

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

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Previous Editions

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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

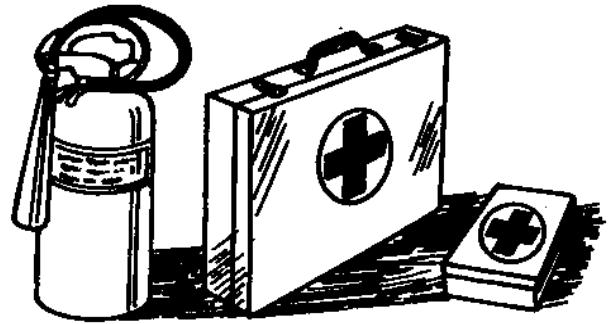
10
05
2

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

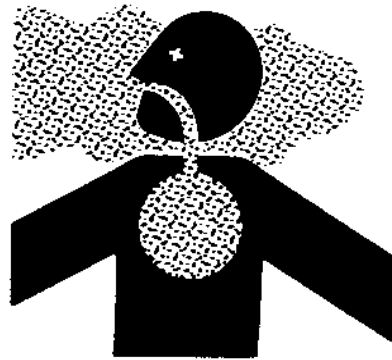
AVOID HARMFUL ASBESTOS DUST

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

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5
-UN-08NOV89
TS779

DISPOSE OF WASTE PROPERLY

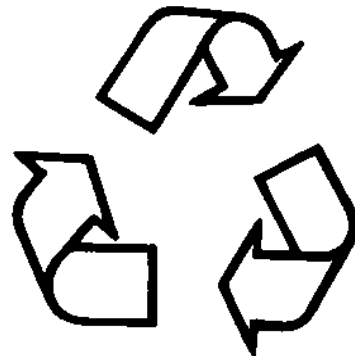
Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

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 ³ (7.92 cu. in.)	151 cm ³ (9.21 cu. in.)	153 cm ³ (9.30 cu. in.)	207 cm ³ (12.7 cu. in.)	207 cm ³ (12.7 cu. in.)	341 cm ³ (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 ³ (17.5 cu. in.)	286 cm ³ (17.5 cu. in.)	460 cm ³ (28.1 cu. in.)	400 cm ³ (24.4 cu. in.)	423 cm ³ (25.8 cu. in.)	535 cm ³ (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

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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

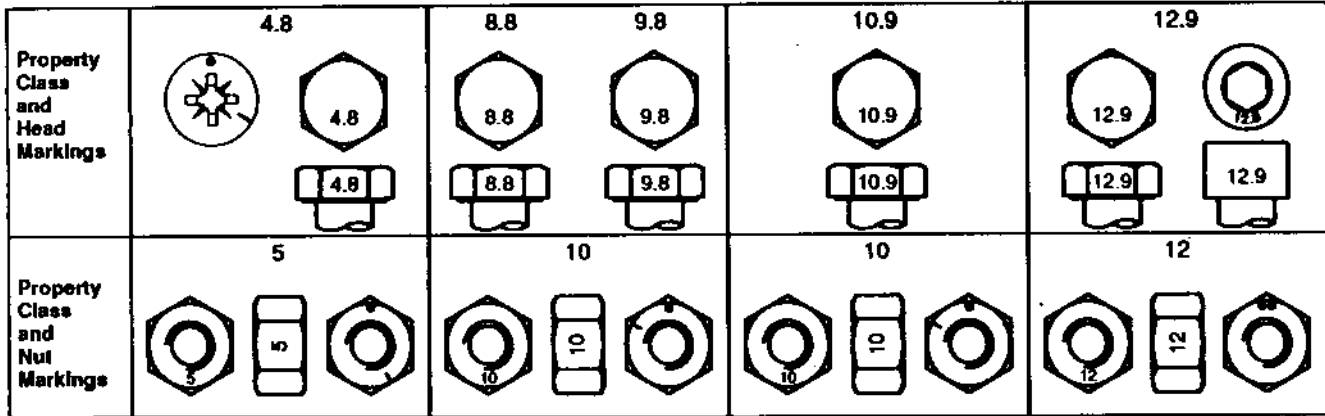
UTILITY VEHICLES

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

MX,1010A1,A3 -19-21OCT92

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 ^a		Dry ^a		Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a	
	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.

