

JA60, JA62, JA65, JE75, JX75, and JX85 21-Inch Walk-Behind Mower (Cast Deck)

TECHNICAL MANUAL

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

**TM1723 (Mar01)
Replaces TM1723 (15Oct97)**



M88849

21" Walk-Behind Mower (Cast Deck)

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
- General Diagnostic Information
- Specifications
- Electrical Wiring Harness Legend
- Component Location
- System Schematic
- Wiring Harness
- Troubleshooting Chart
- Theory of Operation
- 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.

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.

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.

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 Horicon, WI
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Safety



Specifications and Information



Engine - B&S Quantum



Engine - B&S Intek



Engine - Kawasaki



Electrical



Power Train

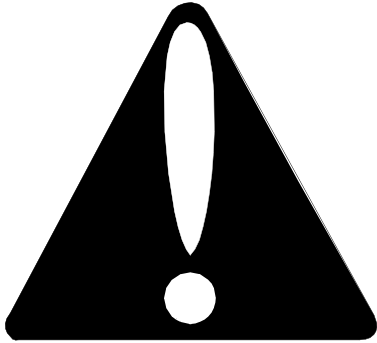


Miscellaneous





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.

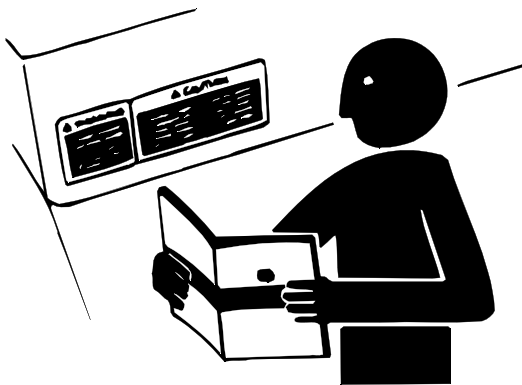
Follow recommended precautions and safe servicing practices.

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



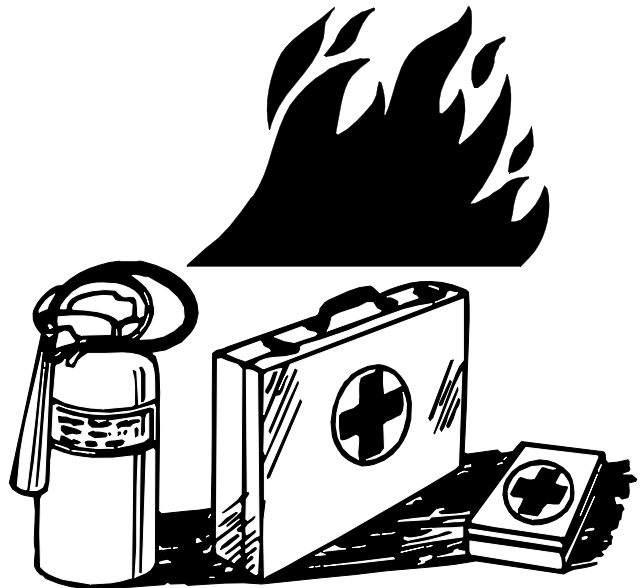
Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.

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.

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.

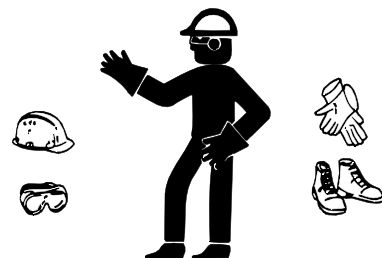
Do not store oily rags; they can ignite and burn spontaneously.

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.

Wear Protective Clothing

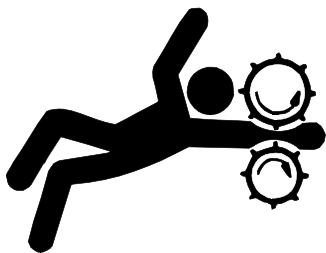


Wear close fitting clothing and safety equipment appropriate to the job.

