

STX30, STX38, and STX46 Lawn Tractors



TECHNICAL MANUAL

**John Deere
Worldwide Commercial and
Consumer Equipment Division**

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TM1418 (26Oct92)**

Litho in U.S.A



STX38 Gear Drive



STX38 Hydrostatic Drive



STX38 Motorsport Edition



STX46 Gear Drive



STX46 Hydrostatic Drive

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:

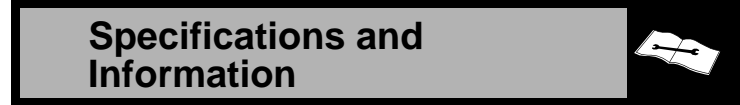
- Table of Contents
- Specifications
- Theory of Operation
- Troubleshooting Diagram
- Diagnostics
- Tests & Adjustments
- Repair

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 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.



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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.

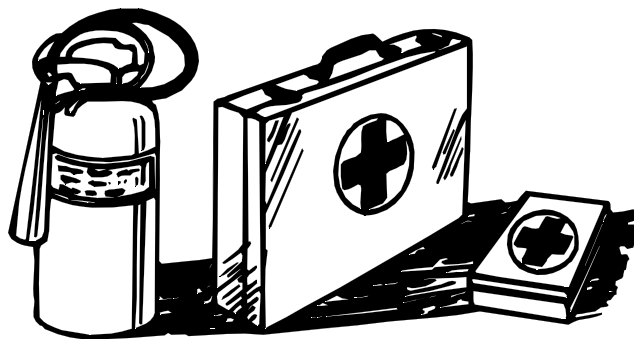
REPLACE SAFETY SIGNS



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.

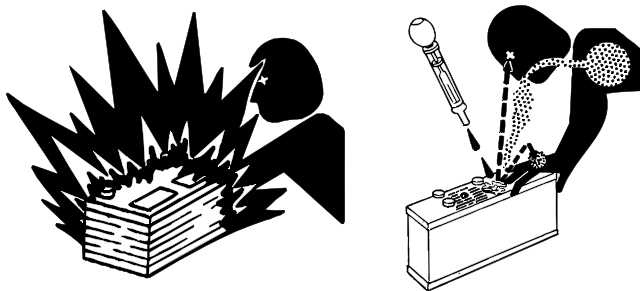
Do not store oily rags; they can ignite and burn spontaneously.

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

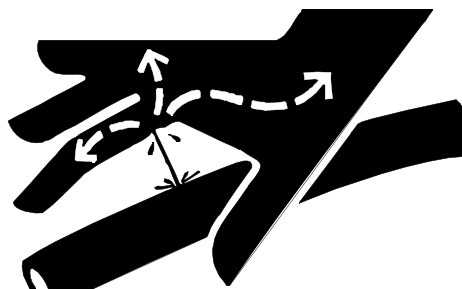
- Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.
- Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.
- Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).

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 CARE AROUND HIGH-PRESSURE FLUID LINES

Avoid High-pressure Fluids



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

Avoid injury from escaping fluid under pressure by stopping the engine and relieving pressure in the system before disconnecting or connecting 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.

Avoid Heating Near Pressurized Fluid Lines

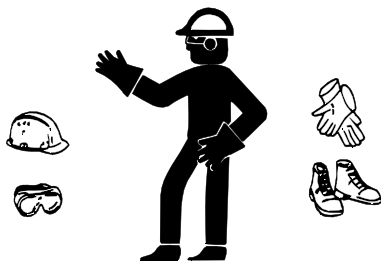


Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area.



USE SAFE SERVICE PROCEDURES

Wear Protective Clothing

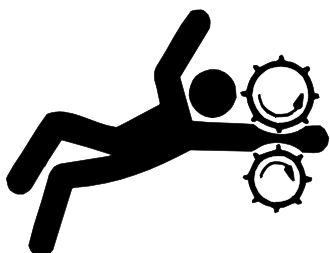


Wear close fitting clothing and safety equipment appropriate to the job.

