

# **John Deere K Series Air-Cooled Engines**

**John Deere Horicon Works  
CTM5 (20OCT92)**

LITHO IN U.S.A.  
ENGLISH

# Introduction

## FOREWORD

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual and are recommended for use.

Live with safety: Read the safety messages in the General Information Section of this manual and the cautions presented throughout the text of the manual.



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.

Use this component technical manual in conjunction with the machine technical manual. An application listing in the beginning of each section identifies product-model/component type-model relationship. See the machine technical manual for information on component removal and installation, and gaining access to the components.

Information is organized in groups for the various components requiring service instruction. At the beginning of each group are summary listings of all applicable essential tools, other materials needed to do the job, and service parts kits.

Group 00, in the beginning of each section—Repair Specifications, consist of all applicable specifications, wear tolerances and specific torque values for various components on each engine.

Binders, binder labels, and tab sets can be ordered by John Deere dealers direct from the John Deere Distribution Service Center.

This manual is part of a total product 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 type of failures and their causes. FOS Manuals are for training new personnel and for reference by experienced technicians.

Technical Manuals are concise guides for specific machines. Technical manuals are on-the-job guides containing only the vital information needed for diagnosis, analysis, testing, and repair.

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

# Dealer Presentation Sheet

## JOHN DEERE DEALERS

This is a complete revision to CTM5.

Discard your old CTM5, dated 26 JUN 91.

New information added to this manual includes:

1. The basic engine specifications have been updated to include the new FC400V, 12.5 hp engine.

2. The engine applications charts have been updated to include the new products introduced in 1992:

- 14ST and 14PT 21-Inch Walk-Behind Mowers
- 38-Inch Walk-Behind Commercial Mower
- GX95 Riding Mower
- 245 Lawn and Garden Tractor
- GT242 Lawn and Garden Tractor
- Gator 4 X 2

# Contents

## SECTION 10—GENERAL INFORMATION

- Group 05—Safety
- Group 10—General Specifications
- Group 15—Serial Number Locations
- Group 20—Features

## SECTION 20—FA130D and FA210D

- Group 00—Engine Application and Repair Specifications
- Group 05—Fuel and Air Systems—FA130D
- Group 06—Fuel and Air Systems—FA210D
- Group 10—Blower Housing and Flywheel
- Group 15—Cylinder Head
- Group 20—Cylinder Block, Valves and Internal Components
- Group 25—Ignition and Charging System
- Group 30—Starting Systems—FA130D
- Group 31—Starting Systems—FA210D

## SECTION 21—FA210V

- Group 00—Engine Application and Repair Specifications
- Group 05—Fuel and Air Systems
- Group 10—Blower Housing and Flywheel
- Group 15—Cylinder Head
- Group 20—Cylinder Block, Valves and Internal Components
- Group 25—Ignition and Charging System
- Group 30—Starting Systems

## SECTION 25—FG150G/FG150D

- Group 00—Engine Application and Repair Specifications
- Group 05—Fuel and Air Systems
- Group 10—Blower Housing and Flywheel
- Group 15—Cylinder Head
- Group 20—Cylinder Block, Valves and Internal Components
- Group 25—Ignition and Charging System
- Group 30—Starting Systems

## SECTION 30—FC150V

- Group 00—Engine Application and Repair Specifications
- Group 05—Fuel and Air Systems
- Group 10—Blower Housing and Flywheel
- Group 15—Cylinder Head and Valves
- Group 20—Cylinder Block and Internal Components
- Group 25—Ignition and Charging System
- Group 30—Starting Systems

## SECTION 35—KF82D/FZ340D

- Group 00—Engine Application and Repair Specifications
- Group 05—Fuel and Air Systems
- Group 10—Blower Housing and Flywheel
- Group 15—Cylinder Head
- Group 20—Cylinder Block, Valves and Internal Components
- Group 25—Ignition and Charging System
- Group 30—Starting Systems

