880R EXCAVATOR
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C E Div 9-67074
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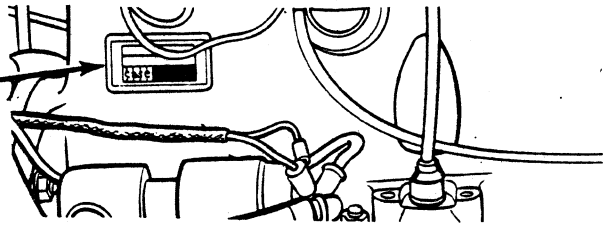
Section 1010

GENERAL ENGINE SPECIFICATIONS 880R EXCAVATOR

THE MODEL AND ENGINE SERIAL NUMBER IS STAMPED ON A PLATE LOCATED ON THE SIDE OF THE ENGINE ABOVE THE CRANKING MOTOR.



General

Type	4 Cylinder, 4 Stroke Cycle, Valve-in-Head Turbo-Charged
Firing Order	1-3-4-2
Bore	4-5/8 Inches
Stroke	5 Inches
Piston Displacement	336 Cubic Inches
Compression Ratio	15.8 to 1
No Load Governed Speed	2330 to 2370 RPM
Rated Engine Speed	2200 RPM
Engine Idling Speed	700 to 750 RPM
Exhaust Valve Rotators	Positive Type
Valve Tappet Clearance (Exhaust)	(Cold) .025 Inch
(Intake)	(Cold) .015 Inch

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	Replaceable Precision, Steel Back, Copper-Lead Alloy Liners

Main Bearings

Number of Bearings	5
Type Bearings	Replaceable Precision Steel Back, Copper-Lead Alloy Liners

Engine Lubricating System

Crankcase Capacity	10 Quarts
with Filter Change	11 Quarts
Oil Pressure	45 to 60 Pounds with Engine Warm and Operating at Rated Engine Speed
Type System	Pressure and Spray Circulation
Oil Pump	Gear Type
Oil Filter	Full Flow Spin on Type

Fuel System

Fuel Injection Pump	Robert Bosch, Type PES Multiple Plunger
Pump Timing	30 Degrees Before Top Dead Center (Port Closing)
Fuel Injectors	Pencil Type (Opening Pressure 2800 PSI)
Fuel Transfer Pump	Plunger Type, Integral Part of Injection Pump
Governor	Variable Speed, Fly-Weight Centrifugal Type, Integral Part of Injection Pump
1st Stage Fuel Filter	Full Flow Spin on Type
2nd Stage Fuel Filter	Full Flow Spin on Type

CASE

Rac. 9-45781

PRINTED IN U.S.A.

Section

1023

SPECIFICATION DETAILS

336BD ENGINES

Written In *Clear And Simple English*

CASE CORPORATION

Rac 9-78646

Printed in U.S.A.
(Revised) October, 1979

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.

DETAILED ENGINE SPECIFICATIONS

Cylinder Sleeves

	U.S. Value	Metric Value
Type	Wet, Can Be Replaced	
Material	Cast Iron	
ID 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"	0.0508 mm
Clearance at Bottom of Piston, 90 Degree to Piston Pin	0.0052 to 0.0075"	0.1321 to 0.1905 mm
Maximum Service Limit	0.010"	0.254 mm

Piston with 1.62" (41.15 mm) Pin Bore

Type	Cam Ground	
Material	Aluminum Alloy	
OD at Bottom, 90 Degree to Piston Pin	4.6188 to 4.6198"	117.3175 to 117.3429 mm
Minimum Service Limit	4.6178"	117.2921 mm
ID of Piston Pin Bore	1.6251 to 1.6253"	41.2775 to 41.2826 mm
Maximum Service Limit	1.6258"	41.2953 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 with 1.80" (45.72 mm) Pin Bore

Type	Cam Ground	
Material	Aluminum Alloy	
OD at Bottom, 90 Degree to Piston Pin	4.6188 to 4.6198"	117.3175 to 117.3429 mm
Minimum Service Limit	4.6178"	117.2921 mm
ID of Piston Pin Bore	1.8001 to 1.8005"	45.7225 to 45.7327 mm
Maximum Service Limit	1.8010"	45.7454 mm
Width of 1st Ring Groove	Not Measureable	
Width of 2nd Ring Groove	Not Measureable	
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 Pin for Piston with 1.62" (41.15 mm) Pin Bore

Type	Floats	
OD of Pin	1.6244 to 1.6246"	41.2598 to 41.2648 mm

Piston Pin for Piston with 1.80" (45.72 mm) Pin Bore

Type	Floats	
OD of Pin	1.7994 to 1.7996"	45.7048 to 45.7098 mm

Piston Rings

	U.S. Value	Metric Value
Number One Compression (Top)	Rectangular Type	
End Gap in 4.625" (117.475 mm) ID 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 0.005"	0.089 to 0.127 mm
Maximum Service Limit	0.006"	0.152 mm
Number One Compression (Top)	Keystone Type	
End Gap in 4.625" (117.475 mm) ID Sleeve	0.015 to 0.025"	0.381 to 0.635 mm
Maximum Service Limit	0.030"	0.762 mm
Side Clearance	Not Measureable	
Number Two Compression (Intermediate)	Rectangular Type	
End Gap in 4.625" (117.475 mm) ID 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 Two Compression (Intermediate)	Keystone Type	
End Gap in 4.625" (117.475 mm) ID Sleeve	0.015 to 0.025"	0.381 to 0.635 mm
Maximum Service Limit	0.030"	0.762 mm
Side Clearance	Not Measureable	
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) ID 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

