SERVICE MANUAL
Excavator
880C
9-69762

1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4

SERVICE MANUAL
Excavator
880C
9-69762

1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4

SERVICE MANUAL
Excavator
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TYPE 1-4

SERVICE MANUAL
Excavator
880C
9-69762

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2. Slide into pocket on Binder Spine.

TYPE 1-4

880C EXCAVATOR
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CASE CORPORATION

9-69761-R1

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Section

1010

GENERAL ENGINE SPECIFICATIONS
880C EXCAVATOR

504BD DIESEL ENGINE

General

Type	Six Cylinder, Four Stroke Cycle, Natural Aspirated, Valve in Cylinder Head
Firing Order	1-5-3-6-2-4
Bore	4-5/8 Inches (117.5 mm)
Stroke	5 Inches (127 mm)
Piston Displacement	504 Cubic Inches (8 259 cm^3)
Compression Ratio	16.0 to 1
No Load Governed Speed	2280-2320 RPM
Rated Engine Speed	2100 RPM
Engine Idling Speed	725 to 775 RPM
Exhaust Valve Rotators	Positive Type
Rocker Arm-To-Valve Clearance, Cold (Exhaust)	.025 Inch (0.635 mm)
(Intake)	.015 Inch (0.381 mm)

Piston and Connecting Rods

Rings per Piston	3
Number of Compression Rings	2
Number of Oil Rings	1
Type Pins	Full Floating Type
Type Bearing	Replacement Type, Steel Back With Aluminum or Copper and Lead Liners

Main Bearings

Number of Bearings	7
Type Bearings	Replacement Type, Steel Back With Aluminum or copper and Lead Liners

Engine Lubricating System

Crankcase Capacity	19 U.S. Qts., (17.8 liters)
with Filter Change	21 U.S. Qts., (19.9 liters)
Oil Pressure	45 To 60 PSI (310 to 414 kPa)(3.1 to 4.14 bar) with Engine Warm and Operating at Rated Engine Speed
Type System	Pressure and Spray Circulation
Oil Pump	Gear Type
Oil Filter	Full Flow Turn on Type By-Pass Valve in Filter Base

Fuel System

Fuel Injection Pump	Robert Bosch, Type PES Multiple Plunger
Pump Timing	27 Degrees Before Top Center
Fuel Injectors	17 mm, Opening Pressure 3950 to 4100 PSI (27 234 to 28 268 kPa)(272.34 to 282.68 bar) Reset Opening Pressure When Pressure Drops Below 3400 PSI
Fuel Transfer Pump	Plunger Type, Part of Fuel Injection Pump
Governor	Variable Speed, Part of Fuel Injection Pump
1st Stage Fuel Filter	Full Flow Turn on Type
2nd Stage Fuel Filter	Full Flow Turn on Type

Section 1050

GENERAL MAINTENANCE

Written In *Clear And Simple English*

CASE CORPORATION

CE Div. 9-69760 - Nov. 1980

Printed in U.S.A.

MAINTENANCE

Introduction

Preventive maintenance and lubrication are the normal operations needed for safe and trouble free operation. Preventive maintenance is the easiest and best way to keep machine down time to a minimum.

Hour intervals are specified according to the number of hours the engine has run. The hourmeter, which operates when the engine is running, indicates the total hours of operation.

Run-In Period

The items given in the run-in section are to be done during the run-in period only.

Preventive Maintenance

The items in this section are separated into maximum hour intervals. These intervals are for "average" operating conditions. When operating under "severe" conditions, for example, severe heat, cold, dust, mud or water, increase the interval (do the maintenance more frequently).

The following chart includes all components that need regular maintenance, the maintenance interval and the section where details of maintenance can be found.

NOTE: See page 1050-5 for list of fluids and lubricants.

NOTE: The following charts show maximum intervals. If the machine operates in severe conditions, do maintenance more frequently.

RUN-IN MAINTENANCE CHART

INTERVAL	MAINTENANCE	INSTRUCTIONS
Run-In Period After First 20 Hours	Drain and fill engine crankcase with new oil	See Operator's Manual
	Change engine oil filter.	See Operator's Manual
	Check fan belt tension	Section 4007
	Replace 10 micron element for hydraulic filter	Section 8201
	Clean 100 mesh screen	Section 8201

PREVENTIVE MAINTENANCE CHART

INTERVAL	MAINTENANCE	INSTRUCTIONS
Every 10 Hours or daily, whichever comes first	Check engine oil level	See Operator's Manual
	Check hydraulic oil level	Section 8201
	Check restriction indicator for air cleaner	Section 2051
	Check coolant level in radiator	See Operator's Manual
	Clean dust cup for air cleaner	See Operator's Manual