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



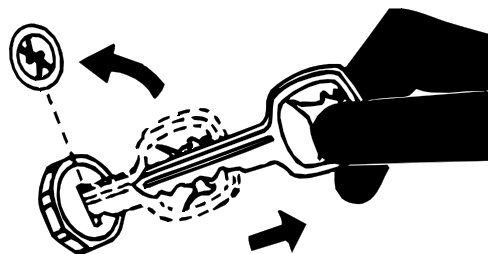
Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

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.

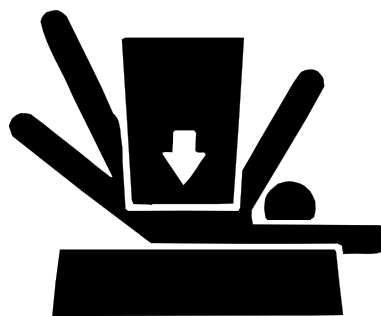
Park Machine Safely



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.

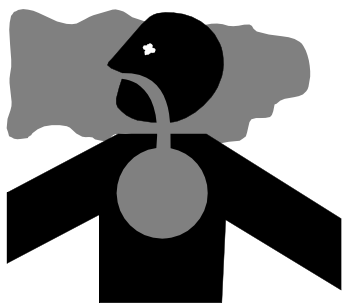
Using High Pressure Washers

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**

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

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.

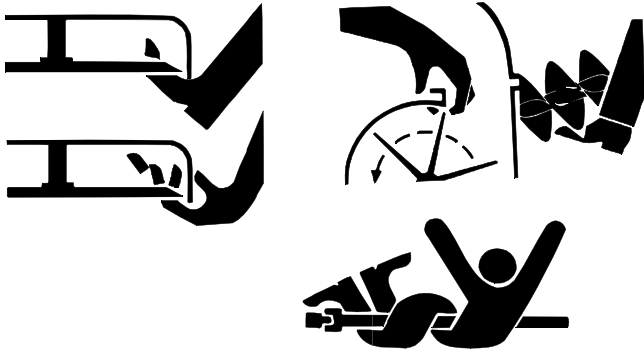
Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job. Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure. Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting 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.

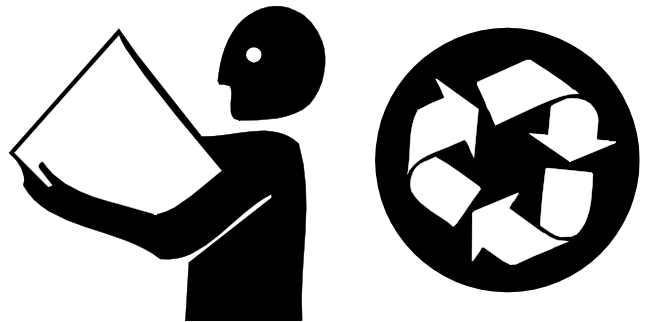
**SERVICE COOLING SYSTEM
SAFELY**



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:

Make	Kohler
Style	Command LT
STX30	CV12.5—1216s
STX38 (Serial No. —270000)	CV12.5—1215
STX38 (Serial No. 210001—270000)	CV12.5—1270
STX38 (Serial No. 270001—595000 & Motorsport)	CV13S—21509
STX46 (Serial No. 210001—270000)	CV14S—1463
STX46 (Serial No. 270001—595000)	CV15S—41521
Type	Gasoline, Air Cooled, Single Cylinder, 4-Cycle, Overhead Valves
Crankcase Oil Capacity (with filter)	1.8 L (1.9 U.S. qt)
Oil Type: (Warm Climate)	10W30
(Cold Climate)	5W30

Electrical:

Charging System	Flywheel/Electronic Magneto
Magneto Air Gap	0.2—0.3 mm (0.008—0.012 in.)
Charging Capacity	15 amp (regulated)
Spark Plug	Champion RC12YC
Spark Plug Air Gap	1.0 mm (0.040 in.)
Battery Type	BCI Group, U1
Battery Reserve Capacity	23 min. at 25 amp
Battery Cold Cranking Amp.	25 amp at 27° C (0° F) for 20 minutes
Battery Specific Gravity	Above 1.225 Points
Starter Type	Bendix Inertia Drive
PTO Clutch Type	Electric (Manufactured by Warner)
Fuel Shut-Off Solenoid (Optional)	Replaceable (Below Carburetor Float Bowl)
Headlight Kit (Optional)	Two Bulbs—Each 12 Volt/23W/1.9 Amp Draw

