JOHN DEERE

WORLDWIDE COMMERCIAL & CONSUMER EQUIPMENT DIVISION

325 and 345
Lawn and Garden Tractors

TM1574 Feb-95

TECHNICAL MANUAL

JOHN DEERE

Litho in U.S.A.

325 M82900

345 M82901

This technical manual is written for an experieced technician and contains sections that are specifically for this product. It is a part of a total product support program.

The manual is organized so that all the information on a particular system is kept together. The order of grouping is as follows:

- Table of Contents
- Specifications
- Component Location
- System Schematic
- Theory of Operation
- Troubleshooting Chart
- Diagnostics
- Tests and Adjustments
- Repair

NOTE: Depending on the particular section or system being covered, not all of the above groups may be used.

Each section will be identified with a symbol rather than a number. The groups and pages within a section will be consecutively numbered.

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.

We appreciate your input on this manual. To help, there are postage paid post cards included at the back. If you find any errors or want to comment on the layout of the manual please fill out one of the cards and mail it back to us.

RECOGNIZE SAFETY INFORMATION

T81389

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.

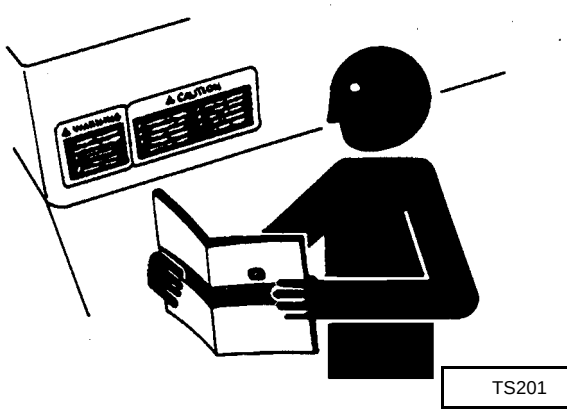
Follow recommended precautions and safe servicing practices.

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.

REPLACE SAFETY SIGNS

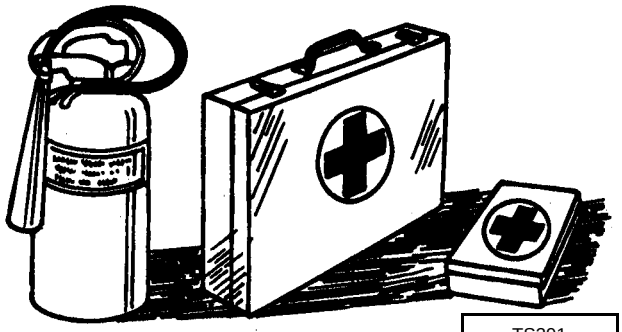


TS201

Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.

HANDLE FLUIDS SAFELY-AVOID FIRES

Be Prepared For Emergencies



TS291

TS227

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.

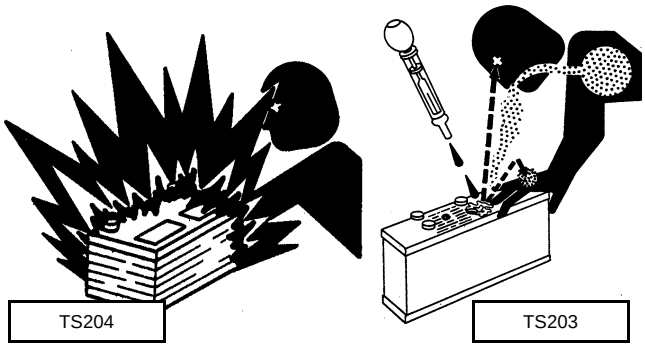
Do not store oily rags; they can ignite and burn spontaneously.

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.

USE CARE IN HANDLING AND SERVICING BATTERIES



Prevent Battery Explosions

- Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.
- Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.
- Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).

Prevent Acid Burns

- Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.
- **Avoid acid burns by:**

1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

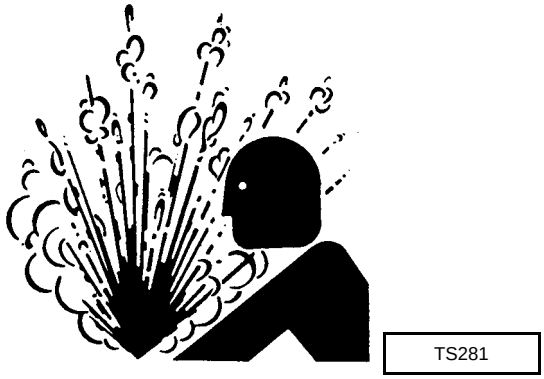
- **If you spill acid on yourself:**

1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush your eyes with water for 15-30 minutes.
4. Get medical attention immediately.

- **If acid is swallowed:**

1. Do not induce vomiting.
2. Drink large amounts of water or milk, but do not exceed 1.9 L (2 quarts).
3. Get medical attention immediately.

SERVICE COOLING SYSTEM SAFELY



Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off machine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.

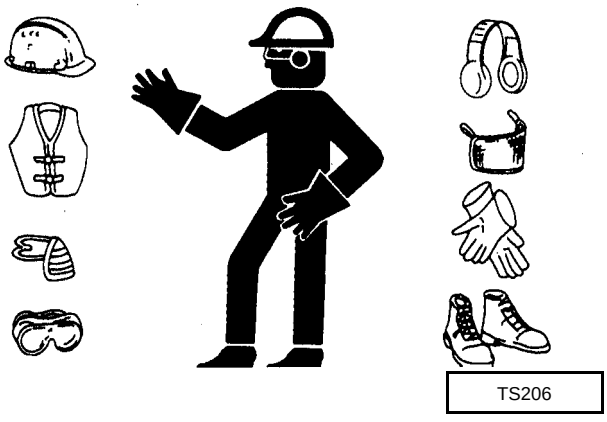
USE SAFE SERVICE PROCEDURES

Wear Protective Clothing

Wear close fitting clothing and safety equipment appropriate to the job.

Prolonged exposure to loud noise can cause impairment or loss of hearing. Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.

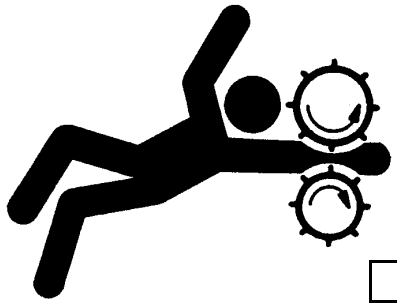
Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.



Service Machine Safely

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.

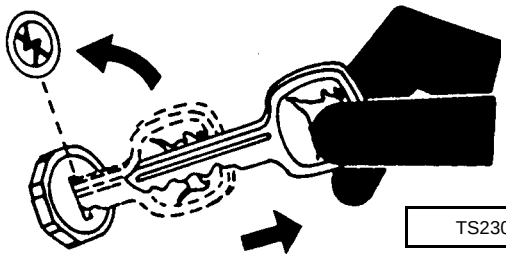


TS228

Use Proper Tools

Use tools appropriate to the work. Makeshift tools 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. Use only service parts meeting John Deere specifications.

