

# **3TN and 4TN Series Yanmar Diesel Engines**

**John Deere Horicon Works  
CTM3 (03JAN90)**

LITHO IN U.S.A.  
ENGLISH

**3TN and 4TN Series Yanmar Engines**

**CTM3 (03JAN90)**

# Introduction

This Component Technical Manual contains necessary instructions to repair the engine, engine fuel, and engine electrical systems.

Use this Component Technical Manual in conjunction with the Machine Technical Manual. An engine application listing in the introduction identifies product-model/engine type-model relationship. See the

Machine Technical Manual for information on engine removal and installation, theory of operation, diagnostic, and testing procedures.



**CAUTION: THIS IS THE SAFETY-ALERT symbol. When you see this symbol on the machine or in this manual, be alert to the potential for personal injury.**

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## INTRODUCTION

This manual is part of a total service support program.

FOS MANUALS—REFERENCE

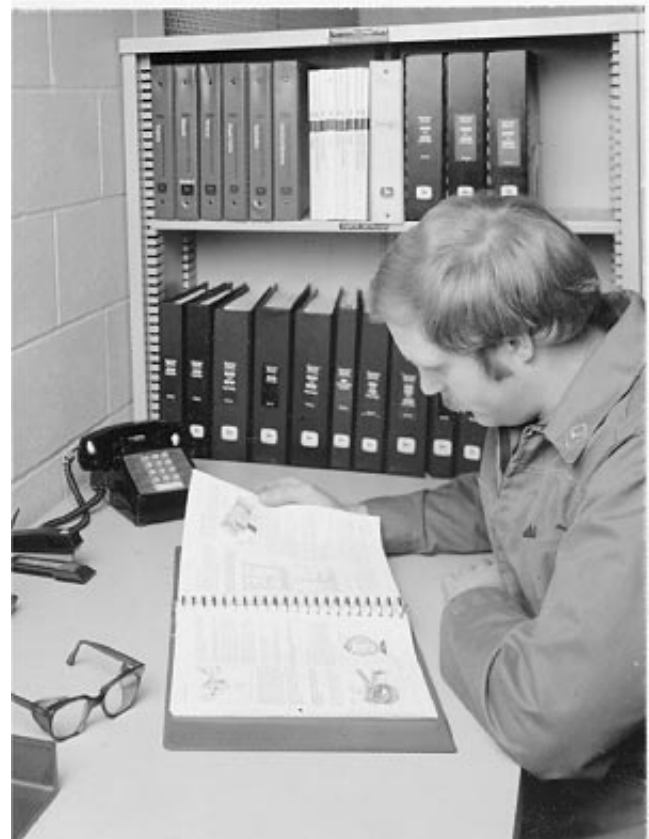
TECHNICAL MANUALS—MACHINE SERVICE

COMPONENT MANUALS—COMPONENT SERVICE

Fundamentals of Service (FOS) Manuals cover basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic types of failures and their causes. FOS Manuals are for training new personnel and for reference by experienced technicians.

Technical Manuals are concise service guides for specific machines. Technical manuals are on-the-job guides containing only the vital information needed by an experienced service technician.

Component Technical Manuals are concise service guides for specific components. Component Technical Manuals are written as stand alone manuals covering multiple machine applications.



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## FEATURES OF THIS TECHNICAL MANUAL

John Deere ILLUSTRATION format emphasizing illustrations and concise instructions in easy-to-use modules.

Emphasis on diagnosis, analysis, and testing so you can understand the problem and correct it.

