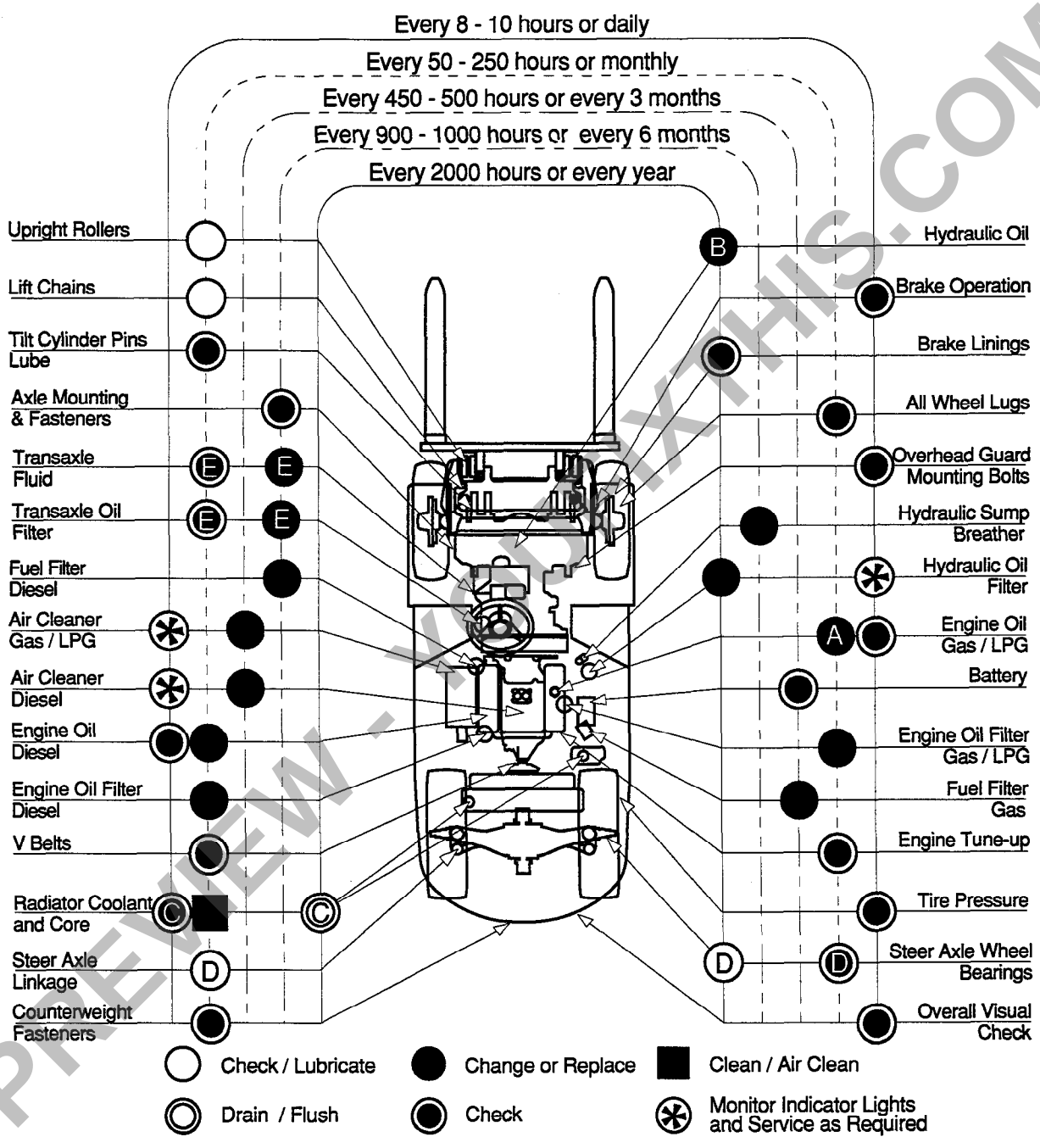
Service Chart/Lubrication Points

A decal, similar to the illustration below, is located on the underside of the truck's engine cover. This decal is a basic guide to periodic maintenance intervals and tasks. A more detailed chart is supplied on the next page.



A - Engine Oil 15W40 API, CC, CD / SG, SF	B - Hydraulic Oil Clark # 2776239	C - Engine Coolant 50 / 50 Mixture	D - MP Grease NLG # 2	E - Transaxle Fluid Clark # 2776236

- Intervals refer to elapsed hour meter time and are based on Clark's experience found to be suitable and convenient under normal operating conditions.
- Service and Maintain as per Service and Operator Manuals. Special or harsh conditions may need additional intervals.

PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com

Section 1.

Engine Specifications (4.3L, V6 Gas/LPG/CNG Engine)

General Specifications

Engine Type: GM, 4.3L, Vortec V6, 4-cycle, water-cooled

Number Of Cylinders: 6

Combustion Chamber: Straight port cylinder head

Total Displacement: 4.3L (262.4 cubic inches)

Cylinder Bore: 101.6 mm (4.0 in)

Piston Stroke: 88.392 mm (3.48 in)

Compression Ratio: 9.2:1

Firing Order: 1,6,5,4,3,2

Rotation: Clockwise viewed from fan end.

Lubrication System: Forced lubrication by gear pump

Engine Oil:API classifications CD, CC/SG/SF and API CF-4 SAE 15w-40; gas also can use API SD SAE 10w-30 or better.

Sump Capacity: 4.7 L (5 qt)

Cooling System: Water-cooled circulation

	CGP 40/55	CGC 40/70
LPG Fuel System		
Spark Plugs:	AC R42TS	AC R42LTS
Plug Gap:	0.89mm (0.035")	1.14mm (0.045)
Ignition Timing:	17° BTDC	17° BTDC
Gas Fuel System		
Spark Plugs:	AC R42TS	AC R42LTS
Plug Gap:	0.897mm (0.035")	1.143mm (0.045)
Ignition Timing:	4° ATDC	9° BTDC

Tune-Up Specifications

Tune-up specifications are listed in the engine tune-up Section of this Group.

Overhaul Specifications

Overhaul specifications are listed in the engine overhaul Section of this Group.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Section 2.

Engine Troubleshooting (4.3L, V6 Gas/LPG/CNG Engine)

Also use the rpm and stall tests in Section 5 to analyze engine performance

The following troubleshooting guide lists typical complaints or troubles encountered in routine operation of the engine, and suggests possible remedies.

Engine hard to start or won't start

- Fuel system fault; see fuel system troubleshooting in Group 02.
- Ignition system fault; see ignition system troubleshooting in Group 12.
- Starter motor faulty; see electrical system troubleshooting in Group 14.
- Battery, ground, or wiring is faulty; see electrical system troubleshooting in Group 14.
- Engine oil is too viscous (heavy weight oil); change to lighter oil viscosity.
- Engine timing too advanced; adjust timing.
- Valves or valve seats worn and leaking; relap or replace valves.
- Intake manifold gasket leaking: replace gasket if necessary and retighten manifold nuts to correct torque.
- Cylinder head gasket leaking; replace head gasket and retighten cylinder head nuts to correct torque.
- Internal engine seizure; refer to engine overhaul procedures.
- Instrument pod faulty; see instrument pod troubleshooting in Group 13.
- Out of fuel.
- LPG tank shut off or improperly coupled.

Irregular idling

- Fuel system fault; see fuel system troubleshooting in Group 02.
- Spark plug gap is too wide; adjust.
- Cylinder head gasket leaking; replace head gasket.
- Valves not seating tight; relap valves.
- Excessive valve-to-valve guide clearance; replace valves and valve guides.

Engine runs unevenly at high speed

- Fuel system fault; see fuel system troubleshooting in Group 02.
- Ignition system fault; see ignition system troubleshooting in Group 12.

Engine fires erratically

- Fuel system fault; see fuel system troubleshooting in Group 02.
- Ignition system fault; see ignition system troubleshooting in Group 12.
- Uneven compression or cylinder head problem:
  - Carbon deposits in combustion chamber; clean.
  - Cylinder head water passages clogged; clean.
  - Cylinder head gasket leaking; replace.
  - Cylinder head bolts not torqued properly; tighten per specification.
- Leaking intake gasket.
- Valves sticking; repair or replace valves.
- Valve springs weak or broken; replace valve springs.

Backfiring

- Fuel system fault; see fuel system troubleshooting in Group 02.
- Ignition system fault; see ignition system troubleshooting in Group 12.
- Sticking valves; repair.
- Broken or fatigued valve springs; repair or replace.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Section 6.

Engine Removal and Replacement (4.3L, V6 Engine)

Engine Removal 1

Engine Replacement 4

Engine Removal

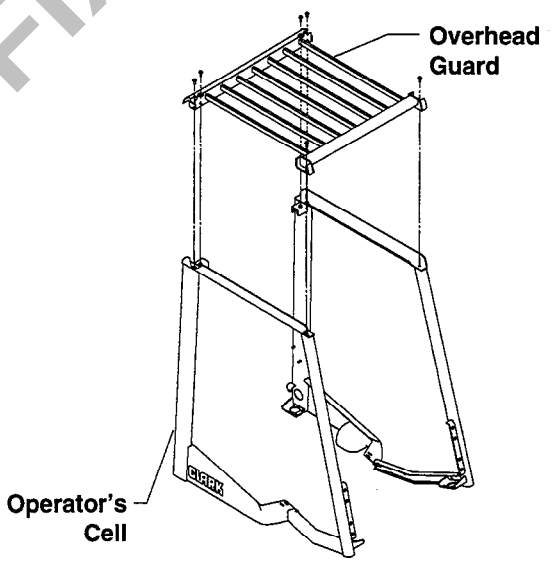
CAUTION

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.**

To remove the engine:

1. Tilt the steering column fully forward.
2. Raise the seat deck.
3. Lift out the operator's compartment floor plate and remove the seat deck; see Group 38.
4. Remove the overhead guard from the operator's cell.