Park Machine Safely

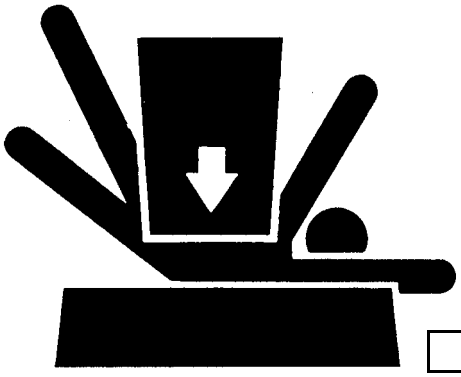


TS230

- **Before working on the machine:**

1. Lower all equipment to the ground.
2. Stop the machine and remove the key.
3. Disconnect the battery ground strap.
4. Hang a “DO NOT OPERATE” tag in operator station.

Support Machine Properly and Use Proper Lifting Equipment



TS229

If you must work on a lifted machine or attachment, securely support the machine or attachment.

Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under continuous load. Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.

Lifting heavy components incorrectly can cause severe injury or machine damage. Follow recommended procedure for removal and installation of components in the manual.

Work In A Clean Area

- **Before starting a job:**

1. Clean work area and machine.
2. Make sure you have all necessary tools to do your job.
3. Have the right parts on hand.
4. Read all instructions thoroughly; do not attempt shortcuts.

Illuminate Work Area Safely

Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.

Work In A Ventilated Area

TS220

Engine exhaust fumes can cause sickness or death. If it is necessary to run an engine in an enclosed area, remove the exhaust fumes from the area with an exhaust pipe extension.

If you do not have an exhaust pipe extension, open the doors and get outside air into the area.

Remove Paint Before Welding Or Heating

Avoid potentially toxic fumes and dust. Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch. Do all work outside or in a well ventilated area. Dispose of paint and solvent properly. Remove paint before welding or heating: If you sand or grind paint, avoid breathing the dust. Wear an approved respirator. If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

SERVICE TIRES SAFELY

TS952

Explosive separation of a tire and rim parts can cause serious injury or death.

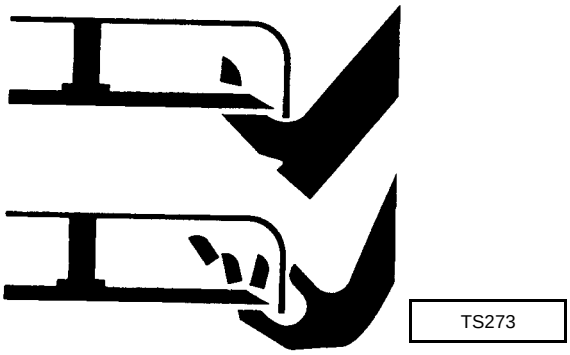
Do not attempt to mount tire unless you have the proper equipment and experience to perform the job.

Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure. Never weld or heat a wheel and tire assembly. The heat can cause an increase in tire pressure resulting in a tire explosion. Welding can structurally weaken or deform the wheel.

When inflating tires, use a clip-on chuck and extension hose long enough to allow you stand to one side and NOT in front of or over the tire assembly. Use a safety cage if available.

Check wheels for low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.

AVOID INJURY FROM ROTATING BLADES

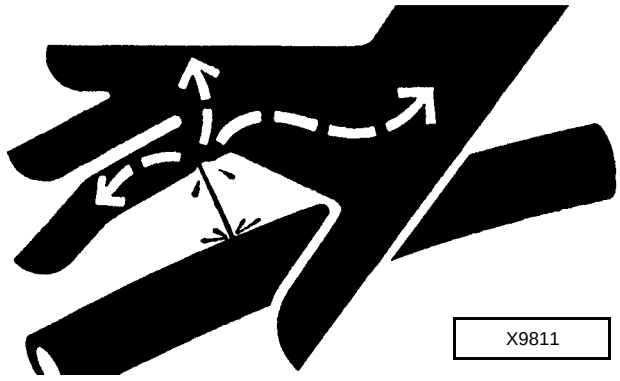


TS273

Keep hands and feet away while machine is running. Shut off power to service, lubricate or unlatch mower decks.

USE CARE AROUND HIGH-PRESSURE FLUID LINES

Avoid High-Pressure Fluids



X9811

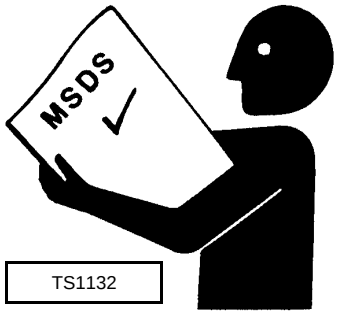
Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

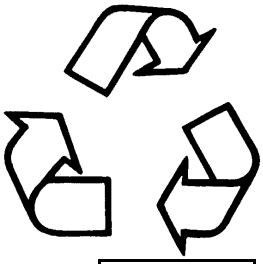
Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

HANDLE CHEMICAL PRODUCTS SAFELY



TS1132


TS1133

Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with John Deere equipment include such items as lubricants, coolants, paints, and adhesives.

A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques. Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and recommended equipment.

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

LIVE WITH SAFETY

TS231

Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.

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CONTENTS

VEHICLE SPECIFICATIONS

ENGINE- 325

Make	John Deere “K” Series, Air Cooled
Type	Gasoline
Model	FC540V-AS15
Aspiration	Natural
Horsepower (SAEJ1940)	12.6 kW (17 HP)
Cylinders	1
Displacement	535 cm^3 (32.6 cu. in.)
Stroke/Cycle	4 Cycle
Bore	89 mm (3.500 in.)
Stroke	86 mm (3.360 in.)
Compression Ratio	8.3:1
Slow Idle	1550 ± 75 rpm
Fast Idle	3350 ± 50 rpm
Valves	Overhead
Lubrication	Pressurized
Oil Filter	Full Flow Filter
Cooling System	Air Cooled
Air Cleaner	Dual Stage Paper Air Filter and Foam Precleaner
Muffler	Horizontal discharge below frame
Engine Oil Capacity	
With Filter	1.8 L (3.8 U.S. pt)
Without Filter	1.6 L (3.4 U.S. pt)

ENGINE- 345

Make	John Deere “K” Series, Liquid Cooled
Type	Gasoline
Model	FC590V-AS04
Aspiration	Natural
Horsepower (SAEJ1940)	13.4 kW (18 HP)
Cylinders	2, V-twin
Displacement	585 cm^3 (35.7 cu. in.)
Stroke/Cycle	4 Cycle
Bore	74 mm (2.900 in.)
Stroke	68 mm (2.700 in.)
Compression Ratio	8.7:1
Slow Idle	1550 ± 75 rpm
Fast Idle	3400 ± 75 rpm
Valves	Overhead
Lubrication	Pressurized
Oil Filter	Full Flow Filter
Cooling System	Liquid Cooled
Coolant Capacity	3.1 L (3.3 qt)
Air Cleaner	Dual Stage Paper Air Filter and Foam Precleaner
Muffler	Horizontal discharge below frame
Engine Oil Capacity	
With Filter	1.9 L (4.0 U.S. pt)
Without Filter	1.7 L (3.6 U.S. pt)

