# XUV560E and XUV560E S4 Gator™ Utility Vehicles

**(Serial No. 040001 - )**

## TECHNICAL MANUAL
## XUV560E and XUV560E S4 Gator™ Utility Vehicles (Serial No. 040001-)

**TM159819 30NOV20 (ENGLISH)**

**John Deere Horicon Works**
PRINTED IN U.S.A.

# Introduction

## Foreword

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual and are recommended for use.

Live with safety: Read the safety messages in the introduction of this manual and the cautions presented throughout the text of the manual.

 This is the safety-alert symbol. When you see this symbol on the machine or in this manual, be alert to the potential for personal injury.

Technical manuals are divided in two parts: repair and operation and tests. Repair sections tell how to repair the components. Operation and tests sections help you identify the majority of routine failures quickly.

Information is organized in groups for the various components requiring service instruction. At the beginning of each group are summary listings of all applicable essential tools, service equipment and tools, other materials needed to do the job, service parts kits, specifications, wear tolerances, and torque values.

Technical Manuals are concise guides for specific machines. They are on-the-job guides containing only the vital information needed for diagnosis, analysis, testing, and repair.

Fundamental service information is available from other sources covering basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic type of failures and their causes.

DX,TMIFC -19-15APR14-1/1

# Contents



**Continued on next page**

*Original Instructions. 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.*

# Section 10
# General Information—Repair

## Contents

## Recognize Safety Information

This is a 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 operating practices.

T81389 —UN—28JUN13

DX,ALERT -19-29SEP98-1/1

## Understand Signal Words

**DANGER**; The signal word DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING**; The signal word WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION**; The signal word CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. CAUTION may also be used to alert against unsafe practices associated with events which could lead to personal injury.


TS187 —19—30SEP88

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.

DX,SIGNAL -19-05OCT16-1/1

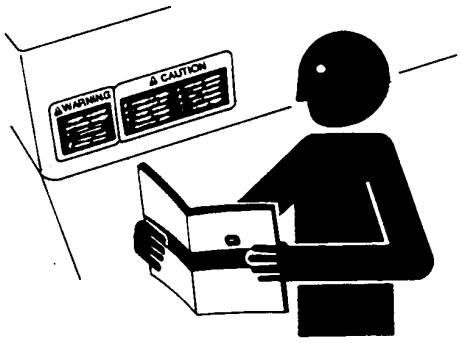
## Follow Safety Instructions

Carefully read all safety messages in this manual and on your machine safety signs. Keep safety signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from your John Deere dealer.

There can be additional safety information contained on parts and components sourced from suppliers that is not reproduced in this operator's manual.

Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machine in proper working condition. Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.




TS201 —UN—15APR13

If you do not understand any part of this manual and need assistance, contact your John Deere dealer.

DX,READ -19-16JUN09-1/1

## Practice Safe Maintenance

Understand service procedure before doing work. Keep area clean and dry.

Never lubricate, service, or adjust machine while it is moving. Keep hands, feet, and clothing away from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the ground. Stop the engine. Remove the key. Allow machine to cool.

Securely support any machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

On self-propelled equipment, disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

On towed implements, disconnect wiring harnesses from tractor before servicing electrical system components or welding on machine.

Falling while cleaning or working at height can cause serious injury. Use a ladder or platform to easily reach each location. Use sturdy and secure footholds and handholds.

TS218 —UN—23AUG88

DX,SERV -19-28FEB17-1/1

## 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.

TS779 —UN—08NOV89

DX,REPAIR -19-17FEB99-1/1

## Handle Fluids Safely—Avoid Fires

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.

TS227 —UN—15APR13

DX,FLAME -19-29SEP98-1/1

## Drain Gasoline When Storing Machine

Gasoline stored in fuel tank can explode.

Never store equipment with gasoline in the tank inside a building where fumes may reach an open flame or spark.

Always drain gasoline from fuel tank and carburetor bowl when storing machine. Allow engine to cool before storing.

TS227 —UN—15APR13

DX,STORE2 -19-26JAN90-1/1

## Handling Batteries Safely

Battery gas can explode. Keep sparks and flames away from batteries. Use a flashlight to check battery electrolyte level.

Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.

Always remove grounded (-) battery clamp first and replace grounded clamp last.

Sulfuric acid in battery electrolyte is poisonous and strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

**Avoid hazards by:**

- Filling batteries in a well-ventilated area
- Wearing eye protection and rubber gloves
- Avoiding use of air pressure to clean batteries
- Avoiding breathing fumes when electrolyte is added
- Avoiding spilling or dripping electrolyte
- Using correct battery booster or charger procedure.

**If acid is spilled on skin or in eyes:**

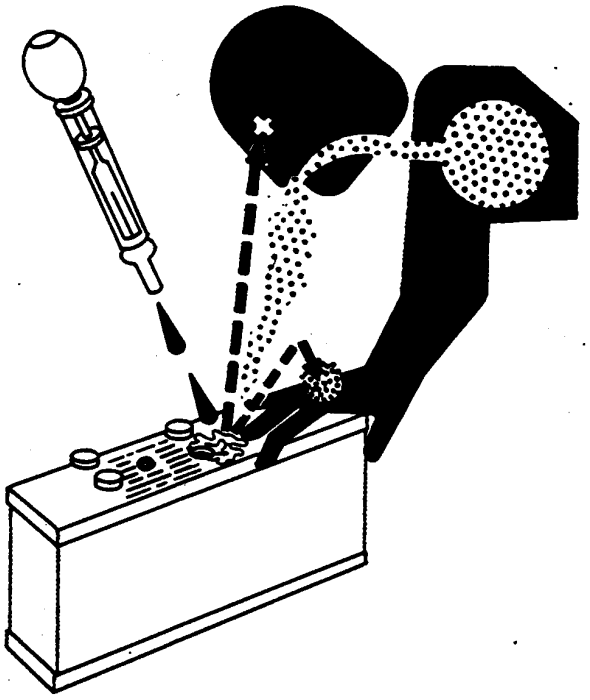
1. Flush skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush eyes with water for 15—30 minutes. Get medical attention immediately.

**If acid is swallowed:**

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

**WARNING:** Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. **Wash hands after handling.**

TS204 —UN—15APR13



TS203 —UN—23AUG88

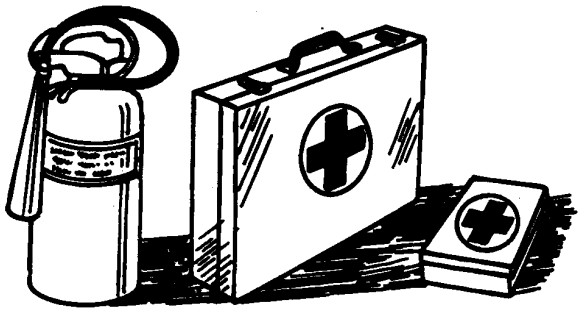
DX,WW,BATTERIES -19-02DEC10-1/1

## Prepare for Emergencies

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.



TS291 —UN—15APR13

DX,FIRE2 -19-03MAR93-1/1

## Parking Safely

1. Stop vehicle on a level surface, not on a slope.
2. Fully lower the cargo box and any attachments on the machine that can be lowered.
3. Fully engage park brake and ensure vehicle is not moving.
4. Stop engine.
5. Remove key.
6. Before you leave the operator's seat, wait for engine and all moving parts to stop.
7. Disconnect the negative battery cable before servicing the machine.
8. Hang a "DO NOT OPERATE" tag in operator station.

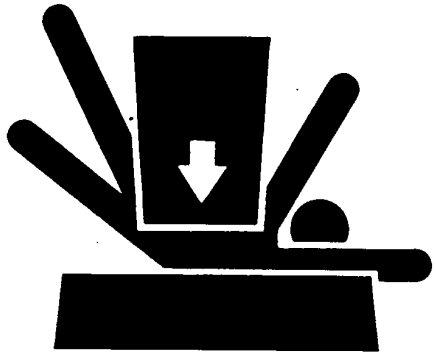
MK71445,00000EF -19-05FEB19-1/1

## Support Machine Properly

Always lower the attachment or implement to the ground before you work on the machine. If the work requires that the machine or attachment be lifted, provide secure support for them. If left in a raised position, hydraulically supported devices can settle or leak down.

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.

When implements or attachments are used with a machine, always follow safety precautions listed in the implement or attachment operator's manual.