Fuel/Air System:

Carburetor Make	Walbro
Carburetor Type	Side Draft
Throttle/Choke	Unitized Control Linkage
Carburetor Fuel Shut-Off Solenoid (Optional)	Electric
Fuel Delivery	Gravity Flow
Fuel Filter	Replaceable Paper (in-line type)
Fuel Type	Unleaded (87 octane minimum)
Fuel Tank Capacity	4.7 L (1.25 gal)
Air Filter	Paper Element with Foam Pre-cleaner
Muffler Type	Anti-Backfire

Power Train:

Gear Transaxle—

Make	Dana
Model	Spicer Heavy-Duty 4360 Transaxle
Type	Five-Speed/Linear Shift

Domestic Ground Speeds (at FAST idle—3350 rpm) and Gear Ratios:

1st Gear . (STX30 & STX38 SN —210000	2.2km/hr	2.4 km/hr (1.5 mph)—61.67:1
2nd Gear	3.2 km/hr (2.0 mph)—46.67:1	
3rd Gear . (STX30 & STX38 SN —210000	4.5km/hr	5.0 km/hr (3.1 mph)—30.00:1
4th Gear . (STX30 & STX38 SN —210000	5.7km/hr	6.4 km/hr (4.0 mph)—23.48:1
5th Gear . (STX30 & STX38 SN —210000	8.5km/hr	8.0 km/hr (5.0 mph)—15.71:1
Reverse . (STX30 & STX38 SN —210000	3.3km/hr	3.7 km/hr (2.3 mph)—40.00:1

Export Ground Speeds (at FAST idle—3000 rpm) and Gear Ratios:

1st Gear	1.97 km/hr (1.22 mph)—61.67:1
2nd Gear	2.61 km/hr (1.67 mph)—46.67:1
3rd Gear	4.07 km/hr (2.53 mph)—30.00:1
4th Gear	5.18 km/hr (3.22 mph)—23.48:1
5th Gear	7.76 km/hr (4.82 mph)—15.71:1
Reverse	3.04 km/hr (1.89 mph)—40.00:1

Brake Type	Single, External Brake Disc With Dual Friction Pucks
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Power Train: (Continued)

Lubrication—Input Shaft Needle Bearings Unirex® N3 Grease Only
 Lubrication—Transaxle Shell Darina® D Grease Only
 Capacity—Transaxle 0.64 kg (1.406 lbs)

Hydro Transaxle—

Make Kanzaki
 Model (STX38—early models) Tuff Torq® K50 Transaxle
 Model (STX38—late models) Tuff Torq® K55 Transaxle
 Model (STX46) Tuff Torq® K55 Transaxle
 Type Hydrostatic
 Domestic Ground Speeds (at FAST idle—3350 rpm):
 Forward 0—9.3 km/hr (0—5.8 mph)
 Reverse 0—4.7 km/hr (0—2.9 mph)
 Export Ground Speeds (at FAST idle—3000 rpm):
 Forward 0—7.75 km/hr (0—4.82 mph)
 Reverse 0—3.80 km/hr (0—2.36 mph)
 Brake Type Single, External Disc Brake With Friction Pucks
 Lubrication John Deere Plus-4 10W30 Engine Oil, Class CD
 Reservoir Internal
 Capacity 1.6 L (3.4 pt)

Traction Drive Belt:

Gear—

Actual effective length 2660±8 mm (104.7±0.3 in.)
 Theoretical effective length (short) 2631 mm (103.6 in.)
 Theoretical effective length (long) 2710 mm (106.7 in.)

Hydro—

Actual effective length 2485±8 mm (97.8±0.3 in.)
 Theoretical effective length (short) 2477 mm (97.5 in.)
 Theoretical effective length (long) 2530 mm (99.6 in.)

Mower Deck Drive Belt

38-Inch Deck—

Actual effective length 2425±10 mm (95.5±0.4 in.)

46-Inch Deck—

Actual effective length 3492±10 mm (137.5±0.4 in.)