## SECTION 40—FC290V/FC400V/FC420V/FC540V

- Group 00—Engine Application and Repair Specifications
- Group 05—Fuel and Air Systems
- Group 10—Blower Housing and Flywheel
- Group 15—Cylinder Head and Valves
- Group 20—Cylinder Block and Internal Components
- Group 25—Ignition and Charging System
- Group 30—Starting Systems

## SECTION 45—FE290D and FE290R

- Group 00—Engine Application and Repair Specifications
- Group 05—Fuel and Air Systems
- Group 10—Blower Housing and Flywheel
- Group 15—Cylinder Head and Valves
- Group 20—Cylinder Block and Internal Components
- Group 25—Ignition and Charging System
- Group 30—Starting Systems

Continued on next page

*All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.*

CTM5-19-20OCT92

COPYRIGHT© 1992  
DEERE & COMPANY  
Moline, Illinois  
All rights reserved

A John Deere ILLUSTRATION™ Manual  
Previous Editions

Copyright 1991, 1989, 1988, 1987 Deere & Company

**SECTION 50—FB460V**

10

Group 00—Engine Application and Repair  
Specifications

Group 05—Fuel and Air Systems

Group 10—Blower Housing and Flywheel

Group 15—Cylinder Head

20

Group 20—Cylinder Block, Valves and Internal  
Components

Group 25—Ignition and Charging System

Group 30—Starting Systems

21

**SECTION 100—COMPONENT ANALYSIS AND  
GENERAL REPAIR**

Group 05—Valves

Group 10—Piston, Piston Rings, Crankshaft and  
Connecting Rod

Group 15—Cylinder Block

25

**Index**

30

35

40

45

50

100

# Contents

## SECTION 10—GENERAL INFORMATION

- Group 05—Safety
- Group 10—General Specifications
- Group 15—Serial Number Locations
- Group 20—Features

## SECTION 20—FA130D and FA210D

- Group 00—Engine Application and Repair Specifications
- Group 05—Fuel and Air Systems—FA130D
- Group 06—Fuel and Air Systems—FA210D
- Group 10—Blower Housing and Flywheel
- Group 15—Cylinder Head
- Group 20—Cylinder Block, Valves and Internal Components
- Group 25—Ignition and Charging System
- Group 30—Starting Systems—FA130D
- Group 31—Starting Systems—FA210D

## SECTION 21—FA210V

- Group 00—Engine Application and Repair Specifications
- Group 05—Fuel and Air Systems
- Group 10—Blower Housing and Flywheel
- Group 15—Cylinder Head
- Group 20—Cylinder Block, Valves and Internal Components
- Group 25—Ignition and Charging System
- Group 30—Starting Systems

## SECTION 25—FG150G/FG150D

- Group 00—Engine Application and Repair Specifications
- Group 05—Fuel and Air Systems
- Group 10—Blower Housing and Flywheel
- Group 15—Cylinder Head
- Group 20—Cylinder Block, Valves and Internal Components
- Group 25—Ignition and Charging System
- Group 30—Starting Systems

## SECTION 30—FC150V

- Group 00—Engine Application and Repair Specifications
- Group 05—Fuel and Air Systems
- Group 10—Blower Housing and Flywheel
- Group 15—Cylinder Head and Valves
- Group 20—Cylinder Block and Internal Components
- Group 25—Ignition and Charging System
- Group 30—Starting Systems

## SECTION 35—KF82D/FZ340D

- Group 00—Engine Application and Repair Specifications
- Group 05—Fuel and Air Systems
- Group 10—Blower Housing and Flywheel
- Group 15—Cylinder Head
- Group 20—Cylinder Block, Valves and Internal Components
- Group 25—Ignition and Charging System
- Group 30—Starting Systems

## SECTION 40—FC290V/FC400V/FC420V/FC540V

- Group 00—Engine Application and Repair Specifications
- Group 05—Fuel and Air Systems
- Group 10—Blower Housing and Flywheel
- Group 15—Cylinder Head and Valves
- Group 20—Cylinder Block and Internal Components
- Group 25—Ignition and Charging System
- Group 30—Starting Systems

