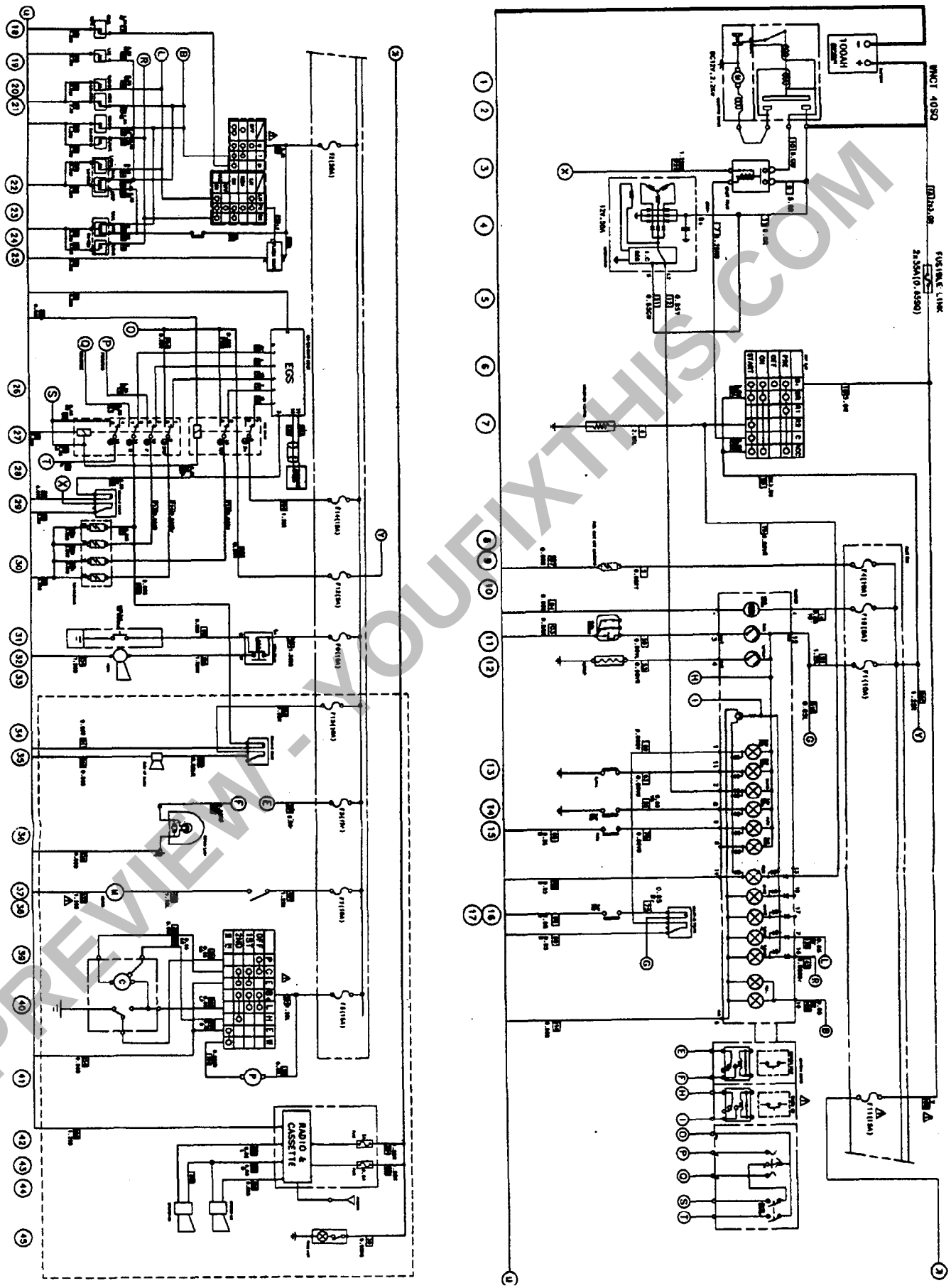
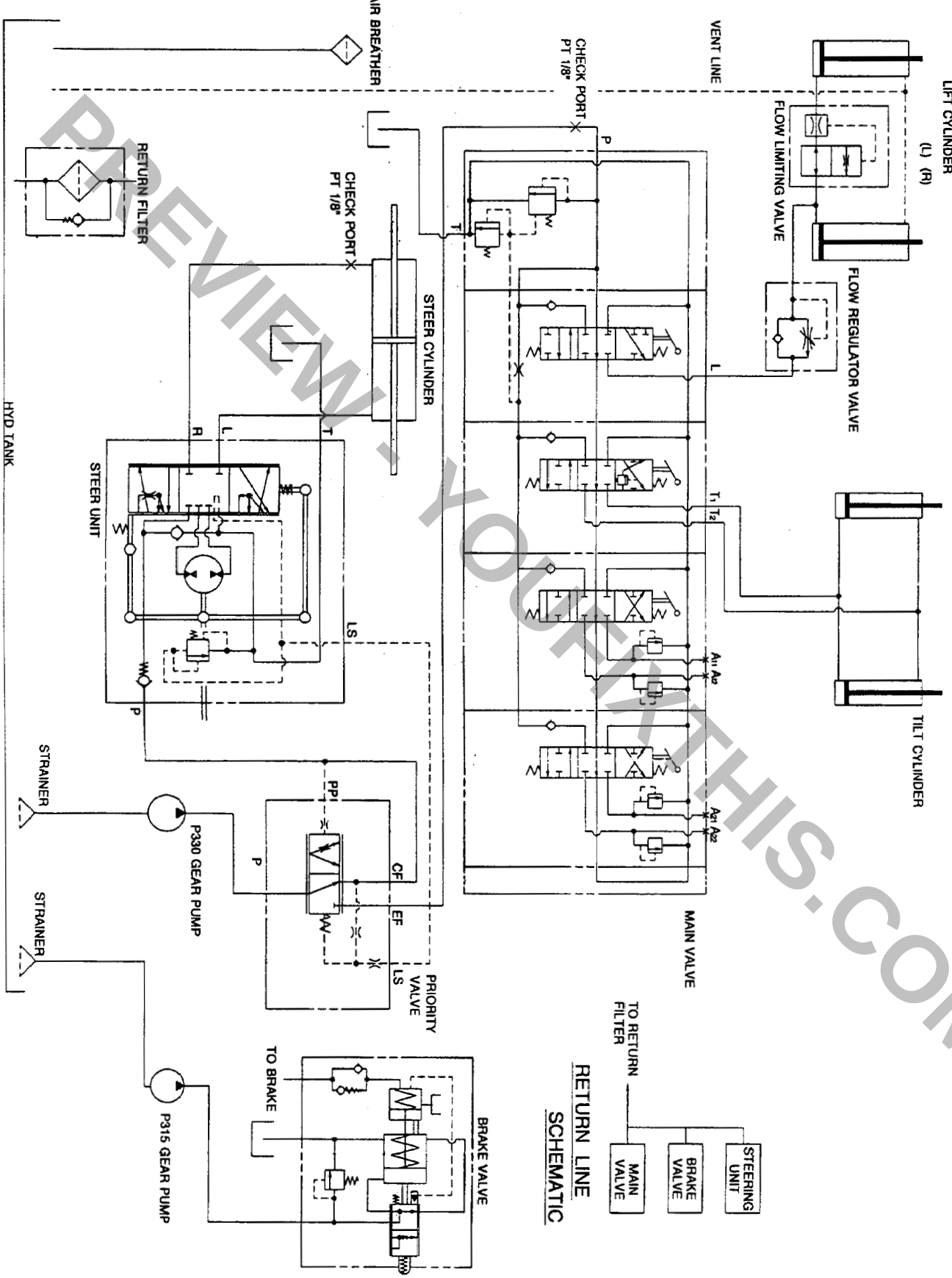