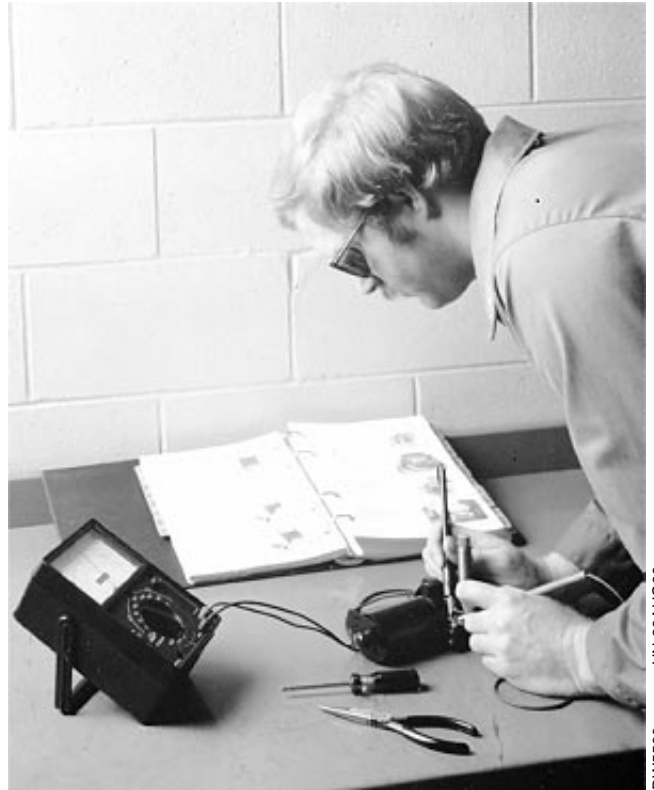
Diagnostic information presented with the most logical and easiest to isolate problems first to help you identify the majority of routine failures quickly.

Step-by-step instructions for teardown and assembly.

Summary listing at the beginning of each group of all applicable specifications, wear tolerances, torque values, essential tools, and materials needed to do the job.

An emphasis throughout on safety—so you do the job right without getting hurt.

This technical manual was planned and written for you—an experienced service technician. Keep it in a permanent binder in the shop where it is handy. Refer to it when you need to know correct service procedures or specifications.



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## ABOUT THIS MANUAL

This Component Technical Manual (CTM-3) covers the recommended repair procedures for all Yanmar Diesel Engines removed from the machine.

Some components may be serviced without removing the engine from the machine. You may want to determine the repair procedure before you remove the engine.

The repair procedure for the Yanmar diesel engines in this manual are similar. The 3TNA72UJ engine is

shown except where differences are noted by engine model number. Refer to Engine Application Chart in this group to identify product-model/engine type-model relationship.

Read each module completely before performing service to check for differences in procedure or specifications. Follow only the steps that apply to the engine model number you are working on. If only one step is given, that step applies to all Yanmar diesel engines in this manual.

M21,TM305,1 -19-21APR86

## ENGINE SERIAL NUMBER PLATE

The engine serial number plate is located on the rocker arm cover.

Refer to the engine model designation on your engine's serial number plate to identify repair information covered in the Component Technical Manual.



M21, TM305,2 -19-21 APR86

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## ENGINE APPLICATION CHART

Refer to the engine application chart to identify product-model/engine type-model relationship.

### CONSUMER PRODUCTS

#### Lawn and Garden Tractors

Machine No.	Engine Model
330 .....	3TN66UJ
332 .....	3TN66UJ
430 .....	3TNA72UJ*

#### Compact Utility Tractors

Machine No.	Engine Model
655 .....	3TN66UJ
670 .....	3TNA72UJX
755 .....	3TNA72UJ
770 .....	3TNA82RJX
855 .....	3TN75RJ
870 .....	3TN84RJX
955 .....	3TN84RJ
970 .....	4TN82RJX
1070 .....	4TN84RJX

#### Front Mowers

Machine No.	Engine Model
F915 .....	3TN66UJ
F935 .....	3TNA72UJ

#### Skid Steer Loaders

Machine No.	Engine Model
375 .....	3TN66E-SP
575 .....	3TN82E-SP
675 .....	4TN82E-SP

### INDUSTRIAL

#### Loaders

Machine No.	Engine Model
84 .....	4TN1004JF

#### Excavators

Machine No.	Engine Model
15 .....	3TNA72UJB
25 .....	3TN78RJB
30 .....	3TN82RJB
50 .....	4TN78TRJB

#### Golf and Turf

Machine No.	Engine Model
756 .....	3TNA72UJ
856 .....	3TN75RJ
3325 .....	4TN82RJ

\*430 Lawn and Garden Tractors were built with two slightly different versions of 3TNA72UJ engines. In this manual, 3TNA72UJ engines, serial numbers ( —5000), are referred to as "Early 3TNA72". Engines with serial numbers (5001— ) are referred to as "Later 3TNA72".