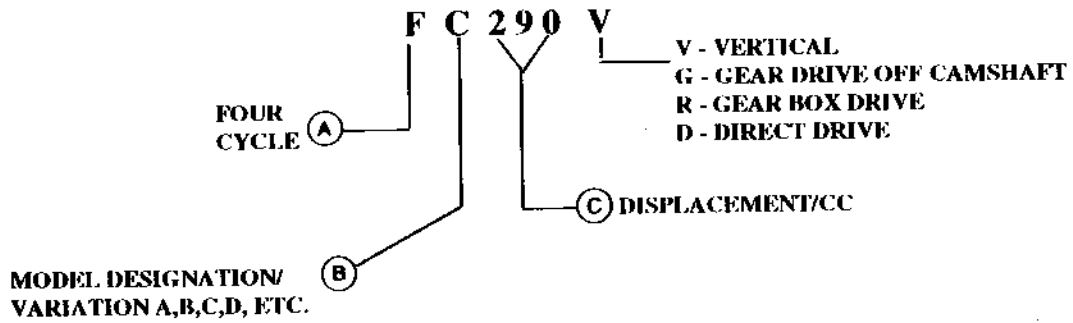
Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

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.

^a "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

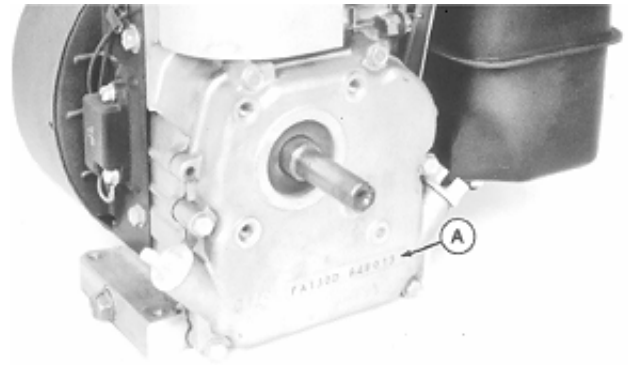
V—Vertical

MX1020A1,A12 -19-21OCT92

10
15
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M46856 -19-15OCT92

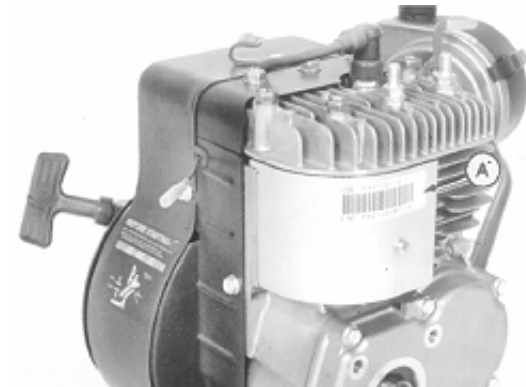
ENGINE SERIAL NUMBER LOCATION

The complete serial number (A) is used to identify the engine model, series, configuration, and serial number range. Have this number available when referring to a particular engine or requesting parts or service information.