NOTE

Remove the overhead guard only if an overhead hoist is used to lift the engine out. If an engine hoist or another fork lift truck will be used to lift out the engine, removal of the overhead guard is not necessary.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

ENGINE LUBRICATION

Figures 5 and 6
Lubrication schematics are shown in figures 5 and 6. The gear type oil pump is driven from the distributor shaft, which is gear driven from the camshaft. Oil is drawn into the oil pump through a pickup screen and pipe.

Pressurized oil is routed to the oil filter. In case of excessive oil pressure, a bypass valve is provided. Filtered oil flows into the main gallery and then to the camshaft, balance shaft rear bearing, and crankshaft bearings.

The valve lifter oil gallery supplies oil to the valve lifters. Oil flows from the hydraulic lifters through the hollow pushrods to the rocker arms. Oil from overhead drains back to the crankcase through oil drain holes.

The timing chain is drip fed from the front camshaft bearing. The pistons and piston pins are lubricated by oil splash.

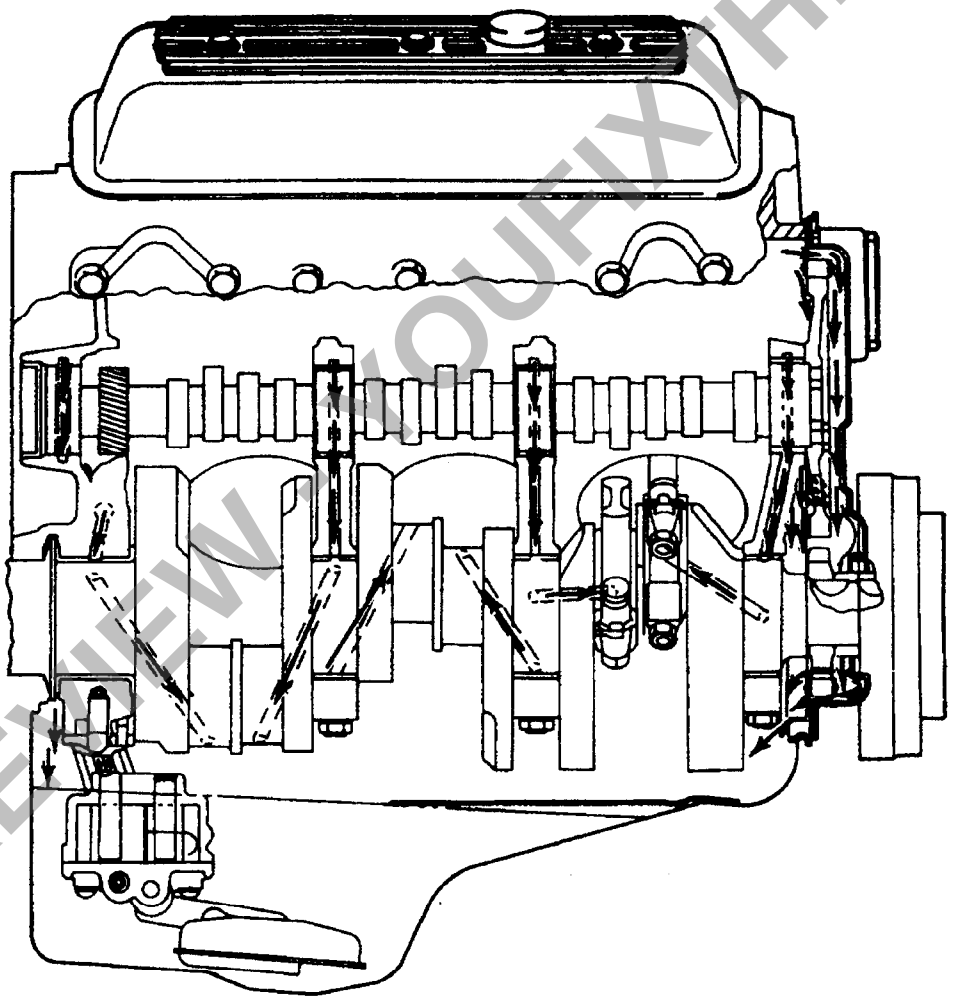


Figure 5 - Engine Lubrication Diagram

PREVIEW ONLY YOUFIXTHIS.COM
Download full manual at youfixthis.com

Fastener Tightening Specifications

ITEM	N•m	lb. ft.	lb. in.
Balance Shaft Drive Gear Retaining Bolt	16	12	---
Balance Gear Driven Gear Bolt (torque plus a 35° turn)	20	15	---
Balance Shaft Retainer Bolt	14	---	124
Camshaft Sprocket Bolts	28	21	---
Camshaft Thrust Plate Screws	14	---	124
Connecting Rod Bolt Nuts (torque plus a 70° turn)	27	20	---
Coolant outlet Bolts	28	21	---
Coolant Pump Bolts	40	30	---
Crankshaft Rear Oil Seal Retainer Screws and Nuts	15	11	---
Cylinder Head Bolts (in sequence)	90	65	---
EGR Valve Bolt	22	16	---
Engine Block Drain Plug	20	15	---
Exhaust Manifold Bolts			
Center Two Bolts	36	26	---
All Other Bolts	28	20	---
Flywheel Bolts	100	74	---
Flywheel Housing Bolts	44	32	---
Front Cover Bolts	14	---	124
Hydraulic Lifter Guide Assembly	16	12	---
Intake Manifold Bolts (in sequence)	47	35	---
Main Bearing Cap Bolts	110	81	---
Oil Filter Adapter Bolts	22	16	---
Oil Gallery Plug, Left Rear	40	30	---
Oil Gallery Plug, Right Rear	40	30	---
Oil Gallery Plug, Left Side Rear	30	22	---
Oil Pan Bolts	11	---	97
Oil Pan Drain Plug	25	18	---
Oil Pan Nuts	23	17	---
Oil Pan Studs to Oil Seal Retainer or Engine Block	23	17	---
Oil Pressure Fitting	11	---	97
Oil Pump Bolt	88	65	---
Oil Pump Cover Bolts	9	---	80
Rocker Arm Cover Bolts	10	---	90
Rocker Arm Nuts	27	20	---
Rocker Arm Stud	47	35	---
Torsional Damper Bolt	95	70	---

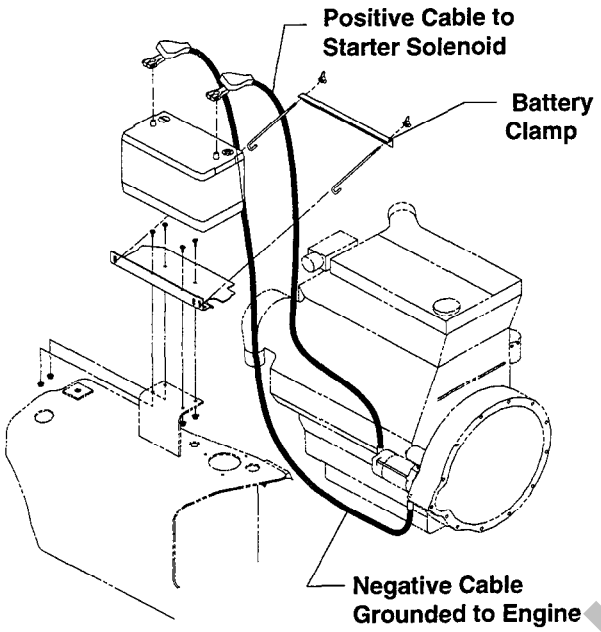
43SPEC3

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

15. Replace the engine air cleaner and hoses. See Group 3 for complete details. Set the hoses in place and align before tightening clamps. Torque the hose-to-engine clamp to 1.5-2.5 N•m (1-1.5 ft-lb).

16. Replace the battery and reconnect the cables to the battery posts and to the starter and ground.



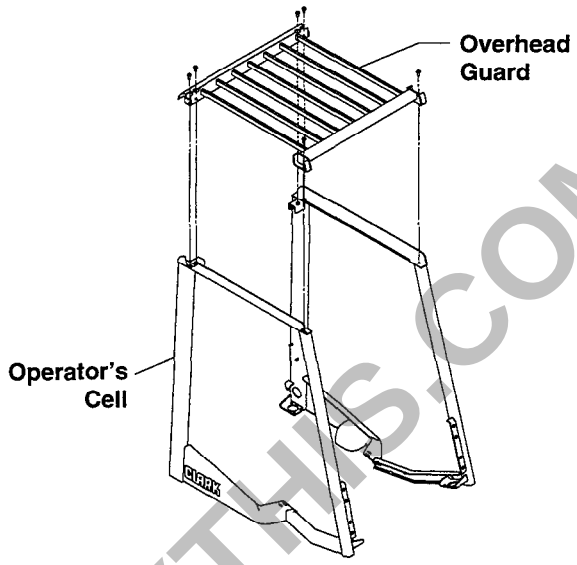
   a. Torque the terminal nuts at the battery posts to 14-20 N•m (10.3-14.8 ft-lb).

   b. Torque the nut on the starter terminal to 10-12 N•m (90-110 in-lb; 7.5-9.1 ft-lb).

   c. Install covers over cable ends after assembly.