PREVIEW - YOUFIXTHIS.COM

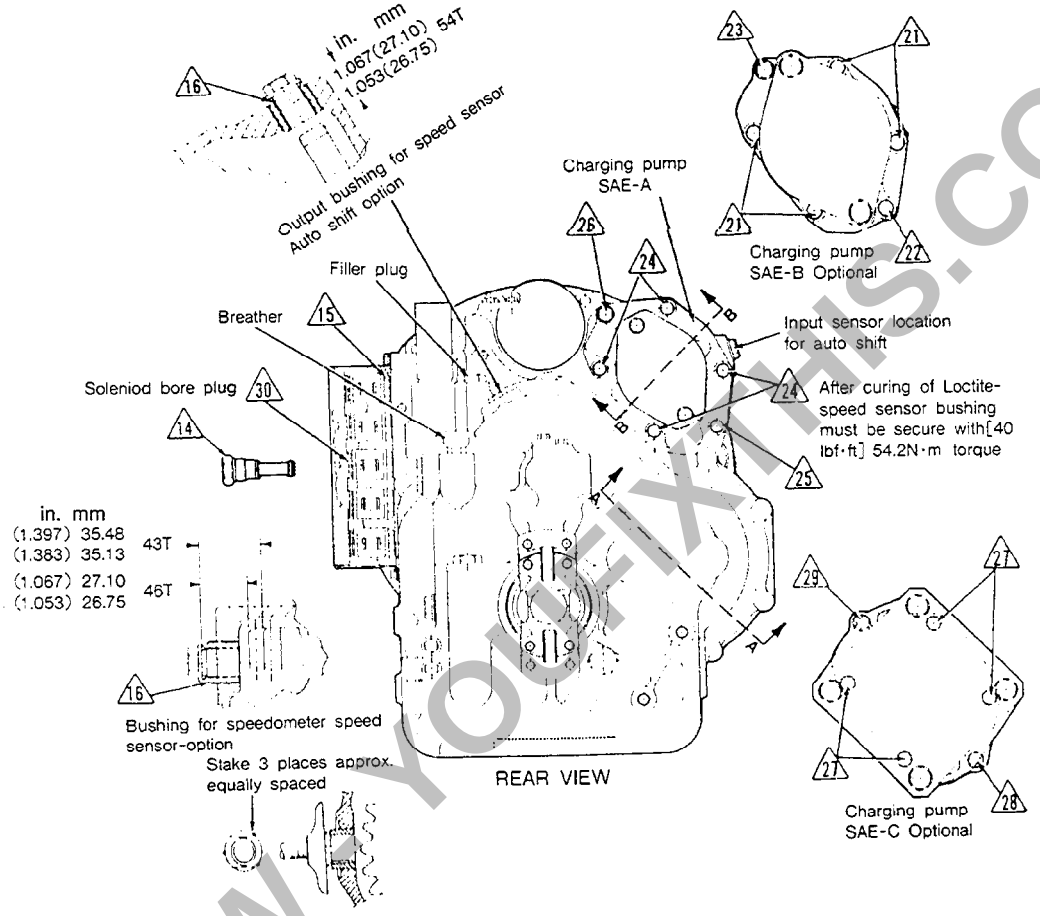
Download full manual at youfixthis.com

Hydraulic Schematic



PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com



TORQUE SPECIFICATION FOR LUBRICATED OR PLATED SCREWS AND NUTS				
NOMINAL SIZE	GRADE 5		GRADE 8	
	FINE THREAD N·m (lbf·ft)	COARSE THREAD N·m (lbf·ft)	FINE THREAD N·m (lbf·ft)	COARSE THREAD N·m (lbf·ft)
0.2500	12~15 (9~11)	11~14 (8~10)	15~18 (11~13)	12~15 (9~11)
0.3125	22~27 (16~20)	16~22 (12~15)	38~43 (28~32)	35~41 (26~30)
0.3750	35~39 (26~29)	31~34 (23~25)	50~56 (37~41)	45~49 (33~36)
0.4375	56~61 (41~45)	50~56 (37~41)	79~84 (58~64)	71~77 (52~57)
0.5000	87~95 (64~70)	77~85 (57~63)	122~134 (90~99)	108~119 (80~88)
0.5625	123~136 (91~100)	111~122 (82~90)	174~191 (128~141)	156~172 (115~127)
0.6250	174~191 (128~141)	153~168 (113~124)	224~268 (180~198)	216~327 (159~175)
0.7500	302~332 (223~245)	271~298 (200~220)	427~470 (315~347)	382~420 (282~310)

Figure K

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Safe Parking

Before working on truck:

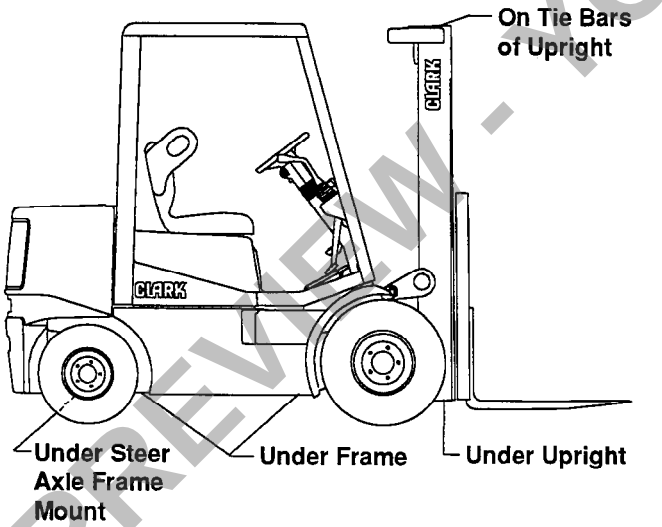
1. Park truck on a hard, level, and solid surface, such as a concrete floor with no gaps or breaks.
2. Put upright in vertical position and fully lower the forks or attachment.
3. Put all controls in neutral. Turn key switch OFF and remove key.
4. Apply the parking brake and block the wheels.

WARNING

Defective equipment can cause accidents. All tools and lifting equipment must be in good condition, meet the load capacity requirements and have OSHA labels when required. Tools with defects can have failures causing severe injury or death.

Lifting, Blocking, and Jacking Points

Use the following illustration to locate general lifting, blocking, and jacking points on the truck. Read the procedures for raising, blocking, or jacking specific components of the truck to make sure you understand the correct, safe procedures.



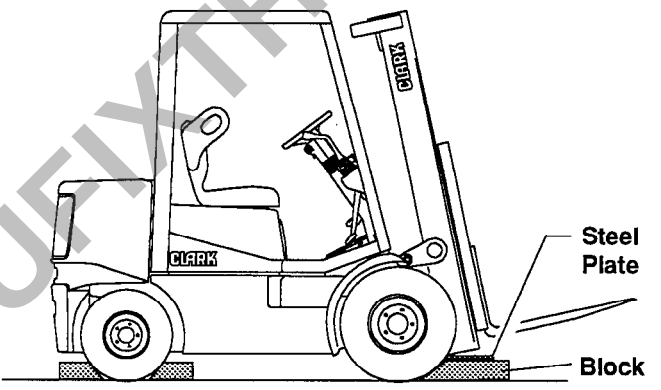
WARNING

Do not attempt to lift the truck by the overhead guard or the counterweight. Severe injury may result and the truck can be damaged.

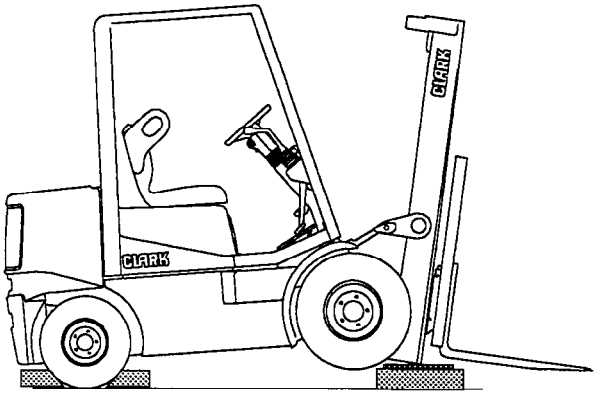
Raising Drive Wheels Off Floor

This procedure uses the upright as a lever to lift the drive wheels off the floor and prevent accidents due to inadvertent powering of the drive wheels.

1. Park truck safely as described in "Safe Parking." Block steer wheels.
2. Be sure upright trunnion bolts are tight. Bolt torques must be 75-80 N•m (55-59 ft-lb).
3. Start the engine. Tilt the upright fully back. Adjust upright height as necessary to put blocking underneath the lower end of the upright.
4. Put a solid 100 x 100 mm (4 x 4 in) hardwood block under the front section of each upright rail. Put a 3-6 mm (.125-.250 in) steel plate on top of each block.



5. Tilt upright fully forward. This raises the drive wheels off the floor. Release the tilt control lever and turn engine OFF.



PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Contents

Contents are listed by Group number and name followed by Section number and name:

SA SAFE MAINTENANCE
1. Safety
2. Lifting, Jacking, and Blocking
3. Towing

PS PERIODIC SERVICE
1. Maintenance Schedules
2. Planned Maintenance
3. PM Inspection Form

00 PERKINS DIESEL ENGINE

01 COOLING SYSTEM
1. Specifications and Description
2. Troubleshooting

06 TRANSMISSION

14 ELECTRICAL
1. Circuit Diagram
2. Instrument Pod

16 WHEELS AND TIRES
1. Specifications and Description
2. Cushion Wheels and Tires
3. Pneumatic Wheels and Tires

23 BRAKE SYSTEM
1. Specifications
2. Service/Inching Brake
3. Parking Brake

20 DRIVE AXLE
1. Specifications and Description
2. Drive Axle Overhaul

25/26 STEER SYSTEM
1. Specifications and Description
2. Troubleshooting
3. Steering System Removals & Installations
4. Steering System Pressure Check
5. Steering Unit Overhaul
6. Priority Valve Overhaul
7. Steer Cylinder Overhaul

29/30 HYDRAULIC SYSTEM
1. Specifications and Description
2. Troubleshooting
3. Hydraulic Pump Overhaual
4. Control Valve Overhaul

34 UPRIGHTS
1. Specifications and Description
2. Upright Checks and Adjustments
3. Lift Chain Service
4. Removals and Replacements
5. Lift and Tilt Cylinder Overhaul

38 COUNTERWEIGHT
1. Specifications
2. Inspection
3. Removal and Replacement

40 SPECIFICATIONS
1. Specifications

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Section 1. Safety

Safety Signs and Messages

Safety signs and messages in this manual and on the lift truck provide instructions and identify specific areas where potential hazards exist and special precautions should be taken. Be sure you know and understand the meaning of these instructions, signs, and messages. Damage to the truck, death, or serious injury to you or other persons may result if these messages are not followed.

