

**LX172, LX173, LX176,
LX178, LX186 & LX188
Lawn Tractors**

**TECHNICAL
MANUAL**

**John Deere
Lawn & Grounds Care Division**

TM1492 (31MAY96)



M58372

LX Series Lawn Tractor

This technical manual is written for an experienced 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:





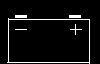





- Table of Contents
- Specifications
- Component Location
- System Schematic
- Theory of Operation
- Troubleshooting Chart
- Diagnostics
- Tests & Adjustments
- Repair

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 tab 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.

Safety	
Specifications and Information	
Engine—Kawasaki	
Engine—Kohler	
Electrical	
Power Train (Gear)	
Power Train (Hydrostatic)	
Steering	
Brakes	
Attachments	
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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 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.

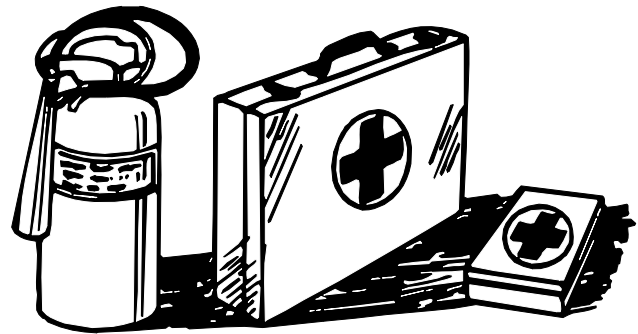
REPLACE SAFETY SIGNS



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



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.

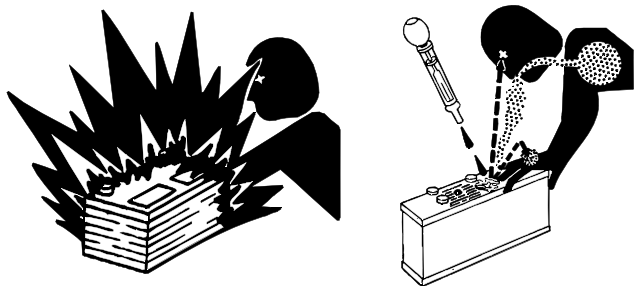
Do not store oily rags; they can ignite and burn spontaneously.

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

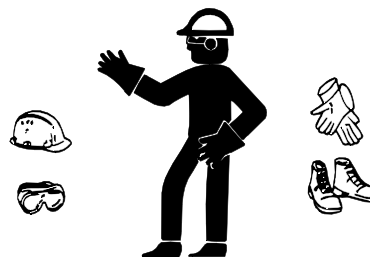
- Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.
- Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.
- Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).

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 10-15 minutes.
 4. Get medical attention immediately.
- **If acid is swallowed:**
 1. Drink large amounts of water or milk.
 2. Then drink milk of magnesia, beaten eggs, or vegetable oil.
 3. Get medical attention immediately.

USE SAFE SERVICE PROCEDURES

Wear Protective Clothing

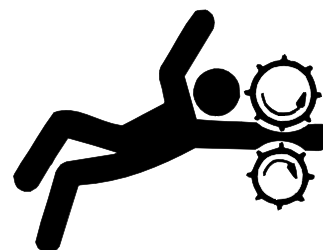


Wear close fitting clothing and safety equipment appropriate to the job.

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 Machines 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.

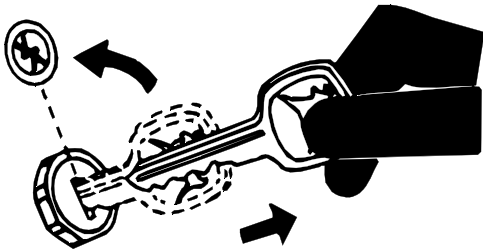
Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.

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.



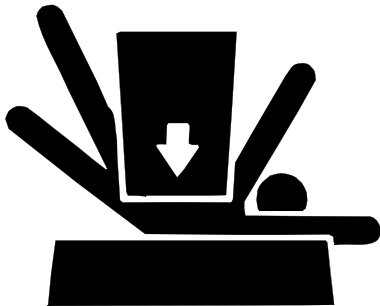
Park Machine Safely



Before working on the machine:

1. Lower all equipment to the ground.
2. Stop the engine 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



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 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.