17. Replace the seat deck.

18. Install the driver overhead guard. Torque the bolts to 70-75 N•m (52-55 ft-lb).



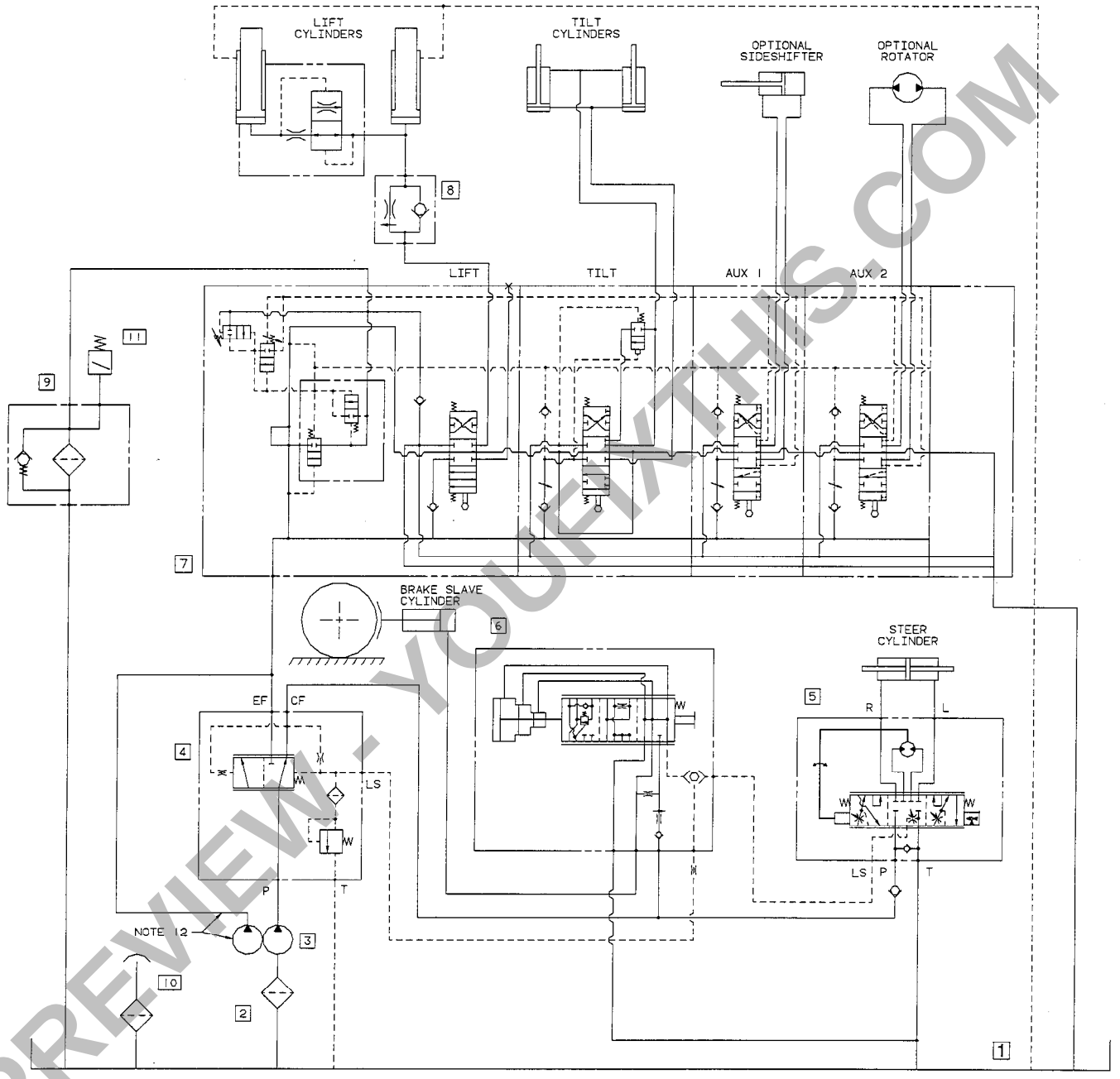
19. Close engine drain valve and fill radiator according to the procedures presented in "Cooling System Testing and Maintenance" in Group 01. Check inlet and outlet hoses for leaks.

20. Restart the engine and check all truck electrical, hydraulic, and mechanical components for proper operation before returning the truck to service.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Section 2. Hydraulic System Schematic



1 Hydraulic Sump
2 Suction Strainer
3 Hydraulic pump
4 Priority valve, steering relief valve
5 Power Steering Valve
6 Power Brake Valve
7 Main Hydraulic Valve: Main Pressure Relief; Lift Spool; Tilt Spool & Tilt-Lock Valve; Aux Spools with Secondary Pressure Relief Valve; Adjustable Pressure-Compensated Flow Controls
8 Load-Lowering Valve
9 Filter and Bypass
10 Breather Filter
11 Filter By-Pass Indicator
12 Secondary pump (not used on diesel trucks)

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Recommended Periodic Service Schedule

This chart lists maintenance tasks that should be done periodically, the suggested time intervals, and the service manual Group in which the task is covered. Apply as appropriate for diesel, gas, and LPG trucks. Operators should refer to Operator's Manual for **Daily Checks.**

TASKS	1st 50 Hours	Every 50-250 Hours	Every 450-500 Hours (or 3 months)	Every 900-1000 Hours (or 6 months)	Every 2000 Hours (or 1 year)
Group PS - Periodic Maintenance					
Perform Planned Maintenance inspections, lubrications, and adjustments		•			
Group 00 - Engine					
Exhaust smoke from gas engine-inspect (blue-oil; black-fuel)		•			
Idle/governed rpm - check/adjust		•			
Mounts / brackets - inspect/tighten		•			
Oil change - drain/fill *	•	•			
Oil filler cap & seal - clean/check		•			
Oil filter - replace	•	•			
Oil level / condition - check	•	•			
Stall rpm - check on standard transaxle truck		•			
Tune up - determine if needed by stall check and/or functional test		•			
Valve tappet adjustment - diesel engine		•			
Group 01 - Cooling System					
Coolant level		•			
Coolant -hydrometer test				•	
Coolant change - drain & flush					•
Coolant hoses - inspect/replace		•			•
Radiator - air clean		•			
Fan blades - inspect loose/damaged		•			
Fan belt(s) - check tension, wear	•	•			
Radiator cap - inspect/test		•			
Thermostat - test/replace					•
Water pump - check leaks/wear		•			
Group 02 - Fuel System					
Carburetor idle/air - check/adjust		•			
CO level - check/adjust					•
Diesel injectors/lines - clean/inspect				•	
Filler cap/screen - clean/inspect		•			
Fuel filter, diesel - replace				•	
Fuel filter, gas - replace			•		
LPG lock-off valve filter - inspect/replace					•
LPG tank mounting/guard - inspect		•			
LPG tank shut-off valve - inspect/test		•			
LPG vaporizer/regulator/hoses - inspect		•			
Throttle linkage - check/adjust		•			

* Oil change interval may be determined by laboratory analysis

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

4.3L ENGINE SPECIFICATIONS

GENERAL DATA:				
Type				V6
Displacement				4.3L (262 C.I.D.)
Bore				101.600 mm (4.00 in.)
Stroke				88.392 mm (3.48 in.)
Compression Ratio				9.10 to 1
Firing Order				1 - 6 - 5 - 4 - 3 - 2
Oil Pressure (Minimum HOT)				41 kPa (6 psi) / 1000 RPM - 124 kPa (18 psi) / 2000 RPM
CYLINDER BORE:				
Diameter				101.618 - 101.643 mm (4.0007 - 4.0017 in.)
Out of Round	Production			0.025 mm (0.001 in.) Maximum
	Service			0.051 mm (0.002 in.) Maximum
Taper	Production	Thrust Side		0.0125 mm (0.0005 in.) Maximum
		Relief Side		0.025 mm (0.001 in.) Maximum
	Service			0.025 mm (0.001 in.) Maximum
PISTON:				
Clearance	Production			0.018 - 0.061 mm (0.0007 - 0.0024 in.)
	Service Limit			0.061 mm (0.0024 in.) Maximum
PISTON RING:				
Compression	Groove Clearance	Production	Top	0.030 - 0.081 mm (0.0012 - 0.0032 in.)
			Second	0.030 - 0.081 mm (0.0012 - 0.0032 in.)
		Service Limit		0.107 mm (0.0042 in.) Maximum
	Gap	Production	Top	0.254 - 0.508 mm (0.010 - 0.020 in.)
			Second	0.254 - 0.635 mm (0.010 - 0.025 in.)
		Service Limit		0.889 mm (0.035 in.) Maximum
Oil	Groove Clearance	Production		0.051 - 0.178 mm (0.002 - 0.007 in.)
		Service Limit		0.202 mm (0.008 in.) Maximum
	Gap	Production		0.381 - 1.397 mm (0.015 - 0.055 in.)
		Service Limit		1.651 mm (0.065 in.)
PISTON PIN:				
Diameter				23.546 - 23.553 mm (0.9270 - 0.9273 in.)
Clearance in Piston	Production			0.005 - 0.018 mm (0.0002 - 0.0007 in.)
	Service Limit			0.025 mm (0.001 in.) Maximum
Fit in Rod				0.020 - 0.041 mm (0.0008 - 0.0016 in.) Interference
EXHAUST MANIFOLD:				
Surface Flatness				0.254 mm (0.010 in.) Maximum
INLET MANIFOLD:				
Surface Flatness				0.254 mm (0.010 in.) Maximum
CYLINDER HEAD:				
Surface Flatness				0.102 mm (0.004 in.) Overall
BALANCE SHAFT:				
Front Bearing Journal Diameter				54.986 - 55.001 mm (2.1648 - 2.1654 in.)
Rear Bearing Journal Diameter				38.085 - 38.100 mm (1.4994 - 1.500 in.)
Rear Bearing Journal Clearance				0.025 - 0.091 mm (0.001 - 0.0036 in.)

43SPEC1

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Lack of power or poor acceleration

- Ignition system malfunctioning; see ignition system troubleshooting in Group 12.
- Fuel system malfunctioning; see fuel system troubleshooting in Group 02.
- Air intake system restriction:
  - Air filter element clogged; replace.
  - Throttle control not opening fully; adjust.
  - Carburetor choke faulty (gasoline only); adjust or repair.
  - Excessive exhaust back pressure; inspect and repair.
  - Sharp bend or kink in hose from air filter to carburetor; inspect, repair or replace.
  - Engine valves sticking or worn; repair or replace.
  - Engine valves adjusted incorrectly; adjust.
- Cylinder head gasket leaking; replace head gasket if necessary and retighten cylinder head bolts to specified torque.
- Piston rings sticking or worn; replace rings.
- Cylinders worn; check and replace if necessary. See also "Faulty Compression."
- Overheating; see "Overheating."
- Valve seats leaking; relap valves.
- Valve stems sticking; repair or replace valves.
- Valve springs weak or broken; replace springs.

