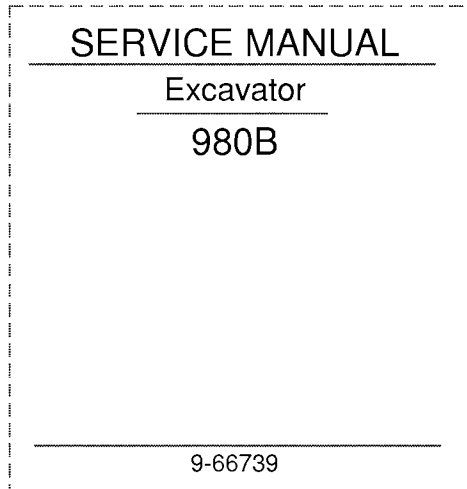
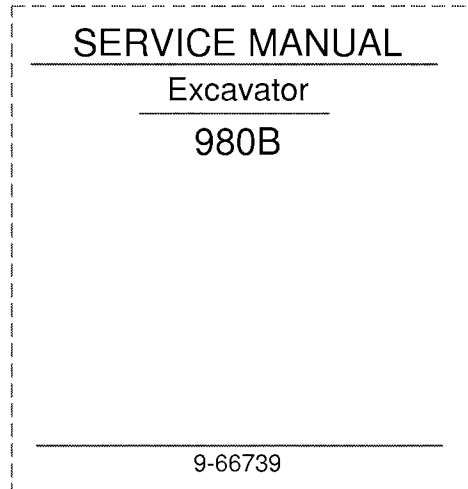




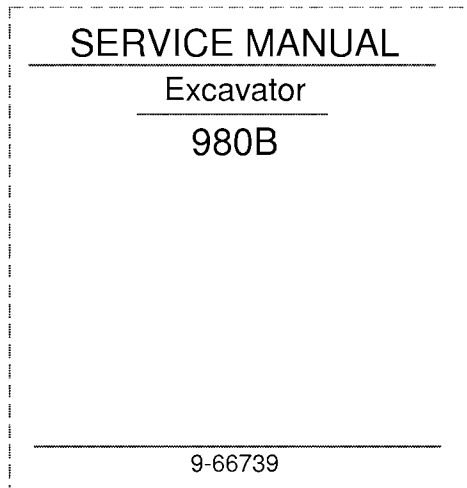
1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4



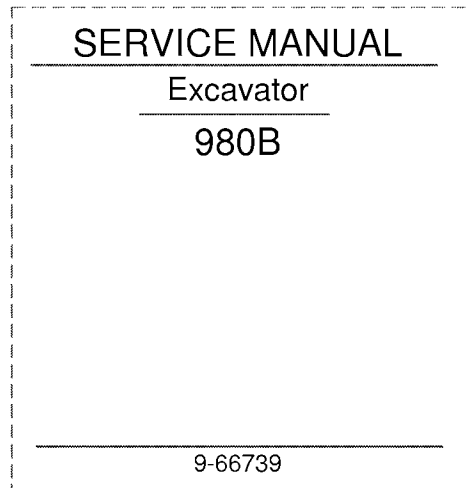
1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4



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

TYPE 1-4



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

TYPE 1-4

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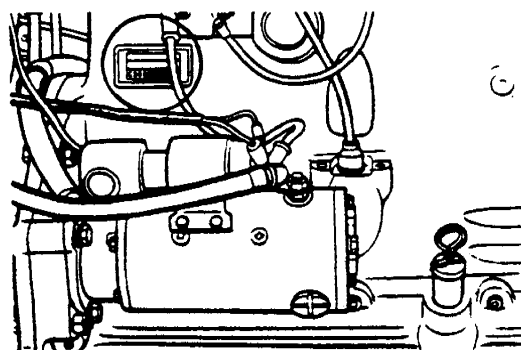
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Section 1010