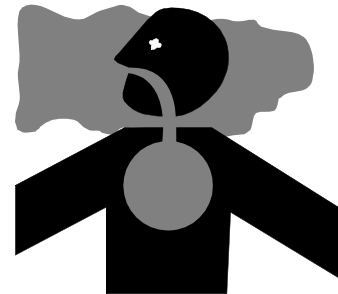
Using High Pressure Washers

Directing pressurized water at electronic/electrical components or connectors, bearings, hydraulic seals, fuel injection pumps or other sensitive parts and components may cause product malfunctions. Reduce pressure and spray at a 45 to 90 degree angle.

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 Ventilated Area



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.

WARNING: California Proposition 65 Warning

Gasoline engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

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.

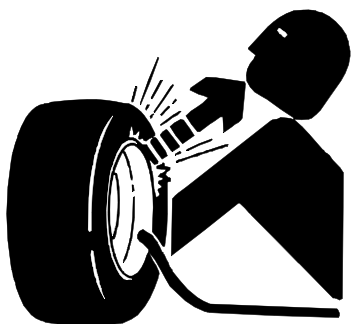
Avoid Harmful Asbestos Dust

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.

SERVICE TIRES SAFELY



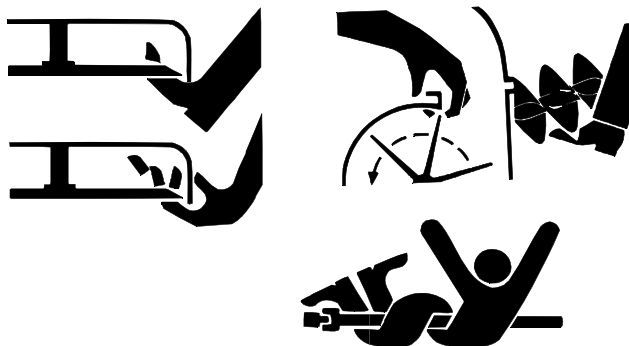
Explosive separation of a tire and rim parts can cause serious injury or death.

Do not attempt to mount a 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 air 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 to 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, AUGERS AND PTO SHAFTS



Keep hands and feet away while machine is running. Shut off power to service, lubricate or remove mower blades, augers or PTO shafts.

SERVICE COOLING SYSTEM SAFELY

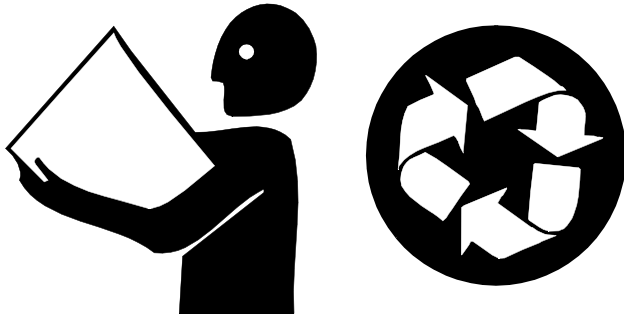


Explosive release of fluids from pressurized cooling system can cause serious burns.

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.



HANDLE CHEMICAL PRODUCTS SAFELY



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



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

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GENERAL VEHICLE SPECIFICATIONS

ENGINE—LX172 AND LX176

Make	John Deere "K" Series
Type	Gasoline
Model	FC420V
Aspiration	Natural
Horsepower	10.4 kW (14 hp)
Cylinders	1
Displacement	423 mL (25.8 cu. in.)
Stroke/Cycle	4 Cycle
Bore	89 mm (3.500 in.)
Stroke	68 mm (2.68 in.)
Slow Idle	1550 ±75 rpm
Fast Idle	3350 ±50 rpm
Valving	Overhead Valves
Lubrication	Pressurized
Oil Filter	Full Flow Filter
Engine Oil Capacity (with filter)	1.50 L (3.2 U.S. pt)
Cooling System	Air Cooled
Air Cleaner	Two-stage with replaceable filter element
Muffler	Horizontal discharge below frame