**ENGLISH TORQUE SPECIFICATIONS**

*NOTE: Wrench torque tolerance is  $\pm 20\%$ .*

Bolt Diameter	Plain Head*		Three Radial Dashes*		Six Radial Dashes*	
	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m
1/4 in.	6	8	9	12	12	16
5/16 in.	10	14	18	24	25	34
3/8 in.	20	27	30	41	45	61
7/16 in.	30	41	50	68	70	95
1/2 in.	45	61	75	101	110	149
9/16 in.	70	95	110	150	155	210
5/8 in.	95	128	155	210	215	290
3/4 in.	165	225	270	365	385	520
7/8 in.	170	230	435	590	620	840
1 in.	255	345	660	895	930	1260

Torque figures indicated above and in the Specification Sections of this manual are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or cap screws unless otherwise specified in this manual.

\* Torque value for bolts and cap screws are identified by their head markings.

S11,2000,DD -19-11JUL85

**METRIC TORQUE SPECIFICATIONS**

*NOTE: Wrench torque tolerance is  $\pm 20\%$ .*

Bolt Diameter	Property Class 8.8*		Property Class 10.9*	
	lb-ft	N-m	lb-ft	N-m
M5	5	6	7	9
M6	8	10	11	15
M8	18	25	26	35
M10	37	50	52	70
M12	66	90	92	125
M16	166	225	229	310
M20	321	435	450	610
M24	554	750	775	1050

Torque figure indicated above and in the Specification Sections of this manual are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or cap screws unless otherwise specified in this manual.

\* Torque value for bolts and cap screws are identified by their head markings.

S11,2000,DE -19-11JUL85

**ENGINE: 3TN66**

**GROUP 10—Valve Train and Camshaft**

Item	Standard mm (inches)	Wear Limit mm (in.)
Valve Clearance	0.2 (0.008)	
<b>Rocker Arm</b>		
Shaft O.D.	9.97—9.99 (0.3925—0.3933)	9.95 (0.392)
Shaft Support I.D.	10.0—10.02 (0.3937—0.3945)	10.1 (0.398)
Arm I.D.	10.0—10.02 (0.3937—0.3945)	10.1 (0.398)
Shaft Clearance	0.01—0.05 (0.0004—0.0020)	0.13 (0.005)
Rocker Arm Assembly Cap Screw and Nut Torque	26 N·m (226 lb-in.)	
Rocker Arm Cover Nut Torque	18 N·m (160 lb-in.)	
<b>Push Rod</b>		
Maximum T.I.R.		0.075 (0.003)
Length	114—115 (4.488—4.528)	114 (4.49)
Diameter	5 (0.197)	
<b>Cam Follower</b>		
O.D.	17.95—17.968 (0.7067—0.7074)	17.93 (0.706)
Bore I.D.	18.00—18.018 (0.7087—0.7094)	18.05 (0.711)
Bore Clearance	0.032—0.068 (0.0013—0.0027)	
<b>Camshaft</b>		
End Play	0.05—0.15 (0.002—0.006)	0.4 (0.16)
Maximum Gear Backlash Between		
Each Gear		0.2 (0.008)
End Journals O.D.	35.94—35.96 (1.415—1.416)	35.85 (1.411)
Intermediate Journals O.D.	35.91—35.94 (1.414—1.415)	35.81 (1.410)
Lobe Height	29.97—30.03 (1.180—1.182)	29.7 (1.169)
Bushing I.D.		
(Gearcase Side)	36.00—36.065 (1.417—1.420)	36.1 (1.421)
Intermediate and Flywheel		
End Bores I.D.	36.00—36.025 (1.417—1.418)	36.1 (1.421)
End Journal Clearance	0.040—0.125 (0.0016—0.0049)	0.18 (0.007)
Intermediate Journal Clearance	0.065—0.115 (0.0026—0.0045)	0.18 (0.007)
Attaching Cap Screw Torque	11 N·m (96 lb-in.)	
Gear Housing Cover Cap Screw Torque	9 N·m (78 lb-in.)	
Crankshaft Pulley Cap Screw Torque	115 N·m (85 lb-ft)	

**GROUP 15—Cylinder Head, Valves, and Manifolds**

Item	Standard mm (in.)	Wear Limit mm (in.)
<b>Manifold</b>		
Exhaust Manifold Cap Screw Torque	11 N·m (96 lb-in.)	
Intake Manifold Cap Screw Torque	11 N·m (96 lb-in.)	