NOTE

This message is used when special information, instructions or identification is required relating to procedures, equipment, tools, pressures, capacities, and other special data.

IMPORTANT

This message is used when special precautions should be taken to ensure a correct action or to avoid damage to, or malfunction of, the truck or a component.

⚠ CAUTION

This message is used as a reminder of safety hazards that can result in personal injury if proper precautions are not taken.

⚠ WARNING

This message is used when a hazard exists that can result in injury or death if proper precautions are not taken.

⚠ DANGER

This message is used when an extreme hazard exists that can result in injury or death or serious injury if proper precautions are not taken.

The above terms have been adopted by Clark Material Handling Company. The same terms may be used in different context in service literature supplied directly or indirectly by vendors of truck components.

Safe Maintenance Practices

The following instructions have been prepared from current industry and government safety standards applicable to industrial truck operation and maintenance. These recommended procedures specify conditions, methods, and accepted practices that aid in the safe maintenance of industrial trucks. They are listed here for the reference and safety of all workers during maintenance operations. Carefully read and understand these instructions and the specific maintenance procedures before attempting to do any repair work.

When in doubt of any maintenance procedure, please contact your local Clark dealer.

1. Powered industrial trucks can become hazardous if maintenance is neglected. Therefore, suitable maintenance facilities, trained personnel, and procedures must be provided.
2. Maintenance and inspection of all powered industrial trucks shall be done in conformance with the manufacturer's recommendations.
3. A scheduled planned maintenance, lubrication, and inspection program shall be followed.
4. Only trained and authorized personnel shall be permitted to maintain, repair, adjust, and inspect industrial trucks. Work should be performed in accordance with the manufacturer's specifications.
5. Properly ventilate work area, vent exhaust fumes, and keep shop clean and floor dry.
6. Avoid fire hazards and have fire protection equipment present in the work area. Do not use an open flame to check for level or leakage of fuel, electrolyte, or coolant. Do not use open pans of fuel or flammable cleaning fluids for cleaning parts.
7. Before starting work on truck:
   a. Raise drive wheels off of floor or disconnect power source and use blocks or other positive truck positioning devices.
   b. Disconnect battery before working on the electrical system.
8. Before working on engine fuel system of gasoline- or diesel-powered trucks, be sure the fuel shut-off valve is closed.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