TS229 —UN—23AUG88

DX,LOWER -19-24FEB00-1/1

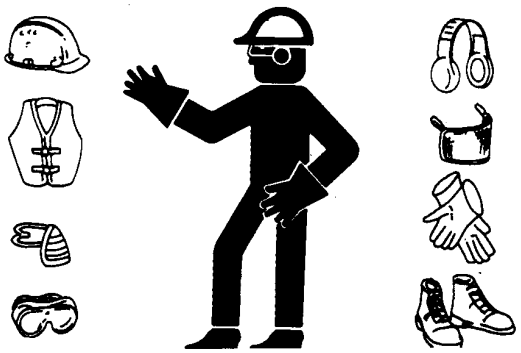
## Wear Protective Clothing

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.



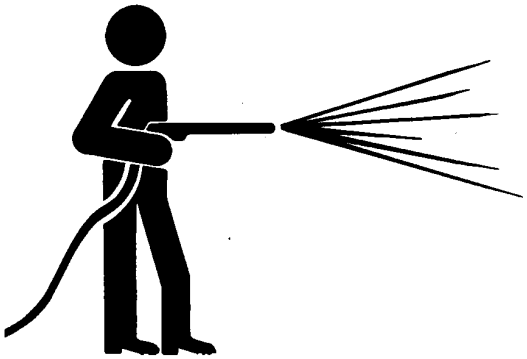
TS206 —UN—15APR13

DX,WEAR -19-10SEP90-1/1

## Work in Clean Area

Before starting a job:

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



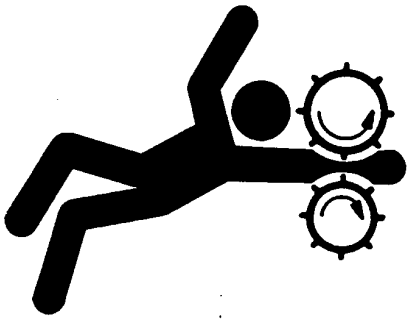
T6642EJ —UN—18OCT88

DX,CLEAN -19-04JUN90-1/1

## 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.



TS228 —UN—23AUG88

DX,LOOSE -19-04JUN90-1/1

## 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.

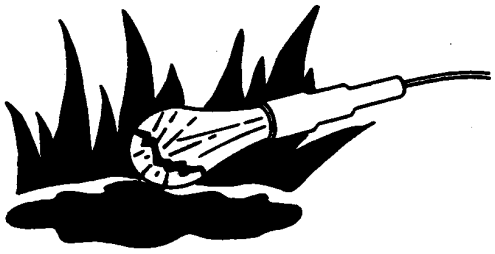
If you do not have an exhaust pipe extension, open the doors and get outside air into the area.

TS220 —UN—15APR13

DX,AIR -19-17FEB99-1/1

## 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.

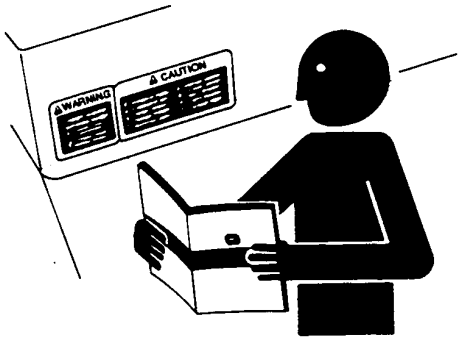


TS223 —UN—23AUG88

DX,LIGHT -19-04JUN90-1/1

## Replace Safety Signs

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



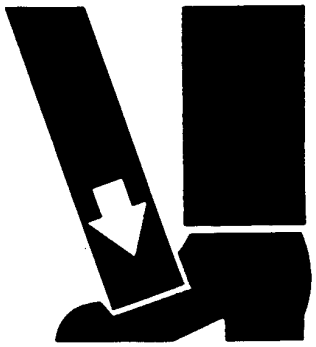

TS201 —UN—15APR13

DX,SIGNS1 -19-04JUN90-1/1

## Use Proper Lifting Equipment

Lifting heavy components incorrectly can cause severe injury or machine damage.

Follow recommended procedure for removal and installation of components in the manual.



TS226 —UN—23AUG88

DX,LIFT -19-04JUN90-1/1

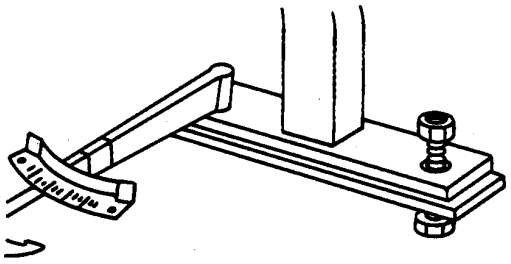
## Keep ROPS Installed Properly

Make certain all parts are reinstalled correctly if the roll-over protective structure (ROPS) is loosened or removed for any reason. Tighten mounting bolts to proper torque.

The protection offered by ROPS will be impaired if ROPS is subjected to structural damage, is involved in an overturn incident, or is in any way altered by welding, bending, drilling, or cutting. A damaged ROPS should be replaced, not reused.

The seat is part of the ROPS safety zone. Replace only with John Deere seat approved for your tractor.

Any alteration of the ROPS must be approved by the manufacturer.



TS212 —UN—23AUG88

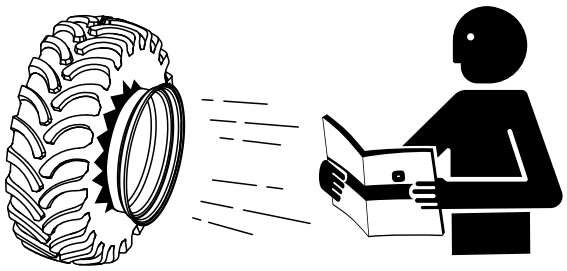
DX,ROPS3 -19-12OCT11-1/1

## Follow Tire Recommendations

Keep your machine in proper working order.

Use only prescribed tire sizes with correct ratings and inflate to the pressure specified in this manual.

Use of other than prescribed tires may decrease stability, affect steering, result in premature tire failure, or cause other durability or safety issues.



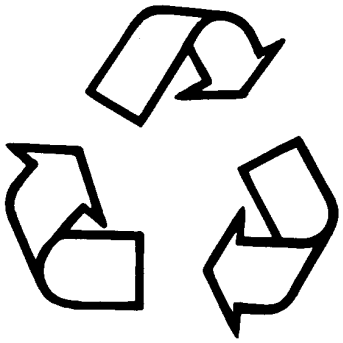
H111235 —UN—13MAY14

DX,TIRE,INFO -19-19MAY14-1/1

## Decommissioning — Proper Recycling and Disposal of Fluids and Components

Safety and environmental stewardship measures must be taken into account when decommissioning a machine and/or component. These measures include the following:

- Use appropriate tools and personal protective equipment such as clothing, gloves, face shields or glasses, during the removal or handling of objects and materials.
- Follow instructions for specialized components.
- Release stored energy by lowering suspended machine elements, relaxing springs, disconnecting the battery or other electrical power, and releasing pressure in hydraulic components, accumulators, and other similar systems.
- Minimize exposure to components which may have residue from agricultural chemicals, such as fertilizers and pesticides. Handle and dispose of these components appropriately.
- Carefully drain engines, fuel tanks, radiators, hydraulic cylinders, reservoirs, and lines before recycling components. Use leak-proof containers when draining fluids. Do not use food or beverage containers.
- Do not pour waste fluids onto the ground, down a drain, or into any water source.
- Observe all national, state, and local laws, regulations, or ordinances governing the handling or disposal of waste fluids (example: oil, fuel, coolant, brake fluid);



TS1133 —UN—15APR13

filters; batteries; and, other substances or parts. Burning of flammable fluids or components in other than specially designed incinerators may be prohibited by law and could result in exposure to harmful fumes or ashes.
- Service and dispose of air conditioning systems appropriately. Government regulations may require a certified service center to recover and recycle air conditioning refrigerants which could damage the atmosphere if allowed to escape.
- Evaluate recycling options for tires, metal, plastic, glass, rubber, and electronic components which may be recyclable, in part or completely.
- Contact your local environmental or recycling center, or your John Deere dealer for information on the proper way to recycle or dispose of waste.

DX,DRAIN -19-01JUN15-1/1

## Protect Against High Pressure Spray

Spray from high pressure nozzles can penetrate the skin and cause serious injury. Keep spray from contacting hands or body.

