

Product: John Deere 220A Walk-Behind Greensmower Service Repair Technical Manual

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# 220A Walk-Behind Greensmower

Serial No. (030001— )

## TECHNICAL MANUAL

**John Deere**  
**Lawn & Grounds Care Division**  
**TM1680 (01/Dec/96)**

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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 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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Horicon, Wisconsin  
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## Safety



## Specifications and General Information



## Engine (Honda GX120)



## Electrical



## Power Train



## Handlebars and Controls



## Brakes



## Cutting Unit

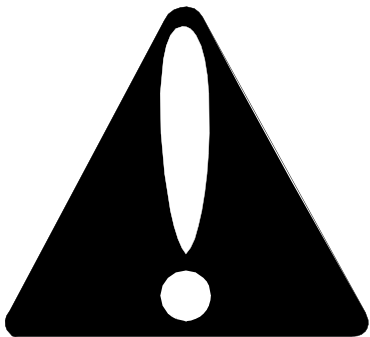


## Miscellaneous





### 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.

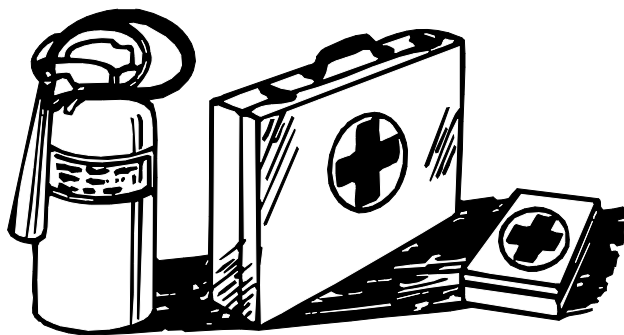
### REPLACE SAFETY SIGNS



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

### 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.

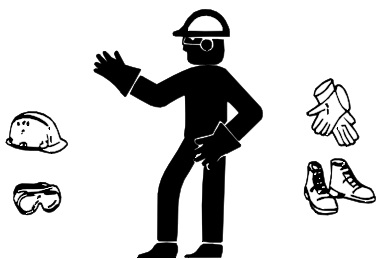
Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.

## USE SAFE SERVICE PROCEDURES

### Wear Protective Clothing

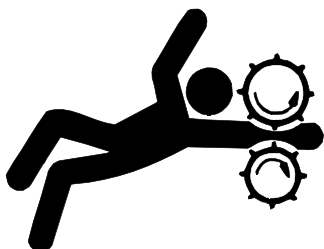


Wear close fitting clothing and safety equipment appropriate to the job.

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



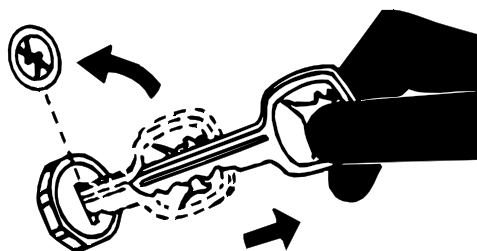
Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

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.

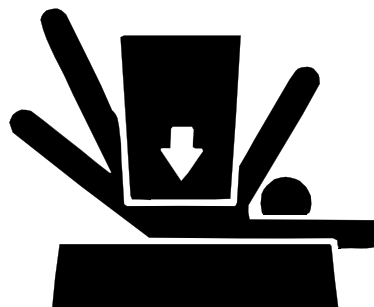
## Park Machine Safely



### 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:

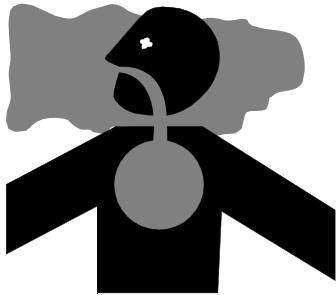
1. Clean work area and machine.
2. Make sure you have all necessary tools to do your job.
3. Have the right parts on hand.
4. Read all instructions thoroughly; do not attempt shortcuts.



### 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



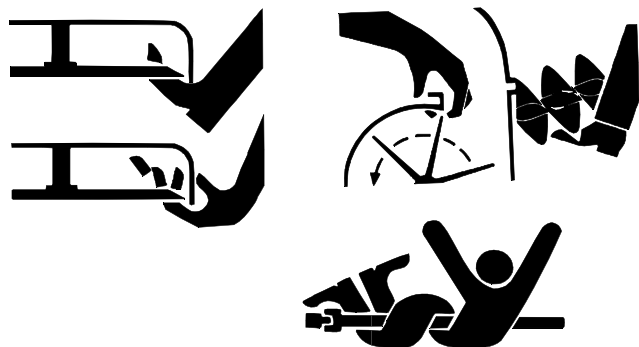
Explosive separation of a tire and rim parts can cause serious injury or death.

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.

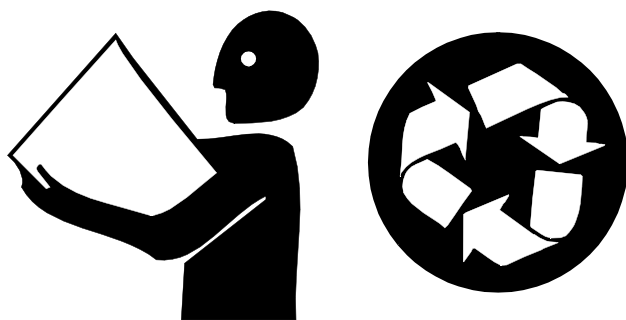
Check wheels for low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.