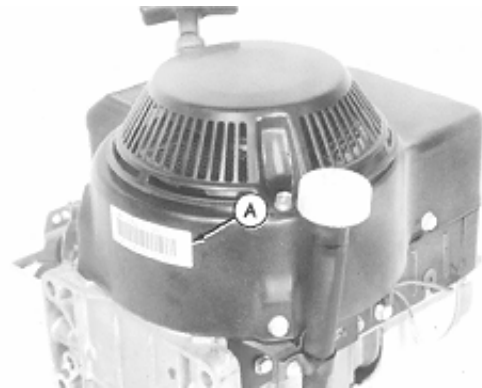
FA130D

M80492 -UN-07JUN91



FA210D

M80493 -UN-07JUN91



FA210V

M80494 -UN-07JUN91



FG150D/FG150G

M80495 -UN-07JUN91

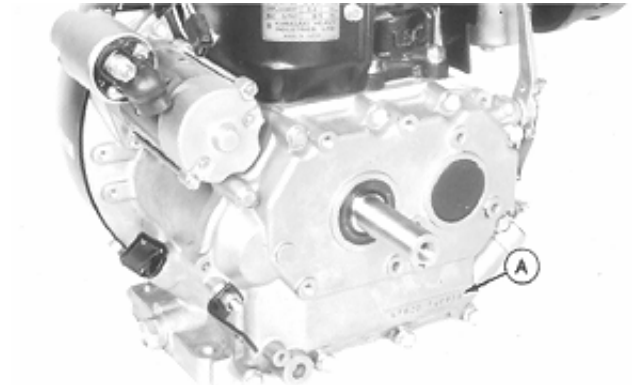
MX,1015A1,A1 -19-21OCT92

SERIAL NUMBER LOCATION—CONTINUED

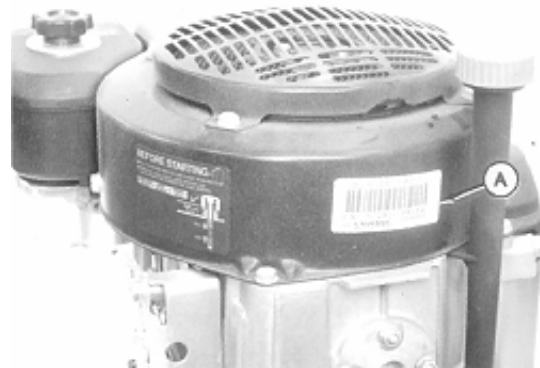
A—Serial Number Location



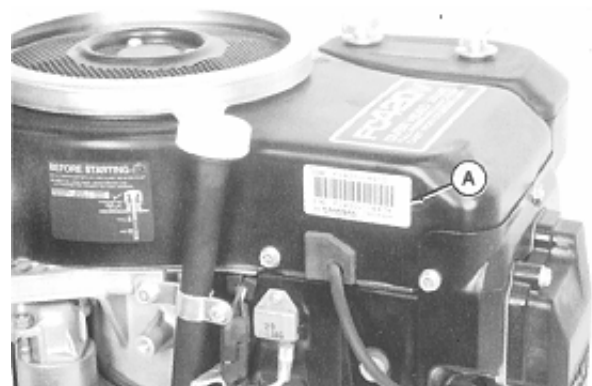
FC150V



KF82D/FZ340D



FC290V

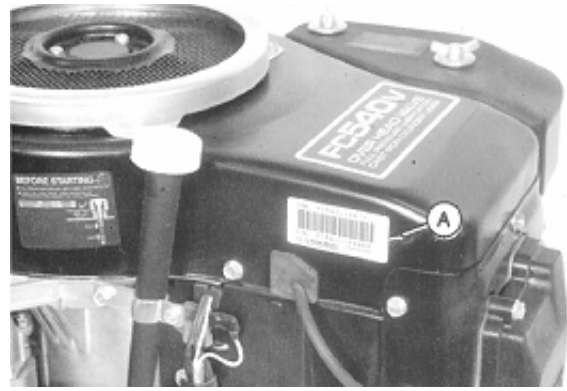


FC400V/FC420V

310
M80496 -UN-07JUN91
M80497 -UN-07JUN91
M80498 -UN-07JUN91
M80499 -UN-07JUN91

SERIAL NUMBER LOCATION—CONTINUED

A—Serial Number Location



FC540V

M80500 -UN-07JUN91



FE290D/FE290R

M80501 -UN-07JUN91



FB460V

M80502 -UN-07JUN91

MX,1015A1,A3 -19-21OCT92

10
15
4

CARBURETOR SERIAL NUMBER LOCATION

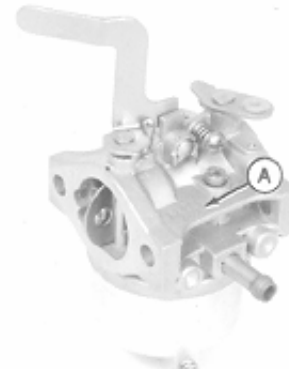
NOTE: FA130D carburetor shown is used on FA130D-AS16/AS19 and FA210D-AS20 engines. FA130D-AN00 carburetor not shown.