GROUP SA

SAFE MAINTENANCE

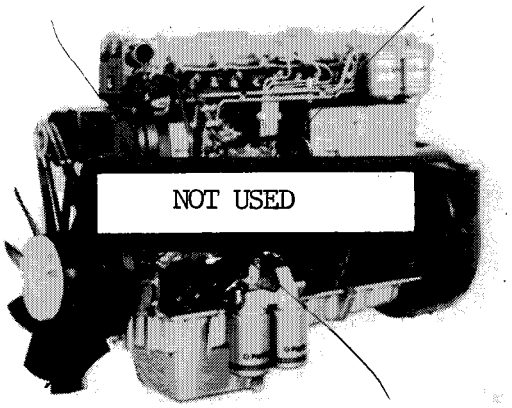
Safety ..... Section 1

Lifting, Jacking, and Blocking the Truck ..... Section 2

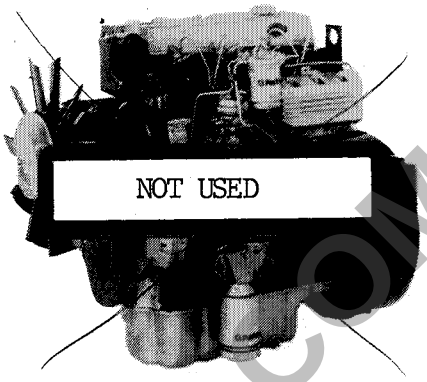
Towing ..... Section 2

PREVIEW - YOUFIXTHIS.COM

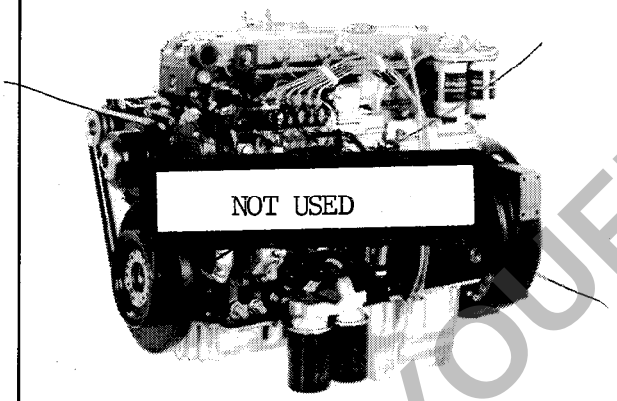
Download full manual at youfixthis.com



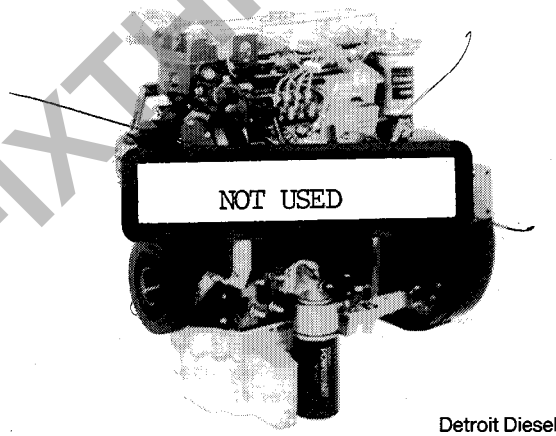
Phaser 160T



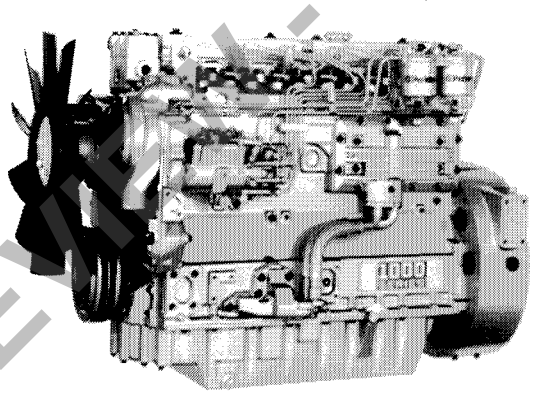
Phaser 110T



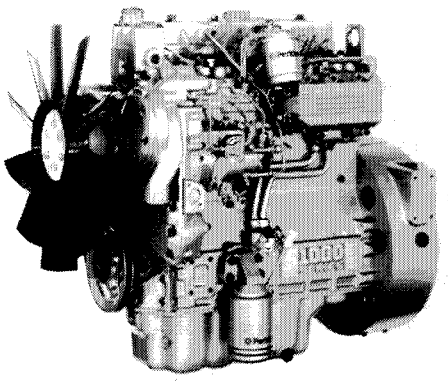
Detroit Diesel
Phaser 180Ti



Detroit Diesel
Phaser 110Ti



1006-6



1004-4T

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Cylinder head assembly

To remove and to fit **12A-07**

To remove

1 Drain the cooling system.

2 Disconnect the battery terminals.

3 Engine types AA and YA: Remove the air filter/cleaner hose at the induction manifold.

Engine types AB, AC, AD, AE, YB, YC, YD and YE: Remove the air filter/cleaner hose at the compressor inlet of the turbocharger.

4 Remove the pipe which is fitted between the cold start device in the induction manifold and the fuel filter. Disconnect the electrical connection.

5 Engine types AB, AD, AE, YB, YD and YE: Remove the boost control pipe which is fitted between the front of the induction manifold and the fuel injection pump.

6 Remove the induction manifold.

7 Engine types AB, AC, AD, AE, YB, YC, YD and YE: Disconnect all connections to the turbocharger and remove the turbocharger, operation 18A-01.

8 Remove the exhaust manifold.

9 Remove the low pressure fuel pipes which are fitted between the fuel injection pump and the fuel filter. Where a Bosch fuel injection pump is fitted, keep the fuel outlet banjo bolt with the fuel injection pump. Remove the fuel pipe fitted between the fuel lift pump and the fuel filter. Remove the fuel filter bracket together with the fuel filter.

10 Remove the high pressure fuel pipes. Where a Bosch EPVE fuel injection pump is fitted, ensure that a separate spanner is used to prevent movement of the fuel injection pump outlets when the connections of the high pressure pipes are released. Fit suitable covers to all open connections on the fuel injection pump.

11 Remove the atomiser leak-off pipe.

12 Remove the atomisers, operation 20A-02. Fit suitable covers to the nozzles and the open connections.

13 If a compressor is fitted: Remove the coolant pipe which is fitted between the cylinder head and the compressor. Then remove the coolant pipe which is fitted between the by-pass connection and the compressor.

14 Release the clip of the coolant by-pass hose at the cylinder head. Release the setscrews and remove the coolant by-pass connection and the hose.

15 Disconnect the coolant temperature sender unit.

16 Engine types AB, AD and certain AA: Remove the oil cooler, operation 21A-07A.

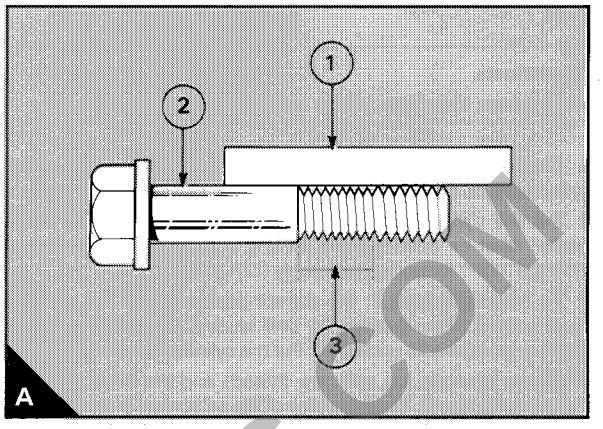
17 Remove the rocker cover, operation 12A-01.

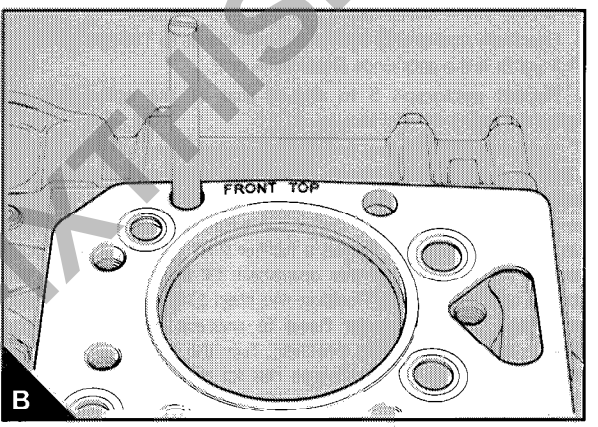
18 Remove the rocker assembly, operation 12A-02.

19 Remove the push rods.

20 Release the cylinder head setscrews evenly and gradually in the reverse sequence to that shown in 12A.08/A or B. Check the setscrews for distortion with a straight edge (A1) held along the setscrew (A2). If there is visible reduction in the diameter of the thread that has not been in engagement with the cylinder block (A3), the setscrew must be discarded.

21 Remove the cylinder head and put it on a surface that will not damage the face of the cylinder head. Do not use a lever to separate the cylinder head from the cylinder block.



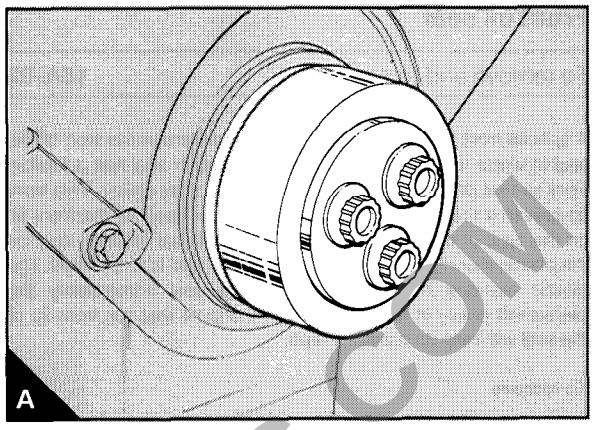


PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Timing case cover

To remove and to fit **15A-01**



To remove

1 Remove the fan, operation 21A-04.

2 Remove the drive belts, operation 23A-03.

3 Remove the crankshaft pulley, operation 14A-01.

4 If necessary, remove the fan drive pulley, operation 21A-05.

5 Drain the coolant and remove the water pump, operation 21A-02.

6 Release the setscrews and nuts of the cover and remove the cover. There is no need to remove the noise shield from the cover.