Overheating

- Cooling system malfunctioning; see cooling system troubleshooting in Group 01.
- Cylinder head gasket leaks coolant; tighten bolts or replace.
- Cylinder block or head cracked; repair or replace.
- Radiator fins plugged (dirty) or core clogged; clean or replace.
- Fan installed backwards; remove and reinstall correctly.
- Thermostat faulty; replace.
- Rust buildup in engine block; clean cooling system or overhaul.
- Fan belt slipping, worn or damaged; clean, adjust, or replace.
- Ignition timing incorrect; see ignition system troubleshooting in Group 12.
- Engine oil level is low; add oil, inspect for cause.
- Fuel system malfunctioning; see fuel system troubleshooting in Group 02.
- Faulty compression pressure; see "Faulty Compression."
- Overloading of engine; review operation.
- Blown head gasket; replace.
- Exhaust system leak or blockage; repair or replace.

Faulty compression

- Valve holding open; repair.
- Incorrect valve timing; retime engine assembly.
- Burned or sticking valves; repair or replace.
- Broken or fatigued (weak) valve springs; replace.
- Cylinder head gasket faulty (leaking); tighten bolts or replace.
- Piston rings worn, broken or stuck; repair or replace.

Low oil pressure

- Oil level is low; check and add oil.
- Oil viscosity too light or diluted; check and replace oil.
- Pump suction screen clogged; clean.
- Dirt in relief valve or broken spring; clean or repair/replace.
- Worn or damaged oil pump; replace.
- Worn engine bearings; replace.
- Worn cam bushings; replace.
- Oil pressure indicator, sensor, or wiring faulty; repair or replace.

High oil pressure

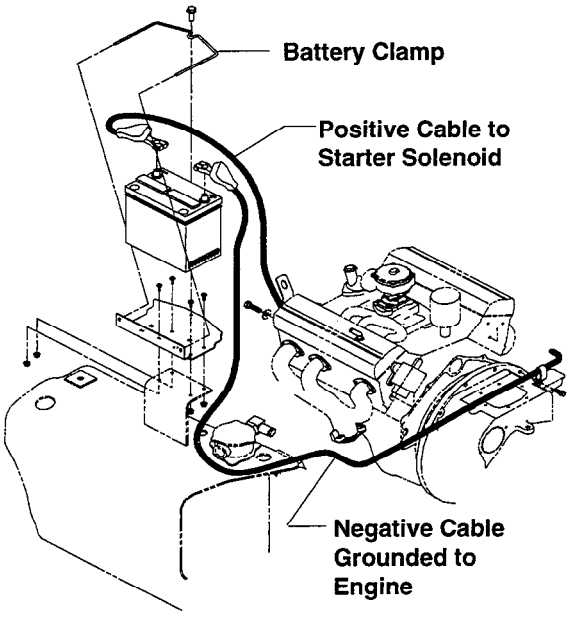
Oil pressure should not exceed recommended pressures except when engine is starting up cold. Abnormally high oil pressure is not desirable because it increases oil consumption. Possible causes of high oil pressures are:

- Engine oil too viscous (heavy weight); change to correct oil grade.
- Stuck relief valve; repair or replace.
- Obstruction in distributing line.
- Faulty oil pressure gauge; replace.
- Dirty or plugged oil filter; replace.

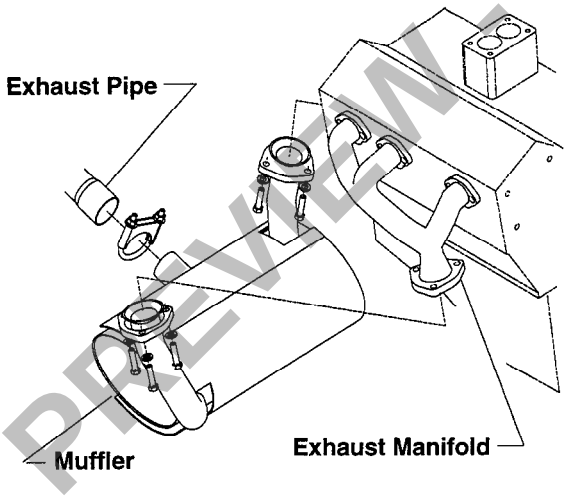
PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

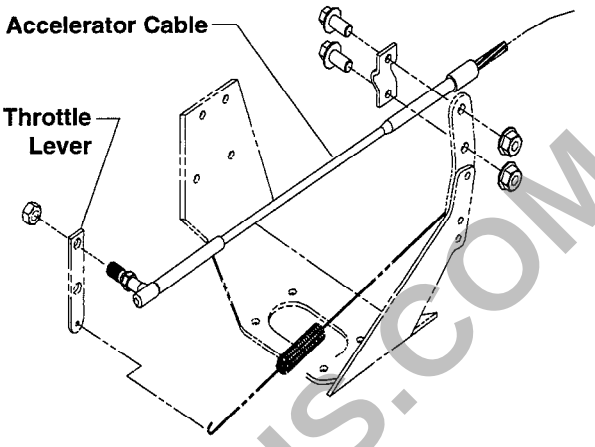
5. Disconnect the battery and remove it from the engine compartment. Disconnect negative cable first.



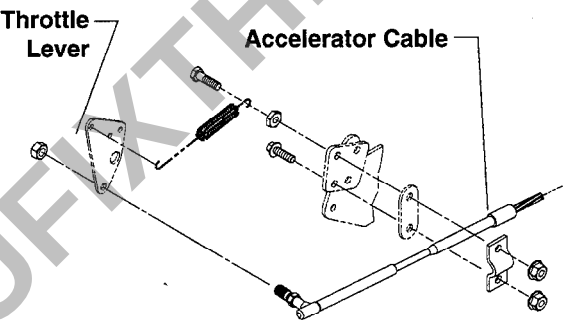
6. Disconnect and remove the air cleaner and hoses as described in Group 03, "Air Induction System."
7. Disconnect and remove the exhaust pipes between the engine exhaust manifolds and the muffler pipe. See Group 03.



8. Label and disconnect all wiring from the engine to components that will remain in the truck frame. See Group 14 for wiring configurations.
9. Disconnect the accelerator cable at the throttle lever.

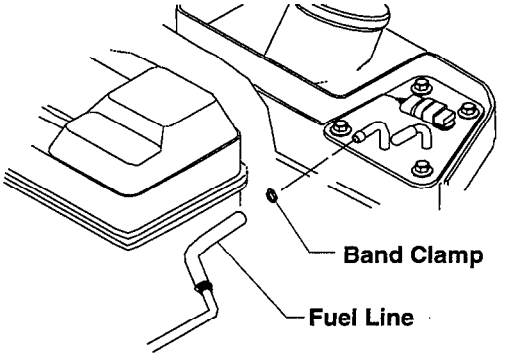


Accelerator Linkage/LPG



Accelerator Linkage/Gas

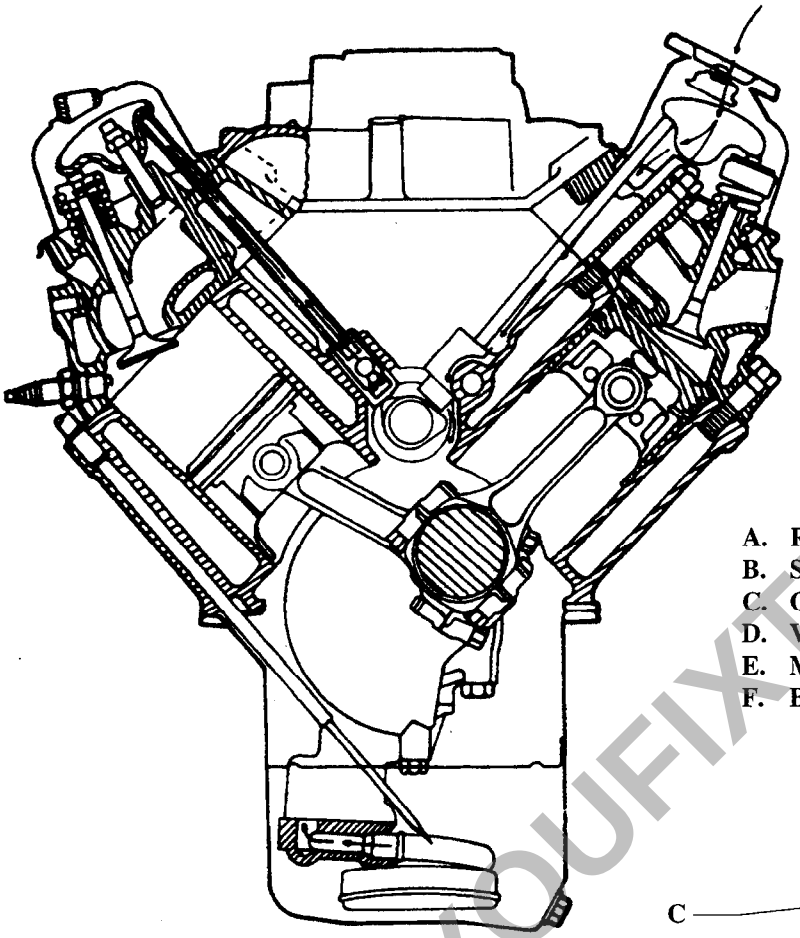
10. Disconnect and cap the fuel lines at the fuel tank.



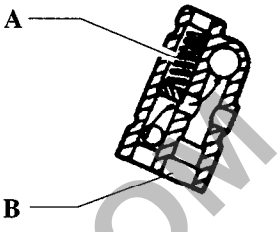
11. Drain the coolant from the engine and radiator, and disconnect the radiator hoses from the engine thermostat and water pump, as explained in Group 01.
12. Disconnect and remove the radiator upper shroud, fan ring, and venturi (as explained in Group 01) to allow for engine front-to-back movement.
13. Unbolt the engine bracket mounting bolts.