## SECTION 45—FE290D and FE290R

- Group 00—Engine Application and Repair Specifications
- Group 05—Fuel and Air Systems
- Group 10—Blower Housing and Flywheel
- Group 15—Cylinder Head and Valves
- Group 20—Cylinder Block and Internal Components
- Group 25—Ignition and Charging System
- Group 30—Starting Systems

Continued on next page

*All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.*

CTM5-19-20OCT92

COPYRIGHT© 1992  
DEERE & COMPANY  
Moline, Illinois  
All rights reserved

A John Deere ILLUSTRATION™ Manual  
Previous Editions

Copyright 1991, 1989, 1988, 1987 Deere & Company

**SECTION 50—FB460V**

10

Group 00—Engine Application and Repair  
Specifications

Group 05—Fuel and Air Systems

Group 10—Blower Housing and Flywheel

Group 15—Cylinder Head

20

Group 20—Cylinder Block, Valves and Internal  
Components

Group 25—Ignition and Charging System

Group 30—Starting Systems

21

**SECTION 100—COMPONENT ANALYSIS AND  
GENERAL REPAIR**

Group 05—Valves

Group 10—Piston, Piston Rings, Crankshaft and  
Connecting Rod

Group 15—Cylinder Block

25

**Index**

30

35

40

45

50

100

# Section 10 GENERAL INFORMATION

## Contents

### Page

**Group 05—Safety** . . . . . 10-05-1

**Group 10—General Specifications**

Basic Engine Specifications . . . . . 10-10-1

Basic Engine Applications Chart . . . . . 10-10-2

Metric Bolt and Cap Screw Torque  
Values . . . . . 10-10-4

**Group 15—Serial Number Locations**

Serial Number Location

Engine . . . . . 10-15-2

Carburetor . . . . . 10-15-5

**Group 20—Features**

Engine Features

FA130D . . . . . 10-20-1

FA210D . . . . . 10-20-1

FA210V . . . . . 10-20-2

FG150G/FG150D . . . . . 10-20-2

FC150V . . . . . 10-20-3

KF82D/FZ340D . . . . . 10-20-3

FC290V . . . . . 10-20-4

FC400V . . . . . 10-20-4

FC420V . . . . . 10-20-5

FC540V . . . . . 10-20-5

FE290D/FE290R . . . . . 10-20-6

FB460V . . . . . 10-20-6



## RECOGNIZE SAFETY INFORMATION

This is the safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.



DX,ALERT -19-04JUN90

10  
05  
1  
-UN-07DEC88  
T81389

## UNDERSTAND SIGNAL WORDS

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards.

DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.



DX,SIGNAL -19-09JAN92

-19-30SEP88  
TS187

## HANDLE FLUIDS SAFELY—AVOID FIRES

When you work around fuel, do not smoke or work near heaters or other fire hazards.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.



DX,FLAME -19-04JUN90

-UN-23AUG88  
TS227

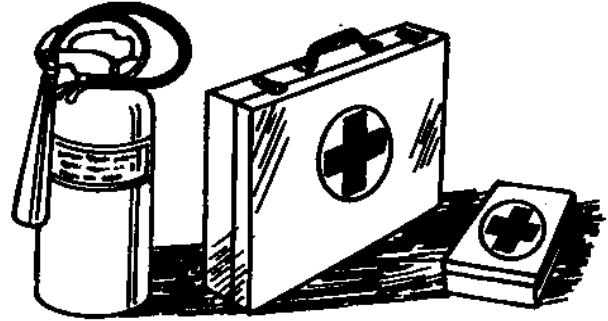
10  
05  
2

## PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



DX,FIRE2 -19-04JUN90

TS291 -UN-23AUG88

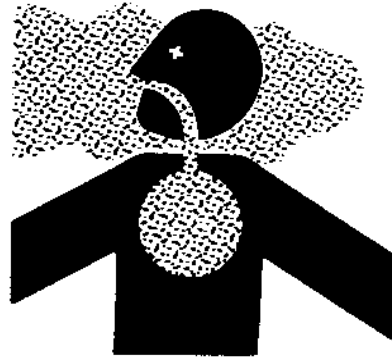
## AVOID HARMFUL ASBESTOS DUST

Avoid breathing dust that may be generated when handling components containing asbestos fibers. Inhaled asbestos fibers may cause lung cancer.