INTERVAL	MAINTENANCE	INSTRUCTIONS
	Check sediment bowl on fuel transfer pump for water. If found, drain bowl, filter and fuel tank.	See Operator's Manual
	Fill fuel tank	See Operator's Manual
	Controls - check operation	Section 9206
	Check track rollers for leakage. Lifetime lubrication - no regular maintenance required.	
	Lubricate turntable open gear	Section 9201
	Clean operator's compartment	See Operator's Manual
	Grease boom and attachment fittings	Section 9201
	Grease pillow blocks on crawler drive	Section 6301
After first 50 hours or first week of operation	Check torques on all turntable bearing bolts	Section 9216
Every 50 hours or Weekly	Grease leveler fittings	Section 9201
	Lubricate control linkage	Section 9201
	Lubricate turntable bearing	Section 9201
	Check oil level in final drive transmissions	Section 6301
	Check tension in excavator tracks	Section 5501
Every 100 hours	Change engine oil	See Operator's Manual
Every 200 hours	Change engine oil filter element	See Operator's Manual
Every 250 Hours	Check V-belt deflection	Section 4007
Every 300 Hours or 6 Weeks	Check torque on all turntable bearing bolts	Section 9216
Every 500 Hours or two months	Drain deposits from fuel tank and sediment bowls	See Operator's Manual
	Add corrosion inhibitor to radiator	See Operator's Manual
	Replace fuel filters	See Operator's Manual
	Replace hydraulic oil filter element and clean mesh screens	Section 8201

INTERVAL	MAINTENANCE	INSTRUCTIONS
Every 1500 Hours or 6 months	Drain and fill drive transmission	Section 6301
	Drain and fill swing reducer	Section 9201
	Drain and fill hydraulic oil tank	Section 8201
	Clean battery and connecting posts	See Operator's Manual
	Drain and flush radiator and cooling system. Install fresh coolants	See Operator's Manual
Every 3000 Hours or Yearly	Lubricate starter motor wicks	Section 4201

FUEL, FLUIDS AND LUBRICANT CHART

COMPONENT	CAPACITY U.S.	CAPACITY METRIC	SPECIFICATIONS
Fuel Tank	75 gal.	284 litres	No. 2 diesel fuel
Engine crankcase with filter change without filter change	 21 quarts 19 quarts	 19.8 litres 18 litres	Engine oil: Case HDM Oil CD - Commercial class D Above 32° F (0° C) - SAE 30W 10° to 50° F (-12° to 10° C) - SAE 20W Below 32° F (0° C) - SAE 10W
Hydraulic Tank Hydraulic System	18.7 gals. 43 gal.	71 litres 163 litres	Case TCH Fluid Alternate oils: Engine oil - SD Service class D CA - Commercial class A (Service MS or DG) Above 32° F (0° C) - SAE 10W Below 32° F (0° C) - SAE 5W Type C-2 transmission and hydraulic fluid, example: Tenneco Hytrans Fluid
Final drives (each)	8.5 quarts	8 litres	Case FDL final drive fluid or SAE 90 API-GL-4 Gear Lubricant
Swing Gearbox	4.5 quarts	4.25 litres	Case FDL final drive fluid or SAE 90, API-GI-4 Gear Lubricant
Cooling System	10.3 gal.	39.2 litres	Ethylene glycol and water mixed for prevailing temperatures. Follow specifications of antifreeze manufacturer.
Grease Fittings	As required		No. 2 Moly-disulfide grease

NOTE: It is extremely important that a stable, high quality engine lubricating oil be selected for use in the Case Diesel Engine. It is also extremely important that the correct weight (SAE Viscosity Rating) of oil be selected for the prevailing air temperature. This assures you that the oil will remain fluid or free flowing within the specified temperature ranges.

Section 1051

TORQUE SPECIFICATIONS

CASE CORPORATION

C. E. Div. 9-66015
580C Loader Backhoe
February 1976

PRINTED IN U.S.A.

U.S. AND METRIC TORQUE SPECIFICATIONS

Grade 5 Bolts, Nuts and Studs (Dry Threads)

Thread size	Ft-lbs	N m	Thread size	Ft-lbs	N m
1/4"-20 NC	5-10	7-13	3/4"-10 NC	235-285	319-386
1/4"-28 NF	10-15	13-20	3/4"-16 NF	270-330	366-447
5/16"-18 NC	15-20	20-27	7/8"-9 NC	360-440	488-597
5/16"-24 NF	15-20	20-27	7/8"-14 NF	395-490	536-664
3/8"-16 NC	25-35	34-47	1"-8 NC	520-640	705-867
3/8"-24 NF	30-40	41-54	1"-12 NF	575-705	780-955
7/16"-14 NC	45-55	61-74	1-1/8"-7 NC	720-820	976-1111
7/16"-20 NF	50-60	68-81	1-1/8"-12 NF	790-970	1071-1315
1/2"-13 NC	65-85	88-115	1-1/4"-7 NC	1010-1240	1370-1681
1/2"-20 NF	80-100	109-135	1-1/4"-12 NF	1115-1365	1512-1850
9/16"-12 NC	100-120	135-163	1-3/8"-6 NC	1315-1610	1783-2182
9/16"-18 NF	110-130	149-176	1-3/8"-12 NF	1510-1850	2047-2508
5/8"-11 NC	135-165	183-223	1-1/2"-6 NC	1745-2135	2366-2894
5/8"-18 NF	160-200	216-271	1-1/2"-12 NF	1880-2420	2549-3281

Grade 8 Bolts, Nuts and Studs (Dry Threads)