If an accident occurs, see a doctor immediately. Any high pressure spray 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.

TS1343 —UN—18MAR92

DX,SPRAY -19-16APR92-1/1

## Live With Safety

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

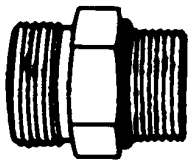

TS231 —19—07OCT88

DX,LIVE -19-25SEP92-1/1

## Service Recommendations for O-Ring Boss Fittings

### Straight Fitting

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



T6243AE —UN—15APR13

*Straight Fitting*

04T,90,K66 -19-29SEP99-1/2

### Angle Fitting

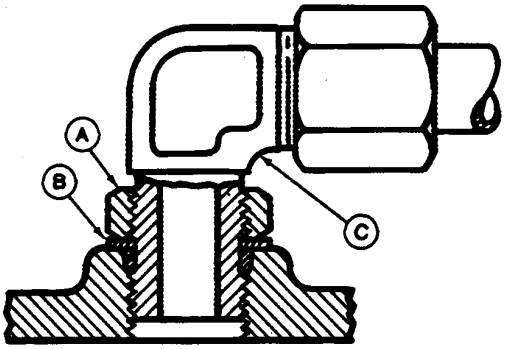
1. Back off lock nut (A) and backup washer (B) completely to head end (C) of fitting.
2. Turn fitting into threaded boss until backup washer contacts face of boss.
3. Turn fitting head end counterclockwise to proper index (maximum of one turn).

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

4. Hold fitting head end with a wrench and tighten locknut and backup washer to proper torque value.

| STRAIGHT FITTING OR SPECIAL NUT TORQUE CHART | | |
|---|---|---|
| **Thread Size** | **N·m** | **lb·ft** |
| 3/8-24 UNF | 8 | 6 |
| 7/16-20 UNF | 12 | 9 |
| 1/2-20 UNF | 16 | 12 |
| 9/16-18 UNF | 24 | 18 |
| 3/4-16 UNF | 46 | 34 |
| 7/8-14 UNF | 62 | 46 |
| 1-1/16-12 UN | 102 | 75 |
| 1-3/16-12 UN | 122 | 90 |
| 1-5/16-12 UN | 142 | 105 |
| 1-5/8-12 UN | 190 | 140 |
| 1-7/8-12 UN | 217 | 160 |

*NOTE: Torque tolerance is ± 10%.*




T6520AB —UN—15APR13

*Angle Fitting*

**A—Lock Nut**
**B—Backup Washer**
**C—Head End**

04T,90,K66 -19-29SEP99-2/2

## Service Recommendations For Flat Face O-Ring Seal Fittings

1. Inspect the fitting sealing surfaces and O-ring. They must be free of dirt or defects.
2. Lubricate O-rings and install into grove using petroleum jelly to hold in place.
3. Index angle fittings and tighten by hand pressing joint together to insure O-ring remains in place.
4. Tighten fitting or nut to torque value shown on the chart. Do not allow hoses to twist when tightening fittings, use backup wrench on straight hose couplings.

**IMPORTANT: Tighten fittings to 150% of listed torque value if indexing is necessary or if fitting is attached to an actuating device.**

**Tighten fittings to 50% of listed torque value if used in aluminum housing.**

**FLAT FACE O-RING SEAL FITTING TORQUE***

| Nomial Tube O.D. | | Thread Size | Swivel Nut | | Bulkhead Nut | |
|---|---|---|---|---|---|---|
| mm | in. | in. | N·m | lb·ft | N·m | lb·ft |
| 6.35 | 0.250 | 9/16-18 | 16 | 12 | 12 | 9 |
| 9.52 | 0.375 | 11/16-16 | 24 | 18 | 24 | 18 |
| 12.70 | 0.500 | 13/16-16 | 50 | 37 | 46 | 34 |
| 15.88 | 0.625 | 1-14 | 69 | 51 | 62 | 46 |
| 19.05 | 0.750 | 1 3/16-12 | 102 | 75 | 102 | 75 |
| 22.22 | 0.875 | 1 3/16-12 | 102 | 75 | 102 | 75 |
| 25.40 | 1.000 | 1 7/16-12 | 142 | 105 | 142 | 105 |
| 31.75 | 1.250 | 1 11/16-12 | 190 | 140 | 190 | 140 |
| 38.10 | 1.500 | 2-12 | 217 | 160 | 217 | 160 |

*Torque tolerance is +15 -20% unless otherwise specified.

**Stud End O-ring Seal Torque for Straight and Adjustable Fittings***

| Thread Size | Straight Hex Size | Locknut Hex Size | Straight Fitting or Locknut Toque | |
|---|---|---|---|---|
| Inch | Inch | Inch | N·m | lb·ft |
| 3/8-24 | 5/8 | 9/16 | 12 | 9 |
| 7/16-20 | 5/8 | 5/8 | 21 | 15 |
| 1/2-20 | 3/4 | 11/16 | 26 | 19 |
| 9/16-18 | 3/4 | 3/4 | 34 | 25 |
| 3/4-16 | 7/8 | 15/16 | 73 | 55 |
| 7/8-14 | 1 1/16 | 1 1/16 | 104 | 76 |
| 1 1/16-12 | 1 1/4 | 1 3/8 | 176 | 130 |
| 1 3/16-12 | 1 3/8 | 1 1/2 | 230 | 170 |
| 1 5/16-12 | 1 1/2 | 1 5/8 | 285 | 210 |

*Torque tolerance is +15 -20% unless otherwise specified.

OUO6092,00010A4 -19-31MAY11-1/1

## Metric Cap Screw Torque Values—Grade 7

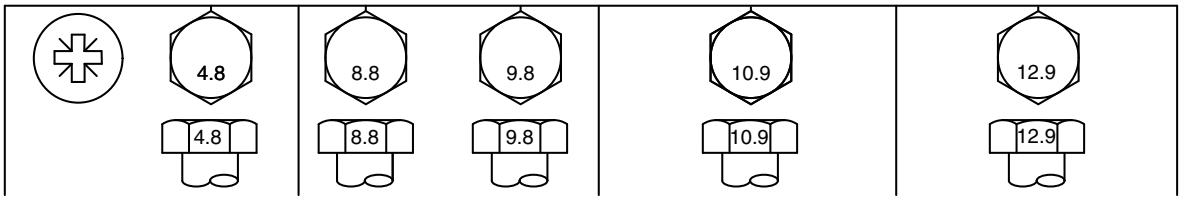
*NOTE: When bolting aluminum parts, tighten to 80% of torque specified in table.*

| Size | N·m | (lb-ft) |
|---|---|---|
| M6 | 9.5—12.2 | (7—9) |
| M8 | 20.3—27.1 | (15—20) |
| M10 | 47.5—54.2 | (35—40) |
| M12 | 81.4—94.9 | (60—70) |
| M14 | 128.8—146.4 | (95—108) |
| M16 | 210.2—240 | (155—177) |