## 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.

## 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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# CONTENTS

Page



## SPECIFICATIONS AND GENERAL INFORMATION

### GENERAL SPECIFICATIONS

VEHICLE SPECIFICATIONS . . . . . 2-2

### REPAIR INFORMATION

METRIC FASTENER TORQUE VALUES . . . . . 2-4

INCH FASTENER TORQUE VALUES . . . . . 2-5

### GASOLINE

4-CYCLE ENGINES—NORTH AMERICA . . . . . 2-6

GASOLINE STORAGE . . . . . 2-6

4-CYCLE ENGINES—EUROPE . . . . . 2-7

GASOLINE STORAGE . . . . . 2-7

### OILS AND LUBRICANTS

4-CYCLE GASOLINE ENGINE OIL—NORTH AMERICA . . . . . 2-8

4-CYCLE GASOLINE ENGINE OIL—EUROPE . . . . . 2-9

SPEED REDUCER OIL—NORTH AMERICA . . . . . 2-10

SPEED REDUCER OIL—EUROPE . . . . . 2-10

REEL SUPPORT GREASE—NORTH AMERICA . . . . . 2-11

REEL SUPPORT GREASE—EUROPE . . . . . 2-11

ANTI-CORROSION GREASE . . . . . 2-12

GREASE—NORTH AMERICA . . . . . 2-13

GREASE—EUROPE . . . . . 2-13

ALTERNATIVE LUBRICANTS . . . . . 2-14

SYNTHETIC LUBRICANTS . . . . . 2-14

LUBRICANT STORAGE . . . . . 2-14

MIXING OF LUBRICANTS . . . . . 2-14

### SERIAL NUMBER LOCATIONS

SERIAL NUMBER LOCATION . . . . . 2-15

MACHINE IDENTIFICATION NUMBER . . . . . 2-15

ENGINE SERIAL NUMBER . . . . . 2-15

CARBURETOR IDENTIFICATION NUMBER . . . . . 2-15

### OPERATIONAL CHECKOUT PROCEDURES

ENGINE OIL LEVEL CHECK . . . . . 2-16

SPEED REDUCER OIL LEVEL CHECK . . . . . 2-16

THROTTLE LEVER CHECK . . . . . 2-17

OPERATOR PRESENCE BAIL CHECK . . . . . 2-18

PARK BRAKE CHECK . . . . . 2-18

TRAVEL CLUTCH CHECK . . . . . 2-19

REEL CLUTCH CHECK . . . . . 2-19

## GENERAL SPECIFICATIONS

## VEHICLE SPECIFICATIONS



### ENGINE

|                     |                                  |
|---------------------|----------------------------------|
| Make                | Honda                            |
| Type                | Gasoline, 25° Incline            |
| Model               | GX120 K1LJD2                     |
| Aspiration          | Natural                          |
| Horsepower          | 3.1 kW (4.0 hp)                  |
| Cylinders           | 1                                |
| Displacement        | 118 cm <sup>3</sup> (7.2 cu in.) |
| Stroke/Cycle        | 4 Cycle                          |
| Bore                | 60 mm (2.4 in.)                  |
| Stroke              | 42 mm (1.7 in.)                  |
| Compression Ratio   | 8.5:1                            |
| Slow Idle           | 1400 +220/-150 rpm               |
| Fast Idle           | 3450 ±150 rpm                    |
| Timing              | 25° BTDC                         |
| Valving             | Overhead Valves                  |
| Lubrication         | Splash                           |
| Cooling System      | Forced Air                       |
| Air Cleaner         | Dual-Element (Silent) Type       |
| Carburetor          | Externally Vented                |
| Muffler             | In-line                          |
| Engine Oil Capacity | 0.56 L (0.59 qt)                 |
| Type of Starter     | Recoil                           |
| Weight              | 15.5 kg. (34.2 lb)               |

### FUEL SYSTEM

|                       |                              |
|-----------------------|------------------------------|
| Fuel Tank Location    | On Engine                    |
| Fuel Tank Capacity    | 2.5 L (0.66 gal)             |
| Fuel (minimum octane) | Unleaded Gasoline, 87 Octane |
| Fuel Delivery         | Gravity                      |
| Carburetor            | Float-type Side Draft        |
| Fuel Filter           | Screen                       |

### ELECTRICAL

|          |                        |
|----------|------------------------|
| Ignition | Transistorized Magneto |
|----------|------------------------|

### DRIVE TRAIN/TRAVELING DEVICE

|                 |                                  |
|-----------------|----------------------------------|
| Traction Roller | Smooth Surface, Dual Aluminium   |
| Traveling Speed |                                  |
| Forward Speed   | 9.2 km/h (5.5 mph)               |
| Mow Speed       | 3.4 km/h (5.5 mph)               |
| Front Roller    | Machined Steel, Solid or Grooved |

### BRAKES

|            |                            |
|------------|----------------------------|
| Park Brake | Band Type, lever Activated |
|------------|----------------------------|

CUTTING UNIT

|                          |                                   |
|--------------------------|-----------------------------------|
| Cutting Width            | 559 mm (22 in.)                   |
| Cutting Height (minimum) |                                   |
| Standard—3.0 mm Bedknife | 3.2 mm (1/8 in.)                  |
| Optional—2.5 mm Bedknife | 2.8 mm (7/64 in.)                 |
| Cutting Height (maximum) | 22.2 mm (7/8 in.)                 |
| Frequency of Clip        | 5 mm (0.195 in.)                  |
| Reel                     |                                   |
| Diameter                 | 127 mm (5 in.)                    |
| Number of Blades         | 11                                |
| Material                 | Heat Treated Special Alloy Steel  |
| Grass Catcher            | Rotational Moulded Poly Propylene |



WEIGHTS AND DIMENSIONS















|  |                    |
|--|--------------------|
| Weight (less GTC and Wheels, with Grass Catcher) | 99.5 kg (219 lb)   |
| Width  | 946 mm (37.25 in.) |
| Length   | 940 mm (37.00 in.) |
| Height   | 1.119 m (46.8 in.) |

WHEELS AND TIRES

|          |                         |
|----------|-------------------------|
| Size     | 4.1-6 (2 pr) Tubeless   |
| Pressure | 125—140 kPa (18—20 psi) |

(Specifications and design subject to change without notice.)

## 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 |

|      | Class 4.8               |       |                  |       | Class 8.8 or 9.8        |       |                  |       | Class 10.9              |       |                  |       | Class 12.9              |       |                  |       |
|------|-------------------------|-------|------------------|-------|-------------------------|-------|------------------|-------|-------------------------|-------|------------------|-------|-------------------------|-------|------------------|-------|
|      | Lubricated <sup>a</sup> |       | Dry <sup>a</sup> |       | Lubricated <sup>a</sup> |       | Dry <sup>a</sup> |       | Lubricated <sup>a</sup> |       | Dry <sup>a</sup> |       | Lubricated <sup>a</sup> |       | Dry <sup>a</sup> |       |
| SIZE | 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  $\pm 10\%$  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.

<sup>a</sup> "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 <sup>b</sup><br>No Marks  | 5  5.1  5.2  | 8  8.2  |
| SAE Grade and Nut Markings  | 2<br>No Marks                    | 5     | 8       |

TS1162

|       | Grade 1                 |       |                  |       | Grade 2 <sup>b</sup>    |       |                  |       | Grade 5, 5.1 or 5.2     |       |                  |       | Grade 8 or 8.2          |       |                  |       |
|-------|-------------------------|-------|------------------|-------|-------------------------|-------|------------------|-------|-------------------------|-------|------------------|-------|-------------------------|-------|------------------|-------|
|       | Lubricated <sup>a</sup> |       | Dry <sup>a</sup> |       | Lubricated <sup>a</sup> |       | Dry <sup>a</sup> |       | Lubricated <sup>a</sup> |       | Dry <sup>a</sup> |       | Lubricated <sup>a</sup> |       | Dry <sup>a</sup> |       |
| SIZE  | 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  $\pm 10\%$  variance factor. Check tightness of fasteners periodically. DO NOT use air powered wrenches.

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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.

<sup>a</sup> "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.

<sup>b</sup> "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:

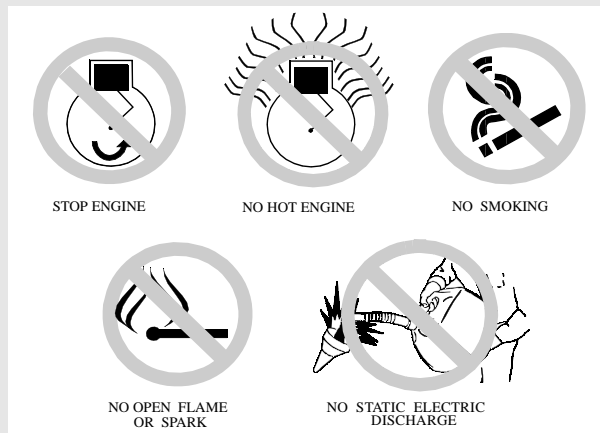
- indoors, always fill gas tank outdoors;
- machine is near an open flame or sparks;
- engine is running, **STOP** engine;
- engine is hot, allow it to cool sufficiently first;
- smoking.

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.

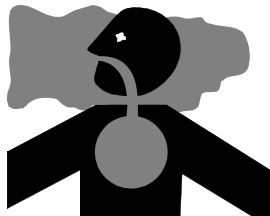


To avoid engine damage:

- 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:

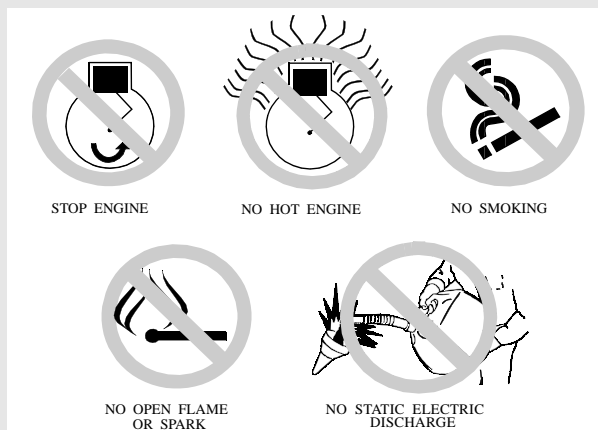
- indoors, always fill gas tank outdoors;
- machine is near an open flame or sparks;
- engine is running, **STOP** engine;
- engine is hot, allow it to cool sufficiently first;
- smoking.