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



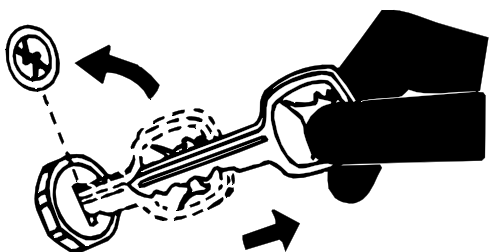
Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

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



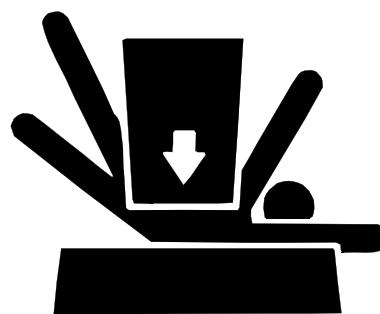
Before working on the machine:

1. Lower all equipment to the ground.
2. Stop the engine and remove the key.
3. Hang a "DO NOT OPERATE" tag in operator station.

Support Machine Properly And Use Proper Lifting Equipment

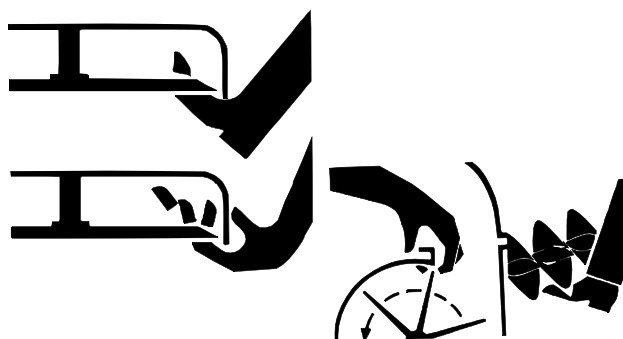
If you must work on a lifted machine or attachment, securely support the machine or attachment.

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.

Avoid Injury From Rotating Blades and PTO Shafts



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

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, or other sensitive parts and components may cause product malfunctions. Reduce pressure and spray at a 45 to 90 degree angle.

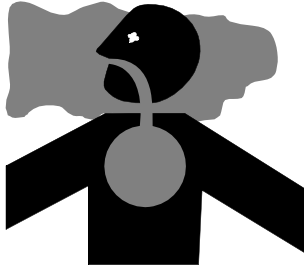
Illuminate Work Area Safely

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.

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.

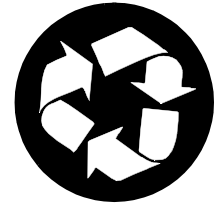
Avoid Harmful Asbestos Dust

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.

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 MOWER SPECIFICATIONS¹

ENGINE SPECIFICATIONS

| Product | JA60/JA62/JA65 | JA60/JA62/JA65 | JE75 | JX75/JX85 |
|------------------|--------------------------------|------------------------------|------------------------------|--|
| Manufacturer | Briggs & Stratton | Briggs & Stratton | Kawasaki | Kawasaki |
| Engine Model | 12J802 (Quantum) | 121602 (Intek) | FC150V-ES20 | FC150V-HS00 (JX75) FC150V-GS07 (JX85) |
| Type | 4-cycle gas/Air cooled | 4-cycle gas/Air cooled | 4-cycle gas/Air cooled | 4-cycle gas/Air cooled |
| Cylinders | 1 | 1 | 1 | 1 |
| Valves | Side valves | Overhead | Overhead | Overhead |
| Displacement | 190 cc (11.56 cu. in.) | 190 cc (11.56 cu. in.) | 153 cc (9.34 cu. in.) | 153 cc (9.34 cu. in.) |
| Horsepower | 4.5 kW (6 HP) | 4.8 kW (6.5 HP) | 4.1 kW (5.5 HP) | 4.1 kW (5.5 HP) |
| Lubrication | Splash | Splash | Pressure | Pressure |
| Oil filter | N/A | N/A | N/A | Replaceable (JX85 Only) |
| Oil Capacity | 0.65 L (22.0 oz) | 0.65 L (22.0 oz) | 0.6 L (20.0 oz) | 0.66 L (22.0 oz) w/filter |
| Throttle Control | Variable speed | Variable Speed | Variable speed | Variable speed |
| Slow Idle Speed | 1500 ± 100 rpm | 1500 ± 100 rpm | 1550 ± 100 rpm | 1550 ± 100 rpm |
| Fast Idle Speed | 3200 ± 100 rpm | 3200 ± 100 rpm | 3125 ± 75 rpm | 3125 ± 75 rpm |
| Carburetor | CARB/EPA Certified | CARB/EPA Certified | CARB/EPA Certified | CARB/EPA Certified |
| Choke | Primer bulb | Primer bulb | Manual | Manual |
| Cooling system | Air | Air | Air | Air |
| Air cleaner | Dry replaceable single element | Dry replaceable dual element | Dry replaceable dual element | Dry replaceable dual element |



