310SK Backhoe Loader

(PIN: E219607—)

JOHN DEERE

OPERATOR'S MANUAL

310SK Backhoe Loader

OMT305678 ISSUE L3 (ENGLISH)

CALIFORNIA

Proposition 65 Warning

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

If this product contains a gasoline engine:

⚠ WARNING

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

The State of California requires the above two warnings.

**Worldwide Construction,
And Forestry Division**
PRINTED IN U.S.A.

Introduction

Foreword

READ THIS MANUAL carefully to learn how to operate and service your machine correctly. Failure to do so could result in personal injury or equipment damage. This manual and safety signs on your machine may also be available in other languages. (See your John Deere dealer to order.)

THIS MANUAL SHOULD BE CONSIDERED a permanent part of your machine and should remain with the machine when you sell it.

MEASUREMENTS in this manual are given in both metric and customary U.S. unit equivalents. Use only correct replacement parts and fasteners. Metric and inch fasteners may require a specific metric or inch wrench.

RIGHT-HAND AND LEFT-HAND sides are determined by facing in the direction of forward travel.

WRITE PRODUCT IDENTIFICATION NUMBERS (P.I.N.) in the Machine Numbers section. Accurately record all the numbers to help in tracing the machine should it be stolen. Your dealer also needs these numbers when you order parts. File the identification numbers in a secure place off the machine.

WARRANTY is provided as part of John Deere's support program for customers who operate and maintain their equipment as described in this manual. The warranty is explained on the warranty certificate or statement which you should have received from your dealer.

This warranty provides you the assurance that John Deere will back its products where defects appear within the warranty period. In some circumstances, John Deere also provides field improvements, often without charge to the customer, even if the product is out of warranty. Should the equipment be abused, or modified to change its performance beyond the original factory specifications, the warranty will become void and field improvements may be denied. Setting fuel delivery above specifications or otherwise overpowering machines will result in such action.

THE TIRE MANUFACTURER'S warranty supplied with your machine may not apply outside the U.S.

If you are not the original owner of this machine, it is in your interest to contact your local John Deere dealer to inform them of this unit's serial number. This will help John Deere notify you of any issues or product improvements.

DX,IFC7-19-03APR09-1/1

Manual Identification—READ THIS FIRST!

IMPORTANT: Use only supporting manuals designated for your specific machine. If incorrect manual is chosen, improper service may occur. Verify product identification number (PIN) when choosing the correct manual.

Choosing the Correct Supporting Manuals

John Deere backhoe loaders are available in different machine configurations based on the various markets into which they are sold. Different supporting manuals exist for different machine configurations.

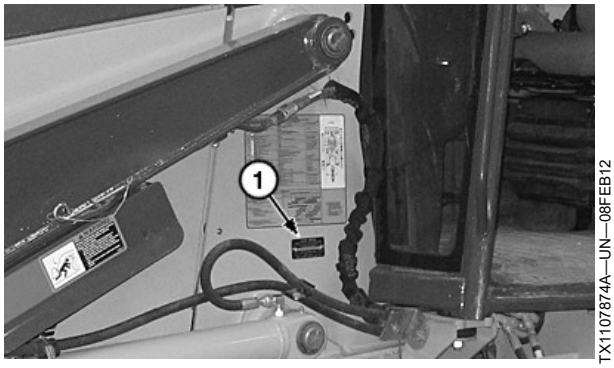
When necessary, product identification numbers are listed on the front covers of backhoe loader manuals. These numbers are used to identify the correct supporting manual for your machine.

Product Identification Number

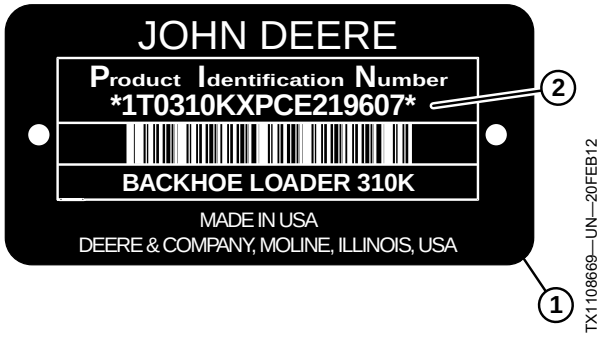
Continued on next page

JS93577,000009E-19-19JUL12-1/3

The product identification number (PIN) plate (1) is located on the left-side of machine on the loader frame. Each machine has a 17-character PIN (2) shown on PIN plate.



PIN Plate Location



Example of PIN Plate

1—PIN Plate **2—17-Character PIN**

The PIN identifies the producing factory, machine model number, machine option, year of manufacture, engine emission level, and machine serial number.

17-Character PIN Examples																
(3)			(4)			(5)	(4)	(6)	(7)	(8)	(9)					
1	T	0	3	1	0	S	K			E	2	1	9	6	0	7
1	T	0	3	1	0	S	K			D	2	1	9	6	0	7
1	T	0	3	1	0	S	K			C	2	1	9	6	0	7

- **(3)—World Code**—Identifies location where machine is manufactured.
- **(4)—Machine Model Identifier**—Identifies model number.
- **(5)—Machine Option Code**—Identifies which major machine option is equipped. This character will change from one machine to another.
- **(6)—Check Letter**—This is a random character assigned by the factory. This is not used in machine identification.
- **(7)—Manufacturing Year Code**—Identifies year of machine manufacture.
- **(8)—Engine Emission Code**—Represents engine emission certification.
- **(9)—Machine Serial Number**—Identifies machine serial number. This character will change from one machine to another.

The following is an example for a 310SK machine that meets Interim Tier 4/Stage III B emission levels:

1T0310SK_ _E219607

1T0	**World Code** (manufacturing location)
1DW	Davenport Works
1T8	Thibodaux Works
1T0	Dubuque Works
310_K	**Machine Model Identifier**
S	**Machine Option Code**
X	Base Machine
S	Super Duty
E	Easy Power (EP)
T	Total Machine Control (TMC) Configuration

Continued on next page

1T0310SK_ _E219607

_ ..... **Check Letter** (variable)
_ ..... **Manufacturing Year Code** (variable)
C 2012
D 2013
E 2014
F 2015
G 2016
E ..... **Engine Emission Code**

1T0310SK_ _E219607

C ..... Tier 2 and Stage II
D ..... Tier 3 and Stage III A
E ..... Interim Tier 4 and Stage III B
F ..... Tier 4
G ..... Interim Tier 4 and Stage III A (19-56 kW)
219607 ..... **Machine Serial Number**

JS93577,000009E-19-19JUL12-3/3

IMPORTANT

Warranty will not apply to engine and drivetrain failures resulting from unauthorized adjustments to this engine.

Unauthorized adjustments are in violation of the emissions regulations applicable to this engine and may result in substantial fines and penalties.

VD76477,000104D-19-27JUN12-1/1

EPA Non-road Emissions Control Warranty Statement—Compression Ignition

DXLOGOV1—UN—28APR09

JOHN DEERE

U.S. AND CANADA EMISSION CONTROL WARRANTY STATEMENT
YOUR WARRANTY RIGHTS AND OBLIGATIONS

To determine if the John Deere engine qualifies for the additional warranties set forth below, look for the "Emissions Control Information" label located on the engine. If the engine is operated in the United States or Canada and the Emissions Control information label states: "This engine complies with US EPA regulations for nonroad and stationary diesel engines", or "This engine conforms to US EPA nonroad compression-ignition regulations", refer to the "U.S. and Canada Emission Control Warranty Statement." If the engine is operated in California, and the label states: "This engine complies with US EPA and CARB regulations for nonroad diesel engines", or "This engine conforms to US EPA and California nonroad compression-ignition emission regulations", also refer to the "California Emission Control Warranty Statement."

Warranties stated on this certificate refer only to emissions-related parts and components of your engine. The complete engine warranty, less emissions-related parts and components, is provided separately. If you have any questions about your warranty rights and responsibilities, you should contact John Deere at 1-319-292-5400.

JOHN DEERE'S WARRANTY RESPONSIBILITY

John Deere warrants to the ultimate purchaser and each subsequent purchaser that this off-road diesel engine including all parts of its emission-control system was designed, built and equipped so as to conform at the time of the sale with Section 213 of the Clean Air Act and is free from defects in materials and workmanship which would cause the engine to fail to conform with applicable US EPA regulations for a period of five years from the date the engine is placed into service or 3,000 hours of operation, whichever first occurs.

Where a warrantable condition exists, John Deere will repair or replace, as it elects, any part or component with a defect in materials or workmanship that would increase the engine's emissions of any regulated pollutant within the stated warranty period at no cost to you, including expenses related to diagnosing and repairing or replacing emission-related parts. Warranty coverage is subject to the limitations and exclusions set forth herein. Emission-related components include engine parts developed to control emissions related to the following:

Air-Induction System
Fuel System
Ignition System
Exhaust Gas Recirculation Systems
Aftertreatment Devices
Crankcase Ventilation Valves
Sensors
Engine Electronic Control Units

EMISSION WARRANTY EXCLUSIONS

John Deere may deny warranty claims for malfunctions or failures caused by:

- Non-performance of maintenance requirements listed in the Operator's Manual
- The use of the engine/equipment in a manner for which it was not designed
- Abuse, neglect, improper maintenance or unapproved modifications or alterations
- Accidents for which it does not have responsibility or by acts of God

The off-road diesel engine is designed to operate on diesel fuel as specified in the Fuels, Lubricants and Coolants section in the Operators Manual. Use of any other fuel can harm the emissions control system of the engine/equipment and is not approved for use.

To the extent permitted by law John Deere is not liable for damage to other engine components caused by a failure of an emission-related part, unless otherwise covered by standard warranty.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. REMEDIES UNDER THIS WARRANTY ARE LIMITED TO THE PROVISIONS OF MATERIAL AND SERVICES AS SPECIFIED HEREIN. WHERE PERMITTED BY LAW, NEITHER JOHN DEERE NOR ANY AUTHORIZED JOHN DEERE ENGINE DISTRIBUTOR, DEALER, OR REPAIR FACILITY OR ANY COMPANY AFFILIATED WITH JOHN DEERE WILL BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

Emission_CI_EPA (18Dec09)

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JOHN DEERE

U.S. AND CANADA EMISSION CONTROL WARRANTY STATEMENT
YOUR WARRANTY RIGHTS AND OBLIGATIONS

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Warranties stated on this certificate refer only to emissions-related parts and components of your engine. The complete engine warranty, less emissions-related parts and components, is provided separately. If you have any questions about your warranty rights and responsibilities, you should contact John Deere at 1-319-292-5400.

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Where a warrantable condition exists, John Deere will repair or replace, as it elects, any part or component with a defect in materials or workmanship that would increase the engine's emissions of any regulated pollutant within the stated warranty period at no cost to you, including expenses related to diagnosing and repairing or replacing emission-related parts. Warranty coverage is subject to the limitations and exclusions set forth herein. Emission- related components include engine parts developed to control emissions related to the following:

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Engine Electronic Control Units

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- Non-performance of maintenance requirements listed in the Operator's Manual
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To the extent permitted by law John Deere is not liable for damage to other engine components caused by a failure of an emission-related part, unless otherwise covered by standard warranty.

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Emission_CI_EPA (18Dec09)

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DX,EMISSIONS,EPA-19-12DEC12-2/2

CARB Non-road Emissions Control Warranty Statement—Compression Ignition
Emissions Control Warranty Statement 2022 through 2024

DXLOGOV1—UN—28APR09

JOHN DEERE

CALIFORNIA EMISSIONS CONTROL WARRANTY STATEMENT
YOUR WARRANTY RIGHTS AND OBLIGATIONS

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Warranties stated on this certificate refer only to emissions-related parts and components of your engine. The complete engine warranty, less emission-related parts and components, is provided separately. If you have any questions about your warranty rights and responsibilities, you should contact John Deere at 1-319-292-5400.

CALIFORNIA EMISSIONS CONTROL WARRANTY STATEMENT:

The California Air Resources Board (CARB) is pleased to explain the emission-control system warranty on 2022 through 2024 off-road diesel engines. In California, new off-road engines must be designed, built and equipped to meet the State’s stringent anti-smog standards. John Deere must warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel injection system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.

John Deere warrants to the ultimate purchaser and each subsequent purchaser that this off-road diesel engine was designed, built, and equipped so as to conform at the time of sale with all applicable regulations adopted by CARB. John Deere warrants that this engine is free from defects in materials and workmanship which would cause the failure of emissions warrantied parts to be identical in all material respects to the part as described in John Deere's application for certification for a period of five years from the date the engine is delivered to an ultimate purchaser or 3,000 hours of operation, whichever occurs first. This applies to all engines rated at 19 kW and greater. In the absence of a device to measure hours of use, the engine shall be warranted for a period of five years.

EMISSIONS WARRANTY EXCLUSIONS:

John Deere may deny warranty claims for failures caused by the use of an add-on or modified part which has not been exempted by the CARB. A modified part is an aftermarket part intended to replace an original emission-related part which is not functionally identical in all respects and which in any way affects emissions. An add-on part is any aftermarket part which is not a modified part or a replacement part.

In no event will John Deere, any authorized engine distributor, dealer, or repair facility, or any company affiliated with John Deere be liable for incidental or consequential damage.

JOHN DEERE'S WARRANTY RESPONSIBILITY:

Where a warrantable condition exists, John Deere will repair or replace, as it elects, your off-road diesel engine at no cost to you, including diagnosis, parts or labor. Warranty coverage is subject to the limitations and exclusions set forth herein. The off-road diesel engine is warranted for a period of five years from the date the engine is delivered to an ultimate purchaser or 3,000 hours of operation, whichever occurs first. The following are emissions-related parts:

Continued on next page

Air Induction System

- Intake manifold
- Turbocharger
- Charge air cooler

Fuel Metering system

- Fuel injection system

Exhaust Gas Recirculation

- EGR valve

Catalyst or Thermal Reactor Systems

- Catalytic converter
- Exhaust manifold

Emission control labels

Particulate Controls

- Any device used to capture particulate emissions
- Any device used in the regeneration of the capturing system
- Enclosures and manifolding
- Smoke Puff Limiters

Positive Crankcase Ventilation (PCV) System

- PCV valve
- Oil filler cap

Advanced Oxides of Nitrogen (NOx) Controls

- NOx absorbers and catalysts

SCR systems and urea containers/dispensing systems

Miscellaneous Items used in Above Systems

- Electronic control units, sensors, actuators, wiring harnesses, hoses, connectors, clamps, fittings, gasket, mounting hardware

Any warranted emissions-related part scheduled for replacement as required maintenance is warranted by John Deere for the period of time prior to the first scheduled replacement point for the part. Any warranted emissions-related part not scheduled for replacement as required maintenance or scheduled only for regular inspection is warranted by John Deere for the stated warranty period.

OWNER'S WARRANTY RESPONSIBILITIES:

As the off-road diesel engine owner you are responsible for the performance of the required maintenance listed in your Operator’s Manual. John Deere recommends that the owner retain all receipts covering maintenance on the off-road diesel engine, but John Deere cannot deny warranty solely for the lack of receipts or for the owner’s failure to ensure the performance of all scheduled maintenance. However, as the off-road diesel engine owner, you should be aware that John Deere may deny you warranty coverage if your off-road diesel engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

The off-road diesel engine is designed to operate on diesel fuel as specified in the Fuels, Lubricants and Coolants section in the Operators Manual. Use of any other fuel may result in the engine no longer operating in compliance with applicable emissions requirements.

The owner is responsible for initiating the warranty process, and should present the machine to the nearest authorized John Deere dealer as soon as a problem is suspected. The warranty repairs should be completed by the authorized John Deere dealer as quickly as possible.

Emissions regulations require the customer to bring the unit to an authorized servicing dealer when warranty service is required. As a result, John Deere is NOT liable for travel or mileage on emissions warranty service calls.

Emission_CI_CARB (14Apr20)

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Emissions Control Warranty Statement 2022 through 2024

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JOHN DEERE

CALIFORNIA EMISSIONS CONTROL WARRANTY STATEMENT
YOUR WARRANTY RIGHTS AND OBLIGATIONS

To determine if the John Deere engine qualifies for the additional warranties set forth below, look for the "Emission Control Information" label located on the engine. If the engine is operated in the United States or Canada and the engine label states: "This engine complies with US EPA regulations for nonroad and stationary diesel engines", or "This engine complies with US EPA regulations for stationary emergency diesel engines", refer to the "U.S. and Canada Emission Control Warranty Statement." If the engine is operated in California, and the engine label states: "This engine complies with US EPA and California regulations for nonroad/off-road diesel engines" also refer to the "California Emissions Control Warranty Statement."

Warranties stated on this certificate refer only to emissions-related parts and components of your engine. The complete engine warranty, less emission-related parts and components, is provided separately. If you have any questions about your warranty rights and responsibilities, you should contact John Deere at 1-319-292-5400.

CALIFORNIA EMISSIONS CONTROL WARRANTY STATEMENT:

The California Air Resources Board (CARB) is pleased to explain the emission-control system warranty on 2022 through 2024 off-road diesel engines. In California, new off-road engines must be designed, built and equipped to meet the State's stringent anti-smog standards. John Deere must warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel injection system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.

John Deere warrants to the ultimate purchaser and each subsequent purchaser that this off-road diesel engine was designed, built, and equipped so as to conform at the time of sale with all applicable regulations adopted by CARB. John Deere warrants that this engine is free from defects in materials and workmanship which would cause the failure of emissions warrantied parts to be identical in all material respects to the part as described in John Deere's application for certification for a period of five years from the date the engine is delivered to an ultimate purchaser or 3,000 hours of operation, whichever occurs first. This applies to all engines rated at 19 kW and greater. In the absence of a device to measure hours of use, the engine shall be warranted for a period of five years.

EMISSIONS WARRANTY EXCLUSIONS:

John Deere may deny warranty claims for failures caused by the use of an add-on or modified part which has not been exempted by the CARB. A modified part is an aftermarket part intended to replace an original emission-related part which is not functionally identical in all respects and which in any way affects emissions. An add-on part is any aftermarket part which is not a modified part or a replacement part.

In no event will John Deere, any authorized engine distributor, dealer, or repair facility, or any company affiliated with John Deere be liable for incidental or consequential damage.

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DX,EMISSIONS,CARB-19-15DEC23-3/6

JOHN DEERE'S WARRANTY RESPONSIBILITY:

Where a warrantable condition exists, John Deere will repair or replace, as it elects, your off-road diesel engine at no cost to you, including diagnosis, parts or labor. Warranty coverage is subject to the limitations and exclusions set forth herein. The off-road diesel engine is warranted for a period of five years from the date the engine is delivered to an ultimate purchaser or 3,000 hours of operation, whichever occurs first. The following are emissions-related parts:

Air Induction System

- Intake manifold
- Turbocharger
- Charge air cooler

Fuel Metering system

- Fuel injection system

Exhaust Gas Recirculation

- EGR valve

Catalyst or Thermal Reactor Systems

- Catalytic converter
- Exhaust manifold

Emission control labels

Particulate Controls

- Any device used to capture particulate emissions
- Any device used in the regeneration of the capturing system
- Enclosures and manifolding
- Smoke Puff Limiters

Positive Crankcase Ventilation (PCV) System

- PCV valve
- Oil filler cap

Advanced Oxides of Nitrogen (NOx) Controls

- NOx absorbers and catalysts

SCR systems and urea containers/dispensing systems

Miscellaneous Items used in Above Systems

- Electronic control units, sensors, actuators, wiring harnesses, hoses, connectors, clamps, fittings, gasket, mounting hardware

Any warranted emissions-related part scheduled for replacement as required maintenance is warranted by John Deere for the period of time prior to the first scheduled replacement point for the part. Any warranted emissions-related part not scheduled for replacement as required maintenance or scheduled only for regular inspection is warranted by John Deere for the stated warranty period.

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The off-road diesel engine is designed to operate on diesel fuel as specified in the Fuels, Lubricants and Coolants section in the Operators Manual. Use of any other fuel may result in the engine no longer operating in compliance with applicable emissions requirements.

The owner is responsible for initiating the warranty process, and should present the machine to the nearest authorized John Deere dealer as soon as a problem is suspected. The warranty repairs should be completed by the authorized John Deere dealer as quickly as possible.

Emissions regulations require the customer to bring the unit to an authorized servicing dealer when warranty service is required. As a result, John Deere is NOT liable for travel or mileage on emissions warranty service calls.

RG32759—UN—19AUG20

Emission_CI_CARB (14Apr20)

Emissions Control Warranty Statement 2025 through 2027

DXLOGOV1—UN—28APR09

JOHN DEERE

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DX,EMISSIONS,CARB-19-15DEC23-4/6

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CALIFORNIA EMISSIONS CONTROL WARRANTY STATEMENT
YOUR WARRANTY RIGHTS AND OBLIGATIONS

To determine if the John Deere engine qualifies for the additional warranties set forth below, look for the “Emission Control Information” label located on the engine. If the engine is operated in the United States or Canada and the engine label states: “This engine complies with US EPA regulations for nonroad and stationary diesel engines”, or “This engine complies with US EPA regulations for stationary emergency diesel engines”, refer to the “U.S. and Canada Emission Control Warranty Statement.” If the engine is operated in California, and the engine label states: “This engine complies with US EPA and California regulations for nonroad/off-road diesel engines” also refer to the “California Emissions Control Warranty Statement.”

Warranties stated on this certificate refer only to emissions-related parts and components of your engine. The complete engine warranty, less emission-related parts and components, is provided separately. If you have any questions about your warranty rights and responsibilities, you should contact John Deere at 1-319-292-5400.

CALIFORNIA EMISSIONS CONTROL WARRANTY STATEMENT:

The California Air Resources Board (CARB) is pleased to explain the emission-control system warranty in 2025 through 2027 off-road diesel engines. In California, new off-road engines must be designed, built and equipped to meet the State’s stringent anti-smog standards. John Deere must warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel injection system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.

John Deere warrants to the ultimate purchaser and each subsequent purchaser that this off-road diesel engine was designed, built, and equipped so as to conform at the time of sale with all applicable regulations adopted by CARB and is free from defects in materials and workmanship which would cause the failure of a warranted part to be identical in all material respects to the part as described in John Deere's application for certification for a period of five years from the date the engine is delivered to an ultimate purchaser or 3,000 hours of operation, whichever occurs first for all engines rated at 19 kW and greater. In the absence of a device to measure hours of use, the engine shall be warranted for a period of five years.

EMISSIONS WARRANTY EXCLUSIONS:

John Deere may deny warranty claims for failures caused by the use of an add-on or modified part which has not been exempted by the CARB. A modified part is an aftermarket part intended to replace an original emission-related part which is not functionally identical in all respects and which in any way affects emissions. An add-on part is any aftermarket part which is not a modified part or a replacement part.

In no event will John Deere, any authorized engine distributor, dealer, or repair facility, or any company affiliated with John Deere be liable for incidental or consequential damage.

RG595770—UN—07DEC23

JOHN DEERE’S WARRANTY RESPONSIBILITY:

Where a warrantable condition exists, John Deere will repair or replace, as it elects, your off-road diesel engine at no cost to you, including diagnosis, parts and labor. Warranty coverage is subject to the limitations and exclusions set forth herein. The off-road diesel engine is warranted for a period of five years from the date the engine is delivered to an ultimate purchaser or 3,000 hours of operation, whichever occurs first. The following are emissions-related parts:

- Air Induction System
  - Intake manifold
  - Turbocharger
  - Charge air cooler
- Fuel Metering System
  - Fuel injection system
- Exhaust Gas Recirculation
  - EGR valve
- Catalyst or Thermal Reactor Systems
  - Catalytic converter
  - Exhaust manifold
- Emission control labels
- Particulate Controls
  - Any device used to capture particulate emissions
  - Any device used in the regeneration of the capturing system
  - Enclosures and manifolding
  - Smoke Puff Limiters
- Positive Crankcase Ventilation (PCV) System
  - PCV valve
  - Oil filler cap
- Advanced Oxides of Nitrogen (NOx Controls)
  - NOx absorbers and catalysts
- SCR systems and urea containers / dispensing systems
- Miscellaneous Items used in Above Systems
  - Electronic control units, sensors, actuators, wiring harnesses, hoses, connectors, clamps, fittings, gasket, mounting hardware

Any warranted emissions-related part scheduled for replacement as required maintenance is warranted by John Deere for the period of time prior to the first scheduled replacement point for the part. Any warranted emissions-related part not scheduled for replacement as required maintenance or scheduled only for regular inspection is warranted by John Deere for the stated warranty period.

OWNER’S WARRANTY RESPONSIBILIT IES:

As the off-road diesel engine owner you are responsible for the performance of the required maintenance listed in your Operator’s Manual. John Deere recommends that the owner retain all receipts covering maintenance on the off-road diesel engine, but John Deere cannot deny warranty solely for the lack of receipts or for the owner’s failure to ensure the performance of all scheduled maintenance. However, as the off-road diesel engine owner, you should be aware that John Deere may deny you warranty coverage if your off-road diesel engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

The off-road diesel engine is designed to operate on diesel fuel as specified in the Fuels, Lubricants and Coolants section in the Operators Manual. Use of any other fuel may result in the engine no longer operating in compliance with applicable emissions requirements.

The owner is responsible for initiating the warranty process, and should present the machine to the nearest authorized John Deere dealer as soon as a problem is suspected. The warranty repairs should be completed by the authorized John Deere dealer as quickly as possible.

Emissions regulations require the customer to bring the unit to an authorized servicing dealer when warranty service is required. As a result, John Deere is NOT liable for travel or mileage on emissions warranty service calls.

RG595771—UN—07DEC23

DX,EMISSIONS,CARB-19-15DEC23-6/6

Required Emission-Related Information
Service Provider

A repair shop or person of the owner's choosing may maintain, replace, or repair emission control devices and systems with original or equivalent replacement parts. However, warranty, recall, and all other services paid for by John Deere must be performed at an authorized John Deere service center.

DX,EMISSIONS,REQINFO-19-08DEC23-1/1

FCC Notifications to User

FCC Notification

These devices comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) These devices may not cause harmful interference, and (2) these devices must accept any interference received, including interference that may cause undesired operation.

These devices must be operated as supplied by John Deere Ag Management Solutions. Any changes or modifications made to these devices without the express written approval of John Deere Ag Management Solutions may void the user’s authority to operate these devices.

Modular Telematics Gateway and Satellite Module

This equipment has been tested and found to comply with the limits for Class B digital devices, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, no guarantee shall be made that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

MM16284,000196F-19-20FEB19-1/1

Service ADVISOR™ Remote (SAR)—SOFTWARE TERMS AND CONDITIONS

IMPORTANT -- READ CAREFULLY: THIS SOFTWARE LICENSE AGREEMENT IS A LEGAL CONTRACT BETWEEN YOU AND THE LICENSOR ("LICENSOR") IDENTIFIED BELOW AND GOVERNS YOUR USE OF THE SOFTWARE DELIVERED TO YOUR MACHINE (THE “MACHINE”).

BY INDICATING YOUR ACCEPTANCE ON A DISPLAY ON THE MACHINE, BY INSTALLING SOFTWARE TO THE MACHINE, OR USING SOFTWARE ON THE MACHINE, YOU ARE ACCEPTING AND AGREEING TO THE TERMS OF THIS LICENSE AGREEMENT WITH RESPECT TO THE SOFTWARE (THE "Software") THAT IS DELIVERED TO YOUR MACHINE. YOU AGREE THAT THIS SOFTWARE LICENSE AGREEMENT, INCLUDING THE WARRANTY DISCLAIMERS, LIMITATIONS OF LIABILITY AND TERMINATION PROVISIONS BELOW, IS BINDING UPON YOU, AND UPON ANY COMPANY ON WHOSE BEHALF YOU USE THE SOFTWARE AS WELL AS THE EMPLOYEES OF ANY SUCH COMPANY (COLLECTIVELY REFERRED TO AS "YOU" IN THIS SOFTWARE LICENSE AGREEMENT). IF YOU DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, OR IF YOU ARE NOT AUTHORIZED TO ACCEPT THESE TERMS ON BEHALF OF YOUR COMPANY OR ITS EMPLOYEES, PLEASE CLICK THE [Decline] ICON ON THE DISPLAY ON THE MACHINE TO DECLINE THESE TERMS AND CONDITIONS. THIS LICENSE AGREEMENT REPRESENTS THE ENTIRE AGREEMENT CONCERNING THE SOFTWARE BETWEEN YOU AND THE LICENSOR.

1.
Delivery of Software. Software may be delivered to your Machine by Licensor wirelessly or via an agent of Licensor, such as a dealer. If it is delivered wirelessly, you may be responsible for any data transmission fees incurred due to such delivery.

2.
License. Licensor hereby grants to you, and you accept, a nonexclusive license to use the Software in machine-readable, object code form, only as authorized in this License Agreement and the applicable provisions of the Operators' Manuals, which you agree to review carefully prior to using the Software. The Software may be used only on the Machine to which it was initially delivered. You agree that you will not assign, sublicense, transfer, pledge, lease, rent, or share your rights under this License Agreement, except that you may permanently transfer all of your rights under this License Agreement in connection with the sale of the Machine on which the Software covered by this Agreement is installed.

3.
Licensor's Rights. You acknowledge and agree that the Software is proprietary to Licensor and is protected under copyright law. You further acknowledge and agree that all right, title, and interests in and to the Software, including associated intellectual property rights, are and shall remain with Licensor. This License Agreement does not convey to you any title or interest in or to the Software, but only a limited right of use revocable in accordance with the terms of this License Agreement. You agree that you will not: (a) reverse assemble, reverse compile, modify, or otherwise translate the Software, or attempt to defeat the copyright protection and application enabling mechanisms therein; (b) copy or reproduce the Software; or, (b) remove or obliterate any copyright, trademark or other proprietary rights notices from the Software. You also agree not to permit any third party acting under your control to do any of the foregoing.

4.
License Fees. The license fees paid by you, if any, are paid in consideration of the licenses granted under this License Agreement.

5.
Limited Warranty. Licensor warrants, for your benefit alone and not for the benefit of any other party, that during the "**Warranty Period**" defined below, the Software will operate substantially in accordance with the applicable functional specifications ("**Specifications**") set forth in the Operators' Manuals. If, prior to expiration of the Warranty Period, the Software fails to perform substantially in accordance with the Specifications, you may return the Machine to the place of purchase for repair or replacement of the non-performing Software. The Warranty Period is ninety (90) days from the date of installation of the Software or the duration of the warranty period of the component of the Machine on which the Software is installed, whichever is longer. The Software Warranty Period does not affect the warranty period of the Machine itself or any component thereof.

6.
DISCLAIMER OF WARRANTIES. YOU HEREBY AGREE THAT THE LIMITED WARRANTY PROVIDED ABOVE (THE "**LIMITED WARRANTY**") CONSTITUTES YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY PROBLEM WHATSOEVER WITH THE SOFTWARE. EXCEPT AS PROVIDED IN THE LIMITED WARRANTY, THE SOFTWARE IS LICENSED “AS IS,” AND LICENSOR, ITS AFFILIATES AND THIRD PARTY SUPPLIERS EXPRESSLY DISCLAIM AND YOU EXPRESSLY WAIVE, RELEASE AND RENOUNCE ALL WARRANTIES ARISING BY LAW OR OTHERWISE WITH RESPECT TO THE SOFTWARE, INCLUDING, BUT NOT LIMITED TO: ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE; ANY IMPLIED WARRANTY ARISING FROM COURSE OF PERFORMANCE, COURSE OF DEALING OR TRADE USAGE; ANY WARRANTY OF TITLE OR NON-INFRINGEMENT; AND, ANY OTHER WARRANTY ARISING UNDER ANY THEORY OF LAW, INCLUDING TORT, NEGLIGENCE, STRICT LIABILITY, CONTRACT OR OTHER LEGAL OR EQUITABLE THEORY. NO REPRESENTATION OR OTHER AFFIRMATION OF FACT INCLUDING, BUT NOT LIMITED TO, STATEMENTS

Continued on next page

REGARDING SUITABILITY FOR USE, SHALL BE DEEMED TO BE A WARRANTY BY LICENSOR OR ANY OF ITS AFFILIATES OR THIRD PARTY SUPPLIERS. LICENSOR DOES NOT WARRANT THAT THE SOFTWARE IS ERROR-FREE OR WILL OPERATE WITHOUT INTERRUPTION.

7.
LIMITATION OF LIABILITY. EXCEPT AS SET FORTH IN THE LIMITED WARRANTY, UNDER NO CIRCUMSTANCES SHALL LICENSOR, ITS AFFILIATES OR ITS THIRD PARTY SUPPLIERS BE LIABLE TO YOU OR TO ANY THIRD PARTIES FOR DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND, INCLUDING ANY LOSS OR DAMAGE CAUSED BY THE SOFTWARE; ANY PARTIAL OR TOTAL FAILURE OF THE SOFTWARE; PERFORMANCE, NONPERFORMANCE OR DELAYS IN CONNECTION WITH ANY INSTALLATION, MAINTENANCE, WARRANTY OR REPAIRS OF THE SOFTWARE, DAMAGES FOR CROP LOSS, DAMAGE TO LAND, LOST PROFITS, LOSS OF BUSINESS OR LOSS OF GOODWILL, LOSS OF USE OF EQUIPMENT OR SERVICES OR DAMAGES TO BUSINESS OR REPUTATION ARISING FROM THE PERFORMANCE OR NON-PERFORMANCE OF ANY ASPECT OF THIS AGREEMENT, WHETHER IN CONTRACT, TORT OR OTHERWISE, AND WHETHER OR NOT LICENSOR, ITS AFFILIATES OR ITS THIRD PARTY SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL LICENSOR'S CUMULATIVE LIABILITY TO YOU OR TO ANY OTHER PARTY FOR ANY LOSSES OR DAMAGES RESULTING FROM ANY CLAIMS, LAWSUITS, DEMANDS, OR ACTIONS ARISING FROM OR RELATING TO USE OF THE SOFTWARE EXCEED YOUR TOTAL PAYMENT FOR THE MACHINE AND FOR THE LICENSE OF THE SOFTWARE.

8.
Termination of License. Licensor may terminate the license granted under this Agreement upon written notice of termination provided to you if you violate any material term of this Agreement pertaining to your use of the Software or Licensor's rights, including, without limitation, the provisions of Sections 2 and 3 above.

9.
Compliance with Law. You agree that you will use the Software in accordance with United States law and the laws of the country in which you are located, as applicable, including foreign trade control laws and regulations. The Software may be subject to export and other foreign trade controls restricting re-sales and/or transfers to other countries and parties. By accepting the terms of this Agreement, you acknowledge that you understand that the Software may be so controlled, including, but not limited to, by the Export Administration Regulations and/or the foreign trade control regulations of the Treasury Department of the United States. Any other provision of this Agreement to the contrary notwithstanding, you agree that the Software will not be resold, re-exported or otherwise transferred. The Software remains subject to applicable U.S. laws.

10.
Indemnification. You agree to defend, indemnify and hold Licensor, its affiliates and third party supplier, and their, officers, directors, employees, agents and representatives (each an "**Indemnified Party**"), harmless from and against all claims, demands proceedings, injuries, liabilities, losses, or costs and expenses (including reasonable legal fees) brought by any third party against any such persons arising from or in connection with your use of the Software, regardless of whether such losses are caused, wholly or partially, by any negligence, breach of contract or other fault of an Indemnified Party.

11.
Costs of Litigation. If any claim or action is brought by either party to this License Agreement against the other party regarding the subject matter hereof, the prevailing party shall be entitled to recover, in addition to any other relief granted, reasonable attorney fees and expenses of litigation.

12.
Severability and Waiver. Should any term of this Agreement be declared void or unenforceable by any court of competent jurisdiction, such declaration shall have no effect on the remaining terms hereof. The failure of either party to enforce any rights granted hereunder or to take action against the other party in the event of any breach hereunder shall not be deemed a waiver by that party as to subsequent enforcement of rights of subsequent actions in the event of future breaches.

13.
Language Clause. If you are a resident of Canada at the time you accept this Agreement, then the parties hereby acknowledge that they have required this Agreement, and all other documents relating hereto, be drawn up in the English language only. Les parties reconnaissent avoir demandé que le présent contrat ainsi que toute autre entente ou avis requis ou permis à être conclu ou donné en vertu des stipulations du présent contrat, soient rédigés en langue anglaise seulement. If you are a resident of any country other than the United States, Canada, Great Britain, Australia or New Zealand then you agree as follows: there may be a translated version of this Agreement. If there is an inconsistency or contradiction between the translated version and the English version of this Agreement, the English version of this Agreement shall control.

14.
Assignment by Licensor. Licensor may assign this Agreement without your prior consent to any company or entity affiliated with Licensor, or by an assignment associated with a corporate restructuring, merger or acquisition.

15.
Governing Law and Forum. This Agreement will be

Continued on next page

governed by and construed in accordance with the substantive laws identified in the table in Section 18, below The respective courts of the venue identified in the table in Section 18, below, for the location of the Machine shall have non-exclusive jurisdiction over all disputes relating to this Agreement. This Agreement will not be governed by the conflict of law rules of any jurisdiction or the United Nations Convention on Contracts for the International Sale of Goods, the application of which is expressly excluded.