FA210D carburetor shown is used on FA210D-AS17/BS17/CS17 engines. FA210D-AS19-01 carburetor not shown.

The serial number (A) is used to identify the carburetor. Have this number available when requesting parts or service information.



FA130D



FA210D



FA210V



FG150G/FG150D

51510
-UN-07JUN91
M80503
-UN-07JUN91
M80504
-UN-07JUN91
M80505
-UN-07JUN91
M80506

CARBURETOR SERIAL NUMBER LOCATION—CONTINUED

A—Serial Number Location



FC150V

M80507 -UN-07JUN91



KF82D/FZ340D

M80508 -UN-07JUN91



FC290V

M80509 -UN-07JUN91



FC400V/FC420V

M80510 -UN-07JUN91

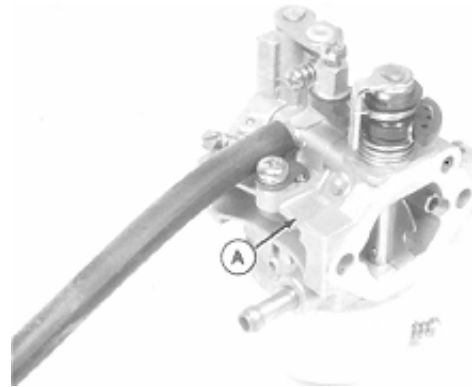
MX,1015A1,A5 -19-21OCT92

CARBURETOR SERIAL NUMBER LOCATION—CONTINUED

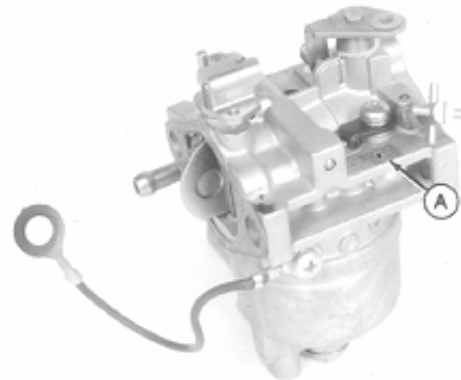
A—Serial Number Location



FC540V



FE290D/FE290R



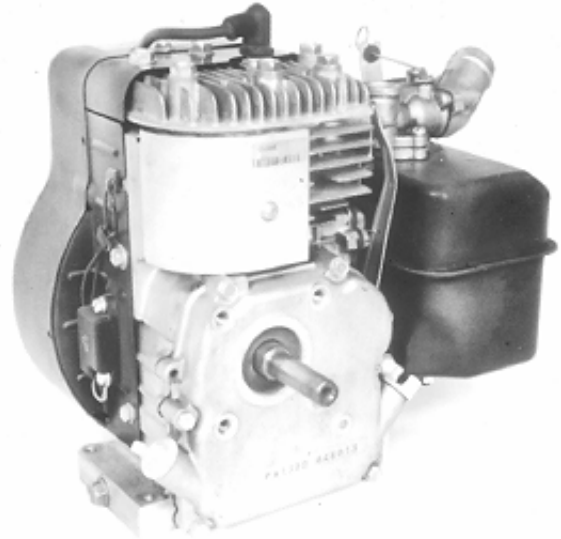
FB460V

MX,1015A1,A6 -19-21OCT92

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7
-UN-07JUN91
M80511
-UN-07JUN91
M80512
-UN-07JUN91
M80513

FA130D ENGINE FEATURES

- 2.3 kW (3.1 hp)
- Pulse Pump carburetor (FA130D-AS16/AS19)
Float type carburetor (FA130D-AN00)
- Two stage air filter with dry paper filter
and foam precleaner (FA130D-AS16)
Single stage foam air filter (FA130D-AN00)
- Side valves
- Horizontal crankshaft
- Aluminum block
- Splash lubrication
- Low oil level sensor (FA130D-AN00)
- Electronic ignition
- Recoil starter