Thread size	Ft-lbs	N m	Thread size	Ft-lbs	N m
1/4"-20 NC	10-15	13-20	3/4"-10 NC	340-420	461-569
1/4"-28 NF	15-20	20-27	3/4"-16 NF	380-460	515-623
5/16"-18 NC	20-30	27-40	7/8"-9 NC	540-660	732-894
5/16"-24 NF	25-30	34-40	7/8"-14 NF	595-725	807-982
3/8"-16 NC	40-50	54-67	1"-8 NC	810-990	1098-1342
3/8"-24 NF	45-55	61-74	1"-12" NF	900-1100	1220-1491
7/16"-14 NC	60-80	82-102	1-1/8"-7 NC	1150-1400	1559-1898
7/16"-20 NF	70-90	95-122	1-1/8"-12 NF	1295-1585	1756-2148
1/2"-13 NC	100-120	136-162	1-1/4"-7 NC	1640-2000	2224-2711
1/2"-20 NF	110-130	149-176	1-1/4"-12 NF	1800-2200	2440-2982
9/16"-12 NC	135-165	183-223	1-3/8"-6 NC	2140-2620	2901-3552
9/16"-18 NF	155-190	210-257	1-3/8"-12 NF	2450-3000	3322-4067
5/8"-11 NC	200-240	271-325	1-1/2"-6 NC	2845-3475	3857-4711
5/8"-18 NF	215-265	292-359	1-1/2"-12 NF	3200-3900	4339-4880

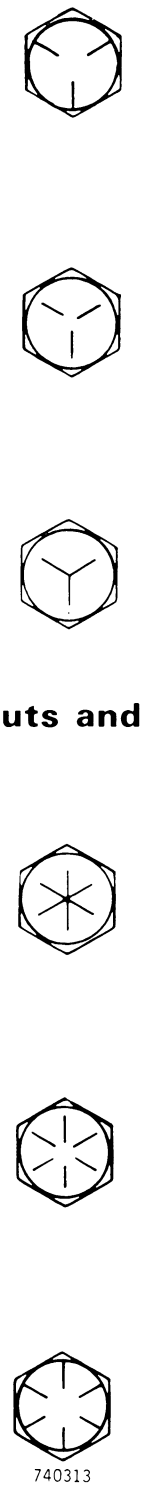

Figure 1

U.S. AND METRIC TORQUE SPECIFICATIONS

Hydraulic Fittings (Steel)

Dash Size	Tube O.D. Hose I.D.	Thread Size	37° Flare Torque		Straight Thread O-ring Torque	
			Ft-lbs	N m	Ft-lbs	N m
4	1/4"	7/16"-20	6-12	8-16	12-19	16-25
5	5/16"	1/2"-20	8-16	11-21	16-25	22-33
6	3/8"	9/16"-18	10-25	14-33	25-40	34-54
8	1/2"	3/4"-16	15-42	20-56	42-67	57-90
10	5/8"	7/8"-14	25-58	34-78	58-92	79-124
12	3/4"	1-1/16"-12	40-80	54-108	80-128	108-174
14	7/8"	1-3/16"-12	60-100	81-135	100-160	136-216
16	1"	1-5/16"-12	75-117	102-158	117-187	159-253
20	1-1/4"	1-5/8"-12	125-165	169-223	165-264	224-357
24	1-1/2"	1-7/8"-12	210-250	285-338	250-400	339-542

Split Flange Mounting Bolts (Grade 5, Dry Threads)

Flange Size	Thread Size	Torque	
		Ft-lbs	N m
1/2"	5/16"-18 NC	15-20	20-25
3/4"	3/8"-16 NC	20-25	26-33
1"	3/8"-16 NC	20-25	26-33
1-1/4"	7/16"-14 NC	35-45	47-61
1-1/2"	1/2"-13 NC	45-55	61-74
2"	1/2"-13 NC	55-65	74-88
2-1/2"	1/2"-13 NC	80-90	104-122
3"	5/8"-11 NC	140-150	190-203

740314

Figure 2

Section
1055

GENERAL CLEANING INSTRUCTIONS

CASE CORPORATION Burl. Form 9-66735 Sept. 1976 PRINTED IN U.S.A.

GENERAL CLEANING INSTRUCTIONS

Complete Assemblies

Completely assembled components may be steam cleaned on the outside only, to make for easier removal and disassembly. All openings and breathers must be closed or plugged to prevent possibility of water entering the component.

WARNING: To prevent injury from burns always use a non-flammable solvent for cleaning component parts. DO NOT USE gasoline or other flammable substances.

Rough Parts

Rough parts such as housings, castings, etc., may be cleaned in hot solution tanks with mild alkali solutions, providing these parts do not have ground or polished surfaces. The parts should remain in the tank long enough to be thoroughly cleaned and heated. This will aid the evaporation of rinse water. The parts should be thoroughly rinsed after cleaning to remove all traces of alkali.

Finished or Machined Parts

Parts having ground or polished surfaces such as gears, bearings, shafts and collars, should be cleaned in non-flammable solvent.

IMPORTANT: DO NOT clean machined parts in hot solution tanks with water and alkaline solutions such as sodium hydroxide, orthosilicates or phosphates.

Rubber Parts

Clean rubber parts by washing in clean denatured alcohol. DO NOT use mineral base cleaning solvents such as acetone or paint thinner on any rubber parts. If a mineral base solvent is used, the rubber will start to deteroirate and continue to deteriorate after the part is put back into service. The continued deterioration of the rubber could cause the part to fail.