16.
Specific Exceptions.

16.1
Limited Warranty for Users Residing in European Economic Area Countries or Switzerland. If you obtained the Software in any European Economic Area country or Switzerland, and you usually reside in such country, then Section 6 does not apply, instead, Licensor warrants that the Software provides the functionalities set forth in the Operators Manuals (the "**agreed upon functionalities**") for the Warranty Period. As used in this Section, "Warranty Period" means one (1) year. Non-substantial variation from the agreed upon functionalities shall not be considered and does not establish any warranty rights. THIS LIMITED WARRANTY DOES NOT APPLY TO SOFTWARE PROVIDED TO YOU FREE OF CHARGE, FOR EXAMPLE, UPDATES, OR SOFTWARE THAT HAS BEEN ALTERED BY YOU, TO THE EXTENT SUCH ALTERATIONS CAUSED A DEFECT. To make a warranty claim, during the Warranty Period you must return, at our expense, the Software and proof of purchase to the location where you obtained it. If the functionalities of the Software vary substantially from the agreed upon functionalities, Licensor is entitled -- by way of re-performance and at its own discretion -- to repair or replace the Software. If this fails, you are entitled to a reduction of the purchase price (reduction) or to cancel the purchase agreement (rescission). For further warranty information, please contact Licensor at the address listed in Section 18.

16.2
Limitation of Liability for Users Residing in European Economic Area Countries or Switzerland.

(a) If you obtained the Software in any European Economic Area country or Switzerland, and you usually reside in such country, then Sections 7 and 10 do not apply, Instead, Licensor's statutory liability for damages shall be limited as follows: (a) Licensor shall be liable only up to the amount of damages as typically foreseeable at the time of entering into this Agreement in respect of damages caused by a slightly negligent breach of a material contractual obligation and (b) Licensor shall not be liable for damages caused by a slightly negligent breach of a non-material contractual obligation.

(b) The aforesaid limitation of liability shall not apply to any mandatory statutory liability, in particular, to liability under the German Product Liability Act, liability for assuming a specific guarantee or liability for culpably caused personal injuries.

(c) You are required to take all reasonable measures to avoid and reduce damages, in particular to make back-up copies of the Software and your computer data subject to the provisions of this Agreement.

17.
Representations of Licensee. BY ACCEPTING THIS AGREEMENT, YOU: (A) ACKNOWLEDGE THAT YOU HAVE READ AND UNDERSTAND THIS AGREEMENT; (B) REPRESENT THAT YOU HAVE THE AUTHORITY TO ENTER INTO THIS AGREEMENT; (C) AGREE THAT THIS AGREEMENT IS ENFORCEABLE AGAINST YOU AND ANY LEGAL ENTITY THAT OBTAINED THE SOFTWARE AND ON WHOSE BEHALF IT IS USED; AND, (D) AGREE TO PERFORM THE OBLIGATIONS OF THIS AGREEMENT.

18.
Identification of Licensor and Notices. The Licensor is the entity identified in the table below. All notices to Licensor shall be sent by certified or registered mail to the corresponding address for the Licensor given below. In each case a copy of the notice shall also be sent to John Deere Intelligent Solutions Group, ATTN: Legal, 4140 114th Street Urbandale, IA 50322 U.S.A. All notices to Licensor shall be effective upon receipt. All notices required to be given to you shall, in Licensor’s sole discretion, either be sent via certified or registered mail to the address given to Licensor in connection with your purchase of the Machine. Either method of notification used by Licensor shall be effective upon dispatch. You agree to notify Licensor of any change in your address in the manner set forth above.

Place of Purchase	Address	Governing Law	Venue
United States of America	John Deere Shared Services, Inc. One John Deere Place Moline, IL 61265 U.S.A.	State of Illinois, USA	Rock Island County, Illinois, USA
Argentina	Industrias John Deere Argentina, S.A. Casilla de Correo 80 Rosario (Santa Fe), 2000, Argentina	Province of Santa Fe, Argentina	Province of Santa Fe, Argentina
Australia or New Zealand	John Deere Limited (Australia) P.O. Box 2022 Crestmead, Queensland, Australia 4132	State of Queensland, Australia	State of Queensland, Australia
Canada	John Deere Limited 295 Hunter Road P.O. Box 1000	Province of Ontario, Canada	Province of Ontario, Canada

Continued on next page

	Grimsby, ON L9K 1M3		
Chile	John Deere Water, S.A. Cerro Santa Lucia 9990 Quilicura, Santiago, Chile	Province of Santiago, Chile	Province of Santiago, Chile
Mexico	Industrias John Deere, S.A. de C.V. Boulevard Diaz Ordaz #500 Garza Garcia Nuevo Leon 66210, Mexico	State of Nuevo Leon, Mexico	State of Nuevo Leon, Mexico
Europe	ETIC Strassburgerallee 5 67657 Kaiserslautern, Germany	Federal Republic of Germany	Kaiserslautern, Germany
Other	The John Deere entity identified for the location of your Machine on www.JDLink.com.	The John Deere entity identified for the location of your Machine on www.JDLink.com.	The John Deere entity identified for the location of your Machine on www.JDLink.com.

OUT4001,00006C5-19-08NOV10-4/4

Technical Information Feedback Form

We need your help to continually improve our technical publications. Please copy this page and FAX or mail your comments, ideas and improvements.

SEND TO: John Deere Dubuque Works
18600 South John Deere Road
Attn: Publications, Dept. 324
Dubuque, IA 52004-0538
USA

FAX NUMBER: 1-563-589-5800 (USA)

Publication Number: _____

Page Number: _____

Ideas, Comments: _____

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Name: _____

Phone: _____

Email Address: _____

THANK YOU!

TX,TM,FAX-19-03JUL01-1/1

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.

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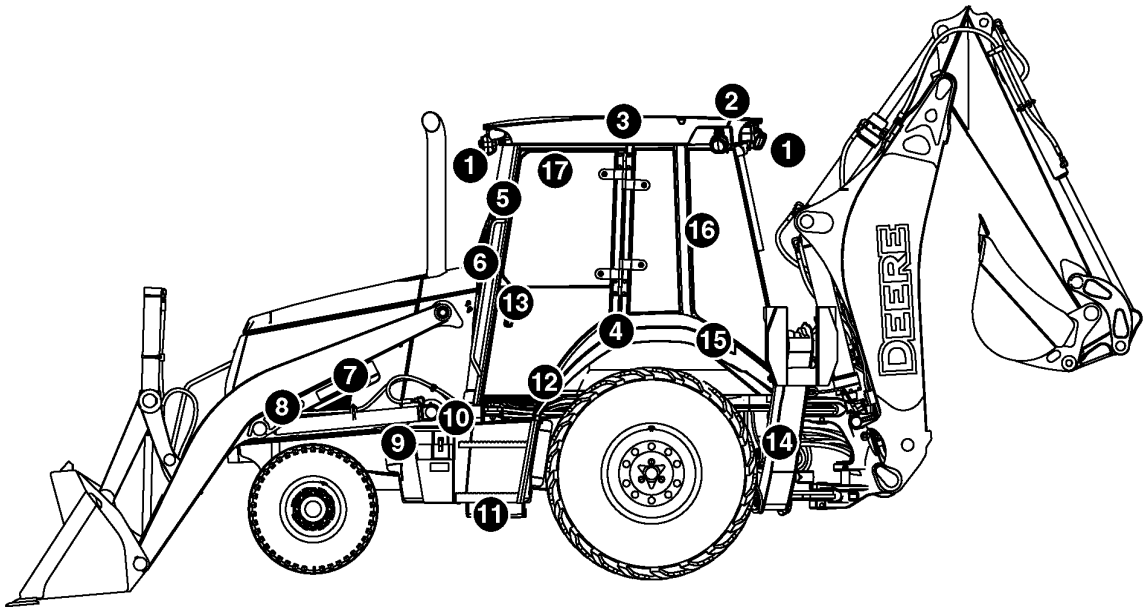
Safety and Operator Convenience Features



TX1106958

TX1106958—UN—30JAN12

Please remember, the **operator** is the key to preventing accidents.

1. **Headlights/Taillights.** Two front halogen driving/work lights and two rear halogen work lights.
2. **Signal/Warning Lights.** Roof mounted turning signal lights and warning lights for on-road use.
3. **ROPS Protection.** Certified rollover protection structure surrounds the operator. Integral roof provides overhead protection.
4. **Seat Position Sensor.** An audio/visual warning alerts operator when transmission control lever (TCL) is in forward/reverse and the seat turned toward the backhoe position.
5. **Interior Rearview Mirror.** Offers the operator a view of activity behind him.
6. **Handholds.** Large and conveniently placed handholds, make it easy to enter or exit the operator's station.
7. **Loader Boom Service Lock.** Provided for working on or around this machine with the boom raised.
8. **Engine Fan Guard.** A secondary engine fan guard inside engine compartment encloses rotating fan blades.
9. **Bypass Start Protection.** Shielding over the starter solenoid helps prevent dangerous bypass starting.
10. **Ground-Level Fueling, Daily Service Checks.** Ground-level fueling feature eliminates the need to climb on the machine to fuel it.
11. **Steps.** Wide, skid-resistant steps provide excellent footing for getting in/out of operator's station.
12. **Independent Parking/Secondary Brake.** Independent, electrically controlled, parking brake electrically engages when the engine is stopped.
13. **Neutral Start.** The machine will not move until the transmission control lever (TCL) is cycled back to neutral and the park brake is released, regardless of TCL position at startup.
14. **Backup Alarm.** Alerts bystanders when the machine is shifted into reverse.
15. **Seat Belt Retractors.** Seat belt retractors help keep belts clean and convenient to use.
16. **Exceptional Visibility.** Views to either side and front or rear working tools are unrestricted.
17. **Operator Manual Holder.** A sealed manual holder keeps manual clean and dry.

MB60223,000029E-19-01MAR12-1/1

Recognize Safety Information

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

Follow the precautions and safe operating practices highlighted by this symbol.

A signal word — DANGER, WARNING, or CAUTION — is used with the safety alert symbol. DANGER identifies the most serious hazards.

On your machine, DANGER signs are red in color, WARNING signs are orange, and CAUTION signs are yellow. DANGER and WARNING signs are located near specific hazards. General precautions are on CAUTION labels.

T133555—UN—15APR13

T133588—19—28AUG00

TX,RECOGNIZE-19-28JUN10-1/1

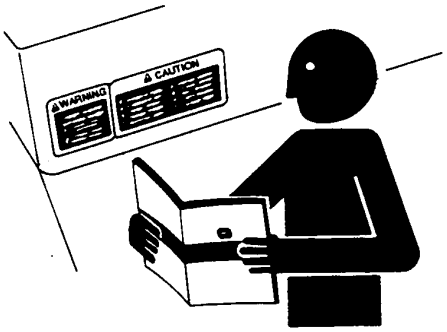
Follow Safety Instructions

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. Use this operator's manual for correct safety sign placement. Be sure that new equipment components and repair parts include the current safety signs. Replacement safety signs are available at 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 could impair the function 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.

TX,FOLLOW-19-28AUG23-1/1

Operate Only If Qualified

Do not operate this machine unless the operator's manual has been read carefully, and you have been qualified by supervised training and instruction.

Operator should be familiar with the job site and surroundings before operating. Try all controls and machine functions with the machine in an open area before starting to work.

Know and observe all safety rules that may apply to every work situation and work site.

TX,QUALIFIED-19-18JAN11-1/1

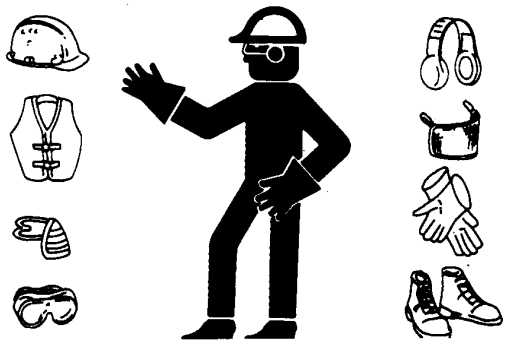
Wear Protective Equipment

Guard against injury from flying pieces of metal or debris; wear goggles or safety glasses.

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

Operating equipment safety requires the full attention of the operator. Do not wear radio or music headphones while operating machine.

Prolonged exposure to loud noise can cause impairment or loss of hearing. Wear suitable hearing protection such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises. Radio or music headphones are not suitable to use for hearing protection.



TS206—UN—15APR13

TX,WEAR,PE-19-28AUG23-1/1

Avoid Unauthorized Machine Modifications

John Deere recommends using only genuine John Deere replacement parts to ensure machine performance. Never substitute genuine John Deere parts with alternate parts not intended for the application as these can create hazardous situations or hazardous performance. Non-John Deere parts, or any damage or malfunctions resulting from their use, are not covered by any John Deere warranty.

Modifications of this machine, or addition of unapproved products or attachments, may affect machine stability or reliability, and may create a hazard for the operator or others near the machine. The installer of any modification which may affect the electronic controls of this machine is responsible for establishing that the modification does not adversely affect the machine or its performance.

Always contact an authorized dealer before making machine modifications that change the intended use, weight or balance of the machine, or that alter machine controls, performance, or reliability.

AM40430,00000A9-19-01JUL15-1/1

Inspect Machine

Inspect machine carefully each day by walking around it before starting.

Keep all guards and shields in good condition and properly installed. Fix damage and replace worn or broken parts immediately. Pay special attention to hydraulic hoses and electrical wiring.

T6607AQ—UN—15APR13

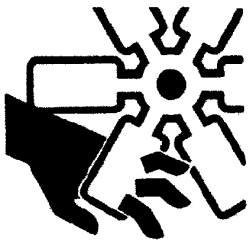
TX,INSPECT-19-16MAY23-1/1

Stay Clear of Moving Parts

Entanglements in moving parts can cause serious injury.

Stop engine before examining, adjusting, or maintaining any part of machine with moving parts.

Keep guards and shields in place. Replace any guard or shield that has been removed for access as soon as service or repair is complete.



T133592—UN—15APR13

TX,MOVING,PARTS-19-20JAN11-1/1

Avoid High-Pressure Fluids

Inspect hydraulic hoses periodically – at least once per year – for leakage, kinking, cuts, cracks, abrasion, blisters, corrosion, exposed wire braid or any other signs of wear or damage.

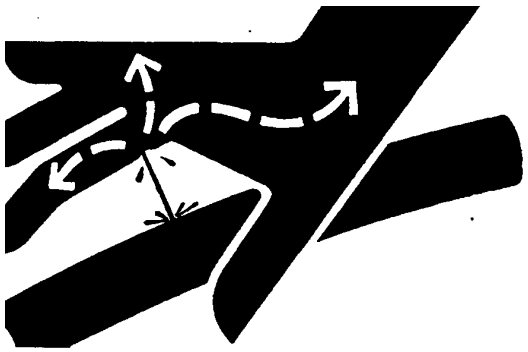
Replace worn or damaged hose assemblies immediately with John Deere approved replacement parts.

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

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available in English from Deere & Company Medical Department in Moline, Illinois, U.S.A., by calling 1-800-822-8262 or +1 309-748-5636.



X9811—UN—23AUG88

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

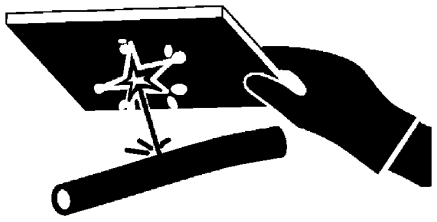
Avoid High-Pressure Oils

This machine uses a high-pressure hydraulic system. Escaping oil under pressure can penetrate the skin causing serious injury.

Never search for leaks with your hands. Protect hands. Use a piece of cardboard to find location of escaping oil. Stop engine and relieve pressure before disconnecting lines or working on hydraulic system.

If hydraulic oil penetrates your skin, seek medical assistance immediately.

T133509—UN—15APR13



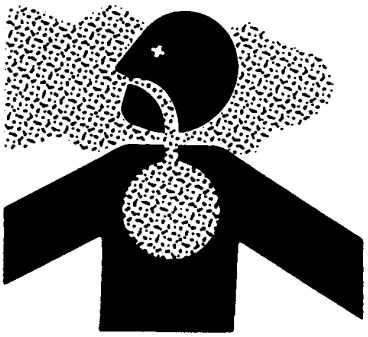
T133840—UN—20SEP00

TX,HPOILS-19-21DEC21-1/1

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

Prevent Fires, Clean Debris From Machine

Handle Fluids Safely: All fuels, most lubricants, and some coolant mixtures are flammable. Store flammable fluids away from fire hazards. Never refuel machine while smoking or when near sparks or flame.

Clean Machine Regularly: Engine temperatures may be elevated following engine shut-down. Keep flammable debris (trash, leaves, twigs, straw, etc.), grease and oil from accumulating in or around engine compartment, radiator, batteries, fuel tank, operator station, fuel lines, hydraulic lines, exhaust components, and electrical wiring. Never store oily rags or flammable materials inside any machine compartment.

Maintain Hoses, Tubes, and Wiring: Replace hoses and tubes immediately if they begin to leak, and clean up any oil spills. Examine electrical wiring and connectors frequently for damage.

Keep a Fire Extinguisher Available: Always keep a multipurpose fire extinguisher on or near the machine. Know how to use an extinguisher properly.

Be Aware of the Operating Environment: debris may contain sparks or embers. Do not operate near any flames.

T133552—UN—15APR13

Handle Fuel Safely

T133553—UN—07SEP00

Clean Machine Regularly

T133554—UN—07SEP00

Carry a Fire Extinguisher

T133555—UN—15APR13

Caution

TX,PREVENT,FIRE-19-02NOV22-1/1

Prevent Battery Explosions

Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.

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

Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).

TS204—UN—15APR13

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

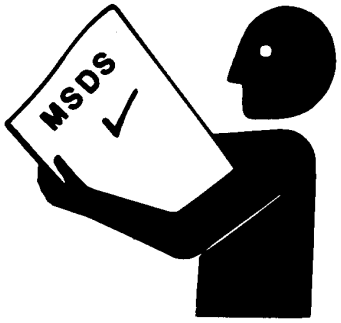
Handle Chemical Products Safely

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.

(See your John Deere dealer for MSDS's on chemical products used with John Deere equipment.)



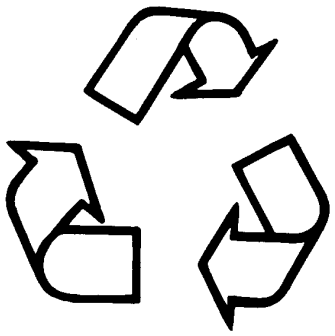
TS1132—UN—15APR13

DX,MSDS,NA-19-03MAR93-1/1

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

Exhaust Filter Ash Handling and Disposal

CAUTION: Under federal, state, and local laws or regulations, exhaust filter ash can be classified as a hazardous waste. Hazardous waste must be disposed of in accordance with all applicable federal, state, and local laws or regulations governing hazardous waste disposal. Only a qualified service provider should remove ash from the exhaust filter. Personal protective equipment and clothing, maintained in a sanitary and reliable condition, should be used when handling and cleaning exhaust filter. See an authorized John Deere dealer for exhaust filter ash handling and disposal.

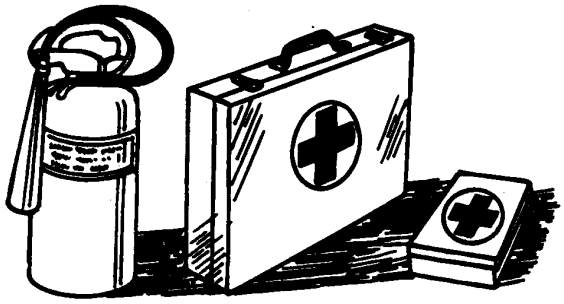
TX,ASH,DISP-19-31MAR22-1/1

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

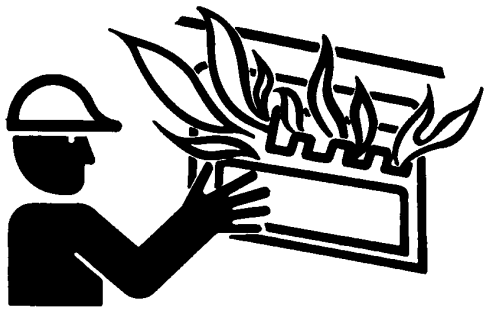
Clean Debris from Machine

Keep engine compartment, radiator, batteries, hydraulic lines, exhaust components, fuel tank, and operator's station clean and free of debris.

Clean any oil spills or fuel spills on machine surfaces.

Temperature in engine compartment could go up immediately after engine is stopped. BE ON GUARD FOR FIRES DURING THIS PERIOD.

Open access door(s) to cool the engine faster, and clean engine compartment.



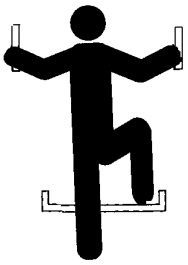
T6669AG—UN—15APR13

TX,DEBRIS-19-16MAY23-1/1

Use Steps and Handholds Correctly

Prevent falls by facing the machine when you get on and off. Maintain 3-point contact with steps and handrails. Never use machine controls as handholds.

Use extra care when mud, snow, or moisture present slippery conditions. Keep steps clean and free of grease or oil. Never jump when exiting machine. Never mount or dismount a moving machine.



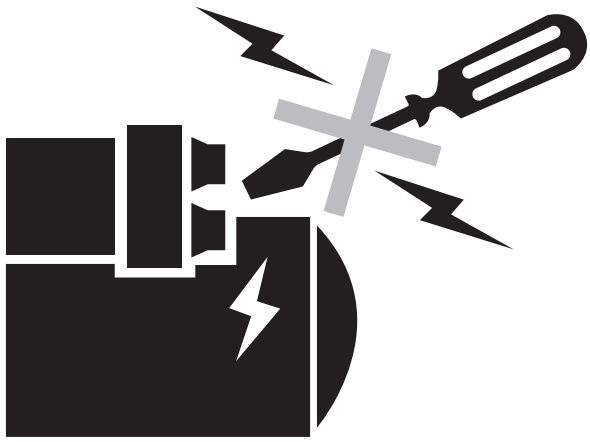
T133468—UN—15APR13

TX,STEPS-19-09FEB11-1/1

Start Only From Operator's Seat

Avoid unexpected machine movement. Start engine only while sitting in operator's seat. Ensure that all controls and working tools are in proper position for a parked machine.

Never attempt to start engine from the ground. Do not attempt to start engine by shorting across the starter solenoid terminals.



TX1314398—UN—29JUN21

Operate Only From Operators Seat

TX,SOFOS-19-29JUN21-1/1

Use and Maintain Seat Belt

Use seat belt when operating machine. Remember to fasten seat belt when loading and unloading from trucks and during other uses.

⚠ CAUTION: Prevent personal injury. Check condition of seat belt and mounting hardware before operating machine. Replace if worn, frayed, or damaged.

Replace seat belt at least every 3 years, regardless of condition.

TX1165594—19—23JUL14

TX,SEAT,BELT-19-27JUL20-1/1

Prevent Unintended Machine Movement

Always press park brake switch (1) on the sealed switch module (SSM) to engage park brake before leaving the operator's seat for any reason.

Be careful not to accidentally actuate steering, travel or other controls. Engage park brake and lower work equipment to the ground during work interruptions. Stop the engine before allowing anyone to approach the machine. Follow proper parking procedures before leaving the operator's station.

1—Park Brake Switch

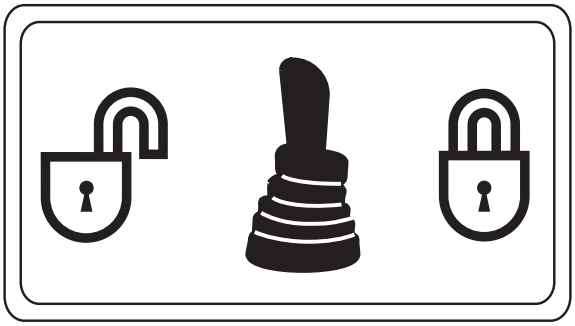
TX1107499A—UN—03FEB12

SSM

OUT4001,0000B41-19-03FEB12-1/1

Prevent Unintended Machine Movement—If Equipped With Pilot Controls

Be careful not to accidentally actuate control levers when co-workers are present. Always lock hydraulics on backhoe during work interruptions. Lock hydraulics before allowing anyone to approach machine.



TX1014474—UN—12DEC06

Pilot Enable Switch

VD76477,0001200-19-05SEP12-1/1

Avoid Work Site Hazards

Before digging, check local requirements and call utility line location services to identify and mark all underground utilities in digging area before starting work. Avoid contact with gas lines, buried cables and water lines.

Prepare work site properly. Avoid operating near structures or objects that could fall onto the machine. Clear away debris that could move unexpectedly if run over.

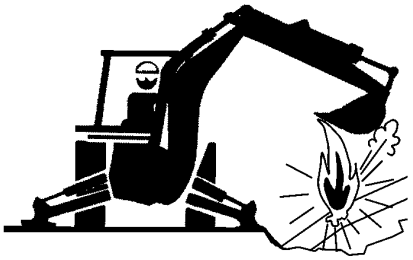
Avoid boom or attachment contact with overhead obstacles or overhead electrical lines. Never move any part of machine or load closer than 3 m (10 ft) plus twice the line insulator length to overhead wires.

Keep bystanders clear at all times. Keep bystanders away from raised booms, attachments, and unsupported loads. Avoid swinging or raising booms, attachments, or loads over or near personnel. Use barricades or a signal person to keep vehicles and pedestrians away. Use a signal person if moving machine in congested areas or where visibility is restricted. Always keep signal person in view. Coordinate hand signals before starting machine.

Operate only on solid footing with strength sufficient to support machine. Be especially alert working near embankments or excavations.

Avoid working under over-hanging embankments or stockpiles that could collapse on machine.

Reduce machine speed when operating with tool on or near ground when obstacles may be hidden (e.g., during snow removal or clearing mud, dirt, etc.). At high speeds hitting obstacles (rocks, uneven concrete or manholes) can cause a sudden stop. Always wear your seat belt.



T147554—UN—01NOV01

T147555—UN—13DEC01

811 Know what's below. Call before you dig.

(USA only)
1-888-258-0808
(USA & Canada)

TX1286211—UN—03OCT19

811 Call Before You Dig

VD76477,000001C-19-04OCT19-1/1

Keep Riders Off Machine

Only allow the operator on the machine. Keep riders off.

Riders on machine are subject to injury such as being struck by foreign objects and being thrown off of the machine. Riders also obstruct the operator's view resulting in the machine being operated in an unsafe manner.

T148715—UN—06DEC01

TX03768,0000BAF-19-27MAR09-1/1

Avoid Backover Accidents

Before moving machine, be sure that all persons are clear of machine path. Turn around and look directly for best visibility. Use mirrors to assist in checking all around machine. Keep windows and mirrors clean, adjusted, and in good repair.

Be certain reverse warning alarm is working properly.

Use a signal person when backing if view is obstructed or when in close quarters. Keep signal person in view at all times. Use prearranged hand signals to communicate.

Do not rely on the rear camera and radar object detection systems, if equipped, to determine if personnel are behind the machine. The system has limitations due to maintenance practices, environmental conditions, and operating range.

PC10857XW—UN—15APR13

TX,AVOID,BACKOVER-19-04MAR16-1/1

Avoid Machine Tipover and Machine Damage

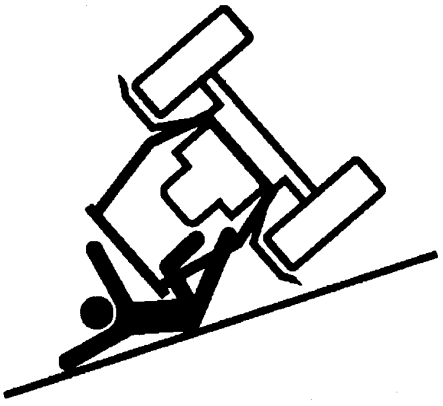
Use seat belt at all times.

Do not jump if the machine tips. You will be unlikely to jump clear and the machine may crush you.

Load and unload from trucks or trailers carefully. Be sure truck is wide enough and secured on a firm level surface. Use loading ramps and attach them properly to truck bed.

Be careful on slopes. Use extra care on soft, rocky or frozen ground because machine may slip sideways in these conditions.

Ensure solid footing. Use extra care when operating on stockpile materials, or near banks or excavations that may cave-in and cause machine to tip or fall.



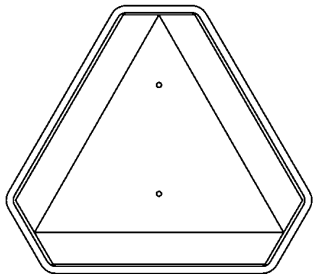
T147495—19—26OCT01

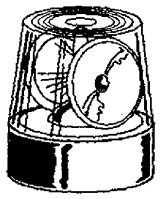
TX03768,0000BA3-19-05MAY20-1/1

Operating or Traveling On Public Roads

Machines that work near vehicle traffic or travel slower than normal highway speeds must have proper lighting and markings to assure they are visible to other drivers.

Install additional lights, beacon lights, slow moving vehicle (SMV) emblems, or other devices and use as required to make the machine visible and identify it as a work machine. Check state and local regulations to assure compliance. Keep these devices clean and in working condition.





T141891—UN—15APR13

TX,ROADS-19-20JAN11-1/1

Inspect and Maintain ROPS

A damaged rollover protective structure (ROPS) should be replaced, not reused.

The protection offered by ROPS could 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.

If ROPS was loosened or removed for any reason, inspect it carefully before operating the machine again.

To maintain the ROPS:

- Replace missing hardware using correct grade hardware.
- Check hardware torque.
- Check isolation mounts for damage, looseness, or wear; replace them if necessary.
- Check ROPS for cracks or physical damage.

TX,ROPS-19-20JAN11-1/1

Add and Operate Attachments Safely

Always verify compatibility of attachments by contacting your authorized dealer. Adding unapproved attachments could affect machine stability or reliability and could create a hazard for others near the machine.

Ensure that a qualified person is involved in attachment installation. Add guards to machine if operator protection is required or recommended. Verify that all connections are secure and attachment responds properly to controls.

Carefully read attachment manual and follow all instructions and warnings. In an area free of bystanders and obstructions, carefully operate attachment to learn its characteristics and range of motion.

TX,ATTACH-19-20JAN11-1/1

Use Special Care When Operating

Never use the loader to lift people. Do not allow anyone to ride in the bucket or use the bucket as a work platform.

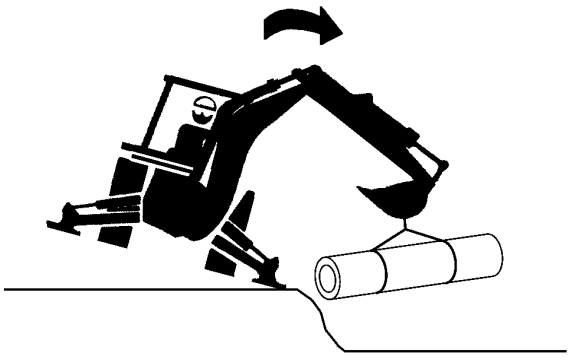
Operate carefully with raised loads. Raising the load reduces machine stability, especially on side slopes on soft terrain. Drive and turn slowly with a raised load.

Ensure that objects in the bucket are secure. Do not attempt to lift or carry objects that are too big or too long to fit inside the bucket unless secured with an adequate chain or other device. Keep bystanders away from raised loads.

Be careful when lifting objects. Never attempt to lift objects too heavy for your machine. Assure machine stability and hydraulic capability with a test lift before attempting other maneuvers. Use an adequate chain or sling and proper rigging techniques to attach and stabilize loads.

Never lift an object above or near another person.

T148749—UN—05DEC01



T147438—UN—26OCT01

TX03768,0000B70-19-27MAR09-1/1

Park and Prepare for Service Safely

Warn others of service work. Always park and prepare your machine for service or repair properly.

- Do not support machine with any hydraulically actuated tools or attachments.
- Do not support machine with cinder blocks or wooden pieces that may crumble or crush.
- Do not support machine with a single jack or other devices that may slip out of place.
- Always install boom lock before working on or around this machine with the loader boom raised.
- Park machine on a level surface and lower equipment to the ground.
- Engage park brake.
- Stop engine.
- Attach a “Do Not Operate” tag in an obvious place in the operator's station.

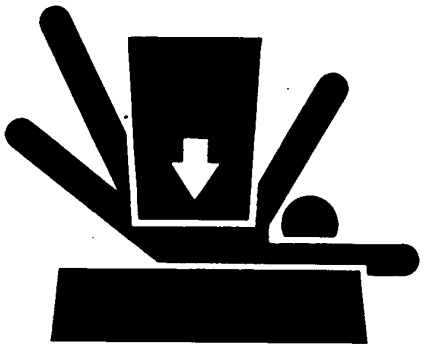
Securely support machine or attachment before working under it.

Install wheel chocks to ensure that machine cannot move backward or forward during service.

Understand service procedures before beginning repairs. Keep service area clean and dry. Use two people whenever the engine must be running for service work.

When performing above-ground maintenance, use appropriate support devices such as ladders, lifts, or platforms. If equipped, use the machine anchorage points and approved fall arrest harnesses and lanyards

T133332—19—17APR13



TS229—UN—23AUG88

TX,PARK,LBH-19-05APR23-1/1

Service Cooling System Safely

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

Do not service radiator through the radiator cap. Only fill through the surge tank filler cap. Shut off engine. Only remove surge tank filler cap when cool enough to touch with bare hands. Slowly loosen cap to relieve pressure before removing completely.

TS281—UN—15APR13

TX,SURGE-19-19JAN11-1/1

Remove Paint Before Welding or Heating

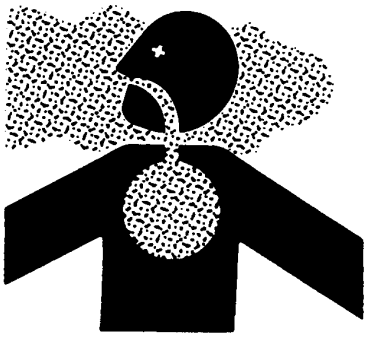
Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

Remove paint before heating:

- Remove paint a minimum of 100 mm (4 in.) from area to be affected by heating. If paint cannot be removed, wear an approved respirator before heating or welding.
- 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.

Do not use a chlorinated solvent in areas where welding will take place.



TS220—UN—15APR13

Do all work in an area that is well ventilated to carry toxic fumes and dust away.

Dispose of paint and solvent properly.

DX,PAINT-19-24JUL02-1/1

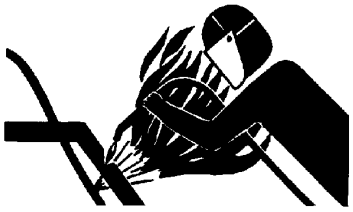
Make Welding Repairs Safely

IMPORTANT: Disable electrical power before welding. Turn off main battery switch and disconnect positive (+) and negative (-) battery cables.

Do not weld or apply heat on any part of a reservoir or tank that has contained oil or fuel. Heat from welding and cutting can cause oil, fuel, or cleaning solution to create gases which are explosive, flammable, or toxic.

Avoid welding or heating near pressurized fluid lines. Flammable spray may result and cause severe burns if pressurized lines malfunction as a result of heating. Do not let heat go beyond work area to nearby pressurized lines.

Remove paint properly. Do not inhale paint dust or fumes.



T133647—UN—15APR13

Heating Near Pressurized Fluid Lines

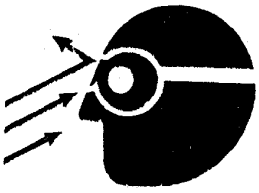
Use a qualified welding technician for structural repairs. Make sure there is good ventilation. Wear eye protection and protective equipment when welding.

MB60223,0000212-19-02JUL15-1/1

Drive Metal Pins Safely

Always wear protective goggles or safety glasses and other protective equipment before striking hardened parts. Hammering hardened metal parts such as pins and bucket teeth could dislodge chips at high velocity.

Use a soft hammer or a brass bar between hammer and object to prevent chipping.



T133738—UN—15APR13

TX,PINS-19-20JAN11-1/1

Service Tires Safely

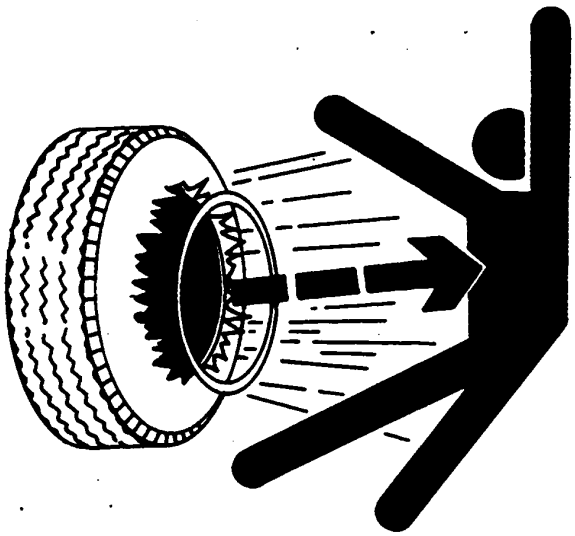
Explosive separation of a tire and rim parts can cause serious injury or death.

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.



TS211—UN—15APR13

DX,RIM-19-24AUG90-1/1

Clean Exhaust Filter Safely

During exhaust filter cleaning operations, the engine may run at elevated idle and hot temperatures for an extended period of time. Exhaust gases and exhaust filter components reach temperatures hot enough to burn people, or ignite or melt common materials.

Keep machine away from people, animals, or structures which may be susceptible to harm or damage from hot exhaust gases or components. Avoid potential fire or explosion hazards from flammable materials and vapors near the exhaust. Keep exhaust outlet away from people and anything that can melt, burn, or explode.

Closely monitor machine and surrounding area for smoldering debris during and after exhaust filter cleaning.

Adding fuel while an engine is running can create a fire or explosion hazard. Always stop engine before refueling machine and clean up any spilled fuel.

Always make sure that engine is stopped while hauling machine on a truck or trailer.

Contact with exhaust components while still hot can result in serious personal injury.

Avoid contact with these components until cooled to safe temperatures.