Connecting Rod for Piston with 1.62" (41.15 mm) Pin Bore

Bushing	Replaceable	
Bushing ID, Installed (Ream to Size)	1.6254 to 1.6258"	41.2852 to 41.2953 mm
Maximum Service Limit	1.6265"	41.3131 mm
Bearing Liners	Replaceable	
Bearing Liner Width	1.586 to 1.596"	40.284 to 40.538 mm
Bore ID without Liners	2.9003 to 2.9013"	73.6676 to 73.6930 mm
Bearing Oil Clearance	0.0013 to 0.0038"	0.033 to 0.0965 mm
Maximum Service Limit	0.0043"	0.1092 mm
Undersize Bearings for Service	0.002, 0.010, 0.020, 0.030"	0.051, 0.254, 0.508, 0.762 mm
Side Clearance	0.007 to 0.016"	0.178 to 0.406 mm

Connecting Rod for Piston with 1.80" (45.72 mm) Pin Bore

Bushing	Replaceable	
Bushing ID, Installed (Ream to Size)	1.8004 to 1.8008"	45.7302 to 45.7403 mm
Maximum Service Limit	1.8015"	45.7581 mm
Bearing Liners	Replaceable	
Bearing Liner Width	1.586 to 1.596"	40.284 to 40.538 mm
Bore ID without Liners	3.1503 to 3.1513"	80.176 to 80.043 mm
Bearing Oil Clearance	0.0013 to 0.0038"	0.033 to 0.0965 mm
Maximum Service Limit	0.0043"	0.1092 mm
Undersize Bearings for Service	0.002, 0.010, 0.020, 0.030"	0.051, 0.254, 0.508, 0.762 mm
Side Clearance	0.007 to 0.016"	0.178 to 0.406 mm

Crankshaft with 3" (76.2 mm) Main Bearing Journals

	U.S. Value	Metric Value
Type	Forged, Heat Treated and Balanced	
End Play, Number Three 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 Width	1.9975 to 2.0025"	50.7365 to 50.8635 mm
Connecting Rod Journal, Standard OD	2.748 to 2.749"	69.799 to 69.825 mm
0.010" (0.254 mm) OD Undersize, Grind to	2.738 to 2.739"	69.545 to 69.571 mm
0.020" (0.508 mm) OD Undersize, Grind to	2.728 to 2.729"	69.291 to 69.317 mm
0.030" (0.762 mm) OD Undersize, Grind to	2.718 to 2.719"	69.037 to 69.063 mm
Connecting Rod Journal Maximum Taper	0.0005"	0.0127"
Connecting Rod Journals Out of Round	0.0005"	0.0127 mm
Main Bearing Liners	Replaceable	
Main Bearing Liner Width, 1st, 3rd and 5th	2.1515 to 2.1615"	54.648 to 54.9021 mm
Main Bearing Liner Width, 2nd and 4th	1.151 to 1.161"	29.235 to 29.489 mm
Main Bearing Oil Clearance	0.0016 to 0.0046"	0.0406 to 0.1168 mm
Maximum Service Limit	0.005"	0.127 mm
Undersize Main Bearing Liners for Service	0.002, 0.010, 0.020, 0.030"	0.051, 0.254, 0.508, 0.762 mm
Main Bearing Journal, Standard OD	2.998 to 2.999"	76.149 to 76.175 mm
0.010" (0.254 mm) OD Undersize, Grind to	2.988 to 2.989"	75.895 to 75.921 mm
0.020" (0.508 mm) OD Undersize, Grind to	2.978 to 2.979"	75.641 to 75.667 mm
0.030" (0.762 mm) OD Undersize, Grind to	2.968 to 2.969"	75.387 to 75.413 mm
Main Bearing Journal Bore ID without Liners	3.191 to 3.192"	81.051 to 81.077 mm
Main Bearing Journal Width		
2nd and 4th	1.555 to 1.570	39.497 to 39.878 mm
3rd	2.623 to 2.627"	66.624 to 66.726 mm
5th	2.6175 to 2.6325"	66.4845 to 66.8655 mm

Crankshaft with 3.5" (88.9 mm) Main Bearing Journals

Type	0.003 to 0.015"	0.076 to 0.381 mm
Thrust Bearing, Standard Thickness	0.155 to 0.157"	3.937 to 3.988 mm
Thrust Bearing, Oversize Thickness for Service	0.161 to 0.163"	4.089 to 4.140 mm
Connecting Rod Journal Width	1.9775 to 2.0025"	50.2285 to 50.8635 mm
Connecting Rod Journal, Standard OD	2.998 to 2.999"	76.149 to 76.175 mm
0.010" (0.254 mm) OD Undersize, Grind to	2.988 to 2.989"	75.895 to 75.921 mm
0.020" (0.508 mm) OD Undersize, Grind to	2.978 to 2.979"	75.641 to 75.667 mm
0.030" (0.762 mm) OD Undersize, Grind to	2.968 to 2.969"	75.387 to 75.413 mm
Connecting Rod Journal Maximum Taper	0.0005"	0.0127 mm
Connecting Rod Journal Out of Round	0.0005"	0.0127 mm
Main Bearing Liners	Replaceable	
Main Bearing Liner Width, 1st, 3rd and 5th	2.1515 to 2.1615"	54.6481 to 54.9021 mm
Main Bearing Liner Width, 2nd and 4th	1.214 to 1.224"	30.836 to 31.089 mm
Main Bearing Oil Clearance	0.0016 to 0.0046"	0.0406 to 0.1168 mm
Maximum Service Limit	0.005"	0.127 mm
Undersize Main Bearing Liners for Service	0.002, 0.010, 0.020, 0.030"	0.051, 0.254, 0.508, 0.762 mm