To fit

Special tools:
Centralising tool, PD.163A

1 Clean the faces of the timing case cover.

2 Put the cover and a new joint in position on the timing case. Loosely fit two opposite setscrews to hold the cover in place. Fit the centralising tool in the oil seal housing (A) and use the special washer and the crankshaft pulley setscrews to put the cover in its correct position. Do not overtighten the setscrews. Fit the remainder of the setscrews and nuts and tighten all of the cover fasteners to 22 Nm (16 lbf ft) 2,2 kgf m. Remove the centralising tool.

Attention: It is important that the cover of the timing case is centred correctly. If the cover is not centred, the backlash between the fuel pump gear and water pump gear could be affected. This could cause the seizure of the fuel injection pump.

3 Fit the water pump, operation 21A-02.

4 Fit the crankshaft pulley, operation 14A-01.

5 If necessary, fit the fan drive pulley, operation 21A-05.

6 Fit the drive belts, operation 23A-03 and adjust the belt tension, operation 23A-02.

7 Fit the fan, operation 21A-04.

8 Fill the cooling system.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Atomisers

Atomiser fault

An atomiser fault can be shown by an engine misfire. In order to find which atomiser is defective, operate the engine at a fast idle speed. Loosen and tighten the union nut of the high pressure fuel pipe at each atomiser. When the union nut of the defective atomiser is loosened, it will have little or no effect on the engine speed.

Do not let the fuel spray on to your skin!

To remove and to fit 20A-02

1 Remove the fuel leak-off pipe.

2 Release the union nuts of the high-pressure pipes from the atomisers and from the fuel injection pump. Hold the pump outlet with a spanner to prevent movement while the union nut of the high-pressure pipe is released at the pump. Do not bend the pipe. If necessary, remove the pipe clamps.

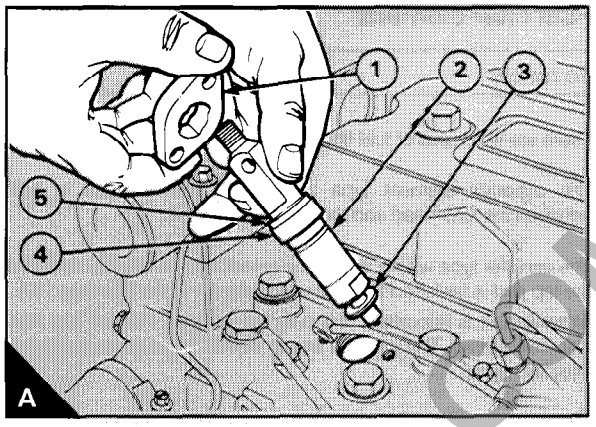
3 Release the setscrews of the atomiser flange and remove the flange (A1), the atomiser (A2) and its seat washer (A3). Remove the dust seal (A4) and the spacer (A5) and fit the spacer and a new dust seal to the new atomiser.

4 Put the new atomiser in position with its spacer, new dust seal and a new seat washer. Fit the flange and engage the flange setscrews. Ensure that the atomiser is not tilted and tighten the setscrews gradually and evenly to 12 Nm (9 lbf ft) 1,2 kgf m.

5 Fit the high-pressure pipes and tighten the union nuts to 18 Nm (13 lbf ft) 1,9 kgf m. Hold the pump outlet with a spanner to prevent movement while the pipe nut is tightened at the pump. If necessary, fit the pipe clamps.

6 Renew the seal washers and fit the leak-off pipe.

7 Operate the engine and check for fuel leakage.



PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Starter motor

To remove and to fit 23B-01

To remove

If the engine has a flywheel housing which is oil filled, drain the flywheel housing before the starter motor is removed.

1 Disconnect the battery.
2 Disconnect the starter motor cables.
3 Release the fasteners and remove the starter motor and, if necessary, the distance piece.

To fit

1 If necessary, put the distance piece in position with its location lip to the flywheel housing. Fit the starter motor and tighten the fasteners. If the engine has a flywheel housing which is oil filled, the starter motor must be sealed before it is fitted. Clean the flange face of the starter motor and the face of the flywheel housing. Apply a 2,0 mm (0.080 in) continuous bead of POWERPART Hylosil to the flange face of the starter motor near to the spigot.
2 Connect the starter motor cables.
3 Connect the battery.

To maintain the brush gear and the commutator 23B-02

CA45G or S115 starter motors

Inspect the brushes at intervals to ensure that they are free in their guides and that the wire connections are free to move. To check this, lift the spring from the brush and pull carefully on the flexible connections. If the brush does not move freely, remove it from its holder and clean the sides with a material which is damp with gasolene.

Ensure that the brushes are fitted in their original positions to keep the original wear seat. The brushes must have good seats which conform to the shape of the commutator. If the brush seat is not correct, put a piece of very fine carborundum paper or similar material tight around the commutator with the rough face to the outside. With the brush in position, turn the armature by hand, in the normal direction of rotation, until the brush has the correct shape. If the brushes are so worn that the springs do not give enough pressure, they must be renewed. Check the spring pressure with the hook of a spring balance under the spring lip. The correct tension is 8,34/11,00 N (30/40 ozf) 0,85/1,13 kgf.

The new brushes must be the exact same grade as the original brushes. To ensure that correct brushes are fitted, use only parts from the approved manufacturer. To remove the brushes, remove the four setscrews that hold the brushes, one for each brush. When the new brushes are assembled, connect carefully the field coil and connector wires, held by two of the setscrews. Before the brushes are inserted in their holders, it is advised that the holders are cleaned with compressed air or with a material which is damp with gasolene.

The commutator must be completely clean of dirt and oil. Dirt or oil must be removed by a piece of clean dry material (with no loose fibres) pressed against it, while the armature is turned by hand.

If the commutator is dirty and has a colour other than its natural colour, lift the brushes and put a strip of fine glass paper or similar material around the commutator, with the rough surface to the inside. Turn the armature by hand until the surface has returned to its natural colour. Clean the commutator with a material which is damp with gasolene.