If service procedure requires engine to be running:

- Only engage power-driven parts required by service procedure
- Ensure that other people are clear of operator station and machine

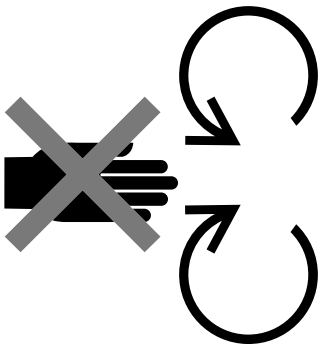
Keep hands, feet, and clothing away from power-driven parts.

Always disable movement (neutral), set the parking brake or mechanism and disconnect power to attachments or tools before leaving the operator's station.

Shut off engine and remove key (if equipped) before leaving the machine unattended.

TS227—UN—15APR13

TS271—UN—23AUG88

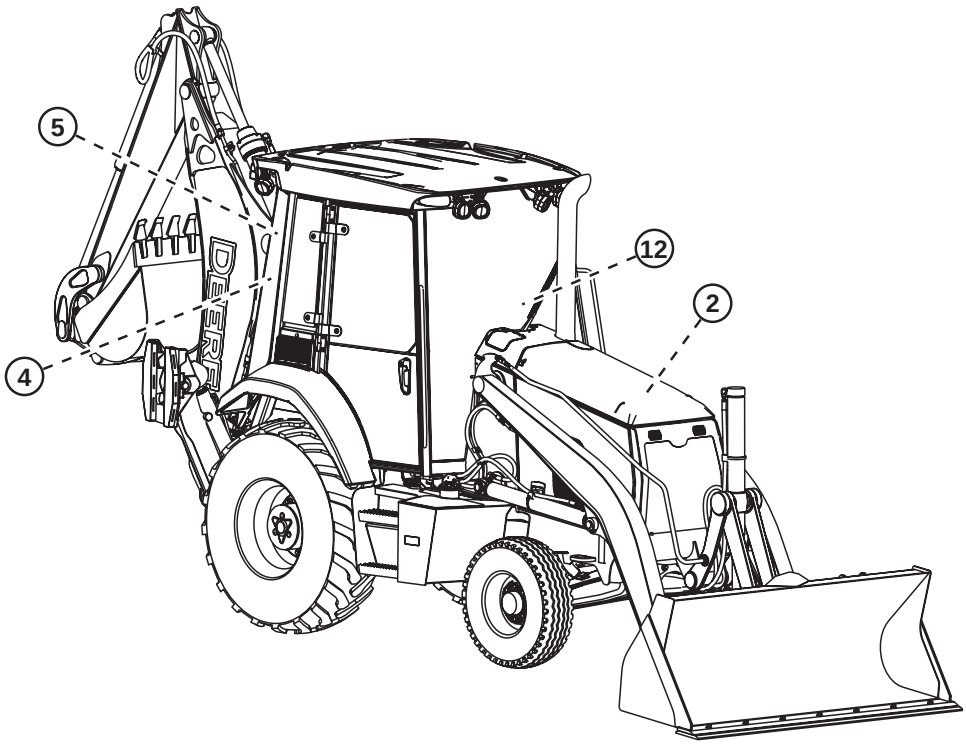


TS1693—UN—09DEC09

TS1695—UN—07DEC09

DX,EXHAUST,FILTER-19-12JAN11-1/1

Safety Signs



TX1103268

TX1103268—UN—21FEB12

Safety Signs

2—WARNING, Pressurized System

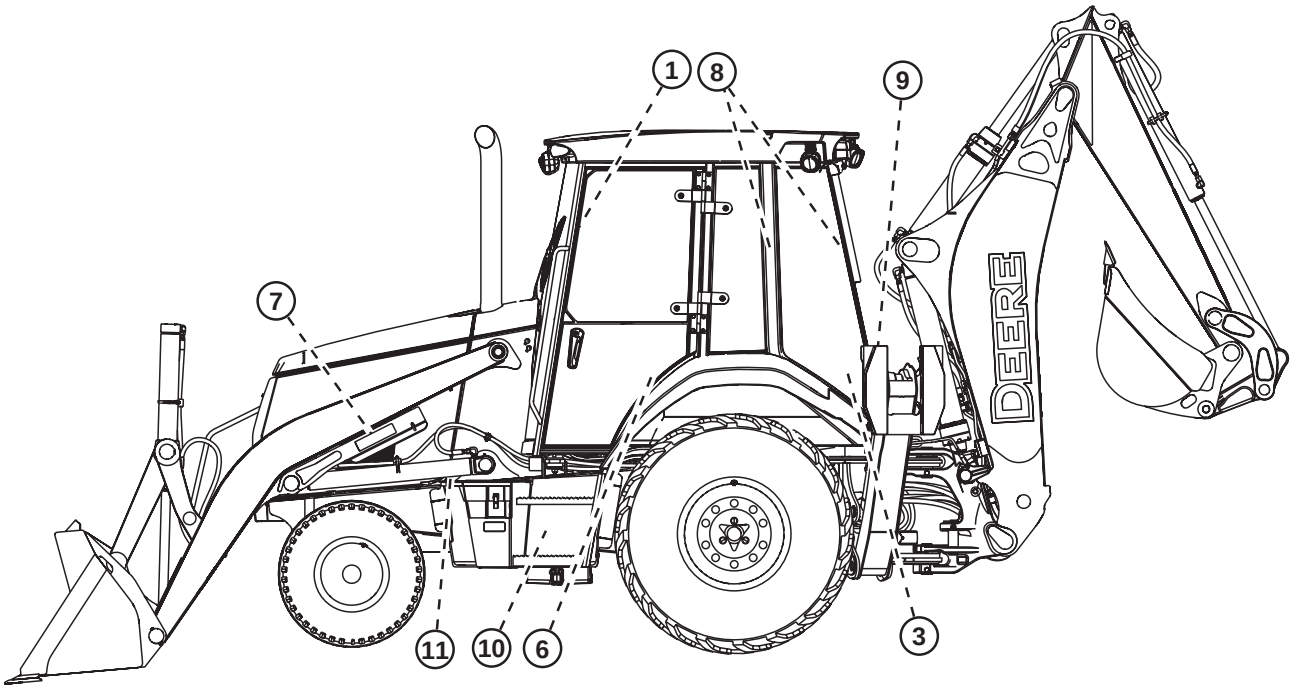
4—CAUTION, Alternate Control Patterns—If Equipped

5—CAUTION, Operate Machine Safely

12—WARNING, Prevent Unintended Machine Movement

Continued on next page

MB60223,0000299-19-16MAR12-1/14



TX1103269

TX1103269—UN—21FEB12

Safety Signs

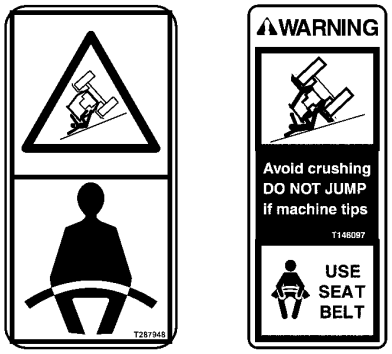
1—WARNING, Seat Belt Should Be Worn At All Times
3—CAUTION, Alternate Control Patterns—If Equipped
6—WARNING, Prevent Machine Movement
7—WARNING, Always Install Boom Lock
8—CAUTION, Prevent Unintended Motion—If Equipped
9—WARNING, Stay Clear of Swing Area
10—WARNING, Avoid Injury From Escaping Fluid
11—DANGER, Start Only From Seat

MB60223,0000299-19-16MAR12-2/14

1. **WARNING, Seat Belt Should Be Worn At All Times**

   A seat belt should be worn at all times during machine operation to prevent serious injury or death in the event of an accident or machine overturn. Failure to wear a seat belt during machine operation may result in serious injury or death.

   This safety label is located inside the cab on the left-front ROPS post.



TX1099887—19—05DEC11

WARNING, Seat Belt Should Be Worn At All Times

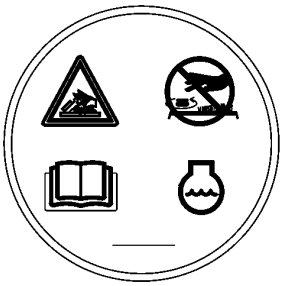
Continued on next page

MB60223,0000299-19-16MAR12-3/14

2. **WARNING, Pressurized System**

   Hot coolant can cause serious burns, injury or death. To open the cooling system filler cap, stop the engine and wait until the cooling system components are cool. Loosen the cooling system pressure cap slowly in order to relieve the pressure.

   This safety label is located on the surge tank cap.



TX1099924—UN—24OCT11

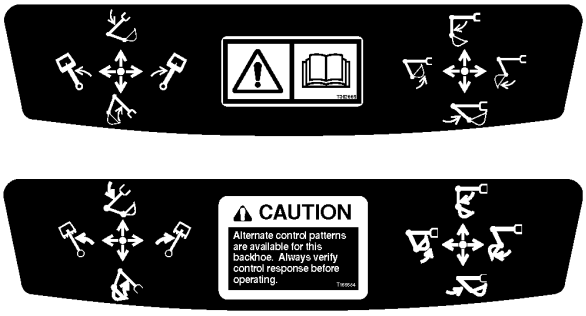
WARNING, Pressurized System

MB60223,0000299-19-16MAR12-4/14

3. **CAUTION, Alternate Control Patterns—If Equipped**

   Alternate control patterns are available for this backhoe. Always verify control response before operating.

   This safety label is located inside the cab on the backhoe control lever console.



TX1103287—19—26JAN12

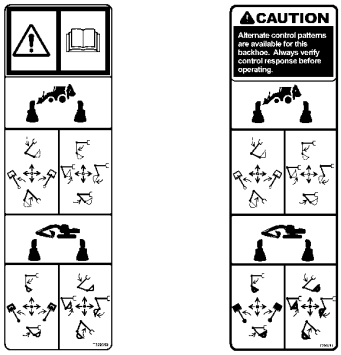
CAUTION, Alternate Control Patterns—If Equipped

MB60223,0000299-19-16MAR12-5/14

4. **CAUTION, Alternate Control Patterns—If Equipped**

   Alternate control patterns are available for this backhoe. Always verify control response before operating.

   This safety label is located inside the cab on the right-rear ROPS post.



TX1103286—19—18SEP12

CAUTION, Alternate Control Patterns—If Equipped

Continued on next page

MB60223,0000299-19-16MAR12-6/14

5. **CAUTION, Operate Machine Safely**

AVOID DEATH OR SERIOUS INJURY - Read and understand Operator's Manual before operating this machine.

- Operate machine only from operator's seat.
- Before leaving operator's seat:
  - Lower working tools to the ground, place in neutral and engage parking brake.
- Never carry riders.
- Carry working tools low.
- Engage backhoe boom and swing locks before transporting.
- Avoid contact with overhead obstacles when operating or hauling machine.

This safety label is located inside the cab on the right-rear ROPS post.

TX11103278—19—26JAN12

CAUTION, Operate Machine Safely

MB60223,0000299-19-16MAR12-7/14

6. **WARNING, Prevent Machine Movement**

AVOID SERIOUS INJURY - Block wheels to prevent machine movement before deactivating park brake for towing.

This safety label is located inside the cab on the left side panel.

TX1099922—19—06DEC11

WARNING, Prevent Machine Movement

MB60223,0000299-19-16MAR12-8/14

7. **WARNING, Always Install Boom Lock**

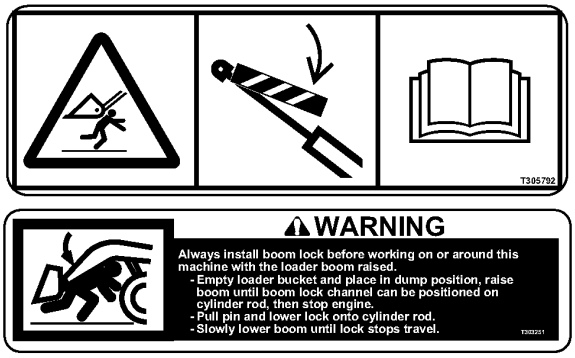
Always install boom lock before working on or around this machine with the loader boom raised.

• Empty loader bucket and place in dump position, raise boom until boom lock channel can be positioned on cylinder rod, then stop engine.

• Pull pin and lower lock onto cylinder rod.

• Slowly lower boom until lock stops travel.

This safety label is located on the boom lock.



TX1106500—19—26JAN12

WARNING, Always Install Boom Lock

Continued on next page

MB60223,0000299-19-16MAR12-9/14

8. **CAUTION, Prevent Unintended Motion—If Equipped**

   To prevent unintended motion always lock hydraulics when not operating backhoe or opening or closing window.

   This safety label is located inside the cab on the left-rear ROPS post.

TX1103276—19—27JAN12

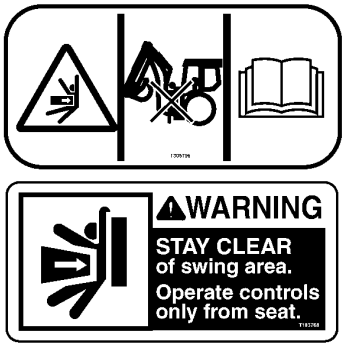
CAUTION, Prevent Unintended Motion—If Equipped

MB60223,0000299-19-16MAR12-10/14

9. **WARNING, Stay Clear of Swing Area**

   Stay clear of swing area. Operate controls only from seat.

   This safety label is located in two locations on the rear side of the cab.



TX1103277—19—01FEB12

WARNING, Stay Clear of Swing Area

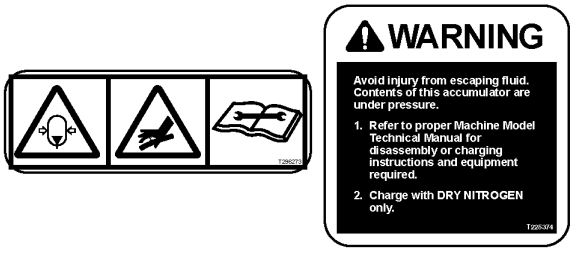
MB60223,0000299-19-16MAR12-11/14

10. **WARNING, Avoid Injury From Escaping Fluid**

    Avoid injury from escaping fluid. Contents of this accumulator are under pressure. Refer to proper Machine Model Technical Manual for disassembly or charging instructions and equipment required.

    Charge with DRY NITROGEN only.

    This safety message is positioned on or near all accumulators.



TX1099886—19—02DEC11

WARNING, Avoid Injury From Escaping Fluid.

Continued on next page

MB60223,0000299-19-16MAR12-12/14

11. **DANGER, Start Only From Seat**

Start only from seat in park or neutral. Starting in gear kills.

This safety message is positioned on the starter inside the engine compartment and also on the left frame rail.

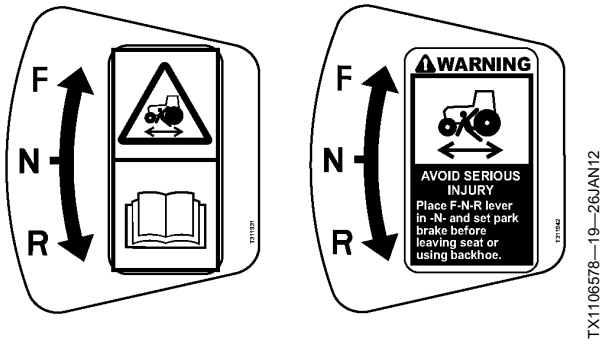
DANGER, Start Only From Seat

MB60223,0000299-19-16MAR12-13/14

12. **WARNING, Prevent Unintended Machine Movement**

Place the transmission control lever (TCL) in neutral and set park brake before leaving seat or operating backhoe.

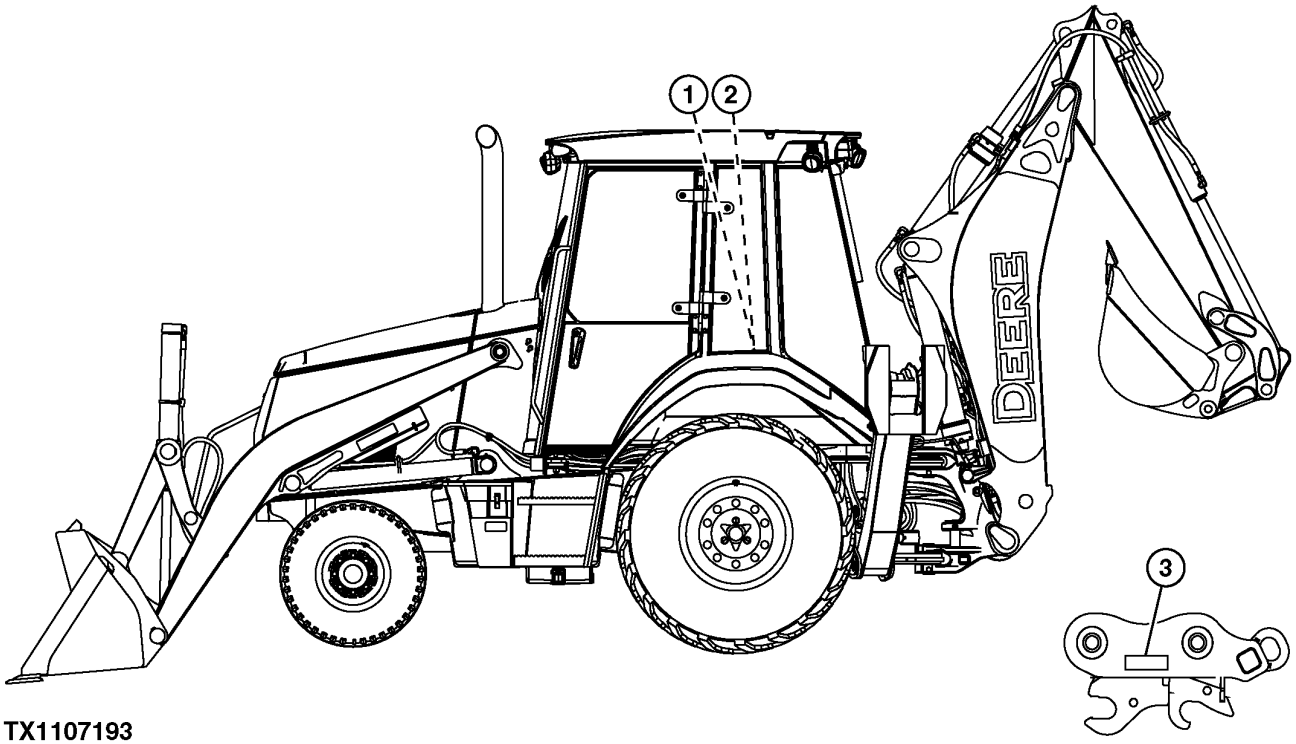
This safety message is positioned inside the cab behind the TCL.



WARNING, Prevent Unintended Machine Movement

MB60223,0000299-19-16MAR12-14/14

Safety Signs—Backhoe Coupler—If Equipped



TX1107193

TX1107193—UN—31JAN12

1—WARNING, Ground Test Required—If Equipped

2—WARNING, Crush Hazard—If Equipped

3—WARNING, Crush Hazard—If Equipped

MB60223,00002A1-19-31JAN12-1/4

1. **WARNING, Ground Test Required—If Equipped**

   Before using the attachment, perform a ground test to verify it properly locked to the coupler.

   This safety label is located inside the cab.

TX1107202—19—31JAN12

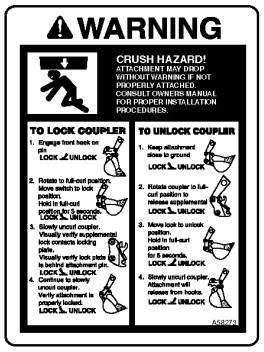
Continued on next page

MB60223,00002A1-19-31JAN12-2/4

2. **WARNING, Crush Hazard—If Equipped**

Attachment may drop without warning if not properly attached. Consult operators manual for proper installation procedures.

This safety label is located inside the cab.



TX1107204—19—31JAN12

MB60223,00002A1-19-31JAN12-3/4

3. **WARNING, Crush Hazard—If Equipped**

Improperly locked attachment could release and cause serious injury or death

This safety label is located on each side of the backhoe coupler.

TX1107207—19—31JAN12

MB60223,00002A1-19-31JAN12-4/4

Fire Extinguisher Mounting Location

MOUNTING LOCATION:

The designated fire extinguisher mounting location (1) is to the left of the steering console.

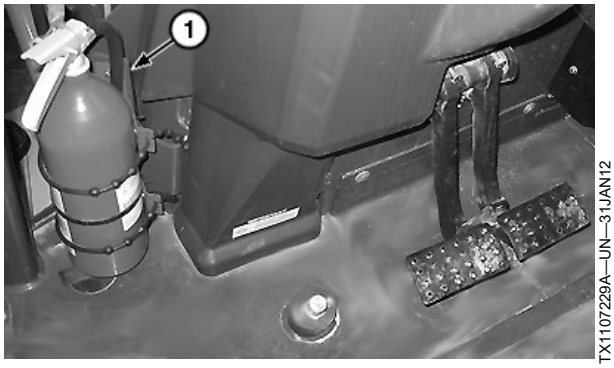
USE:

NOTE: All fire extinguishers do not operate the same. Read operating instructions on canister.

The portable fire extinguisher is used to aid in the extinguishing of small fires. Refer to individual manufacturer's instructions and proper fire fighting procedures before the need to use the fire extinguisher arises. See Prevent Fires. (Section 1-2.)

MAINTENANCE:

IMPORTANT: Avoid possible machine damage. Check gauge (if equipped) on fire extinguisher. If fire extinguisher is not fully charged, recharge or replace it according to the manufacturer's instructions.



Fire Extinguisher Mounting Location

1—Fire Extinguisher Mounting Location

Inspect and maintain the fire extinguisher following the manufacturer's recommendations and all local, regional and national regulations.

OUT4001,00009AC-19-04FEB12-1/1

Sealed Switch Module (SSM)

Most switches on the sealed switch module (SSM) are equipped with light emitting diodes (LEDs) to indicate current switch setting. Press switch momentarily to advance to next setting. For switches with more than one LED, press and hold switch for 2—3 seconds to return to OFF from any setting.

1—Engine Start Switch: This switch has three settings:

- Press and release switch (left LED is illuminated) to energize ignition and apply power to control units and display unit.

NOTE: If kept in this state for more than 10 minutes, machine will shutdown automatically.

- After display unit has initialized, press and hold switch to start engine. Both LEDs are illuminated when engine is cranking. Only left LED is illuminated when engine is running.
- When engine stop switch is pressed, engine stops and both LEDs are off.

IMPORTANT: Avoid turbocharger/engine damage. Engine must be shut down properly.

2—Engine Stop Switch: Press switch to shut off engine.

If the engine is above a threshold temperature, the first time the engine stop switch is pressed, engine will drop down to 900 rpm if it isn't already at that speed. The monitor will display a countdown timer and turbocharger/engine will automatically shutdown once it has completed the cool down process. This will take a maximum of 2 minutes.

If engine stop switch is pressed and held (not recommended as it may cause damage to the turbocharger/engine), the engine will shut down immediately. If this is done, a diagnostic trouble code (DTC) will be displayed on the monitor. The active DTC will disappear on the monitor once the turbocharger has cooled down and then will become a stored code.

If ground speed is greater than 0.5 km/h (0.3 mph), engine stops and ignition power remains on until ground speed is less than 0.5 km/h (0.3 mph). To turn off ignition power while machine is still moving, press and hold switch or press and release switch twice.

3—Automatic Transmission Switch: For autoshift operation, see Driving the Machine. (Section 2-3.)

- Press and release switch to enable AUTOSHIFT mode (2 LED's illuminated).
- Press and release switch again to return to MANUAL mode (both LEDs off).

4—Park Brake Switch: Press switch (LED and indicator on display unit are illuminated) to engage park brake. Press switch again to release park brake (LED and indicator on display unit go off).

5—Hazard Warning Signal Switch: Press switch (LED is illuminated) to turn on hazard warning signals. Press switch again to turn signals off (LED is off).

TX1107090A—UN—30JAN12

Sealed Switch Module (SSM)

1—Engine Start Switch
2—Engine Stop Switch
3—Automatic Transmission Switch
4—Park Brake Switch
5—Hazard Warning Signal Switch
6—Loader Coupler Switch—If Equipped
7—Front Work Light Switch
8—Rear Work Light Switch
9—Front Wiper Switch
10—Front Washer Switch
11—Rear Wiper Switch
12—Auxiliary Hydraulic Switch—If Equipped
13—Control Pattern Select Switch—If Equipped
14—Ride Control Switch—If Equipped

6—Loader Coupler Switch—If Equipped: Press and hold switch for 1 second (LED is illuminated) to enable installation of attachments. Press switch again to disable installation of attachments (LED is off).

7—Front Work Light Switch: This switch has three settings:

- Press and release switch (one LED is illuminated) to turn on inner front work lights.
- Press and release switch again (two LEDs are illuminated) to turn on inner and outer front work lights.
- Any subsequent press and release of switch toggles front work lights between the first two settings.
- Press and hold switch for more than 2 seconds to turn all lights off (all LEDs are off).

8—Rear Work Light Switch: This switch has five settings:

- Press and release switch (one LED is illuminated) to turn on inner rear work lights.
- Press and release switch again (two LEDs are illuminated) to turn on inner and outer rear work lights.
- Press and release switch again (three LEDs are illuminated) to turn on inner, outer, and side dock rear work lights.

Continued on next page

OUT4001,0000B35-19-15OCT13-2/1

- Press and release switch again (far right LED is illuminated) to turn on side dock rear work lights only.
- Press and release switch again to turn all lights off (all LEDs are off).

9—Front Wiper Switch: Switch has four settings:

- Press and release switch (one LED is illuminated) for intermittent front wiper operation.
- Press and release switch again (two LEDs are illuminated) for low speed front wiper operation.
- Press and release switch again (three LEDs are illuminated) for high speed front wiper operation.
- Press and release switch again to turn off front wipers (all LEDs are off).

10—Front Washer Switch: Press and hold switch to spray washer fluid on front window and activate low speed front wiper operation. Wiper blade swipes three times and turns off.

11—Rear Wiper Switch: This switch has three settings:

- Press and release switch (one LED is illuminated) for intermittent rear wiper operation.
- Press and release switch again (two LEDs are illuminated) for high speed rear wiper operation.
- Press and release switch again to turn off rear wipers (all LEDs are off).

12—Auxiliary Hydraulic Switch—If Equipped: This switch has different settings depending on if loader operation or backhoe operation is needed.

For loader operation:

NOTE: Auxiliary hydraulic switch does NOT need to be pressed to enable hydraulics. Switch is used to set either proportional flow or continuous flow when in loader operation position.

- Press and release switch to enable proportional auxiliary hydraulics (left LED illuminated).
- Press and release switch again to enable continuous auxiliary hydraulics (right LED illuminated).

For backhoe operation, with selective flow installed:

- Press and release switch to enable the foot pedal mode (left LED illuminated). Press the foot pedal to turn on the auxiliary hydraulics. Press and release switch again to turn off.
- When in foot pedal mode (left LED illuminated), press and hold switch to change to continuous mode (right LED illuminated). This will turn on the auxiliary hydraulics. Press and release switch again to turn off.

Press and hold auxiliary hydraulic switch to cycle between foot pedal mode and continuous mode.

13—Control Pattern Select Switch—If Equipped: This switch has two settings for backhoe operation with pilot controls:

CAUTION: Prevent possible injury from unexpected machine movement. Always verify control response before operating backhoe.

- Press and release switch to activate backhoe control pattern (left LED is illuminated).
- Press and release switch again to activate excavator control pattern (right LED is illuminated).

14—Ride Control Switch—If Equipped: Press switch (LED is illuminated) to activate ride control. Press switch again to deactivate ride control (LED is off).

OUT4001,0000B35-19-15OCT13-1/1

Security System

The security system can be active (enabled) or inactive (disabled) to function on this machine, but security system software needs to be installed first. If the machine does not have the security system installed, then no indications for security will be present. Once installed, the owner of the machine must contact their authorized John Deere dealer to obtain a **MASTER** PIN code for the security system. The dealer will need the current engine hour meter reading and the machine serial number in order to obtain a new PIN code from a web page in DealerNet. The hour meter value, measured to the nearest whole number, shall be used to calculate the MASTER PIN code. After entering a valid MASTER PIN code at engine start-up, the following occurs:

- Security system is active (enabled) for use.
- The OWNER PIN code is set to its default code of 1111. All other PIN codes are not set.
- The locking method for security system is set to OFF.

There is one **OWNER** PIN code, five **OPERATOR** PIN codes, and one **TRANSPORT** PIN code allowed in the system.

The OWNER PIN code is designed for the owner or equipment manager. It is primarily used as a safeguard in the event the OPERATOR PIN code is forgotten or unknown and the owner wishes to change or replace that code.

The five OPERATOR PIN codes are to be used by authorized operators. An OPERATOR PIN code allows operators to unlock security system so that the engine can be started.

The TRANSPORT PIN code allows the owner to restrict the machine use to a certain amount of time and limit some performance options. This is useful when someone other than the owner is transporting the machine and the owner would like to restrict the machine. When the TRANSPORT PIN time expires, the owner will need to reset it in order for the engine to be restarted.

Continued on next page

OUT4001,0000AE5-19-19JUN13-1/2

When security system is enabled, the following occurs at engine start up:

- Engine start switch is pressed once, operator is prompted to enter a PIN code. This can be done by either:
  a. Using the BACK, NEXT, and SELECT buttons (1, 2, and 3) on the standard display monitor (SDM).

  NOTE: Keypad numbers are located in the lower right corner of the specified switches on the SSM.

  b. Using the numeric keypad (4) on the sealed switch module (SSM), then press the enter key (5).

  Both methods can be used independently or together. Valid PIN code must be entered or engine will not start.

When security is enabled and the engine stop switch is pressed, the system automatically locks the machine controllers. Operator can restart engine within preset delay lock time. If lock time expires, PIN code must be entered to start the engine.

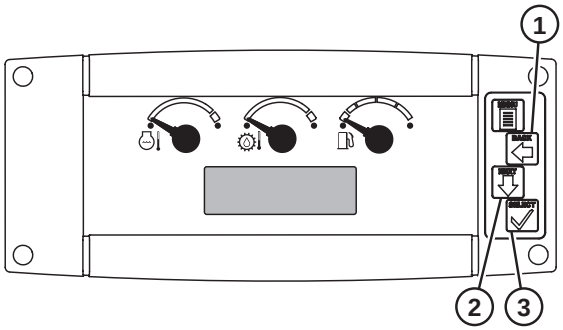
All settings and changes to the security system are done through the MAIN MENU—SETUP—SECURITY menu on the SDM.

In the SECURITY menu, the owner can enter a valid OWNER PIN code to:

- Disable the security system or choose when the security system will be enabled.
- Clear or change the OWNER, OPERATOR, or TRANSPORT PIN codes and set a designated time for the TRANSPORT PIN code to be valid.

For more information, see Standard Display Monitor (SDM) —Main Menu—Setup—Security. (Section 2-2.)

1—BACK Button
2—NEXT Button
3—SELECT Button
4—Numeric Keypad
5—Enter Key



TX1106908—UN—27JAN12

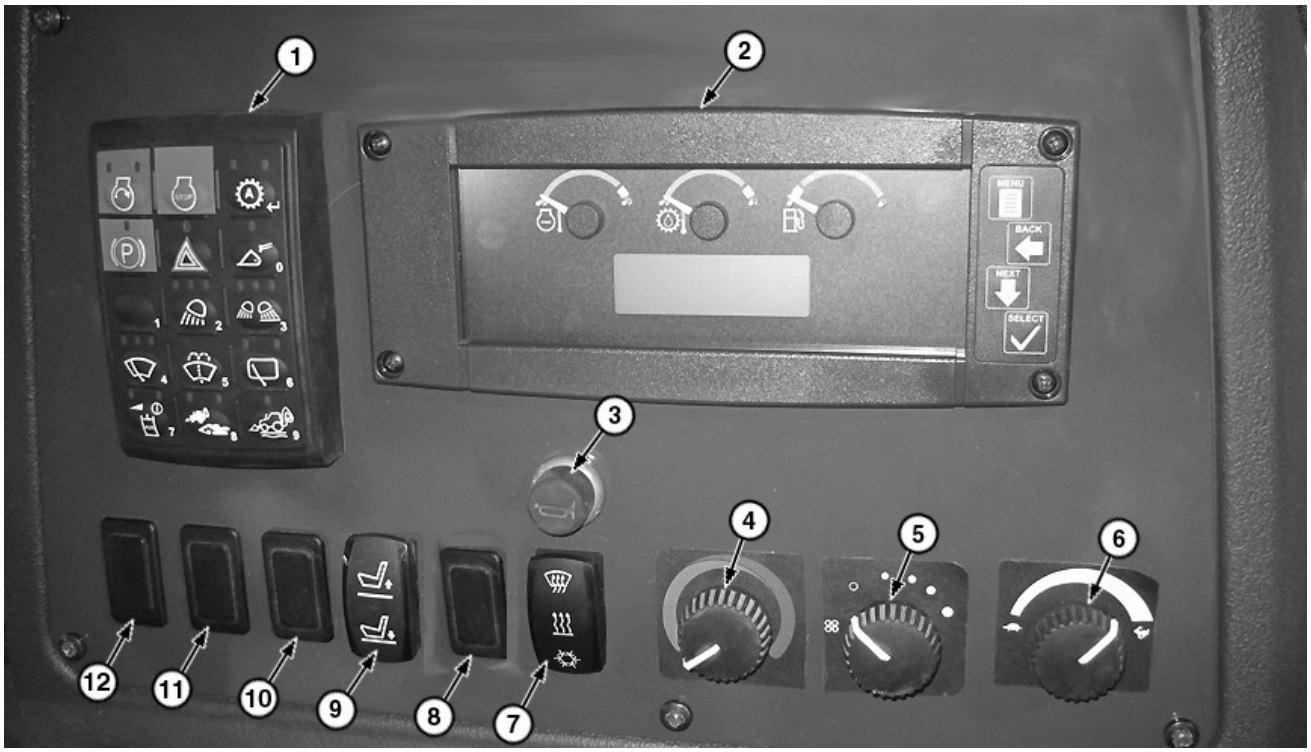
Standard Display Monitor (SDM)

TX1106911A—UN—27JAN12

Sealed Switch Module (SSM)

OUT4001,0000AE5-19-19JUN13-2/2

Right Console Functions



Right Side Console

1—SSM
2—Display Monitor
3—Horn Button
4—Temperature Control Knob—If Equipped
5—Blower Speed Knob—If Equipped
6—Engine Speed Control Knob
7—Defroster, Heater, and Air Conditioner Switch—If Equipped
8—Not Used
9—Air Suspension Seat Height Adjustment Switch—If Equipped
10—Beacon Switch—If Equipped
11—Not Used
12—Mechanical Front Wheel Drive (MFWD) Switch—If Equipped

1—Sealed Switch Module (SSM): For switch and function details, see Sealed Switch Module (SSM) in this section.

2—Display Monitor: For monitor and menu information, see Standard Display Monitor (SDM). (Section 2-2.)

3—Horn Button: Press button to sound the horn.

4—Temperature Control Knob—If Equipped: Turn knob to adjust air temperature. Turn clockwise towards HOT (red) for warmer air (best for heating and defrosting). Turn counterclockwise towards COLD (blue) for cooler air (best for venting and air conditioning).

5—Blower Speed Knob—If Equipped: Turn knob clockwise to increase blower speed or counterclockwise to reduce blower speed. The blower knob has four speed settings plus an Off position.

6—Engine Speed Control Knob: Rotate knob clockwise to increase engine speed. Rotate counterclockwise to decrease engine speed.

7—Defroster, Heater, and Air Conditioner Switch—If Equipped:

NOTE: Blower speed knob; defroster, heater, and air conditioner switch; and temperature control knob must be adjusted as a group to obtain proper operation of the defroster, heater, or air conditioner.

Use the air conditioner with the temperature control knob in a middle-to-cool position to dehumidify air without over cooling.

The defroster, heater, and air conditioner switch has three positions:

- Press bottom half of rocker switch to activate the air conditioner. Adjust the blower knob and temperature control knob as appropriate.
- Press top half of rocker switch to activate the defrost mode. In this position, the air conditioner compressor is powered and a vent is opened to provide air flow to the front windshield. Adjust the blower knob and temperature control knob as appropriate.
- For maximum heater performance, set the rocker switch to the middle position. In this position, the air conditioner compressor is not powered.

8—Not Used.

Continued on next page

9—Air Suspension Seat Height Adjustment Switch—If Equipped:

CAUTION: Ensure seat is locked in position before operating machine. A seat that is loose or not properly locked can cause loss of control of machine and injuries or death.

Press upper half of switch to increase air suspension seat height and firmness of ride. Press lower half of switch to decrease air suspension seat height and firmness of ride.

10—Beacon Switch—If Equipped: Press the upper half of switch to turn beacon light on. Press lower half of switch to turn beacon light off.

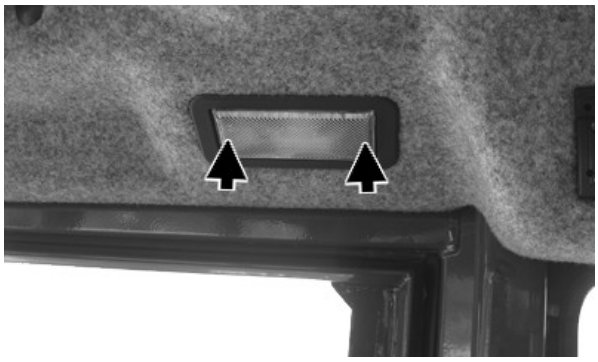
11—Not Used.

12—Mechanical Front Wheel Drive (MFWD) Switch—If Equipped: Press switch up to engage the MFWD axle. Press switch down to disengage the MFWD axle.