Drying

All parts cleaned must be thoroughly dried immediately. Use moisture-free compressed air or soft lintless absorbent wiping rags. The rags should be free of abrasive materials such as metal filings, contaminated oil or lapping compound. Bearings may be dried using compressed air, provided the air is directed across the bearings to avoid spinning. Do not spin bearings when drying. Bearings may be rotated slowly by hand to speed the drying process.

CAUTION: When using compressed air keep stream from direction of face. Use only low air pressure.

Corrosion Prevention

Parts that have been cleaned, dried, inspected and are to be immediately reassembled should be coated with a light oil to prevent corrosion. If these parts are to be stored for any length of time, they should be treated with a good RUST PREVENTIVE and wrapped in special paper or other material to prevent corrosion.

Section 1056

SAFETY RULES

CASE CORPORATION

CE Div. 9-68141 - Nov. 1978

Printed in USA.

SAFETY RULES

This Safety Alert Symbol Indicates Important Safety Messages In This Manual. When You See This Symbol, Carefully Read The Message That Follows And Be Alert To The Possibility Of Personal Injury Or Death.

CAUTION: Do not service machine with engine running. If necessary to make checks with engine running, have one man stay at the controls while the other makes the check.

CAUTION: When servicing the machine, tag mark the ignition switch to alert other operators and prevent accidental start-ups.

CAUTION: Engage digging brake whenever the unit is not "crawling". Accidental engagement of the drive lock switch will cause the machine to immediately move in the forward direction.

CAUTION: Before starting engine make sure all operating controls are in NEUTRAL.

WARNING: To prevent injury from burns always use a non-flammable solvent for cleaning component parts. DO NOT USE gasoline or other flammable substances.

Keep a fire extinguisher on hand and KNOW HOW TO USE IT. Check it regularly to ensure it is in good working order.

WARNING: To prevent eye injuries wear safety glasses when servicing this machine.

POISON DANGER: BATTERY ACID CAUSES SEVERE BURNS. BATTERIES CONTAIN SULFURIC ACID. Avoid contact with skin, eyes, or clothing.

Anti-dote: EXTERNAL: Flush with water. INTERNAL: Drink large quantities of water or milk. Follow with Milk of Magnesia, beaten egg or vegetable oil. Call physician immediately. EYES: Flush with water for 15 minutes and get prompt medical attention. KEEP OUT OF REACH OF CHILDREN.

WARNING: Never attempt to disconnect any hydraulic lines unless boom is firmly supported or blocked, load is lowered to the ground and hydraulic line pressure is relieved by working the controls back and forth several times while cranking the engine with shutoff control pulled out.

WARNING: Never operate the alternator on an open circuit. With no battery or other electrical load on the circuit, a voltage buildup will occur within the alternator. This voltage buildup could be extremely hazardous to anyone touching the alternator "BAT" terminal.

CAUTION: Decals provide operating instructions and safety information to the operator. To help prevent accidents or personal injury, clean or replace any decal that cannot be easily read.

CAUTION: Before attempting to remove any major component, check the approximate weight of that component and make adequate provision for attaching and lifting. Use a hoist or crane capable of supporting the weight.

Clean rubber parts by washing in clean denatured alcohol. DO NOT use mineral base cleaning solvents such as acetone or paint thinner on any rubber parts. If a mineral base solvent is used, the rubber will start to deteriorate and continue to deteriorate after the part is put back into service. The continued deterioration of the rubber could cause the part to fail.

CAUTION: Never leave engine running when machine is unattended.

WARNING: Batteries produce explosive gases. Keep flames, sparks and cigarettes away. Ventilate when charging or using in enclosed space. Always shield eyes when working near batteries.

CAUTION: Disconnect both leads from the batteries when working on the engine or electrical system. Always disconnect the ground lead first.

CAUTION: When checking coolant level, remove radiator cap slowly to relieve pressure within the system.

CAUTION: Wipe oil spills immediately and keep work areas as clean as possible. A cluttered work area invites accidents.

CAUTION: Inspect the machine daily for loose, worn or damaged parts. Have unsafe conditions corrected immediately.

CAUTION: Before removing or disassembling the swing brake, SET BOOM ON GROUND to prevent turntable from rotating.

CAUTION: DO NOT wear loose clothing which may catch in moving parts.

WARNING: This machine is equipped with a 24-volt starting sytem. Sparking will occur across greater distances than with a conventional 12 volt system. NEVER WEAR RINGS OR OTHER METAL OBJECTS that may ground a live circuit.

WARNING: This machine must be level when torquing turntable capscrews. Since it is necessary to disconnect the swing brake, the boom will swing to the down side unless the machine is level. Blocking or resting the boom in the required position is not recommended.

CAUTION: ENGINE FAN AND BELTS - To prevent possible serious injury avoid contact with rotating fan and belts.

WARNING: Use extreme care when handling the track. Never insert fingers between track shoes when removing track.

WARNING: Never place fingers between track shoes when installing tracks.

CAUTION: Slowly loosen the adapter to allow grease to escape. Very high pressures exist in the adjustment cylinder when under tension. The adapter fitting could fly loose and cause personal injury.

CAUTION: The idler wheel spring is under tension. If for any reason this spring must be removed, use extreme caution.

WARNING: Never place your hands inside the access hole while the turntable is moving. If you find it necessary to place hand inside opening, stop the turntable and set the swing brake.