GENERAL ENGINE SPECIFICATIONS 980B EXCAVATOR

504BDT DIESEL ENGINES

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



General

Type	6 Cylinder, 4 Stroke Cycle, Valve-in-Head Turbo-Charged
Firing Order	1-5-3-6-2-4
Bore	4-5/8 Inches (117.5mm)
Stroke	5 Inches (127mm)
Piston Displacement	504 Cubic Inches (8 259cm ³)
Compression Ratio	15.8 to 1
No Load Governed Speed	2230-2270 RPM
Rated Engine Speed	2100 RPM
Engine Idling Speed	725 to 775 RPM
Exhaust Valve Rotators	Positive Type
*Valve Tappet Clearance (Exhaust)	(Hot) .020 Inch (0.508mm) (Cold) .025 Inch (0.635mm)
	(Intake) (Hot and Cold) .015 Inch (0.381mm)
*Hot Settings Are Made After the Engine Has Operated At Thermostat Controlled Temperature For At Least Fifteen Minutes.	

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manual**

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click on it.**

**Have any questions please write to me:
admin@servicemanualperfect.com**

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 or Aluminum Alloy Liners

Main Bearings

Number of Bearings	7
Type Bearings	Replaceable Precision Steel Back, Copper-Lead or Aluminum Alloy Liners

Engine Lubricating System

Crankcase Capacity	12 U.S. Qts., 9.9 Imperial Qts. (11.4 liters)
with Filter Change	13 U.S. Qts., 10.8 Imperial Qts. (12.3 liters)
Oil Pressure	45 (310 kPa) to 60 (413 kPa) PSI 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 3200 PSI (22 063 kPa)
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

Section 1020

DETAILED SPECIFICATIONS 504BDT ENGINE

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

When the engine rebuild is complete, fill the engine crankcase with Case HDM oil and install new engine oil filters. **NOTE:** If Case HDM oil is not used, use only a Series 3 DS or CD Service Classification oil that has the proper viscosity rating for prevailing air temperature. Refer to vehicle Operators Manual.

After the first 20 hours of operation, change the engine oil while the engine is hot and replace the engine oil filter/s. **DO NOT DRAIN OIL UNTIL THE ENGINE HAS BEEN OPERATED 20 HOURS.**

Change the engine oil and filter/s at the recommended intervals thereafter as outlined in the Operator's Manual.

Break-In Procedure for Rebuilt Engines (With a Dynamometer)

The following procedure must be implemented when using a PTO dynamometer to break-in the engine. The dynamometer will insure control of the engine load at each speed and will eliminate over stressing new parts during break-in.

During the break-in, continually check the oil pressure, coolant level, and coolant temperature.

STEP	TIME	ENGINE SPEED	DYNAMOMETER SCALE LOAD*
1	**10 Minutes	1000 RPM	None
2	**10 Minutes	1800 RPM	None
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	Retorque the cylinder head bolts using the procedure described in Section 2015 of this service manual.		

*Based upon normal dynamometer scale load at rated speed for the particular vehicle model. Reduce this scale load as indicated.

**The most ideal break-in procedure would be to constantly vary the throttle between 750 to 1000 RPM for the first 10 minutes and from 1000 RPM to 1800 RPM for the next 10 minutes. The purpose of this changing RPM is to vary the lubrication and coolant flow.

***30 minutes at 3/4 load is a minimum amount of time the engine should be run. It is recommended that whenever possible the engine (especially turbocharged diesels) should 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.

Break-In Procedure for Rebuilt Engines (Without a Dynamometer)

STEP	TIME	ENGINE SPEED	LOAD
1	*10 Minutes	1000 RPM	None
2	*10 Minutes	1800 RPM	None
3	30 Minutes	2/3 Rated RPM	Light Load
4	1 Hour	Full RPM (not over 2000 RPM)	80 to 90%
5	Retorque the cylinder head bolts using the procedure described in Section 2015 of this service manual.		

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

Run-In Procedure (Agricultural Tractors)

For the first 8 hours of field operation stay one gear lower than normal. For the next 12 hours DO NOT “lug” the engine. Prevent “lugging” by shifting to a lower gear. The engine must not be “lugged” below its Rated Engine RPM during the early hours of life.