FUEL SYSTEM

Fuel Tank Location . . . . . Rear
Fuel Tank Capacity (Total) . . . . . 13.2 L (3.50 U.S. gal)
Fuel (min. octane) . . . . . Unleaded gasoline, 87 octane
Fuel Pump
  Location
    325 . . . . . On Left-hand Side of Engine
    345 . . . . . On Front of Engine
  Type
    325 . . . . . Diaphragm Vacuum Pulse
    345 . . . . . Mechanical
Fuel Delivery . . . . . Float-Type Side Draft Carburetor
Fuel Shut-Off . . . . . Fuel Shutoff Solenoid (325)
Fuel Filter . . . . . Replaceable, In-line
Fuel Gauge . . . . . Translucent Fuel Tank

ELECTRICAL

Ignition . . . . . Electronic
Type of Starter . . . . . Solenoid Shift
Charging System . . . . . Flywheel Alternator
Charging Capacity:
  325 . . . . . 15 amp Regulated
  345 . . . . . 17 amp Regulated
Battery Type . . . . . BCI Group, 45
Battery Voltage 12V
Battery Reserve Capacity at 25 amp . . . . . 76 minutes
Battery Cold Cranking amps at 0° F . . . . . 470 amps
Headlights . . . . . Incandescent, Standard (Halogen Bulbs, Optional)
Indicator Lights . . . . . Engine Oil Pressure, Battery Charge, Coolant Temperature (345)
Gauges . . . . . Hourmeter
Ignition Interlock Switches . . . . . Neutral Start, Operator Presence

PTO DRIVE

Type . . . . . V-Belt
Clutch Type . . . . . Engine Mounted, Electric

POWER TRAIN

Drive Wheels . . . . . Rear
Traction Drive . . . . . Hydrostatic, Twin Touch Foot Control
Transmission . . . . . Hydrostatic, Piston Type
Transmission Drive . . . . . Belt
Transmission Filter . . . . . Replaceable Internal Cartridge
Fan Blade Size . . . . . 9 in. Diameter
Transmission Lubricant Capacity . . . . . 4.3 L (4.7 qt)
Axle Type/Wheel Hubs . . . . . Straight with Separate 5-Bolt Hubs
Cruise Control . . . . . Forward Travel, Lever on Dash
Travel Speeds at Full RPM
  Forward . . . . . 0—11.2 km/h (0—7 mph)
  Reverse . . . . . 0—6.4 km/h (0—4 mph)

STEERING

Type:
- 325 . . . . . Manual, Sealed Gearbox
- 345 . . . . . Power, Hydraulic, Front Wheels

Tilt Wheel . . . . . 5 Position

BRAKES

Location. . . . . .Transmission
Type. . . . . Internal Wet Disk, Single Pedal
Parking Brake . . . . . Brake Pedal Lock Lever

HYDRAULICS

System . . . . . Lift and Steering (345)
Lift Control Valve
- Type . . . . . Mechanical, Spool Valve
- Location . . . . . Under Tunnel Cover

Cutting Unit Lift . . . . . Rear Cylinder
Filter . . . . . .10 Micron, Replaceable, In-Line

IMPLEMENT LIFT

Lift System . . . . . Hydraulic with Depth Stop
Lift Lever Location. . . . . Right-hand Side of Dash
Cutting Heights . . . . . .12.7—143.3 mm (6.35 mm increments)
0.500—4.500 in. (0.250 in. increments)

MOWER ATTACHMENTS

Cutting Unit Drive . . . . . .Belt

WEIGHTS AND DIMENSIONS

Net Weight (less attachments and fuel)
- 325 . . . . . 291 kg (642 lbs)
- 345 . . . . . 317 kg (699 lbs)

Mower Deck Weight
- 38-Inch Mower Deck. . . . . 43 kg (95 lbs)
- 44-Inch Mower Deck. . . . . 49 kg (108 lbs)
- 48-Inch Mower Deck. . . . . 57 kg (125 lbs)
- 54-Inch Mower Deck. . . . . 64 kg (140 lbs)

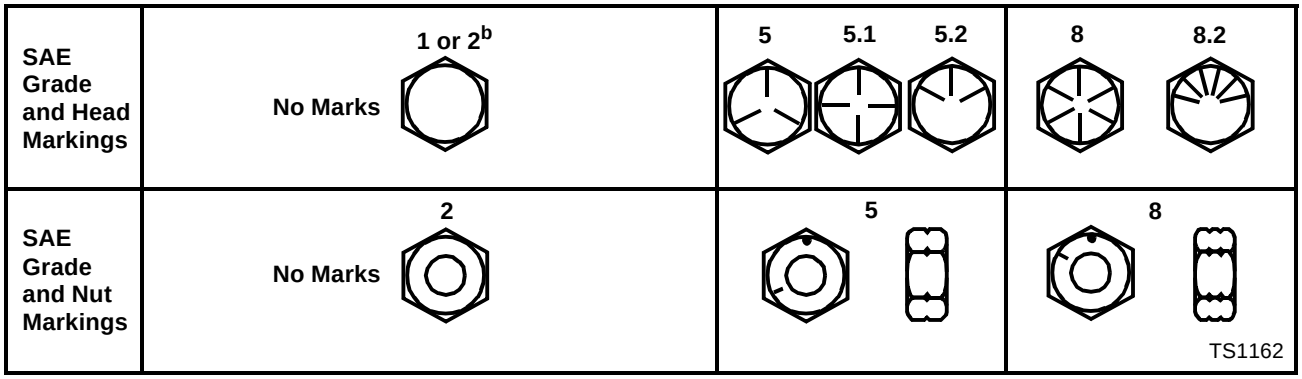
Wheel Base. . . . . .1.28 m (47.900 in.)
Tread Width. . . . . 0.74 m (29 in.)
Turning Radius (inside rear wheel) . . . . . 0.64 m (25 in.)
Overall Length. . . . . .1.84 m (72.250 in.)
Overall Height . . . . . .1.11 m (43.6 in.)
Overall Width (less attachments) . . . . . .0.99—1.05 m (39—41.5 in.)
- With 38-Inch Mower Deck. . . . . .1.33 m (52.600 in.)
- With 44-Inch Mower Deck. . . . . .1.16 m (45.700 in.)
- With 48-Inch Mower Deck. . . . . 1.52 m (60 in.)
- With 54-Inch Mower Deck. . . . . 1.68 m (66 in.)

WHEELS AND TIRES

Front . . . . . 16 x 6.50-8.00, 2 or 4 ply, Turf
Rear . . . . . 23 x 10.50-12.00, Turf or Bar

(Specifications and design subject to change without notice.)