**ENGINE: 3TN66**

Item	Standard mm (in.)	Wear Limit mm (in.)
<b>Cylinder Head</b>		
Valve Recession Intake	0.4 (0.016)	0.50 (0.020)
Exhaust	0.85 (0.034)	0.50 (0.020)
Valve Spring Free Length (Approx.)		28 (1.102)
Valve Spring Test Length		17 (0.59)
@ Test Force		125 N (28 lb)
<b>Cylinder Head</b>		
Valve Stem O.D.		
(Intake)	5.460—5.475 (0.215—0.216)	5.40 (0.213)
(Exhaust)	5.445—5.460 (0.214—0.215)	5.40 (0.213)
Valve Guide I.D.	5.5—5.515 (0.2165—0.217)	5.58 (0.220)
Valve Guide-to-Valve Stem Clearance:		
(Replace)		0.20 (0.008)
(Knurl)		0.15—0.20 (0.006—0.008)
Valve Seat Width		
Intake	1.15 (0.045)	1.65 (0.065)
Exhaust	1.41 (0.056)	1.91 (0.075)
Valve Seat Angle		
Intake	120°	
Exhaust	90°	
Cylinder Head Flatness		
(Maximum Distortion)	Less than 0.5 (0.002)	0.15 (0.006)
Mill Cylinder Head No More Than		0.20 (0.008)
Valve Guide Height	7 (0.276)	
Cylinder Head Cap Screw Torque		
In Sequence (Lubricated)	34 N·m (25 lb-ft)	

**GROUP 20—Flywheel**

Item	Standard mm (in.)	Wear Limit mm (in.)
<b>Stub Shaft</b>		
Maximum T.I.R.		0.2 (0.008)
Flatness		0.05 (0.002)
Attaching Cap Screw Torque	59 N·m (44 lb-ft)	
<b>Flywheel</b>		
Flatness		0.05 (0.002)
Attaching Cap Screw Torque	83 N·m (61 lb-ft)	
<b>Flywheel Housing</b>		
Mounting Plate or Housing		
Cap Screw Torque	49 N·m (36 lb-ft)	
Starter-to-Mounting Plate		
Cap Screw Torque	49 N·m (36 lb-ft)	
<b>Flywheel Housing or Shield</b>		
Cap Screw or Nut Torque		
M10	49 N·m (36 lb-ft)	
M8	26 N·m (226 lb-in.)	
M12 Nut	88 N·m (65 lb-ft)	

**ENGINE: 3TN66**

**GROUP 25—Connecting Rods and Pistons**

Item	Standard mm (in.)	Wear Limit mm (in.)
<b>Connecting Rod</b>		
Side Clearance . . . . .	0.2—0.4 (0.0079—0.0157)	0.55 (0.0217)
End-Cap Screw Torque . . . . .	23 N·m (200 lb-in.)	
Bearing Clearance (Crankpin) . . . . .	0.020—0.0072 (0.0008—0.0028) . . .	0.15 (0.006)
Bearing Clearance (Piston Pin) . . . . .	0.025—0.047 (0.0010—0.0019) . . .	0.12 (0.005)
Maximum Twist . . . . .		0.08 (0.003)
Journal O.D. . . . .	35.97—35.98 (1.416—1.417) . . .	35.92 (1.414)
Bearing I.D. (Crankpin) . . . . .	36.00—36.042 (1.417—1.419) . . .	36.07 (1.420)
<b>Piston</b>		
<b>Ring Groove Clearance</b>		
Top Ring . . . . .	0.065—0.1 (0.0026—0.0039) . . . . .	0.2 (0.08)
Second Ring . . . . .	0.065—0.1 (0.0026—0.0039) . . . . .	0.2 (0.08)
Oil Ring . . . . .	0.065—0.1 (0.0026—0.0039) . . . . .	0.2 (0.08)
Ring End Gap (1st and Oil) . . . . .	0.15—0.35 (0.006—0.014) . . . . .	1.5 (0.059)
Ring End Gap (2nd) . . . . .	0.25—0.40 (0.010—0.016) . . . . .	1.5 (0.059)
Piston Pin O.D. . . . .	19.991—20.0 (0.787—0.7874) . . . . .	19.9 (0.786)
Pin Bushing I.D. . . . .	20.025—20.038 (0.788—0.789) . . . . .	20.1 (0.791)
Piston Pin Clearance . . . . .	0—0.17 (0—0.0007) . . . . .	0.045 (0.0018)
Pin Bore I.D. . . . .	20.000—20.008 (0.787—0.788) . . . . .	20.02 (0.788)
Pin Bore Clearance . . . . .	0.0017 (0—0.0007) . . . . .	0.045 (0.0018)
Piston O.D. . . . .	65.927—65.957 (2.596—2.597) . . . . .	65.85 (2.593)
Cylinder Block Cylinder Bore I.D. . . . .	66.00—66.03 (2.599—2.600) . . . . .	66.20 (2.606)
Maximum Piston Clearance . . . . .		0.33 (0.013)
Cylinder Out-of-Round . . . . .		0.02 (0.001)