Run-In Procedure (Construction Equipment)

For the first 8 hours, operate the engine at full throttle maintaining a normal load. DO NOT baby the engine, but avoid prolonged converter or hydraulic stall. Engine must not be “lugged” below its Rated Engine RPM (Do not exceed 10 seconds of stall).

Run-In Procedure (Power Units)

For the first 1/2 hour, operate engine at 2/3 rated RPM with a light load or no load. For the next (1) hour, run engine at 80 to 90% load at rated RPM (but not over 2000 RPM). Then full load and rated RPM as required in application.

DETAILED ENGINE SPECIFICATONS

Cylinder Sleeves

	Decimal System	Metric System
I.D. of sleeve including wear	4.6250 to 4.6333"	117.475 to 117.7163mm
Sleeve out of round (installed in block)	.001"	.025mm
Maximum Limit including wear	.002"	.0508mm
Taper (installed in block)	.001"	.0254mm
Maximum limit including wear	.007"	.1778mm
Clearance to bottom of piston skirt, 90° to piston pin including wear	.0052 to .0175"	.1321 to .445mm

Piston

Type	Cam ground	
Material	Aluminum Alloy	
O.D. at bottom of skirt, 90° to piston pin including wear	4.6178 to 4.6198"	117.2921 to 117.3429mm
I.D. of piston pin bore including wear	1.8001 to 1.8015"	45.7225 to 45.7581mm
Width of 3rd ring groove including wear	.188 to .191"	4.775 to 4.851mm

Piston Rings

No. 1 Compression (chrome)	Keystone	
End gap in 4.625 I.D. (117.475 I.D.) sleeve including wear	.017 to .037"	.432 to .940mm
No. 2 Compression (chrome)	Keystone	
End gap in 4.625 I.D. (117.475mm I.D.) sleeve including wear	.013 to .033"	.330 to .838mm

Oil Ring

Width	.186 to .187"	4.724 to 4.75mm
End gap in 4.625 I.D. (117.475mm I.D.) sleeve	.013 to .033"	.330 to .838mm
Side clearance including wear	.001 to .005"	.025 to .127mm

Piston Pin

Type	Full Floating	
O.D. of pin	1.7994 to 1.7996"	45.7052 to 45.7102mm
Fit in piston	.0005 to .0011"	.0127 to .0279mm
Fit in rod bushing	.0008 to .0014"	.0203 to .0356mm

Connecting Rod

Decimal System

Metric System

Bushing	Replaceable	
Bushing I.D. installed (ream to size)	1.8004 to 1.8008"	45.7302 to 45.7403mm
Maximum limit including wear	1.8018"	45.7657mm
Bushing out of round including wear	.0015"	.0377mm
Bearing liners	Replaceable	
Bearing liner width	1.586 to 1.596"	40.284 to 40.538mm
Journal I.D. without bearing liners	3.1503 to 3.1513"	80.0176 to 80.0426mm
Bearing oil clearance including wear	.0013 to .005"	.0326 to .127mm
Undersize bearings for service	.002,.010,.020,.030"	.051,.254,.508,.762mm
Side clearance	.007 to .016"	.178 to .406mm
Cap bolts	12 point flange head	