METRIC BOLT AND CAP SCREW TORQUE VALUES



	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]	
Size	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	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	255	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.

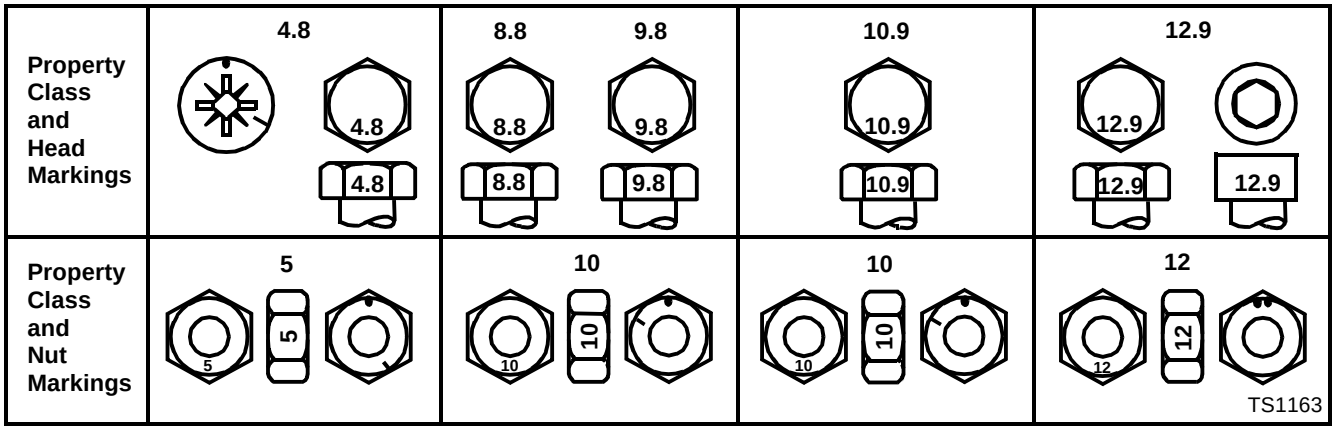
Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original. Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

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.

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.*

UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES



	Grade 1				Grade 2[b]				Grade 5, 5.1 or 5.2				Grade 8 or 8.2			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
Size	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft
1/4	3.7	2.8	4.7	3.5	6	4.5	7.5	5.5	9.5	7	12	9	13.5	10	17	12.5
5/16	7.7	5.5	10	7	12	9	15	11	20	15	25	18	28	21	35	26
3/8	14	10	17	13	22	16	27	20	35	26	44	33	50	36	63	46
7/16	22	16	28	20	35	26	44	32	55	41	70	52	80	58	100	75
1/2	33	25	42	31	53	39	67	50	85	63	110	80	120	90	150	115
9/16	48	36	60	45	75	56	95	70	125	90	155	115	175	130	225	160
5/8	67	50	85	62	105	78	135	100	170	125	215	160	240	175	300	225
3/4	120	87	150	110	190	140	240	175	300	225	375	280	425	310	550	400
7/8	190	140	240	175	190	140	240	175	490	360	625	450	700	500	875	650
1	290	210	360	270	290	210	360	270	725	540	925	675	1050	750	1300	975
1-1/8	470	300	510	375	470	300	510	375	900	675	1150	850	1450	1075	1850	1350
1-1/4	570	425	725	530	570	425	725	530	1300	950	1650	1200	2050	1500	2600	1950
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2150	1550	2700	2000	3400	2550
1-1/2	1000	725	1250	925	990	725	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

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.

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

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original. Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

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.

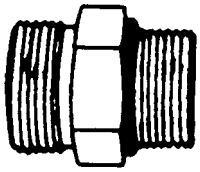
a *"Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.*

b *Grade 2 applies for hex cap screws (not hex bolts) up to 152 mm (6 in.) long. Grade 1 applies for hex cap screws over 152 mm (6 in.) long, and for all other types of bolts and screws of any length.*

SERVICE RECOMENDATIONS FOR O-RING BOSS FITTINGS

Straight Fitting

1. Inspect O-ring boss seal for dirt or defects.
2. Lubricate O-rings with petroleum jelly. Place electrical tape over threads to protect O-ring. Slide O-ring over tape and into O-ring groove of fitting. Remove tape.
3. Tighten fitting to torque value shown on chart.



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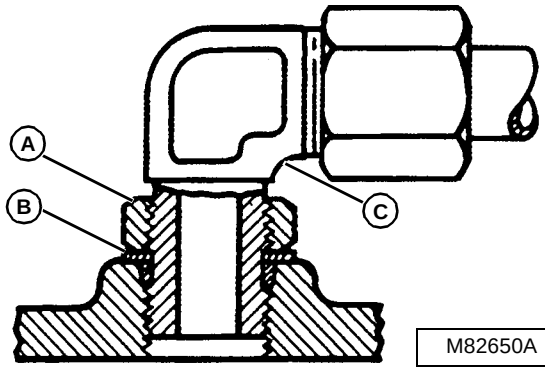
Angle Fitting

1. Back-off lock nut (A) and back-up washer (B) completely to head-end (C) of fitting.
2. Turn fitting into threaded boss until back-up washer contacts face of boss.
3. Turn fitting head-end counterclockwise to proper index (maximum of one turn).
4. Hold fitting head-end with a wrench and tighten locknut and back-up washer to proper torque value.



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NOTE: Do not allow hoses to twist when tightening fittings.

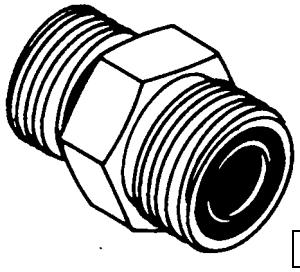
TORQUE VALUE

Thread Size	N•m	lb-ft
3/8-24 UNF	8	6
7/16-20 UNF	12	9
1/2-20 UNF	16	12
9/16-18 UNF	24	18
3/4-16 UNF	46	34
7/8-14UNF	62	46
1-1/16-12 UN	102	75
1-3/16-12 UN	122	90
1-5/16-12 UN	142	105
1-5/8-12 UN	190	140
1-7/8-12 UN	217	160

NOTE: Torque tolerance is ± 10%

SERVICE RECOMENDATIONS FOR FLAT FACE O-RING SEAL FITTINGS

1. Inspect the fitting sealing surfaces. They must be free of dirt or defects.
2. Inspect the O-ring. It must be free of damage or defects.
3. Lubricate O-rings and install into groove using petroleum jelly to hold in place.
4. Push O-ring into the groove with plenty of petroleum jelly so O-ring is not displaced during assembly.
5. Index angle fittings and tighten by hand pressing joint together to insure O-ring remains in place.
6. Tighten fitting or nut to torque value shown on the chart per dash size stamped on the fitting. Do not allow hoses to twist when tightening fittings.