OUT4001,00009B8-19-20JUN13-2/2

Dome Light Operation—Cab Machines

Illuminate light by pressing either of the indicated edges in photograph upward. To deactivate dome light, toggle the light back to the neutral position.



Dome Light

OUT4001,0000B38-19-06FEB12-1/1

Steering Console Controls

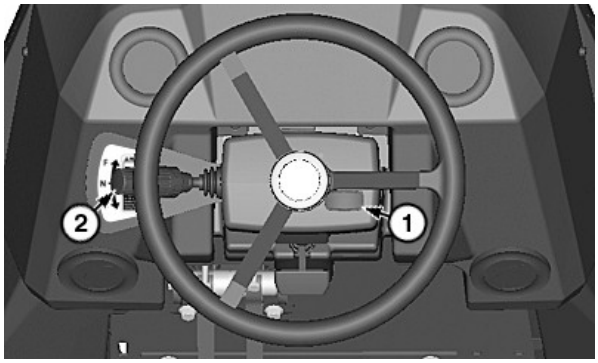
Turn signal switch (1)—Press turn signal switch to signal turning direction. The switch has three positions:

- Press left half of switch to signal left turn. Left turn indicator will flash.
- Middle position is OFF. Indicators will not flash unless hazard warning signal switch is ON. Hazard warning switch is located on the sealed switch module (SSM).
- Press right half of switch to signal right turn. Right turn indicator will flash.

Amber turn signal lights flash individually to signal direction of turn when left or right half of turn signal switch is pressed. Amber turn signal lights flash together when hazard warning signal switch is pressed.

NOTE: When TCL is in the reverse position, only travel speeds 1 and 2 are operational.

Transmission control lever (TCL) (2)—Place TCL in middle (detented) position for neutral. Move TCL to forward (F) travel or reverse (R) travel. Rotate TCL to select gear (travel speed) range (manual mode) or maximum gear (autoshift mode).



Steering Console

1—Turn Signal Switch

2—Transmission Control Lever (TCL)

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OUT4001,00009B9-19-19JUN13-1/2

Foot Controls:

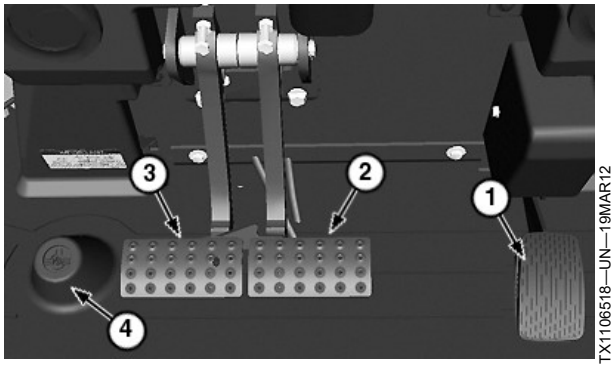
Engine Speed Control Pedal (1): Depress pedal to increase travel speed.

Brake Pedals (2 and 3): Depress left and right pedals together to stop machine travel. Use individual brake pedals to assist in turning.

NOTE: Use differential lock only when conditions require even traction. Avoid using differential lock when turning.

Differential Lock Switch (4): Depress switch to lock rear differential. For more information, see Differential Lock Operation. (Section 2-3.)

1—Engine Speed Control Pedal
2—Right Brake Pedal
3—Left Brake Pedal
4—Differential Lock Switch



TX1106518—UN—19MAR12

Foot Controls

OUT4001,00009B9-19-19JUN13-2/2

Pilot Enable Switch—If Equipped

CAUTION: Prevent injury from unexpected machine movement. Always lock hydraulics when not operating backhoe.

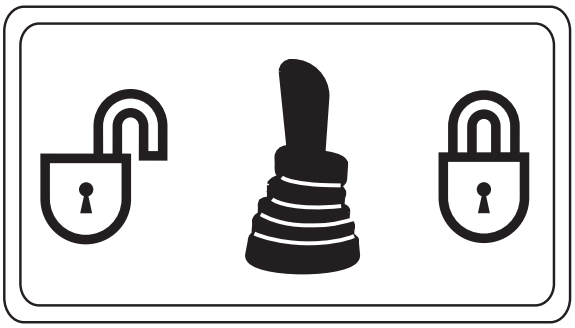
NOTE: If seat is NOT in backhoe operation position and pilot enable switch is pressed to unlock position, an audible alarm will sound, joystick enable indicator on the monitor will flash, and a pop-up warning on the monitor will appear stating BACKHOE ACTIVE.

Rotate seat to backhoe operation position.

Momentarily press upper half of pilot enable switch (1) to unlock position to enable pilot controls. Three-position rocker switch will return to middle position and the joystick enable indicator on the monitor will illuminate. If the seat is turned out of backhoe operation position or the engine is shut off, the pilot controls are automatically disabled. To enable pilot controls, cycle switch to lock position and back to unlock position.

Press lower half of pilot enable switch to lock position to disable pilot controls.

1—Pilot Enable Switch



TX1014474—UN—12DEC06

Pilot Enable Switch

TX1107361A—UN—01FEB12

Pilot Enable Switch Location

OUT4001,00009BA-19-06SEP12-1/1

Engine Speed Control Knob

Rotate engine speed control knob (1) clockwise to increase engine speed. Rotate knob counterclockwise to decrease engine speed.

NOTE: Engine speed control knob must be dialed to low speed stop position before engine speed will respond to changes in the knob position.

The engine speed control knob is operating normally when:

- Engine speed **changes** when turning the knob while seat is in loader position.
- Engine speed **changes** when turning the knob while seat is in the backhoe position.
- Engine speed **does change** when turning the knob while seat is not in backhoe or loader position.
- Engine speed **does not change** when turning the knob while service brake pedal is pressed in either backhoe or loader position.
- Engine speed is dialed up to something other than idle and seat position changes, causing the engine speed to drop out.

Engine Speed Control Knob

1—Engine Speed Control Knob

- Engine speed is dialed up to something other than idle and the service brake pedal is pressed, causing the engine speed to drop out.

OUT4001,00009BC-19-02MAR12-1/1

Defroster, Heater, and Air Conditioner Controls—If Equipped

Defroster, heater, and air conditioner switch (1); temperature control knob (2); and blower speed knob (3) must be adjusted as a group to obtain proper operation of the defroster, heater, or air conditioner.

Press the defroster, heater, and air conditioner switch to the appropriate setting. The defroster, heater, and air conditioner switch has three positions:

- Press bottom half of rocker switch to activate the air conditioner. Adjust the blower speed knob and temperature control knob as appropriate.
- Press top half of rocker switch to activate the defrost mode. In this position, the air conditioner compressor is powered and a vent is opened to provide air flow to the front windshield. Adjust the blower speed knob and temperature control knob as appropriate.
- For maximum heater performance, set the rocker switch to the middle position. In this position, the air conditioner compressor is not powered.

Turn blower speed knob clockwise to increase blower speed or counterclockwise to reduce blower speed. The blower speed knob has four speed settings and an off position.

Heater and Air Conditioner Controls

1—Defroster, Heater, and Air Conditioner Switch
2—Temperature Control Knob
3—Blower Speed Knob

NOTE: Use the air conditioner with the temperature control knob in a middle-to-cool position to dehumidify air without over cooling.

Turn temperature control knob to adjust air temperature. Turn clockwise towards red range for warmer air (best for heating and defrosting). Turn counterclockwise towards blue range for cooler air (best for venting and air conditioning).

OUT4001,00009BE-19-13MAR12-1/1

Seat Controls

CAUTION: Ensure seat is locked in position before operating machine. A seat that is loose or not properly locked can cause loss of control of machine and injuries or death.

NOTE: Grease seat base guide rails as needed.

OUT4001,00009C1-19-11APR12-1/3

Air Suspension Seat

Lift forward and aft lever (1) up and slide seat to desired position. Release forward and aft lever to lock seat in position.

Lift pivot lever (2) up and pivot seat. Release pivot lever to lock seat in position.

Lift back tilt lever (3) up and adjust backrest to desired tilt angle. Release back tilt lever to lock backrest in position.

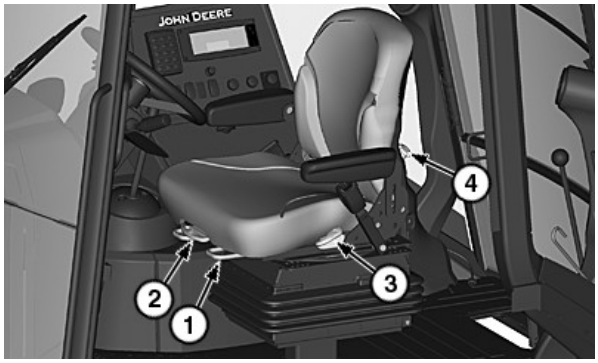
Turn lumbar support adjustment lever (4) to position lumbar support for operator's preference.

Seat Height and Ride Firmness

NOTE: Engine start switch must be pressed once (left LED illuminated) to adjust seat height and ride firmness.

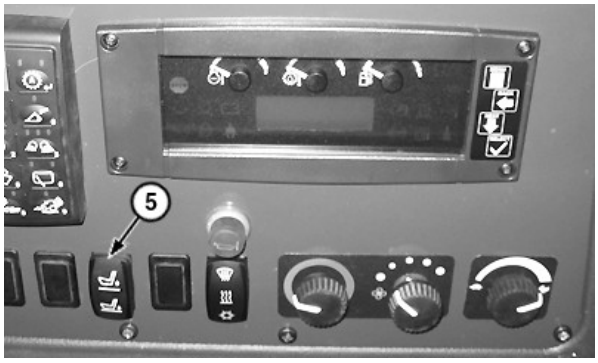
Press upper half of air suspension seat height adjustment switch (5) to increase air suspension seat height and firmness of ride. Press lower half of switch to decrease air suspension seat height and firmness of ride.

1—Forward and Aft Lever
2—Pivot Lever
3—Back Tilt Lever
4—Lumbar Support Adjustment Lever
5—Air Suspension Seat Height Adjustment Switch



TX1107544A—UN—03FEB12

Air Suspension Seat



TX1111218A—UN—28MAR12

Right Console

Continued on next page

OUT4001,00009C1-19-11APR12-2/3

Mechanical Suspension Seat

CAUTION: Ensure seat is locked in position before operating machine. A seat that is loose or not properly locked can cause loss of control of machine and injuries or death.

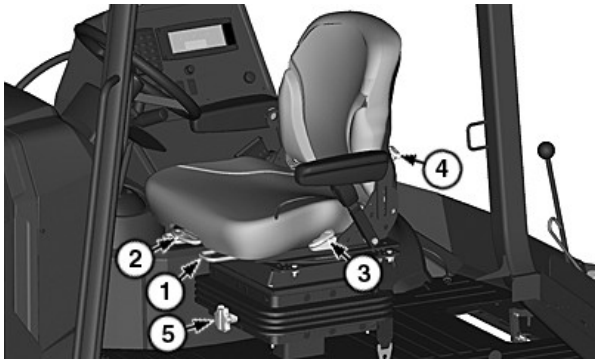
NOTE: With weight adjustment knob turned counterclockwise (-) as far as it can go and with no weight on seat, the distance to the floor from top of seat is 48 cm (19 in.). With knob turned clockwise (+) as far as it can go, the distance to floor from top of seat is 53 cm (21 in.). The distances will decrease by 5 cm (2 in.) when an 86 kg (190 lb.) person sits on seat.

Lift forward and aft lever (1) up and slide seat to desired position. Release forward and aft lever to lock seat in position.

Lift pivot lever (2) up and pivot seat. Release pivot lever to lock seat in position.

Lift back tilt lever (3) up and adjust backrest to desired tilt angle. Release back tilt lever to lock backrest in position.

Turn lumbar support adjustment lever (4) to position lumbar support for operator's preference.



Mechanical Suspension Seat

1—Forward and Aft Lever
2—Pivot Lever
3—Back Tilt Lever
4—Lumbar Support Adjustment Lever
5—Weight Adjustment Knob

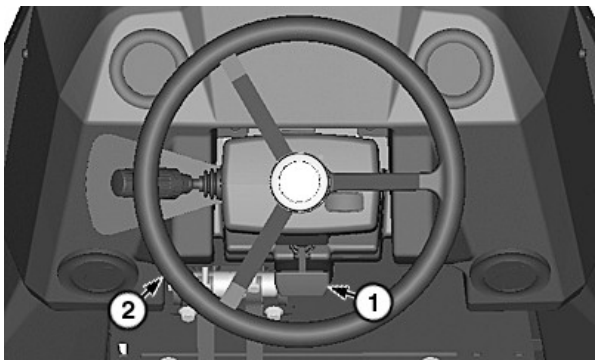
While NOT sitting on seat, turn weight adjustment knob (5) to change seat height and ride stiffness.

OUT4001,00009C1-19-11APR12-3/3

Steering Wheel Tilt Lever

Lift tilt lever (1) to adjust steering wheel (2) to operator's preference. Release lever to lock steering wheel in position.

1—Tilt Lever
2—Steering Wheel



Steering Wheel and Tilt Lever

OUT4001,00009C2-19-17APR12-1/1

Accessory Power Outlets

Accessory power outlets (1) are conveniently positioned to the right of operator's seat.

1—Accessory Power Outlet—12-Volt (2 used)

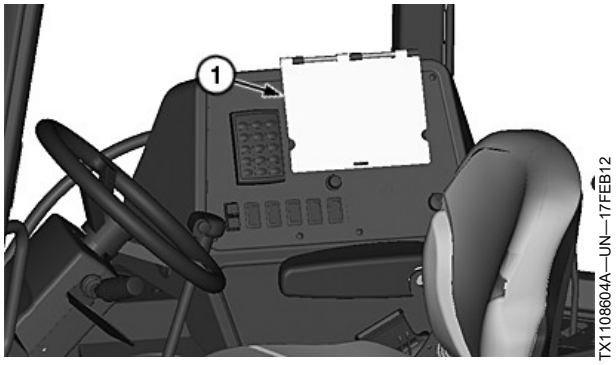
Accessory Power Outlets

OUT4001,00009C3-19-03FEB12-1/1

Vandal Protection—Canopy Machines

Ensure security system is installed on machine. For added protection on canopy machines, also lock vandal protection cover (1) over the standard display monitor (SDM) when machine is left unattended.

1—Protection Cover



Canopy Machine

OUT4001,0000B3A-19-17FEB12-1/1

Opening Windows—Cab Machines

CAUTION: Prevent injury from unexpected machine movement. Always lock hydraulics when opening or closing window.

Side and Door Windows

The side windows and door windows can open 180°. The door windows can be used as secondary exits.

To open, pull handle (1) in and away from cab post latch.

Retain in open position against fixed window on same side by fastening knob (2) into socket (3). Turn knob until tension is felt to prevent window from swinging during operation.

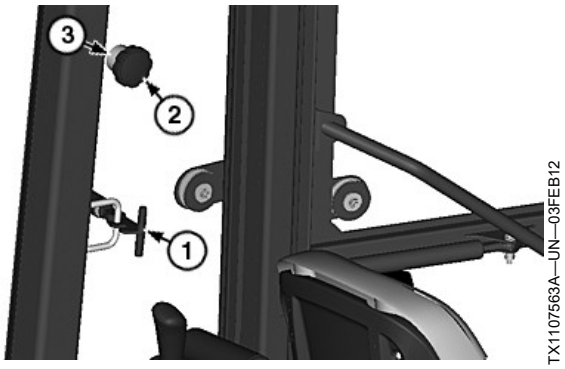
Rear Windows

Squeeze upper rear window latches (4) and slide upper rear window up or down.

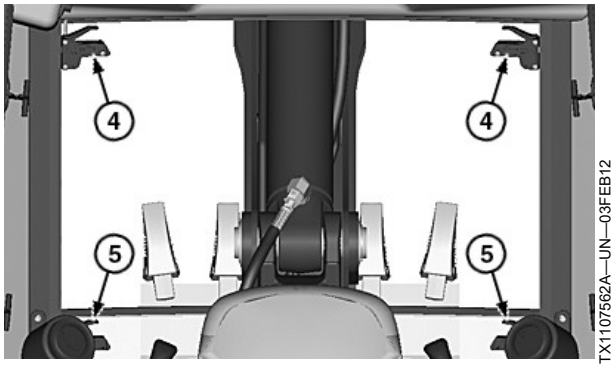
Squeeze middle rear window latches (5) and slide middle rear window up or down.

Ensure all rear window latches lock into detent positions on window frame.

1—Handle (8 used)
2—Fastening Knob (2 used)
3—Socket (2 used)
4—Upper Rear Window Latch (2 used)
5—Middle Rear Window Latch (2 used)



Side Window

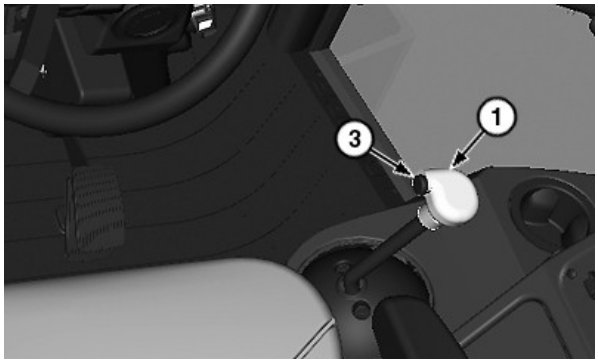


Rear Window

OUT4001,0000B3B-19-04FEB12-1/1

Loader Controls

1—Loader Control Lever
2—Single Lever Loader Control (SLLC) With Auxiliary—If Equipped
3—Clutch Disconnect Switch
4—Mechanical Front Wheel Drive (MFWD) Switch
5—Proportional Loader Auxiliary Switch
6—Momentary MFWD Switch



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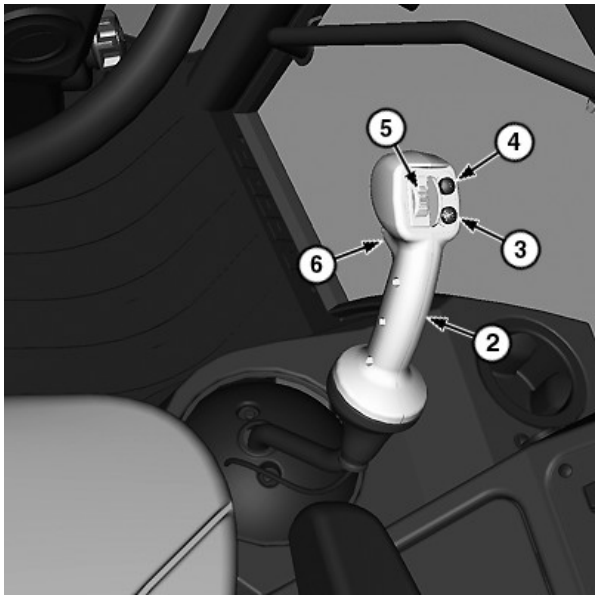
Loader Control Lever



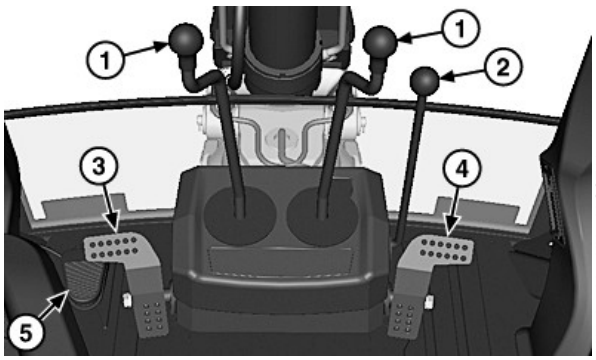
TX1107570A—UN—04FEB12

Single Lever Loader Control (SLLC) With Auxiliary—If Equipped

OUT4001,0000B3C-19-10FEB12-1/1

Backhoe Controls—Manual Control Machines

1—Backhoe Control Lever (2 used)
2—Boom Lock Lever
3—Auxiliary Hydraulic Foot Pedal (if equipped)
4—Extendable Dipperstick Foot Pedal (if equipped)
5—Auxiliary Selective Flow Control Foot Switch (if equipped)



TX1173570A—UN—08OCT14

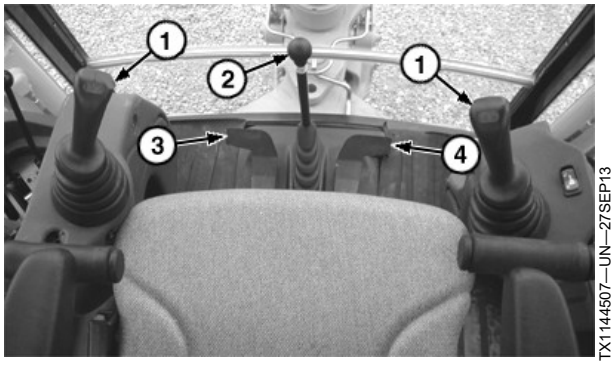
Backhoe Pedals and Levers

OUT4001,0000B3D-19-02OCT14-1/1

Backhoe Controls—Pilot Control Machines

NOTE: If machine is only equipped with auxiliary (no extendable dipperstick), left or right foot pedal may operate auxiliary function.

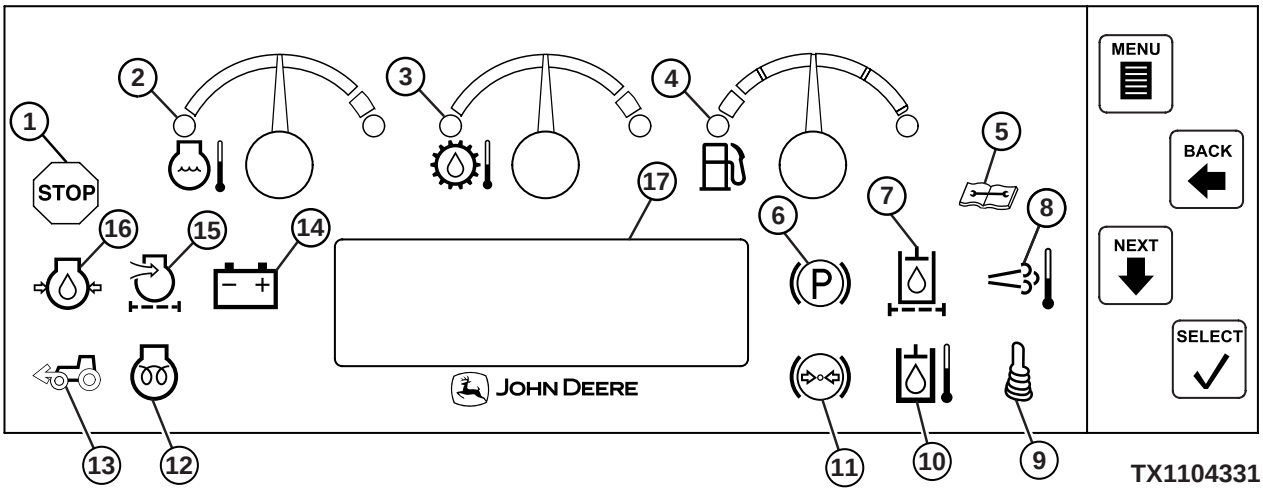
1—Backhoe Pilot Control (2 used)
2—Boom Lock Lever
3—Auxiliary Foot Pedal
4—Extendable Dipperstick Foot Pedal (if equipped)



Pilot Control Pedals and Levers

OUT4001,0000B3E-19-26SEP13-1/1

Standard Display Monitor (SDM)



Standard Display Monitor

1—STOP Indicator
2—Engine Coolant Temperature Gauge
3—Transmission Oil Temperature Gauge
4—Fuel Level Gauge
5—Diagnostic Code Indicator
6—Park Brake Indicator
7—Hydraulic Oil Filter Restriction Indicator
8—Exhaust Filter Cleaning Indicator
9—Joystick Enable Indicator
10—Not Used
11—Not Used
12—Wait-To-Start Indicator
13—MFWD Indicator
14—Engine Alternator Voltage Indicator
15—Engine Air Filter Restriction Indicator
16—Engine Oil Pressure Indicator
17—Display Window

- MENU button provides initial entry into operation, diagnostic and setup functions. Once a main menu has been selected, pressing MENU button again will return to the normal display.
- BACK button will back out of a menu, one item each time the button is pressed. The BACK button will eventually return to the normal display.
- NEXT button will move to the next selection within a menu or mode. Press NEXT button to cycle through all the possible selections in a menu.
- SELECT button toggles between displays during normal operation. During menu modes, SELECT button will activate the currently chosen menu, provide additional information on codes, make selection and reset timers.

IMPORTANT: Prevent possible machine damage. If STOP indicator lights and alarm sounds for more than 10 seconds with engine oil pressure indicator lit, stop machine immediately and investigate cause of problem.

If STOP indicator lights and alarm sounds for more than 10 seconds with engine coolant temperature gauge needle in red zone, reduce load and run engine for 1—2 minutes at slow idle to allow time to cool. If STOP indicator remains lit and engine coolant temperature gauge needle does not fall to an acceptable operating temperature, stop engine and investigate problem. Do not restart engine until problem has been corrected.

1—Stop Indicator: Indicator lights and alarm sounds when:

- Transmission control lever (TCL) is shifted into F (forward) or R (reverse) with park brake ON.
- TCL is shifted into F (forward) or R (reverse) with park brake OFF and seat rotated toward the backhoe position.
- Engine oil pressure is low.
- Engine coolant temperature is excessively high.
- High intake manifold air temperature.
- Low coolant level.
- High transmission oil temperature.
- Water in fuel detected.
- Air filter restricted.
- Exhaust filter soot level is high.
- Other operator warnings.

2—Engine Coolant Temperature Gauge: When engine coolant temperature is too high, gauge needle will enter red zone. STOP indicator will light and alarm will sound. Do not stop engine. Reduce load and run engine at slow idle for 1—2 minutes. If gauge needle does not fall to an acceptable operating level, stop engine and see your authorized dealer.

3—Transmission Oil Temperature Gauge: When transmission oil temperature is too high, gauge needle will enter red zone. STOP indicator will light and alarm will sound. Reduce load immediately, shift TCL into N (neutral) and run engine at slow idle. Inspect for plugged oil cooler.

4—Fuel Level Gauge: Gauge shows fuel level in tank. Fuel level gauge needle will enter red zone when fuel level is low.

5—Diagnostic Code Indicator: Indicator will light when a

Continued on next page

diagnostic trouble code (DTC) is activated; text message and code appears in display window. It may not be necessary to stop the engine immediately, but the cause should be investigated as soon as possible. Press MENU, BACK, NEXT or SELECT to acknowledge message and turn indicator off.

6—Park Brake Indicator: Indicator will light when park brake is engaged.

IMPORTANT: Prevent possible machine damage. If hydraulic oil filter restriction indicator lights and hydraulic oil is warm, change filter as soon as possible to prevent damage.

NOTE: The hydraulic oil filter restriction warning is disabled (will NOT activate) for temperatures 38°C (100°F) and below.

7—Hydraulic Oil Filter Restriction Indicator: Indicator will light when hydraulic oil filter element is restricted.

NOTE: Cold oil can cause indicator to light temporarily. Allow time for oil to warm up and indicator to go out before servicing filter.

8—Exhaust Filter Cleaning Indicator: Indicator will light when elevated idle is active or exhaust filter cleaning is in process.

If auto cleaning is being performed, machine can be operated as normal and indicator will disappear when exhaust filter auto cleaning is complete and exhaust temperatures return to normal.

If a parked cleaning has been initiated by the operator and is being performed, machine CANNOT be operated until the process is complete. Indicator will disappear when exhaust filter parked cleaning is complete and exhaust temperatures return to normal.

9—Joystick Enable Indicator: Indicator will light when pilot joysticks are enabled. Light will go off whenever pilot joysticks become disabled.

10—Not Used.

11—Not Used.

12—Wait-To-Start Indicator: Indicator will light when glow plugs have been activated due to cold temperatures. Engine cannot be started until the wait-to-start indicator goes out. See Starting the Engine and Cold Start Aid—Glow Plugs. (Section 2-3.)

13—MFWD Indicator: Indicator will light when mechanical front wheel drive (MFWD) is engaged.

14—Engine Alternator Voltage Indicator: Indicator will light when alternator output voltage drops below 12 V. Check electrical system or recharge battery, if necessary.

15—Engine Air Filter Restriction Indicator: Indicator will light when air filter elements are restricted. Clean or change air filter elements.

IMPORTANT: Prevent possible engine damage. If engine oil pressure indicator light comes on while operating, stop machine and STOP ENGINE IMMEDIATELY.

16—Engine Oil Pressure Indicator: Indicator will light when engine oil pressure is low. STOP indicator will flash and alarm will sound. Stop machine and STOP ENGINE IMMEDIATELY.

17—Display Window: Display window has six active displays; two constant and four selectable.

- Transmission Gear (constant)
- Tachometer (constant)
- Hour Meter (selectable)
- Transmission Oil Temperature (selectable)
- Battery Voltage (selectable)
- Job Timer (selectable)

Press NEXT to scroll through items to view desired data.

OUT4001,0000B05-19-19JUN13-2/2

Standard Display Monitor (SDM)—Normal Display

When the engine start switch is pressed and released, display monitor will go into bulb check mode. All lights on display monitor will come on, all gauges will position gauge needle to the 12 o'clock position, and alarm will sound. If security system has been enabled by owner, operator logon screen appears on display unit. Operator must enter valid personal identification number (PIN).

Approximately 5 seconds later, the normal display will be shown.

Display window has six active displays; two constant and four selectable.

Transmission gear (1) and the tachometer (2) are constant displays.

- Transmission gear display shows the travel position of the transmission control lever (TCL) (P—park, F—forward, N—neutral, or R—reverse) and the speed range (1, 2, 3, 4, or 5) of the transmission.
- Tachometer shows engine speed in revolutions-per-minute (rpm).

Press NEXT button repeatedly to scroll through the four selectable displays.

Hour meter, transmission oil temperature, battery voltage, and job timer are operator selectable displays.

- Hour meter shows total machine hours to the nearest tenth of an hour and accumulates time only when the engine is running.

Normal Display Window

1—Transmission Gear
2—Tachometer
3—Hour Meter (shown), Transmission Oil Temperature, Battery Voltage, and Job Timer Display

NOTE: To change unit selection, see Standard Display Monitor (SDM)—Main Menu—Setup—Monitor in this section.

- Transmission oil temperature is displayed in either degrees Fahrenheit (°F) or Celsius (°C) depending on the units selected.
- Battery voltage is displayed to the nearest tenth of a volt.
- Job timer can be set to record time for a specific job or operator. To reset, see Standard Display Monitor (SDM)—Main Menu—Operation—Job Timer in this section.

OUT4001,0000B06-19-28MAR12-1/1

Standard Display Monitor (SDM)—Display Messages

The standard display monitor (SDM) automatically displays a pop-up message for certain diagnostic trouble codes (DTCs). When the DTC is initially active, a message displays on the SDM until the malfunction either is resolved or the operator presses any button on the SDM.

The DTCs that automatically generate a SDM pop-up message include:

Monitor Text	Description
BACKHOE ACTIVE	Hydraulics enabled while not facing rear.
CALIBRATE SEAT SENSOR	Seat position sensor requires calibration.
CONVERTER OIL TEMP HIGH	Torque converter temperature high.
CONVERTER TEMP FAULT	Torque converter temperature sensor malfunction.
DIFF LOCK DISABLED DUE TO HIGH SPEED	The diff lock feature is disabled. Attempted to engage at too high of speed.
ECU CONFIGURATION MISMATCH	Security violation.
ENGINE AIR FILTER RESTRICTED	Engine air filter restricted.
ENGINE DERATED	Engine related malfunction.
ENGINE SHUTDOWN XX PRESS START TO ABORT	Auto shutdown is enabled.
ENGINE TEMP HIGH	Engine coolant temperature high.
ENGINE TEMP SENSOR FAULT	Engine coolant temperature sensor malfunction.
EXHAUST FILTER AUTO CLEANING IDLE ELEVATED	Exhaust filter is in auto cleaning mode.
EXHAUST FILTER CLEANING REQD ENGINE PWR LMTD	Soot level 4 has been reached.
EXHAUST FILTER FILTER RESTRICTING	Soot level 3 has been reached.
EXHAUST FILTER PRESS SELECT TO ENTER CLEANING CYCLE	Exhaust filter is ready to initiate a parked cleaning.
EXHAUST FILTER SERVICE REQD ENGINE PWR LMTD	Soot level 5 has been reached.
FAN SPEED FAULT	Cooling fan speed sensor malfunction.
FASTEN SEAT BELT	Fasten seat belt.
FUEL GAUGE FAULT	Fuel level sensor malfunction.
FUEL PUMP CONTROL FAULT	Engine fuel pump control system malfunction.
HIGH EGR TEMPERATURE	EGR temperature high.
HIGH FUEL TEMPERATURE	Fuel temperature high.
HIGH SYSTEM VOLTAGE	System voltage high.
HYDRAULIC OIL FILTER RESTRICTED	Hydraulic oil filter restricted.
HYDRAULIC OIL SENSOR FAULT	Hydraulic oil filter system malfunction.
INCORRECT VIN	Security violation.
INJECTOR FAILURE	Fuel injector malfunction.
LEARNING OPTIONS	Following a reprogramming event the controllers communicate to set the options that are installed. This is displayed while that occurs.
LEFT STAB NOT CENTERED	Left stabilizer is not in center position.
LOADER COUPLER DISENGAGED	Coupler is disengaged.
LOW COOLANT LEVEL	Coolant is low.
LOW ENGINE OIL PRESSURE	Engine oil pressure extremely low.
LOW FUEL	Fuel is low.
LOW SYSTEM VOLTAGE	System voltage low.
MAINIFOLD AIR TEMP HIGH	Manifold air temperature high.
NO CLUTCH DISCONNECT	Clutch disconnect device malfunction.

Continued on next page

Monitor Text	Description
OPTION NOT INSTALLED	When trying to access an option that has not been installed on machine.
PARK BRAKE APPLY XX	A condition has occurred where the park brake will be automatically applied. The XX is the number of seconds remaining before it will apply.
PARK BRAKE APPLY XX PRESS START TO ABORT	Shutdown initiated while machine moving and park brake released. The park brake will be applied unless the start button is pressed.
PIN EXPIRED CONTACT OWNER	Transport pin has expired and owner needs to be contacted.
RAIL PRESSURE SENSOR FAULT	Engine rail pressure malfunction.
RIGHT STAB NOT CENTERED	Right stabilizer is not in center position.
RELEASE PARK BRAKE	Park brake has not been released.
RETURN TCL TO NEUTRAL	Transmission control lever (TCL) needs to be in neutral.
SEAT NOT LATCHED	Seat not locked in front or rear facing position.
SEAT SENSOR FAULT	Seat position sensor malfunction.
SECURITY ENABLED	Machine security is enabled. A valid PIN is required to start the machine.
SERVICE BRAKE PRESSURE LOW	Low service brake pressure.
TURN SEAT TO ENABLE	No front seat switch. Operator is attempting to enable hydraulics with seat in middle position.
WAIT TO START	Starter has been engaged for an extended period. To prevent starter damage, do not start until this message has cleared.
WAIT TO START XX	Cold start aid required. XX is the number of seconds remaining.
WATER IN FUEL	Fuel contaminated.

OUT4001,0000BC1-19-11APR12-2/2

Standard Display Monitor (SDM)—Main Menu

The MAIN MENU displays three submenus that can be selected to view diagnostic information or change various operating characteristics of the machine or the display unit.

NOTE: Translations shown on display may be abbreviated.

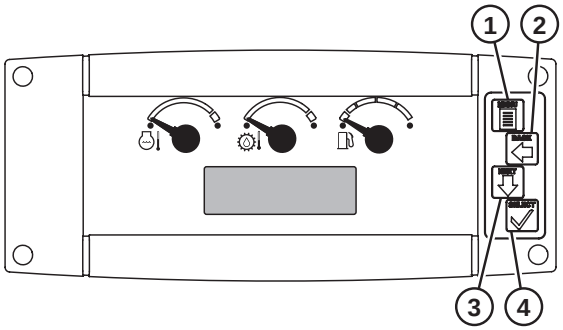
The MAIN MENU is accessed by pressing the MENU button (1).

The submenus under MAIN MENU that appear on display include:

- **OPERATION—**allows operator to select settings for the exhaust filter, job timer, and software delivery.
- **DIAGNOSTICS—**allows operator to view active and stored diagnostic trouble codes (DTCs).
- **SETUP—**allows operator to select various settings for the machine.

At MAIN MENU, press NEXT button (3) to move to desired submenu.

Press SELECT button (4) to activate chosen submenu.



TX1103319—UN—17DEC11

Standard Display Monitor (SDM)

1—MENU Button
2—BACK Button
3—NEXT Button
4—SELECT Button

Press BACK button (2) to return to previous menu.

Press MENU button to return to runtime screen.

OUT4001,00009B3-19-14DEC11-1/1

Standard Display Monitor (SDM)—Main Menu —Operation

The OPERATION menu provides the capability to select settings for the exhaust filter, job timer, and software delivery.

The submenus under MAIN MENU that appear on display include:

- **OPERATION**
- **DIAGNOSTICS**
- **SETUP**

Press NEXT button (3) at MAIN MENU to highlight OPERATION.

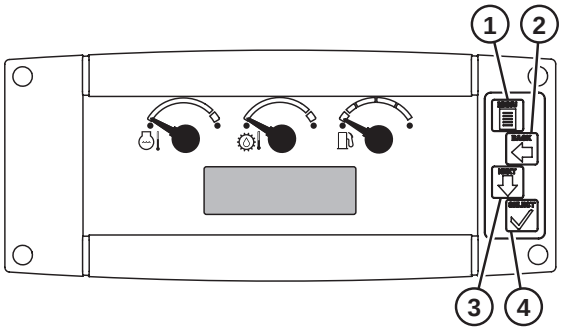
Press SELECT button (4) to display OPERATION menu.