If a repair is necessary to the commutator or switch gear, etc. the starter must be removed for specialist repair.

M127 Starter motor

Repair of this starter motor is more difficult. If necessary, remove the starter motor for specialist repair.

To test on the engine 23B-03

Ensure that the battery is fully charged.

Turn on lights and operate the starter switch. If no lights are fitted to the machine, connect a voltmeter across the battery terminals and operate the starter switch.

If the starter does not operate but the lights keep their power or there is no voltage drop across the battery, check the switch and all the connections and wires. Slow action of the starter can be caused by faulty connections.

Difficulty to engage smoothly between the starter and the flywheel can be caused, on some types of starter motor, by dirt on the helical grooves of the starter motor drive, which can prevent free pinion movement. Clean the shaft thoroughly with gasolene, or a fluid made specially for the purpose, and apply a small quantity of Aero Shell 6B or its equal.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

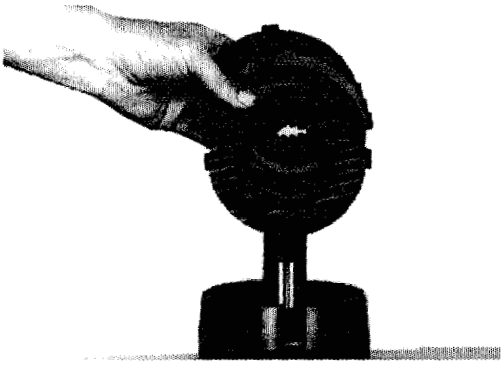
• Remove clutch disc end plate retainer ring.



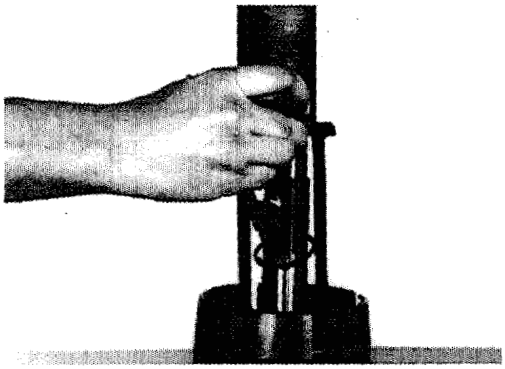
• Remove end plate.



• Remove inner and outer clutch discs.



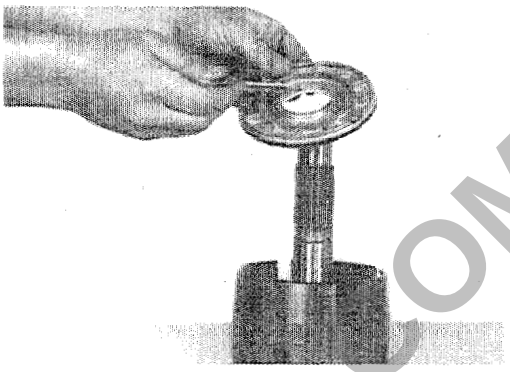
• Compress disc springs and remove retainer ring.



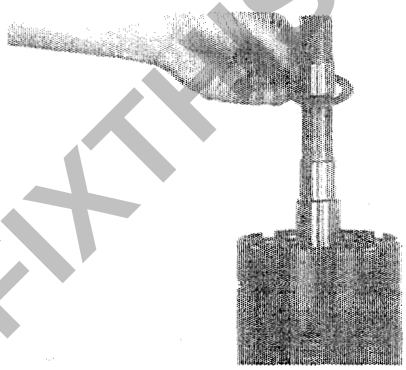
PREVIEW - YOUFIXTHIS.COM

• Install inner and outer clutch piston seal rings. Size inner ring as explained on page 20–02–21 install clutch piston in clutch drum. Use caution as not to damage sealing rings.

△2 Assembly instruction.

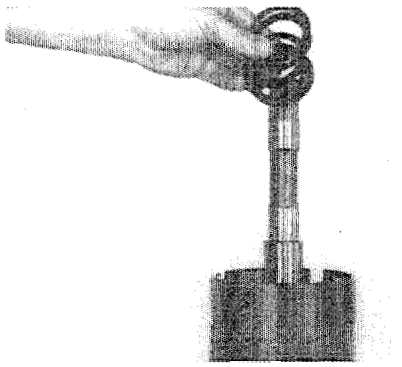


• Install clutch piston wear plate.

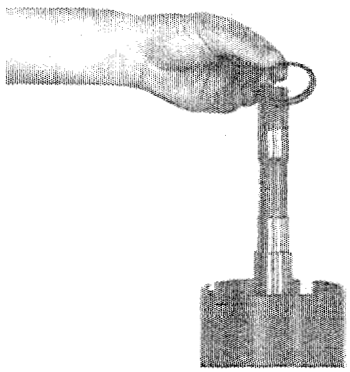


• Install piston return disc springs. First spring with large diameter of bevel toward wear plate. Alternate five (5) springs.

△7 Assembly instruction.



• Position return spring ring retainer in clutch shaft.

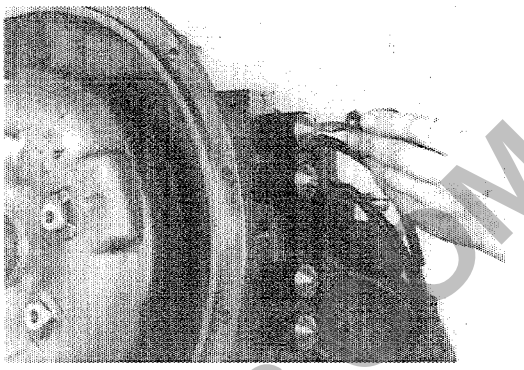


PREVIEW - YOUFIXTHIS.COM

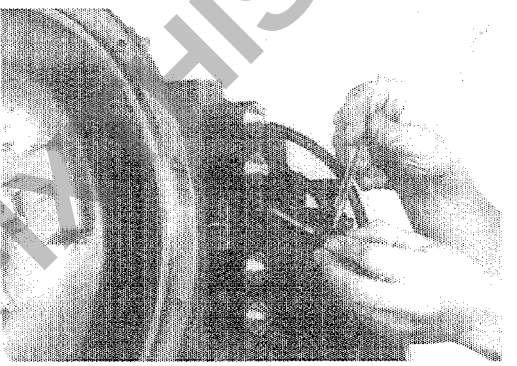
Download full manual at youfixthis.com

• Tighten cartridge nut per assembly instruction figure K, page 20–02–107.