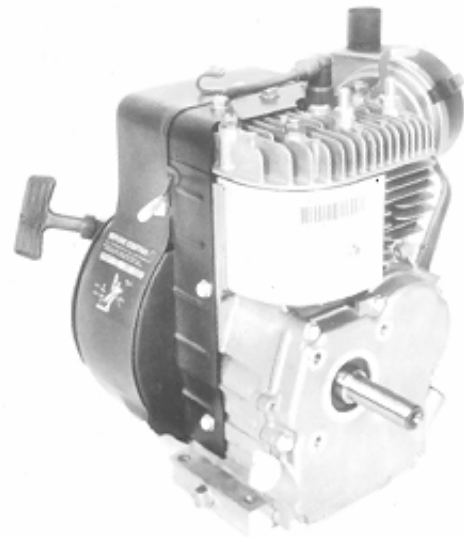


MX,1020A1,A1 -19-21OCT92

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M80514
-UN-07-JUN91

FA210D ENGINE FEATURES

- 3.9 kW (5.2 hp)
- Fuel pump (FA210D-AS17/BS17/CS17)
- Pulse pump carburetor (FA210D-AS20)
Float type carburetor
(FA210D-AS17/BS17/CS17 & FA210D-AS19-01)
- Two stage air filter with dry paper
filter and foam precleaner
- Side valves
- Compression release mechanism
(FA210D-AS20)
- Horizontal crankshaft
- Aluminum block
- Splash lubrication
- Electronic ignition
- Recoil starter

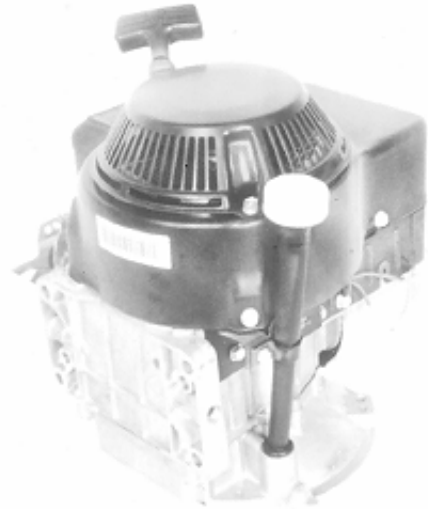


MX,1020A1,A2 -19-21OCT92

M80515
-UN-07-JUN91

FA210V ENGINE FEATURES

- 4.5 kW (6 hp)
- Float type carburetor
- Two stage air filter with dry paper filter and foam precleaner
- Side valves
- Compression release mechanism
- Vertical crankshaft
- Aluminum block
- Splash lubrication
- Electronic ignition
- Recoil starter



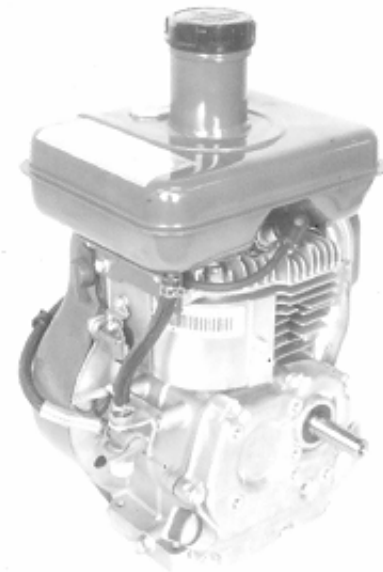
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-UN-07JUN91

MX,1020A1,A3 -19-21OCT92

FG150G/FG150D ENGINE FEATURES

NOTE: Engines are the same except FG150G engine is camshaft driven and FG150D engine is crankshaft driven.