OPERATION menu items on display include:

- **EXHAUST FILTER**
- **JOB TIMER**
- **SOFTWARE DELIVERY**

Press NEXT button to move to desired menu item.

Press SELECT button to activate chosen menu item.



Standard Display Monitor (SDM)

1—MENU Button
2—BACK Button
3—NEXT Button
4—SELECT Button

Press BACK button (2) to return to previous menu.

Press MENU button (1) to return to runtime screen at any time.

OUT4001,00009B4-19-14DEC11-1/1

Standard Display Monitor (SDM)—Main Menu —Operation—Exhaust Filter

There are five soot levels to describe the amount of restriction in the exhaust filter. These levels determine the type of cleaning that is required:

- LOW
- MODERATE
- HIGH
- VERY HIGH
- SERVICE

Auto cleaning is able to activate (if not disabled by the operator) when the exhaust filter restriction is anywhere between MODERATE and HIGH soot levels. Auto cleaning is no longer available if exhaust filter restriction reaches VERY HIGH or SERVICE soot levels.

Parked cleaning can only be initiated when the exhaust filter restriction reaches HIGH or VERY HIGH soot levels.

If exhaust filter restriction reaches SERVICE soot level, contact your authorized dealer.

For more information on the exhaust filter, see Exhaust Filter. (Section 2-3.)

The **EXHAUST FILTER** menu allows the operator to view the current soot level, enable or disable auto filter cleaning, or allow the operator to initiate a parked filter cleaning.

At OPERATION menu, press NEXT button to highlight EXHAUST FILTER.

Press SELECT button to display EXHAUST FILTER menu.

EXHAUST FILTER menu items on display include:

- **SOOT LEVEL**—if selected, displays LOW, MODERATE, HIGH, VERY HIGH, or SERVICE to describe the soot level restriction in the exhaust filter.
- **AUTO CLEANING**
- **PARKED CLEANING**

Press NEXT button to move to desired menu item.

Press SELECT button to activate chosen menu item.

Press BACK button to return to previous menu.

Press MENU button to return to runtime screen at any time.

OUT4001,00009B5-19-19JUN13-1/1

Standard Display Monitor (SDM)—Main Menu—Operation—Exhaust Filter—Auto Cleaning

CAUTION: Servicing machine during exhaust filter auto cleaning can result in serious personal injury. Avoid exposure and skin contact with hot gases and components.

During exhaust filter auto cleaning, the engine may run at elevated idle and hot temperatures for an extended period of time. Exhaust gases and exhaust filter components may reach temperatures hot enough to burn people and ignite or melt common materials.

NOTE: Disabling exhaust filter auto cleaning is not preferred. Whenever possible, auto cleaning should be enabled to keep soot buildup to a minimum and to increase overall machine uptime.

Auto cleaning is set from the factory to be enabled. If operating in conditions where it may be unsafe for elevated exhaust temperatures, auto cleaning can be disabled.

The **AUTO CLEANING** menu allows the operator to enable or disable the auto cleaning function for the exhaust filter.

At EXHAUST FILTER menu, press NEXT button to highlight AUTO CLEANING.

Press SELECT button to display AUTO CLEANING menu.

AUTO CLEANING menu items on display include:

- **ENABLED**
- **DISABLED**

Press NEXT button to highlight desired function.

Press SELECT button to activate chosen function.

Press BACK button to return to previous menu.

Press MENU button to return to runtime screen at any time.

If auto cleaning is enabled, and operator chooses to disable, a pop-up will appear on the monitor for 3 seconds stating AUTO CLEANING DISABLED.

If auto cleaning is disabled, and operator chooses to enable, a pop-up will appear on the monitor for 3 seconds stating AUTO CLEANING ENABLED. Then another pop-up will appear for 3 seconds stating HIGHER IDLE SPEEDS POSSIBLE, followed by another pop-up stating HIGHER EXHAUST TEMP POSSIBLE.

An exhaust filter cleaning indicator will illuminate on the monitor when elevated idle is active or exhaust filter cleaning is in process. If auto cleaning is being performed, machine can be operated as normal and indicator will disappear when exhaust filter auto cleaning is complete and exhaust temperatures return to normal.

OUT4001,0000A76-19-14DEC11-1/1

Standard Display Monitor (SDM)—Main Menu—Operation—Exhaust Filter—Parked Cleaning

CAUTION: Servicing machine during exhaust filter parked cleaning can result in serious personal injury. Avoid exposure and skin contact with hot gases and components.

During exhaust filter parked cleaning, the engine may run at elevated idle and hot temperatures for an extended period of time. Exhaust gases and exhaust filter components may reach temperatures hot enough to burn people and ignite or melt common materials.

IMPORTANT: Avoid machine damage. Always park machine in a safe location and check for adequate fuel level before beginning exhaust filter parked cleaning.

NOTE: To cancel a parked cleaning, either release park brake, move transmission control lever (TCL), or increase engine speed.

Parked cleaning is performed when the operator chooses to have the machine actively clean the exhaust filter while it is in a predetermined safe state. This safe state includes three conditions:

- park brake applied
- transmission control lever (TCL) in neutral (N)
- engine running at idle

An exhaust filter parked cleaning can only be initiated if the filter restriction is at HIGH or VERY HIGH soot levels.

Parked cleaning occurs in two stages. The first stage is to prepare the exhaust filter by automatically raising exhaust filter temperature to 300°C (572°F). Once the exhaust filter temperature reaches 275—300°C (527—572°F), the cleaning process may begin. The second stage is when the cleaning process begins and can result in exhaust filter temperatures exceeding 550°C (1022°F). The cleaning process will continue until one of the following conditions exist:

- exhaust filter restriction level is back to LOW
- 45 minutes has elapsed causing a time-out
- operator cancels the parked cleaning procedure by releasing park brake, moving TCL out of neutral (N), or increasing engine speed
- parked cleaning is aborted due to a malfunction
- engine runs out of fuel due to not following SDM suggestions
- engine is shut off by operator (not recommended)

If operator tries to initiate a parked cleaning when the filter restriction is at LOW or MODERATE soot levels, the vehicle control unit (VCU) will not activate a parked cleaning and a pop-up will appear on the monitor stating EXHAUST FILTER CLEANING CYCLE NOT REQUIRED. This will be displayed for 3 seconds and then return to EXHAUST FILTER menu.

If operator tries to initiate a parked cleaning when the filter restriction is at the SERVICE soot level, the VCU will not activate a parked cleaning and a pop-up will appear on the monitor stating SERVICE REQUIRED. This will be displayed for 3 seconds and then return to EXHAUST FILTER menu. Contact your authorized dealer for exhaust filter cleaning at this soot level.

The **PARKED CLEANING** menu allows the operator to initiate a parked filter cleaning.

At EXHAUST FILTER menu, press NEXT button to highlight PARKED CLEANING.

Press SELECT button to display PARKED CLEANING menu.

PARKED CLEANING menu will first display the following question:

SHUTDOWN WHEN DONE?

- **NO**
- **YES**

Press NEXT button to highlight desired function.

Press SELECT button to activate chosen function.

Press BACK button to return to previous menu.

Press MENU button to return to runtime screen at any time.

Once a choice is made for shutdown, the monitor will display the next screen with checklist to ensure machine is in a safe state for a parked filter cleaning to take place. If any of the safe state conditions are not met, another screen will appear on the monitor telling the operator what condition is not met and will remain on until operator satisfies condition.

- **✓ PARK**
- **✓ LOW IDLE**
- **PRESS SELECT TO BEGIN**

NOTE: If SELECT button is pressed to start parked cleaning, but fuel level is low, a screen is displayed to warn the operator of this and give the operator the choice to continue cleaning by pressing the SELECT button or cancel cleaning by pressing BACK button.

Press SELECT button to start.

Press BACK button to exit.

If SELECT button is pressed, the first stage of the parked cleaning process will be displayed to show preparation status. No operator action is required during a parked filter cleaning.

Once the first stage is complete, stage two of the parked cleaning process will be displayed to show cleaning progress.

When cleaning is complete and auto shutdown is enabled, a pop-up is displayed stating FILTER CLEANING

Continued on next page

COMPLETE until the machine shuts down or the operator presses SELECT to cancel the auto shutdown.

When cleaning is complete and auto shutdown is disabled, a pop-up is displayed stating FILTER CLEANING

COMPLETE until operator presses SELECT button to confirm. Once SELECT button is pressed, monitor returns to runtime screen.

OUT4001,0000A77-19-06FEB12-2/2

Standard Display Monitor (SDM)—Main Menu—Operation—Job Timer

The **JOB TIMER** menu contains a resettable hour meter that can be used to time tasks to the nearest tenth of an hour.

At OPERATION menu, press NEXT button to highlight JOB TIMER.

Press SELECT button to display JOB TIMER menu.

JOB TIMER menu items on display include:

- **XXX.X HRS—**displays the current hours since last reset.
- **HOLD SELECT TO RESET—**when SELECT button is held for 3 seconds, a pop-up will appear on the monitor for 2 seconds stating JOB TIMER RESET and hours displayed will reset to zero.

Press NEXT button to move to desired menu item.

Press SELECT button to activate chosen menu item.

Press BACK button to return to previous menu.

Press MENU button to return to runtime screen at any time.

OUT4001,0000A78-19-14DEC11-1/1

Standard Display Monitor (SDM)—Main Menu—Operation—Software Delivery

The **SOFTWARE DELIVERY** menu is set by the dealer to enable Service ADVISOR™ Remote (SAR) software to be downloaded and installed on machine through the JDLink™ cellular connection. A series of screens will appear on the display monitor to walk the operator through the download and installation process. It will be necessary to interact with your John Deere dealer or technician for needed information.

At OPERATION menu, press NEXT button to highlight SOFTWARE DELIVERY.

Press SELECT button to display SOFTWARE DELIVERY menu.

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JDLink is a trademark of Deere & Company

NOTE: If software delivery has NOT been enabled by the dealer, a pop-up will appear on the monitor stating:

SOFTWARE DELIVERY HAS NOT BEEN ENABLED

SEE DEALER TO ENABLE

SOFTWARE DELIVERY menu items on display include:

- **SOFTWARE UPDATE**
- **DELIVERY SETTINGS**

Press NEXT button to move to desired menu item.

Press SELECT button to activate chosen menu item.

Press BACK button to return to previous menu.

Press MENU button to return to runtime screen at any time.

OUT4001,0000A79-19-14DEC11-1/1

Standard Display Monitor (SDM)—Main Menu —Operation—Software Delivery—Software Update

The **SOFTWARE UPDATE** menu is for receiving Service ADVISOR™ Remote (SAR) software downloads and installations to the machine. Downloads can take place with the engine running and machine operating. However, installation of the software can only process if the engine is not running and park brake applied. If conditions exist that will not allow the download or installation to happen, screens will appear on the monitor advising what needs to be done in order to continue. For more information, contact your authorized John Deere dealer.

At SOFTWARE DELIVERY menu, press NEXT button to highlight SOFTWARE UPDATE menu.

NOTE: To avoid delays, it will be helpful at this point to make sure engine is not running, park brake is applied, and the Service ADVISOR™ Remote (SAR)—SOFTWARE TERMS AND CONDITIONS have been read before continuing. (Find Service ADVISOR™ Remote (SAR)—SOFTWARE TERMS AND CONDITIONS at the beginning of this manual.)

Press SELECT button to display SOFTWARE UPDATE menu.

The SOFTWARE UPDATE menu will display different screens depending on the status of the update and the status of the machine.

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If update is already downloaded, the monitor will display the following screen:

- **DOWNLOAD COMPLETE**
  READY TO INSTALL
  After 3 seconds, the monitor will display three **SOFTWARE LICENSE AGREEMENT** screens. Press NEXT button to toggle through screens that state:
  PRESS SELECT TO ACCEPT TERMS AND CONDITIONS DEFINED IN OPERATORS MANUAL AND TO BEGIN LOADING NEW SOFTWARE UPDATE
  Once SELECT is pressed, installation will take place if all conditions are acceptable.

Other screens that could be displayed are:

- **DOWNLOADING...**
- **DOWNLOAD COMPLETE**
  STOP ENGINE
- **APPROVE**
  REJECT
- **DOWNLOAD NOT AVAILABLE**
- **STATUS UNKNOWN**
  PLEASE CHECK LATER

Press NEXT button to move to desired menu item.

Press SELECT button to activate chosen menu item.

Press BACK button to return to previous menu.

Press MENU button to return to runtime screen at any time.

OUT4001,0000A82-19-14DEC11-1/1

Standard Display Monitor (SDM)—Main Menu —Operation—Software Delivery—Delivery Settings

The **DELIVERY SETTINGS** menu is for changing the settings for how the software is delivered to the machine.

At SOFTWARE DELIVERY menu, press NEXT button to highlight DELIVERY SETTINGS menu.

Press SELECT button to display DELIVERY SETTINGS menu.

DELIVERY SETTINGS menu items on display include:

- **ENABLE OR DISABLE—**if selected, will give the operator the choice to enable or disable delivery settings. After selection is made, a pop-up appears for 1 second stating SAVING SELECTION.
- **DOWNLOAD APPROVAL—**if selected, three options are available to the operator for receiving software downloads:
  - **NOTIFY—**if selected, next screen appears stating NOTIFICATION BEFORE DOWNLOAD SELECTED
  - **AUTO APPROVE—**if selected, next screen appears stating AUTO APPROVE FILE DOWNLOAD SELECTED
  - **AUTO REJECT—**if selected, next screen appears stating AUTO REJECT FILE DOWNLOAD SELECTED
- **DOWNLOAD COMP. POPUP—**if selected, will give the operator the choice to enable or disable the pop-up to appear on the monitor after software download is completed.
  - **POPUP ENABLED—**if selected, next screen appears stating POPUP WILL BE SHOWN
  - **POPUP DISABLED—**if selected, next screen appears stating POPUP WILL BE HIDDEN

Press NEXT button to move to desired menu item.

Press SELECT button to activate chosen menu item.

Press BACK button to return to previous menu.

Press MENU button to return to runtime screen at any time.

OUT4001,0000A7A-19-14DEC11-1/1

Standard Display Monitor (SDM)—Main Menu —Diagnostics

The **DIAGNOSTICS** menu allows service personnel or operator to view active or stored diagnostic trouble codes (DTCs).

The submenus under MAIN MENU that appear on display include:

- **OPERATION**
- **DIAGNOSTICS**
- **SETUP**

Press NEXT button (3) at MAIN MENU to highlight DIAGNOSTICS.

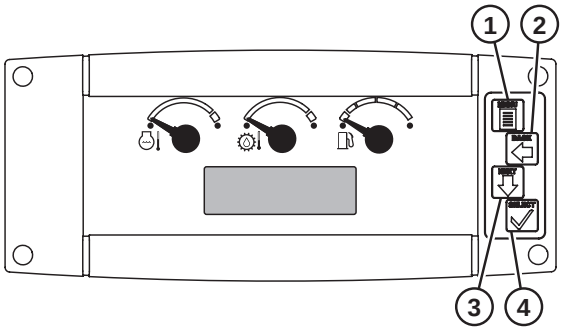
Press SELECT button (4) to display DIAGNOSTICS menu.

DIAGNOSTICS menu items on display include:

- **CODES**

Press SELECT button to activate chosen menu item.

Press BACK button (2) to return to previous menu.



Standard Display Monitor (SDM)

1—MENU Button
2—BACK Button
3—NEXT Button
4—SELECT Button

Press MENU button (1) to return to runtime screen at any time.

OUT4001,0000A7B-19-14DEC11-1/1

Standard Display Monitor (SDM)—Main Menu —Diagnostics—Codes

The **CODES** menu provides the capability to select and display diagnostic trouble codes (DTCs) that are currently active or stored on the machine and information about each DTC. Each DTC is saved in the order it occurred.

At DIAGNOSTICS menu, press SELECT button to display CODES menu.

CODES menu items on display include:

- **ACTIVE | STORED (total number of codes in each category is displayed below heading)—**if selected, allows operator to view all active and stored codes. Continue to press SELECT button to scroll through more information about each code.

Press SELECT button to activate chosen menu item.

Press NEXT button to move to desired menu item.

Press BACK button to return to previous menu.

Press MENU button to return to runtime screen at any time.

OUT4001,0000A7C-19-14DEC11-1/1

Standard Display Monitor (SDM)—Main Menu —Setup

The SETUP menu allows the operator to make changes to various operating conditions of the machine and monitor.

The submenus under MAIN MENU that appear on display include:

- **OPERATION**
- **DIAGNOSTICS**
- **SETUP**

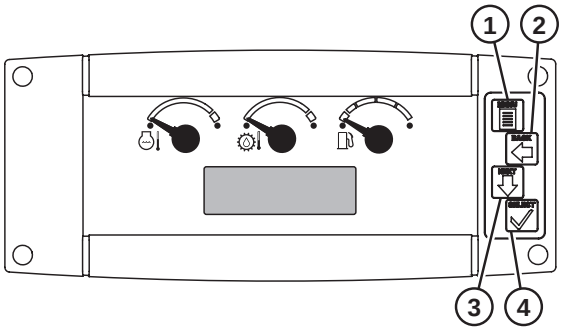
Press NEXT button (3) at MAIN MENU to highlight SETUP.

Press SELECT button (4) to display SETUP menu.

SETUP menu items on display include:

- **MONITOR**
- **WIPER DELAY**
- **MFWD BRAKING**
- **SECURITY**
- **AUTO SHUTDOWN**
- **AUTO IDLE**
- **ECONOMY MODE**
- **LOADER AUX SPEED**

Press NEXT button to move to desired menu item.



Standard Display Monitor (SDM)

1—MENU Button
2—BACK Button
3—NEXT Button
4—SELECT Button

Press SELECT button to activate chosen menu item.

Press BACK button (2) to return to previous menu.

Press MENU button (1) to return to runtime screen at any time.

OUT4001,0000A7D-19-15AUG12-1/1

Standard Display Monitor (SDM)—Main Menu —Setup—Monitor

The **MONITOR** menu allows the operator to make changes to various display settings of the monitor.

At SETUP menu, press NEXT button to highlight MONITOR.

Press SELECT button to display MONITOR menu.

MONITOR menu items on display include:

- **LANGUAGE—**if selected, provides the operator a selection of languages to choose from for the text on the monitor:
  - **ENGLISH**
  - **SPANISH**
  - **FRENCH**
  - **RUSSIAN**
  - **PORTUGUESE**

  Use NEXT button to highlight desired selection. Press SELECT button to store selection. A pop-up will appear for 2 seconds stating what language was chosen and stored.
- **UNITS—**if selected, provides the operator with two measurement selections to choose from for the values on the monitor:
  - **ENGLISH**
  - **METRIC**

  Use NEXT button to highlight desired selection. Press SELECT button to store selection. A pop-up will appear for 2 seconds stating what type of measurement was chosen and stored.
- **CONTRAST—**if selected, allows the operator to change the monitor screen contrast using the monitor buttons:
  - **NEXT to increase**
  - **BACK to decrease**
  - **SELECT to store**
- **JOB TIMER—**if selected, allows the operator to display or hide the job timer on the monitor with the following choices:
  - **VISIBLE**
  - **HIDDEN**

  Use NEXT button to highlight desired selection. Press SELECT button to store selection. A pop-up will appear for 2 seconds stating what was chosen and stored.

Press NEXT button to move to desired menu item.

Press SELECT button to activate chosen menu item.

Press BACK button to return to previous menu.

Press MENU button to return to runtime screen at any time.

OUT4001,0000A7E-19-14DEC11-1/1

Standard Display Monitor (SDM)—Main Menu —Setup—Wiper Delay

The **WIPER DELAY** menu allows the operator to change the time interval between wiper operation. Wiper delay is adjustable in 0.5 second increments, with a range from 2—10 seconds.

At SETUP menu, press NEXT button to highlight WIPER DELAY.

Press SELECT button to display WIPER DELAY menu.

WIPER DELAY menu items on display include:

- **FRONT WIPER DELAY—**if selected, allows the operator to toggle through a range of time increments for the front wiper.
  Use NEXT button to highlight desired selection. Press SELECT button to store selection. A pop-up will appear for 2 seconds stating what was chosen and stored.
- **REAR WIPER DELAY—**if selected, allows the operator to toggle through a range of time increments for the rear wiper.
  Use NEXT button to highlight desired selection. Press SELECT button to store selection. A pop-up will appear for 2 seconds stating what was chosen and stored.

Press NEXT button to move to desired menu item.

Press SELECT button to activate chosen menu item.

Press BACK button to return to previous menu.

Press MENU button to return to runtime screen at any time.

OUT4001,0000A7F-19-14DEC11-1/1

Standard Display Monitor (SDM)—Main Menu —Setup—MFWD Braking

The **MFWD BRAKING** menu allows the operator to turn this option ON or OFF.

At SETUP menu, press NEXT button to highlight MFWD BRAKING.

Press SELECT button to display MFWD BRAKING menu.

MFWD BRAKING menu items on display include:

- **✓ ON**
- **OFF**

Press NEXT button to move to desired menu item.

Press SELECT button to activate chosen menu item. A pop-up will appear for 2 seconds stating what was chosen and stored. A check mark (✓) will be placed in front of the stored item.

Press BACK button to return to previous menu.

Press MENU button to return to runtime screen at any time.

OUT4001,0000A80-19-14DEC11-1/1

Standard Display Monitor (SDM)—Main Menu —Setup—Security

The **SECURITY** menu provides the machine owner a feature that is designed to impede theft or unauthorized use of the machine by preventing the engine from starting until the operator correctly enters a valid security code.

With this menu, the owner can configure how the security system is deployed on the machine. It can also allow the owner to change his personal identification number (PIN) code, enter up to five operator PIN codes, and enter one transport PIN code into the system.

At SETUP menu, press NEXT button to highlight SECURITY.

Press SELECT button. Enter owner PIN code.

NOTE: At installation of security system, default owner PIN code set at the factory is 1111.

There are two methods to enter security PIN codes. One is by using the numeric keypad on the sealed switch module (SSM). The other way is by using the NEXT, BACK, and SELECT buttons on the SDM. Both methods can be used independently or together. For more information, see Security System. (Section 2-1.)

Once the PIN code is entered, SECURITY menu items on display include:

- **CONFIGURATION**
- **MANAGE PINS**

Press NEXT button to move to desired menu item.

Press SELECT button to activate chosen menu item.

Press BACK button to return to previous menu.

Press MENU button to return to runtime screen at any time.

OUT4001,0000A81-19-19JUN13-1/1

Standard Display Monitor (SDM)—Main Menu —Setup—Security—Configuration

The **CONFIGURATION** menu provides the machine owner to disable the security system or choose when the security system will be enabled.

At SECURITY menu, enter owner PIN code. Press NEXT button to highlight CONFIGURATION.

Press SELECT button to display CONFIGURATION menu.

CONFIGURATION menu items on display include:

- **DISABLED**—security system is unlocked at all times. PIN code is not required to start the engine.
- **LOCK AT SHUTDOWN**—security system is locked anytime the machine is powered down. Owner or operator PIN code must be entered to start the engine.
- **LOCK AT 5 MINUTES**—security system is locked 5 minutes after the machine is powered down. If 5 minutes have elapsed after shutdown, the owner or operator PIN code must be re-entered to start the engine.
- **LOCK AT 60 MINUTES**—security system is locked 60 minutes after the machine is powered down. If 60 minutes have elapsed after shutdown, the owner or operator PIN code must be re-entered to start the engine.

Press NEXT button to move to desired menu item.

Press SELECT button to activate chosen menu item.

Press BACK button to return to previous menu.

Press MENU button to return to runtime screen at any time.

OUT4001,0000B2A-19-26JAN12-1/1

Standard Display Monitor (SDM)—Main Menu —Setup—Security—Manage PINs

The **MANAGE PINS** menu allows the machine owner to clear or enter a new OWNER PIN code. It also allows the machine owner to clear or enter up to five OPERATOR PIN codes and one TRANSPORT PIN code. PIN codes can be configured as 3—8 digits in length. Once the OWNER, OPERATOR, or TRANSPORT PIN codes are set up, they can be entered at power up, prior to engine start, for unlocking the security system.

At SECURITY menu, enter owner PIN code. Press NEXT button to highlight MANAGE PINS.

Press SELECT button to display MANAGE PINS menu.

MANAGE PINS menu items on display include:

- **OWNER PIN**
  - **CLEAR PIN**—if highlighted and selected, the previous OWNER PIN code is deleted. This must be done first if a new OWNER PIN code is desired.
  - **ENTER PIN**—this menu allows the OWNER to set up a new OWNER PIN code.

NOTE: Once an OPERATOR PIN code or TRANSPORT PIN code is set and saved, it will be displayed on this screen next to each corresponding OPERATOR or TRANSPORT item.

- **OPERATOR 1**
  - **CLEAR PIN**—if highlighted and selected, the previous OPERATOR 1 PIN code is deleted. This must be done first if a new OPERATOR 1 PIN code is desired.
  - **ENTER PIN**—this menu allows the OWNER to set up a new OPERATOR 1 PIN code.
- **OPERATOR 2**
  - **CLEAR PIN**—if highlighted and selected, the previous OPERATOR 2 PIN code is deleted. This must be done first if a new OPERATOR 2 PIN code is desired.
  - **ENTER PIN**—this menu allows the OWNER to set up a new OPERATOR 2 PIN code.
- **OPERATOR 3**
  - **CLEAR PIN**—if highlighted and selected, the previous OPERATOR 3 PIN code is deleted. This must be done first if a new OPERATOR 3 PIN code is desired.
  - **ENTER PIN**—this menu allows the OWNER to set up a new OPERATOR 3 PIN code.
- **OPERATOR 4**
  - **CLEAR PIN**—if highlighted and selected, the previous OPERATOR 4 PIN code is deleted. This must be done first if a new OPERATOR 4 PIN code is desired.
  - **ENTER PIN**—this menu allows the OWNER to set up a new OPERATOR 4 PIN code.
- **OPERATOR 5**
  - **CLEAR PIN**—if highlighted and selected, the previous OPERATOR 5 PIN code is deleted. This must be done first if a new OPERATOR 5 PIN code is desired.
  - **ENTER PIN**—this menu allows the OWNER to set up a new OPERATOR 5 PIN code.
- **TRANSPORT**
  - **CLEAR PIN**—if highlighted and selected, the previous TRANSPORT PIN code is deleted. This must be done first if a new TRANSPORT PIN code is desired.
  - **ENTER PIN**—this menu allows the OWNER to set up a new TRANSPORT PIN code.
  - **VALID PIN TIME**—this menu allows the OWNER to set an exact time for how long the TRANSPORT PIN code is valid. Time can be set from 1—9 hours. The default valid time is 1 hour.

Press NEXT button to move to desired menu item.

Press SELECT button to activate chosen menu item.

Press BACK button to return to previous menu.

Press MENU button to return to runtime screen at any time.

OUT4001,0000B2B-19-17AUG12-1/1

Standard Display Monitor (SDM)—Main Menu —Setup—Auto Shutdown

The **AUTO SHUTDOWN** menu allows the operator to disable this feature or choose a time increment for the auto shutdown to take place.

At SETUP menu, press NEXT button to highlight AUTO SHUTDOWN.

Press SELECT button to display AUTO SHUTDOWN menu.

AUTO SHUTDOWN menu items on display include:

- **✓ OFF**
- **2 MINUTES**
- **3 MINUTES**
- **4 MINUTES**
- **5 MINUTES**
- **10 MINUTES**
- **20 MINUTES**
- **30 MINUTES**
- **45 MINUTES**

Press NEXT button to move to desired menu item.

Press SELECT button to activate chosen menu item. A pop-up will appear for 2 seconds stating what was chosen and stored. A check mark (✓) will be placed in front of the stored item.

Press BACK button to return to previous menu.

Press MENU button to return to runtime screen at any time.

OUT4001,0000AE3-19-12JAN12-1/1

Standard Display Monitor (SDM)—Main Menu —Setup—Auto Idle

The **AUTO IDLE** menu allows the operator to enable or disable the auto idle feature.

At SETUP menu, press NEXT button to highlight AUTO IDLE.

Press SELECT button to display AUTO IDLE menu.

AUTO IDLE menu items on display include:

- **✓ ENABLED**
- **DISABLED**

Press NEXT button to move to desired menu item.

Press SELECT button to activate chosen menu item. A pop-up will appear for 2 seconds stating what was chosen and stored. A check mark (✓) will be placed in front of the stored item.

Press BACK button to return to previous menu.

Press MENU button to return to runtime screen at any time.

OUT4001,0000AE4-19-12JAN12-1/1

Standard Display Monitor (SDM)—Main Menu —Setup—Economy Mode

The **ECONOMY MODE** menu allows the operator to turn economy mode ON or OFF.

At SETUP menu, press NEXT button to highlight ECONOMY MODE.

Press SELECT button to display ECONOMY MODE menu.

ECONOMY MODE menu items on display include:

- **✓ OFF**
- **ON**

Press NEXT button to move to desired menu item.

Press SELECT button to activate chosen menu item. A pop-up will appear for 2 seconds stating what was chosen and stored. A check mark (✓) will be placed in front of the stored item.

Press BACK button to return to previous menu.

Press MENU button to return to runtime screen at any time.

OUT4001,0000C9C-19-21MAR12-1/1

Standard Display Monitor (SDM)—Main Menu —Setup—Loader Aux Speed (If Equipped)

The **LOADER AUX SPEED** menu allows the operator to set the loader auxiliary continuous flow speed to slow, medium, or fast.

At SETUP menu, press NEXT button to highlight LOADER AUX SPEED.

Press SELECT button to display LOADER AUX SPEED menu.

LOADER AUX SPEED menu items on display include:

NOTE: For 310SK machine, no matter what setting is chosen, the continuous flow speed will always be FAST.

- **✓ SLOW**
- **MEDIUM**
- **FAST**

Press NEXT button to move to desired menu item.

Press SELECT button to activate chosen menu item. A pop-up will appear for 2 seconds stating what was chosen and stored. A check mark (✓) will be placed in front of the stored item.

Press BACK button to return to previous menu.

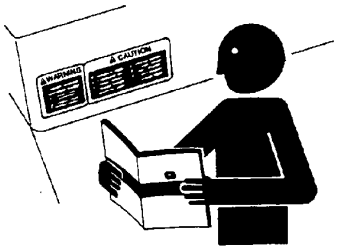
Press MENU button to return to runtime screen at any time.

OUT4001,0000B55-19-28SEP12-1/1

Before Starting Work

Review the operating precautions. See Safety—Operating Precautions. (Section 1-3.)

Use seat belt when operating machine. Remember to fasten seat belt even during brief periods of use.



T133556—UN—24AUG00

Reading Operator's Manual

OUT4001,00005EB-19-29JUL13-1/1

Inspect Machine Daily Before Starting

Safety and Protective Devices Checks

Walk around machine to clear all persons from machine area before starting machine.

Clear all steps and walking surfaces.

Check gauge (if equipped) on fire extinguisher. If fire extinguisher is not fully charged, recharge or replace it according to the manufacturer's instructions.

Check condition of guards, shields, roll-over protective structure (ROPS), covers, and seat belt.

Check for correct park brake operation.

Overall Machine Checks

Check fuel level and fill with proper fuel, if necessary.

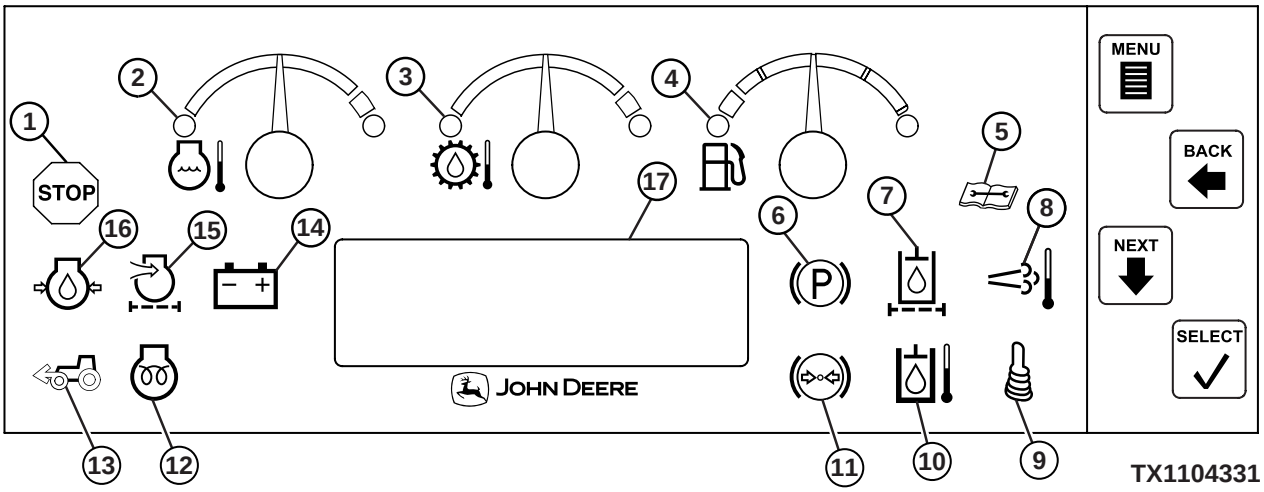
Check for worn or frayed electrical wires and loose or corroded connections.

Check for bent, broken, loose, or missing parts.

Check for oil leaks, missing or loose clamps, kinked hoses, and lines or hoses that rub against each other or other parts.

OUT4001,00009C4-19-07FEB12-1/1

Check Instruments Before Starting



TX1104331—UN—11JAN12

Standard Display Monitor

Press and release engine start switch (18) on sealed switch module (SSM) (left LED is illuminated) to energize ignition and apply power to control units and display unit. (Do not start engine.)

The following must occur:

- The audible alarm must sound.
- All LCD segments in the display window (17) must light, followed by the machine model number and the last screen displayed at shutdown.
- All gauges (2—4) must be backlit, and all gauge needles must cycle from minimum (left) to maximum (right) in approximately 1 second.
- All indicators must light for 5 seconds including those in the SSM. With the engine cold, the engine oil pressure indicator (16) and STOP indicator (1) will remain lit, after other indicators go out. Park brake indicator (6) will also stay ON, as will switch indicators for previously activated functions.

For descriptions of indicators, see Standard Display Monitor (SDM). (Section 2-2.)

If any indicator does not light, see your authorized dealer.

TX1107785A—UN—07FEB12

Sealed Switch Module (SSM)

1—STOP Indicator
2—Engine Coolant Temperature Gauge
3—Transmission Oil Temperature Gauge
4—Fuel Level Gauge
5—Diagnostic Code Indicator
6—Park Brake Indicator
7—Hydraulic Oil Filter Restriction Indicator
8—Exhaust Filter Cleaning Indicator
9—Joystick Enable Indicator
10—Not Used
11—Not Used
12—Wait-To-Start Indicator
13—MFWD Indicator
14—Engine Alternator Voltage Indicator
15—Engine Air Filter Restriction Indicator
16—Engine Oil Pressure Indicator
17—Display Window
18—Engine Start Switch

OUT4001,0000BC2-19-19JUN13-1/1

Automatic Recall of Stored Functions and Settings

CAUTION: To prevent unexpected machine movement, always deactivate ride control, before starting the engine.

If the following functions are activated when the engine is stopped, they are automatically reactivated when the engine is started again:

- Control Pattern Selection (backhoe)
- Ride Control (if equipped)

OUT4001,0000C9E-19-05JUL12-1/1

Engine Break-In Period

IMPORTANT: To avoid engine damage it is critical to observe the engine break-in period. Extra care during the first 500 hours of operation will result in more satisfactory long-term engine performance and life. DO NOT exceed 500 hours of operation with John Deere Break-In Plus™ engine oil.

This machine is factory filled with John Deere Break-In Plus engine oil.

1. Operate the machine at heavy or normal loads with minimal idling during the break-in period. During the first 20 hours, avoid prolonged periods of engine idling or sustained maximum load operation. If engine will idle longer than 5 minutes, stop engine.

IMPORTANT: DO NOT add make-up oil until the oil level is BELOW the ADD mark on the dipstick. John Deere Break-In Plus oil should be used to make up any oil consumed during the break-in period. See John Deere Break-In Plus Engine Oil. (Section 3-1.)

If John Deere Break-In Plus Engine Oil is not available, use a 10W-30 diesel engine oil meeting one of the following during the initial 250 hours of operation:

- **API Service Category CJ-4**
- **ACEA Oil Sequence E9**
- **ACEA Oil Sequence E6**

2. Check engine oil level more frequently during the engine break-in period.
3. Change oil and oil filter after first 500 hours of operation (maximum). Fill crankcase with the normal seasonal viscosity grade oil. See Maintenance—Machine. (Section 3-1.)
4. Watch coolant temperature gauge closely. If coolant temperature rises above specified limits on the gauge, reduce load on engine. Unless temperature drops quickly, stop the engine and determine the cause before resuming operation. See Troubleshooting. (Section 4-3.)
5. Watch oil pressure gauge for pressure within specification.
6. Check belt for proper alignment and seating in pulley grooves.

Break-In Plus is a trademark of Deere & Company

OUT4001,0000B83-19-28FEB12-1/1

Starting the Engine

CAUTION: Avoid possible injury or death from a runaway machine. DO NOT start engine by shorting across starter terminals. Machine will start in gear if normal circuitry is bypassed. NEVER start engine while standing on ground. Start engine only from operator's seat, with transmission control lever (TCL) in neutral (N) and park brake engaged.