Components in products that may contain asbestos fibers are brake pads, brake band and lining assemblies, clutch plates, and some gaskets. The asbestos used in these components is usually found in a resin or sealed in some way. Normal handling is not hazardous as long as airborne dust containing asbestos is not generated.

Avoid creating dust. Never use compressed air for cleaning. Avoid brushing or grinding material containing asbestos. When servicing, wear an approved respirator. A special vacuum cleaner is recommended to clean asbestos. If not available, apply a mist of oil or water on the material containing asbestos.

Keep bystanders away from the area.



DX,DUST -19-15MAR91

TS220 -UN-23AUG88

## USE PROPER TOOLS

Use tools appropriate to the work. Makeshift tools and procedures can create safety hazards.

Use power tools only to loosen threaded parts and fasteners.

For loosening and tightening hardware, use the correct size tools. **DO NOT** use U.S. measurement tools on metric fasteners. Avoid bodily injury caused by slipping wrenches.

Use only service parts meeting John Deere specifications.



DX,REPAIR -19-04JUN90

10  
39510  
-UN-08NOV89  
TS779

## DISPOSE OF WASTE PROPERLY

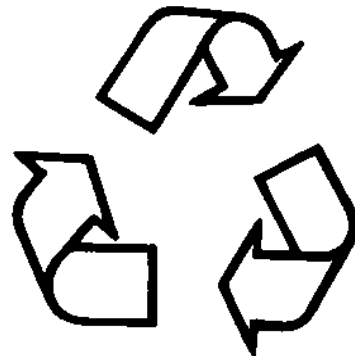
Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your John Deere dealer.



DX,DRAIN -19-09AUG91

-UN-26NOV90  
TS1133

**BASIC ENGINE SPECIFICATIONS**

ENGINE	FA130D	FG150D/ FG150G	FC150V	FA210D	FA210V	KF82D/ FZ340D
CYLINDER	1	1	1	1	1	1
CYCLE	4	4	4	4	4	4
BORE	62 mm (2.44 in.)	64 mm (2.51 in.)	65 mm (2.56 in.)	72 mm (2.83 in.)	72 mm (2.83 in.)	80 mm (3.15 in.)
STROKE	43 mm (1.69 in.)	47 mm (1.85 in.)	46 mm (1.81 in.)	51 mm (2.01 in.)	51 mm (2.01 in.)	68 mm (2.68 in.)
DISPLACE- MENT	129 cm <sup>3</sup> (7.92 cu. in.)	151 cm <sup>3</sup> (9.21 cu. in.)	153 cm <sup>3</sup> (9.30 cu. in.)	207 cm <sup>3</sup> (12.7 cu. in.)	207 cm <sup>3</sup> (12.7 cu. in.)	341 cm <sup>3</sup> (20.9 cu. in.)
HORSE- POWER	2.3 kW (3.1 HP)	2.7 kW (3.6 HP)	3.4 kW (4.5 HP)	3.9 kW (5.2 HP)	4.5 kW (6 HP)	6.3 kW (8.5 HP)
ENGINE	FC290V	FE290D/ FE290R	FB460V	FC400V	FC420V	FC540V
CYLINDER	1	1	1	1	1	1
CYCLE	4	4	4	4	4	4
BORE	78 mm (3.07 in.)	78 mm (3.07 in.)	89 mm (3.50 in.)	87 mm (3.43 in.)	89 mm (3.50 in.)	89 mm (3.50 in.)
STROKE	60 mm (2.36 in.)	60 mm (2.36 in.)	74 mm (2.91 in.)	68 mm (2.68 in.)	68 mm (2.68 in.)	86 mm (3.39 in.)
DISPLACE- MENT	286 cm <sup>3</sup> (17.5 cu. in.)	286 cm <sup>3</sup> (17.5 cu. in.)	460 cm <sup>3</sup> (28.1 cu. in.)	400 cm <sup>3</sup> (24.4 cu. in.)	423 cm <sup>3</sup> (25.8 cu. in.)	535 cm <sup>3</sup> (32.6 cu. in.)
HORSE- POWER	6.7 kW (9 HP)	7.5 kW (10 HP)	9.3 kW (12.5 HP)	9.3 kW (12.5 HP)	10.4 kW (14 HP)	12.7 kW (17 HP)