Crankshaft with 3.5" (88.9 mm) Main Bearing Journals (Continued)

	U.S. Value	Metric Value
Main Bearing Journal, Standard OD	3.498 to 3.499"	88.849 to 88.875 mm
0.010" (0.254 mm) OD Undersize, Grind to	3.488 to 3.489"	88.595 to 88.621 mm
0.020" (0.508 mm) OD Undersize, Grind to	3.478 to 3.479"	88.341 to 88.367 mm
0.030" (0.762 mm) OD Undersize, Grind to	3.468 to 3.469"	88.087 to 88.113 mm
Main Bearing Journal Bore ID without Liners	3.691 to 3.692"	93.751 to 93.777 mm
Main Bearing Journal Width		
2nd and 4th	1.618 to 1.633"	41.097 to 41.478 mm
3rd	2.561 to 2.565"	65.049 to 65.151 mm
5th	2.5855 to 2.6005"	65.6717 to 66.0527 mm

Camshaft

Type	Parabolic	
Bushings	Four, Replaceable	
Bushing Lubrication	Under Pressure	
ID of Bushings	2.2484 to 2.2514"	57.1094 to 57.1856 mm
Maximum Service Limit	2.2524"	57.2110 mm
Bushing Width		
1st (Front)	1.646 to 1.666"	41.808 to 42.316 mm
2nd and 3rd	1.4275 to 1.4475"	36.2585 to 36.7665 mm
4th	1.1462 to 1.1662"	29.1135 to 29.6215 mm
OD of Each Bearing Surface	2.2460 to 2.2470"	57.0484 to 57.0738 mm
Minimum Service Limit	2.2455"	57.0357 mm
Thrust Washer Thickness	0.1225 to 0.1275"	3.1115 to 3.2385 mm
Minimum Service Limit	0.1215"	3.0861 mm
Thrust Plunger Spring:		
Free Length	3.6250"	92.075 mm
OD 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

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

Gear Train

Backlash	U.S. Value	Metric Value
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.
OD of Idler Gear Shaft	1.7325 to 1.7330"	44.0055 to 44.0182 mm
ID 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

Oil Pump and Two Gear Balancer

Positive Displacement Pump	Gear Type	
Pump Gears to Cover Clearance	0.005" max.	0.127 mm max.
Backlash		
Crankshaft Gear to Counterweight Gear	0.008 to 0.013"	0.203 to 0.330 mm
Counterweight Gear to Counterweight Gear	0.005 to 0.013"	0.127 to 0.330 mm
Counterweight Shaft Bushing Wear	0.007" max.	0.178 mm max.
Relief Valve Spring		
Free Length	2.06"	52.324 mm
Wire Diameter	0.071"	1.803 mm
OD of Spring	0.680"	17.272 mm
Number of Coils	12	12
Compress to 1.252" (31.801 mm)	17.25 to 19.05 lbs.	77 to 85 N

Oil Pump and Three Gear Balancer

Positive Displacement Pump	Gear Type	
Pump Gears to Cover Clearance	0.005" max.	0.127 mm max.
Backlash		
Crankshaft Gear to Counterweight Gear	0.008 to 0.13"	0.203 to 0.330 mm
Counterweight Gear to Counterweight Gear	0.005 to 0.013"	0.127 to 0.330 mm
Counterweight Gear and Drive Gear Bushing Wear	0.007" max.	0.178 mm max.
Relief Valve Spring		
Free Length	3.00"	76.2 mm
Wire Diameter	0.062"	1.575 mm
OD of Spring	0.515"	13.081 mm
Number of Coils	25	25
Compress to 1.68" (42.67 mm)	13.5 to 15.5 lbs.	60 to 69 N

Oil Pump, Front Mounted

	U.S. Value	Metric Value
Positive Displacement Pump	Gear Type	
Backlash		
Pump Gear to Crankshaft Gear	0.006 to 0.011"	0.1524 to 0.2794 mm
Pump Gears to Body Radial Clearance	0.0005 to 0.004"	0.013 to 0.102 mm
Pump Gears to Pump Cover Clearance	0.0015 to 0.005"	0.038 to 0.127 mm
Oil Pressure at High Idle, Hot Oil	40 to 65 PSI	276 to 448 kPa
Relief Valve Spring		
Number of Coils	11	11
Wire Diameter	0.080"	2.032 mm
Minimum ID	0.469"	11.913 mm
Free Length	2.00"	50.8 mm
Compress to 1.252" (31.801 mm)	23.8 to 25.6 lbs.	106 to 114 N
Relief Valve Cup Plug Depth	0.327"	8.306 mm