NOTE: The engine will start with the TCL in gear, but the transmission will automatically be shifted to neutral and the display will show N as the actual gear. You will not be able to put the machine into gear without first cycling TCL through the neutral range.

1. Sit in seat and fasten seat belt.
2. Sound horn.

NOTE: Controls and switches must be in the positions described before starting engine.

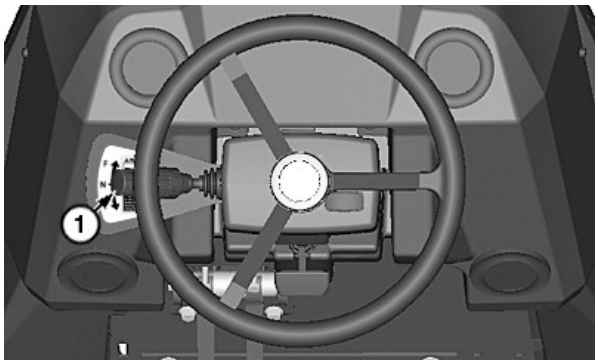
3. Move transmission control lever (TCL) (1) to N.
4. Press and release engine start switch (2) (left LED is illuminated) to energize ignition and apply power to control units and display unit.
5. If security system has been enabled by owner, operator logon screen appears on display unit. Operator must enter valid personal identification number (PIN) code in order to start machine. See Security System. (Section 2-1.)
6. Do not try starting machine until the wait-to-start indicator on display unit turns off.

IMPORTANT: Do not operate starter motor for more than 30 seconds at a time, or it may be damaged. If engine does not start, wait at least 2 minutes before trying again.

To avoid damage to the turbocharger and other engine components, let the engine run at low idle for 30 seconds before operating machine.

After display unit has initialized, press and hold engine start switch to start engine. Both LEDs are illuminated when engine is cranking. Only left LED is illuminated when engine is running.

7. After engine start, display will show FASTEN SEAT BELT warning for 5 seconds.



Transmission Control Lever (TCL)

Sealed Switch Module (SSM)

1—Transmission Control Lever (TCL) 2—Engine Start Switch

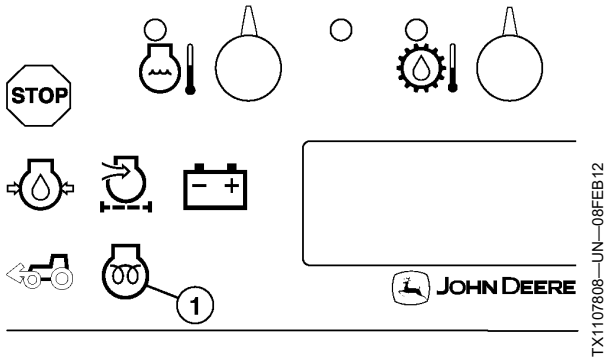
OUT4001,00009C7-19-17NOV11-1/1

Cold Start Aid—Glow Plugs

IMPORTANT: Do NOT use ether with this system. Damage to engine can occur.

This machine is equipped with glow plugs. In cold temperatures, the wait-to-start indicator (1) on the standard display monitor (SDM) will light when glow plugs have been activated. Engine cannot be started until the wait-to-start indicator goes out.

1—Wait-To-Start Indicator



Standard Display Monitor (SDM)

OUT4001,00009C8-19-13FEB12-1/1

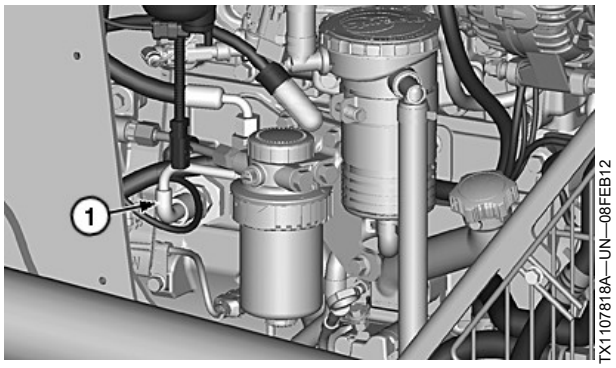
Cold Start Aid—Engine Block Heater (If Equipped)

CAUTION: Prevent possible injury from electrical shock. Use grounded cord and inspect for damage before connecting to power source.

IMPORTANT: Prevent property damage as a result of possible fire from an overheated electrical cord. Use a heavy-duty, grounded cord to connect heater to electrical power.

Supply voltage for engine block heater can be 110 V or 220 V. Ensure correct engine block heater is used for the correct supply voltage.

Connect engine block heater (1) to electrical power 10 hours before starting engine.



Right Side of Engine Shown

1—Engine Block Heater

OUT4001,00009C9-19-17NOV11-1/1

Engine Warm-Up

IMPORTANT: To ensure proper lubrication, idle engine at 1/3 speed for 5 minutes. Extend period as necessary when operating at temperatures below freezing.

To avoid carbon build-up in engine and to use fuel in most efficient manner, do not allow machine to idle at low rpm.

- Before moving machine, run at 1/3 speed for at least 5 minutes.
- Operate machine under light loads for first 5 minutes until engine is warm.
- Check instruments regularly.

OUT4001,00009CA-19-22DEC14-1/1

Cold Weather Engine Warm-Up

CAUTION: Prevent injury from moving backhoe. Backhoe may overshoot in extreme cold conditions. Allow backhoe to warm up.

IMPORTANT: If hydraulic oil is cold, hydraulic functions move slowly. Do not attempt machine operations until hydraulic functions move at close-to-normal cycle times.

In extremely cold conditions, an extended warming up period will be necessary.

Avoid sudden operation of hydraulic functions until engine is thoroughly warmed up. Remove ice, snow, and mud from machine before operation.

1. Run engine at 1/2 speed for 15 minutes.

IMPORTANT: To prevent damage to bucket leveling tube due to cold oil, cycle bucket three times at hood height before using under normal operation.

2. Raise loader lift arms to hood height. Cycle bucket from stop to stop three times.
3. Cycle all remaining hydraulic functions to distribute warmed oil until all functions operate freely.

OUT4001,00009CB-19-07FEB12-1/1

Driving the Machine

CAUTION: Prevent possible injury from unexpected machine movement. Machine will turn in direction of brake pedal if only one brake pedal is applied. Connect brake pedals together before traveling at high speed.

1. Engage brake pedal locking bar (1) to lock left and right brake pedals (2 and 3) together. Keep brake pedal locking bar engaged unless brakes are to be used to aid in turning.

CAUTION: Use a seat belt to minimize chance of injury from an accident such as an overturn.

2. Fasten seat belt.
3. Apply service brakes.

NOTE: Park brake indicator will light, alarm will sound, and STOP indicator will light if transmission control lever (TCL) is moved out of neutral (N) while park brake is engaged. Disengage the park brake before moving the TCL out of neutral.

If park brake is disengaged when engine is stopped, it automatically engages.

4. Press park brake switch (5) to disengage the park brake.

CAUTION: Prevent possible injury from unexpected machine movement. Never rely on TCL to keep machine from moving. Always engage park brake to hold machine.

5. Use transmission control lever (TCL) (6) to change direction of travel.
   - Reduce speed when changing direction of travel.
   - Move TCL to F to travel forward and to R to travel in reverse.
   - Move TCL to N when machine is not moving. TCL will drop to a detented position when in neutral.
6. Use TCL to change travel speed. Machine is capable of 1—5 forward gears and 1—3 reverse gears. Fifth gear forward is not selected by operator.

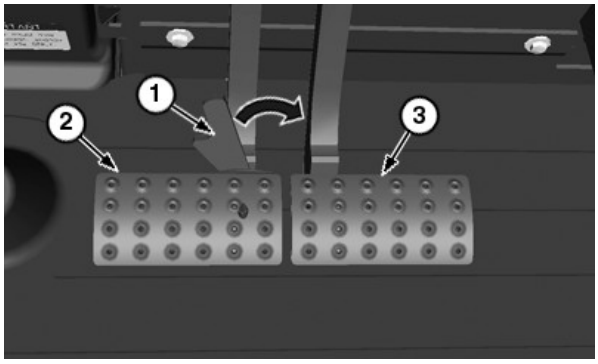
Manual Mode

Rotate handle on TCL to select gear position 1, 2, 3, or D. Machine operates in gear indicated by TCL gear range pointer.

- When TCL is in forward D position, transmission automatically shifts between fourth and fifth gear as speed and load dictate.
- If maximum gear limit is enabled in monitor and gear selected on TCL is higher than maximum gear limit value set, machine will operate at maximum gear limit value set in monitor.

Autoshift Mode—If Equipped

- Press automatic transmission switch (4) (two LED's illuminated) to enable autoshift mode. Rotate handle on TCL to select maximum gear position 2, 3, or D. Transmission automatically shifts between second

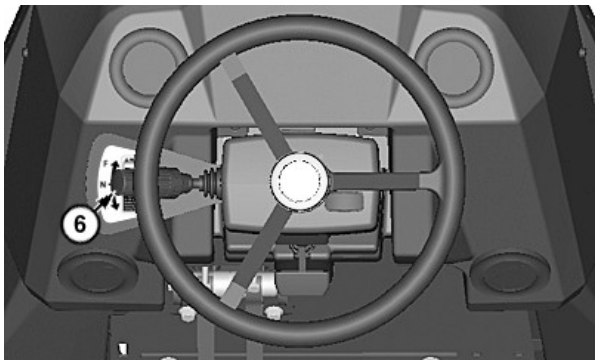


TX1106562—UN—08FEB12

Brake Pedals

TX1107887A—UN—21FEB12

Sealed Switch Module (SSM)



TX1107888A—UN—08FEB12

Transmission Control Lever (TCL)

1—Brake Pedal Locking Bar
2—Left Brake Pedal
3—Right Brake Pedal
4—Automatic Transmission Switch
5—Park Brake Switch
6—Transmission Control Lever (TCL)

Continued on next page

OUT4001,00009CE-19-23OCT13-1/3

gear and highest gear selected on TCL as speed and load dictate.

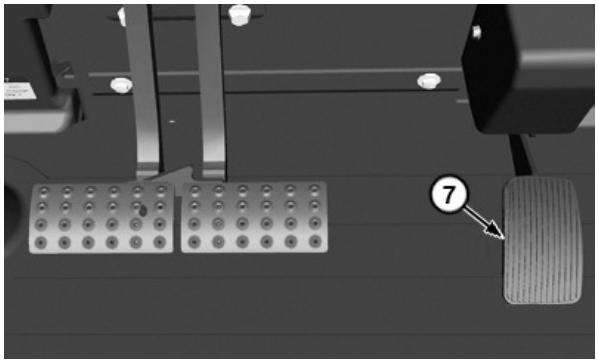
- When TCL is in forward D position or gear limit value is set to 4, maximum gear value is 5.
- If gear limit function is enabled, transmission will only shift to highest gear limit value set in monitor.
- Transmission will never downshift to first gear.

OUT4001,00009CE-19-23OCT13-2/3

7. Vary travel speed when driving using engine speed control pedal (7).

If driving on the road or traversing rough ground on a job site where it is difficult to maintain a steady speed with the engine speed control pedal, use the engine speed control knob on the right console to set engine speed to desired level. Engine speed will remain at that setting until brake pedals are depressed, at which time engine speed will automatically return to idle. In order to return to set engine speed, the engine speed control knob must be returned to idle position and then reset to desired speed.

If set speed is lower than high idle, the engine speed control pedal can be used to accelerate from the selected speed setting up to high idle. If operator then removes foot from accelerator pedal, speed will return to the prior selected setting.



TX1107894A—UN—15FEB12

Engine Speed Control Pedal

7—Engine Speed Control Pedal

OUT4001,00009CE-19-23OCT13-3/3

Ride Control Operation—If Equipped

CAUTION: Prevent possible injury from unexpected boom or bucket movement when equipped with ride control. Ride control accumulator energy must be discharged when working on hydraulic components. Press and release engine start switch (left LED is illuminated). Press ride control switch ON and move loader control lever to float position.

Do not have ride control engaged when operating the loader; the ride control system may cause unexpected movement.

The ride control system has an accumulator and valve in the loader circuit.

Operating Ride Control

Press ride control switch (1) on sealed switch module (SSM) (LED illuminated) to improve machine ride and reduce tire flexing when traveling over rough terrain at a high speed with loaded bucket, or when transporting with an empty bucket.

NOTE: With ride control engaged, the front end of the machine will not remain raised if lifted off the ground with the front loader. The front end of the machine will drift back to the ground. To hold front end up while using the backhoe, disengage ride control.

Discharging the Ride Control Circuit for Service

Discharge hydraulic pressure from the ride control system before performing maintenance. See Discharge Ride Control System Hydraulic Pressure—If Equipped. (Section 4-1.)

TX1107813A—UN—13FEB12

Sealed Switch Module (SSM)

1—Ride Control Switch

OUT4001,00009CC-19-17NOV11-1/1

Pilot Control Operation—If Equipped

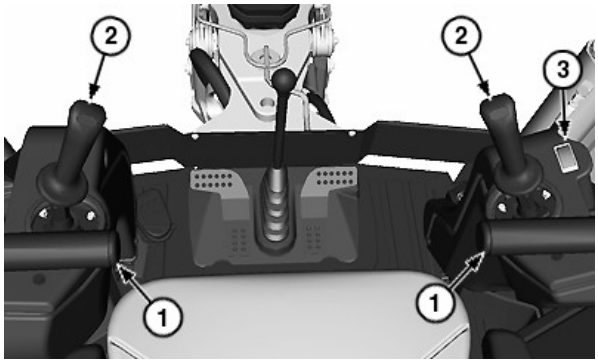
CAUTION: Prevent possible injury from unexpected machine movement. Always lock hydraulics when not operating backhoe.

NOTE: If seat is NOT in backhoe operation position and pilot enable switch is pressed to unlock position, an audible alarm will sound, joystick enable indicator on the monitor will flash, and a pop-up warning on the monitor will appear stating BACKHOE ACTIVE.

1. Rotate seat to backhoe operation position.
2. Use pilot control wrist rests (1) to pull pilot control levers (2) towards operator.
3. Momentarily press upper half of pilot enable switch (3) to unlock position to enable pilot controls. Three-position rocker switch will return to middle position and the joystick enable indicator on the monitor will illuminate.

   If the seat is turned out of backhoe operation position or the engine is shut off, the pilot controls are automatically disabled. To enable pilot controls, cycle switch to lock position and back to unlock position.
4. Press control pattern select switch on sealed switch module (SSM) to select desired backhoe control pattern.

   Functions must correspond to the black-on-yellow labels located on the cab post. When engine is started, the control pattern last selected will be automatically activated.



Pilot Controls

1—Pilot Control Wrist Rest (2 used)
2—Pilot Control Lever (2 used)
3—Pilot Enable Switch

For more pattern information, see Backhoe Operation—Pilot Controls—Backhoe Pattern and Backhoe Operation—Pilot Controls—Excavator Pattern in this section.

5. Press lower half of pilot enable switch to lock position to disable pilot controls.

Discharge hydraulic pressure from the pilot control system before performing maintenance. See Discharge Pilot Control System Hydraulic Pressure—If Equipped. (Section 4-1.)

OUT4001,00009CD-19-06SEP12-1/1

Exhaust Filter

The exhaust filter is a critical component in the engine's emissions control system, which is required to meet governmental emissions regulations. The exhaust filter captures soot and ash to prevent its release into the atmosphere. The soot and ash must be eliminated from the exhaust filter to keep it functioning properly. The process of eliminating collected soot is called exhaust filter cleaning. There are three types of exhaust filter cleaning available to the operator:

- **NATURAL/PASSIVE**
- **AUTO**
- **PARKED**

There are five soot levels to describe the amount of restriction in the exhaust filter. These levels determine the type of cleaning that is required:

- LOW
- MODERATE
- HIGH
- VERY HIGH
- SERVICE

For more information, see Standard Display Monitor (SDM) —Main Menu—Operation—Exhaust Filter. (Section 2-2.)

Auto cleaning is able to activate (if not disabled by the operator) when the exhaust filter restriction is anywhere between MODERATE and HIGH soot levels. Auto cleaning is no longer available if exhaust filter restriction reaches VERY HIGH or SERVICE soot levels.

Parked cleaning can only be initiated when the exhaust filter restriction reaches HIGH or VERY HIGH soot levels.

If exhaust filter restriction reaches SERVICE soot level, contact your authorized dealer.

In addition to the cleaning procedures, the exhaust filter also requires maintenance to remove accumulated ash, which is a noncombustible result of additives used in crankcase lubrication oils and the fuel. Ash removal CANNOT be performed by the operator. For more information on exhaust filter ash removal, see Service Exhaust Filter. (Section 3-3.)

NOTE: Shut off engine whenever possible. Unnecessary idling can cause exhaust filter soot to accumulate. For the best possible exhaust filter operation, which requires the least amount of operator interaction, idling should be kept to a minimum.

Natural/Passive Cleaning

During normal machine operation the exhaust heat will naturally clean the soot build up in the exhaust filter.

Auto Cleaning

CAUTION: Servicing machine during exhaust filter auto cleaning can result in serious personal injury. Avoid exposure and skin contact with hot gases and components.

During exhaust filter auto cleaning, the engine may run at elevated idle and hot temperatures for an extended period of time. Exhaust gases and exhaust filter components may reach temperatures hot enough to burn people and ignite or melt common materials.

Auto cleaning is set from the factory in the standard display monitor (SDM) menu to be enabled. Different settings can be chosen for the default state after a power cycle. These settings are:

NOTE: If auto cleaning is set to disabled, machine may revert back to enabled after a power cycle.

☐ DEFAULT PREVIOUS
☐ DEFAULT ENABLED
☐ DEFAULT DISABLED

See your authorized dealer if a different default setting is preferred.

With auto cleaning enabled, exhaust filter cleaning is automatically performed as needed, with no interaction from the operator. An exhaust filter cleaning indicator will illuminate on the SDM when the system is actively performing an exhaust filter auto cleaning. Machine can be operated as normal. When the exhaust filter auto cleaning process has completed its cycle, the cleaning indicator will automatically turn off.

If filter restriction reaches the HIGH soot level with auto cleaning enabled, further action is needed to clean the filter. Initiate a parked filter cleaning.

NOTE: Disabling exhaust filter auto cleaning is not preferred. Whenever possible, auto cleaning should be enabled to keep soot buildup to a minimum and to increase overall machine uptime.

If operating in conditions where it may be unsafe for elevated exhaust temperatures, auto cleaning can be disabled using the SDM menu. If filter restriction reaches the HIGH soot level with auto cleaning disabled, a pop-up will appear on the display monitor stating that auto cleaning needs to be enabled. For more information, see Standard Display Monitor (SDM)—Main Menu—Operation—Exhaust Filter—Auto Cleaning. (Section 2-2.)

Parked Cleaning

CAUTION: Servicing machine during exhaust filter parked cleaning can result in serious personal injury. Avoid exposure and skin contact with hot gases and components.

During exhaust filter parked cleaning, the engine may run at elevated idle and hot temperatures for an extended period of time. Exhaust gases and exhaust filter components may reach temperatures hot enough to burn people and ignite or melt common materials.

Continued on next page

Avoid death or serious injury from machine movement. Do not leave running machine unattended during exhaust filter cleaning.

IMPORTANT: Avoid machine damage. Always park machine in a safe location and check for adequate fuel level before beginning exhaust filter parked cleaning.

Parked cleaning is prompted by the SDM and initiated by the operator. This process allows the system to clean the exhaust filter. It is most commonly initiated after extended operation with exhaust filter auto cleaning disabled or frequent engine shut downs have occurred while the auto cleaning process was active.

During the cleaning process, the engine speed will be controlled automatically and the machine must remain parked to complete the procedure. Complete cleaning time takes less than 45 minutes, but will vary on several criteria including fuel type, oil type, duty cycle, and the number of previously aborted exhaust filter cleaning requests.

Parked cleaning needs to be activated through the SDM menu. The first parked cleaning menu offers a choice to either automatically shut down the machine after parked cleaning is complete or to not shutdown. For more information, see Standard Display Monitor (SDM)—Main Menu—Operation—Exhaust Filter—Parked Cleaning. (Section 2-2.) Parked cleaning can only be initiated if the filter restriction is at HIGH or VERY HIGH soot levels. Machine needs to be in a predetermined safe state. This safe state includes two conditions:

- Park brake applied
- Engine running at idle

Parked cleaning occurs in two stages. The first stage is to prepare the exhaust filter by automatically raising exhaust filter temperature to 300°C (572°F). Preparation status is displayed on the monitor. Once the exhaust filter temperature reaches 275—300°C (527—572°F), the cleaning process may begin. The second stage is when the cleaning process begins and may result in exhaust filter temperatures exceeding 550°C (1022°F). Progress status is displayed on the monitor. The cleaning process will continue until one of the following conditions exist:

- Until there is no soot restriction in the exhaust filter
- 45 minutes has elapsed causing a time-out
- Operator cancels the parked cleaning procedure by releasing park brake or increasing engine speed
- Parked cleaning is aborted due to a fault
- Engine runs out of fuel
- Engine is shut off by operator (not recommended)

The exhaust filter cleaning indicator will be illuminated on the SDM during a parked cleaning. When parked cleaning procedure is complete, engine will automatically return to low idle and exhaust filter cleaning indicator will turn off. Machine is ready to return to operation.

IMPORTANT: Avoid engine damage. If machine will NOT be returning to operation immediately after a parked cleaning procedure, allow the engine and exhaust filter time to return to normal operating temperatures BEFORE stopping engine.

Operator can choose to have the machine automatically shutdown when parked cleaning procedure is complete by selecting the auto shutdown feature from the SDM parked cleaning menu. If auto shutdown was not chosen and operator decides not to return to operation after a parked cleaning procedure, allow the engine and exhaust filter time to return to normal operating temperatures BEFORE stopping engine.

Avoid disabling the auto cleaning process unless absolutely necessary. Repeated disabling of the auto cleaning process or ignoring prompts to perform a parked cleaning procedure, will cause engine power limitations and can eventually lead to dealer required service cleaning.

Ash Removal

The exhaust filter cleaning procedures described previously cleaned the soot from the machine's exhaust filter. The exhaust filter also traps ash deposits over time which are not removed during an exhaust filter cleaning. When the exhaust filter has run several thousand hours, these ash deposits can restrict engine performance and must be removed. For more information on ash removal, see Service Exhaust Filter. (Section 3-3.)

OUT4001,0000B52-19-19JUN13-2/2

Service ADVISOR™ Remote (SAR) Software Delivery Process

Theory of Operation

Service ADVISOR™ is a diagnostic tool used by John Deere dealers to perform diagnostics as well as updates to machine settings and software. Dealers can access diagnostic trouble codes and diagnostic addresses, create readings and recordings, and program controllers. This technology consists of both software and hardware. Technicians attend a minimum of 8 hours of training to become certified in utilizing this tool.

Service ADVISOR Remote (SAR) is a function of Service ADVISOR. It allows the dealer technician to connect to a SAR-enabled machine via the JDLink™ network to remotely access diagnostic trouble code information and record diagnostic data, as well as program controllers.

Similar to software (payload) updates in the computer industry, SAR enables John Deere to remotely deliver updated software via the JDLink hardware on board. Remote programming gives John Deere the ability to update software to enhance the performance of the machine. This capability can be used to reprogram most machine controllers. The user actively participates with the dealer in this process by both downloading the software update and installing the software update.

Service ADVISOR is a trademark of Deere & Company
JDLink is a trademark of Deere & Company

NOTE: Some vehicle controllers may not be compatible for SAR reprogramming.

For more information about Service ADVISOR Remote, consult your local John Deere dealer.

Vehicle Reprogramming

NOTE: Factory setting is set to always accept software downloads. To change this setting, consult your John Deere dealer to either be prompted for software updates or deny all software updates.

Normal machine operation can continue during the software download process.

Customer will be notified by John Deere or a John Deere dealer of pending software updates with appropriate installation instructions via letter or phone.

Customer will determine the appropriate time and place to install the new software on the machine via the machine monitor. For more information, see Standard Display Monitor (SDM)—Main Menu—Operation—Software Delivery—Software Update. (Section 2-2.)

Once the customer initiates delivery and installation of the software, SAR will start and manage the installation of the new payload to the appropriate machine controllers.

NOTE: Software download speed capability depends on JDLink cellular coverage.

OUT4001,0000B50-19-19JUN13-1/1

Economy Mode Operation

This feature is provided to reduce fuel consumption and increase machine productivity.

When enabled via the monitor, this feature provides a limit to the maximum engine speed when in backhoe operation mode and a different limit when in loader operation mode.

- When in backhoe operation mode, maximum speed will be limited to 2000 rpm.
- When in loader operation mode:
  - speed will be limited to 2100 rpm when in 1st or 2nd gear.
  - economy mode is automatically disabled when in 3rd gear or higher allowing maximum engine speed (2400 rpm) for transport operations.

To enable, see Standard Display Monitor (SDM)—Main Menu—Setup—Economy Mode. (Section 2-2.)

OUT4001,0000B47-19-19JUN13-1/1

Auto-Shutdown Operation

Automatic shutdown feature turns off ignition power and shuts down the engine after the engine has been operating at a reduced idle speed for a preset period of time.

Automatic shutdown can be enabled or disabled and set to activate after 2, 3, 4, 5, 10, 20, 30, or 45 minute increments. See Standard Display Monitor (SDM)—Main Menu—Setup—Auto Shutdown. (Section 2-2.)

With automatic shutdown enabled, the automatic shutdown timer is started when engine rpm is at idle for the selected time. When timer reaches 30 seconds remaining, an audible alarm beeps once and a pop-up display shows a countdown timer indicating that the machine is about to power down. Momentarily increase idle or press engine start button to deactivate automatic shutdown feature and return machine to standard operating idle.

Prerequisites that must be met for features to operate are:

- Transmission is in neutral
- Engine speed is at idle
- Exhaust filter cleaning not in process

If any of these parameters vary from preset values, or CAN communication is lost with the ECU or transmission control unit (TCU), the machine will return to standard operating idle.

OUT4001,0000B48-19-19JUN13-1/1

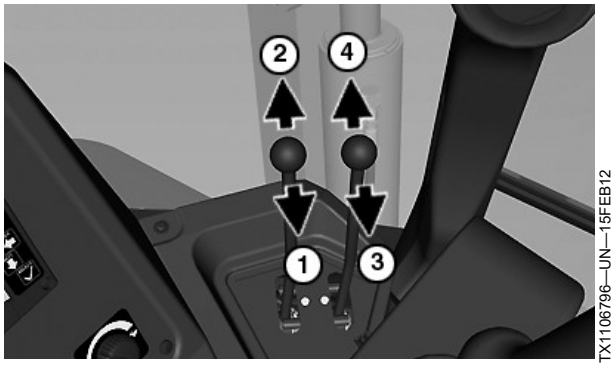
Stabilizer Operation

CAUTION: Prevent possible injury from unexpected machine movement. Stabilizers must be set on a firm surface. Do not dig under stabilizers. Be alert to possible machine movement when raising stabilizers and loader bucket.

Before operating the backhoe, use stabilizers to lift and level the machine. Use the stabilizer levers to move stabilizers from raised position (1 and 3) to lowered position (2 and 4).

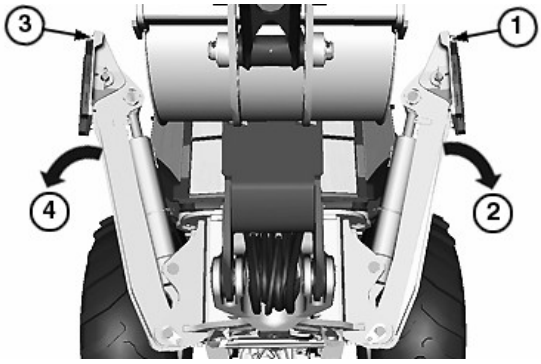
Stabilizer feet are reversible for use on paved and unpaved surfaces. See Reversing Stabilizer Feet. (Section 4-1.)

1—Left Stabilizer Up
2—Left Stabilizer Down
3—Right Stabilizer Up
4—Right Stabilizer Down



TX1106796—UN—15FEB12

Stabilizer Levers



TX1106797—UN—15FEB12

Stabilizer Operation

OUT4001,00009D0-19-17NOV11-1/1

Boom Lock Operation

IMPORTANT: To prevent possible machine damage, unlock boom before operating backhoe.

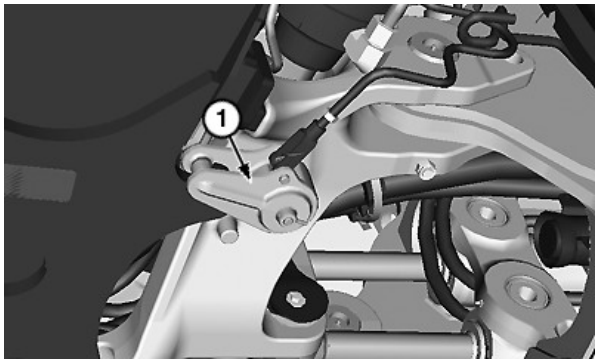
Disengaging Boom Lock

1. Raise boom against stops to release tension on boom lock (1).
2. Pull boom lock lever (2) toward operator to disengage boom lock from boom hooks (unlocked position).
3. Lower boom so boom hooks are clear of boom lock. Release boom lock lever.

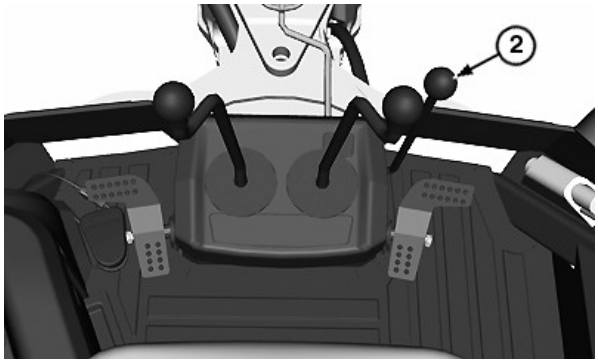
Engaging Boom Lock

1. Pull boom lock lever toward operator to raise boom lock.
2. Raise boom against stops.
3. Release boom lock lever to engage boom lock with boom hooks (locked position).
4. After machine shutdown, move boom lock lever to release hydraulic pressure and put tension on boom lock.

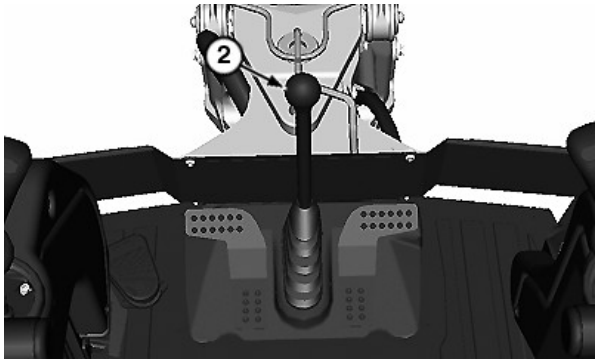
1—Boom Lock **2—Boom Lock Lever**



Boom Lock Mechanism



Manual Control Machine



Pilot Control Machine

OUT4001,00009D1-19-17NOV11-1/1

Swing Lock Operation

IMPORTANT: To prevent possible machine damage, remove swing lock pin before operating backhoe.

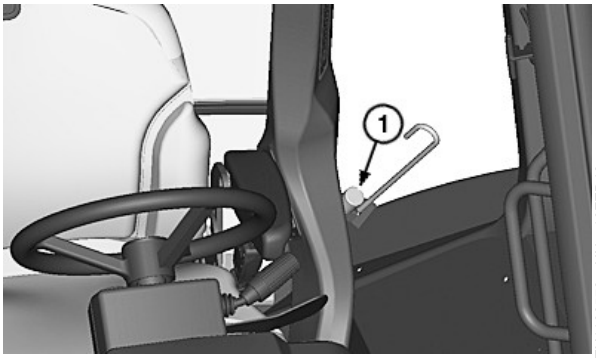
Disengaging the Swing Lock

Remove swing lock pin (1) from swing lock mounting hole (2) and install pin in storage position in operator's station.

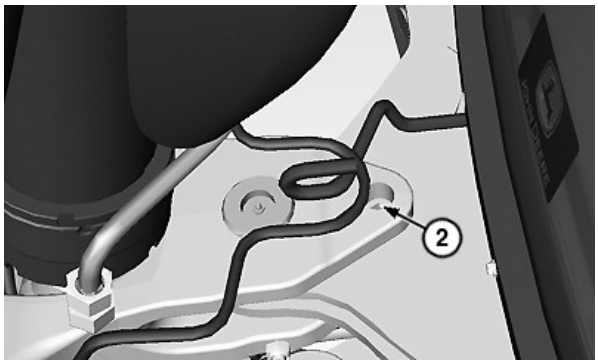
Engaging the Swing Lock

Remove swing lock pin from storage position in operator's station and install pin in swing lock mounting hole.

1—Swing Lock Pin **2—Swing Lock Mounting Hole**



Storage Position



Swing Lock Mounting Hole

OUT4001,00009D2-19-17NOV11-1/1

Backhoe Operation—Two-Lever Controls—Backhoe Pattern

CAUTION: Several control patterns are available for this backhoe. Always verify control response before operating.

Prevent possible personal injury from unexpected machine movement. DO NOT operate backhoe from outside the operator station. Only operate when in the operator's seat in backhoe operation position with stabilizers down.

IMPORTANT: To avoid machine damage, do not swing boom into stabilizers.

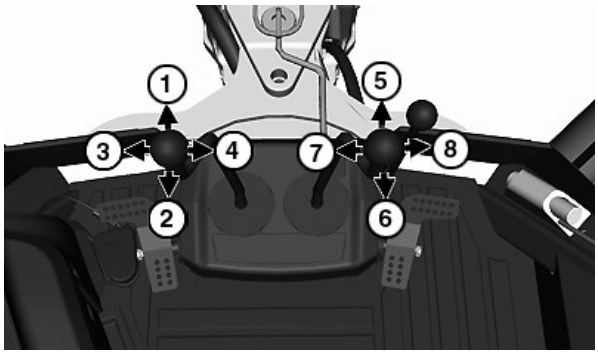
NOTE: When seat is turned to backhoe operation position, seat position sensor will sound an audible alarm and STOP indicator will light if transmission control lever (TCL) is moved to F or R.

A conversion kit for changing controls is available from your authorized dealer. Labels corresponding to other controls MUST be installed.

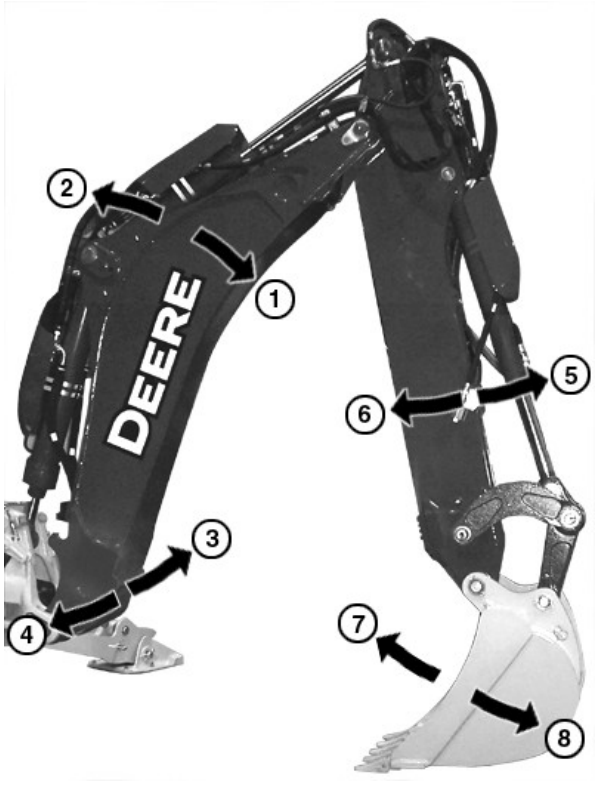
Operate backhoe with control levers. Move levers as shown to maneuver backhoe components in desired directions.

For faster cycle times, fully extend levers when moving and operate more than one component at a time.

1—Boom Lower
2—Boom Raise
3—Boom Swing Left
4—Boom Swing Right
5—Dipperstick Raise
6—Dipperstick Lower
7—Bucket Load
8—Bucket Dump



Two-Lever Controls—Backhoe Pattern



Backhoe Movement

OUT4001,00009D4-19-17NOV11-1/1

Backhoe Operation—Two-Lever Controls—Excavator Pattern

CAUTION: Several control patterns are available for this backhoe. Always verify control response before operating.

Prevent possible personal injury from unexpected machine movement. DO NOT operate backhoe from outside the operator station. Only operate when in the operator's seat in backhoe operation position with stabilizers down.

IMPORTANT: To avoid machine damage, do not swing boom into stabilizers.

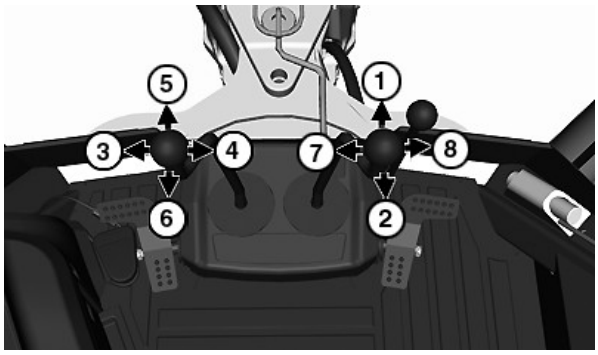
NOTE: When seat is turned to backhoe operation position, seat position sensor will sound an audible alarm and STOP indicator will light if transmission control lever (TCL) is moved to F or R.