Crankshaft

Type	Balanced	
Main bearing liners	Replaceable	
End play, No. 5 main bearing cap including wear	.003 to .020"	.076 to .508mm
Thrust bearings std. thickness including wear	.147 to .157"	3.734 to 3.988mm
Thrust bearings oversize thickness for service including wear	.153 to .163"	3.886 to 4.140mm
Connecting rod journal std. O.D.	2.998 to 2.999"	76.149 to 76.175mm
.010" (.254mm) O.D. undersize, grind to	2.988 to 2.989"	75.895 to 75.921mm
.020" (.508mm) O.D. undersize, grind to	2.978 to 2.979"	75.641 to 75.667mm
.030" (.762mm) O.D. undersize, grind to	2.968 to 2.969"	75.387 to 75.413mm
Connecting rod journal maximum taper including wear	.0015"	.0377mm
Journals out of round	.0005"	.0127mm
Main bearing liner width 1st, 3rd, 5th and 7th	2.1515 to 2.1615"	54.6477 to 54.9017mm
Main bearing liner width 2nd, 4th and 6th	1.214 to 1.224"	30.836 to 31.09mm
Undersize main bearing liners for service	.002,.010,.020,.030"	.051,.254,.508,.762mm
Main bearing oil clearance including wear	.0016 to .006"	.0402 to .152mm
Main bearing journal std. O.D.	3.498 to 3.499"	88.849 to 88.875mm
.010" (.254mm) O.D. undersize, grind to	3.488 to 3.489"	88.595 to 88.621mm
.020" (.508mm) O.D. undersize, grind to	3.478 to 3.479"	88.341 to 88.367mm
.030" (.762mm) O.D. undersize, grind to	3.468 to 3.469"	88.087 to 88.113mm
Main journal bore I.D. without liners	3.691 to 3.692"	93.751 to 93.777mm

Crankshaft (Cont'd)

Decimal System

Metric System

Main journal width between cheeks:

2nd, 4th and 6th	1.618 to 1.633"	41.097 to 41.478mm
3rd	2.555 to 2.570"	64.897 to 65.278mm
5th	2.561 to 2.565"	65.049 to 65.151mm
7th	2.585 to 2.600"	65.659 to 66.040mm
Connecting rod journals width between cheeks	1.9775 to 2.0025"	50.2287 to 50.8637mm

Camshaft

Type Parabolic

Bushings 5, Replaceable

Bushing Lubrication Pressurized

Oil clearance including wear0014 to .0124" .0352 to .3150mm

I.D. of bushing including wear 2.2484 to 2.2554" 57.1092 to 57.2872mm

Bushing width:

1st (front)	1.646 to 1.666"	41.808 to 42.316mm
2nd, 3rd and 4th	1.4275 to 1.4475"	36.2587 to 36.7667mm
5th	1.1462 to 1.1662"	29.1131 to 29.6211mm
O.D. of each bearing surface including wear	2.242 to 2.247"	56.947 to 57.074mm
Thrust washer thickness including wear	.1105 to .1275"	2.8067 to 3.2385mm
Thrust plunger spring:		
Free length	3.625"	92.075mm
O.D. of spring	.3912 to .4062"	9.9361 to 10.3171mm
Compressed 2.750" (69.85mm)	45 to 55 lbs.	20.37 kg. to 24.97 kg.

Valve Push Rod Lifters

Type Mushroom

O.D. of lifter stem, standard8097 to .8102" 20.5668 to 20.5791mm

O.D. of lifter stem, oversize for service8190 to .8195" 20.803 to 20.8157mm

I.D. of block bore, std. including wear8115 to .8145" 20.6117 to 20.6883mm

I.D. of block bore, oversize for service8215 to .8225" 20.8657 to 20.8917mm

Gear Train

Decimal System

Metric System

Backlash:

Crankshaft gear to camshaft gear	.004 to .011"	.102 to .279mm
Idler drive gear to idler gear	.003 to .010"	.076 to .254mm
Idler gear to fuel pump gear	.004 to .012"	.102 to .305mm
Crankshaft gear to oil pump gear	.006 to .011"	.152 to .279mm
Crankshaft gear to fuel pump gear	Maximum .027"	Maximum .686mm
O.D. of idler gear shaft including wear	1.732 to 1.733"	43.993 to 44.019mm
I.D. of idler gear with bushing including wear	1.7345 to 1.740"	44.0567 to 44.196mm
Idler gear thrust washer thickness	.057 to .063"	1.448 to 1.600mm
Idler gear end play (maximum limit including wear)	.010"	.254mm