ELECTRICAL SPECIFICATIONS

| | | | | |
|-----------------------|---------------------------------------|---------------------------------------|---|---|
| Ignition | Electronic | Electronic | Capacitive discharge | Capacitive discharge |
| Ignition Coil Air Gap | 0.15 – 0.25 mm (0.006 – 0.010 in.) | 0.15 – 0.36 mm (0.006 – 0.014 in.) | 0.30 mm (0.012 in.) | 0.30 mm (0.012 in.) |
| Spark Plug (resistor) | RCJ8 Champion | RC12YC Champion | RJ19LM Champion | RJ19LM Champion |
| Spark Plug Gap | 0.76 mm (0.030 in.) | 0.51 mm (0.020 in.) | 0.710 – 0.084 mm (0.028 – 0.033 in.) | 0.710 – 0.084 mm (0.028 – 0.033 in.) |

FUEL SYSTEM SPECIFICATIONS

| | | | | |
|-----------|---------------------|---------------------|---------------------|---------------------|
| Fuel type | Unleaded gasoline | Unleaded gasoline | Unleaded gasoline | Unleaded gasoline |
| Capacity | 1.5 L (1.6 U.S. qt) | 1.5 L (1.6 U.S. qt) | 1.3 L (1.4 U.S. qt) | 1.3 L (1.4 U.S. qt) |

TRANSMISSION SPECIFICATIONS

| | | | | |
|----------------|--|--|---------------------------|---------------------------|
| Make | Kanzaki Tuff Torq | Kanzaki Tuff Torq | Kanzaki Tuff Torq | Kanzaki Tuff Torq |
| Type | Two or Five Speed | Two or Five Speed | Five Speed | Five Speed |
| Drive belt | 3L – 861.0 mm (33.90 in.) | 3L – 861.0 mm (33.90 in.) | 3L – 861.0 mm (33.90 in.) | 3L – 861.0 mm (33.90 in.) |
| Transaxle | Fully enclosed; grease | Fully enclosed; grease | Fully enclosed; grease | Fully enclosed; grease |
| Gear selection | 2 or 5 Forward (except JA60 - Push) | 2 or 5 Forward (except JA60 - Push) | 5 Forward | 5 Forward |
| Brake | Blade brake (clutch) | Blade brake (clutch) | Blade brake (clutch) | Blade brake (clutch) |

DIMENSIONS

| | | | | |
|---------------------------|------------------|------------------|-------------------|-------------------|
| Tire & Wheel Size | 8.0 x 2.0 | 8.0 x 2.0 | 8.0 x 2.0 | 8.0 x 2.0 |
| Shipping Weight (Approx.) | (43.0 kg) 95 lb. | (44.0 kg) 98 lb. | (48.0 kg) 105 lb. | (54.0 kg) 120 lb. |