CED,OUO1085,12 -19-31JUL00-1/1

## Metric Bolt and Screw Torque Values

TS1742 —UN—31MAY18



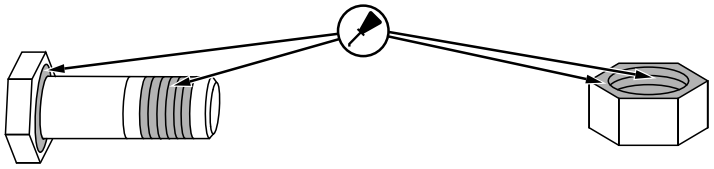

| Bolt or Screw Size | Class 4.8 | | | | Class 8.8 or 9.8 | | | | Class 10.9 | | | | Class 12.9 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hex Head[a] | | Flange Head[b] | | Hex Head[a] | | Flange Head[b] | | Hex Head[a] | | Flange Head[b] | | Hex Head[a] | | Flange Head[b] | |
| | N·m | lb·in | N·m | lb·in | N·m | lb·in | N·m | lb·in | N·m | lb·in | N·m | lb·in | N·m | lb·in | N·m | lb·in |
| M6 | 3.6 | 31.9 | 3.9 | 34.5 | 6.7 | 59.3 | 7.3 | 64.6 | 9.8 | 86.7 | 10.8 | 95.6 | 11.5 | 102 | 12.6 | 112 |
| | | | | | | | | | N·m | lb·ft | N·m | lb·ft | N·m | lb·ft | N·m | lb·ft |
| M8 | 8.6 | 76.1 | 9.4 | 83.2 | 16.2 | 143 | 17.6 | 156 | 23.8 | 17.6 | 25.9 | 19.1 | 27.8 | 20.5 | 30.3 | 22.3 |
| | | | N·m | lb·ft | N·m | lb·ft | N·m | lb·ft | | | | | | | | |
| M10 | 16.9 | 150 | 18.4 | 13.6 | 31.9 | 23.5 | 34.7 | 25.6 | 46.8 | 34.5 | 51 | 37.6 | 55 | 40.6 | 60 | 44.3 |
| | N·m | lb·ft | | | | | | | | | | | | | | |
| M12 | — | — | — | — | 55 | 40.6 | 61 | 45 | 81 | 59.7 | 89 | 65.6 | 95 | 70.1 | 105 | 77.4 |
| M14 | — | — | — | — | 87 | 64.2 | 96 | 70.8 | 128 | 94.4 | 141 | 104 | 150 | 111 | 165 | 122 |
| M16 | — | — | — | — | 135 | 99.6 | 149 | 110 | 198 | 146 | 219 | 162 | 232 | 171 | 257 | 190 |
| M18 | — | — | — | — | 193 | 142 | 214 | 158 | 275 | 203 | 304 | 224 | 322 | 245 | 356 | 263 |
| M20 | — | — | — | — | 272 | 201 | 301 | 222 | 387 | 285 | 428 | 316 | 453 | 334 | 501 | 370 |
| M22 | — | — | — | — | 365 | 263 | 405 | 299 | 520 | 384 | 576 | 425 | 608 | 448 | 674 | 497 |
| M24 | — | — | — | — | 468 | 345 | 518 | 382 | 666 | 491 | 738 | 544 | 780 | 575 | 864 | 637 |
| M27 | — | — | — | — | 683 | 504 | 758 | 559 | 973 | 718 | 1080 | 797 | 1139 | 840 | 1263 | 932 |
| M30 | — | — | — | — | 932 | 687 | 1029 | 759 | 1327 | 979 | 1466 | 1081 | 1553 | 1145 | 1715 | 1265 |
| M33 | — | — | — | — | 1258 | 928 | 1398 | 1031 | 1788 | 1319 | 1986 | 1465 | 2092 | 1543 | 2324 | 1714 |
| M36 | — | — | — | — | 1617 | 1193 | 1789 | 1319 | 2303 | 1699 | 2548 | 1879 | 2695 | 1988 | 2982 | 2199 |

The nominal torque values listed are for general use only with the assumed wrenching accuracy of 20%, such as a manual torque wrench.
DO NOT use these values if a different torque value or tightening procedure is given for a specific application.
For lock nuts, for stainless steel fasteners, or for nuts on U-bolts, see the tightening instructions for the specific application.

Replace fasteners with the same or higher property class. If higher property class fasteners are used, tighten these to the strength of the original.

- Make sure that fastener threads are clean.
- Apply a thin coat of Hy-Gard™ or equivalent oil under the head and on the threads of the fastener, as shown in the following image.
- Be conservative with the amount of oil to reduce the potential for hydraulic lockup in blind holes due to excessive oil.
- Properly start thread engagement.

TS1741 —UN—22MAY18

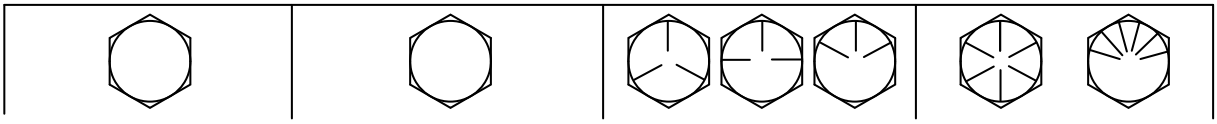


*[a]Hex head column values are valid for ISO 4014 and ISO 4017 hex head, ISO 4162 hex socket head, and ISO 4032 hex nuts.*
*[b]Hex flange column values are valid for ASME B18.2.3.9M, ISO 4161, or EN 1665 hex flange products.*

DX,TORQ2 -19-30MAY18-1/1

## Unified Inch Bolt and Screw Torque Values

TS1671 —UN—01MAY03



| Bolt or Screw Size | SAE Grade 1[a] | | | | SAE Grade 2[b] | | | | SAE Grade 5, 5.1 or 5.2 | | | | SAE Grade 8 or 8.2 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hex Head[c] | | Flange Head[d] | | Hex Head[c] | | Flange Head[d] | | Hex Head[c] | | Flange Head[d] | | Hex Head[c] | | Flange Head[d] | |
| | N·m | lb·in | N·m | lb·in | N·m | lb·in | N·m | lb·in | N·m | lb·in | N·m | lb·in | N·m | lb·in | N·m | lb·in |
| 1/4 | 3.1 | 27.3 | 3.2 | 28.4 | 5.1 | 45.5 | 5.3 | 47.3 | 7.9 | 70.2 | 8.3 | 73.1 | 11.2 | 99.2 | 11.6 | 103 |
| | | | | | | | | | | | | | N·m | lb·ft | N·m | lb·ft |
| 5/16 | 6.1 | 54.1 | 6.5 | 57.7 | 10.2 | 90.2 | 10.9 | 96.2 | 15.7 | 139 | 16.8 | 149 | 22.2 | 16.4 | 23.7 | 17.5 |
| | | | | | | | | | N·m | lb·ft | N·m | lb·ft | | | | |
| 3/8 | 10.5 | 93.6 | 11.5 | 102 | 17.6 | 156 | 19.2 | 170 | 27.3 | 20.1 | 29.7 | 21.9 | 38.5 | 28.4 | 41.9 | 30.9 |
| | | | | | N·m | lb·ft | N·m | lb·ft | | | | | | | | |
| 7/16 | 16.7 | 148 | 18.4 | 163 | 27.8 | 20.5 | 30.6 | 22.6 | 43 | 31.7 | 47.3 | 34.9 | 60.6 | 44.7 | 66.8 | 49.3 |
| | N·m | lb·ft | N·m | lb·ft | | | | | | | | | | | | |
| 1/2 | 25.9 | 19.1 | 28.2 | 20.8 | 43.1 | 31.8 | 47 | 34.7 | 66.6 | 49.1 | 72.8 | 53.7 | 94 | 69.3 | 103 | 75.8 |
| 9/16 | 36.7 | 27.1 | 40.5 | 29.9 | 61.1 | 45.1 | 67.5 | 49.8 | 94.6 | 69.8 | 104 | 77 | 134 | 98.5 | 148 | 109 |
| 5/8 | 51 | 37.6 | 55.9 | 41.2 | 85 | 62.7 | 93.1 | 68.7 | 131 | 96.9 | 144 | 106 | 186 | 137 | 203 | 150 |
| 3/4 | 89.5 | 66 | 98 | 72.3 | 149 | 110 | 164 | 121 | 230 | 170 | 252 | 186 | 325 | 240 | 357 | 263 |
| 7/8 | 144 | 106 | 157 | 116 | 144 | 106 | 157 | 116 | 370 | 273 | 405 | 299 | 522 | 385 | 572 | 422 |
| 1 | 216 | 159 | 236 | 174 | 216 | 159 | 236 | 174 | 556 | 410 | 609 | 449 | 785 | 579 | 860 | 634 |
| 1-1/8 | 305 | 225 | 335 | 247 | 305 | 225 | 335 | 247 | 685 | 505 | 751 | 554 | 1110 | 819 | 1218 | 898 |
| 1-1/4 | 427 | 315 | 469 | 346 | 427 | 315 | 469 | 346 | 957 | 706 | 1051 | 775 | 1552 | 1145 | 1703 | 1256 |
| 1-3/8 | 564 | 416 | 618 | 456 | 564 | 416 | 618 | 456 | 1264 | 932 | 1386 | 1022 | 2050 | 1512 | 2248 | 1658 |
| 1-1/2 | 743 | 548 | 815 | 601 | 743 | 548 | 815 | 601 | 1665 | 1228 | 1826 | 1347 | 2699 | 1991 | 2962 | 2185 |

The nominal torque values listed are for general use only with the assumed wrenching accuracy of 20%, such as a manual torque wrench.
DO NOT use these values if a different torque value or tightening procedure is given for a specific application.
For lock nuts, for stainless steel fasteners, or for nuts on U-bolts, see the tightening instructions for the specific application.