**GROUP 30—Crankshaft and Main Bearings**

Item	Standard mm (in.)	Wear Limit mm (in.)
<b>Crankshaft</b>		
End Play . . . . .	0.095—0.266 (0.004—0.011) . . . . .	0.33 (0.013)
Main Bearing Cap Screw Torque . . . . .	54 N·m (40 lb-ft)	
Main Bearing Clearance . . . . .	0.020—0.072 (0.0008—0.0028) . . . . .	0.15 (0.0059)
<b>Oil Seal Case Cap Screw Torque</b>		
Seal Case to Block . . . . .	11 N·m (96 lb-in.)	
Oil Pan to Seal Case . . . . .	9 N·m (78 lb-in.)	
Main Bearing Journal O.D. . . . .	39.97—39.98 (1.5736—1.5740) . . . . .	39.9 (1.572)
Main Bearing I.D. . . . .	40.00—40.042 (1.575—1.577) . . . . .	40.07 (1.578)



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**GROUP 35—Gear Housing**

Item	Standard mm (in.)	Wear Limit mm (in.)
Gear Housing Cap Screw Torque . . . . .	9 N·m (78 lb-in.)	
Crankshaft Pulley Cap Screw Torque . . .	115 N·m (85 lb-ft)	
<b>Timing Gear Backlash</b>		
Fuel Injection Pump . . . . .	0.04—0.12 (0.0016—0.0047)	. . . . 0.20 (0.008)
Idler . . . . .	0.04—0.12 (0.0016—0.0047)	. . . . 0.20 (0.008)
Camshaft . . . . .	0.04—0.12 (0.0016—0.0047)	. . . . 0.20 (0.008)
Crankshaft . . . . .	0.11—0.19 (0.0043—0.0075)	. . . . 0.20 (0.008)
Oil Pump . . . . .	0.11—0.19 (0.0043—0.0075)	. . . . 0.20 (0.008)
<b>Timing Gear</b>		
Idler Gear Bushing Diameter . . . . .	20.00—20.021 (0.786—0.788)	. . . . 20.08 (0.791)
Idler Shaft Diameter . . . . .	19.959—19.980 (0.786—0.787)	. . . . 19.93 (0.785)
Idler Shaft Oil Clearance . . . . .	0.02—0.062 (0.001—0.002)	. . . . 0.15 (0.006)

**GROUP 49—Lubrication System**

Item	Standard mm (in.)	Wear Limit mm (in.)
<b>Oil Pump</b>		
Gear Backlash . . . . .	0.11—0.19 (0.0043—0.0075)	. . . . 0.20 (0.008)
Rotor Recess . . . . .		0.25 (0.010)
Outer Rotor-to-Pump Body Clearance . . . . .		0.25 (0.010)
Inner Rotor-to-Outer Rotor Clearance . . . . .		0.25 (0.010)
Oil Pump Attaching Cap Screw Torque .	25 N·m (18 lb-ft)	
<b>Oil Pressure Regulating Valve</b>		
Valve Spring Free Length (Approx.) . . .	21.9—24.5 (0.86—0.96)	
Valve Spring Test Length . . . . .	14.7 (0.58)	
<b>Oil Pressure Change Per 1 mm (0.039 in.) of Shim Thickness . . . . .</b>		
	13.8 kPa (2 psi)	
<b>Oil Pan</b>		
Strainer Tube Attaching		
Cap Screw Torque . . . . .	11 N·m (96 lb-in.)	
Oil Pan-to-Block Cap Screw Torque . . .	11 N·m (96 lb-in.)	
Oil Pan-to-Gear Housing		
Cover Torque . . . . .	9 N·m (78 lb-in.)	