Cylinder Head

Warpage	0.005"	0.127 mm

Exhaust Valve

Tappet Clearance	0.025"	0.635 mm
Face Angle	44 Degrees	44 Degrees
Face Run-Out	0.002" max.	0.051 mm max.
OD of Head	1.745 to 1.755"	44.323 to 44.577 mm
OD of Stem	0.402 to 0.403"	10.211 to 10.236 mm
Minimum Service Limit	0.4018"	10.206 mm
OD of Taper at 4.2675" (108.395 mm)	0.401 to 0.402"	10.185 to 10.211 mm
Minimum Service Limit	0.4008"	10.180 mm
Length	6.4195 to 6.4405"	163.055 to 163.589 mm
Insert Seat Angle	45 Degrees	45 Degrees
Seat Contact Width	0.0775 to 0.100"	1.9685 to 2.540 mm
Seat Run-Out	0.002"	0.051 mm
Insert Height	0.313 to 0.316"	7.950 to 8.026 mm
OD of Insert	1.9455 to 1.9465"	49.4157 to 49.4411 mm
ID of Insert	1.571 to 1.577"	39.903 to 40.056 mm

Intake Valve

Tappet Clearance	0.015"	0.381 mm
Face Angle	44 Degrees	44 Degrees
Face Run-Out	0.002" max.	0.051 mm
OD of Stem	0.402 to 0.403"	10.211 to 10.236 mm
Minimum Service Limit	0.4018"	10.206 mm
OD of Head	1.995 to 2.005"	50.673 to 50.927 mm
Length	6.4195 to 6.4405"	163.055 to 163.589 mm
Seat Angle	45 Degrees	45 Degrees
Seat Contact Width	0.0750 to 0.0975"	1.905 to 2.477 mm
Seat Run-Out	0.002" max.	0.051 mm
Insert Height (If Equipped)	0.2775 to 0.2825"	7.0485 to 7.1755 mm
OD of Insert (If Equipped)	2.099 to 2.100"	53.315 to 53.340 mm
ID of Insert (If Equipped)	1.805 to 1.815"	45.847 to 46.101 mm

Intake and Exhaust Valve Guides

	U.S. Value	Metric Value
Length	3.219"	81.763 mm
OD of Guide	0.7510 to 0.7515"	19.075 to 19.088 mm
ID of Guide (Installed and Reamed)	0.4045 to 0.4055"	10.274 to 10.300 mm
Maximum Service Limit	0.4065"	10.325 mm
Protrusion Above Cylinder Head	0.953"	24.206 mm

Valve Spring

Free Length	2.18"	55.372 mm
Number of Coils	7.25	7.25
Wire Diameter	0.192"	4.877 mm
Compress Spring to 1.484" (37.694 mm), Valve Open	153 to 167 lbs.	681 to 743 N
Compress Spring to 1.937" (49.200 mm), Valve Closed	50.5 to 60.5 lbs.	225 to 269 N

Rocker Arm Assembly

OD of Shaft	0.872 to 0.873"	22.149 to 22.174 mm
ID of Arm Bore	0.8745 to 0.8755"	22.212 to 22.238 mm
Shaft Assembly Lateral Movement (Both Ends)	0.010 to 0.030"	0.254 to 0.762 mm
Shaft Spring		
Number of Working Coils	4	4
Wire Diameter	0.080"	2.032 mm
Compress Spring to 1.562" (39.675 mm)	8.5 to 11.5 lbs.	38 to 51 N
Lubrication	Engine Oil, Camshaft Metering	
Shaft Oil Holes	Toward Valve Side of Engine	
	Shaft Can Not Be Turned	

Intake Valve Timing

Valve Timing ..... With the Number One Intake Valve to Rocker Arm Clearance Set at 0.015" (0.381 mm) and the Dial Indicator on the Number One Valve Retainer, 0.053" (1.346 mm) Movement of the Valve From the Seat (Clockwise Pulley Rotation) Will Give One Complete Revolution Plus 7 Degrees after TC Timing Indication on the Crank Pulley.

Special Torques

	U.S. Value	Metric Valve
Camshaft Nut - With Lock Washer	95 to 105 ft. lbs.	129 to 142 Nm (12.9 to 14.2 kgm)
- With Hardened Washer	195 to 205 ft. lbs.	264 to 278 Nm (26.4 to 27.8 kgm)
Connecting Rod Bolts (Add Lubrication to Threads and Under Bolt Heads with 30W Oil)	95 to 105 ft. lbs.	129 to 142 Nm (12.9 to 14.2 kgm)
Crankshaft Pulley Bolt	100 to 110 ft. lbs.	136 to 149 Nm (13.6 to 14.9 kgm)
Crankshaft Pulley Nut	125 to 135 ft. lbs.	169 to 183 Nm (16.9 to 18.3 kgm)
Crankshaft Main Bearing Bolts	145 to 155 ft. lbs.	197 to 210 am (19.7 to 21.0 kgm)
- With Hardened Washers	200 to 210 ft. lbs.	271 to 285 Nm (27.1 to 28.5 kgm)
Oil Cooler Outlet Cover Screws	35 to 42 ft. lbs.	48 to 51 mm (4.8 to 5.1 kgm)
Cylinder Head Bolts	200 to 210 ft. lbs.	271 to 285 Nm (27.1 to 28.5 kgm)
Cylinder Head Cover Stud Nuts	8 to 10 ft. lbs.	11 to 14 Nm (1.1 to 1.4 kgm)
Flywheel to Crankshaft Bolts Without Hardened Washers	180 to 190 ft. lbs.	244 to 258 Nm (24.4 to 25.8 kgm)
With Hardened Washers	230 to 250 ft. lbs.	312 to 339 Nm (31.2 to 33.9 kgm)
Intake and Exhaust Manifold Studs	25 to 30 ft. lbs.	34 to 41 Nm (3.4 to 4.1 kgm)
Exhaust Manifold Hex Nuts	25 to 30 ft. lbs.	34 to 41 Nm (3.4 to 4.1 kgm)
Intake Manifold Hex Nuts - Standard	25 to 30 ft. lbs.	34 to 41 Nm (3.4 to 4.1 kgm)
- Heavy	35 to 42 ft. lbs.	48 to 57 Nm (4.8 to 5.7 kgm)
Oil Pan Capscrews	15 to 20 ft. lbs.	20 to 27 Nm (2.0 to 2.7 kgm)
Oil Pan Drain Plug	29 to 31 ft. lbs.	39 to 42 Nm (3.9 to 4.2 kgm)