Replace fasteners with the same or higher property class. If higher property class fasteners are used, tighten these to the strength of the original.

- Make sure that fastener threads are clean.
- Apply a thin coat of Hy-Gard™ or equivalent oil under the head and on the threads of the fastener, as shown in the following image.
- Be conservative with the amount of oil to reduce the potential for hydraulic lockup in blind holes due to excessive oil.
- Properly start thread engagement.

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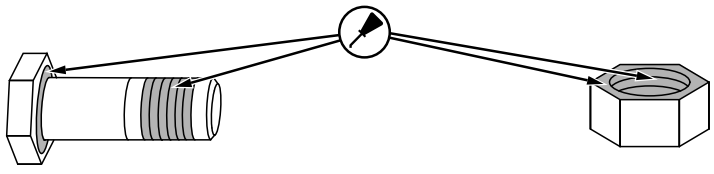


*[a]Grade 1 applies for hex cap screws over 6 in (152 mm) long, and for all other types of bolts and screws of any length.*
*[b]Grade 2 applies for hex cap screws (not hex bolts) up to 6 in (152 mm) long.*
*[c]Hex head column values are valid for ISO 4014 and ISO 4017 hex head, ISO 4162 hex socket head, and ISO 4032 hex nuts.*
*[d]Hex flange column values are valid for ASME B18.2.3.9M, ISO 4161, or EN 1665 hex flange products.*

DX,TORQ1 -19-30MAY18-1/1

## Gasoline Engine Oil

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

Using single viscosity grade oils such as SAE 30 or SAE 40 can reduce oil consumption in air cooled engines.

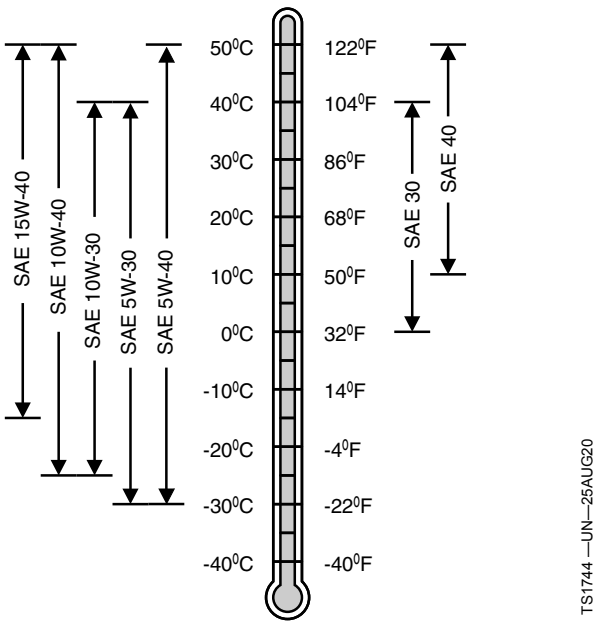
The following oils are approved:

- John Deere Plus-50™ II
- John Deere Turf-Gard™

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

- ILSAC GF-6A
- API Service Category SP
- API Service Category SN
- API Service Category SM
- API Service Category SL
- API Service Category SJ
- ACEA Oil Sequence A3/B3
- ACEA Oil Sequence A3/B4
- ACEA Oil Sequence A5/B5
- ACEA Oil Sequence C5
- ACEA Oil Sequence C4
- ACEA Oil Sequence C3
- ACEA Oil Sequence C2

*Plus-50 is a trademark of Deere & Company*
*Turf-Gard is a trademark of Deere & Company*




*Oil Viscosities for Air Temperature Ranges*

- ACEA Oil Sequence C1

DX,ENOIL2 -19-15JUL20-1/1

## Oil Filters

Filtration of oils is critical to proper operation and lubrication.

Always change filters regularly as specified in this manual.

Use filters meeting John Deere performance specifications.

DX,FILT -19-18MAR96-1/1

## Gasoline Fuel for 4-Cycle Engines

Use unleaded gasoline with a minimum octane rating of 87 AKI (anti-knock index) or 90 RON (research octane number). Gasoline fuels specified to EN 228 or ASTM D4814 are recommended.

Fuel blends of unleaded gasoline with a maximum 10% ethanol or 15% MTBE (methyl tertiary-butyl ether) are also acceptable.

**CAUTION: Reduce the risk of fire. Handle fuel carefully. DO NOT fill the fuel tank when the engine is running or hot. Stop engine and allow it to cool for several minutes before filling fuel tank. Fill fuel tank only to the bottom of the filler neck.**

**Refuel outdoors. DO NOT smoke while you fill the fuel tank or service the fuel system.**

**Store fuel in properly identified polyethylene containers.**

When storing fuel, add John Deere Gasoline Conditioner and Stabilizer (or equivalent) at the specified concentration.

**IMPORTANT: DO NOT use methanol or fuel blends that contain methanol.**

**Avoid spilling fuel. Gasoline can damage plastic and painted surfaces.**

**DO NOT mix oil with gasoline.**

DX,FUEL2 -19-15MAY13-1/1

## Transmission and 4WD Front Differential Oil

**IMPORTANT: Avoid damage! DO NOT mix any other oils in this transmission. DO NOT use engine oil or "Type F" (Red) Automatic Transmission Fluid in this transmission.**

John Deere J20D Low Viscosity Hy-Gard™ transmission and hydraulic oil is recommended.

*Hy-Gard is a trademark of Deere & Company*

Other oils can be used if recommended John Deere oils are not available, provided they meet the following specifications:

- John Deere Standard JDM J20D

MX52301,0002CA3 -19-20NOV20-1/1

## Multipurpose Extreme Pressure (EP) Grease

**IMPORTANT: For automated lubrication systems different ambient air temperatures need to be considered.**

Use grease based on NLGI consistency numbers and the expected air temperature range during the service interval.

**John Deere SD Polyurea Grease is preferred.**

The following greases are also recommended:

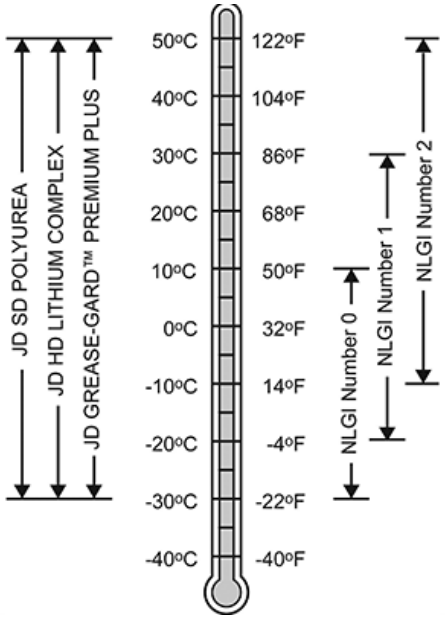
- John Deere HD Lithium Complex Grease
- John Deere Grease-Gard™ Premium Plus

Other greases may be used if they meet the following:

- NLGI Performance Classification GC-LB
- ISO-L-X-BDHB 2 or DIN KP 2 N-10 Lithium Complex, Non-Synthetic Base Oil (100 to 220 mm2/s @ 40°C)

**IMPORTANT: Some types of thickeners, base oils, and additives used in greases are not compatible with others. Mixing greases should be avoided. Consult your grease supplier before mixing different types of grease.**

*Grease-Gard is a trademark of Deere & Company*




*Greases for Air Temperature Ranges*

DX,GREA1 -19-13JAN18-1/1

## Mixing of Lubricants

In general, avoid mixing different brands 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.

Consult your John Deere dealer to obtain specific information and recommendations.

DX,LUBMIX -19-18MAR96-1/1

## Alternative and Synthetic Lubricants

Conditions in certain geographical areas may require lubricant recommendations different from those printed in this manual.

Some John Deere brand coolants and lubricants may not be available in your location.

Consult your John Deere dealer to obtain information and recommendations.

Synthetic lubricants may be used if they meet the performance requirements as shown in this manual.

The temperature limits and service intervals shown in this manual apply to John Deere branded fluids or fluids that have been tested and/or approved for use in John Deere equipment.

Re-refined base stock products may be used if the finished lubricant meets the performance requirements.

DX,ALTER -19-13JAN18-1/1

## Lubricant Storage

Your equipment can operate at top efficiency only when clean lubricants are used.

