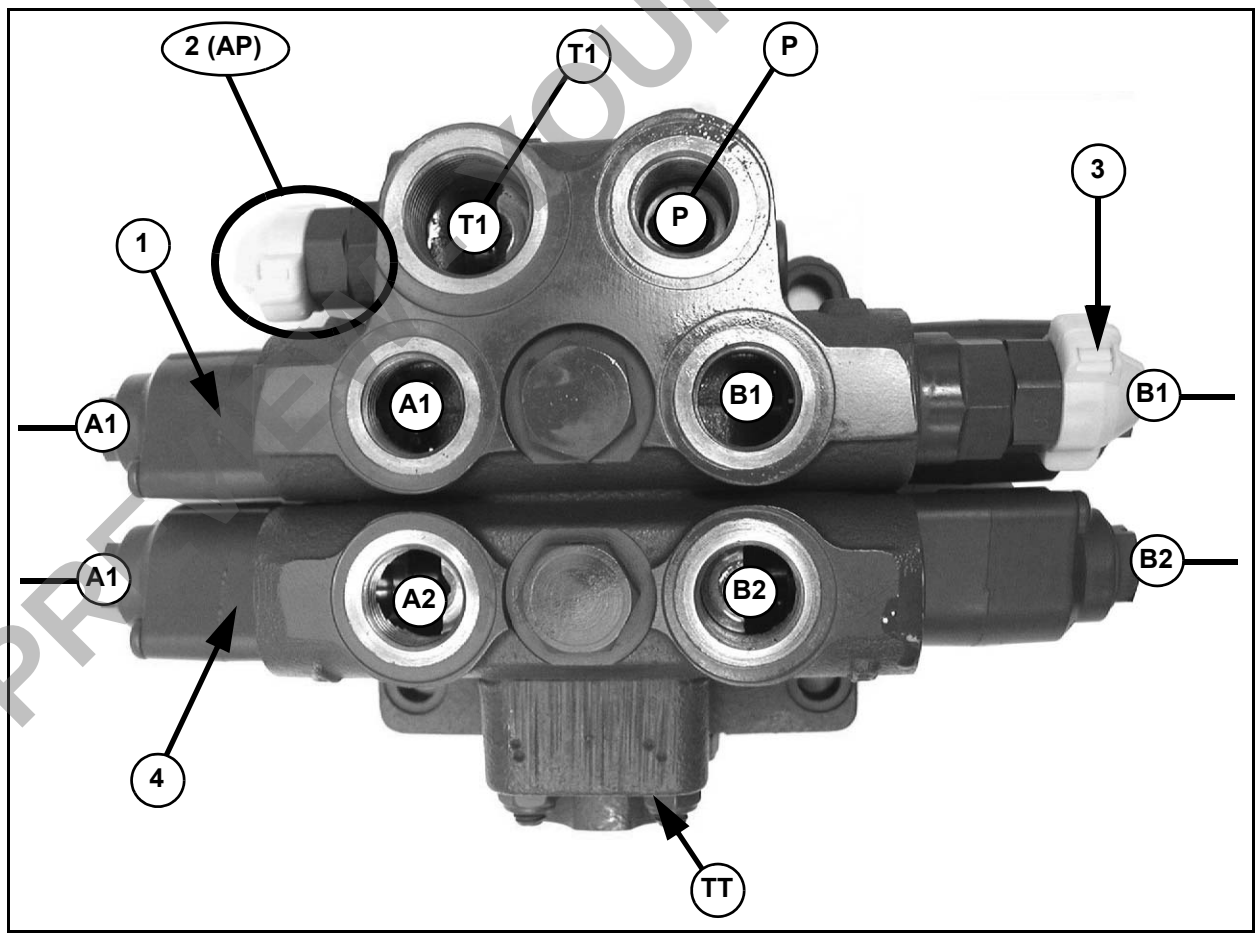


Figure 3-265 Side Valve Block

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CHAPTER 5

YANMAR ENGINE 4TNE106T-NS (SN AB00473-AB03158)

For specifications, see “John Deere 4045TF270 and Yanmar 4TNE106T-NS Specifications” on page 9.