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**GROUP 45—Cooling System**

Item	Specification
Thermostat	
Begin Opening Temperature . . . . .	71°C (160°F)
Fully Open Temperature . . . . .	85°C (184°F)
Housing Cover Cap Screw Torque . . . . .	9 N·m (78 lb-in.)
Water Pump	
Plate Screws Torque . . . . .	9 N·m (78 lb-in.)
Pulley Cap Screws Torque . . . . .	11 N·m (96 lb-in.)
Attaching Cap Screws . . . . .	26 N·m (226 lb-in.)
Alternator Belt Deflection . . . . .	13 mm (0.5 in.) at 107 N (24 lb) Force applied midway between pulleys.

**GROUP 50—Fuel Injection Pump, Camshaft, and Nozzles**

Item	Standard mm (in.)	Wear Limit mm (in.)
Fuel Injection Pump		
Pump Mounting Hardware Torque . . . . .	20 N·m (180 lb-in.)	
Gear Backlash . . . . .	0.04—0.12 (0.0016—0.0047)	0.2 (0.008)
Gear Attaching Nut Torque . . . . .	88 N·m (65 lb-ft)	
Pump Camshaft Lobe Height . . . . .		30.9 (1.217)
Camshaft Bearing Screw Torque . . . . .	20 N·m (180 lb-in.)	
Screw Torque . . . . .	20 N·m (180 lb-in.)	
Fuel Injection Nozzles		
Nozzle Opening Pressure . . . . .	11722 ± 480 kPa (1700 ± 70 psi)	
Minimum Leakage Time . . . . .	10 Seconds	
	@ 11032 kPa (1600 psi) Pressure	@ 11032 kPa (1600 psi) Pressure
Retaining Nut-to-Nozzle Body Torque . . . . .	40 N·m (30 lb-ft)	
Nozzle-to-Cylinder Head Torque . . . . .	50 N·m (37 lb-ft)	
Leak-Off Fitting-to-Nozzle Torque . . . . .	40 N·m (30 lb-ft)	

**GROUP 55—Fuel Control and Governor Linkage**

Item	Standard mm (in.)	Wear Limit mm (in.)
Fuel Control and Governor Linkage		
Governor Shaft O.D. . . . .		7.90 (0.311)
Fuel Control Linkage Bore I.D. . . . .		8.15 (0.321)
Sleeve Bore I.D. . . . .		8.20 (0.323)
Sleeve Shaft O.D. . . . .		7.90 (0.311)
Sleeve Oil Clearance (Sleeve Bore I.D. Minus Shaft O.D.) . . . . .		0.150 (0.006)
Governor Shaft Clearance Linkage Bore Minus Shaft O.D. . . . .		0.18 (0.0071)

**GROUP 60—Starter**  
See Starter Specifications in this Group

**GROUP 65—Alternator**  
See Alternator Specifications in this Group

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**GROUP 10—Valve Train and Camshaft**