CAUTION: Weight of the turntable with counterweight is approximately 17,000 lbs. (7 700 kg).

WARNING: Do not disconnect brake unless machine is level and turntable securely blocked to prevent it from swinging.

CAUTION: Never wear rings or metal watch bands as you may ground a live circuit.

CAUTION: Cylinders used on this machine are heavy and may be awkward to handle. Use suitable lifting equipment (a hoist is recommended).

CAUTION: The transmission and brake assembly weigh approximately 800 lbs. (360 kg). Make adequate provisions to handle this weight.

CAUTION: Use care when applying compressed air to brake release port. Housing may pop up causing personal injury. Use only low air pressure.

CAUTION: Crowd cylinder must be securely supported so when rod end pin is removed cylinder will not drop. Personal injury could result.

CAUTION: Swivel is heavy and hard to handle. Use a hoist to handle to avoid possible damage to swivel or personal injury.

CAUTION: Do not attempt repairs you do not understand. There is no disgrace in asking for help.

WARNING: Never check battery charge by placing a metal object across the posts -the sparks could cause an explosion. Use a voltmeter or hydrometer.

CAUTION: Storage areas for batteries must be well ventilated to prevent accumulation of hydrogen gas from newly recharged batteries.

CAUTION: Think out the circuit before making or breaking a connection. A wrong connection can be painful and expensive.

WARNING: Use extreme caution when disconnecting hydraulic lines. High pressure in a system could cause injury when fittings are disconnected. Relieve all pressure before working on system.

DANGER: Exhaust fumes can kill. If necessary to start an engine in an enclosed area, be sure to provide adequate ventilation.

CAUTION: Always lower all attachments to the ground or block them securely before performing any service or adjustment.

WARNING: Do not fuel the machine when smoking, when near an open fire or with the engine running.

CAUTION: Never grease, oil or perform any maintenance with the engine running unless so instructed in the operator's manual or service manual. If the attachment must be raised in order to perform the operation, block up the attachment securely.

CAUTION: The swing motor is heavy and awkward to handle. Use care when handling the motor to prevent personal injury and damage to the motor.

CAUTION: Do not try to replace pump without using a hoist. Pump is heavy and could cause personal injury if not properly handled.

CAUTION: When using jumper cables on negative ground system, always connect positive jumper cable to battery terminal on starter solenoid, then use normal starting procedure from operator's seat. Any other method could result in machine runaway.

CAUTION: The four-spool valve weighs approximately 112 lbs. (51 kg); the one-spool valve weighs approximately 40 lbs. (18 kg). Use care in handling the valve to prevent personal injury and damage to the valve.

CAUTION: Swing gearbox and house brake weigh approximately 225 lbs. (102 kg). Use care when handling the assembly to prevent personal injury and damage to the assembly.

CAUTION: When bleeding brakes, loosen bleeder plug approximately one-half to three-quarters turn or until oil just starts to flow. If plug is loosened too far, it may be blown out under pressure and cause personal injury.

CAUTION: The track motor is heavy and awkward to handle. Use care when handling the motor to prevent personal injury and damage to the motor.

CAUTION: Always wear asbestos gloves to prevent burning your hands when handling heated parts.

The fuel spray from an injector has sufficient penetrating power to puncture the flesh and destroy tissue. Should the fuel enter the blood stream, it may cause blood poisoning.

CAUTION: Main boom weighs approximately 1900 lbs. (860 kg), hoist cylinder weighs 200 lbs. (90 kg) and crowd cylinder weighs 200 lbs. (90 kg). Use appropriate hoist to remove these items or personal injury could result.

CAUTION: Dipperstick weighs approximately 800 lbs. (360 kg) and tool cylinder weighs approximately 175 lbs. (80 kg). Use a hoist capable of lifting these items as personal injury could result.

WARNING When testing or adjusting fuel injectors, do not place your hands or arms in front of the injector nozzle.

In the event the skin is punctured from the discharge of an injector, apply the following first aid immediately, then have the injury examined by a physician as quickly as possible.

Wash the injured part with boric acid solution, support the injured finger or hand with a splint or sling so the injured part will remain absolutely at rest until a physician can examine it.

CAUTION: Before removing leveler cylinders support turntable under both sides to prevent turntable from shifting and causing an unbalanced situation and possible personal injury.

CAUTION: Do not place fingers around or near the edge of the housing bore when installing housing. Possible personal injury could occur.

CAUTION: Hydraulic systems are highly pressurized. Escaping hydraulic oil, even an invisible pinhole leak, can penetrate body tissue causing serious injury. Use a piece of wood or cardboard when looking for leaks - never use the hands or other parts of the body.

Relieve hydraulic pressure before disconnecting circuits. When reassembling, make absolutely certain that all connections are tight.

If injured by hydraulic oil escaping under pressure, see a doctor immediately. Serious complications may arise if medical attention is not given at once.

WARNING: Because of the danger of explosion always present when connecting live batteries to dead batteries, NEVER lean over batteries when connecting jumper cables.

CAUTION: When removing a battery, always disconnect the (—) negative ground cable first. When installing the battery, always connect the (—) ground cable last.

WARNING: When checking starter circuit switch, make sure digging brake is engaged and the fuel shut-off control is pulled out.