ENGINE—LX173

Make	Kohler
Series	Command LT
Type	Gasoline
Model	CV15S
Aspiration	Natural
Horsepower	11.19 kW (15.0 hp)
Cylinders	1
Displacement	426 cc (26.0 cu. in.)
Stroke/Cycle	4 Cycle
Bore	90 mm (3.60 in.)
Stroke	67 mm (2.64 in.)
Slow Idle	1650 ±75 rpm
Fast Idle (Domestic)	3350 ±50 rpm
Valving	Overhead Valves
Lubrication	Pressurized
Oil Filter	Full Flow Filter (w/o By-Pass Valve)
Engine Oil Capacity (with filter)	1.8 L (1.9 U.S. qt)
Cooling System	Air Cooled
Air Cleaner	Paper with outer foam element
Muffler	Horizontal discharge below frame
Compression Release	Automatic/Centrifugal
Compression Ratio (Cranking)	2:1
Compression Ratio (Running)	8.5:1

ENGINE—LX178

Make John Deere "K" Series
 Type Gasoline
 Model FD440V
 Aspiration Natural
 Horsepower 11.1 kW (15 hp)
 Cylinders 2 (V-twin)
 Displacement 437 mL (26.7 cu. in.)
 Stroke/Cycle 4 Cycle
 Bore 67 mm (2.34 in.)
 Stroke 62 mm (2.44 in.)
 Slow Idle 1550 ±75 rpm
 Fast Idle 3400 ±75 rpm
 Valving Overhead Valves
 Lubrication Pressurized
 Oil Filter Full Flow Filter
 Engine Oil Capacity (with filter) 1.50 L (3.2 U.S. pt)
 Cooling System Liquid Cooled
 Air Cleaner Two-stage with replaceable filter element
 Muffler Horizontal discharge below frame

ENGINE—LX186

Make John Deere "K" Series
 Type Gasoline
 Model FC540V
 Aspiration Natural
 Horsepower 10.4 kW (14 hp)
 Cylinders 1
 Displacement 423 mL (25.8 cu. in.)
 Stroke/Cycle 4 Cycle
 Bore 89 mm (3.50 in.)
 Stroke 68 mm (2.680 in.)
 Slow Idle 1550 ±75 rpm
 Fast Idle 3350 ±50 rpm
 Valving Overhead Valves
 Lubrication Pressurized
 Oil Filter Full Flow Filter
 Engine Oil Capacity (with filter) 1.80 L (3.8 U.S. pt.)
 Cooling System Air Cooled
 Air Cleaner Two-stage with replaceable filter element
 Muffler Horizontal discharge below frame



ENGINE—LX188

Make John Deere "K" Series
 Type Gasoline
 Model FD501V
 Aspiration Natural
 Horsepower 12.6 kW (17 hp)
 Cylinders 2 (V-twin)
 Displacement 437 mL (26.7 cu. in.)
 Stroke/Cycle 4 Cycle
 Bore 67 mm (2.34 in.)
 Stroke 62 mm (2.44 in.)
 Slow Idle 1550 ±75 rpm
 Fast Idle 3550 ±75 rpm
 Valving Overhead Valves
 Lubrication Pressurized
 Oil Filter Full Flow Filter
 Engine Oil Capacity (with filter) 1.5 L (3.2 U.S. pt)
 Cooling System Liquid Cooled
 Air Cleaner Two-stage with replaceable filter element
 Muffler Horizontal discharge below frame

FUEL SYSTEM

Fuel Tank Location Rear
 Fuel Tank Capacity 9.5 L (2.5 U.S. gal)
 Fuel (minimum octane) Unleaded Gasoline, 87 Octane
 Fuel Pump Location
 LX172, LX173, LX176 and LX186 On left-hand side of engine
 LX178 and LX188 On front of engine
 Fuel Delivery Float-Type Side Draft Carburetor
 Fuel Filter Replaceable In-Line