Special Torques (Continued)

	U.S. Value	Metric Value
Oil Pump Inlet Connector	105 to 115 ft. lbs.	142 to 156 Nm (14.2 to 15.6 kgm)
Oil Pump Inlet Tube Nut	95 to 105 ft. lbs.	129 to 142 Nm (12.9 to 14.2 kgm)
Rocker Arm Adjusting Screw Locknut	20 to 25 ft. lbs.	27 to 34 Nm (2.7 to 3.4 kgm)
Rocker Arm Bracket Stud Nut or Bolt	40 to 45 ft. lbs.	54 to 61 Nm (5.4 to 6.1 kgm)
Water Pump and Fan Shaft Nut - Standard	60 to 70 ft. lbs.	81 to 95 Nm (8.1 to 9.5 kgm)
- Crownlock	45 to 50 ft. lbs.	61 to 68 Nm (6.1 to 6.8 kgm)
Balancer Mounting Bolts - Grade 5	80 to 96 ft. lbs.	108 to 130 Nm (10.8 to 13.0 kgm)
- Grade 8	110 to 132 ft. lbs.	149 to 179 Nm (14.9 to 17.9 kgm)
Balancer Counterweight Set Screws	70 to 80 ft. lbs.	95 to 108 Nm (9.5 to 10.8 kgm)

GENERAL TORQUE SPECIFICATION TABLE (Revised 11-73)

USE THE FOLLOWING TORQUES WHEN SPECIAL TORQUES ARE NOT GIVEN

NOTE: These values apply to fasteners as received from supplier, dry, or when lubricated with normal engine oil. They do not apply if special graphited or moly-disulphide greases or other extreme pressure lubricants are used. This applies to both UNF and UNC threads.

SAE Grade No.		5				8 *			
Bolt head identification marks as per grade NOTE: Manufacturing Marks Will Vary									
		Torque				Torque			
Bolt Size		Foot Pounds		Newton-Meters		Foot Pounds		Newton-Meters	
Inches	Millimeters	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1/4	6.35	9	11	12.2	14.9	12	15	16.3	20.3
5/16	7.94	17	20.5	23.1	27.8	24	29	32.5	39.3
3/8	9.53	35	42	47.5	57.0	45	54	61.0	73.2
7/16	11.11	54	64	73.2	86.8	70	84	94.9	113.9
1/2	12.70	80	96	108.5	130.2	110	132	149.2	179.0
9/16	14.29	110	132	149.2	179.0	160	192	217.0	260.4
5/8	15.88	150	180	203.4	244.1	220	264	298.3	358.0
3/4	19.05	270	324	366.1	439.3	380	456	515.3	618.3
7/8	22.23	400	480	542.4	650.9	600	720	813.6	976.3
1	25.40	580	696	786.5	943.8	900	1080	1220.4	1464.5
1-1/8	25.58	800	880	1084.8	1193.3	1280	1440	1735.7	1952.6
1-1/4	31.75	1120	1240	1518.7	1681.4	1820	2000	2467.9	2712.0
1-3/8	34.93	1460	1680	1979.8	2278.1	2380	2720	3227.3	3688.3
1-1/2	38.10	1940	2200	2630.6	2983.2	3160	3560	4285.0	4827.4

* Thick nuts must be used with Grade 8 bolts

Section

1030

DETAILED SPECIFICATIONS

FUEL SYSTEM

1270 and 1370 Tractors

CASE CORPORATION Rac. 9-76115 PRINTED IN U.S.A.

FUEL SYSTEM

Fuel Filters

	Decimal System	Metric System
Preliminary fuel filter	Located at bottom of fuel transfer pump.	
First stage filter	Full flow spin-on type	
Second stage filter	Full flow spin-on type.	
Filter replacement	Every 500 hours or when loss of engine horsepower is indicated.	
Preliminary fuel filter service interval	Whenever 1st and 2nd stage filters are serviced.	
Fuel system relief valve operating pressure	20 to 25 PSI	1.4 to 1.8 kg/cm^2

Fuel Injection Pump

Type	Robert Bosch, PES Multiple plunger.	
Rotation	Counterclockwise	
Mounting	Left hand side of engine	
Drive	Gear driven at 1/2 engine speed	
Governor	Centrifugal type, variable speed, flyweight, integral part of pump.	
Backlash idler gear to fuel pump gear	.004 to .012″	.102 to .305mm
Lubrication	Pressurized engine oil	