- 2.7 kW (3.6 hp)
- Float type carburetor
- Two stage air filter with dry paper filter and foam precleaner
- Side valves
- Horizontal crankshaft
- Aluminum block
- Cast-iron cylinder liner
- Electronic ignition
- Recoil starter



FG150G Shown

MX,1020A1,A4 -19-21OCT92

M80517
-UN-07JUN91

FC150V ENGINE FEATURES

- 3.4 kW (4.5 hp)
- 3.7 kW (5.0 hp) (FS01 and ES06)
- Float type carburetor
- Two stage air filter with dry paper filter and foam precleaner
- Flywheel brake (option)
- Overhead valves
- Compression release mechanism
- Vertical crankshaft
- Aluminum block
- Cast-iron cylinder liner
- Splash (AS00 and AS01)
- Full pressure lubrication
- Oil filter (optional)
- Electronic ignition
- Regulated charging system
- Recoil starter
- Electric starter (option)



MX,1020A1,A5 -19-21OCT92

KF82D/FZ340D ENGINE FEATURES

- 6.3 kW (8.5 hp)
- Float type carburetor
- Two stage air filter with dry paper filter and foam precleaner
- Side valves
- Horizontal crankshaft
- Dynamic balancer shaft
- Cast-iron cylinder block
- Aluminum crankcase
- Splash lubrication
- CDI ignition
- Regulated charging system
- Electric starter

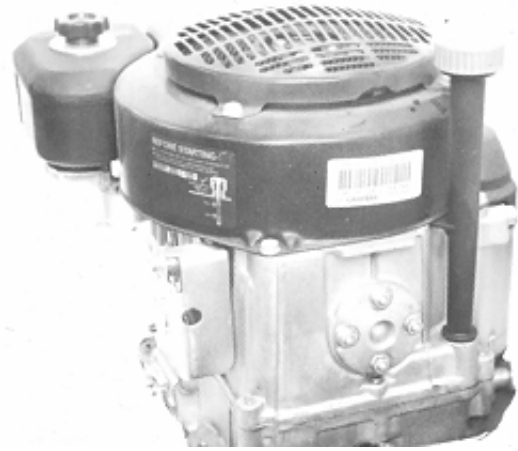


MX,1020A1,A6 -19-21OCT92

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4

FC290V ENGINE FEATURES

- 6.7 kW (9 hp)
- Float type carburetor
- Two stage air filter with dry paper filter and foam precleaner
- Overhead valves
- Compression release mechanism
- Vertical crankshaft with reciprocating balancer
- Aluminum block
- Cast-iron cylinder liner
- Splash lubrication
- Electronic ignition
- Regulated charging system
- Recoil starter
- Electric starter (optional)

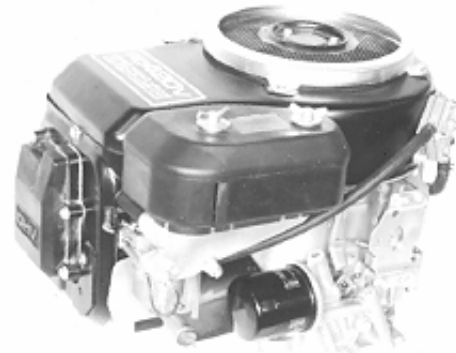


M80213 -UN-19JUN91

MX,1020A1,A7 -19-21OCT92

FC400V ENGINE FEATURES

- 9.3 kW (12.5 hp)
- Float type carburetor
- Two stage air-filter with dry paper filter and foam precleaner
- Overhead valves
- Compression release mechanism
- Vertical crankshaft with reciprocating balancer
- Aluminum block
- Cast-iron cylinder liner
- Full pressure lubrication
- Oil filter
- Solid-state ignition
- Regulated charging system
- Recoil start
- Electric starter (optional)