A conversion kit for changing backhoe pattern to excavator pattern is available from your authorized dealer. Excavator pattern labels corresponding to the controls MUST be installed.

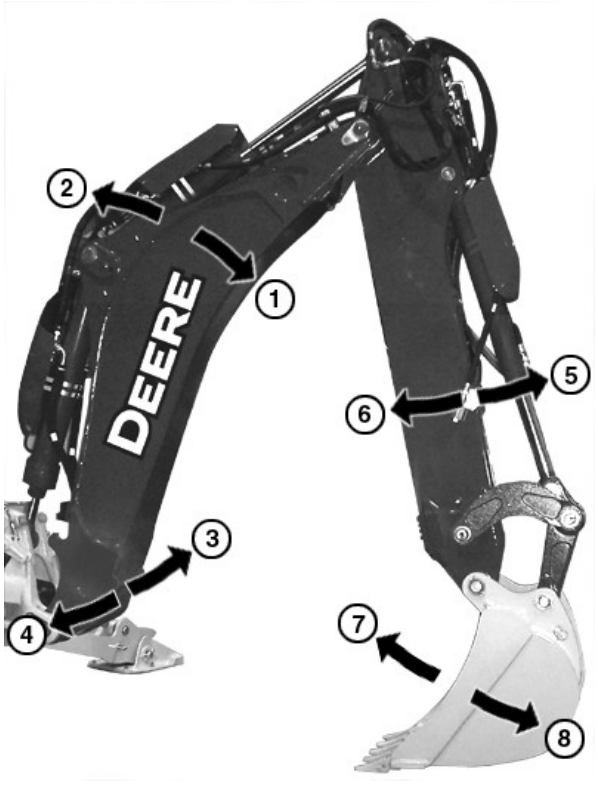
Operate backhoe with control levers. Move levers as shown to maneuver backhoe components in desired directions.

For faster cycle times, fully extend levers when moving and operate more than one component at a time.

1—Boom Lower
2—Boom Raise
3—Boom Swing Left
4—Boom Swing Right
5—Dipperstick Raise
6—Dipperstick Lower
7—Bucket Load
8—Bucket Dump



Two-Lever Controls—Excavator Pattern



Backhoe Movement

OUT4001,00009D5-19-17NOV11-1/1

Backhoe Operation—Pilot Controls—Backhoe Pattern

CAUTION: Different control patterns are available for this backhoe. Always verify control response before operating.

Prevent possible personal injury from unexpected machine movement. DO NOT operate backhoe from outside the operator station. Only operate when in the operator's seat in backhoe operation position with stabilizers down.

IMPORTANT: To avoid machine damage, do not swing boom into stabilizers.

NOTE: When seat is in backhoe operation position, seat position sensor will sound an audible alarm and STOP indicator will illuminate if transmission control lever (TCL) is moved to F or R.

Move seat to backhoe operation position.

NOTE: If seat moves out of backhoe operation position or the engine is shut off, the pilot controls are automatically disabled. To enable pilot controls, cycle pilot enable switch to lock position and back to unlock position.

Momentarily press upper half of pilot enable switch to unlock position to enable pilot controls. Three-position rocker switch will return to middle position and the joystick enable indicator on the monitor will illuminate.

NOTE: LED indicator on SSM switch shows which control pattern (backhoe or excavator) is currently activated.

Press control pattern select switch on sealed switch module (SSM) to select backhoe control pattern (left LED illuminated). With this control pattern, functions must correspond to the black-on-yellow labels located on the cab post. When engine is started, the control pattern last selected will be automatically activated when pilot controls are enabled.

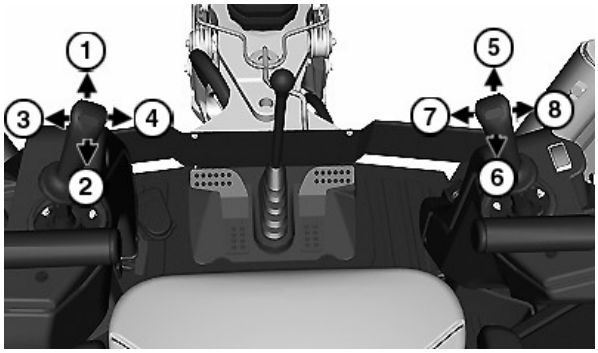
Operate backhoe with pilot controls. Move pilot controls as shown to maneuver backhoe components in desired directions.

When pilot controls are released, they will return to neutral. The machine will remain positioned.

1—Boom Lower
2—Boom Raise
3—Boom Swing Left
4—Boom Swing Right
5—Dipperstick Raise
6—Dipperstick Lower
7—Bucket Load
8—Bucket Dump

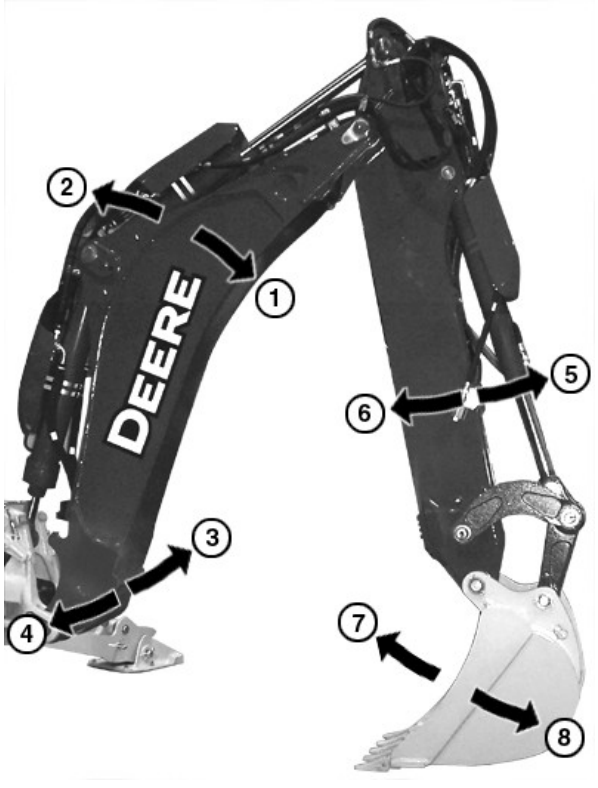
TX1054914—UN—23JAN09

Backhoe Pattern



TX1107961—UN—15FEB12

Pilot Controls—Backhoe Pattern



TX1106586—UN—28FEB12

Backhoe Movement

OUT4001,00009D6-19-07SEP12-1/1

Backhoe Operation—Pilot Controls—Excavator Pattern

CAUTION: Different control patterns are available for this backhoe. Always verify control response before operating.

Prevent possible personal injury from unexpected machine movement. DO NOT operate backhoe from outside the operator station. Only operate when in the operator's seat in backhoe operation position with stabilizers down.

IMPORTANT: To avoid machine damage, do not swing boom into stabilizers.

NOTE: When seat is in backhoe operation position, seat position sensor will sound an audible alarm and STOP indicator will illuminate if transmission control lever (TCL) is moved to F or R.

Move seat to backhoe operation position.

NOTE: If seat moves out of backhoe operation position or the engine is shut off, the pilot controls are automatically disabled. To enable pilot controls, cycle pilot enable switch to lock position and back to unlock position.

Momentarily press upper half of pilot enable switch to unlock position to enable pilot controls. Three-position rocker switch will return to middle position and the joystick enable indicator on the monitor will illuminate.

NOTE: LED indicator on SSM switch shows which control pattern (backhoe or excavator) is currently activated.

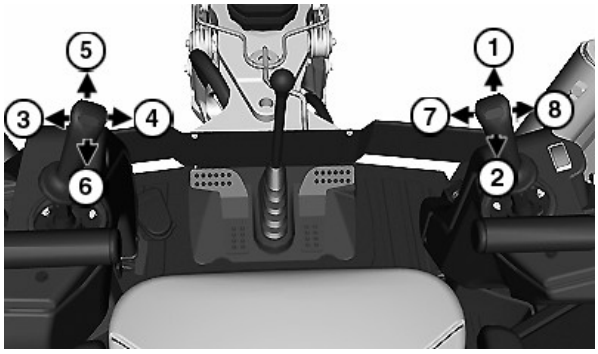
Press control pattern select switch on sealed switch module (SSM) to select excavator control pattern (right LED illuminated). With this control pattern, functions must correspond to the black-on-yellow labels located on the cab post. When engine is started, the control pattern last selected will be automatically activated when pilot controls are enabled.

Operate backhoe with pilot controls. Move pilot controls as shown to maneuver backhoe components in desired directions.

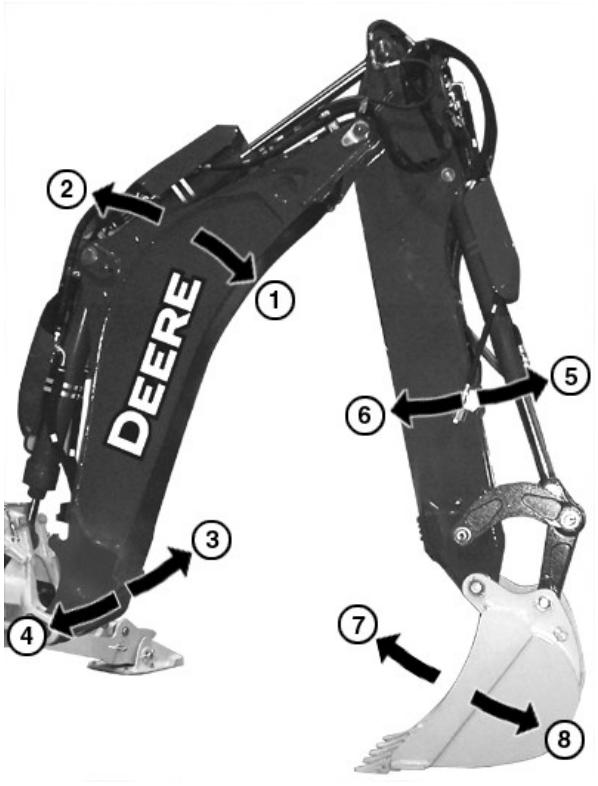
When pilot controls are released, they will return to neutral. The machine will remain positioned.

1—Boom Lower
2—Boom Raise
3—Boom Swing Left
4—Boom Swing Right
5—Dipperstick Raise
6—Dipperstick Lower
7—Bucket Load
8—Bucket Dump

Excavator Pattern



Pilot Controls—Excavator Pattern



Backhoe Movement

OUT4001,00009D7-19-07SEP12-1/1

Auto-Idle Operation—Backhoe Functions Only

To conserve fuel, auto-idle function reduces engine speed from the current engine speed control setting to 900 rpm whenever there is no hydraulic demand detected, then automatically returns engine speed to the engine speed control setting when a hydraulic function is activated.

The following conditions are required to activate auto-idle feature:

- Engine running at operating temperature.
- Engine speed control knob must first be set to desired high speed setting.
- Seat in backhoe position.
- Transmission control lever (TCL) in neutral (N).

NOTE: If auto-idle was being used and the seat is rotated out of the backhoe position, auto-idle will be temporarily disabled. It will automatically re-enable when the seat is rotated back to the backhoe position and the joystick controls are re-enabled using the pilot enable switch.

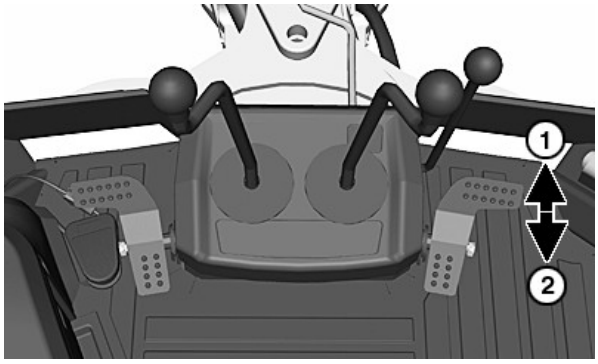
When the above conditions are met, auto-idle needs to be enabled through the monitor menu. See Standard Display Monitor (SDM)—Main Menu—Setup—Auto Idle. (Section 2-2.) Auto-idle will automatically deactivate if the above conditions change.

OUT4001,0000B46-19-19JUN13-1/1

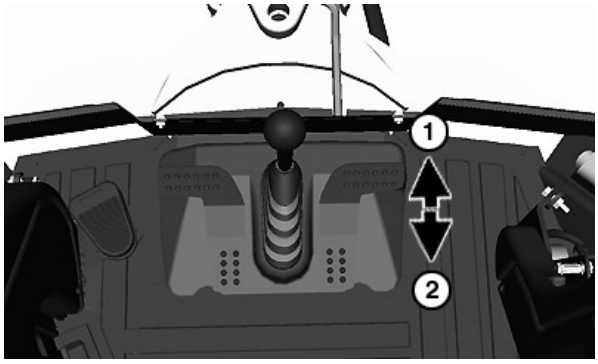
Extendable Dipperstick Operation—If Equipped

Push extendable dipperstick control pedal with toe or heel to extend (1) or retract (2) the extendable dipperstick.

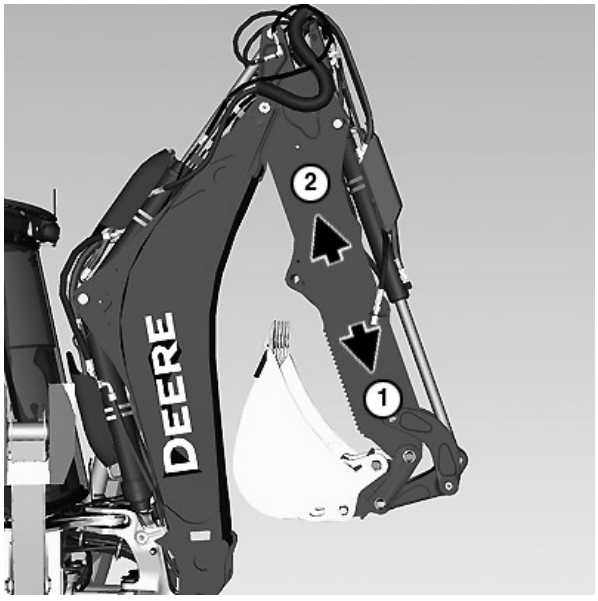
1—Extend **2—Retract**



Manual Control Machine



Pilot Control Machine

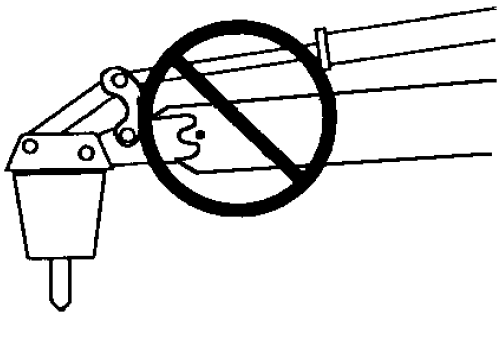


Extendable Dipperstick Movement

OUT4001,00009D8-19-19JUL12-1/1

Extendable Dipperstick Operation With Attachments—If Equipped

When using attachments, it is recommended to retract extendable dipperstick and lock in place. Operating hydraulic hammers, compactors, etc., with dipperstick extended may cause abnormal wear and stress on dipperstick components and ultimately shorten their life.



OUT4001,00009D9-19-19JUL12-1/1

Extendable Dipperstick Lock Operation—If Equipped

CAUTION: Avoid personal injury from unexpected machine movement. Always install locking pin from ground.

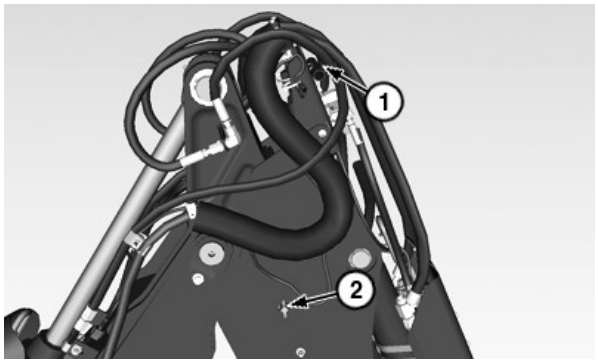
Always lower backhoe to ground and stop engine before removing or installing extendable dipperstick locking pin.

Disengaging Extendable Dipperstick Lock

1. Remove quick-lock pin from extendable dipperstick locking pin.
2. Remove extendable dipperstick locking pin from locking position (2) and install extendable dipperstick locking pin in storage position (1).
3. Install quick-lock pin on extendable dipperstick locking pin.

Engaging Extendable Dipperstick Lock

1. Remove quick-lock pin from extendable dipperstick locking pin.
2. Remove extendable dipperstick locking pin from storage position and install extendable dipperstick locking pin in locking position.
3. Install quick-lock pin on extendable dipperstick locking pin.



Extendable Dipperstick Lock Pin Locations

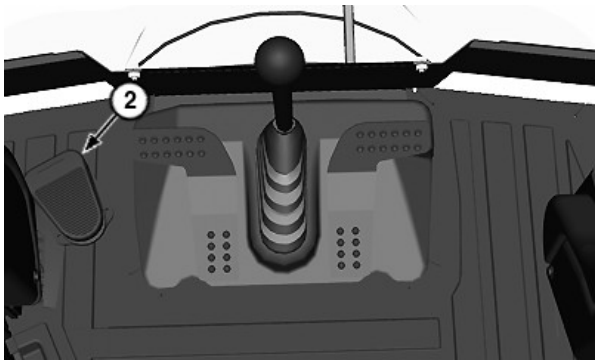
1—Storage Position **2—Locking Position**

OUT4001,00009DA-19-20JUL12-1/1

Backhoe Auxiliary Hydraulic Selective Flow Operation—If Equipped

TX1108373A—UN—14FEB12

Sealed Switch Module (SSM)



TX1108375A—UN—14FEB12

Foot Switch Location (backhoe pilot controls shown)

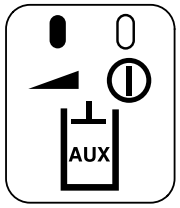
Backhoe auxiliary hydraulic selective flow is used to run attachments that use continuous hydraulic flow (hammer).

Disable auxiliary hydraulic selective flow when:

- No attachment is installed.
- Changing attachments.
- Installed attachments are not in use.

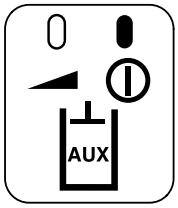
Operator's seat must be in backhoe operating position to enable function.

Backhoe auxiliary hydraulic selective flow has three modes of operation: off, foot switch, and continuous.



TX1054891—UN—23JAN09

Foot Switch Mode



TX1054917—UN—23JAN09

Continuous Mode

1—Auxiliary Hydraulic Switch 2—Foot Pedal

OFF

- All LED's on auxiliary hydraulic switch (1) are off.
- Attachment is disabled.

FOOT SWITCH MODE

NOTE: This auxiliary hydraulic switch setting is recalled if seat is rotated out of backhoe position or if engine is stopped.

1. Press and release auxiliary hydraulic switch (1).
2. Left LED illuminates on auxiliary hydraulic switch.
3. Press and hold foot switch (2) to enable attachment.
4. Release foot switch to disable attachment.
5. Press and release auxiliary hydraulic switch again to return to off mode.

CONTINUOUS MODE

NOTE: This auxiliary hydraulic switch setting is NOT recalled if seat is rotated out of backhoe position or if engine is stopped. Switch must be cycled again to activate continuous mode.

1. Enable foot switch mode.
2. Press and hold auxiliary hydraulic switch (1).
3. Right LED illuminates on auxiliary hydraulic switch.
   - Attachment is enabled.
   - Foot switch (2) is disabled.
4. Press and hold auxiliary hydraulic switch to cycle between foot pedal mode and continuous mode.
5. Press and release auxiliary hydraulic switch to return to off mode.

Continued on next page

OUT4001,0000B4A-19-16SEP14-1/2

Flow Rate Adjustment

IMPORTANT: To avoid potential machine damage, machine must be OFF when adjusting auxiliary selective flow control valve.

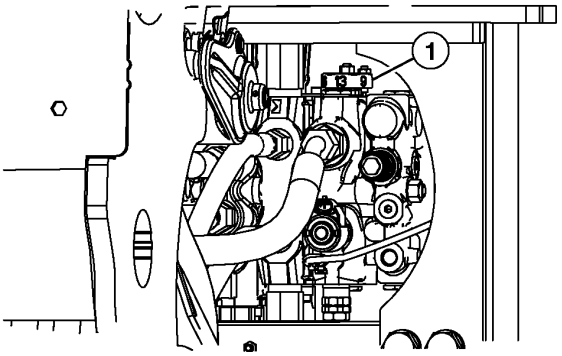
1. Ensure auxiliary hydraulics are disabled (all LED's on auxiliary hydraulic switch are off).

NOTE: Flow settings are stamped into the flow selector knob in gallons per minute (gpm).

2. To adjust backhoe flow rate, rotate flow selector knob (1) until the desired flow setting is observed.

Flow Settings:

- 34 L/min (9 gpm)
- 49 L/min (13 gpm)
- 60 L/min (16 gpm)
- 68 L/min (18 gpm)
- 83 L/min (22 gpm)
- 94 L/min (25 gpm)



Auxiliary Selective Flow Control Valve Section

1—Flow Selector Knob

OUT4001,0000B4A-19-16SEP14-2/2

Backhoe Auxiliary Hydraulics Operation—If Equipped

Extendable Dipperstick Foot Pedal (1)

The right foot pedal controls an optional extendable dipperstick. For more information see Extendable Dipperstick Operation—If Equipped or Extendable Dipperstick Operation With Attachments—If Equipped in this section.

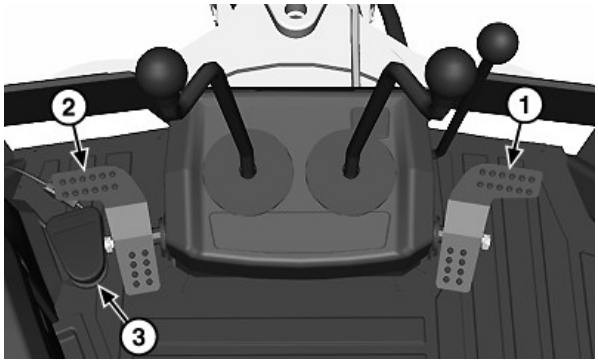
Auxiliary Hydraulic Attachment Foot Pedal (2)

The left foot pedal controls an optional backhoe attachment (thumb). For more information see Backhoe Hydraulic Thumb Operation in this section or attachment supplier operator's manual.

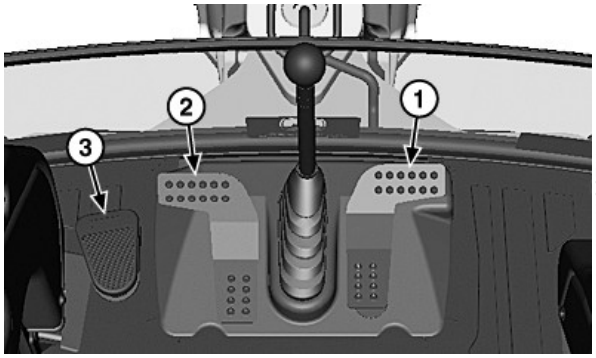
Auxiliary Hydraulic Selective Flow Control Foot Switch (3)

The auxiliary hydraulic selective flow control foot switch controls an optional backhoe attachment that utilizes continuous hydraulic flow (hammer). For more information see Backhoe Auxiliary Hydraulic Selective Flow Operation —If Equipped in this section.

1—Extendable Dipperstick Foot Pedal
2—Auxiliary Hydraulic Attachment Foot Pedal
3—Auxiliary Hydraulic Selective Flow Control Foot Switch



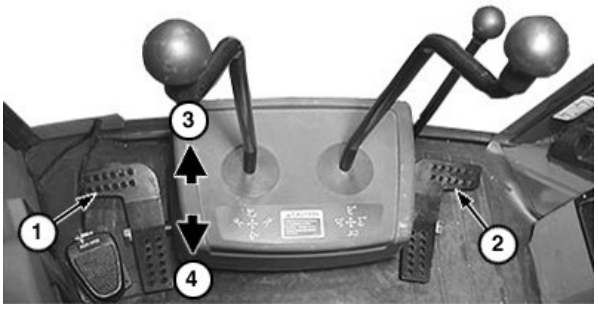
Manual Control Machine



Pilot Control Machine (if equipped)

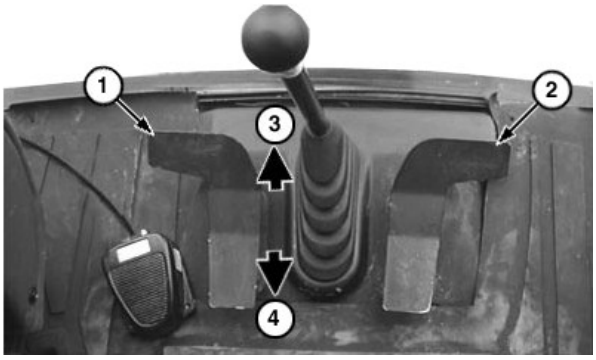
OUT4001,00009DC-19-08OCT14-1/1

Backhoe Hydraulic Thumb Operation—If Equipped



TX1048226A—UN—04SEP08

Manual Control Machine



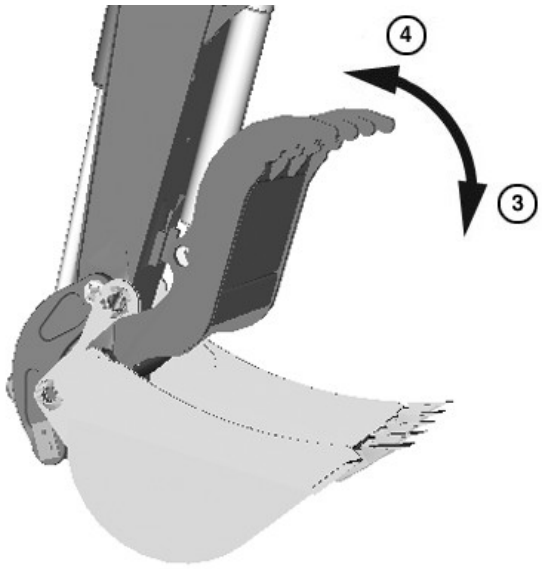
TX1048220A—UN—04SEP08

Pilot Control Machine

NOTE: Hydraulic thumb control pedal may change location based on if machine is equipped with extendable dipperstick. If equipped with extendable dipperstick, the left auxiliary hydraulic function foot pedal (1) will operate thumb. If equipped with standard dipperstick, the right auxiliary hydraulic function foot pedal (2) will operate thumb.

Push appropriate auxiliary hydraulic function foot pedal (1 or 2) with heel or toe to close hydraulic thumb (3) or open hydraulic thumb (4).

1—Left Auxiliary Hydraulic Function Foot Pedal
2—Right Auxiliary Hydraulic Function Foot Pedal (or extendable dipperstick—if equipped)
3—Close Hydraulic Thumb
4—Open Hydraulic Thumb



TX1047774A—UN—04SEP08

Hydraulic Thumb Movement

OUT4001,00009DD-19-27SEP12-1/1

Backhoe Coupler Operation—If Equipped

CAUTION: Prevent serious injury or death from unexpected machine movement. Ensure coupler is attached properly to attachment.

Locking Coupler:

1. Position machine and coupler to pick up desired attachment.
2. Move the adjustable coupler hook (3) by turning the hex head (5) clockwise into the fully retracted position.
3. Lower front coupler hook (4) to pin (2).
4. Rotate, curl, and lift the attachment slightly off the ground.
5. Lower adjustable coupler hook to pin (1).

NOTE: Do not torque hex head greater than 270 N·m (200 lb-ft).

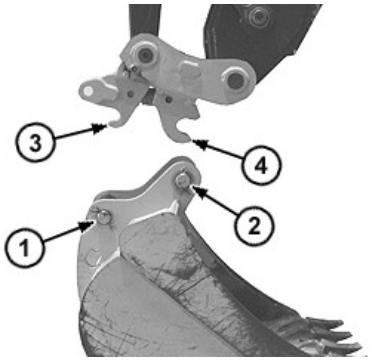
6. Rotate the hex head of the screw mechanism counterclockwise until the adjustable coupler hook contacts the back pin.

CAUTION: Avoid injury from unexpected machine movement. Ensure the supplement lock is engaged. If this is not locked over the hex head, the screw can turn and the attachment can fall off.

7. Visually check the coupler to verify that both hooks are firmly in contact with the attachment pins. Ensure the supplemental lock (6) is engaged.
8. Verify the attachment is properly locked by performing a ground test before using.
9. Place the bucket on the ground and uncurl to ensure the attachment is secured to the coupler.

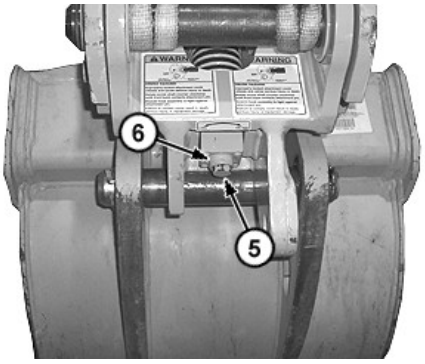
Unlocking Coupler:

1. Position machine and coupler to disconnect from the attachment.
2. Rotate the coupler so that the center of the attachment pin (2) and center of the adjustable coupler hook are in line.
3. Rotate, curl, and lift the attachment slightly off the ground.
4. Rotate the hex head of the screw mechanism clockwise until the adjustable coupler hook is clear from the back pin. Loosen the screw mechanism with the hand rachet to fully release the attachment pin from the coupler.
5. Keeping the attachment close to the ground, slowly retract the bucket cylinder.
6. With the attachment flat on the ground, uncurl the coupler from the attachment. Assure the attachment is on a flat, stable surface and will not move when released from the coupler.



TX1021632A—UN—09APR07

Backhoe Coupler Operation



TX1021636A—UN—09APR07

Hex Head and Supplemental Lock

1—Pin
2—Pin
3—Adjustable Coupler Hook
4—Front Coupler Hook
5—Hex Head
6—Supplemental Lock

OUT4001,00009DE-19-20FEB12-1/1

Auxiliary Handheld Hydraulics Operation—If Equipped

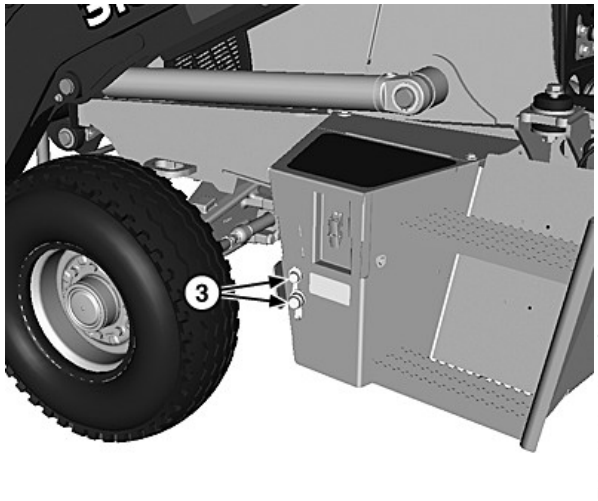
The handheld hydraulics feature utilizes the auxiliary selective flow control circuit to supply hydraulic oil to desired handheld attachment.

Disable handheld hydraulics when:

- No attachment is installed.
- Changing attachments.
- Installed attachments are not in use.

Connect desired attachment plumbing to supply and return quick connect fittings (3).

3—Quick Connect Fitting (2 used)



Quick Connect Fittings

AR71719,00000BD-19-04AUG15-1/4

CAUTION: Prevent injury from unexpected machine movement. Auxiliary hydraulic switch (1) also controls loader auxiliary hydraulics. If switch (1) is pressed when seat is in loader position and auxiliary handheld hydraulics switch (9) is in OFF position, loader auxiliary hydraulics will enable, see Loader Auxiliary Hydraulic Operation—If Equipped in this section.

NOTE: Auxiliary hydraulic switch (1) does not control any functionality for this function. Switch only provides indication of mode selected.

Auxiliary handheld hydraulics can be operated in either loader or backhoe operator seat positions.

1—Auxiliary Hydraulic Switch

Sealed Switch Module (SSM)

Continued on next page

AR71719,00000BD-19-04AUG15-2/4

Auxiliary handheld hydraulics has three modes of operation: off, foot switch, and continuous.

OFF

Press bottom half of switch (9) all the way in.

- All LED's are off on auxiliary hydraulic switch.
- Attachment is disabled.

FOOT SWITCH MODE

1. Press switch (9) so that switch is in middle position.
   - Left LED is illuminated on auxiliary hydraulic switch.
   - Loader auxiliary hydraulics are disabled.
2. Press and hold foot switch to enable attachment.
3. Release foot switch to disable attachment.

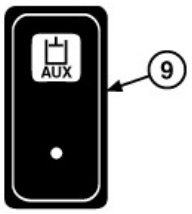
CONTINUOUS MODE

Press upper half of switch (9) all the way in.

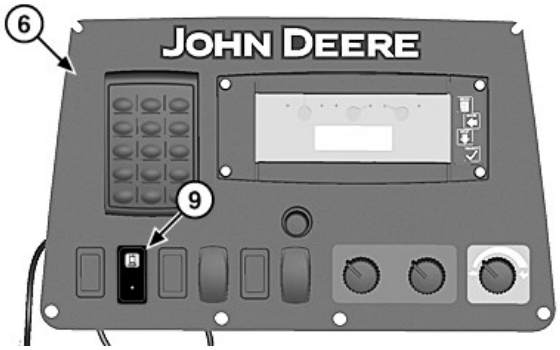
- Attachment is enabled.
- Right LED is illuminated on auxiliary hydraulic switch.
- Foot switch (2) is disabled.
- Loader auxiliary hydraulics are disabled.

2—Foot Switch
6—Right Console
9—Auxiliary Handhleld Hydraulics Switch

TX1171899A—UN—15SEP14

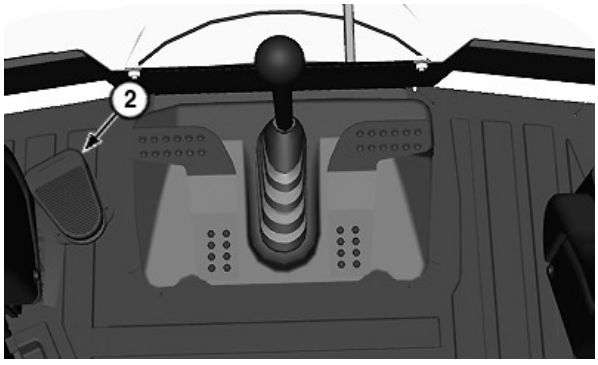


Auxiliary Handheld Hydraulics Switch



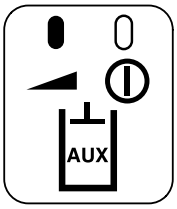
TX1115820A—UN—15SEP14

Auxiliary Handheld Hydraulics Switch Location



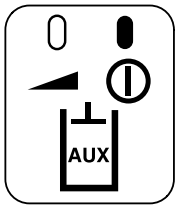
TX1108375A—UN—14FEB12

Foot Switch Location



TX1054891—UN—23JAN09

Foot Switch Mode



TX1054917—UN—23JAN09

Continuous Mode

Continued on next page

AR71719,00000BD-19-04AUG15-3/4

Adjust Flow Rate

IMPORTANT: To avoid potential machine damage, machine must be OFF when adjusting auxiliary selective flow control valve.

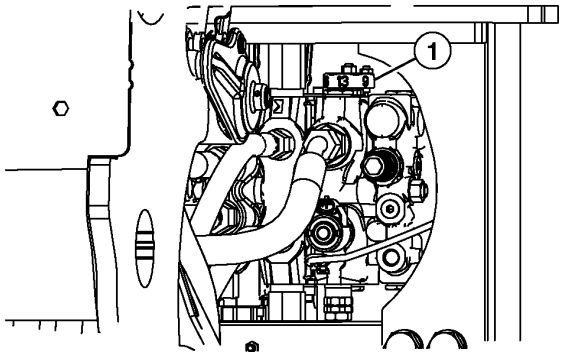
1. Ensure auxiliary hydraulics are disabled (all LED's on auxiliary hydraulics switch are off).

NOTE: Flow settings are stamped into the flow selector knob in gallons per minute (gpm).

2. To adjust backhoe flow rate, rotate flow selector knob (1) until the desired flow setting is observed.

   Flow Settings:

   - 34 L/min (9 gpm)
   - 49 L/min (13 gpm)
   - 60 L/min (16 gpm)
   - 68 L/min (18 gpm)
   - 83 L/min (22 gpm)
   - 94 L/min (25 gpm)



Auxiliary Selective Flow Control Valve

1—Flow Selector Knob

AR71719,00000BD-19-04AUG15-4/4

Loader Operation

IMPORTANT: Operate loader facing forward in the operator's seat only.

IMPORTANT: Do not raise or lower the front loader boom while the engine hood is open. Always close the engine hood fully before moving the front loader boom, or severe damage to the engine hood will occur. See Opening and Closing Engine Hood. (Section 3-2.)

NOTE: Loader control lever will return to neutral if released during normal loader operation.

Push lever in following directions for corresponding loader movements (1, 2, 3, and 4):

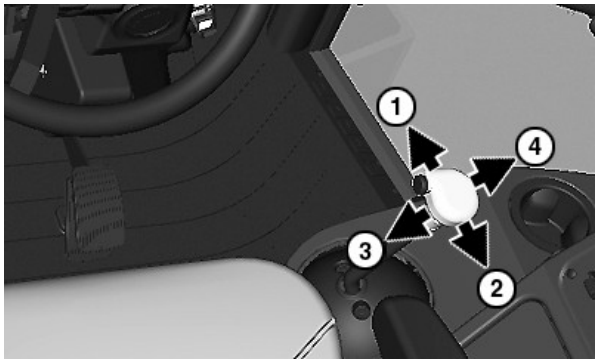
NOTE: Loader control lever will detent in "float" when moved fully forward. Loader control lever will stay in "float" until it is manually moved.