Timing

Timing marks	Located on crankshaft pulley (0^0 to 35^0 BTDC and 0^0 to 15^0 ATDC).
Timing pointer	Located on timing gear cover
Timing	30^0 BTDC

Fuel Injector

Type	Roosa Master	
Opening pressure (New)	3200 to 3400 PSI	224.9 to 339.0 kg/cm^2
(Serviced)	3000 to 3200 PSI	210.9 to 224.9 kg/cm^2
Maximum opening pressure between cylinders	100 PSI	7 kg/cm^2
Valve lift	3/4 turn off valve seat or .0135″	.355mm

Fuel Injector (Cont'd)

	Decimal System	Metric System
Spray orifice size	.014″	.356mm
Sac hole size	.042 to .051″	1.067 to 1.295mm
No. of orifices	4	
Orifice length (through sacwall)	.095″	2.413mm
Orifice spray angle	150^0	150^0
Leakoff rate	3 to 10 drops in 30 seconds at 1500 PSI after first drop appears (serviced injector)	
Opening pressure control spring:		
Free length	.513″	13.030mm
No. coils	6-1/2	
Wire thickness	.064″	1.626mm
O.D.	.289″	7.341mm
Compressed	.444 to .459″ (11.3 to 11.7mm) 31 lbs.	14.1 kg

SPECIAL TORQUES

Fuel System

Fuel filters (2)	Install until gasket contacts filter head, then hand tighten 1/2 to 3/4 turn.	
Fuel filter bleeder screws	12 to 18 in. lbs.	138.26 to 207.69mm-kg.
Fuel injector clamp capscrews	18 to 22 ft. lbs.	2.5 to 3m-kg.
Fuel injector leakoff nuts	35 to 45 in. lbs.	403.2 to 518.5mm-kg.
Fuel injector pressure adjusting screw locknut	70 to 75 in. lbs.	806.5 to 864.1mm-kg.
Fuel injector tube nuts	18 to 22 ft. lbs.	2.5 to 3m-kg.
Fuel pump drive hub nut (14mm thread)	94 to 108.5 ft. lbs.	13 to 15m-kg.
Fuel pump timing pointer screws	60 to 72 in. lbs.	691.3 to 829.5mm-kg.

NOTE: The CASE CORPORATION reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

Section 1050

MAINTENANCE AND LUBRICATION

CASE CORPORATION C.E. Div. 9-67072 October 1977 PRINTED IN U.S.A.

MAINTENANCE

To obtain maximum service from your Case Excavator keep a regular schedule of inspection, servicing and lubrication. Read the hourmeter to determine maintenance intervals. Use only lubricants with specifications recommended in this manual.

Run-In Period

The items listed in the run-in section are performed during the run-in period only.

Scheduled Maintenance

These items listed in this section are separated into maximum hourly intervals. These intervals are based on "average" operating conditions. When operating under "severe" conditions, such as excessive heat, cold, dust, mud or water, shorten the interval.

Run-In Maintenance Chart

NOTE: The following charts are based on maximum intervals. If the machine operates in severe conditions, service more often.

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

SCHEDULED MAINTENANCE CHART

Interval	Service	Instructions
Run In: Every two Hours Units Stabilized	Torque wheel nuts 450-500 ft-lbs. (610-678 Nm), dry threads. Torque axle mounting bolts.	 Section 6128 Section 6128
Run In: After First 20 Hours	Change engine oil Change engine oil filter. Replace 20 micron inline filter element Clean 100 mesh inline screen Check drive belt tension Change forward/reverse unit and torque converter oil and filter. Change transmission oil	 Section 4201 Section 4201 Section 8016 Section 6101 Section 6101
Every ten hours or daily	Grease boom fittings. Lubricate turntable open gear. Check tire pressures Check engine oil level. Check oil reservoir level Check radiator coolant level Clean air cleaner dust cup. Drain air reservoir	 Section 9216 Section 4201

Interval	Service	Instructions
Every ten hours or daily	Check air cleaner restriction indicator Visually inspect transfer pump sediment bowl for water. If found, drain water from bowl, fuel filters and fuel tank. Check machine and ground under machine for signs of leaks.	Section 2051
After first 50 hours or first week of operation	Check torque on all turntable bearing capscrews. *Change oil in axles (Units with serial number 6202227 and after)	Section 9216 Section 6101
Every 50 hours or weekly, whichever comes first	Check brake master cylinder. Check accelerator master cylinder Check transmission oil level Check forward/reverse unit and torque converter oil level Check planetary hub oil level. Check differential oil level Check swing gearbox oil level Grease control linkage Grease shifting linkage Grease air swivel fitting Grease drive shaft universals Grease axle pivot Grease outriggers Grease oscillation lockouts Grease steering cylinder and linkage Grease turntable bearing Check battery fluid level Lubricate shifting tubes Check cab air filters.	 Section 6101 Section 6101 Section 6101 Section 6101 Section 6101 Section 9210 Section 8016
Every 100 Hours	Change engine oil	
Every 200 Hours	Change engine oil filter.	
Every 250 Hours	Check house brake linkage Check drive belt tension. Clean alcohol evaporator intake filter.	 Section 8016 Section 7111
Every 300 Hours	Clean air compressor strainer. Check torque on all turntable bearing capscrews.	Section 7103 Section 9216

*If 160 miles (100 Km) have not been driven by the end of the first week wait until the miles have been driven and then change oil.