**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.

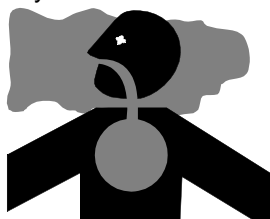


**To avoid engine damage:**

- 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.

## OILS AND LUBRICANTS

## 4-CYCLE GASOLINE ENGINE OIL—NORTH AMERICA

Use the appropriate oil viscosity based on the expected air temperature range during the period between recommended oil changes. Operating outside of these recommended oil air temperature ranges may cause premature engine failure.

*NOTE: For a new or rebuilt engine, the oil should be changed after first 20 hours of use.*

The following John Deere oils are **PREFERRED**:

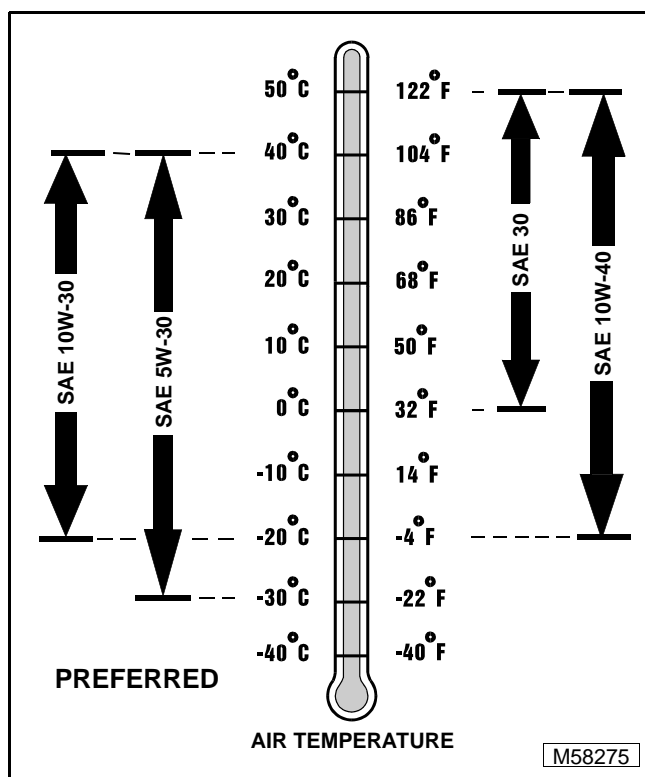
- **PLUS-4®—SAE 10W-30;**
- **TORQ-GARD SUPREME®—SAE 5W-30.**

The following John Deere oils are **also recommended**, based on their specified temperature range:

- **TURF-GARD®—SAE 10W-30;**
- **PLUS-4®—SAE 10W-40;**
- **TORQ-GARD SUPREME®—SAE 30.**

Other oils may be used if above John Deere oils are not available, provided they meet one of the following specifications:

- SAE 5W-30—API Service Classification SG or higher;
- SAE 10W-30—API Service Classification SG or higher;
- SAE 30—API Service Classification SC or higher.



**John Deere Distributors:** You may want to cross-reference the following publications to recommend the proper oil for your customers:

- Module DX, ENOIL2 in JDS-G135;
- Section 530, Lubricants & Hydraulics, of the John Deere Merchandise Sales Guide;
- Lubrication Sales Manual PI7032.



## 4-CYCLE GASOLINE ENGINE OIL—EUROPE

Use the appropriate oil viscosity based on the expected air temperature range during the period between recommended oil changes. Operating outside of these recommended oil air temperature ranges may cause premature engine failure.

**NOTE:** For a new or rebuilt engine, the oil should be changed after first 20 hours of use.

The following John Deere oils are **PREFERRED**:

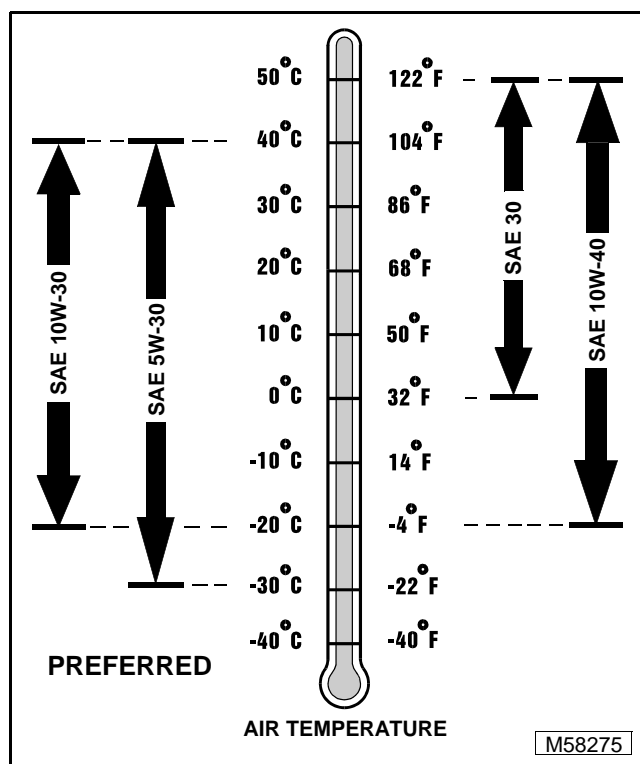
- **UNI-GARD™—SAE 10W-30;**
- **TORQ-GARD SUPREME®—SAE 5W-30;**
- **UNI-GARD™—SAE 5W-30.**

The following John Deere oils are **also recommended**, based on their specified temperature range:

- **TORQ-GARD SUPREME®—SAE 10W-30;**
- **UNI-GARD™—SAE 10W-40;**
- **TORQ-GARD SUPREME®—SAE 30;**
- **UNI-GARD™—SAE 30.**

Other oils may be used if above John Deere oils are not available, provided they meet one of the following specifications:

- CCMC Specification G4 or higher.



**John Deere Distributors:** You may want to cross-reference the following publications to recommend the proper oil for your customers:

- Module DX, ENOIL2 in JDS-G135;
- Section 530, Lubricants & Hydraulics, of the John Deere Merchandise Sales Guide.

## SPEED REDUCER OIL—NORTH AMERICA

Use the appropriate oil viscosity based on the air temperature ranges. Operating outside of these recommended oil air temperature ranges may cause premature gear case failure.

**IMPORTANT:** ONLY use a quality oil in this gear case. DO NOT mix any other oils in this gear case. DO NOT use BIO-HY-GARD® in this gear case.

The following John Deere gear case oil is **PREFERRED**:

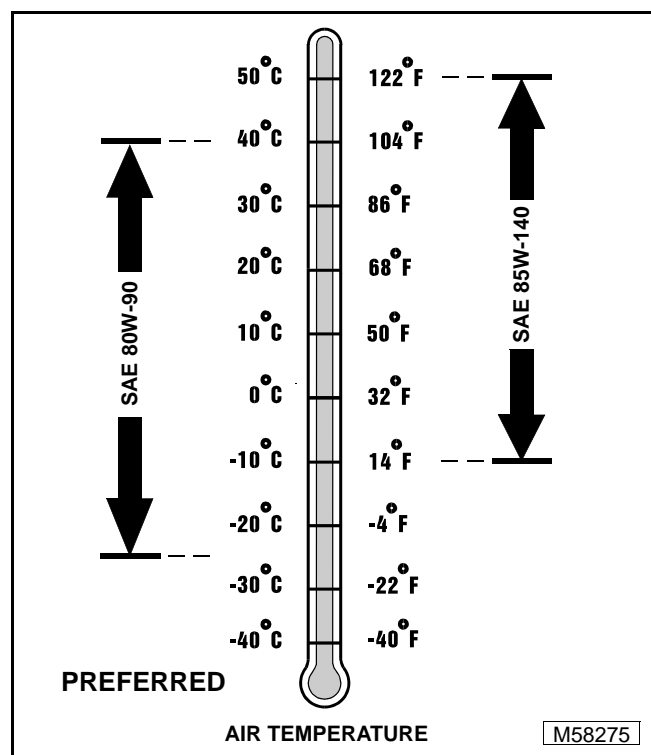
- GL-5 GEAR LUBRICANT®—SAE 80W-90.