ELECTRICAL

Ignition Electronic Capacitor Discharge Ignition (CDI)
 Type of Starter Solenoid Shift
 Charging System Flywheel Alternator
 Charging Capacity
 LX172/LX173/LX176/LX186 13 amp, Regulated
 LX178/LX188 15 amp, Regulated
 Battery Type BCI Group, U1
 Battery Voltage 12 V
 Battery Reserve Capacity at 25 Amp 38 minutes
 Battery Cold Cranking Amps at -18°C (0°F) 295 amps
 Ignition Interlock Switches Neutral Start—LX172/LX173
 Brake—LX176/LX178/ LX186/LX188

PTO DRIVE

Type V-Belt
 Clutch Type Engine-Mounted, Electric
 Control Switch on dash



POWER TRAIN

Drive Wheels Rear
 Transaxle Drive Belt

Gear Transaxle—LX172/ LX173

Type Gear Transaxle
 Number of Speeds 5 Forward, 1 Reverse
 Travel Speeds at Full RPM
 1st Gear 2.6 km/h (1.6 mph)
 2nd Gear 4.1 km/h (2.5 mph)
 3rd Gear 6.1 km/h (3.8 mph)
 4th Gear 7.8 km/h (4.8 mph)
 5th Gear 9.2 km/h (5.7 mph)
 Reverse 4.4 km/h (2.7 mph)
 Transaxle Lubricant Capacity 2.3 L (2.5 qt)
 Lubricant Type John Deere Non-Clay High-Temperature EP Grease

Hydrostatic Transaxle—LX176/ LX178/LX186/LX188

Type Hydrostatic, Piston-Type Transaxle
 Transaxle Filter Replaceable, Internal
 Travel Speeds at Full RPM
 Forward 0—8.8 km/h (0—5.5 mph)
 Reverse 0—4.0 km/h (0—2.5 mph)
 Transaxle Lubricant Capacity 3.4 L (7.2 U.S. qt)
 Lubricant Type John Deere TURF-GARD® 10W-30 Engine Oil

STEERING

Type Sector and Pinion

BRAKES

Location Transaxle
 Type
 LX172/LX173 External Disk, Single Pedal
 LX176/LX178/LX186/LX188 External Band, Single Pedal
 Park Brake
 LX172/LX173 Right Pedal, Clutch Interlock
 LX176/LX178/LX186/LX188 Right Pedal

IMPLEMENT LIFT

Lift System Manual with Lift-Assist Spring
 Lift Lever Location Left-hand side of hood
 Cutting Heights 12.7—88.9 mm (12.7 mm increments)
 0.5—3.5 in. (0.50 in. increments)



WEIGHTS AND DIMENSIONS

Net Weight (no fuel) (estimated)

LX172/LX173

With 38-Inch Mower Deck 238 kg (525 lb)

With 44-Inch Mower Deck 245 kg (540 lb)

With 48-Inch Mower Deck 254 kg (560 lb)

LX176

With 38-Inch Mower Deck 243 kg (535 lb)

With 48-Inch Mower Deck 259 kg (570 lb)

LX178

With 38-Inch Mower Deck 245 kg (540 lb)

With 44-Inch Mower Deck 261 kg (575 lb)

LX186/LX188

With 48-Inch Mower Deck 268 kg (590 lb)

Mower Deck Weight (estimated)

38-Inch Mower Deck 43 kg (95 lb)

44-Inch Mower Deck 49 kg (108 lb)

48-Inch Mower Deck 57 kg (125 lb)

Overall Width (less mower deck)

LX172/LX173/LX176/LX178 1.262 m (49.7 in.)

LX186/LX188 1.504 m (59.2 in.)

Overall Width (with mower deck, discharge chute down)

With 38-Inch Mower Deck 1.32 m (52 in.)

With Rear Bagger 1.26 m (49.5 in.)

With 44-Inch Mower Deck 1.163 m (45.7 in.)

With 48-Inch Mower Deck 1.54 m (60.5 in.)

With Power Flow 1.56 m (61.5 in.)

Overall Height 1.02 m (40.2 in.)

Overall Length 1.68 m (66.1 in.)

Wheelbase 1.165 m (45.9 in.)

Turning Radius

Inside Rear Wheel 0.508 m (20 in.)

Outside Front Wheel 1.88 m (74 in.)

WHEELS AND TIRES

Front 15 x 6.00-6 in.