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FLAT FACE O-RING SEAL FITTING TORQUE

Nominal Tube O.D.		Dash Size	Thread Size (in.)	Swivel Nut Torque		Bulkhead Nut Torque	
mm	(in.)			N•m	(lb-ft)	N•m	(lb-ft)
6.35	0.250	-4	9/16-18	16	12	5.0	3.5
9.52	0.375	-6	11/16-16	24	18	9.0	6.5
12.70	0.500	-8	13/16-16	50	51	17.0	12.5
15.88	0.625	-10	1-14	69	51	17.0	12.5
19.05	0.750	-12	1-3/16-12	102	75	17.0	12.5
22.22	0.875	-14	1-3/16-12	102	75	17.0	12.5
25.40	1.000	-16	1-7/16-12	142	105	17.0	12.5
31.75	1.250	-20	1-11/16-12	190	140	17.0	12.5
38.10	1.500	-24	2-12	217	160	17.0	12.5

NOTE: Torque tolerance is +15 -20%.

GASOLINE

C CAUTION

Handle fuel with care, it is highly flammable. DO NOT refuel machine:

- **Indoors. Always fill fuel tank outdoors.**
- **While you smoke.**
- **When machine is near an open flame or sparks.**
- **When engine is running. STOP engine.**
- **When engine is hot. Allow to cool.**

Help prevent fires:

- **Fill fuel tank only to bottom of filler neck.**
- **Clean oil, grease and dirt from machine.**
- **Clean up spilled fuel immediately.**
- **Do not store machine with fuel in tank in a building where fumes may reach an open flame or spark.**

To prevent fire and explosion caused by static electric discharge while you fill tank:

- **Use approved, non-metal fuel container.**
- **When using a funnel, MAKE SURE it is PLASTIC.**
- **Avoid using a funnel which has a metal screen or filter.**

IMPORTANT: To avoid engine damage:

- DO NOT mix oil with gasoline.
- Use only clean approved containers and funnels.
- Store oil and fuel in an area protected from dust, moisture and other contamination.

Unleaded fuel is recommended because it burns cleaner and leaves less unburned deposits in engine combustion chamber. Regular leaded gasoline with an anti-knock index of 87 or higher may be used. Use of gasohol is acceptable as long as the ethyl alcohol blend does not exceed 11 percent. Unleaded gasohol is preferred over leaded gasohol.

Fill fuel tank at the end of each day's operation. Fill only to bottom of filler neck. Fuel tank capacity is 10.4 L (2.75 U.S. gal).

FUEL STORAGE

Keep fuel in a clean container in a protected area. Water and sediment must be bromated before fuel gets to the engine. Do not use deicers to remove water from fuel. Do not depend on fuel filters to remove water.

If possible, install a water separator at the storage tank outlet.

IMPORTANT: Keep all dirt, scale, water or other foreign material out of fuel.

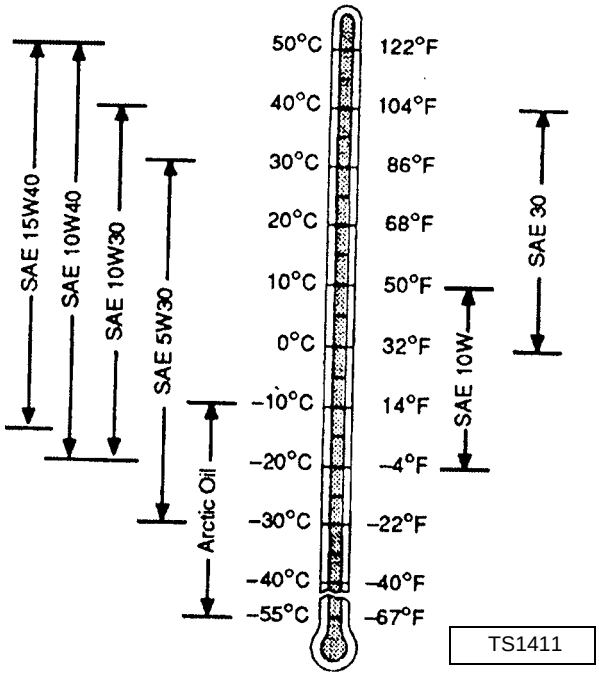
If machine is stored during the winter, add TY6295 John Deere Gasoline Storage Stabilizer or an equivalent to the fuel. Follow directions on the can.

ENGINE OIL

Use oil viscosity based on the expected air temperature range during the period between oil changes.

The following oil is preferred:

- John Deere PLUS-4®.



Other oils may be used if they meet one of the following:

- API Service Classification SG
- API Service Classification SF
- CCMC Specification G4

Oils meeting Military Specification MIL-L-46167B may be used as arctic oils.

ENGINE COOLANT—345

Use ethylene glycol base coolant. These coolants usually have labels stating “For Automobile and Light Duty Service.” These product are also often labels for use in aluminum engines. Check container label before using.

IMPORTANT: To prevent engine damage, DO NOT use pure antifreeze or more than 50 percent antifreeze in the cooling system. DO NOT mix or add any other type additives to the cooling system.

Mix approximately 50 percent antifreeze with 50 percent distilled or deionized water. This mixture will provide freeze protection to -37° C (-34° F).

Certain geographical areas may require lower temperature protection. See the label on your antifreeze container or consult your john Deere dealer to obtain the latest information and recommendations.

The recommended antifreeze provides:

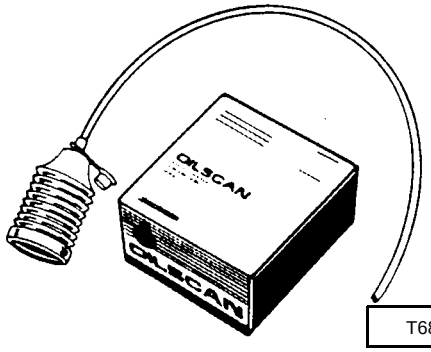
- Adequate heat transfer.
- Corrosion-resistant environment within the cooling system.
- Compatibility with cooling system hose and seal material.
- Protection during cold and hot weather operations.

OILSCAN® AND COOLSCAN™

OILSCAN and COOLSCAN are John Deere sampling programs to help you monitor machine performance and identify potential problems before they cause serious damage.

Oil and coolant samples should be taken from each system prior to its recommended change interval.

Check with your John Deere dealer for the availability of OILSCAN and COOLSCAN kits.



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GREASE

Use grease based on the expected air temperature range during the service interval.