PREVIEW - YOUFIXTHIS.COM

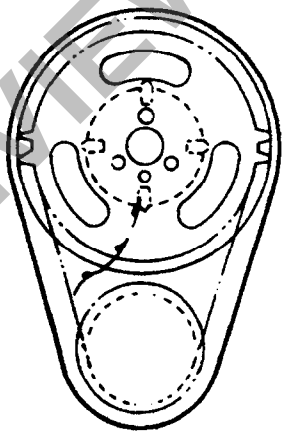
Download full manual at youfixthis.com



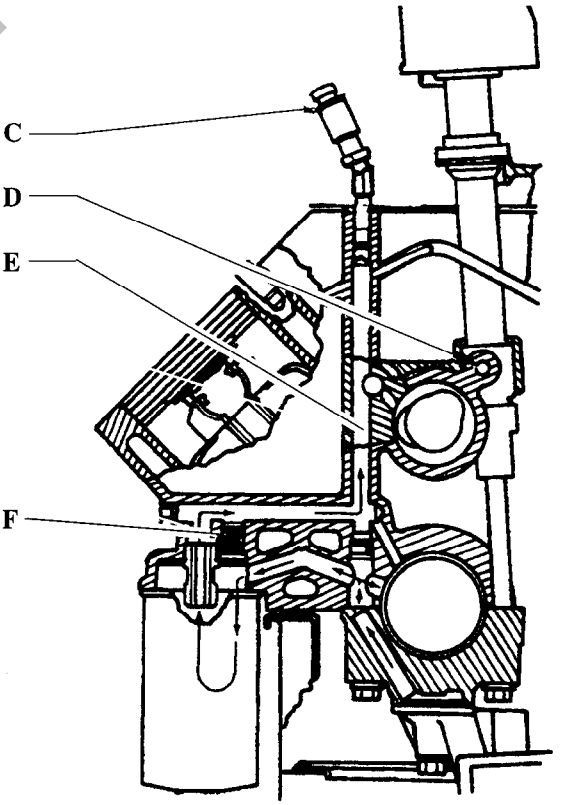
Front View



A. Regulator Valve (Shown in Open Position)
B. Suction
C. Oil Pressure Switch
D. Valve Lifter Gallery
E. Main Oil Gallery
F. Bypass Valve



Front View
Showing Path of Oil to Timing Chain



RearView
Showing Main Gallery, Oil Filter and Crankshaft Oil Feed

Figure 6 - Engine Lubrication Diagram

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Recommended torque tensions

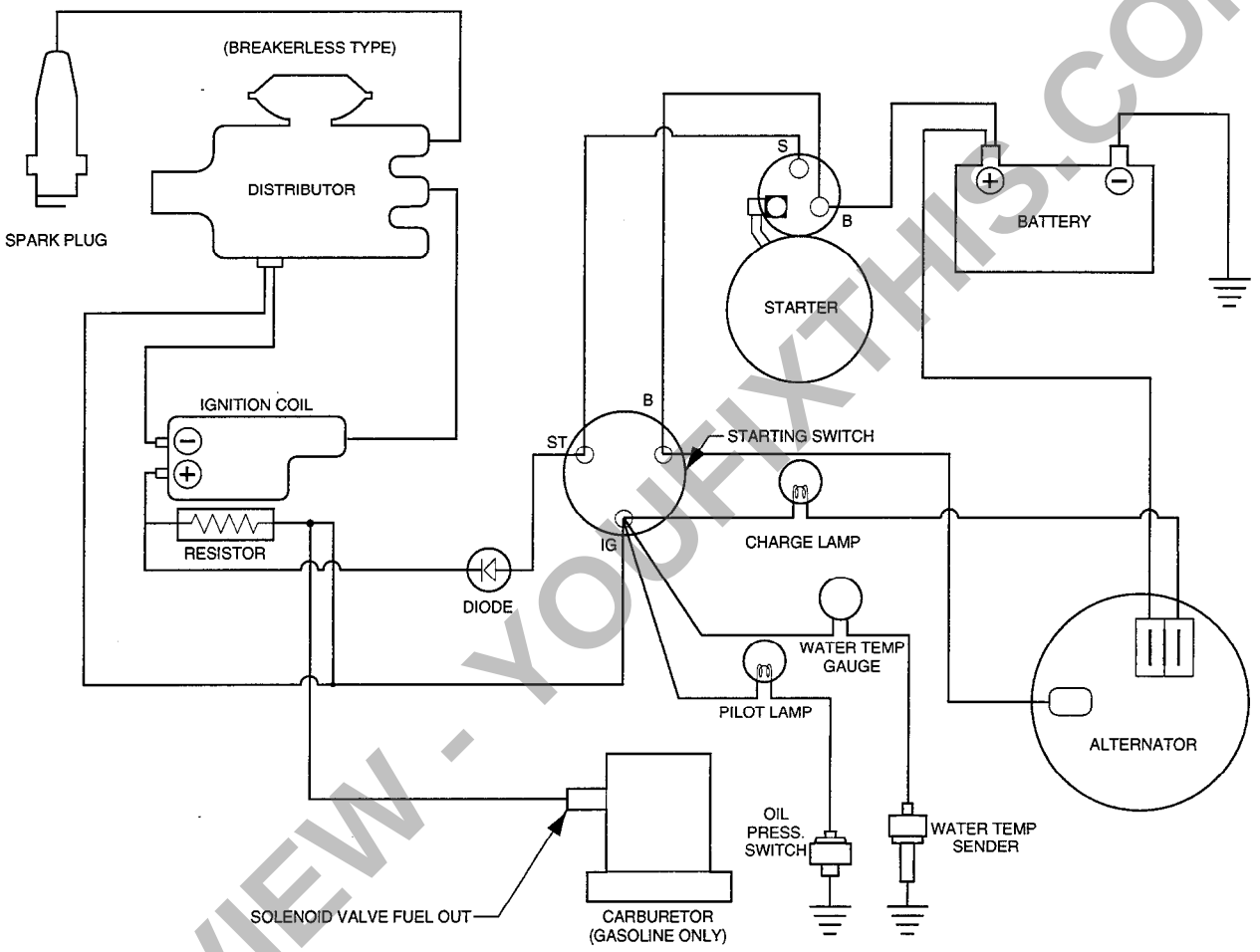
The torque tensions below apply to components lubricated lightly with clean engine oil before they are fitted.

Description	Thread size	Torque		
		Nm	lbf ft	kgf m
Cylinder head assembly				
Setscrews, cylinder head	1/2 UNF	See	section	12
Fasteners, rocker shaft brackets:				
- Aluminium bracket	M12	40	30	4,1
- Cast iron bracket	M12	75	55	7,6
Cap nuts, rocker cover	M12	20	15	2,1
Cap nuts, rocker cover (with shim washer)	M12	30	22	3,0
Setscrews, inlet manifold to cylinder head	M10	44	32	4,5
Nuts (plated), exhaust manifold to cylinder head	M10	44	32	4,5
Nuts (non-plated), exhaust manifold to cylinder head	M10	50	37	5,1
Piston and connecting rod assemblies				
Nuts, connecting rods	1/2 UNF	125	92	12,7
Setscrews, connecting rods	1/2 UNF	155	114	15,8
Banjo bolts, piston cooling jets	3/8 UNF	27	20	2,8
Crankshaft assembly				
Setscrews, main bearings	5/8 UNF	265	196	27,0
Setscrews, crankshaft pulley	7/16 UNF	115	85	11,8
Cap screws, damper to crankshaft pulley	M8	35	26	3,6
Setscrews, rear oil seal housing to cylinder block	M8	22	16	2,2
Cap screws, rear oil seal housing to bridge piece	M8	18	13	1,9
Cap screws, rear oil seal housing to bridge piece	M6	13	10	1,3
Setscrew, idler gear hub of balancer unit	M12	93	68	9,5
Nut, drive gear of balance weight	1/2 UNF	82	60	8,4
Setscrews, rear cover of balancer frame	M10	54	40	5,5
Setscrews, oil transfer plate	M10	30	22	3,1
Setscrews, oil pump to balancer frame	M8	22	16	2,2
Setscrews, balancer to cylinder block	M10	54	40	5,5
Timing case and drive assembly				
Setscrews, timing case to cylinder block	M8	22	16	2,2
	M10	44	33	4,5
Setscrews, hub of idler gear	M10	44	33	4,5
Setscrew, camshaft gear	M12	78	58	8,0
Setscrews, timing case cover to timing case	M8	22	16	2,2
Nuts, timing case cover to timing case	M8	22	16	2,2
Cylinder block				
Setscrews, fitted instead of piston cooling jets	3/8 UNF	27	20	2,8
Aspiration system				
Nuts, turbocharger to manifold	M10	44	33	4,5
Lubrication system				
Plug, lubricating oil sump	3/4 UNF	34	25	3,5
Setscrews, oil pump to front bearing cap	M8	22	16	2,2
Setscrews, cover for oil pump	M8	28	21	2,9
Fasteners, lubricating oil sump	M8	22	16	2,2

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Schematic Drawing of Typical Ignition Circuitry



PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

20. Valve Stem Key
21. Inlet Valve Spring Cap
22. Valve Stem Oil Shield
23. Valve Stem Oil Seal (O-Ring)
24. Inlet Valve Stem Seal
26. Valve Spring with Damper
27. Inlet Valve
28. Exhaust Valve Rotator
29. Exhaust Valve
40. Lifter Restrictor Retainer Bolt
41. Lifter Restrictor Retainer
42. Rocker Arm Nut
43. Rocker Arm Ball
44. Rocker Arm
45. Push Rod
46. Valve Lifter Guide (Restrictor)
47. Lifter
48. Flat Washer
50. Cylinder Head Bolt
51. Spark Plug
52. Coolant Temperature Sensor
53. Drain Plug
54. Cylinder Head Gasket
60. Heat Shield
61. Washer
62. Exhaust Manifold Lock
63. Bolt/Stud
162. Stud
163. Bolt
164. Coolant Outlet
165. Coolant Outlet Gasket
166. Thermostat
167. Vacuum Fitting
168. Engine Coolant Temperature Sensor
169. Bolt
170. Intake Manifold
171. Oil Pressure Sensor
172. Oil Pressure Fitting
173. E.G.R. Valve Gasket
174. E.G.R. Valve
175. Bolt
176. Intake Manifold Gasket
177. Nut
178. Power Booster Vacuum Pipe
179. Exhaust Manifold
180. Power Booster Vacuum Pipe Fitting
181. Plug
182. Coolant Temperature Sensor
183. Crankcase Ventilation Valve
184. Oil Filler Cap
185. Oil Filler Tube
186. Bolt
700. Rocker Arm Cover Bolt
701. Rocker Arm Cover
702. Rocker Arm Cover Gasket
704. Crankcase Vent Tube Grommet
705. Crankcase Vent Valve Grommet