Rear 20 x 10.00-8 in.



METRIC FASTENER TORQUE VALUES

Property Class and Head Markings	4.8		8.8		9.8		10.9		12.9	
Property Class and Nut Markings	5		10		10		10		12	

TS1163

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	48	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	109
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 hand torque values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only and include a ±10% variance factor. Check tightness of fasteners periodically. DO NOT use air powered wrenches.

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

Fasteners should be replaced with the same grade. Make sure fastener threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

When bolt and nut combination fasteners are used, torque values should be applied to the **NUT** instead of the bolt head.

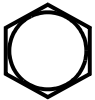










Tighten toothed or serrated-type lock nuts to the full torque value.

^a "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated (yellow dichromate - Specification JDS117) without any lubrication.

Reference: JDS—G200.

INCH FASTENER TORQUE VALUES



SAE Grade and Head Markings	1 or 2 ^b No Marks 	5  5.1  5.2 	8  8.2 
	2 No Marks 	5  	8  

TS1162

SIZE	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	
	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
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	215	160	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 hand torque values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only and include a ±10% variance factor. Check tightness of fasteners periodically. DO NOT use air powered wrenches.

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

Fasteners should be replaced with the same grade. Make sure fastener threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

When bolt and nut combination fasteners are used, torque values should be applied to the **NUT** instead of 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 (yellow dichromate - Specification JDS117) 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.

Reference: JDS—G200.

GASOLINE 4-CYCLE ENGINES—NORTH AMERICA

CAUTION

Gasoline is **HIGHLY FLAMMABLE**, handle it with care.

DO NOT refuel machine while:

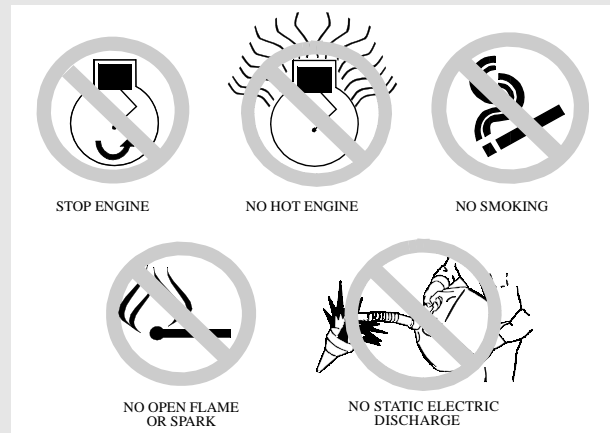
- indoors, always fill gas tank outdoors;
- machine is near an open flame or sparks;
- engine is running, **STOP** engine;
- engine is hot, allow it to cool sufficiently first;
- smoking.

Help prevent fires:

- fill gas tank to bottom of filler neck only;
- be sure fill cap is tight after fueling;
- clean up any gas spills **IMMEDIATELY**;
- keep machine clean and in good repair—free of excess grease, oil, debris, and faulty or damaged parts;
- any storage of machines with gas left in tank should be in an area that is well ventilated to prevent possible igniting of fumes by an open flame or spark, this includes any appliance with a pilot light.

To prevent fire or explosion caused by STATIC ELECTRIC DISCHARGE during fueling:

- **ONLY** use a clean, approved **POLYETHYLENE PLASTIC** fuel container and funnel **WITHOUT** any metal screen or filter.



To avoid engine damage:

- DO NOT mix oil with gasoline;
- **ONLY** use clean, fresh unleaded gasoline with an octane rating (anti-knock index) of 87 or higher;
- fill gas tank at the end of each day's operation to help prevent condensation from forming inside a partially filled tank;
- keep up with specified service intervals.

Use of alternative oxygenated, gasohol blended, unleaded gasoline is acceptable as long as:

- the ethyl or grain alcohol blends DO NOT exceed 10% by volume or
- methyl tertiary butyl ether (MTBE) blends DO NOT exceed 15% by volume.



IMPORTANT: DO NOT use METHANOL gasolines because METHANOL is harmful to the environment and to your health.