CAUTION: Main boom with cylinders weighs approximately 1930 lbs. (875 kg). Use a hoist capable of handling this weight or personal injury could result.

CAUTION: Control valves are heavy and awkward to handle. Use care when handling the valves to prevent personal injury and damage to the valves.

CAUTION: Cylinders on this machine are heavy and awkward to handle. Provide suitable support (a chain hoist is recommended) prior to removing the mounting pins.

CAUTION: Tool boom weighs approximately 475 lbs. (215 kg), and tool cylinder weighs approximately 173 lbs. (78 kg). Use a hoist capable of lifting these items as personal injury could result.

CAUTION: When using compressed air keep stream from direction of face. Use only low air pressure.

CAUTION: Cylinders on this machine are heavy and awkward to handle. Hoist cylinder weighs approximately 700 lbs. (320 kg), crowd cylinder - 665 lbs. (300 kg) and tool cylinder 460 lbs. (280 kg). Provide suitable support (a chain hoist is recommended) prior to removing the mounting pins.

Section

1420

SPECIFICATION DETAILS

504BD ENGINE

Written In *Clear And Simple English*

CASE CORPORATION

Rac 8-20050

Printed in U.S.A.
August, 1978

FRACTION to DECIMAL to MILLIMETER CONVERSION TABLE

Fraction	Decimal	MM	Fraction	Decimal	MM	Fraction	Decimal	MM
1/64	.0156	0.397	23/64	.3593	9.128	45/64	.7031	17.859
1/32	.0312	0.794	**3/8**	**.3750**	**9.525**	23/32	.7187	18.256
3/64	.0468	1.191	25/64	.3906	9.922	47/64	.7343	18.653
1/16	.0625	1.587	13/32	.4062	10.319	**3/4**	**.7500**	**19.050**
5/64	.0781	1.984	27/64	.4218	10.716	49/64	.7656	19.447
3/32	.0937	2.381	7/16	.4375	11.113	25/32	.7812	19.844
7/64	.1093	2.778	29/64	.4531	11.509	51/64	.7968	20.240
1/8	**.1250**	**3.175**	15/32	.4687	11.906	13/16	.8125	20.637
9/64	.1406	3.572	31/64	.4843	12.303	53/64	.8281	21.034
5/32	.1562	3.969	**1/2**	**.5000**	**12.700**	27/32	.8437	21.431
11/64	.1718	4.366	33/64	.5156	13.097	55/64	.8593	21.828
3/16	.1875	4.762	17/32	.5312	13.494	**7/8**	**.8750**	**22.225**
13/64	.2031	5.159	35/64	.5468	13.890	57/64	.8906	22.622
7/32	.2187	5.556	9/16	.5625	14.287	29/32	.9062	23.019
15/64	.2343	5.953	37/64	.5781	14.684	59/64	.9218	23.415
1/4	**.2500**	**6.350**	19/32	.5937	15.081	15/16	.9375	23.812
17/64	.2656	6.747	39/64	.6093	15.478	61/64	.9531	24.209
9/32	.2812	7.144	**5/8**	**.6250**	**15.875**	31/32	.9687	24.606
19/64	.2968	7.541	41/64	.6406	16.272	63/64	.9843	25.003
5/16	.3125	7.937	21/32	.6562	16.669	**1**	**1.0000**	**25.400**
21/64	.3281	8.334	43/64	.6718	17.065			
11/32	.3437	8.731	11/16	.6875	17.462			

INCH to MILLIMETER CONVERSION TABLE

Inch	MM	Inch	MM	Inch	MM	Inch	MM
1	25.400	6	152.000	10	254.000	60	1,524.000
2	50.800	7	177.800	20	508.000	70	1,778.000
3	76.200	8	203.200	30	762.000	80	2,032.000
4	101.600	9	228.600	40	1,016.000	90	2,286.000
5	127.000	10	254.000	50	1,270.000	100	2,540.000

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RUN-IN INSTRUCTIONS

Engine Lubrication

Fill the engine crankcase with CASE HDM oil and install new engine oil filters, after an engine has been rebuilt.

NOTE: *Use a SERIES 3 DS or CD SERVICE CLASSIFICATION oil that has the correct viscosity rating for ambient air temperature, if CASE HDM oil is not used.*

Change the engine oil while the engine is hot and replace the engine oil filters, after the first 20 hours of operation.

Change the engine oil and filters at the given intervals, after the 20 hours, as found in the Operator's Manual.

Run-In Procedure For Rebuilt Engines (With A Dynamometer)

The following procedure must be followed when using a PTO dynamometer to run-in the engine. The dynamometer will make sure of the control of the engine load at each speed and will remove stress on new parts during run-in.

During the run-in, continue to check the oil pressure, coolant level and coolant temperature.

STEP	TIME	ENGINE SPEED	DYNAMOMETER SCALE LOAD*
1	**10 Minutes	1000 RPM	Not Any
2	**10 Minutes	1800 RPM	Not Any
3	20 Minutes	1800 RPM	1/3
4	20 Minutes	1800 RPM	1/2
5	***30 Minutes	100 RPM below rated speed	3/4
6	Tighten the cylinder head bolts to the torque that is found in Section 2015 of the service manual.		

* According to normal dynamometer scale load at rated speed for the specific vehicle model. Decrease this scale load as shown.