Interval	Service	Instructions
Every 500 Hours or 2 months, whichever comes first.	Change first and second stage fuel filters and fuel transfer pump filter. Replace 33 micron inline filter element Clean 100 mesh inline screen Replenish rust inhibitor Change forward/reverse unit and torque converter oil and filter Clean forward/reverse unit breather. Grease upper center swivel.	 Section 4201 Section 4201 Section 6101 Section 6101
Every 1500 Hours or 6 months whichever comes first.	Change hydraulic oil. Change hydraulic reservoir outlet filter Change and refill cooling system. Change transmission oil. Change swing gearbox oil. Clear transmission breather Change front and rear planetary hub oil. Change front and rear differential oil. Clean air compressor cylinder head (by dealer only)	Section 4201 Section 4201 Section 6101 Section 9216 Section 6101 Section 6101 Section 6101 Section 7103
Every 3000 hours or yearly, whichever comes first.	Lubricate starter motor wicks. Disassemble and clean alcohol evaporator & replace all gaskets (by dealer only) Rebuild/replace air compressor (by dealer only)	 Section 7111 Section 7103
As required	Service air cleaner when restriction indicator shows red signal band. After wheel has been removed for servicing and reinstalled, check wheel nut torque every two hours until stabilized.	Section 2051

FUEL, FLUIDS AND LUBRICANTS

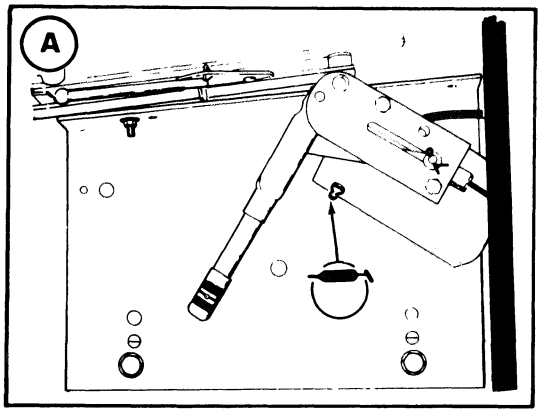
COMPONENT	CAPACITY		SPECIFICATIONS
	U.S.	Metric	
Fuel Tank	45 gals.	170 liters	No. 2 diesel fuel
Cooling System	7.5 gals.	28.4 liters	Ethylene glycol type antifreeze and water should be mixed for prevailing temperatures. Follow manufacturer's specifications.
Engine crankcase: Without filter change With Filter change	 10 qts. 11 qts.	 9.4 liters 10.4 liters	Engine oil: Case HDM Oil CD - Commercial class D Above 32° F (0° C) - SAE 30 10° to 50° F (-12° to 10° C) - SAE 20W Below 32° F (0° C) - SAE 10W
Brake and Accelerator master cylinders			SAE J1703c (DOT 3) brake fluid
Hydraulic System: System total Reservoir refill	 63 gals. 18.7 gals.	 230.5 liters 70.8 liters	Case TCH Fluid. Alternate oils: Tenneco Hytrans Fluid Engine oil - SD - Service class D or CA - Commercial class A. Above 32° F (0° C) - SAE 10W Below 32° F (0° C) - SAE 5W
Axles - (S/N 6202128 thru 6202226) Differential - each Planetary Hub - each Axles - (S/N 6202227 and after) Differential - each Planetary Hub - each	 12 qts. 1 gal. 8 qts. 2½ pts.	 11.4 liters 3.8 liters 7.5 liters 1.2 liters	Case FDL - 15° F (-26° C) and above Alternate Oils: Hypoid Gear Oil, API-GL-5 SAE 90 or SAE 80W/90 - -15° F (-26° C) and above SAE 80W - -15° F(-26° C) to + 70° F (+21° C) SAE 75W - -40° F (-40° C) to 35° F (+2° C) Differentials with NoSpin Only Hatcol 260 for outside temperatures -70° F (-56° C) to + 30° F (-1° C) or Conoco Polar Start DN-600 Gearlube for outside temperatures -60° F (-51° C) to + 40° F (+5° C)

COMPONENT	CAPACITY		SPECIFICATIONS
	U.S.	Metric	
Pressure fittings			No. 2 moly-disulfide grease.
Alcohol evaporator	1 pt.	0.5 liters	Clean wood alcohol
Transmission	4 qts.	3.8 liters	Case FDL -15° F (-26° C) and above Alternate Oils: Hypoid Gear Oil, API-GL-5. SAE 90 or SAE 80W/90 - -15° F (-26° C) and above SAE 80W - -15° F (-26° C) to +70° F (+21° C) SAE 75W - -40° F (-40° C) to +35° F (+2° C)
Swing Gearbox	11 pts.	5.2 liters	Case FDL -15° F (-26° C) and above Alternate Oils: Hypoid Gear Oil. API-GL-5. SAE 90 or SAE 80W/90 - -15° F (-26° C) and above. SAE 80W - -15° F (-26° C) to +70° F (+21° C) SAE 75W - -40° F (-40° C) to +35° F (+2° C)
Forward/Reverse Unit and Torque Converter System Total Refill	 11 qts. 8 qts.	 10.4 liters 7.6 liters	Case TCH Fluid Alternate Oils: Type C-2 transmission hydraulic fluid such as Tenneco Hytrans Fluid
Turntable Open Gear	a/req'd	a/req'd	Mobile Mobiltac E spray on open gear lubricant or functional equivalent