WARNING

California Proposition 65 Warning: Gasoline engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

GASOLINE STORAGE

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

Keep gasoline stored in a safe, protected area. Storage of gasoline in a clean, properly marked (**“UNLEADED GASOLINE”**) **POLYETHYLENE PLASTIC** container **WITHOUT** any metal screen or filter is recommended. **DO NOT** use de-icers to attempt to remove water from gasoline or depend on fuel filters to remove water from gasoline. Use a water separator installed in the storage tank outlet. **BE SURE** to properly discard unstable or contaminated gasoline. When storing unit or gasoline, it is recommended that you add **John Deere Gasoline Conditioner and Stabilizer (TY15977)** or an equivalent to the gasoline. **BE SURE** to follow directions on container and to properly discard empty container.

4-CYCLE ENGINES—EUROPE



CAUTION

Gasoline is **HIGHLY FLAMMABLE**, handle it with care.

DO NOT refuel machine while:

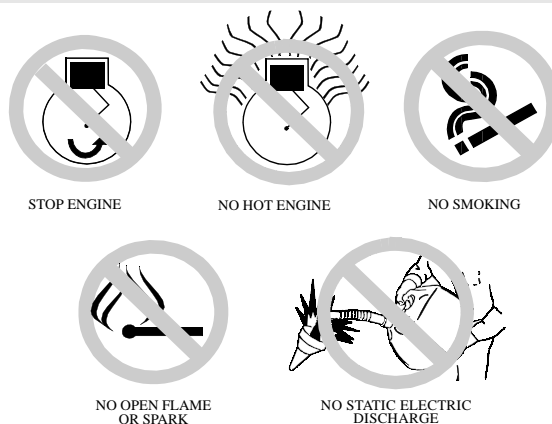
- indoors, always fill gas tank outdoors;
- machine is near an open flame or sparks;
- engine is running, **STOP** engine;
- engine is hot, allow it to cool sufficiently first;
- smoking.

Help prevent fires:

- fill gas tank to bottom of filler neck only;
- be sure fill cap is tight after fueling;
- clean up any gas spills **IMMEDIATELY**;
- keep machine clean and in good repair—free of excess grease, oil, debris, and faulty or damaged parts;
- any storage of machines with gas left in tank should be in an area that is well ventilated to prevent possible igniting of fumes by an open flame or spark, this includes any appliance with a pilot light.

To prevent fire or explosion caused by STATIC ELECTRIC DISCHARGE during fueling:

- **ONLY** use a clean, approved **POLYETHYLENE PLASTIC** fuel container and funnel **WITHOUT** any metal screen or filter.

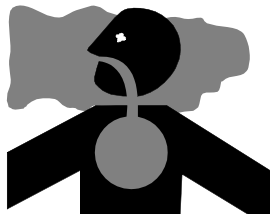


To avoid engine damage:

- **DO NOT** mix oil with gasoline;
- **ONLY** use clean, fresh unleaded gasoline with an octane rating (anti-knock index) of 87 or higher;
- fill gas tank at the end of each day's operation to help prevent condensation from forming inside a partially filled tank;
- keep up with specified service intervals.

Use of alternative oxygenated, gasohol blended, unleaded gasoline is acceptable as long as:

- the ethyl or grain alcohol blends **DO NOT** exceed 10% by volume or
- methyl tertiary butyl ether (MTBE) blends **DO NOT** exceed 15% by volume.



IMPORTANT: **DO NOT** use **METHANOL** gasolines because **METHANOL** is harmful to the environment and to your health.

GASOLINE STORAGE

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

Keep gasoline stored in a safe, protected area. Storage of gasoline in a clean, properly marked ("**UNLEADED GASOLINE**") **POLYETHYLENE PLASTIC** container **WITHOUT** any metal screen or filter is recommended. **DO NOT** use de-icers to attempt to remove water from gasoline or depend on fuel filters to remove water from gasoline. Use a water separator installed in the storage tank outlet. **BE SURE** to properly discard unstable or contaminated gasoline. When storing unit or gasoline, it is recommended that you add **John Deere Gasoline Conditioner and Stabilizer (TY15977)** or an equivalent to the gasoline. **BE SURE** to follow directions on container and to properly discard empty container.