Mower Deck:

38-Inch Mower Deck—

Type Rotary—Dual Spindles (Non-Serviceable)
 Material Type Stamped 2.5 mm (0.098 in.) Nominal Gauge Steel
 Cutting Blade Two—76 x 5 x 496 mm (3 x 0.2 x 19.5 in.)
 Blade Cutting Edge30±5° Angle
 Blade Wing Lift/Height 40±3 mm (1.57±0.12 in.)
 Overall Cutting Width 965 mm (38 in.)
 Overall Width (w/o discharge chute) 1026 mm (40.4 in.)
 Drive Type Single V-Belt (with spring-tensioned idler)
 Spindle Lubrication None—Sealed Bearings
 Lift Type Manual—Operator's Station
 Cutting Settings Seven: 31.8—89 mm (1.25—3.5 in.)

Mower Deck: (Continued)

46-Inch Mower Deck—

Type	Rotary—Triple Spindles (Non-Serviceable)
Material Type	Stamped 2.5 mm (0.098 in.) Nominal Gauge Steel
Cutting Blade	Three—50.8 x 5 x 407.4 mm (2 x 0.2 x 16 in.)
Blade Cutting Edge	30±5° Angle
Blade Wing Lift/Height	20.3±3 mm (0.8±0.12 in.)
Overall Cutting Width	1168.4 mm (46 in.)
Overall Width (w/o discharge chute)	1308 mm (51.5 in.)
Drive Type	Single V-Belt (with spring-tensioned idler)
Spindle Lubrication	None—Supplier Fill Only
Lift Type	Manual—Operator’s Station
Cutting Settings	Seven: 31.75 mm—89 mm (1.25—3.5 in.)

Chassis:

Wheelbase	1135 mm (44.69 in.)
Overall Length	1524 mm (60 in.)
Overall Width (w/o mower deck)	908 mm (35.75 in.)
Height	980 mm (38.6 in.)
Average Overall Weight STX38 (with mower deck/no fuel)	195.05 kg (430 lbs)
Average Overall Weight STX46 (with mower deck/no fuel)	204.12 kg (450 lbs)
Hitch Capacity—	
Export:	
Horizontal Pull Maximum	250 N (56 lbs)
Tongue Weight Maximum	65 N (15 lbs)
Domestic:	
Trailer Load Maximum	136 kg (300 lbs)
Trailer Tongue Weight Maximum	23 kg (50 lbs)

Steering:

Type	Manual—Pinion/Sector
Axle Pivot Hub	Shim Adjustable
Lubrication	DuBois MPG-2® Multipurpose Grease
Lubrication Interval	10 hrs (maximum)
Toe-In	6 mm (0.24 in.) — Non-Adjustable
Turning Radius	584 mm (23 in.)

Wheels:


Size—	
Front	6.0 x 4.50
Rear	8.0 x 6.18

Tires:

Size—	
Front (STX30)	13 x 5—6 NHS (2 ply)
Rear (STX30)	18 x 6.50—8 NHS (2 ply)
Front (STX38 SN —210000)	13 x 6.50—6 NHS (2 ply)
Rear (STX38 SN —210000)	18 x 8.50—8 NHS (2 ply)
Front (STX38 SN 210001—270000)	13 x 6.50—6 NHS (2 ply)
Rear (STX38 SN 210001—270000)	18 x 9.50—8 NHS (2 ply)
Front (STX38 SN 270001—595000 & STX46)	15 x 6.50—6 NHS (2 ply)
Rear (STX38 SN 270001—595000 & STX46)	20 x 8.00—8 NHS (2 ply)
Pressure—	
Front (with mower deck)	83 kPa (12 psi)
Front (with snowthrower)	138 kPa (20 psi)
Rear (STX30 with mower deck)	97 kPa (14 psi)
Rear (with mower deck)	55 kPa (8 psi)



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	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	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	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 class. 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.

**METRIC FASTENER TORQUE
VALUE - GRADE 7**

Size	Steel or Gray Iron Torque		Aluminum Torque	
	N•m	lb-ft	N•m	lb-ft
M6	11	8	8	6
M8	24	18	19	14
M10	52	38	41	30
M12	88	65	70	52
M14	138	102	111	82
M16	224	165	179	132