PREVIEW - YOUFIXTHIS.COM

Figure 4 - Cylinder Head, Manifolds and Components - Legend

Download full manual at youfixthis.com

Contents of this Manual

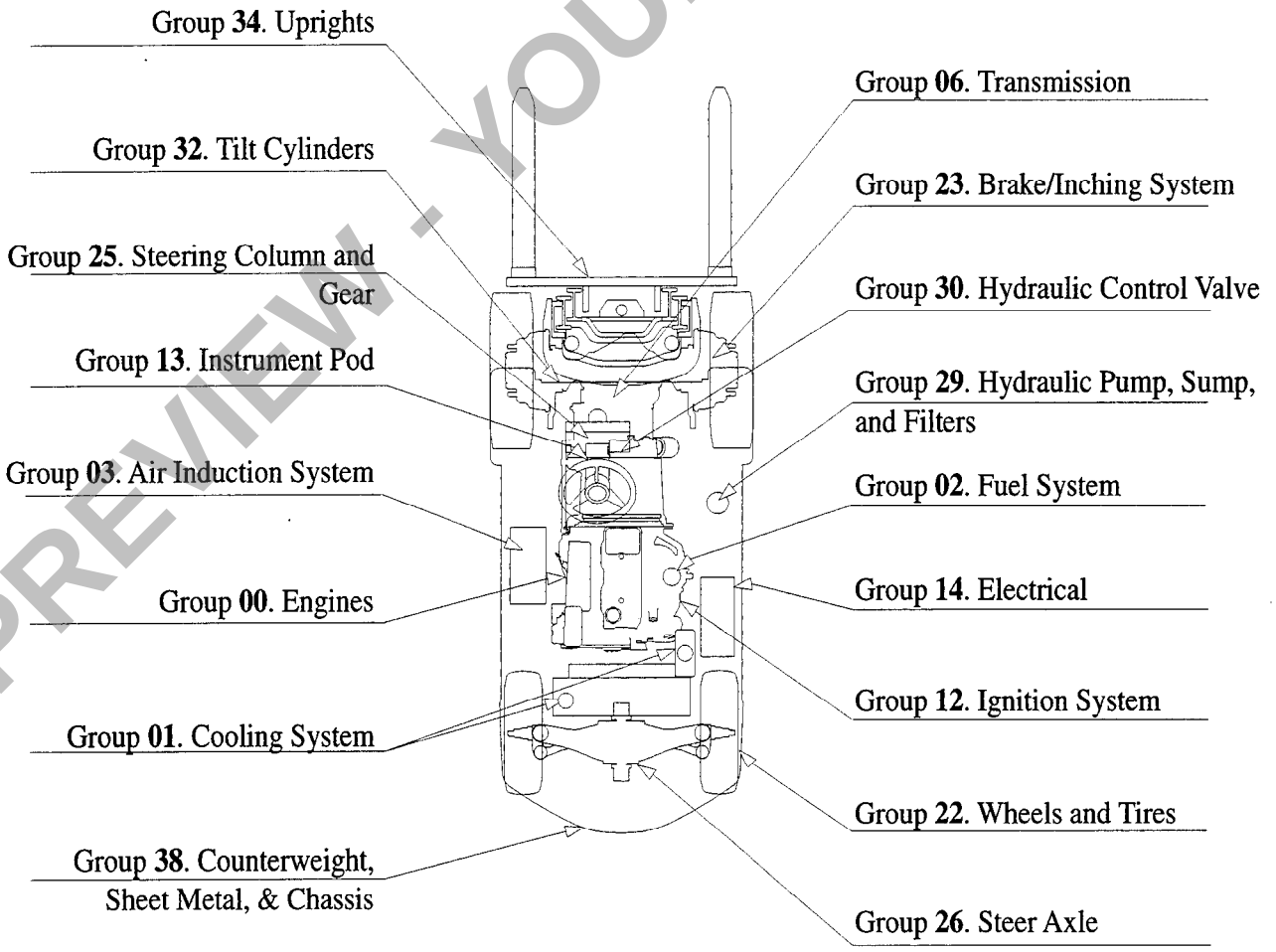
Group Index

Group **SA.** Safe Maintenance
Group **PS.** Periodic Service
Group **00.** Engines
Group **01.** Cooling System
Group **02.** Fuel System
Group **03.** Air Induction System
Group **06.** Transmission
Group **12.** Ignition System
Group **13.** Instrument Pod
Group **14.** Electrical System
Group **22.** Wheels and Tires
Group **23.** Brake System
Group **25.** Steering Column and Gear
Group **26.** Steer Axle
Group **29.** Hydraulic Pump, Sump, and Filters
Group **30.** Hydraulic Control Valve/Lift Circuit
Group **32.** Tilt Cylinders
Group **34.** Uprights
Group **38.** Counterweight, Sheet Metal, & Chassis
Group **40.** Specifications

Alphabetical Index

(SEE NEXT PAGE)

Pictorial Index



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, oil, 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 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.
9. Operation of the truck to check performance must be

PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com

Alphabetical Index

Air Induction System	Group 03
Alternator	Group 14
Brake System	Group 23
Carburetor	Group 02
Cooling System	Group 01
Counterweight	Group 38
Drive Axle	Group 06
Electrical System	Group 14
Engines	Group 00
Fuel System	Group 02
Hydraulic Control Valve	Group 30
Hydraulic Pump, Filters	Group 29
Inching System	Groups 23, 06
Instrument Panel (Pod)	Group 13
Jacking & Blocking	Group SA
Lift Cylinder	Group 34
Oil Change	Group 00
Planned Maintenance	Group PS
Radiator	Group 01
Safety	Group SA
Sheet Metal, & Chassis	Group 38
Shop Supplies	Group 40
Specifications	Group 40
Starter	Group 14
Steer Axle	Group 26
Steering Column and Gear	Group 25
Tilt Cylinders	Group 32
Transmission	Group 06
Tune-Up	Group 00
Uprights	Group 34
Water Pump	Groups 01, 00
Wheels/Tires	Group 22

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

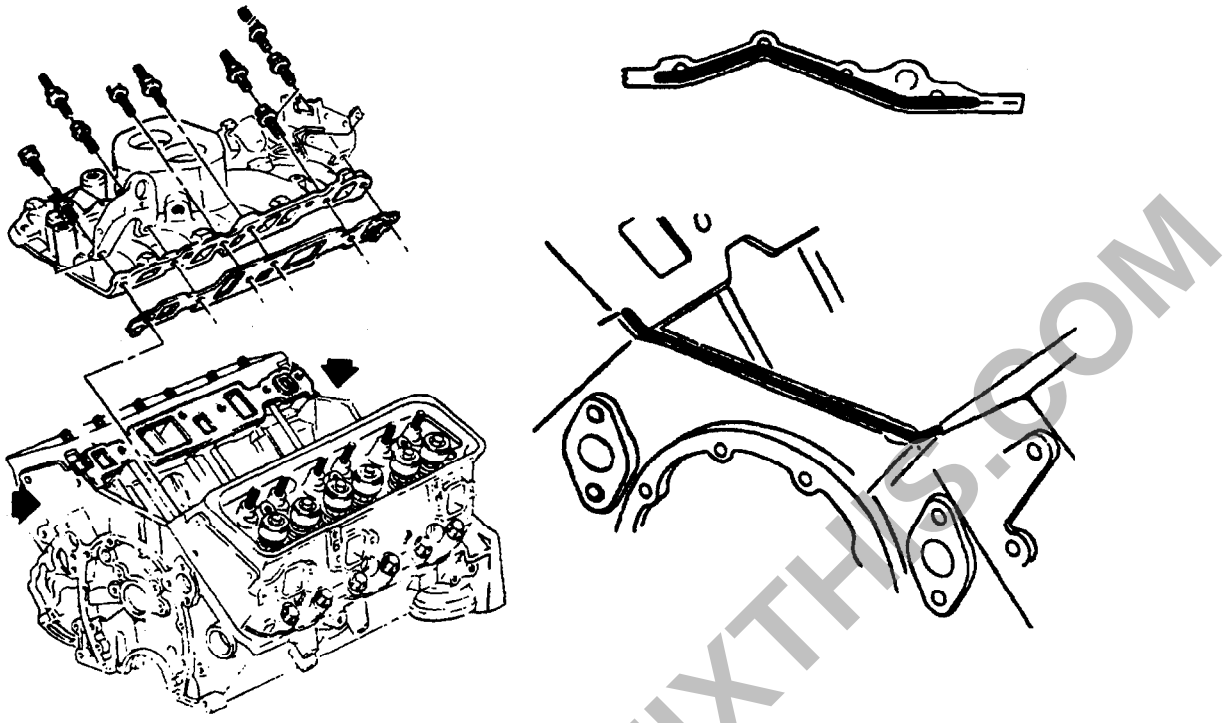


Figure 80 - Intake Manifold and Components

Tighten

a. Intake manifold bolts to 47 N•m (35 lbs. ft.) using the tightening sequence shown in figure 81.
b. Retorque, intake manifold bolts using the tightening sequence shown in figure 81.