MX,1010A1,A1 -19-21OCT92

## BASIC ENGINE APPLICATIONS CHART

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

### WALK-BEHIND PRODUCTS

Machine	Engine Model No.
20SR7 Reel Mower . . . . .	FA130D
3K Lawn Edger . . . . .	FA130D
E35 Lawn Edger . . . . .	FA130D
14PB 21-Inch Rear Discharge Mower . . . . .	FC150V
14SB 21-Inch Rear Discharge Mower . . . . .	FC150V
14SE 21-Inch Rear Discharge Mower . . . . .	FC150V
14SC 21-Inch Rear Discharge Mower . . . . .	FC150V
14ST 21-Inch Rear Discharge Mower . . . . .	FC150V
14PT 21-Inch Rear Discharge Mower . . . . .	FC150V
32/36/48/52-Inch Commercial Mower . . . . .	FB460V
48/52-Inch Commercial Mower . . . . .	FC540V
48/54-Inch Commercial Mower . . . . .	FC420V or FC540V
38-Inch Commercial Mower . . . . .	FC400V

### RIDING MOWERS

Machine	Engine Model No.
RX63 . . . . .	FA210V
RX73 . . . . .	FC290V
RX75 . . . . .	FC290V
RX95 . . . . .	FB460V
SX75 . . . . .	FC290V
SX95 . . . . .	FB460V
GX70 . . . . .	FC290V
GX75 . . . . .	FC290V
SRX75 . . . . .	FC290V
SRX95 . . . . .	FB460V
GX95 . . . . .	FB460V

### LAWN TRACTORS

Machine	Engine Model No.
112L . . . . .	FB460V
130 . . . . .	FC290V
160 . . . . .	FB460V
165 . . . . .	FB460V
170 . . . . .	FC420V
175 . . . . .	FC420V
180 . . . . .	FC540V
185 . . . . .	FC540V
LX172 . . . . .	FC420V
LX176 . . . . .	FC420V
LX186 . . . . .	FC540V

MX,1010A1,A2 -19-21OCT92

10  
10  
2

**BASIC ENGINE APPLICATIONS  
CHART—CONTINUED**

**LAWN AND GARDEN TRACTORS**

Machine	Engine Model No.
240 .....	FC420V
245 .....	FC420V
260 .....	FC540V
265 .....	FC540V
GT262 .....	FC540V
GT242 .....	FC420V

**FRONT MOWERS**

Machine	Engine Model No.
F710 .....	FC540V

**GOLF AND TURF EQUIPMENT**

Machine	Engine Model No.
22 Greensmower .....	FG150G
22R Greensmower .....	FG150D
519 Walk-Behind Vertical Mower .....	FA210D
529 Vacuum Blower .....	FA210D
1200 Bunker and Field Rake .....	FE290R

**MISCELLANEOUS**

Machine	Engine Model No.
1000 Generator .....	FA130D
1400 Generator .....	FA130D
Power Pak Material Collection System .....	FA210D