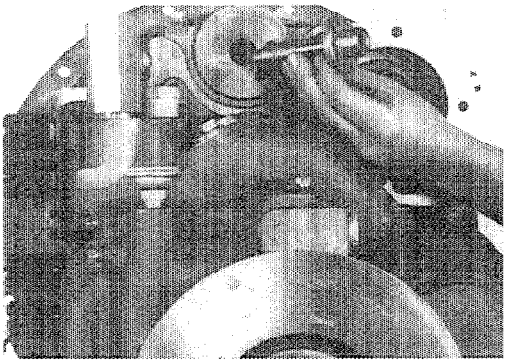
⚠15 Assembly instruction.



• On 3 speed transmission only, position new O–rings on the center hole bore plug. Install plug and tighten to specified torque.



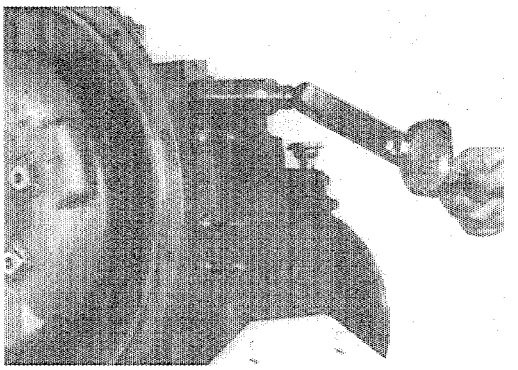
• Install regulator valve assembly in converter housing.



• A special tool can be fabricated to tighten the regulator valve.
Tighten valve assembly sleeve :

45~50 lbf · ft [61.1~67.7 N · m]

⚠13 Assembly instruction.



PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Differential Disassembly

IMPORTANT

Pull out the axle shafts (B-37, 38).
If this operation is not done, it's impossible to remove the differential carrier.

- Remove the mounting capscrews (B-41), separate the differential carrier housing and axle housing 3 mm and rotate the differential carrier housing counter-clockwise 10° then complete the disassembly.
- Fit the differential carrier housing (B-12) on a maintenance stand.
- Remove the locking plate (B-19) from the adjustable nut (B-17) on both sides.
- Loosen the differential bearing adjusting nuts (B-17) with tool 70.84.0014
- Remove the carrier capscrews (B-15) and cap (B-14) on both sides.

IMPORTANT

Prior to disassembly mark each differential cap position.

- Remove the adjusting nuts (B-17) and tapered bearing cups (B-18).
- Lift the differential assembly (B-23) from the carrier.
- With a suitable puller remove the bearing (B-4) from the differential case.
- Remove the differential half case capscrews (B-16, 31).

IMPORTANT

Prior to disassembly match mark the differential half cases.

- Pull out the side gears (B-24), differential pinions (B-41), washers (B-26) and spider (B-29) as an assembly.

IMPORTANT

Prior to removal match mark the spider to the differential half case.

- With a 5000 kg. press remove the ring gear (B-28) from the differential half case (B-23).
- With tool 70.99.0053, hold the input flange (B-1) and remove the nut (B-2) and washer.
- With a suitable puller remove the flange assembly (B-1) from the pinion shaft (B-30).
- With a soft faced mallet tap the pinion shaft (B-30) through the outer bearing assembly (B-4).
- Remove the spacer (B-5—7), keep the shims (B-8—10) together.
- Fit bearing removal tool.

With a 5000 kgf (11000 1bf), press remove the pinion shaft (B-30) from the bearing (B-40).

- Pull out the oil seal (B-39, 40).
- Remove the circlip (B-39).
- Pull out the tapered roller bearing (B-4).
- with a suitable puller remove both bearing (B-4) outer races.

Drive Axle Cleaning

Thoroughly wash all parts (gears, bearings. etc.) with clean solvent.

Do not wash with steam or hot water since it will be difficult to remove the moisture completely.

Thoroughly dry all component parts with compressed air or lintless rags free of abrasive materials to avoid scoring the surface.

Ensure that all the surfaces are covered with a film of oil to protect them against any oxidization.

Drive Axle Inspection

1. Thoroughly check the roller bearings, including the rollers, cage, inner/outer races. Replace any bearing which show signs of wear and tear or other damage.
2. Check all gears for damaged and excessively worn teeth and polished surfaces. Differential pinions, side gears and the pinion/bevel ring gear must be replaced as sets.
3. Inspect side gear, planetary gear and pinion gear thrust washers for damage and replace if necessary.
4. Verify correct matching between bevel ring gear and differential case half, in order to guarantee correct bolt tightening.
5. Check all the splines for excessive wear and tear or other damages.
6. Replace all damaged parts-with genuine spares
7. Always replace the O-rings and oil seal. Inspect brake shoes for damage. Inspect brake shoes spring and replace it if necessary.
8. Inspect brake drums for stretches, wear or eccentricity over 0.10 mm. A maximum admissible diameter of 320±0.1 mm can be machined, whenever necessary.
9. Before assembly clean thoroughly brake actuating parts and lubricate with new grease.
10. Clean air breather with solvent, then verify it is working correctly.
11. Inspect oil drain plug seals for leakage.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Section 3.

Parking Brake

Parking Brake Adjustment 2

Lever and Cable Installation 2
Disassembly 3
Reassembly 3

Parking Brake Lining and Piston Replacement 3

Parking Brake Adjustment 4

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Section 4.

Hydraulic Valve Overhaul

Removal and Replacement 2
Description 4
Disassembly 5
Assembly 5
Inspection and Assessment 5

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

PREVIEW ONLY

You're viewing 18 of 411 pages

The full manual includes:

- All 411 pages, complete
- Searchable PDF (find any keyword)
- No watermarks
- Instant download
- Print-ready quality

GET FULL MANUAL NOW

Clark CMP50, CMP60, CMP70 Service Manual

Scan or click anywhere
youfixthis.com

Click anywhere on this page to get the full manual