Item	Standard mm (in.)	Wear Limit mm (in.)
Valve Clearance	0.20 (0.008)	
<b>Rocker Arm</b>		
Shaft O.D.	11.966—11.984 (0.471—0.472)	11.96 (0.471)
Shaft Support I.D.	12.00—12.02 (0.472—0.473)	12.09 (0.476)
Arm I.D.	12.00—12.02 (0.472—0.473)	12.09 (0.476)
Shaft Clearance	0.016—0.054	0.13 (0.005)
Rocker Arm Assembly Cap Screw and Nut Torque	26 N·m (226 lb-in.)	
Rocker Arm Cover Nut Torque	18 N·m (160 lb-in.)	
<b>Push Rod</b>		
Maximum T.I.R.		0.075 (0.003)
Length	141—142 (5.55—5.59)	141.0 (5.55)
Diameter	5 (0.197)	
<b>Cam Follower</b>		
O.D.	20.927—20.960 (0.824—0.825)	20.93 (0.824)
Bore I.D.	21.0—21.021 (0.827—0.828)	21.05 (0.829)
Bore Clearance	0.04—0.094 (0.0016—0.0037)	
<b>Camshaft</b>		
End Play	0.05—0.15 (0.002—0.006)	0.40 (0.016)
<b>Maximum Gear Backlash Between</b>		
Each Gear		0.2 (0.008)
Journal O.D. (Gearcase Side)	39.94—39.96 (1.572—1.573)	39.85 (1.569)
Journal O.D. (Intermediate)	39.910—39.935 (1.571—1.572)	39.85 (1.569)
Journal O.D. (Flywheel Side)	39.94—39.96 (1.572—1.573)	40.1 (1.579)
Lobe Height	33.95—34.05 (1.337—1.341)	33.75 (1.329)
Bushing I.D. (Gearcase Side)	40.0—40.065 (1.575—1.577)	40.10 (1.579)
Bore I.D. (Intermediate and Flywheel Side)	40.0—40.065 (1.575—1.577)	40.10 (1.579)
End Journal Clearance	0.040—0.085 (0.0016—0.0033)	0.18 (0.007)
Intermediate Journal Clearance	0.065—0.115 (0.0026—0.0045)	
Attaching Cap Screw Torque	11 N·m (96 lb-in.)	
Gear Housing Cover Cap Screw Torque	9 N·m (78 lb-in.)	
<b>Fuel Shut-Off Solenoid Bracket</b>		
Cap Screw Torque (Early Units)		
Crankshaft Pulley Cap Screw Torque	115 N·m (85 lb-ft)	

**GROUP 15—Cylinder Head, Valves, and Manifolds**

Item	Standard mm (in.)	Wear Limit mm (in.)
<b>Manifold</b>		
Exhaust Manifold Cap Scrw Torque	26 N·m (226 lb-in.)	
Intake Manifold Cap Screw Torque	11 N·m (96 lb-in.)	

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Item	Standard mm (in.)	Wear Limit mm (in.)
<b>Cylinder Head</b>		
Valve Recession		
Intake . . . . .	0.50 (0.020)	
Exhaust . . . . .	0.85 (0.033)	
Valve Spring Free Length (Approx.) . . . . .	37.4 (1.472)	
Valve Spring Test Length . . . . .		22.5 (0.87)
Valve Stem O.D. . . . .	6.945—6.960 (0.273—0.274)	6.90 (0.272)
Valve Guide I.D. . . . .	7.005—7.020 (0.2758—0.2764)	6.90 (0.272)
Valve Guide-to-Valve Stem Clearance:		
(Replace) . . . . .		0.20 (0.008)
(Knurl) . . . . .		0.15—0.20 (0.006—0.008)
Valve Seat Width		
Intake . . . . .	1.44 (0.057)	1.98 (0.078)
Exhaust . . . . .	1.77 (0.070)	2.27 (0.089)
Valve Seat Angle		
Intake . . . . .	120°	
Exhaust . . . . .	90°	
Cylinder Head Flatness		
(Maximum Distortion) . . . . .	Less than 0.5 (0.002)	0.15 (0.006)
Mill Cylinder Head No More Than . . . . .		0.20 (0.008)
Valve Guide Height . . . . .	9.00 (0.354)	
Cylinder Head Cap Screw Torque		
In Sequence (Lubricated) . . . . .	61 N·m (45 lb-ft)	

**GROUP 20—Flywheel**

Item	Standard mm (in.)	Wear Limit mm (in.)
<b>Stub Shaft (If Equipped)</b>		
Maximum T.I.R. . . . .		0.20 (0.008)
Flatness . . . . .		0.05 (0.002)
Attaching Cap Screw Torque . . . . .	59 N·m (44 lb-ft)	
<b>Flywheel</b>		
Flatness . . . . .		0.05 (0.002)
Attaching Cap Screw Torque . . . . .	83 N·m (61 lb-ft)	
<b>Flywheel Housing</b>		
Mounting Plate or Housing		
Cap Screw Torque . . . . .	49 N·m (36 lb-ft)	
Starter-to-Mounting Plate		
Cap Screw Torque . . . . .	88 N·m (65 lb-ft)	
Flywheel Housing or Shield		
Cap Screw or Nut Torque		
M10 . . . . .	49 N·m (36 lb-ft)	
M8 . . . . .	26 N·m (226 lb-in.)	
M12 Nut . . . . .	88 N·m (65 lb-ft)	