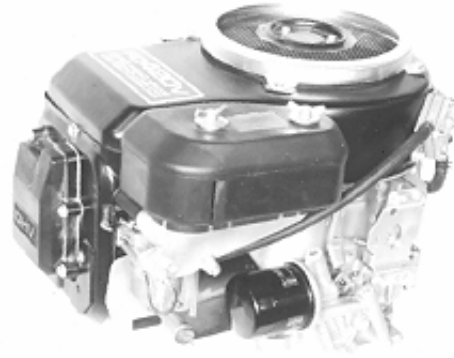


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MX,1020A1,A8 -19-21OCT92

FC420V ENGINE FEATURES

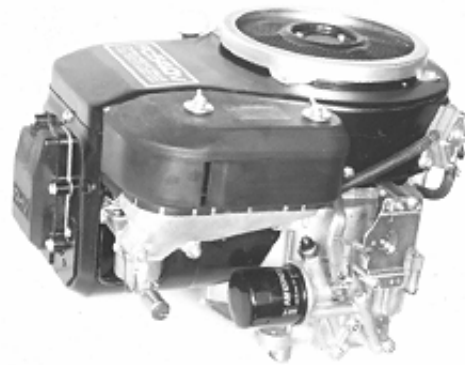
- 10.4 kW (14 hp)
- Float type carburetor
- Two stage air-filter with dry paper filter and foam precleaner
- Overhead valves
- Compression release mechanism
- Vertical crankshaft with reciprocating balancer
- Aluminum block
- Cast-iron cylinder liner
- Full pressure lubrication
- Oil filter
- Solid-state ignition
- Regulated charging system
- Recoil start
- Electric starter (optional)



MX,1020A1,A8A -19-21OCT92

FC540V ENGINE FEATURES

- 12.6 kW (17 hp)
- 13 kW (17.5 hp) (Engine version AS12)
- Float type carburetor
- Two stage air filter with dry paper filter and foam precleaner
- Overhead valves
- Compression release mechanism
- Vertical crankshaft with reciprocating balancer
- Aluminum block
- Cast-iron cylinder liner
- Full pressure lubrication
- Oil filter
- Solid-state ignition
- Regulated charging system
- Electric starter

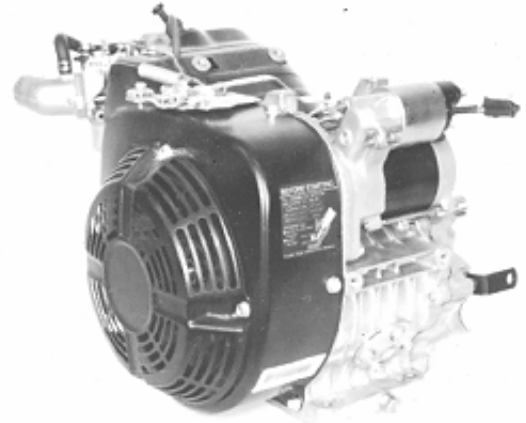


MX,1020A1,A9 -19-21OCT92

FE290D/FE290R ENGINE FEATURES

NOTE: Engines are the same except, FE290R can be equipped with a reduction gearbox. Gearbox attaches to crankcase cover.

- 7.5 kW (10 hp)
- Float type carburetor
- Overhead valves
- Compression release mechanism
- Horizontal crankshaft with reciprocating balancer
- Aluminum block
- Cast-iron cylinder liner
- Full pressure lubrication
- Oil filter (optional)
- Solid-state ignition
- Regulated charging system
- Recoil starter (optional)
- Electric starter



-UN-19JUN91

M80216

MX,1020A1,A10 -19-21OCT92

FB460V ENGINE FEATURES

- 9.3 kW (12.5 hp)
- Fuel pump
- Float type carburetor
- Two stage air filter with dry paper filter and foam precleaner
- Side valves
- Compression release mechanism
- Vertical crankshaft with reciprocating balancer
- Aluminum block
- Cast-iron cylinder liner
- Full pressure lubrication
- Oil filter (optional)
- Electronic ignition
- Regulated charging system
- Recoil starter
- Electric starter (optional)

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Section 20

FA130D and FA210D

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Group 00

Engine Application and Repair Specifications

ENGINE APPLICATIONS CHART

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

Machine	Engine Model No.
3K Lawn Edger	FA130D-AS16
E35 Lawn Edger	FA130D-AS19
1000/1400 Generators	FA130D-AN00
20SR7 Reel Mower	FA130D-AS16
519 Walk-Behind Vertical Mower	FA210D-AS20
529 Vacuum Blower	FA210D-AS19-01
 Power Pak Material Collection System	
(Engine S.N. —254693)	FA210D-AS17
(Engine S.N. 254694—289197)	FA210D-BS17
(Engine S.N. 289198—)	FA210D-CS17

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