Oil Pump

Positive displacement Gear Type

Backlash, pump gear to crankshaft gear	.006 to .011"	.152 to .279mm
Drive gear to pump body clearance	.0035 to .0065"	.0889 to .1651mm
Pump gears to body radial clearance including wear .	.003 to .009"	.0760 to .229mm
Pump gears to pump cover clearance including wear	.0015 to .008"	.0377 to .203mm
Oil pressure	45 to 60 PSI	3.164 to 4.218 kg/cm ²

Relief valve spring:

No. coils	12	
Wire thickness	.071"	1.803mm
Minimum I.D.	.469"	11.913mm
Free length	2.06"	52.32mm
Compressed 1.252" (31.801mm)	17.25 to 19 lbs.	7.84 to 8.62 kg

Cylinder Head

Warpage	(Max. Limit Incl. wear) .005"	0.127mm
---------------	-------------------------------	---------

Intake Valve

Tappet clearance (COLD and HOT)	.015"	3.81mm
Face angle	44°	44°
Face run-out (max. limit Incl. wear)	.002"	.051mm
Length	6.4195 to 6.4405"	163.0557 to 163.5887mm
O.D. of stem including wear	.400 to .403"	10.160 to 10.236mm
O.D. of head	1.995 to 2.005"	50.673 to 50.927mm
Seat angle	45°	45°

Intake Valve (Cont'd)

	Decimal System	Metric System
Seat contact width	.0775 to .0975"	1.9685 to 2.4511mm
Seat run-out (max. limit Incl. wear)	.002"	.051mm
Insert height	.2775 to .2825"	7.0485 to 7.1755
O.D. of insert	2.0990 to 2.1000"	53.315 to 53.34mm
I.D. of insert	1.805 to 1.815"	45.847 to 46.101mm

Exhaust Valve

Tappet clearance (COLD)	.025"	.635mm
Tappet clearance (HOT)	.020"	.508mm
Face angle	44°	44°
Fan run-out	(Max. Limit Incl. wear) .002"	.051mm
O.D. of head	1.745 to 1.755"	44.323 to 44.577mm
O.D. of stem end including wear	.400 to .403"	10.160 to 10.236mm
O.D. of taper 4.2675" (108.3947mm) including wear	.399 to .402"	10.135 to 10.211mm
Length	6.4195 to 6.4405"	163.0557 to 163.5887mm
Insert seat angle	45°	45°
Seat contact width	.0800 to .1000"	2.032 to 2.540mm
Seat run-out (max. limit Incl. wear)	.002"	.051mm
Insert height	.313 to .316"	7.95 to 8.026mm
O.D. of insert	1.9455 to 1.9465"	49.4157 to 49.4407mm
I.D. of insert	1.571 to 1.577"	39.903 to 40.056mm

Intake and Exhaust Valve Guides

Length	3.219"	81.763mm
O.D.	.7510 to .7515"	19.075 to 19.202mm
I.D. (installed and reamed)	.4045 to .4055"	10.2747 to 10.2997mm
Maximum limit including wear	.4065"	10.3251mm
Protrusion above cylinder head	.953"	24.206mm

Valve Spring

Free length	2.28"	57.912mm
Total coils	7.75	
Wire diameter	.171"	4.343mm
Compressed to 1.48" (30.480mm) (valve open)	135 to 145 lbs.	61.24 to 65.78 kg.
Compressed to 1.94" (49.276mm) (valve closed)	40 to 50 lbs.	18.14 to 22.68 kg.

Rocker Arm Assembly

	Decimal System	Metric System
O.D. of shaft	.872 to .873"	22.149 to 22.174mm
I.D. of arm bore	.8745 to .8755"	22.2127 to 22.2377mm
Shaft assembly end play (both ends)	.010 to .030"	.254 to .762mm
Shaft spring:		
Total coils (working coils)	4	
Wire diameter	.080"	2.033mm
Compressed to 1.562" (39.675mm)	8.5 to 11.5 lbs.	3.86 to 5.22 kg.
Lubrication	Engine oil, camshaft metering	
Shaft oil holes	Toward valve side of engine. Shaft cannot be rotated.	