Yanmar Engine Model 4TNE106T-NS Overview

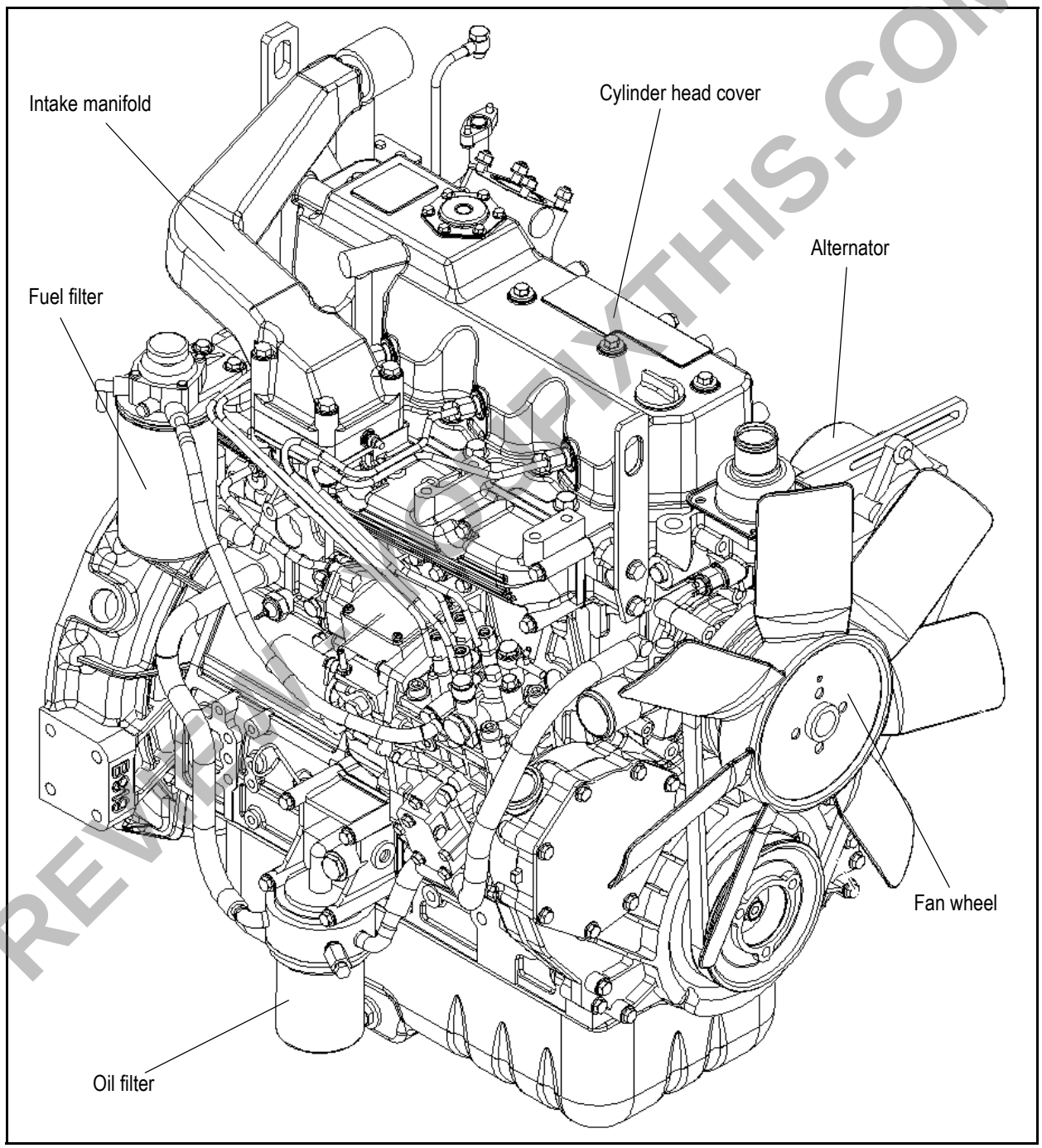


Figure 5-1 Yanmar 4TNE106T-NS (Overview), Fan View

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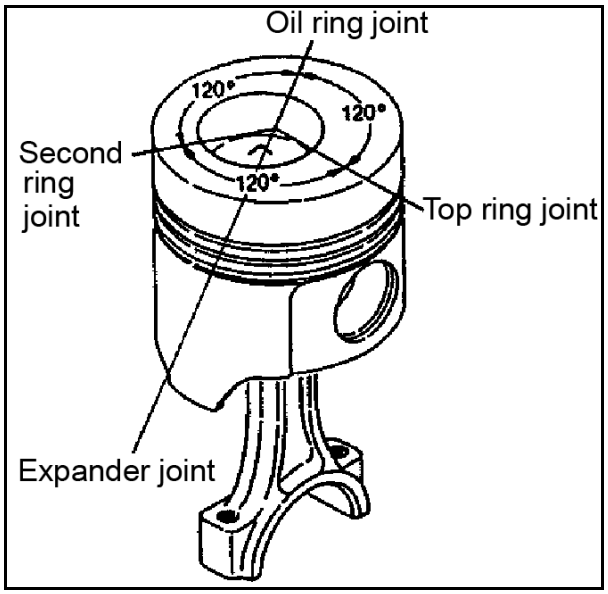