1. Specifications and design subject to change without notice.

| | | | | |
|-------------------------|---|--|--|--|
| Cutting Width | 53.34 cm (21 inches) | 53.34 cm (21 inches) | 53.34 cm (21 inches) | 53.34 cm (21 inches) |
| Cutting Height | 1.3 – 8.9 cm (0.5 – 3.5 inches) | 1.3 – 8.9 cm (0.5 – 3.5 inches) | 1.3 – 8.9 cm (0.5 – 3.5 inches) | 1.3 – 8.9 cm (0.5 – 3.5 inches) |
| Ground Speeds (2-Speed) | 1st - 3.2 kph (2.0 mph) 2nd - 4.8 kph (3.0 mph) | 1st - 3.2 kph (2.0 mph) 2nd - 4.8 kph (3.0 mph) | N/A | N/A |
| Ground Speeds (5-Speed) | 1st - 1.9 kph (1.2 mph) 2nd - 2.9 kph(1.8 mph) 3rd - 3.9 kph(2.4 mph) 4th - 4.8 kph(3.0 mph) 5th - 6.6 kph(4.1 mph) | 1st - 1.9 kph(1.2 mph) 2nd - 2.9 kph(1.8 mph) 3rd - 3.9 kph(2.4 mph) 4th - 4.8 kph(3.0 mph) 5th - 6.6 kph(4.1 mph) | 1st - 1.9 kph(1.2 mph) 2nd - 2.9 kph(1.8 mph) 3rd - 3.9 kph(2.4 mph) 4th - 4.8 kph(3.0 mph) 5th - 6.6 kph(4.1 mph) | 1st - 1.9 kph(1.2 mph) 2nd - 2.9 kph(1.8 mph) 3rd - 3.9 kph(2.4 mph) 4th - 4.8 kph(3.0 mph) 5th - 6.6 kph(4.1 mph) |



TORQUE SPECIFICATIONS

Briggs & Stratton Engine:

| | |
|---|-----------------------------|
| Spark Plug | 20 N•m (180 lb-in.) |
| Cylinder Head Cap Screw | 18 N•m (140 lb-in.) |
| Flywheel Nut Torque | 81 N•m (60 lb-ft.) |
| Intake Manifold Cap Screw | 13.5 N•m (120 lb-in.) |
| Muffler Shoulder Bolts (6.0 Quantum) | 10 N•m (89 lb-in.) |
| Muffler Bolts (6.5 Intek) | 10 N•m (89 lb-in.) |
| Muffler Cylinder Head Bolts (6.5 Intek) | 9.6 N•m (85 lb-in.) |
| Carburetor Mount | 10 N•m (89 lb-in.) |
| Connecting Rod Cap Screw | 11.3 N•m (100 lb-in.) |
| Crankcase Cover Cap Screw | 9.6 N•m (85 lb-in.) |
| Engine to Housing Cap Screws | 55 ± 14 N•m (40 ± 10 lb-ft) |

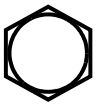
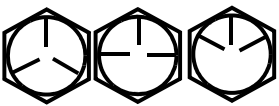
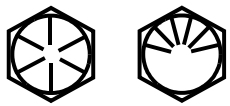





Kawasaki Engine:

| | |
|------------------------------|-----------------------------|
| Spark Plug | 20 N•m (180 lb-in.) |
| Cylinder Head Cap Screw | |
| Initial Torque | 18 N•m (159 lb-in.) |
| Final Torque | 24 N•m (212 lb-in.) |
| Flywheel Nut Torque | 45 N•m (33 lb-ft.) |
| Muffler Nuts | 10 N•m (89 lb-in.) |
| Carburetor Mount | 9 N•m (90 lb-in.) |
| Connecting Rod Cap Screw | 12 N•m (106 lb-in.) |
| Crankcase Cover Cap Screw | 7 N•m (62 lb-in.) |
| Engine to Housing Cap Screws | 55 ± 14 N•m (40 ± 10 lb-ft) |
| Rocker Arm Lock Nut | 7 N•m (62 lb-in.) |

Blade and Blade Brake Clutch:

| | |
|--|-----------------------------|
| Blade Brake Clutch Release Spring Bracket to Deck | 11 N•m (97 lb-in.) |
| Blade Brake Clutch (Center Bolt) | 75 ± 14 N•m (55 ± 10 lb-ft) |
| Mower Blade to Blade Brake Clutch | 75 N•m (55 lb-ft) |
| Mower Blade to Crankshaft Blade Adaptor (JA60 & JA62 Only) | 75 ± 14 N•m (55 ± 10 lb-ft) |

INCH FASTENER TORQUE VALUES

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

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.

^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.

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

Reference: JDS—G200.

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.

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