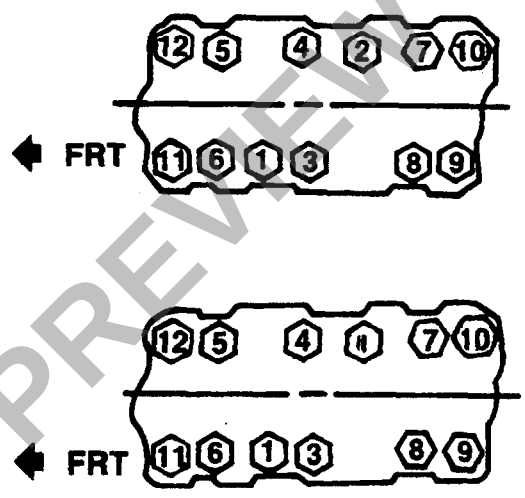


Figure 81 - Intake Manifold Bolt Tightening Sequence

ROCKER ARM COVER INSTALLATION

Install or Connect

1. Rocker arm cover (2 or 3).
2. New gasket.

NOTICE: Refer to "Notice" on page 1.

3. Rocker arm cover bolts (1) and washers.

Tighten

- Rocker arm cover bolts (1) to 10 N•m (90 lbs. in.).

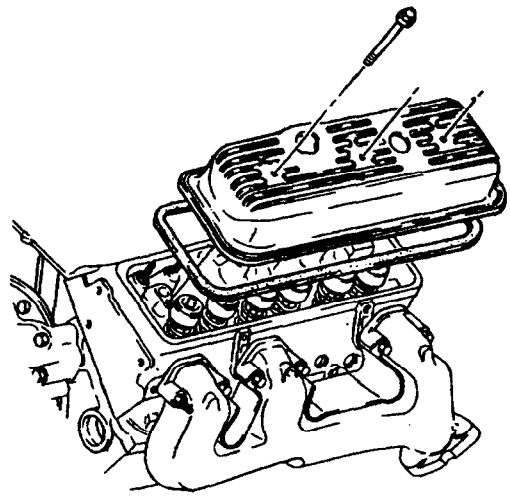


Figure 82 - Rocker Arm Cover and Components

PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com

Idler gear and hub

To remove and to fit **15A-03**

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 Remove the timing case cover, operation 15A-01.

7 Turn the crankshaft until the marked teeth of the crankshaft gear, the camshaft gear and the fuel pump gear are all in mesh with the idler gear. The marked teeth of the idler gear will not necessarily be in mesh with the marked teeth of the other gears because of the different speed of rotation of the idler gear.

Note: There are no timing marks on the fuel pump gear of engine types AE and YE. When the idler gear is removed, the fuel pump gear could move. Before the idler gear is removed, make a temporary mark on a tooth of the fuel pump gear to align with a similar mark on the timing case. It is not necessary to mark the fuel pump gear if it is to be removed, as the timing of the fuel pump will be lost.

8 Release the three setscrews, remove the plate of the idler gear and remove the gear. The drive gear of the fuel injection pump may turn counter-clockwise when the idler gear is removed.

9 Remove the idler hub.

10 For engines that use the idler gear assembly with needle roller bearings - Release the three setscrews, remove the plate of the idler gear (D1). Remove the front thrust washer (D2), the front spacer (D3) and the gear (D4). Remove the two needle roller bearings (D5), if these are to be used again, they should be fitted in their original positions. Remove the rear thrust washer (D6) and the rear spacer (D7). Remove the hub (D8).

Attention: Do not turn the crankshaft with the idler gear removed.

11 Inspect the gear and the bushes for wear and other damage and renew as necessary. The gear and bushes are available as an assembly or separate bushes are available.

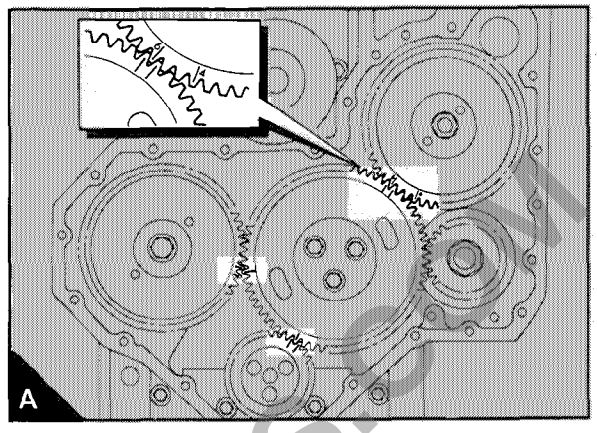
12 If the bushes are to be changed, remove them with a suitable puller. If a puller is not available, machine off the face of one of the bushes and press them out. Press in new bushes, machine the bores to get the correct clearance on the hub and machine the faces to get the correct end clearance, see section 11C.

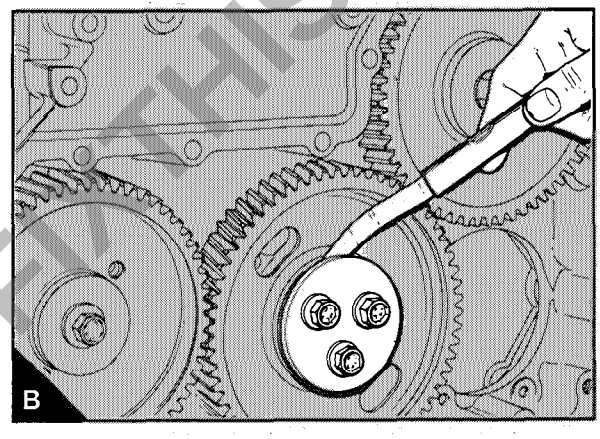
To fit

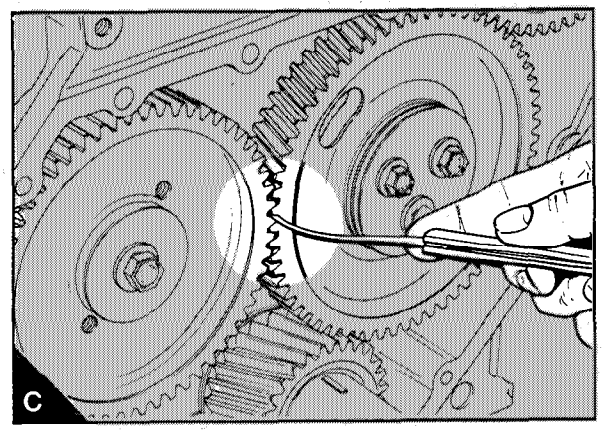
1 Use the three idler gear setscrews to ensure the correct position of the idler gear hub with the lubrication hole at the top. Push the hub into position and remove the setscrews.

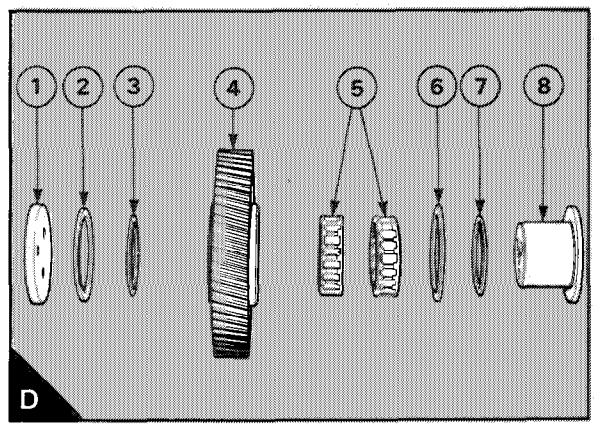
2 Lubricate the idler gear bushes with clean engine lubricating oil. Align the timing marks on the idler gear with the marks on the crankshaft and camshaft gears. If necessary, turn the gear of the fuel injection pump clockwise to align the relevant timing mark with the marks on the idler gear and slide the idler gear into position. On engine types AE and YE, align the temporary mark on the fuel pump gear with the mark on the timing case before the idler gear is fitted. Remove the marks on the fuel pump gear and the timing case after the idler gear has been fitted. Check that all the timing marks are in correct mesh (A). Fit the plate and the setscrews to the idler gear hub and tighten the setscrews to 44 Nm (33 lbf ft) 4,5 kgf m.

3 For engines that use the idler gear assembly with needle roller bearings - Inspect the components for wear and other damage and renew them as necessary. Lightly lubricate the components with clean lubricating oil before assembly onto the hub. Fit the hub (D8) as shown in paragraph 1. Put the rear spacer (D7) in position









PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

desired air fuel ratio. The piston type accelerating pump system mechanically supplies the fuel necessary to overcome this deficiency for a short period of time.

Fuel enters the pump cylinder from the fuel bowl through the pump cup stem clearance hole when the pump is lifted to a refill position. The fuel level is above the normal position of the pump piston. This is known as a wet pump system.

As the throttle lever is moved, the pump link operating through a system of levers and a drive spring, pushes the pump piston down seating the pump cup against the face of the stem. Fuel is forced through a passage around the pump discharge jet which is drilled in the main body.

When the pump is not in operation, vapors or bubbles forming in the pump cylinder can escape through the stem clearance hole of the floating piston cup and past the pump stem.

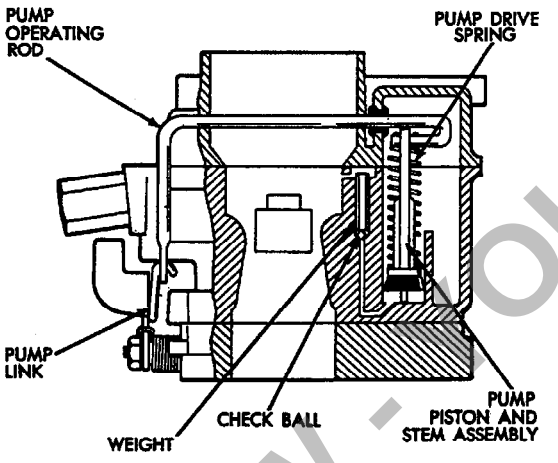


Figure 10, **Accelerator pump system**

AUTOMATIC CHOKE SYSTEMS

The automatic choke provides a richer air-fuel mixture required for starting and operating a cold engine.