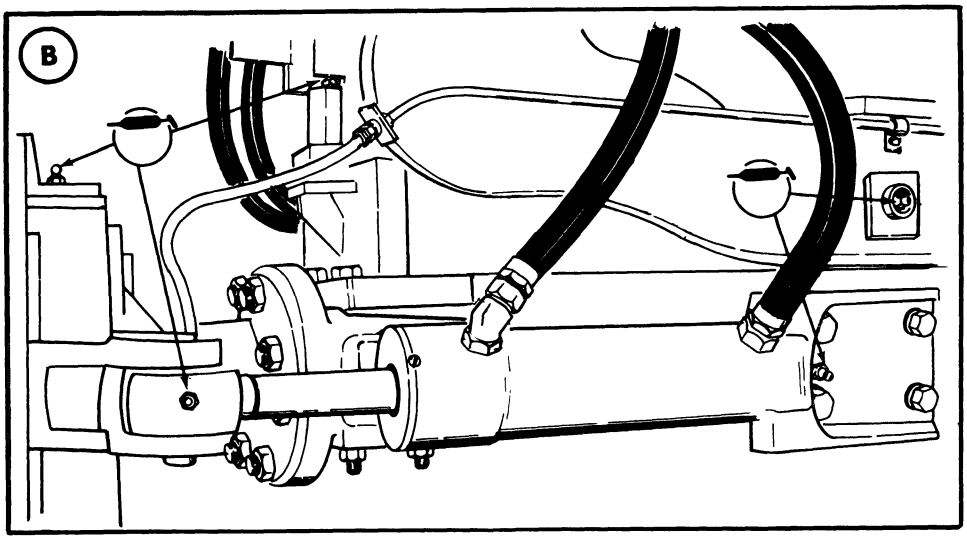
LUBRICATION POINTS

NOTE: If the machine is operated in severe conditions such as water, mud or dust, lubricate points more often. Wipe all pressure points clean before greasing.

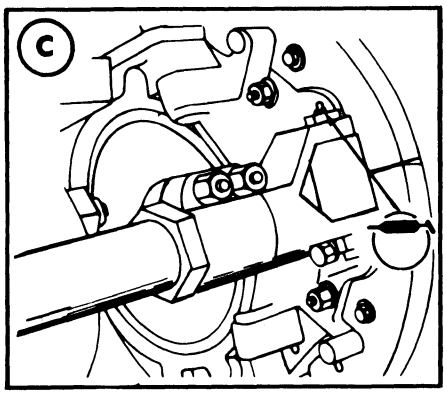
Figure	Location/Title	Quantity	Interval
A	Turntable bearing	1	Weekly/50 hours
B	Front axle area	9	Weekly/50 hours
C	Tie rod ends	1 each side	Weekly/50 hours
D	Rear outriggers	4 per out-rigger	Weekly/50 hours
E	Operator's Compartment	8	Weekly/50 hours
F	Below chassis	8 (1 per shifting linkage; 2 per drive shaft)	Weekly/50 hours
G	Below Operator's Compartment	8	Weekly/50 hours
H	Above center swivel	3	1 - shot Bi-Monthly or 500 hours
I	E-Boom/Ends of cylinders and pivot pins	18	Daily/10 hours
J	Y-Boom/Ends of cylinders and pivot pins	19	Daily/10 hours



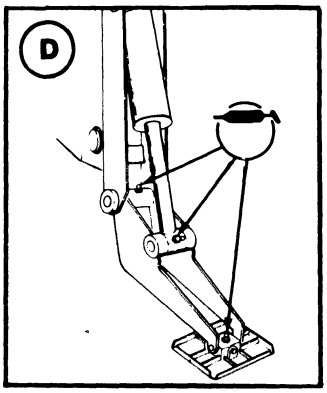
Grease Fitting for Turntable Bearing



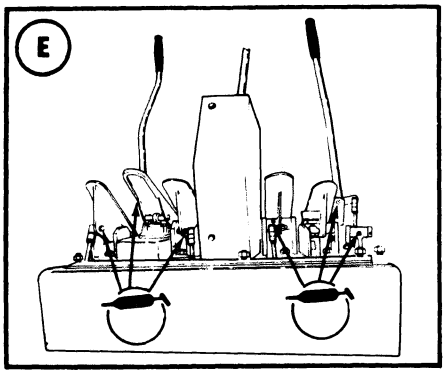
Grease Fittings on Axle Pivot, Axle Lockouts, and Steering Cylinder



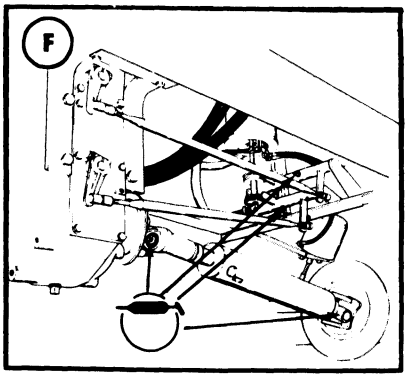
Grease Fittings on Tie Rod Ends



Grease Fittings on Outriggers



Grease Fittings on Controls in Operator's Cab



Grease fittings on Lower Shifting Linkage and Drive Shaft (typical)