The following John Deere gear case oil is **also recommended** if above preferred oil is not available:

- GL-5 GEAR LUBRICANT®—SAE 85W-140.

Other gear case oils may be used if above recommended John Deere gear case oils are not available, provided they meet the following specification:

- API Service Classification GL-5.



**John Deere Distributors:** You may want to cross-reference the following publications to recommend the proper oil for your customers:

- Module DX, GEOIL in JDS-G135;
- Section 530, Lubricants & Hydraulics, of the John Deere Merchandise Sales Guide;
- Lubrication Sales Manual PI7032.

## SPEED REDUCER OIL—EUROPE

Use the appropriate oil viscosity based on the air temperature ranges. Operating outside of these recommended oil air temperature ranges may cause premature gear case failure.

**IMPORTANT:** ONLY use a quality oil in this gear case. DO NOT mix any other oils in this gear case. DO NOT use BIO-HY-GARD® in this gear case.

The following John Deere gear case oil is **PREFERRED**:

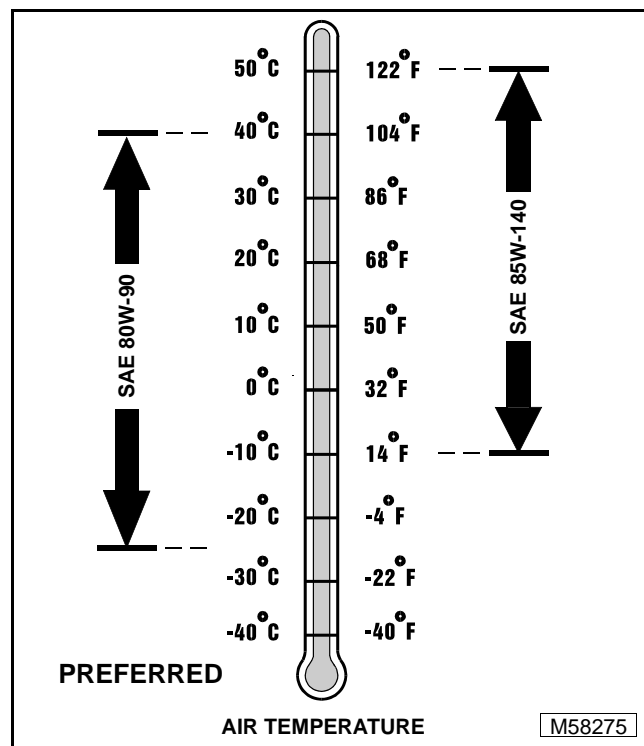
- EXTREME-GARD™—SAE 80W-90.

The following John Deere gear case oil is **also recommended** if above preferred oil is not available:

- EXTREME-GARD™—SAE 85W-140.

Other gear case oils may be used if above recommended John Deere gear case oils are not available, provided they meet the following specification:

- API Service Classification GL-5.



**John Deere Distributors:** You may want to cross-reference the following publications to recommend the proper oil for your customers:

- Module DX, GEOIL in JDS-G135;
- Section 530, Lubricants & Hydraulics, of the John Deere Merchandise Sales Guide.

## REEL SUPPORT GREASE—NORTH AMERICA

Use the following reel support greases based on the air temperature range. Operating outside of the recommended grease air temperature range may cause premature reel support failure.

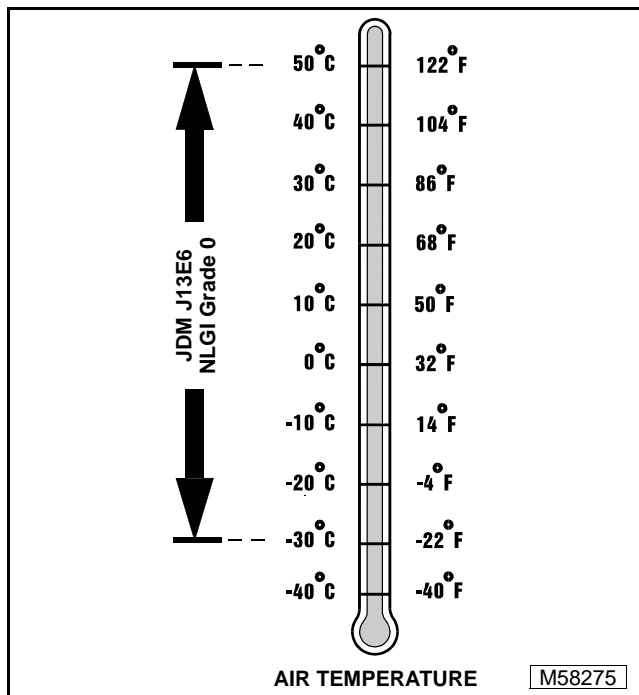
The following John Deere grease is **PREFERRED**:

- **CORN HEAD GREASE—JDM J13E6, NLGI Grade 0 (Polyurea Grease).**

Other greases may be used if above John Deere greases are not available, provided they **meet the following compatibility specifications only**:

- Polyurea Grease—NLGI Grade 0;
- Calcium Complex Grease—NLGI Grade 0.

**IMPORTANT: DO NOT** mix any other greases (including calcium, lithium, lithium complex, and lithium 12-hydroxy based greases) with above recommended greases, they are **NOT COMPATIBLE**. For best results, completely remove all non-compatible grease from housing and fill with above preferred grease or one of the other greases, which are compatible with each other. **DO NOT** use any **BIO-GREASE**.



**John Deere Distributors:** You may want to cross-reference the following publications to recommend the proper grease for your customers:

- Module DX,CORN in JDS-G135;
- Section 530, Lubricants & Hydraulics, of the John Deere Merchandise Sales Guide;
- Lubrication Sales Manual PI7032.

## REEL SUPPORT GREASE—EUROPE

Use the following reel support greases based on the air temperature range. Operating outside of the recommended grease air temperature range may cause premature reel support failure.

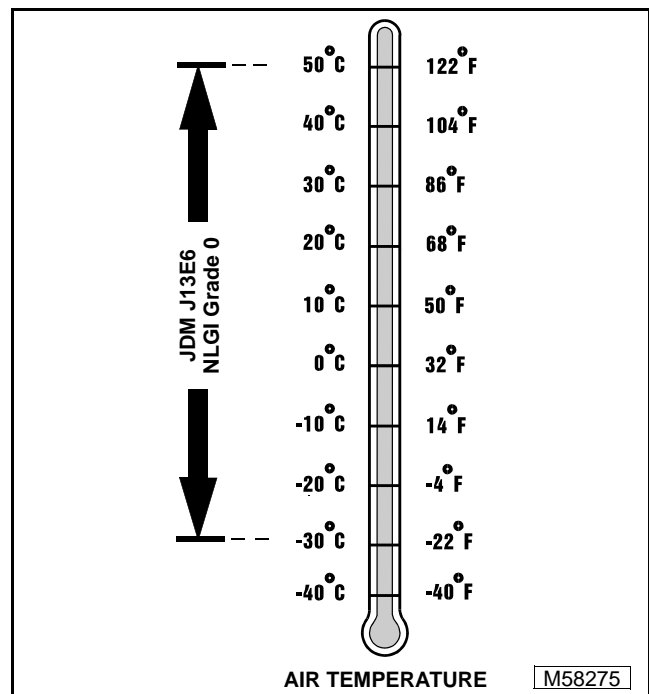
The following John Deere grease is **PREFERRED**:

- **GREASE-GARD®—JDM J13E6, NLGI Grade 0.**

Other greases may be used if above preferred John Deere grease is not available, provided they **meet the following compatibility specifications only**:

- Polyurea Grease—NLGI Grade 0;
- Calcium Complex Grease—NLGI Grade 0.