SPECIAL TORQUES

	Decimal System	Metric System
Camshaft nut	95 to 105 ft. lbs.	13.134 to 14.517m-kp.
Connecting rod bolts	95 to 105 ft. lbs.	13.134 to 14.517m-kp.
Crankshaft nut	125 to 135 ft. lbs.	17.3 to 18.7 m-kp.
Crankshaft pulley bolt	100 to 110 ft. lbs.	13.825 to 15.208m-kp.
Cylinder block oil cooler outlet cover screw	35 to 42 ft. lbs.	4.8 to 5.8m-kp.
Cylinder head bolts	200 to 210 ft. lbs.	27.660 to 29.043m-kp.
Cylinder head cover stud nut	60 to 70 in. lbs.	691.3 to 806.5mm-kp.
Engine oil filter	Install until gasket contacts filter head then hand tighten 1/2 turn. Loosen filter approximately 1 full turn and retighten until gasket contact is made, then hand tighten an additional 1/2 to 3/4 turn.	
Flywheel to crankshaft bolts	180 to 190 ft. lbs.	24.886 to 26.268m-kp.
Intake and Exhaust manifold stud nut	25 to 30 ft. lbs.	3.4 to 4.2m-kp.
Oil pan capscrews	13 to 17 ft. lbs.	1.797 to 2.350m-kp.
Oil pan drain plug (copper or nylon)	18 to 20 ft. lbs.	2.5 to 2.9m-kp.
Oil pump idler gear shaft bolt	40 to 45 ft. lbs.	5.5 to 6.2m-kp.
Oil pump suction tube nut	95 to 105 ft. lbs.	13.134 to 14.517m-kp.
Rocker arm adjusting screw locknut	20 to 25 ft. lbs.	2.8 to 3.5m-kp.
Rocker arm bracket stud nut and bolt	40 to 45 ft. lbs.	5.5 to 6.2m-kp.
Water pump and fan shaft nut	60 to 70 ft. lbs.	8.3 to 9.7m-kp.
Crankshaft main bearing bolts	145 to 155 ft. lbs.	20 to 21.4m-kp.

GENERAL TORQUE SPECIFICATION TABLE (Revised 7-72)**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		Meter Kilograms		Foot Pounds		Meter Kilograms	
Inches	Millimeters	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1/4	6.35	9	11	1.2	1.5	12	15	1.7	2.1
5/16	7.94	17	20.5	2.4	2.8	24	29	2.3	4.0
3/8	9.53	35	42	4.8	5.8	45	54	6.2	7.5
7/16	11.11	54	64	7.5	8.9	70	84	9.7	11.6
1/2	12.70	80	96	11.1	13.3	110	132	15.2	18.3
9/16	14.29	110	132	15.2	18.3	160	192	22.1	26.6
5/8	15.88	150	180	20.7	24.9	220	264	30.4	36.5
3/4	19.05	270	324	37.3	44.8	380	456	52.6	63.1
7/8	22.23	400	480	55.3	66.4	600	720	83.0	99.6
1	25.40	580	696	80.2	96.3	900	1080	124.5	149.4
1-1/8	25.58	800	880	110.6	121.7	1280	1440	177.0	199.2
1-1/4	31.75	1120	1240	154.9	171.5	1820	2000	251.7	276.6
1-3/8	34.93	1460	1680	201.9	232.3	2380	2720	329.2	376.2
1-1/2	38.10	1940	2200	268.3	304.3	3160	3560	437.0	492.3
					★ Thick nuts must be used with Grade 8 bolts				

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

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DETAILED SPECIFICATIONS

FUEL SYSTEM

1270 and 1370 Tractors

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° to 35° BTDC and 0° to 15° ATDC).
Timing pointer	Located on timing gear cover
Timing	30° 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

Decimal System

Metric System

Fuel Injector (Cont'd)

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°	150°
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.

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