** The best run-in procedure will constantly change the throttle between 750 to 1000 RPM, for the first 10 minutes and from 1000 to 1800 RPM, for the next 10 minutes. The purpose of this changing RPM is to change the lubrication and coolant flow.

*** 30 minutes at 3/4 load is a minimum amount of time the engine can be run. It is best that when possible, the engine (especially a turbocharged diesel) must be run for four (4) hours or more, at the above speed and load before checking the full engine horsepower or before using the engine for heavy field work.

Run-In Procedure For Rebuilt Engines (Without A Dynamometer)

STEP	TIME	ENGINE SPEED	LOAD
1	*10 Minutes	1000 RPM	Not Any
2	* 10 Minutes	1800 RPM	Not Any
3	30 Minutes	2/3 Rated RPM	Light Load
4	1 Hour	Full RPM (not over 2000 RPM)	80 to 90%
5	Tighten the cylinder head bolts to the torque that is found in Section 2015 of the service manual.		

* If engine must then run at or near full load to operate the machine, remove the load for the first hour and run at high idle for several minutes at 15 minute intervals.

Run-In Procedure

Keep in one gear lower than normal for the first 8 hours of field operation. DO NOT "lug" the engine for the next 12 hours. Prevent "lugging" by moving the shift lever to a lower gear. The engine must not be "lugged" below the Rated Engine RPM during the early hours of life.

ENGINE SPECIFICATION DETAILS

Cylinder Sleeves

	U.S. Value	Metric Value
Type	Wet, Can Be Replaced	
Material	Cast Iron	
I.D. of Sleeve	4.6250 to 4.6263"	117.475 to 117.508 mm
Maximum Service Limit	4.6283"	117.559 mm
Sleeve Out of Round (Installed in Block)	0.002"	0.0508 mm
Maximum Service Limit	0.002"	0.0508 mm
Taper (Installed in Block)	0.001"	0.0254 mm
Maximum Service Limit	0.002"	0.051 mm
Clearance at Bottom of Piston, 90 Degrees to Piston Pin	0.0052 to 0.0075"	0.1321 to 0.1905 mm
Maximum Service Limit	0.0100"	0.2540 mm

Piston

Type	Cam Ground	
Material	Aluminum Alloy	
O.D. At Bottom, 90 Degrees to Piston Pin	4.6188 to 4.6198"	117.3175 to 117.3429 mm
Minimum Service Limit	4.6178"	117.2921 mm
I.D. of Piston Pin Bore	1.6251 to 1.6253"	41.2775 to 41.2826 mm
Maximum Service Limit	1.6258"	41.295 mm
Width of 1st Ring Groove	0.097 to 0.098"	2.464 to 2.489 mm
Maximum Service Limit	0.0985"	2.502 mm
Width of 2nd Ring Groove	0.097 to 0.098"	2.464 to 2.489 mm
Maximum Service Limit	0.0985"	2.502 mm
Width of 3rd Ring Groove	0.188 to 0.189"	4.775 to 4.801 mm
Maximum Service Limit	0.190"	4.826 mm

Piston Rings

Number One Compression (Top)	Rectangular Type With Chrome Face	
End Gap in 4.625" (117.475 mm) I.D. Sleeve	0.015 to 0.025"	0.381 to 0.635 mm
Maximum Service Limit	0.030"	0.762 mm
Side Clearance	0.0035 to 0.0050"	0.0889 to 0.127 mm
Maximum Service Limit	0.006"	0.152 mm
Number Two Compression (Intermediate)	Square Type With Tapered Face	
End Gap in 4.625" (117.475 mm) I.D. Sleeve	0.013 to 0.023"	0.330 to 0.584 mm
Maximum Service Limit	0.028"	0.711 mm
Side Clearance	0.003 to 0.005"	0.076 to 0.127 mm
Maximum Service Limit	0.006"	0.152 mm
Number Three Oil Control Ring (Bottom)	Two Piece	
Width	0.1860 to 0.1865"	4.7244 to 4.7371 mm
End Gap in 4.625" (117.475 mm) I.D. Sleeve	0.016 to 0.026"	0.406 to 0.660 mm
Maximum Service Limit	0.031"	0.787 mm
Side Clearance	0.0015 to 0.003"	0.038 to 0.076 mm
Maximum Service Limit	0.0035"	0.089 mm

Piston Pin

	U.S. Value	Metric Value
Type	Floats	
O.D. of Pin	1.6244 to 1.6246"	41.260 to 41.625 mm

Connecting Rod

Bushing	Replaceable	
Bushing I.D., Installed (Ream to Size)	1.6254 to 1.6258"	41.285 to 41.295 mm
Maximum Service Limit	1.6265"	41.313 mm
Bearing Liners	Replaceable	
Bearing Liner Width	1.586 to 1.596"	40.284 to 40.538 mm
Bore I.D. Without Bearing Liners	2.9003 to 2.9013"	73.668 to 73.693 mm
Bearing Oil Clearance	0.0011 to 0.0041"	0.028 to 0.104 mm
Maximum Service Limit	0.0046"	0.117 mm
Undersize Bearings for Service	0.002, 0.010, 0.012, 0.020, 0.030"	0.051, 0.254, 0.305, 0.508, 0.762 mm
Side Clearance	0.007 to 0.016"	0.178 to 0.406 mm