**IMPORTANT: DO NOT** mix any other greases (including calcium, lithium, lithium complex, and lithium 12-hydroxy based greases) with above recommended greases, they are **NOT COMPATIBLE**. For best results, completely remove all non-compatible grease from housing and fill with above preferred grease or one of the other greases, which are compatible with each other. **DO NOT** use any **BIO-GREASE**.



**John Deere Distributors:** You may want to cross-reference the following publications to recommend the proper grease for your customers:

- Module DX,CORN in JDS-G135;
- Section 530, Lubricants & Hydraulics, of the John Deere Merchandise Sales Guide.

## ANTI-CORROSION GREASE SPECIFICATIONS

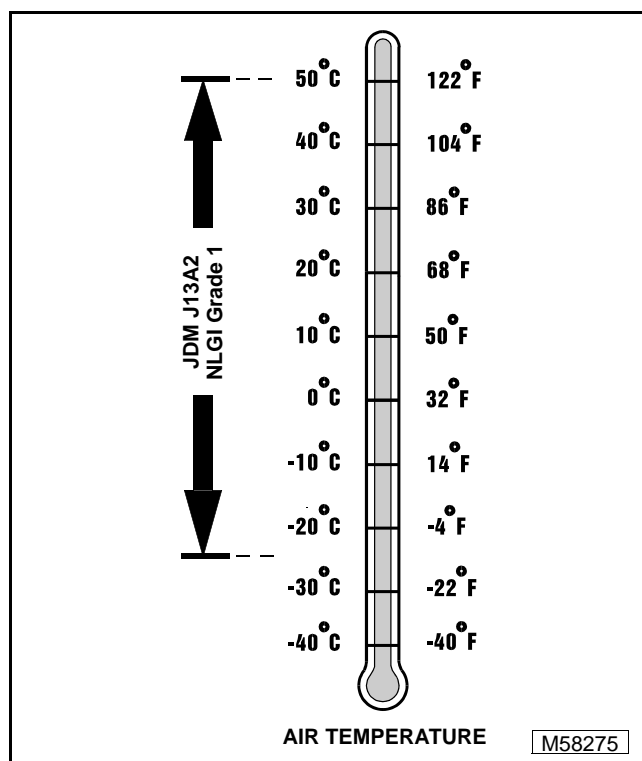
This anti-corrosion grease is formulated to provide the best protection against absorbing moisture, which is one of the major causes of corrosion. This grease is also superior in its resistance to separation and migration.

The following anti-corrosion grease is **PREFERRED**:

- **DuBois MPG-2® Multi-Purpose Polymer Grease—M79292.**

Other greases may be used if they meet or exceed the following specifications:

- John Deere Standard JDM J13A2, NLGI Grade 1.



**John Deere Distributors:** You may want to cross-reference the following publications to recommend the proper grease for your customers:

- Module DX,GREA1 in JDS—G135;
- Section 530, Lubricants & Hydraulics, of the John Deere Merchandise Sales Guide;
- Lubrication Sales Manual PI7032.

## GREASE—NORTH AMERICA

Use the following grease based on the air temperature range. Operating outside of the recommended grease air temperature range may cause premature failures.

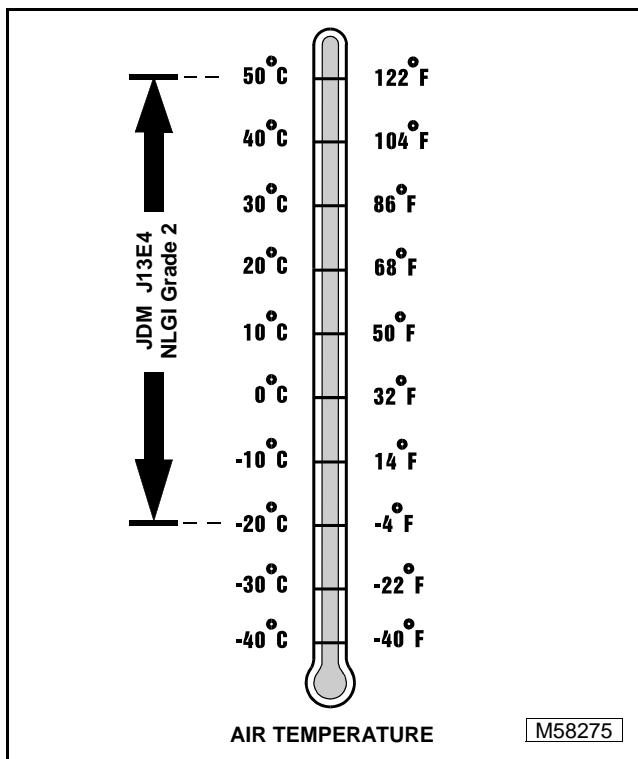
**IMPORTANT:** ONLY use a quality grease in this application. DO NOT mix any other greases in this application. DO NOT use any BIO-GREASE in this application.

The following John Deere grease is **PREFERRED**:

- **NON-CLAY HIGH-TEMPERATURE EP GREASE®—JDM J13E4, NLGI Grade 2.**

Other greases may be used if above preferred John Deere grease is not available, provided they meet the following specification:

- John Deere Standard JDM J13E4, NLGI Grade 2.



**John Deere Distributors:** You may want to cross-reference the following publications to recommend the proper grease for your customers:

- Module DX,GREA1 in JDS-G135;
- Section 530, Lubricants & Hydraulics, of the John Deere Merchandise Sales Guide;
- Lubrication Sales Manual PI7032.

## GREASE—EUROPE

Use the following grease based on the air temperature range. Operating outside of the recommended grease air temperature range may cause premature failures.

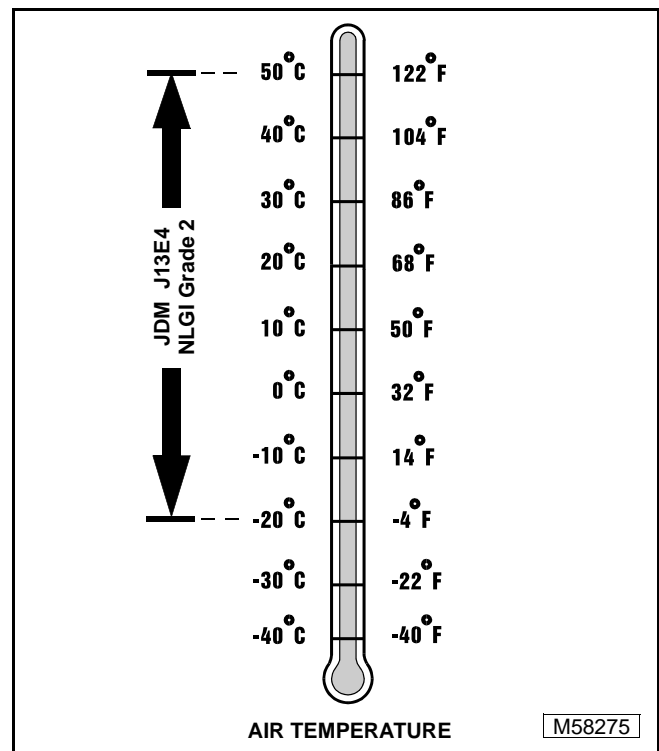
**IMPORTANT:** ONLY use a quality grease in this application. DO NOT mix any other greases in this application. DO NOT use any BIO-GREASE in this application.