INTREGAL AUTOMATIC CHOKE

A bimetal spring is installed inside the choke housing which is a part of the cover. As the engine warms up, manifold heat transmitted by hot air to the choke housing relaxes the bimetal spring until it eventually permits the choke to open fully. The vacuum diaphragm housing is a part of the carburetor body. When the engine starts, manifold vacuum is applied to the choke diaphragm through a passage from the throttle body to the choke diaphragm assembly. The adjustment of the choke valve opening is called "vacuum kick" or "pull down". When the engine starts and vacuum is applied to the choke diaphragm, the~ choke valve is opened sufficiently to keep the engine running. Manifold vacuum alone is not sufficient to provide the proper degree of choke opening during the entire choking period. The impact of in-rushing air past the offset choke plate provides the additional opening force. A modulator spring permits correct initial choke opening after initial start in relation to outside temperature.

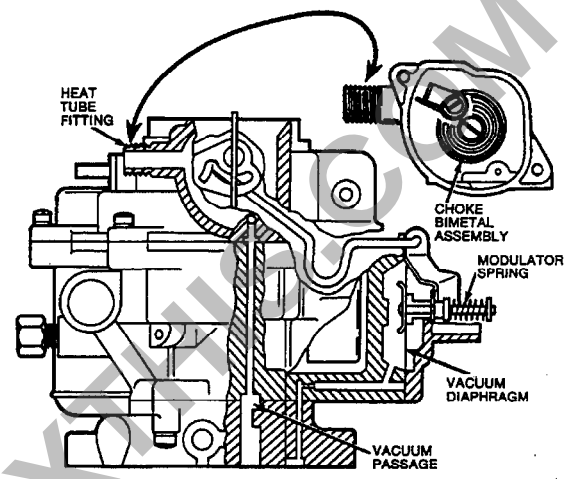


Figure 11, **Model 1940 automatic choke system.**

DIVORCED AUTOMATIC CHOKE

The model 1945 divorced choke system includes the choke bimetal mounted in a well or heat sink in the intake manifold. An electric heating element, which is operated by a thermostatic switch, shortens the choking duration above approximately 60°F and stabilizes the choke duration in colder weather. (Fig. 12) A separate vacuum diaphragm mounted on a bracket performs the vacuum kick or pull down when the engine starts. The diaphragm stem assembly includes a modulator spring.

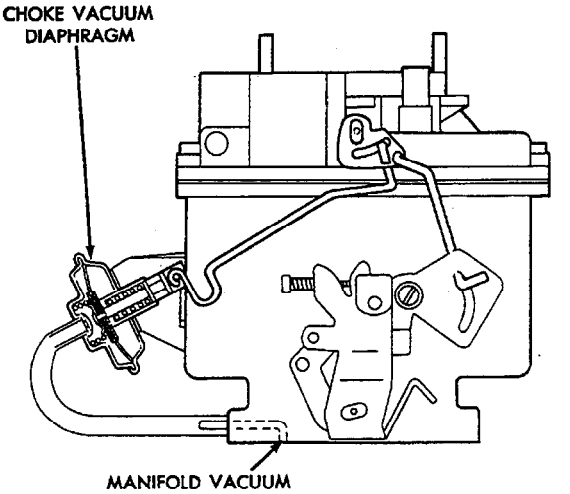


Figure 12, **Model 1945 divorced automatic choke vacuum system.**

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Section 1.

Ignition System Specifications and Description

Specifications 1

Schematic Drawing of Typical Ignition Circuitry 2

Specifications

- Ignition Type: Non-contact, electronic
- Firing Order: 1-6-5-4-3-2
- Rotation (viewed from cap): Clockwise
- Ignition Timing: Gasoline 4° ATDC @ 750 rpm; LPG 17° BTDC @ 750 rpm
- Distributor Advance: Automatic
- Ignition Coil Resistance: See procedure in Section 3.
- Spark Plug Type: AC R4TS
- Spark Plug Gap: 0.897 mm (0.035 in

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Pads Replacement

Pads snap into indentions in axle end housing. Pry pads off with srewdriver.

Caliper Replacement

If the caliper is damaged, it should be replaced:

1. Disconnect the brake line.
2. Remove the bleed screw adaptor and washer.
3. Remove the four caliper mounting bolts.
4. Remove the caliper.
5. Install new pistons and pads.

Caliper replacement is the reverse procedure of removal. Reconnect brake lines using the "Hydraulic Fitting Tightening Procedure" in Group 40.

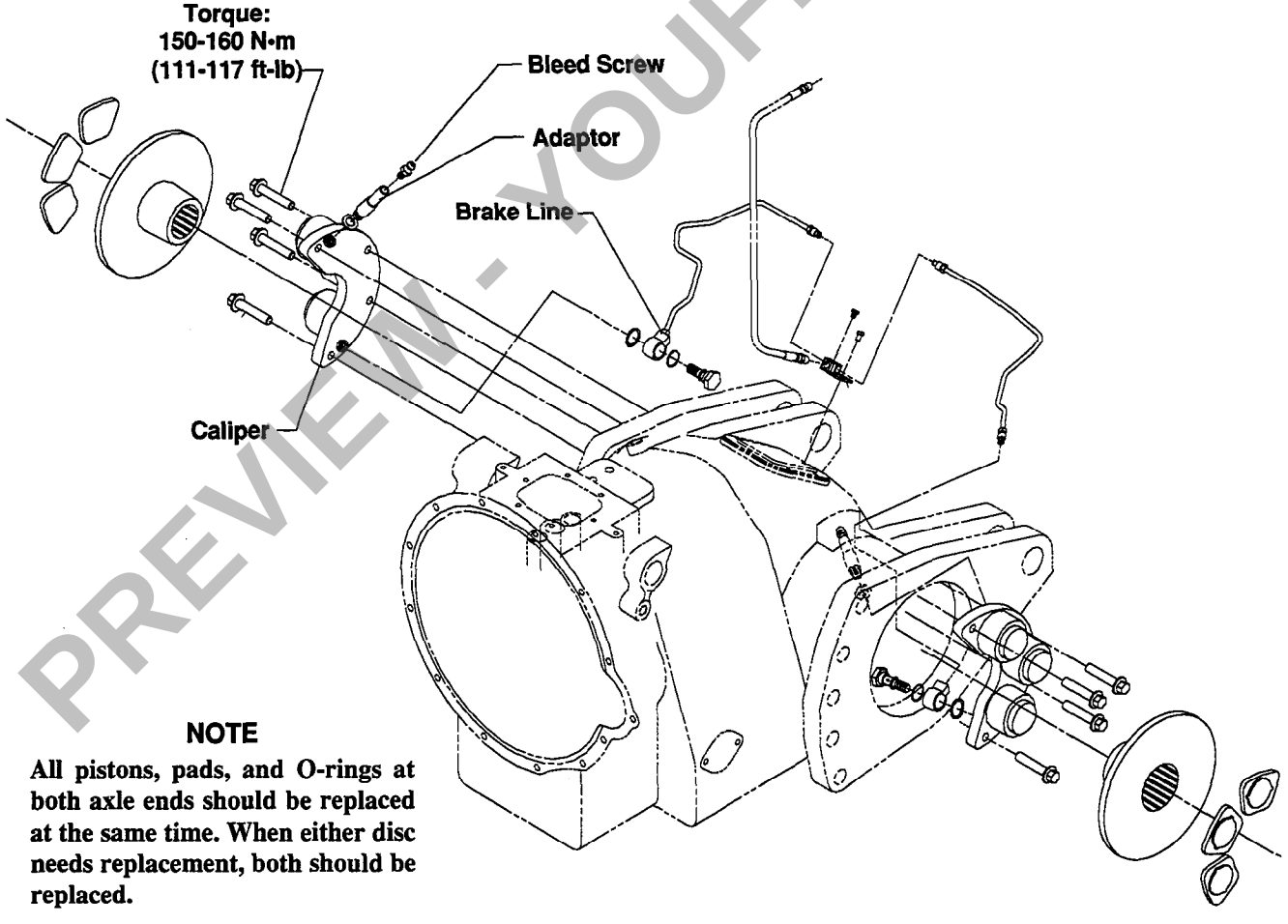
Reassembly and Bleeding

1. Put the discs back on the axle shafts.

NOTICE

Allow the axle ends to stand off 6 mm (0.25 in) during bleeding. This helps the O-rings "wind up" properly for piston retraction.

2. Proceed with replacing the axle ends as described in Group 20, but do not bolt the axle ends up tight. Instead leave a gap of 6 mm (0.25 in).
3. Bleed the braking system as described in the "Brake System Bleeding" Section of this Group.
4. Tighten the axle ends bolts and complete the axle end replacement as described in Group 20.



NOTE

All pistons, pads, and O-rings at both axle ends should be replaced at the same time. When either disc needs replacement, both should be replaced.

Caliper Removal

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

GROUP 34

UPRIGHTS

Upright Specifications and Description ..... Section 1

Troubleshooting ..... Section 2

Upright Inspection ..... Section 3

Roller Clearance Checks and Shim Adjustments ..... Section 4

Cylinder Replacement, Shimming, and Overhaul ..... Section 5

Upright Chain Inspection, Adjustment, and Replacement ..... Section 6

Fork and Carriage Removal and Replacement ..... Section 7

Upright Removal and Replacement ..... Section 8

CGC 60/70 Upright ..... Section 9

IMPORTANT

Related service information is covered in Group 29, "Hydraulic Sump, Filters, and Pump," Group 30, "Hydraulic Control Valve/Lift Circuit," and Group 32, "Tilt Cylinders."

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

PREVIEW ONLY

You're viewing 25 of 657 pages

The full manual includes:

- All 657 pages, complete
- Searchable PDF (find any keyword)
- No watermarks
- Instant download
- Print-ready quality

GET FULL MANUAL NOW

Clark CGC 40, CGC 50, CGC 55, CGC 60, CGC 70, CGP 40, CGP 45, CGP 50, CGP 55, CGC 40/70, CGP 40/70 Service Manual

Scan or click anywhere
youfixthis.com

Click anywhere on this page to get the full manual