Crankshaft

Type	Forged, Heat Treated and Balanced	
Main Bearing Liners	Replaceable	
End Play, Number Five Main Bearing Cap	0.003 to 0.015"	0.076 to 0.381 mm
Thrust Bearing, Standard Thickness	0.184 to 0.186"	4.674 to 4.724 mm
Thrust Bearing, Oversize Thickness for Service	0.190 to 0.192"	4.826 to 4.877 mm
Connecting Rod Journal, Standard O.D.	2.748 to 2.749"	69.799 to 69.825 mm
0.010" (0.254 mm) O.D. Undersize, Grind to	2.738 to 2.739"	69.545 to 69.571 mm
0.020" (0.508 mm) O.D. Undersize, Grind to	2.728 to 2.729"	69.291 to 69.317 mm
0.030" (0.762 mm) O.D. Undersize, Grind to	2.718 to 2.719"	69.037 to 69.063 mm
Connecting Rod Journal Maximum Taper	0.0005"	0.013 mm
Journals Out of Round	0.0005"	0.013 mm
Main Bearing Liner Width, 1st , 3rd, 5th and 7th	2.1515 to 2.1615"	54.648 to 54.902 mm
Main Bearing Liner Width, 2nd, 4th and 6th	1.151 to 1.161"	29.235 to 29.489 mm
Undersize Main Bearing Liners for Service	0.002, 0.010 , 0.012, 0.020, 0.030"	0.051, 0.254, 0.305, 0.508, 0.762 mm
Main Bearing Oil Clearance	0.0016 to 0.0046"	0.041 to 0.117 mm
Maximum Service Limit	0.005"	0.127 mm
Main Bearing Journal, Standard O.D.	2.998 to 2.999"	76.149 to 76.175 mm
0.010" (0.254 mm) O.D. Undersize, Grind to	2.988 to 2.989"	75.895 to 75.921 mm
0.020" (0.508 mm) O.D. Undersize, Grind to	2.978 to 2.979"	75.641 to 75.667 mm
0.030" (0.762 mm) O.D. Undersize, Grind to	2.968 to 2.969"	75.387 to 75.413 mm
Main Bearing Journal Bore I.D. Without Liners	3.191 to 3.192"	81.051 to 81.077 mm
Main Journal Width		
2nd, 4th and 6th	1.555 to 1.570"	39.497 to 39.878 mm
3rd and 7th	2.6175 to 2.6325"	66.485 to 66.866 mm
5th	2.623 to 2.627"	66.624 to 66.726 mm
Connecting Rod Journal Width	1.9975 to 2.0025"	50.737 to 50.864 mm

Camshaft

	U.S. Value	Metric Value
Type	Parabolic	
Bushing	Five, Replaceable	
Bushing Lubrication	Under Pressure	
I.D. of Bushing	2.2484 to 2.2514"	57.109 to 57.186 mm
Maximum Service Limit	2.2524"	57.211 mm
Bushing Width		
1st (Front)	1.6460 to 1.6660"	41.808 to 42.316 mm
2nd, 3rd and 4th	1.4275 to 1.4475"	36.259 to 36.767 mm
5th	1.1462 to 1.1662"	29.113 to 29.622 mm
O.D. of Each Bearing Surface	2.2460 to 2.2470"	57.048 to 57.074 mm
Minimum Service Limit	2.2455"	57.036 mm
Thrust Washer Thickness	0.1225 to 0.1275"	3.1115 to 3.2385 mm
Minimum Service Limit	0.1215"	3.086 mm
Thrust Plunger Spring		
Free Length	3.6250"	92.075 mm
O.D. of Spring	0.406"	10.312 mm
Compress to 2.750" (69.85 mm)	45 to 55 lbs.	200 to 245 N

Valve Push Rod Lifters

O.D. of Lifter Stem, Standard	0.8097 to 0.8102"	20.566 to 20.579 mm
O.D. of Lifter Stem, Oversize for Service	0.8190 to 0.8195"	20.803 to 20.815 mm
I.D. of Block Bore, Standard	0.8118 to 0.8130"	20.620 to 20.650 mm
Maximum Service Limit	0.8135"	20.663 mm
I.D. of Block Bore, Oversize for Service	0.8215 to 0.8225"	20.866 to 20.891 mm

Gear Train

Backlash		
Crankshaft Gear to Camshaft Gear	0.004 to 0.011"	0.1016 to 0.2794 mm
Idler Drive Gear to Idler Gear	0.003 to 0.010"	0.0762 to 0.2540 mm
Idler Gear to Fuel Pump Gear	0.004 to 0.012"	0.1016 to 0.3048 mm
Crankshaft Gear to Oil Pump Idler Gear	0.006 to 0.011"	0.1524 to 0.2794 mm
Crankshaft Gear to Fuel Pump Gear	0.027" Max.	0.6858 mm Max.
O.D. of Idler Gear Shaft	1.7325 to 1.7330"	44.0055 to 44.0182 mm
I.D. of Idler Gear Bushing	1.7345 to 1.7355"	44.0563 to 44.0817 mm
Maximum Service Limit	1.7375"	44.132 mm
Idler Gear Thrust Washer Thickness	0.061 to 0.063"	1.5494 to 1.6002 mm
Idler Gear Lateral Movement	0.002 to 0.012"	0.051 to 0.305 mm