**UTILITY VEHICLES**

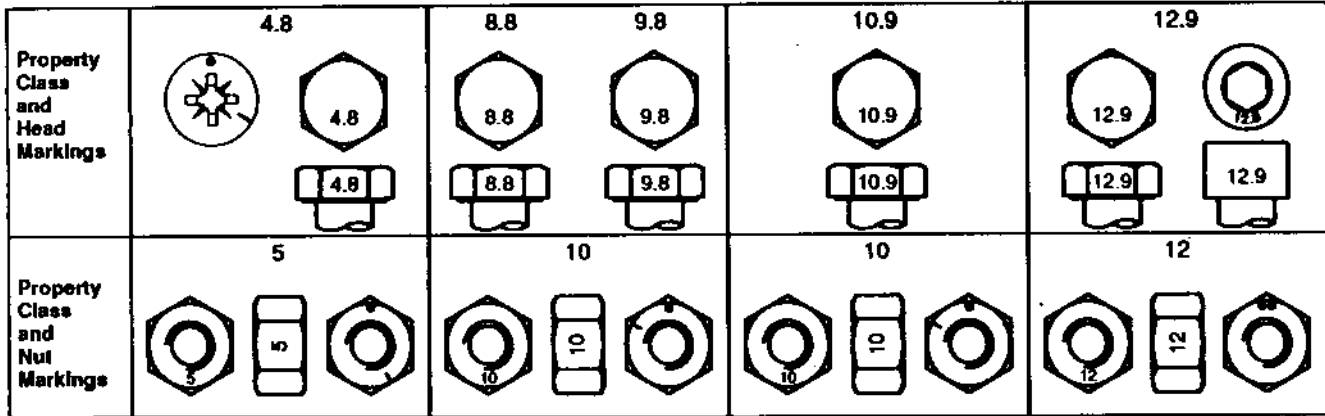
Machine	Engine Model No.
AMT600 .....	KF82D/FZ340D
AMT622 .....	FE290D
AMT626 .....	FE290D
Gator 4x2 .....	FE290D

MX,1010A1,A3 -19-21OCT92

10  
10  
3

**METRIC BOLT AND CAP SCREW TORQUE VALUES**

10  
10  
4



TS1163 -19-04MAR91

Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated <sup>a</sup>		Dry <sup>a</sup>		Lubricated <sup>a</sup>		Dry <sup>a</sup>		Lubricated <sup>a</sup>		Dry <sup>a</sup>		Lubricated <sup>a</sup>		Dry <sup>a</sup>	
	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	190
M16	100	73	125	92	190	140	240	175	275	200	350	225	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class.

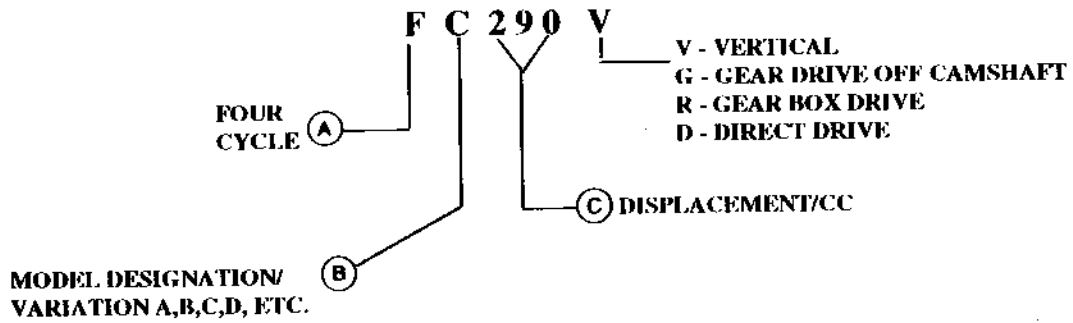
Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

Fasteners should be replaced with the same or higher property class. If higher property class fasteners are used, these should only be tightened to the strength of the original.

<sup>a</sup> "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

ENGINE DESIGNATION (KAWASAKI)

KAWASAKI ENGINE DESIGNATION



M46856

A—Four Cycle  
B—Model Designation

C—Displacement  
D—Direct Drive

R—Gear Box Drive  
G—Gear Drive Off Camshaft

V—Vertical

MX1020A1,A12 -19-21OCT92

10  
15  
1  
M46856 -19-15OCT92



**BUY NOW**

**Then Instant Download  
the Complete Manual  
Thank you very much!**