Use clean containers to handle all lubricants.

Store lubricants and containers in an area protected from dust, moisture, and other contamination. Store containers on their side to avoid water and dirt accumulation.

Make certain that all containers are properly marked to identify their contents.

Properly dispose of all old containers and any residual lubricant they may contain.

DX,LUBST -19-11APR11-1/1

## Machine Specifications XUV560, and XUV560 S4

*NOTE: Specifications and design subject to change without notice.*

| | XUV560 | XUV560 S4 | XUV560 Export |
|---|---|---|---|
| **Ground Speed:** | | | |
| Forward - Range LO | 0—34 km/h (0—21 mph) | | |
| Forward - Range HI | 45 km/h (28 mph) | | |
| Reverse | 0—26 km/h (0—16 mph) | | |
| | | | |
| **Engine:** | | | |
| Make | Briggs & Stratton | | |
| Engine Power Information | http://www.briggsandstratton.com | | |
| Type | Gas | | |
| Model | 355447 | | |
| Slow Idle Speed | 650—800 rpm | | |
| Slow Idle Speed (Governed) | 1150 ± 100 rpm | | |
| Fast Idle Speed | 4100 ± 100 rpm | | |
| Cylinders | V-twin | | |
| Displacement | 0.570 L (34.7 $in.^3$) | | |
| Bore | 72 mm (2.83 in) | | |
| Stroke | 70 mm (2.76 in) | | |
| Lubrication | Pressurized | | |
| Cooling | Air Cooled | | |
| Air Cleaner | Dry-Type Element | | |
| Engine Shut Off | Key Switch | | |
| | | | |
| **Fuel System:** | | | |
| Type | Mechanical Vacuum Pump | | |
| | | | |
| **Electrical System:** | | | |
| Type | 12 Volt Negative Ground | | |
| Alternator | 16 A | | 50 A |
| Battery | 12 volt | | |
| Cold Cranking Amps | 340 | | |
| Voltage Rectifier and Regulator Module Output at 1150 rpm (idle) | 7 amps | | |
| Voltage Rectifier and Regulator Module Output at 4100 rpm (full throttle) | 16 amps | | |
| Voltage Rectifier and Regulator Module Output at 1300 rpm | | | 20 amps |
| Voltage Rectifier and Regulator Module Output at 3600 rpm | | | 50 amps |
| Spark Plug Gap | 0.76 mm (0.030 in) | | |

**Continued on next page**

| | | | |
|---|---|---|---|
| Ignition Coil Air Gap | 0.20—0.30 mm (0.008—0.012 in) | | |
| | | | |
| **Steering:** | | | |
| Type | Rack and Pinion | | |
| | | | |
| **Brakes:** | | | |
| Type | All Wheel Hydraulic Disc | | |
| | | | |
| | | | |
| | | | |
| **Capacities:** | | | |
| Fuel Tank | 18.5 L (4.9 gal) | | |
| Crankcase (with Filter) | 1.4 L (1.5 qt) | | |
| Transmission | 2.4—2.8 L (2.54—2.96 qt) | | |
| MFWD Front Differential | 0.4—0.6 L (13.5—20.3 oz) | | |
| | | | |
| **Dimensions:** | | | |
| Overall Length with Bumper | 2.92 m (115 in) | 3.71 m (146 in) | 2.92 m (115 in) |
| Overall Width | 1.45 m (57 in) | 1.45 m (57 in) | 1.45 m (57 in) |
| Ground Clearance | 26.2 cm (10.3 in) | 23.6 cm (9.3 in) | 26.2 cm (10.3 in) |

SR99263,00000E1 -19-30JUL19-2/2

## Product Identification Number Location

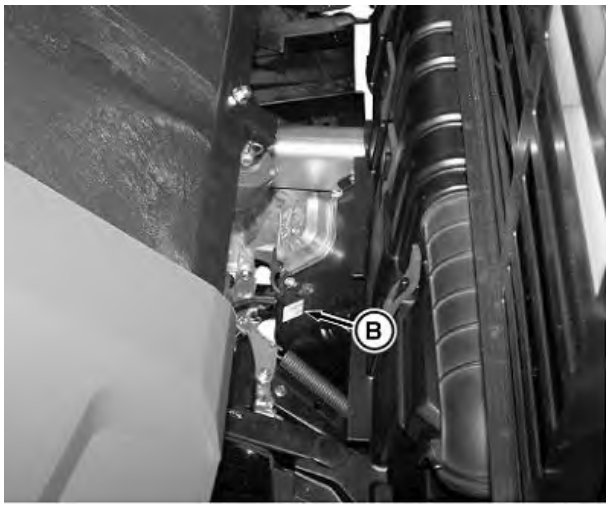
Product identification number (A), also called serial number or chassis number, is located on the rear of the frame.


MXT001072 —UN—06SEP11

**Continued on next page**

OUMX258,00001BE -19-06SEP11-1/2

Engine identification number (B), is located on the engine or valve cover.




MXT001073 —UN—06SEP11

OUMX258,00001BE -19-06SEP11-2/2

# Section 20
# Engine Repair

## Contents

## Summary of References

**Remove and Install**

- Remove and Inspect Crankshaft and Camshaft
- Install Crankshaft and Camshaft
- Remove Cylinder Head
- Install Cylinder Head
- Remove Engine
- Install Engine
- Remove Flywheel
- Install Flywheel
- Remove Flywheel (High Capacity)
- Install Flywheel (High Capacity)
- Remove and Install Intake Manifold
- Remove Oil Pump
- Remove Piston, Rings and Rod
- Install Piston and Rod
- Remove Valve
- Install Valve

**Disassemble and Assemble**

- Assemble Piston and Rod

**Inspect**

- Repair Breather Valve
- Clean Cylinder Bore
- Hone Cylinder Bore
- Inspect Cylinder Bore
- Resize Cylinder Bore
- Inspect and Repair Cylinder Head
- Inspect Magneto Bearing
- Check Piston Ring End Gap
- Inspect Piston and Rod
- Inspect PTO and Cam Bearing
- Inspect and Repair Valves and Guides
- Ream Valve Guide

MX52301,0002A97 -19-19OCT20-1/1

## Essential or Recommended Tools

*NOTE: Order tools from the SERVICEGARD™ Catalog.*

ESSENTIAL TOOLS listed are required to perform the job correctly and are obtainable only from the SERVICEGARD™ Catalog.

*SERVICEGARD is a trademark of Deere & Company*

RECOMMENDED TOOLS, as noted, are suggested to perform the job correctly. Some tools may be available from local suppliers or may be fabricated.

MX52301,000297C -19-02OCT20-1/2

| | |
|---|---|
| JDG1640 Flywheel Removal Tool ..... JDG1640 | Remove high capacity flywheel. |

MX52301,000297C -19-02OCT20-2/2

## Specifications

| Item | Measurement | Specification |
|---|---|---|
| Crankshaft Wear Limits | | |
| PTO Journal | Wear Limit | 34.92 mm (1.375 in) |
| Magneto Journal | Wear Limit | 34.95 mm (1.376 in) |
| Crankshaft Crank Pin | Wear Limit | 36.95 mm (1.455 in) |
| Camshaft Wear Limits | | |
| PTO Journal | Wear Limit | 19.92 mm (0.784 in) |
| Magneto Journal | Wear Limit | 15.93 mm (0.627 in) |
| Cam Lobe | Wear Limit | 30.25 mm (1.191 in) |
| Cylinder Head Bolts | Torque | 19 N·m (165 lb·in) |
| Rocker Stud | Torque | 16 N·m (140 lb·in) |
| Valve Cover Screws | Torque | 3.4 N·m (30 lb·in) |
| Spark Plug | Gap | 0.76 mm (0.030 in) |
| Spark Plug | Torque | 20 N·m (180 lb·in) |
| Clutch Enclosure-to-Transmission | Torque | 32 N·m (24 lb·ft) |
| Engine Mounting Bolts | Torque | 32 N·m (24 lb·ft) |
| Exhaust Pipe Flange Bolts | Torque | 17 N·m (150 lb·ft) |
| Flywheel Nut | Torque | 170 N·m (125 lb·ft) |
| Ignition Coil | Gap | 0.20—0.30 mm (0.008—0.012 in) |
| Intake Manifold Screws | Torque | 16 N·m (140 lb·in) |
| Crankcase Cover Bolts | Torque | 17 N·m (150 lb·in) |
| Connecting Rod Bolts | Torque | 13 N·m (115 lb·in) |
| Voltage Regulator to Engine | Torque | 3.4 N·m (30 lb·in) |
| Voltage Regulator to Engine | Torque | 17 N·m (150 lb·in) |