The following John Deere grease is **PREFERRED**:

- **GREASE-GARD™—JDM J13E4, NLGI Grade 2.**

Other greases may be used if above preferred John Deere grease is not available, provided they meet the following specification:


- John Deere Standard JDM J13E4, NLGI Grade 2.



**John Deere Distributors:** You may want to cross-reference the following publications to recommend the proper grease for your customers:

- Module DX,GREA1 in JDS-G135;
- Section 530, Lubricants & Hydraulics, of the John Deere Merchandise Sales Guide.

## ALTERNATIVE LUBRICANTS



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

**IMPORTANT: Use of alternative lubricants could cause reduced life of the component.**

If alternative lubricants are to be used, it is recommended that the factory fill be thoroughly removed before switching to any alternative lubricant.

## SYNTHETIC LUBRICANTS

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

The recommended air temperature limits and service or lubricant 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.

## LUBRICANT STORAGE

All machines operate at top efficiency only when clean lubricants are used. Use clean storage containers to handle all lubricants. Store them in an area protected from dust, moisture, and other contamination. Store drums on their sides. Make sure all containers are properly marked as to their contents. Dispose of all old, used containers and their contents properly.

## MIXING OF LUBRICANTS

In general, avoid mixing different brands or types of lubricants. Manufacturers blend additives in their lubricants to meet certain specifications and performance requirements. Mixing different lubricants can interfere with the proper functioning of these additives and lubricant properties which will downgrade their intended specified performance.

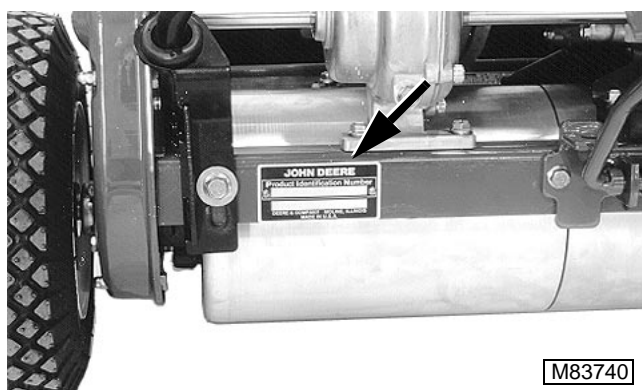
## SERIAL NUMBER LOCATION

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

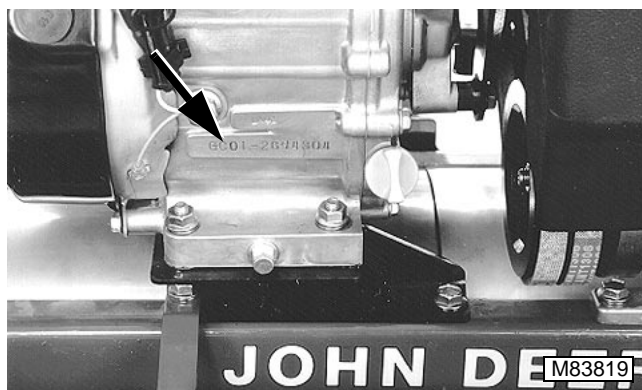
The location of the machine identification number and component serial numbers are shown.



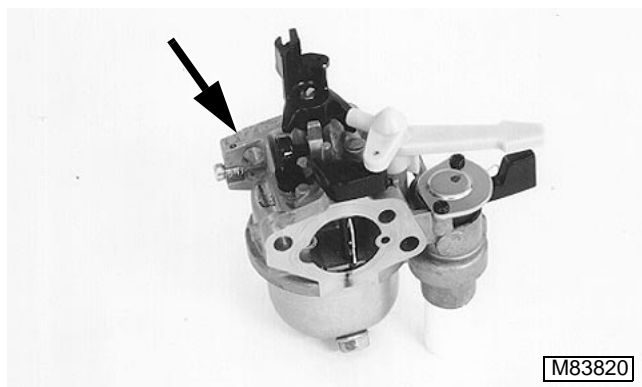
### MACHINE IDENTIFICATION NUMBER



### ENGINE SERIAL NUMBER



### CARBURETOR IDENTIFICATION NUMBER



## OPERATIONAL CHECKOUT PROCEDURES

The procedures covered in this group are used to give a quick checkout of all the systems and components on the unit. These checkouts should be run to insure proper operation after any extended storage, when the unit comes in for service and after repairs have been made on the unit. They can also be helpful in determining the value of the unit at trade-in time. The unit should be placed on a level surface to run checkout. All checkouts should be done and all the steps of each checkout should be followed.

Each checkout list:

- Conditions—How the unit should be set up for the checkout.
- Procedure—The specific action to be done.
- Normal—What should happen, or be heard, or seen.
- If Not Normal—Where to go if other tests or adjustments are needed.

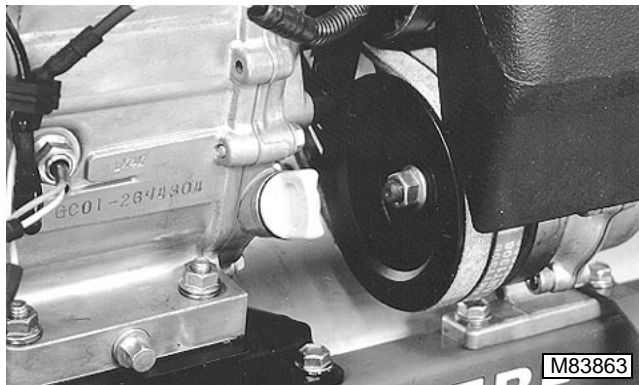
When performing the checkout, be sure to set your machine up to the test conditions listed and follow the sequence carefully. The "NORMAL" paragraph gives the result that should happen when performing the checkout. If the results are not normal, follow the instructions listed in the "IF NOT NORMAL" paragraph to determine the cause and repair the malfunction.

## ENGINE OIL LEVEL CHECK

### Conditions:

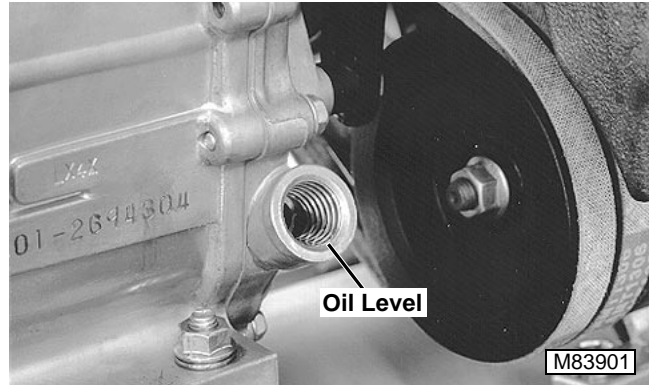
- Engine stopped.
- Machine parked on level surface.
- RUN/OFF switch in OFF position.
- Engine oil cold
- Block placed under front roller to level machine/engine

### Procedure:



1. Before removing dipstick, clean around dipstick.
2. Remove dipstick and check oil level.

### Normal:



- Oil level is to the outer edge of the oil filler neck.