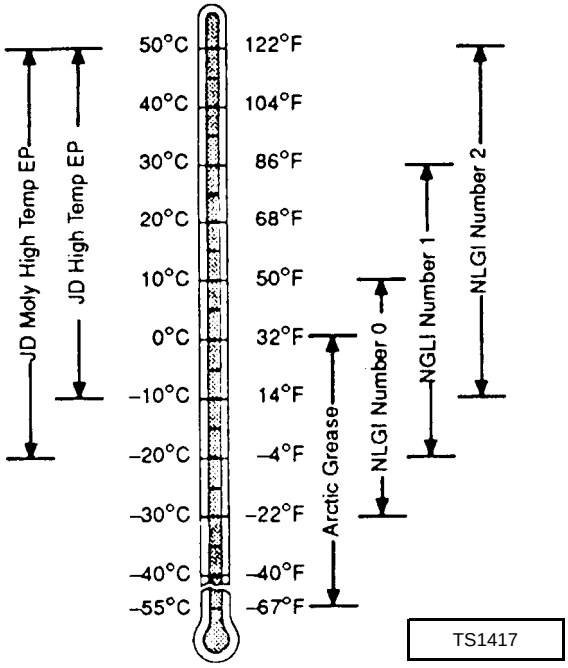
The following greases are preferred:

- John Deere MOLY HIGH TEMPERATURE EP GREASE
- John Deere HIGH TEMPERATURE EP GREASE
- John Deere GREASE-GARD™

Other greases may be used if they meet one of the following:

- SAE Multipurpose EP Grease with a maximum of 5% molybdenum disulfide
- SAE Multipurpose EP Grease

Grease meeting Military Specification MIL-G-10294F may be used as arctic grease.



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ANTI-CHATTER TRANSMISSION OIL

NOTE: This transmission is filled with John Deere Low Viscosity HY-GARD® (J20D) transmission oil at the factory. DO NOT mix oils.

This machine is equipped with an internal wet disc brake transmission. To avoid chatter, use only Low Viscosity HY-GARD® (J20D) transmission oil. It is specifically formulated to minimize wet brake chatter, and to provide maximum protection against mechanical wear, corrosion and foaming.

DO NOT use type "F" automatic transmission fluid.

IMPORTANT: When operating in temperatures below -7°C (-20°F), Low Viscosity HY-GARD® must be used or transmission will be noisy.

ALTERNATIVE LUBRICANTS

Conditions in certain geographical areas outside the United States and Canada may require different lubricant recommendations than these printed in this manual or the operator's manual. Consult with your John Deere Dealer, or Sales Branch to obtain the alternative lubricant recommendations.

SYNTHETIC LUBRICANTS

Synthetic lubricants may be used in John Deere equipment if they meet the applicable performance requirements (industry classification and/or military specification).

The recommended temperature limits and service or oil change intervals should be maintained as shown in the operator's manual.

Avoid mixing different brands, grades or types of oil. Oil manufacturers blend additives in their oils to meet certain specifications and performance requirements. Mixing different oils can interfere with the proper functioning of these additives and degrade lubricant performance.

OIL FILTERS

Filtration of oils is critical to proper lubrication. Always change filter regularly.

Use filters meeting John Deere performance specifications.

LUBRICANT STORAGE

This machine can operate at top efficiency only if clean lubricants are used.

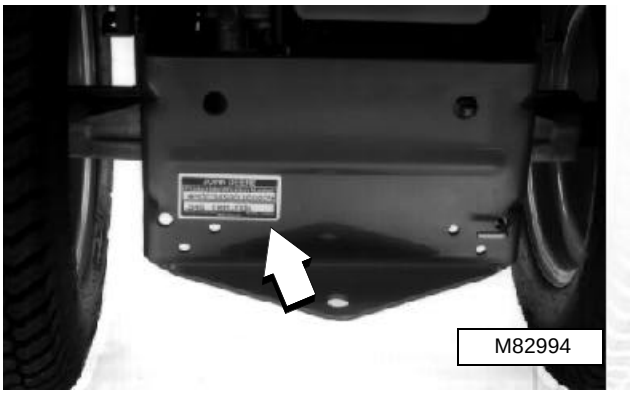
Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture and other contamination. Store drum on their sides.

SERIAL NUMBER LOCATION

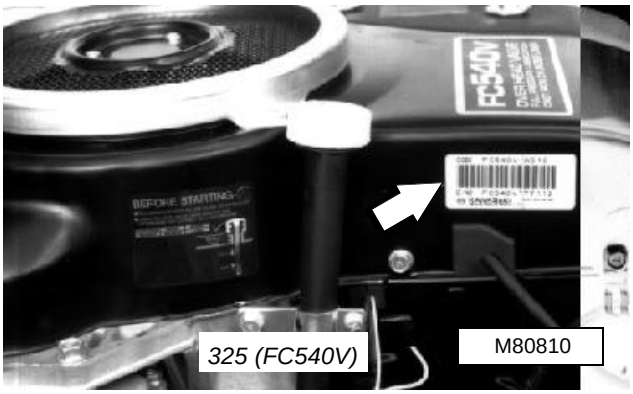
When ordering parts or submitting a warranty claim, it is IMPORTANT that the machine product identification number and component serial numbers are included.

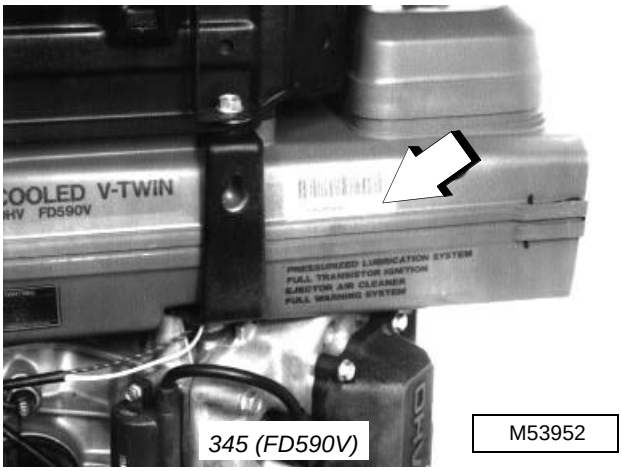
The location of the machine identification number and component serial numbers are shown.