MX52301,0002985 -19-02OCT20-1/1

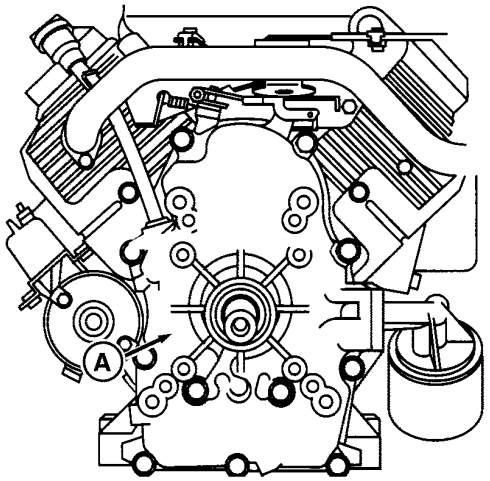
## Remove and Inspect Crankshaft and Camshaft

*NOTE: Before crankcase cover (A) is removed, it is recommended that any rust, paint, or burrs be removed from power take off end of crankshaft. This eliminates or reduces chances of damaging the crankcase cover bearing.*

1. Remove governor lever and disconnect governor link and springs. Remove governor control bracket. Remove oil fill tube and dipstick assembly.
2. Remove exhaust manifold, intake manifold, and cylinder heads.

**IMPORTANT: Avoid Damage! DO NOT remove dowel pins.**

3. Remove crankcase cover. If crankcase cover sticks, tap lightly with soft hammer on alternate sides near dowel pin locations.
4. Tip engine onto the flywheel side of crankcase.
5. Support engine to prevent end of crankshaft from resting on workbench.




MXT001715 —UN—10OCT11

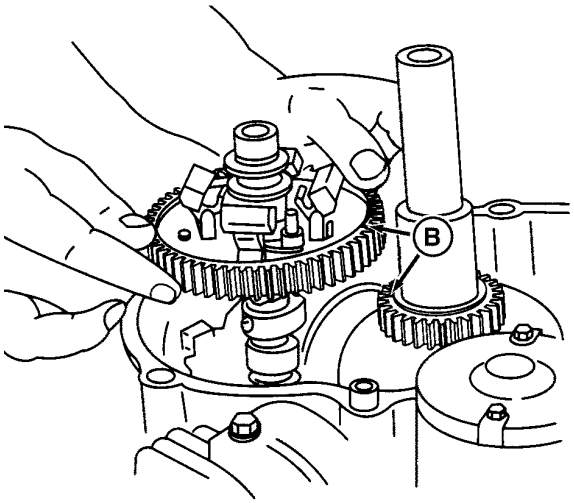
**A—Crankcase Cover**

OUMX068,00000E0 -19-30JUL19-1/4

6. Rotate crankshaft until timing marks (B) are aligned. With cam gear in this position, the valve tappets remain clear of cam lobes.

**IMPORTANT: Avoid Damage! If engine is rotated from this position, tappets will fall out. Tappets must not be mixed.**

7. Lift out cam gear and governor assembly.
8. Mark the connecting rods and caps to prevent interchanging when reassembling.
9. Remove piston and connecting rod assemblies.




MXT001716 —UN—10OCT11

**B—Timing Marks**

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OUMX068,00000E0 -19-30JUL19-2/4

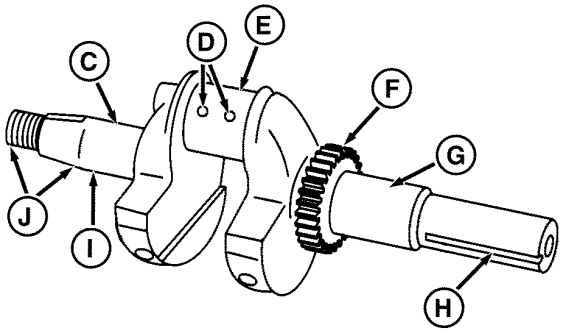
10. Remove crankshaft from crankcase.

**IMPORTANT: Avoid Damage! All wear points on the crankshaft must be measured.**

11. Inspect and measure the crankshaft. Replace crankshaft if worn or if journals are scored. Keyways should be checked to be sure that they are not worn or spread. To prevent damaging the bearing or oil seal, remove burrs from keyway edges. Check oil galleries for blockage or obstructions.

**Crankshaft Wear Limits—Specification**

| | |
|---|---|
| PTO Journal—Wear Limit | 34.92 mm (1.375 in) |
| Magneto Journal—Wear Limit | 34.95 mm (1.376 in) |
| Crankshaft Crank Pin—Wear Limit | 36.95 mm (1.455 in) |




MXT001717 —UN—10OCT11

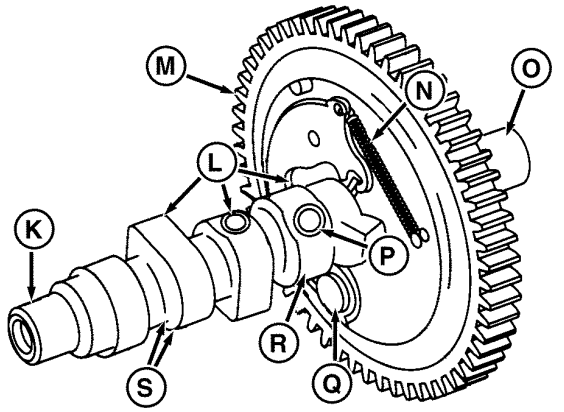
**C—Magneto Journal**
**D—Oil Galleries**
**E—Crankpin**
**F—Timing Gear Teeth**
**G—PTO Journal**
**H—Keyway**
**I— Oil Galleries**
**J—Threads and Keyway**

OUMX068,00000E0 -19-30JUL19-3/4

12. Check camshaft timing gear for chipped or cracked teeth. Replace if needed.
13. The compression release balls must be clean and free to move when the centrifugal weight is rotated counterclockwise. When the centrifugal weight is released, the balls should move up into the locked position.
14. Inspect cam gear teeth, lobes, and journals for wear and nicks. Replace cam gear if worn or damaged.

**Camshaft Wear Limits—Specification**

| | |
|---|---|
| PTO Journal—Wear Limit | 19.92 mm (0.784 in) |
| Magneto Journal—Wear Limit | 15.93 mm (0.627 in) |
| Cam Lobe—Wear Limit | 30.25 mm (1.191 in) |




MXT001718 —UN—13OCT11

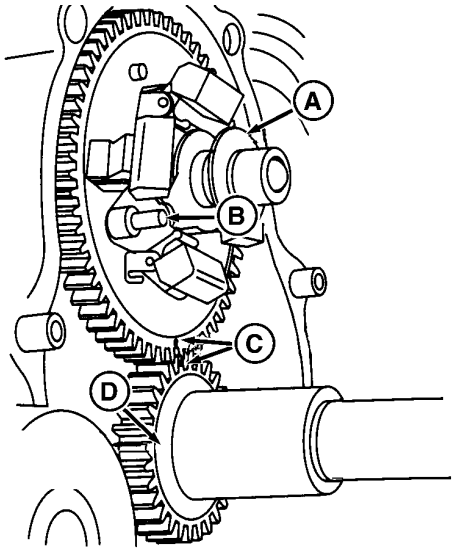
**K—Magneto Journal**
**L—Cam Lobes**
**M—Gear Teeth**
**N—Spring**
**O—PTO Journal**
**P—Compression Release Balls**
**Q—Flywheel Pivot**
**R—Exhaust Lobe**
**S—Intake Lobe**

OUMX068,00000E0 -19-30JUL19-4/4

## Install Crankshaft and Camshaft

1. Governor slider (A) must move freely on PTO journal of cam gear. Flywheel must pivot freely. Make sure flyweight spring is not stretched. Governor weights must move freely on hinge pins. Make sure hinge pins are not loose.
2. Assemble governor slider onto PTO journal on cam gear making sure that slot on slider fits over locating pin (B) on cam gear. Be sure the weights are in the proper location so that they will be able to move freely without binding.
3. Install crankshaft and camshaft, aligning timing marks (C) accordingly. Install thrust washer (D), if required. Tip engine to position crankshaft horizontally.