### If Not Normal:

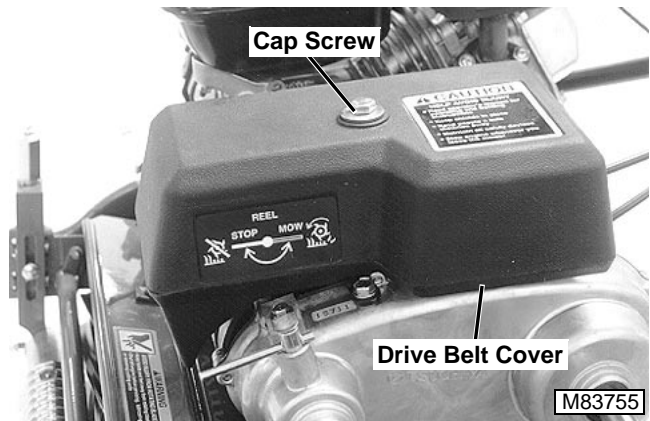
- Oil level is below outer edge of oil filler neck, add oil. (See 4-CYCLE GASOLINE ENGINE OIL—NORTH AMERICA on page 2-8, or 4-CYCLE GASOLINE ENGINE OIL—EUROPE on page 2-9.)

## SPEED REDUCER OIL LEVEL CHECK

### Conditions:

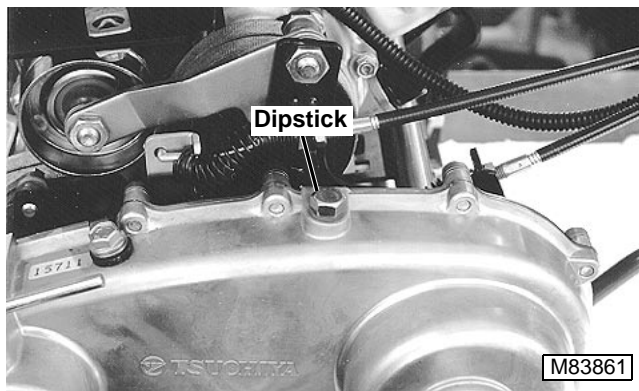
- Engine stopped.
- Machine parked on level surface.
- RUN/OFF switch in OFF position.
- Engine oil cold
- Block placed under front roller to level machine/speed reducer.

### Procedure:

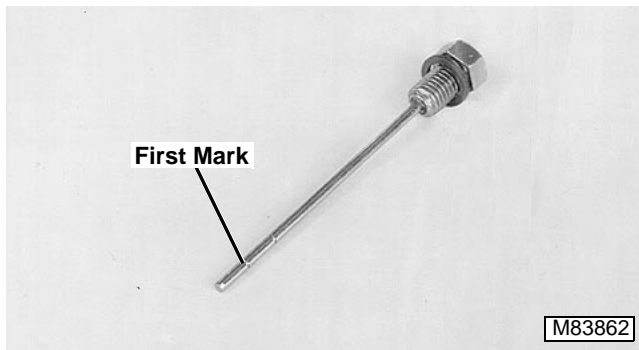


3. Remove cap screw and drive belt cover.





1. Before removing dipstick, clean around dipstick.
2. Wipe dipstick with a clean rag.
3. Thread dipstick into case.
4. Remove dipstick and check oil level.

**Normal:**

- Oil level is between bottom of dipstick and first mark.

**If Not Normal:**

- Oil level is below bottom of dipstick, add oil. (See SPEED REDUCER OIL—NORTH AMERICA on page 2-10, or SPEED REDUCER OIL—EUROPE on page 2-10.)
- Oil level is above first mark, drain excess oil until level is between bottom of dipstick and first mark.

**THROTTLE LEVER CHECK****Conditions:**

- Machine parked on level surface.
- Operator presence bail engaged.
- Travel clutch disengaged.
- Park brake engaged.

**Procedure:**

1. Start engine and run at slow idle (**1400 +220/-150 rpm**).



2. Move throttle from SLOW to FAST to SLOW positions.

**Normal:**

- Engine must accelerate and decelerate SMOOTHLY without hesitation.
- Throttle lever should move freely, yet hold desired position.

**If Not Normal:**

- Adjust throttle cable. (See THROTTLE CABLE CHECK AND ADJUSTMENT on page 3-22.)
- Adjust throttle lever tension. (See THROTTLE LEVER TENSION ADJUSTMENT on page 6-3.)

## OPERATOR PRESENCE BAIL CHECK



### Conditions:

- Engine running.
- Reel clutch in MOW position.
- Park brake disengaged.

### Procedure:



## CAUTION

Perform this check in a large, flat and open area away from people and/or stationary objects or structures.



1. Hold operator presence bail against handlebar.
2. Engage travel clutch lever.

### Normal:

- Transport drive (traction roller/transport wheels) should engage.
- Reel drive should engage.

### If Not Normal:

- Adjust operator presence bail. (See OPERATOR PRESENCE BAIL ADJUSTMENT on page 6-3.)
- Adjust drive belt tension. (See DRIVE BELT TENSION CHECK AND ADJUSTMENT on page 5-10.)
- Repair power train as necessary. (See POWER TRAIN—REPAIR.)

### Procedure:

3. Release operator presence bail.

### Normal:

- Transport drive (traction roller/transport wheels) should stop.
- Reel drive should stop.

### If Not Normal:

- Adjust belt guide. (See BELT GUIDE ADJUSTMENT on page 5-11.)

## PARK BRAKE CHECK

### Conditions:

- Engine running.
- Reel clutch in OFF position.
- Travel clutch disengaged.

### Procedure:



1. Move park brake lever to ENGAGED position.

### Normal:

- Engine should remain running.
- Machine should not move when pushed or pulled.
- Cutting reel should not move.

### If Not Normal:

- Adjust park brake. (See PARK BRAKE CHECK AND ADJUSTMENT on page 7-7.)

## TRAVEL CLUTCH CHECK

### Conditions:

- Engine running.
- Reel clutch in OFF position.
- Park brake disengaged.
- Operator presence bail engaged.

### Procedure:



## CAUTION

Perform this check in a large, flat and open area away from people and/or stationary objects or structures.



1. Engage travel clutch lever.

### Normal:

- Transport drive (traction roller/transport wheels) should engage.

### If Not Normal:

- Adjust drive belt tension. (See DRIVE BELT TENSION CHECK AND ADJUSTMENT on page 5-10.)
- Repair power train as necessary. (See POWER TRAIN—REPAIR.)

## REEL CLUTCH CHECK

### Conditions:

- Engine stopped.
- Machine parked on level surface.
- Park brake disengaged.

### Procedure:

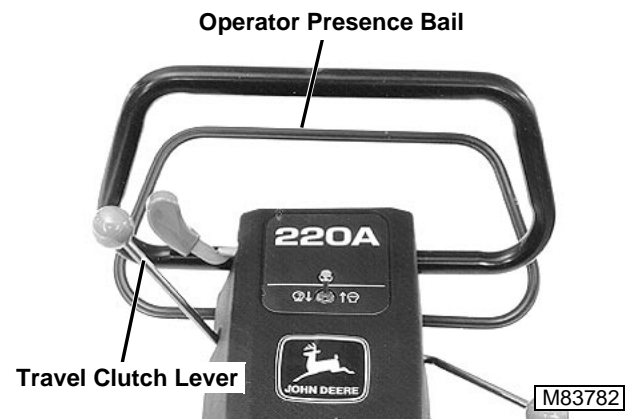


## CAUTION

Perform this check in a large, flat and open area away from people and/or stationary objects or structures.



1. Place reel clutch lever in MOW position.
2. Start engine and run at slow idle (1400 +220/-150 rpm).



3. Hold operator presence bail against handlebar.
4. Engage travel clutch lever.

### Normal:

- Transport drive (traction roller/transport wheels) should engage.
- Reel drive should engage.