MACHINE IDENTIFICATION NUMBER

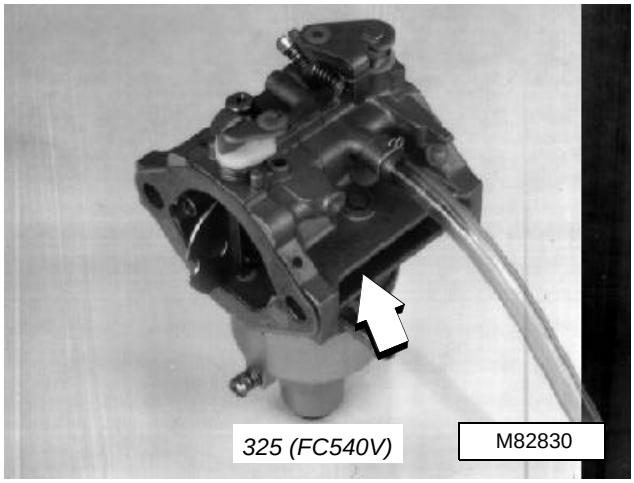


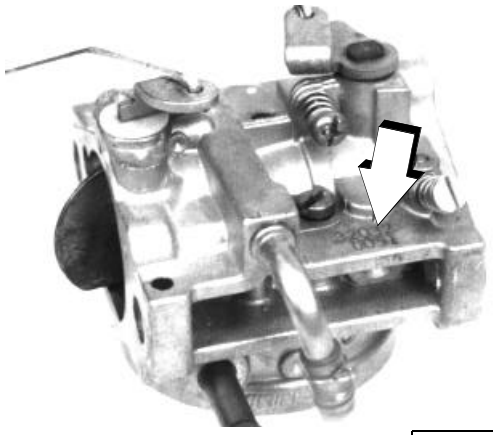
ENGINE SERIAL NUMBER



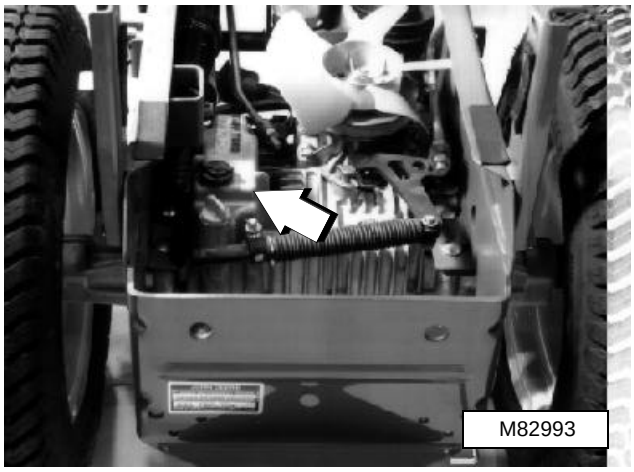


CARBURETOR SERIAL NUMBER



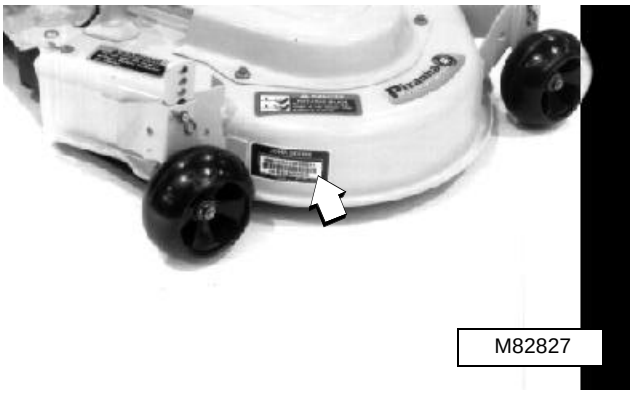


HYDROSTATIC TRANSMISSION SERIAL NUMBER



MOWER DECK SERIAL NUMBER

38, 48 and 54-Inch Mower Decks



44-Inch Rear Discharge Mower Deck

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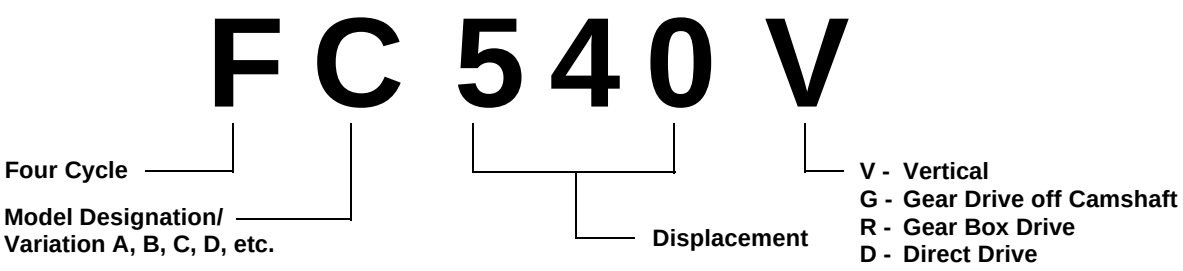
ENGINE DESIGNATION



TEST AND ADJUSTMENT SPECIFICATIONS

Fast Idle . . . . . 3350 ± 50 rpm
Slow Idle
Throttle control arm SLOW idle stop screw setting . . . . . 100 rpm higher than carburetor setting
Carburetor SLOW idle stop screw setting . . . . . 1550 ± 75 rpm
Minimum Cylinder Compression Pressure . . . . . .483 kPa (71 psi)
Valve Clearance (cold) . . . . . 0.15 mm (0.006 in.)
Valve Adjustment Screw Jam Nut Torque . . . . . .9 N•m (79 lb-in.)
Valve Cover Cap Screw Torque . . . . . .6 N•m (53 lb-in.)
Minimum Exhaust Valve ACR Movement . . . . . 0.25 mm (0.010 in.)
Minimum Crankcase Vacuum . . . . . .25 cm (10 in.) water
Minimum Engine Oil Pressure:
Fast Idle (3350 ± 50 rpm) . . . . . .240 kPa (35 psi)
Slow Idle (1450 ± 75 rpm) . . . . . .28 kPa (4 psi)
Fuel Pump Minimum Pressure . . . . . .6.12 kPa (0.90 psi)
Fuel Pump Minimum Flow . . . . . 65 ml/15 seconds (2.2 oz/15 seconds)
Crankshaft End Play . . . . . 0.09—0.22 mm (0.004—0.009 in.)
Spark Plug Gap . . . . . 0.76 mm (0.030 in.)
Spark Plug Torque . . . . . .20 N•m (177 lb-in.)

REPAIR SPECIFICATIONS

Engine Oil Capacity
Without Filter . . . . . .1.6 L (3.4 U.S. pt)
With Filter . . . . . .1.8 L (3.8 U.S. pt)
Engine Mounting Cap Screw Torque . . . . . .16 N•m (144 lb-in.)
Breather Air Gap . . . . . 1—2 mm (0.040—0.080 in.)
Valve Adjustment Screw Jam Nut Torque . . . . . .9 N•m (79 lb-in.)
Valve Cover Cap Screw Torque . . . . . .6 N•m (53 lb-in.)
Flywheel Screen Minimum Gap . . . . . 1.5 mm (0.059 in.)
Flywheel Nut Torque . . . . . .172 N•m (127 lb-ft)
Rocker Arm Assembly
Minimum Shaft O.D. . . . . 12.94 mm (0.509 in.)
Maximum Bearing I.D. . . . . 13.07 mm (0.515 in.)
Maximum Push Rod Bend . . . . . 0.30 mm (0.012 in.)