Figure 5-134 Ring Joints

3. Install the piston ring joints as shown. See Figure 5-134.

NOTICE: *Do not position the top ring joint vertical to the piston pin.*

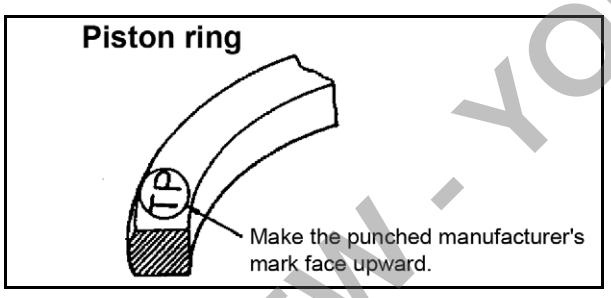


Figure 5-135 Piston Ring

4. Install each piston ring onto the piston with the manufacturer's mark facing upward. See Figure 5-135.

Installing the Crankshaft

⚠ CAUTION

Use care when moving the crankshaft, mishandling the crankshaft can cause serious injury, and damage to the crankshaft.

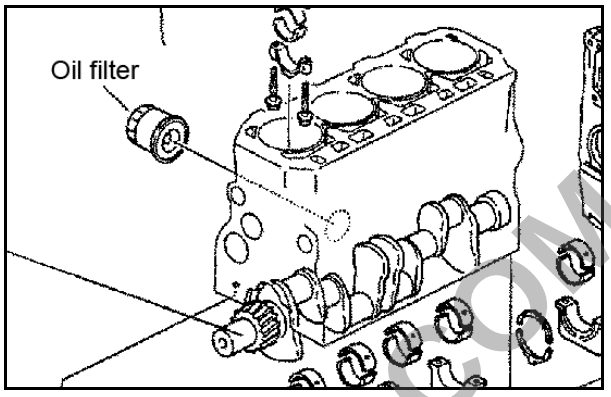


Figure 5-136 Crankshaft

1. Install the crankshaft (8). See Figure 5-136.

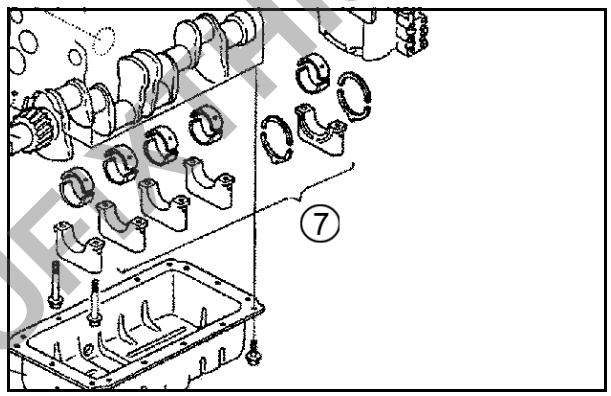


Figure 5-137 Bearing Caps

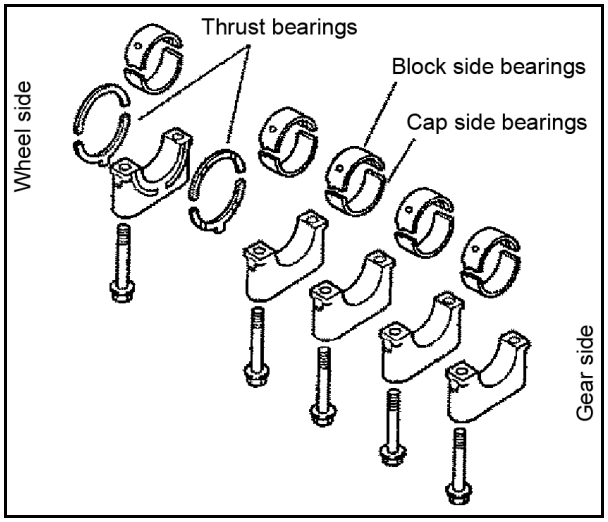


Figure 5-138 Crankshaft Bearings

2. Install the bearing caps (7), cap side bearings, and upper and lower bearings as pairs. The upper bearings have oil holes. See Figure 5-137 and Figure 5-138.

3. Install the thrust bearings in the direction of removal. See Figure 5-138.

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