### If Not Normal:

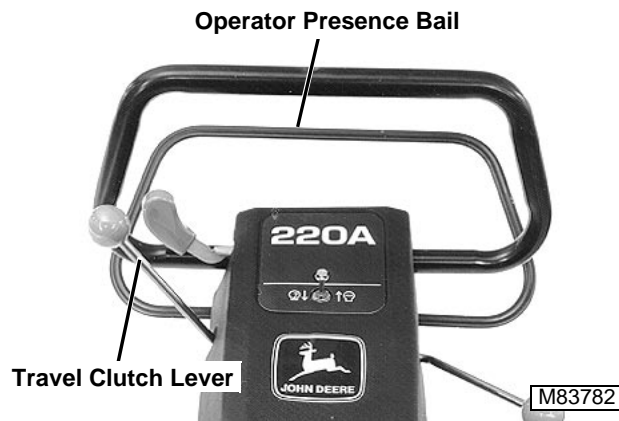
- Adjust drive belt tension. (See DRIVE BELT TENSION CHECK AND ADJUSTMENT on page 5-10.)
- Repair power train as necessary. (See POWER TRAIN—REPAIR.)

**Procedure:**

5. Release operator presence bail.



6. Place reel clutch lever in MOW position.



7. Hold operator presence bail against handlebar.
8. Engage travel clutch lever.

**Normal:**

- Transport drive (traction roller/transport wheels) should engage.
- Reel drive should not engage.

**If Not Normal:**

- Adjust drive belt tension. (See DRIVE BELT TENSION CHECK AND ADJUSTMENT on page 5-10.)
- Repair power train as necessary. (See POWER TRAIN—REPAIR.)

# CONTENTS

|  | Page |
|--|------|
| <b>ENGINE (HONDA GX120)</b>                        |      |
| <b>SPECIFICATIONS</b>                              |      |
| TEST AND ADJUSTMENT SPECIFICATIONS .....           | 3-3  |
| REPAIR SPECIFICATIONS .....                        | 3-3  |
| SPECIAL OR ESSENTIAL TOOLS .....                   | 3-7  |
| OTHER MATERIALS .....                              | 3-7  |
| SERVICE PARTS KITS .....                           | 3-8  |
| <b>COMPONENT LOCATION AND OPERATION</b>            |      |
| EXTERIOR ENGINE COMPONENTS .....                   | 3-9  |
| INTERNAL ENGINE COMPONENTS .....                   | 3-11 |
| LUBRICATION SYSTEM OPERATION .....                 | 3-12 |
| COOLING SYSTEM OPERATION .....                     | 3-14 |
| <b>TROUBLESHOOTING</b>                             |      |
| ENGINE AND FUEL SYSTEM TROUBLESHOOTING CHART ..... | 3-16 |
| ENGINE TROUBLESHOOTING GUIDE .....                 | 3-18 |
| <b>CHECKS, TESTS AND ADJUSTMENTS</b>               |      |
| THROTTLE CABLE CHECK AND ADJUSTMENT .....          | 3-22 |
| SLOW IDLE SPEED ADJUSTMENT .....                   | 3-22 |
| GOVERNOR/FAST IDLE SPEED ADJUSTMENT .....          | 3-23 |
| CYLINDER COMPRESSION TEST .....                    | 3-23 |
| VALVE CLEARANCE, CHECK AND ADJUSTMENT .....        | 3-24 |
| SPARK TEST .....                                   | 3-25 |
| SPARK PLUG GAP ADJUSTMENT .....                    | 3-26 |
| <b>REPAIR</b>                                      |      |
| FUEL TANK .....                                    | 3-27 |
| FUEL FILTER .....                                  | 3-27 |
| THROTTLE CABLE .....                               | 3-28 |
| MUFFLER .....                                      | 3-28 |
| ENGINE .....                                       | 3-29 |
| AIR CLEANER ASSEMBLY                               |      |
| Removal/Installation .....                         | 3-30 |
| Service .....                                      | 3-31 |
| THROTTLE PLATE ASSEMBLY .....                      | 3-32 |
| CARBURETOR   |      |
| Removal/Installation .....                         | 3-32 |
| Disassembly/Assembly .....                         | 3-34 |
| Clean/Inspect/Rebuild .....                        | 3-35 |
| Pilot Screw and Limiter Cap Replacement .....      | 3-35 |
| Float Level Adjustment .....                       | 3-36 |
| BLOWER HOUSING .....                               | 3-36 |
| RECOIL STARTER                                     |      |
| Removal/Installation .....                         | 3-37 |
| Disassembly/Inspection .....                       | 3-37 |
| Assembly .....                                     | 3-38 |



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**Page**

**REPAIR (Continued)**

**IGNITION COIL**

|                                |      |
|--------------------------------|------|
| Removal/Installation . . . . . | 3-39 |
| Air Gap Adjustment . . . . .   | 3-39 |
| Test . . . . .                 | 3-40 |

|                    |      |
|--------------------|------|
| FLYWHEEL . . . . . | 3-40 |
|--------------------|------|

|                            |      |
|----------------------------|------|
| ROCKER ARM COVER . . . . . | 3-41 |
|----------------------------|------|

**CYLINDER HEAD AND VALVES**

|                                   |      |
|-----------------------------------|------|
| Removal/Installation . . . . .    | 3-41 |
| Disassembly/Assembly . . . . .    | 3-42 |
| Inspection . . . . .              | 3-43 |
| Valve Guide Replacement . . . . . | 3-44 |

|                          |      |
|--------------------------|------|
| ANALYZE VALVES . . . . . | 3-45 |
|--------------------------|------|

|                                   |      |
|-----------------------------------|------|
| RECONDITION VALVE SEATS . . . . . | 3-46 |
|-----------------------------------|------|

|                      |      |
|----------------------|------|
| LAP VALVES . . . . . | 3-47 |
|----------------------|------|

**REDUCTION ASSEMBLY**

|  |      |
|--|------|
| Removal/Installation . . . . .         | 3-47 |
| Bearing/Oil Seal Replacement . . . . . | 3-48 |

**CRANKCASE COVER**

|   |      |
|---|------|
| Removal/Installation . . . . .          | 3-48 |
| Bearing/Inspection Replacement. . . . . | 3-49 |

**CAMSHAFT AND TAPPETS**

|                                |      |
|--------------------------------|------|
| Removal/Installation . . . . . | 3-49 |
| Inspection . . . . .           | 3-50 |

**PISTON AND CONNECTING ROD**

|  |      |
|--|------|
| Removal . . . . .                                      | 3-50 |
| Installation . . . . .                                 | 3-51 |
| Disassembly . . . . .                                  | 3-51 |
| Assembly . . . . .                                     | 3-52 |
| Inspection . . . . .                                   | 3-53 |
| Check Connecting Rod Side Play . . . . .               | 3-55 |
| Check Connecting Rod-to-Crankshaft Clearance . . . . . | 3-55 |
| Check Piston Ring End Gap . . . . .                    | 3-55 |

|                                    |      |
|------------------------------------|------|
| ANALYZE PISTON RING WEAR . . . . . | 3-55 |
|------------------------------------|------|

|                               |      |
|-------------------------------|------|
| ANALYZE PISTON WEAR . . . . . | 3-57 |
|-------------------------------|------|

**CRANKSHAFT**

|  |      |
|--|------|
| Removal/Installation . . . . .                   | 3-58 |
| Inspection . . . . .                             | 3-58 |
| Timing/Governor Drive Gear Replacement . . . . . | 3-58 |

|  |      |
|--|------|
| ANALYZE CRANKSHAFT AND CONNECTING ROD WEAR . . . . . | 3-59 |
|--|------|

**CYLINDER BLOCK**

|   |      |
|---|------|
| Inspection . . . . .                    | 3-59 |
| Bearing Inspection/Replacement. . . . . | 3-60 |
| Oil Seal Replacement . . . . .          | 3-60 |
| Deglaze Cylinder Bore. . . . .          | 3-60 |
| Rebore Cylinder Bore . . . . .          | 3-60 |

|                    |      |
|--------------------|------|
| GOVERNOR . . . . . | 3-61 |
|--------------------|------|

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