REPAIR SPECIFICATIONS, continued

- Cylinder Head and Valves
  - Cap Screw Torque in Sequence (Lubricated)
    - Initial Torque . . . . . .32 N•m (24 lb-ft)
    - Final Torque . . . . . .52 N•m (38 lb-ft)
  - Spark Plug Torque. . . . . .20 N•m (177 lb-in.)
  - Cylinder Head Flatness (Maximum) . . . . . 0.05 mm (0.002 in.)
  - Maximum Valve Guide I.D. . . . . 7.07 mm (0.278 in.)
  - Valve Seating Surface . . . . . 1.10—1.46 mm (0.043—0.057 in.)
  - Minimum Spring Free Length . . . . . 37.50 mm (1.476 in.)
  - Minimum Valve Margin . . . . . 0.60 mm (0.024 in.)
  - Maximum Valve Stem Bend . . . . . 0.03 mm (0.001 in.)
  - Valve Guide Installation Depth . . . . . .9.5 mm (0.370 in.)
  - Finished Valve Guide ID. (Reamed) . . . . . 7.00—7.02 mm (0.275—0.276 in.)
  - Valve Seat and Face Angle . . . . . 45°
  - Valve Narrowing Angle . . . . . 30°
- Crankcase Cover
  - Oil Capacity
    - Without Filter. . . . . .1.6 L (3.4 U.S. pt)
    - With Filter . . . . . .1.8 L (3.8 U.S. pt)
  - Mounting Cap Screw Torque . . . . . .26 N•m (230 lb-in.)
  - Oil Drain Plug Torque . . . . . .23 N•m (200 lb-in.)
- Piston
  - Connecting Rod Cap Screw Torque . . . . . .20 N•m (177 lb-in.)
  - Maximum Ring Groove Side Clearance
    - Top Ring . . . . . 0.17 mm (0.007 in.)
    - Second Ring . . . . . 0.15 mm (0.006 in.)
    - Oil Ring . . . . . 0.20 mm (0.008 in.)
  - Minimum Pin O.D. . . . . 21.98 mm (0.865 in.)
  - Maximum Pin Bore O.D. . . . . 22.04 mm (0.868 in.)
  - Piston O.D.
    - Standard Piston . . . . . 88.83—88.864 mm (3.4885—3.4984 in.)
    - 0.50 mm (0.020 in.)
    - Oversize Piston. . . . . 89.330—89.364 mm (3.517—3.518 in.)
- Cylinder Bore I.D.
  - Standard . . . . . 88.98—89.00 mm (3.5031—3.5039 in.)
  - Wear Limit (Maximum) . . . . . 89.08 mm (3.507 in.)
  - 0.50 mm (0.020 in.) Oversize Bore
    - Standard . . . . . 89.48—89.50 mm (3.5228—3.5236 in.)
    - Wear Limit . . . . . (Maximum) 89.58 mm (3.5267 in.)
- Connecting Rod
  - Maximum Crankshaft Bearing I.D.
    - Standard . . . . . 41.07 mm (1.617 in.)
    - Undersized . . . . . 40.56 mm (1.597 in.)
  - Maximum Piston Pin Bearing I.D. . . . . 22.06 mm (0.868 in.)
- Piston Rings
  - Minimum Ring Thickness (Top and Second Rings). . . . . 1.94 mm (0.076 in.)
  - Minimum Ring End Gap . . . . . 0.18 mm (0.007 in.)
  - Maximum Ring End Gap
    - Compression Rings (Top and Second) . . . . . 0.90 mm (0.035 in.)
    - Oil Ring Side Rails . . . . . 1.30 mm (0.051 in.)

REPAIR SPECIFICATIONS, continued

Camshaft
- Minimum End Journal O.D. . . . . 20.91 mm (0.823 in.)
- Minimum Lobe Height . . . . . 37.10 mm (1.461 in.)
- Maximum Bearing I.D. . . . . 21.08 mm (0.830 in.)

Reciprocating Balancer
- Support Shaft Nut Torque . . . . . 7 N•m (65 lb-in.)
- Link Rod
  - Minimum Journal O.D. . . . . 57.94 mm (2.281 in.)
  - Maximum Small End I.D. . . . . 12.06 mm (0.475 in.)
  - Maximum Large End I.D. . . . . 58.15 mm (2.289 in.)
- Balancer Weight
  - Maximum Bearing I.D. . . . . 26.10 mm (1.027 in.)
  - Bushing Depth . . . . . 0.50 mm (0.020 in.)
- Support Shaft
  - Minimum Shaft O.D. . . . . 25.93 mm (1.021 in.)

Crankshaft
- Maximum T.I.R. . . . . 0.05 mm (0.002 in.)
- Minimum Main Bearing Journal O.D. . . . . 37.90 mm (1.492 in.)
- Minimum Connecting Rod Journal O.D.
  - Standard . . . . . 40.93 mm (1.611 in.)
  - Undersized . . . . . 40.43 mm (1.591 in.)
- Maximum Crankcase Cover Plain Bearing I.D. . . . . 38.06 mm (1.498 in.)

PTO Side Oil Seal Depth . . . . . 0.50 mm (0.020 in.)

Oil Pump
- Minimum Rotor Shaft O.D. . . . . 12.63 mm (0.497 in.)
- Maximum Rotor Shaft Bearing I.D. . . . . 12.76 mm (0.502 in.)
- Outer Rotor
  - Minimum Thickness . . . . . 9.92 mm (0.391 in.)
  - Minimum O.D. . . . . 40.47 mm (1.596 in.)
- Outer Rotor Bearing
  - Minimum Depth . . . . . 10.17 mm (0.401 in.)
  - Maximum I.D. . . . . 40.77 mm (1.605 in.)
- Minimum Valve Spring Free Length . . . . . 19.00 mm (0.750 in.)

Governor
- Governor Mounting Shaft Height . . . . . 32.2—32.8 mm (1.267—1.291 in.)
- Governor Lever Nut Torque . . . . . 7.8 N•m (69 lb-in.)

Armature with Coil
- Resistance between primary lead and core . . . . . 0.48—0.72 ohms
- Resistance between plug cap and core . . . . . 10.9—16.3 Kohms
- Air Gap . . . . . 0.30 mm (0.012 in.)

Starter
- Maximum Amperage (No Load) . . . . . 50 amps at 5000 rpm
- Minimum Brush Length . . . . . 10.5 mm (0.413 in.)

SPECIAL OR ESSENTIAL TOOLS

NOTE: Order tools according to information given in the U.S. SERVICE-GARD™ Catalog or in the European Microfiche Tool Catalog (MTC).

JT05719 Hand-Held Digital Tachometer
Used to check idle speed and starter performance.

JDM59 Compression Gauge
Used to check engine compression.

8741-F66 Plug
Used to connect U-tube manometer to engine for Crankcase Vacuum Test.

JT05703 Barb Fitting
Used to connect U-tube manometer to engine for Crankcase Vacuum Test.

JT05699 Line
Used to connect U-tube manometer to engine for Crankcase Vacuum Test.

JT05698 U-Tube Manometer
Used to check engine crankcase vacuum.

JT03338 90° Elbow Fitting
Used to connect pressure gauge to engine when performing Engine Oil Pressure Test.

JT03017 Hose Assembly
Used to connect pressure gauge to engine when performing Engine Oil Pressure Test.

JT03344 Pressure Gauge Assembly
Used to read engine oil pressure when performing Engine Oil Pressure Test.

JDG356 Pressure Gauge
Used to check fuel pump performance.

D-05351ST Spark Tester
Used to check overall condition of ignition system.

JDM70 Valve Spring Compressor
Used to remove and install valve springs.

JDG504 Valve Guide Driver Tool
Used to replace valve guide bushings.

JT05712 Current Gun
Used to check starter performance.