**A—Governor Slider**
**B—Locating Pin**
**C—Timing Marks**
**D—Thrust Washer**

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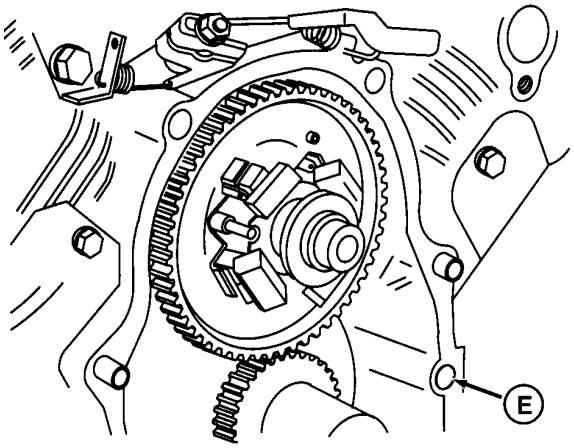
*NOTE: Be sure O-ring (E) is installed in crankcase.*

4. Place new crankcase cover gasket on crankcase.

**E—O-ring**

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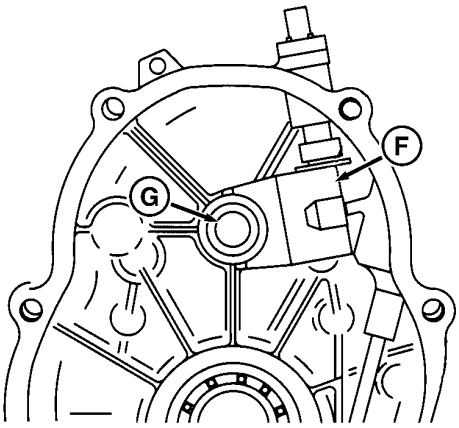
5. Rotate governor shaft (F) against boss (G).
6. Take care to protect the oil seal while assembling crankcase cover. No force should be used.

**F—Governor Shaft**
**G—Boss**

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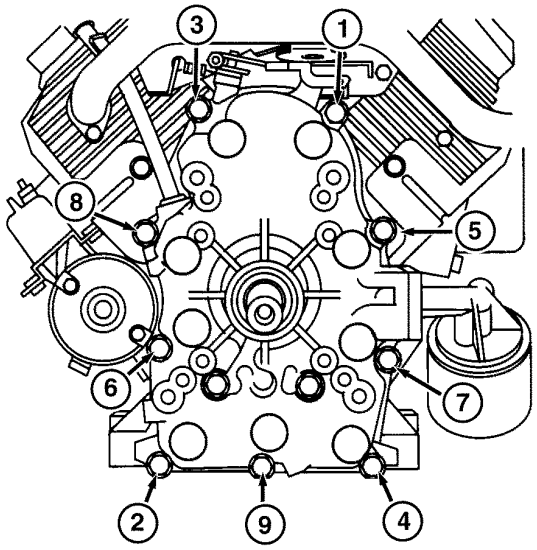
7. Tighten cover bolts to specification in the sequence shown.
8. Install cylinder heads. (See Install Cylinder Head.)
9. Install flywheel. (See Install Flywheel, or Install Flywheel (High Capacity).)
10. Install intake manifold and carburetor assembly. (See Install Carburetor.)
11. Install governor lever and governor springs.
12. Install oil fill tube and dipstick assembly. Perform static governor adjustment. (See Adjust Governor.)
13. Install engine shrouding.

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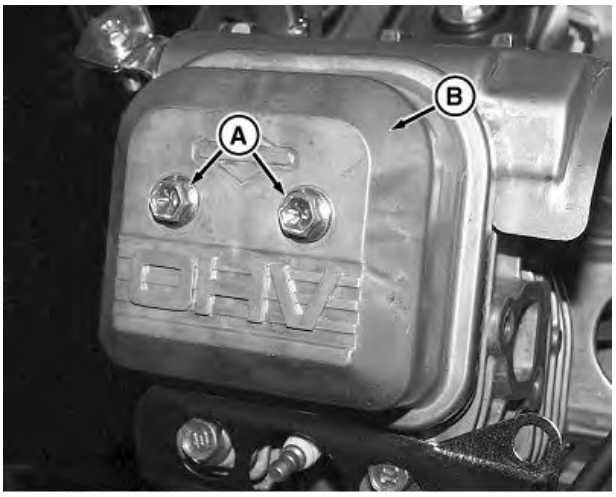
## Remove Cylinder Head

**IMPORTANT: Avoid Damage! Mark all parts when disassembling cylinder heads to prevent interchanging.**

1. Disconnect spark plug leads and remove spark plugs.
2. Remove intake manifold. (See Remove and Install Intake Manifold.)
3. Remove cylinder air guides.
4. Remove bolts (A), and valve cover (B).

**A—Bolts** **B—Cover**

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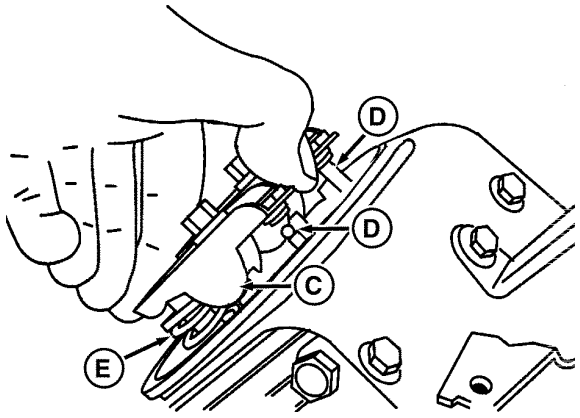
5. Release valve spring pressure from rocker arms (C) by rocking the arm against spring pressure and allowing push rod (D) to drop out of the rocker arm socket. Push rod will move out of position, releasing valve spring (E) pressure.

**C—Rocker Arms** **E—Valve Spring**
**D—Push Rod**

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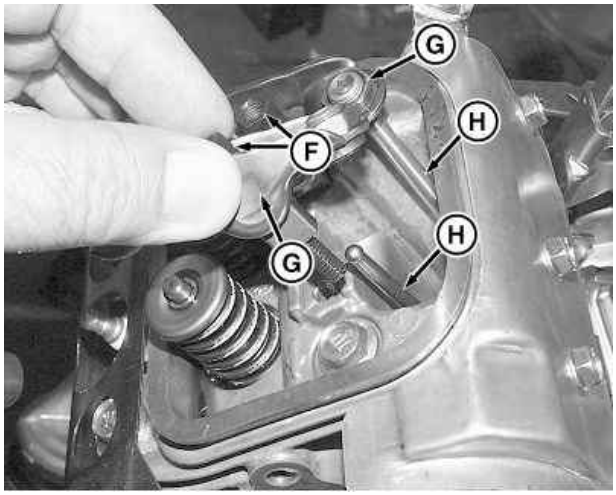
**IMPORTANT: Avoid Damage! Exhaust valve and intake valve push rods are different. Mark push rods for correct reinstallation.**

6. Remove rocker studs (F).
7. Remove rocker arm assemblies (G) and push rods (H).

**F—Rocker Studs**
**G—Rocker Arms**
**H—Push Rods**

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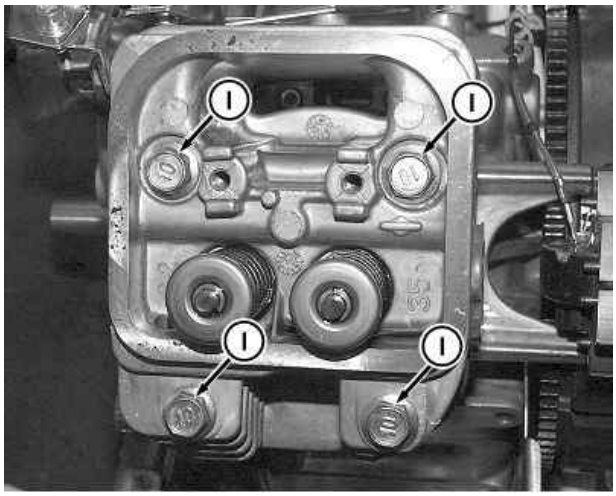
8. Remove cylinder head bolts (I).

**I— Bolts**

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