NOTE: Loader control lever will detent in "return-to-dig" when bucket is dumped and lever is moved fully left. Lever will return to neutral when bucket is in dig position.

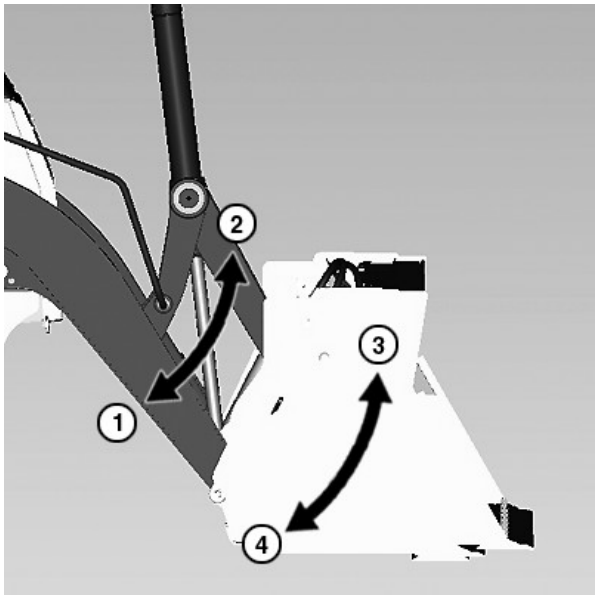
Loader control lever will give resistance when boom is raised and lever is held in "bucket roll-back". Lever will return to neutral when bucket is self-leveled.

Use the "float" and "return-to-dig" detents at the same time to quickly position the front loader bucket for loading, as when driving into a pile of material. When front loader boom and bucket are in correct position, the loader control lever will automatically release from "return-to-dig" detent, but will remain in "float" detent.

For faster cycle times, fully extend lever in desired direction, run engine at fast idle, and move boom and bucket at same time.



Loader Control Lever



Front Loader Boom and Bucket Movement

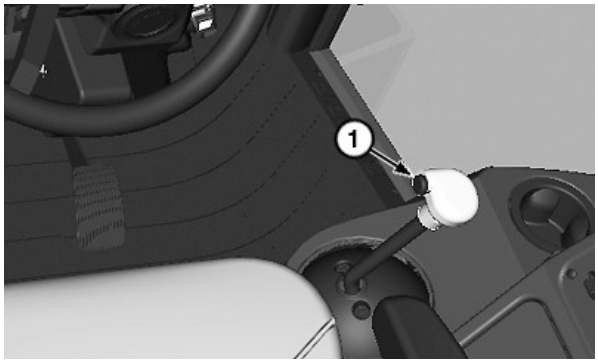
1—Boom Lower and Float
2—Boom Raise
3—Bucket Roll-Back and Return-To-Dig
4—Bucket Dump

OUT4001,00009E0-19-28JAN16-1/1

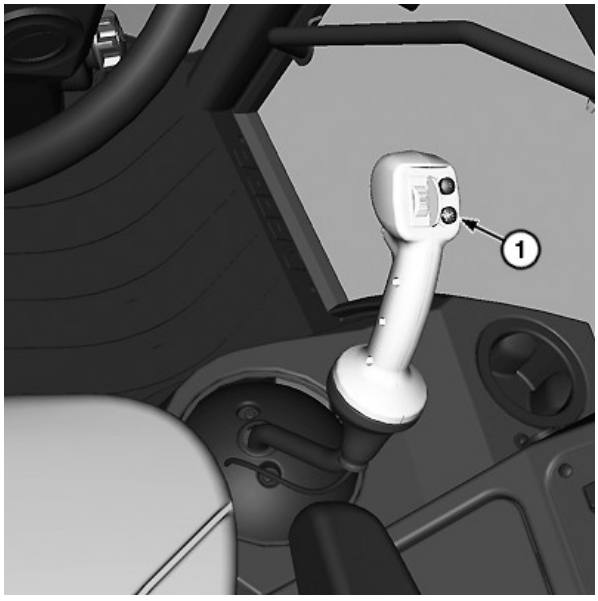
Loader Clutch Disconnect Operation

Press clutch disconnect switch (1) on control lever to disconnect clutch and provide additional power to lift loader bucket, if needed.

1—Clutch Disconnect Switch



Loader Control Lever



Single Lever Loader Control (SLLC) With Auxiliary—If Equipped

OUT4001,0000B49-19-07FEB12-1/1

Loader Auxiliary Hydraulic Operation—If Equipped

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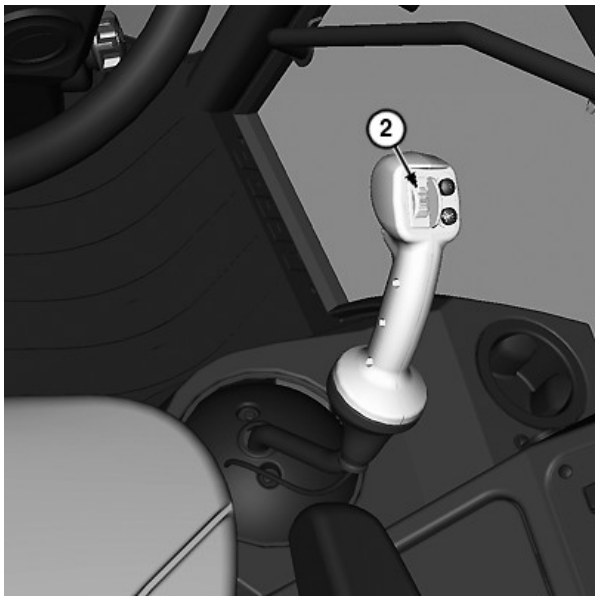
Sealed Switch Module (SSM)



TX1108390A—UN—14FEB12

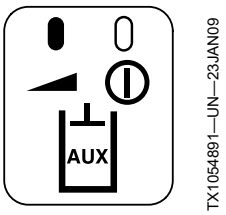
Single Lever Loader Control (SLLC) With Auxiliary—If Equipped

NOTE: Loader auxiliary hydraulics will enable only if the operator's seat is locked in loader operating position. Loader auxiliary hydraulics are automatically disabled if:

- *Seat pivot latch is unlocked*
- *Seat is in backhoe operating position*

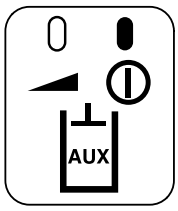
There are two modes of operation for loader auxiliary hydraulics: proportional and continuous. Regardless of operating mode, loader auxiliary hydraulics are activated using the proportional loader auxiliary switch (2) on the single lever loader control (SLLC).

- If the operator's seat is locked in loader operating position, auxiliary hydraulics are automatically enabled to the **proportional** setting (left LED illuminated) on the auxiliary hydraulic switch (1).
  - Oil flow is proportional to the position of the roller switch, relative to neutral. Neutral is considered the centered (no flow) position of the roller switch. Slight switch movements in either forward or reverse direction delivers minimum oil flow. Oil flow increases as the switch is moved further away from neutral. Maximum oil flow is delivered when the switch reaches the end of the forward or reverse direction on the roller switch. Oil flow stops when the roller returns to neutral or the auxiliary hydraulic switch on the SSM is cycled to off.
- Press and release auxiliary hydraulic switch to enable **continuous** auxiliary hydraulics (right LED illuminated).
  - Full oil flow is continuously delivered in either forward or reverse direction on the roller switch. Move roller switch approximately 50% in either direction for continuous, full flow, oil delivery to an attached device. Oil flow stops when the roller switch is moved approximately 50% in the opposite direction or the auxiliary hydraulic switch on the SSM is cycled to off. After stopping oil flow, the roller must return to neutral position before oil flow can be commanded again in either forward or reverse direction.



TX1054891—UN—23JAN09

Loader Operation—Proportional Mode



TX1054917—UN—23JAN09

Loader Operation—Continuous Mode

1—Auxiliary Hydraulic Switch **2—Proportional Loader Auxiliary Switch**

NOTE: For 310SK machine, no matter what setting is chosen in the SDM, the continuous flow speed will always be FAST.

The loader continuous flow speed can be adjusted through the standard display monitor (SDM) to slow, medium or fast. To change setting, see Standard Display Monitor (SDM)—Main Menu—Setup—Loader Aux Speed (If Equipped). (Section 2-2.)

- Press and release auxiliary hydraulic switch again to turn off auxiliary hydraulics (all LEDs are off).

OUT4001,0000B4F-19-19JUN13-1/1

Differential Lock Operation

CAUTION: Prevent injury from loss of machine control. DO NOT engage differential lock when driving at high speed or steering will be limited.

Avoid machine damage and prevent injury from loss of machine control. DO NOT engage differential lock when turning.

Prevent injury from unexpected machine movement. When poor traction results in one rear tire spinning, slow the tire's rotation before engaging differential lock. Internal axle damage can occur if lock is applied with one rear wheel spinning at high speed.

IMPORTANT: Avoid axle damage. Engage differential lock only while machine is at idle.

To engage rear differential lock, reduce engine speed to idle, then press down and hold differential lock switch (1). When rear differential is locked, both rear wheels turn at the same speed.

Unequal traction will keep the rear differential locked. If the differential lock foot switch is released, the differential lock disengages automatically when traction evens out. Hold differential lock switch continuously to keep rear differential locked when traction is even.

Differential Lock Switch

1—Differential Lock Switch

The differential lock function has a setting in the standard display monitor (SDM) called DIFF LOCK SPEED LIMIT (service mode only). When enabled, the system automatically disables the engagement of the differential lock system when engine speed is over 1000 rpm even though the floor switch is engaged. When the function is disabled, the operator has full control of the differential locking system with the floor switch.

OUT4001,0000BAC-19-20SEP12-1/1

Mechanical Front Wheel Drive (MFWD) Operation—If Equipped

NOTE: For best performance, fuel economy, and tire wear, operate mechanical front wheel drive (MFWD) only when needed.

To achieve best MFWD performance, be sure front tires are inflated to proper air pressure. See Tire Pressures. (Section 3-3.)

NOTE: Whenever the transmission shifts into gear F4 or F5 (manual or autoshift mode), MFWD will be automatically disengaged. However, in effort to increase braking performance, MFWD will automatically engage in F4 and F5 whenever the service brakes are applied and MFWD braking option is enabled.

Press top half of MFWD switch (1) to engage MFWD drive shaft. Press lower half of MFWD switch to disengage MFWD.

If machine is equipped with single lever loader control (SLLC) with auxiliary, press MFWD switch (1) on the SLLC to engage MFWD drive shaft. Press MFWD switch on SLLC again to disengage MFWD. The SLLC also has a momentary MFWD switch (3) to hold in and temporarily engage MFWD drive shaft when needed. Releasing the switch will disengage MFWD.

MFWD indicator (2) will remain lit on standard display monitor (SDM) while MFWD is engaged.

When the MFWD switch is on:

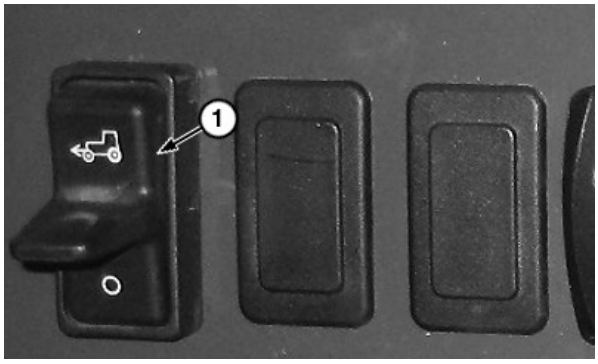
- 4WD is engaged in 1st, 2nd and 3rd gear forward and reverse.
- 4WD disengages in 4th and 5th.

When MFWD braking is enabled through the menu on the SDM:

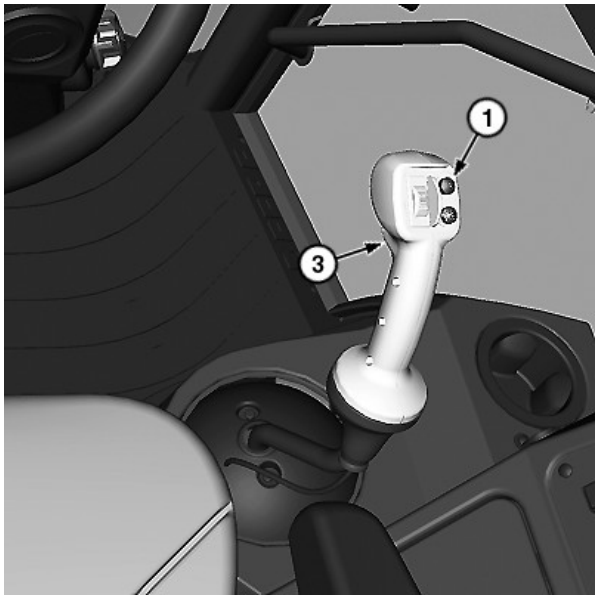
- 4WD is engaged when the brakes are applied in 4th or 5th gear.
- 4WD is not automatically engaged in 1st, 2nd or 3rd gear unless the MFWD switch is on.

To enable or disable MFWD braking, see Standard Display Monitor—Main Menu—Setup—MFWD Braking. (Section 2-2.)

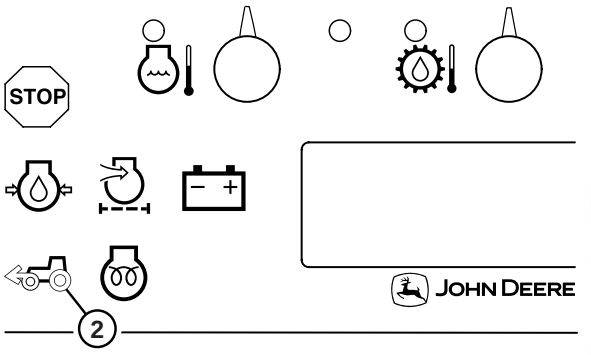
1—MFWD Switch
2—MFWD Indicator
3—Momentary MFWD Switch



Right Console



Single Lever Loader Control (SLLC) With Auxiliary—If Equipped



Standard Display Monitor (SDM)

OUT4001,00009E2-19-19JUN13-1/1

Loader Coupler Operation—If Equipped

CAUTION: Prevent possible injury from unexpected machine motion. The attachment could fall if not properly installed to loader coupler. Operator must be aware of all bystanders at the worksite.

1. Position machine on firm, level ground.
2. Lower boom. Stop machine.
3. Press and hold loader coupler switch (1) on sealed switch module (SSM) for 1 second to enable installation of attachments (retract coupler pins).
4. Operate bucket control to move coupler frame forward.
5. Drive forward. Guide top of coupler frame into attachment mounting hooks.
6. Raise boom. Tilt mounting frame rearward until attachment is against coupler.
7. Press loader coupler switch again to engage coupler pins.

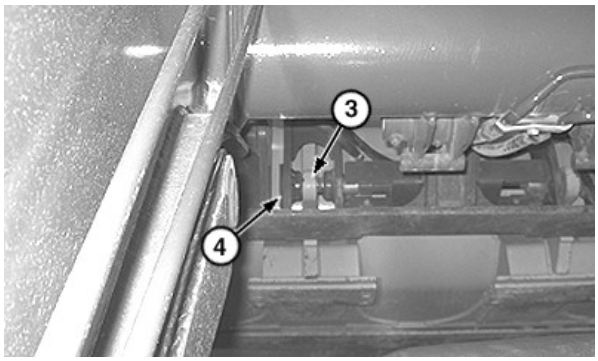
NOTE: If attachment is not properly latched, disconnect and attach again.

8. Raise boom. Visually inspect attachment to verify that loader coupler pin plate (3) is pressed against the loader coupler structure (4) and that the pins are engaged in attachment mounting holes.

1—Loader Coupler Switch
3—Loader Coupler Pin Plate (1 on each side)
4—Loader Coupler Structure (1 on each side)

TX1108094A—UN—10FEB12

Sealed Switch Module (SSM)



TX1014133A—UN—26OCT06

Left Side Shown

OUT4001,00009DF-19-17NOV11-1/1

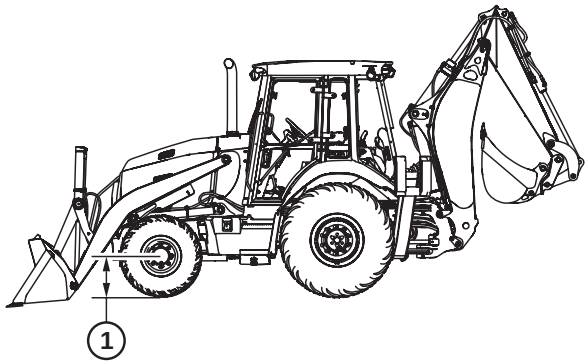
Operating in Water and Mud

IMPORTANT: Damage to machine components could occur if fording depth is exceeded. Never exceed the maximum fording depth (1) (center line of the front axle).

When it is necessary to operate or drive the machine in water or mud, water or mud must not go higher than the center line of the front axle.

After working in water or mud, lubricate all grease and lubrication points.

1—Maximum Fording Depth



XJ1279371—UN—05JUN19

Maximum Fording Depth

BJ21193,000028C-19-07JUN19-1/1

Lifting Objects

CAUTION: Avoid personal injury. Never move the load suddenly. Never move load over person's head. DO NOT allow any persons near the load. Keep all persons away from raised load until blocks are supporting it or load is sitting on the ground.

Ensure chain/sling is in good condition and is rated for load being lifted.

1. For maximum lifting capability, attach chain/sling to buckets at positions shown. For capacities of backhoe, see Miscellaneous—Specifications. (Section 4-6.)
2. Attach a hand line to load for stability. Use long enough line to ensure that person holding it is a safe distance from load.
3. Before lifting, perform following test of load stability:

   NOTE: If using backhoe to lift, raise rear tires off ground 50 mm (2 in.) and ensure machine is level. If ground is soft, place boards or other wide support under stabilizer feet to increase stability.

   a. Park machine close to load.

   b. Attach load to chain/sling.

   c. Raise load 50 mm (2 in.) above ground.

   d. If using backhoe, swing load all the way to one side.

   e. While keeping load close to the ground, extend it away from machine.

If there is any indication of reduced stability of the machine, lower load to the ground and make necessary adjustments so machine can successfully perform test. Do not lift load until machine can perform test at acceptable level.

TX10146618A—UN—03NOV06

Lifting With Front Loader

TX10146625A—UN—03NOV06

Lifting With Backhoe

OUT4001,00009E3-19-13FEB12-1/1

Parking Machine

1. Park machine on a level surface.
2. Lower all equipment to ground.
3. Move transmission control lever (TCL) (1) to neutral (N).

CAUTION: Prevent possible injury from unexpected machine movement. Never rely on TCL to keep machine from moving. Always engage park brake to hold machine.

4. Press park brake switch (2) on sealed switch module (SSM) to engage park brake.
5. Move engine speed control knob (3) to slow idle.

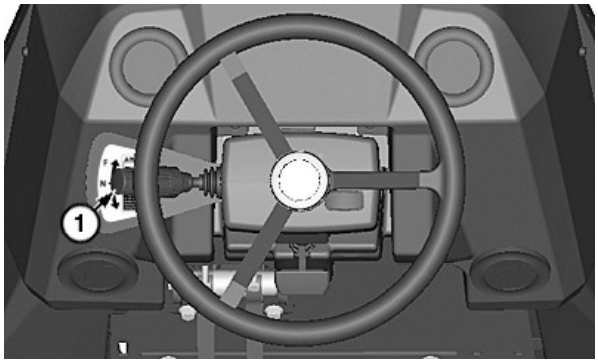
IMPORTANT: Avoid turbocharger/engine damage. Engine must be shut down properly.

6. Press engine stop switch (4) to stop engine.

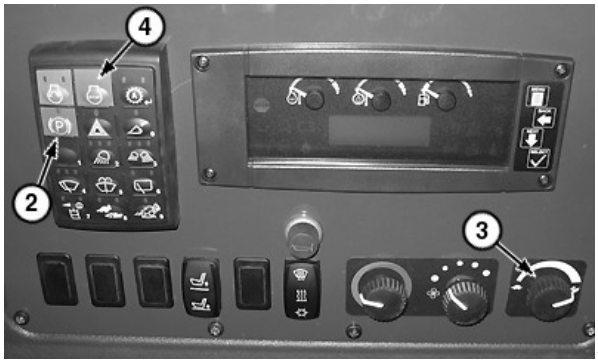
   If the engine is above a threshold temperature, the first time the engine stop switch is pressed, engine will drop down to 900 rpm if it isn't already at that speed. The monitor will display a countdown timer and turbocharger/engine will automatically shutdown once it has completed the cool down process. This will take a maximum of 2 minutes.

   If engine stop switch is pressed and held (not recommended as it may cause damage to the turbocharger/engine), the engine will shut down immediately. If this is done, a diagnostic trouble code (DTC) will be displayed on the monitor. The active DTC will disappear on the monitor once the turbocharger has cooled down and then will become a stored code.

7. Release hydraulic pressure by moving control levers until equipment does not move.



Transmission Control Lever (TCL)



Right Console

1—Transmission Control Lever (TCL)
2—Park Brake Switch
3—Engine Speed Control Knob
4—Engine Stop Switch

OUT4001,00009E4-19-24APR12-1/1

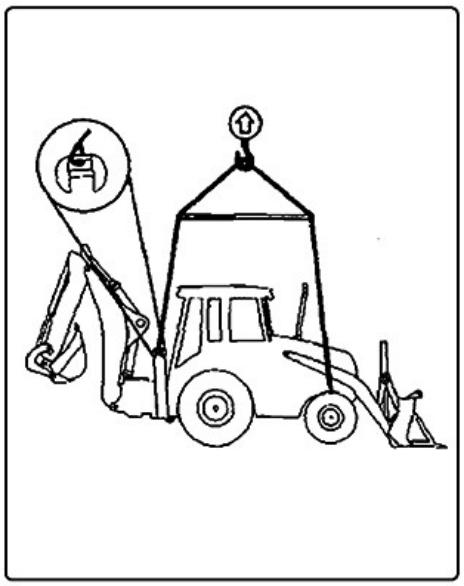
Lifting Machine

CAUTION: Prevent possible injury from unexpected machine movement when lifting the machine. Check lifting capacity of crane before lifting the machine. Lift load only as high as necessary. Keep all people clear of raised load.

NOTE: Do not use handles or steps in order to lift or tie down the machine.

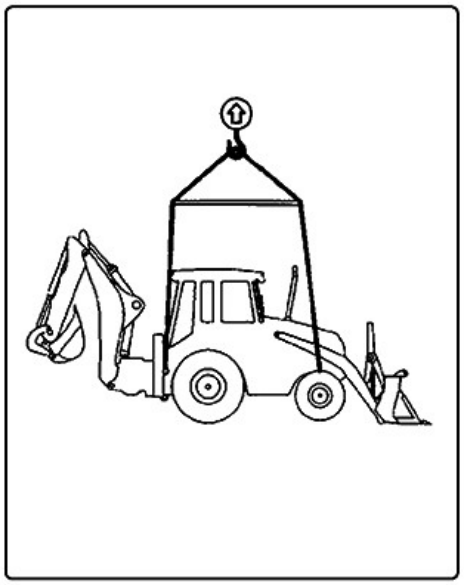
For specific weight information, see 310SK Backhoe Loader Weight. (Section 4-6.)

1. Engage the park brake.
2. Move stabilizers to the fully raised position.
3. Engage backhoe boom and swing lock. See Boom Lock Operation and Swing Lock Operation in this section.
4. Engage extendable dipperstick lock, if equipped. See Extendable Dipperstick Lock Operation—If Equipped in this section.
5. Use proper rated cables and slings for lifting. The crane should be positioned so that the machine is lifted parallel to the ground.
   - **For Center Mount Backhoe:** Position the slings on the front axle of the machine and on stabilizer foot at the rear side of the machine.
   - **For Sideshift Backhoe:** Position the slings on the front axle of the machine and on the D-ring of H-frame at the rear of the machine.
6. On sharp corners, use corner protectors.
7. To prevent contact with the machine, lifting cables should have sufficient length.
8. The width and strength of the spreader bar should be sufficient to prevent contact with the machine.



XJ12614476—UN—31JUL18

Lifting the Machine (center mount backhoe)



XJ12614475—UN—31JUL18

Lifting the Machine (sideshift backhoe)

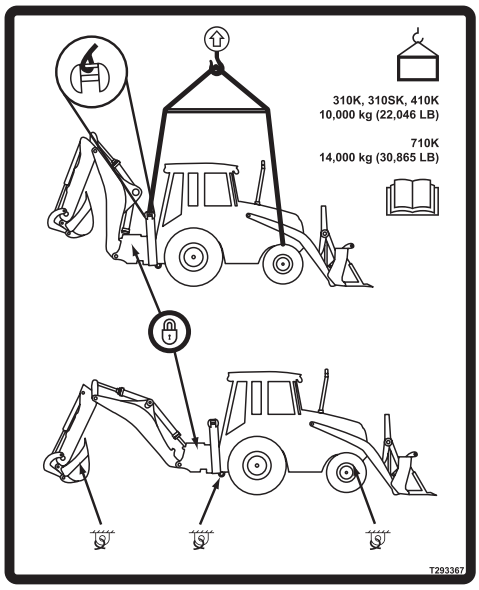
OUT4001,0000B4E-19-13AUG18-1/1

Loading Machine Onto Trailer

1. Keep trailer bed clean. Put wheel chocks against trailer wheels.
2. Use a ramp or loading dock. Ramps must be strong enough, have a low angle, and correct height. Load and unload machine on a level surface.
3. Fasten seat belt before starting engine. Allow engine to run for several minutes.
4. Install the extendable dipperstick locking pin, if equipped, and engage the backhoe swing lock.
5. Drive the machine up ramps slowly with centerline of machine over centerline of trailer.
6. Lower loader bucket onto blocks or trailer bed.
7. Lower backhoe boom until bucket rests on trailer bed.
8. Stop engine.

IMPORTANT: Prevent possible hydraulic system damage. Fasten chains or cables to machine at proper locations.

9. Fasten chains or cables from trailer to frame tie-downs. Do not route chains or cables over or against hydraulic lines or hoses.
10. Fasten backhoe bucket to trailer with chains or cables to prevent movement during transport.



TX1108407—UN—15FEB12

Machine Tie Down Locations

11. Cover engine exhaust pipe opening with tape to keep dust and rain out of pipe.

OUT4001,00009E5-19-20JUL12-1/1

Towing

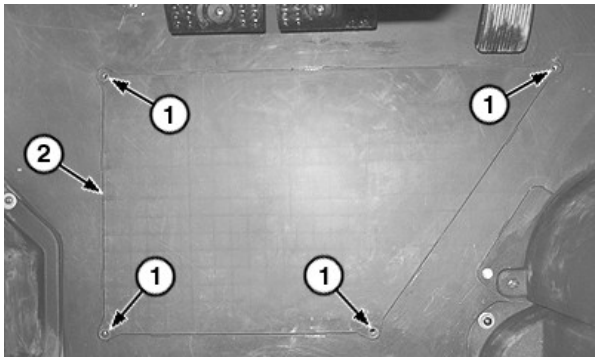
IMPORTANT: Prevent damage to transmission from insufficient oil supply. Do not attempt to start engine by towing. DO NOT tow machine faster than 10 km/hr (6 mph) or a distance longer than 10 km (6.21 miles).

Towing IS NOT recommended. If you MUST tow machine, use the following procedure:

1. Stop engine.

CAUTION: Prevent possible injury or death from unexpected machine movement. Block wheels to prevent machine movement before disengaging park brake.

2. Block tires securely.
3. Attach towing machine and towed machine as closely together as possible with chains.



TX1106638—UN—13FEB12

Cab Floor

1—Cap Screw (4 used) **2—Cab Floor Access Plate**

4. Remove rubber mat from floor of operator's station. Remove cap screws (1) and cab floor access plate (2).

Continued on next page

OUT4001,00009E6-19-23SEP14-1/2

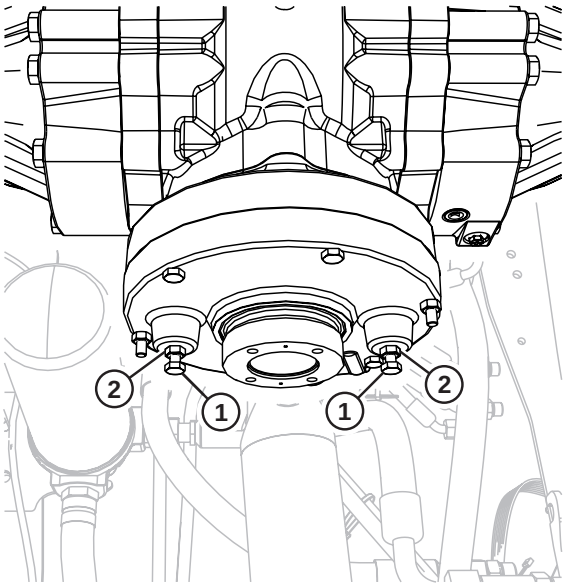
IMPORTANT: Prevent park brake damage from heat build-up. Manually disengage brake.

5. Loosen hex nuts (2).
6. Release park brake for tow by turning screws (1) completely in.
7. Remove blocks from tires and tow machine.
8. When towing is completed, block tires and engage park brake to hold machine by turning both cap screws out to specification (3) as illustrated.

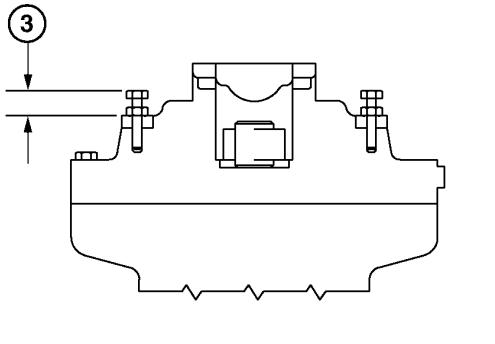
Specification	
Park Brake Engagement Cap Screw—Distance	27—28 mm 1.06—1.10 in.

9. Tighten hex nuts to lock cap screws in position.
10. Install operator's station floor access plate and rubber floor mat.

1—Park Brake Engagement Cap Screw (2 used)
2—Hex Nut (2 used)
3—Cap Screw Position From Housing



Park Brake Engagement Screws



Park Brake Engagement Adjustment

OUT4001,00009E6-19-23SEP14-2/2

Diesel Fuel

Consult your local fuel distributor for properties of the diesel fuel available in your area.

In general, diesel fuels are blended to satisfy the low temperature requirements of the geographical area in which they are marketed.

Diesel fuels specified to EN 590 or ASTM D975 are recommended. Renewable diesel fuel produced by hydrotreating animal fats and vegetable oils is basically identical to petroleum diesel fuel. Renewable diesel that meets EN 590 or ASTM D975 is acceptable for use at all percentage mixture levels.

Required Fuel Properties

In all cases, the fuel shall meet the following properties:

Cetane number of 43 minimum. Cetane number greater than 47 is preferred, especially for temperatures below –20° C (–4°F) or elevations above 1500 m (5000 ft.).

Cold Filter Plugging Point (CFPP) should be at least 5°C (9°F) below the expected lowest temperature or **Cloud Point** below the expected lowest ambient temperature.

Fuel lubricity should pass a maximum scar diameter of 0.45 mm as measured by ASTM D6079 or ISO 12156-1.

Diesel fuel quality and sulfur content must comply with all existing emissions regulations for the area in which the engine operates. DO NOT use diesel fuel with sulfur content greater than 10 000 mg/kg (10 000 ppm).

Sulfur Content for Engines that meet Interim Tier 4 and Stage III B Emission Levels

- Use ONLY ultra low sulfur diesel (ULSD) fuel with a maximum of 15 mg/kg (15 ppm) sulfur content.

Sulfur Content for Engines that meet Tier 3 and Stage III A Emission Levels

- Use of diesel fuel with sulfur content less than 1000 mg/kg (1000 ppm) is RECOMMENDED
- Use of diesel fuel with sulfur content 1000–5000 mg/kg (1000–5000 ppm) REDUCES oil and filter change intervals.
- BEFORE using diesel fuel with sulfur content greater than 5000 mg/kg (5000 ppm), contact your John Deere dealer

Sulfur Content for Engines that meet Tier 2 and Stage II Emission Levels

- Use of diesel fuel with sulfur content less than 500 mg/kg (500 ppm) is RECOMMENDED.
- Use of diesel fuel with sulfur content 500–5000 mg/kg (500–5000 ppm) REDUCES the oil and filter change interval
- BEFORE using diesel fuel with sulfur content greater than 5000 mg/kg (5000 ppm), contact your John Deere dealer

Sulfur Content for Other Engines

- Use of diesel fuel with sulfur content less than 5000 mg/kg (5000 ppm) is recommended.
- Use of diesel fuel with sulfur content greater than 5000 mg/kg (5000 ppm) REDUCES the oil and filter change intervals.

IMPORTANT: Do not mix used diesel engine oil or any other type of lubricating oil with diesel fuel.

IMPORTANT: Improper fuel additive usage may cause damage on fuel injection equipment of diesel engines.

OUT4001,0000B8D-19-05MAR12-1/1

Diesel Fuel Specifications

The engine in this machine is designed to operate only with ultra low sulfur diesel (ULSD) fuel. Use of fuel other than ULSD will reduce the efficiency and durability of the engine, will harm and permanently damage the engine's advanced emissions control systems, reduce fuel economy, and possibly prevent the engine from running at all. Emission-related warranties are likely to be rendered void by the use of fuel that does not meet these specifications.

TX,FUEL,SPECS-19-26OCT20-1/1

Lubricity of Diesel Fuel

Most diesel fuels manufactured in the United States, Canada, and the European Union have adequate lubricity to ensure proper operation and durability of fuel injection system components. However, diesel fuels manufactured in some areas of the world may lack the necessary lubricity.

IMPORTANT: Make sure the diesel fuel used in your machine demonstrates good lubricity characteristics.

Fuel lubricity should pass a maximum scar diameter of 0.52 mm as measured by ASTM D6079 or ISO 12156-1. A maximum scar diameter of 0.45 mm is preferred.

If fuel of low or unknown lubricity is used, add John Deere Fuel-Protect Diesel Fuel Conditioner (or equivalent) at the specified concentration.

Lubricity of BioDiesel Fuel

Fuel lubricity can improve significantly with BioDiesel blends up to B20 (20% BioDiesel). Further increase in lubricity is limited for BioDiesel blends greater than B20.

DX,FUEL5-19-07FEB14-1/1

Handling and Storing Diesel Fuel

CAUTION: Reduce the risk of fire. Handle fuel carefully. DO NOT fill the fuel tank when engine is running. DO NOT smoke while you fill the fuel tank or service the fuel system.

Fill the fuel tank at the end of each day's operation to prevent water condensation and freezing during cold weather.

Keep all storage tanks as full as practical to minimize condensation.

Ensure that all fuel tank caps and covers are installed properly to prevent moisture from entering. Monitor water content of the fuel regularly.

When using biodiesel fuel, the fuel filter may require more frequent replacement due to premature plugging.

Check engine oil level daily prior to starting engine. A rising oil level may indicate fuel dilution of the engine oil.

IMPORTANT: The fuel tank is vented through the filler cap. If a new filler cap is required, always replace it with an original vented cap.

When fuel is stored for an extended period or if there is a slow turnover of fuel, add a fuel conditioner to stabilize the fuel. Keeping the free water drained and treating the bulk fuel storage tank quarterly with a maintenance dose of a biocide will prevent microbial growth. Contact your fuel supplier or John Deere dealer for recommendations.

DX,FUEL4-19-13JAN18-1/1

Biodiesel Fuel

Biodiesel is a fuel comprised of monoalkyl esters of long chain fatty acids derived from vegetable oils or animal fats. Biodiesel blends are biodiesel mixed with petroleum diesel fuel on a volume basis.

Before using fuel containing biodiesel review the Biodiesel Use Requirements and Recommendations in this Operator's Manual.

Environmental laws/regulations may encourage or prohibit the use of biofuels. Operators should consult with appropriate governmental authorities prior to using biofuels.

US/Canada

While 5% blends are preferred (B5), biodiesel concentrations up to a 20% blend (B20) in petroleum diesel fuel can be used in all John Deere engines. Biodiesel blends up to B20 can be used ONLY if the biodiesel (100% biodiesel or B100) meets ASTM D6751 (US), EN 14214 (EU), or equivalent specification. Expect a 2% reduction in power and a 3% reduction in fuel economy when using B20.

Biodiesel concentrations above B20 may harm the engine's emission control systems and should not be used in the US and Canada. Risks may include, but not be limited to, more frequent exhaust filter parked cleanings, soot accumulation, and increased intervals for ash removal.

Biodiesel users in the U.S. are strongly encouraged to purchase biodiesel blends from a BQ9000 Certified Marketer and sourced from a BQ9000 Accredited Producer (as certified by the National Biodiesel Board). Certified Marketers and Accredited Producers can be found at the following website: http://www.bq9000.org.

Other regions

John Deere engines can operate on biodiesel blends below and above B20 (up to 100% biodiesel). Operate at levels above B20 ONLY if the biodiesel meets the EN 14214 specification (primarily available in Europe). Engines operating on biodiesel blends above B20 may not fully comply with all applicable emissions regulations. Expect up to a 12% reduction in power and an 18% reduction in fuel economy when using 100% biodiesel. John Deere approved fuel conditioners containing detergent/dispersant additives are required.

Biodiesel Use Requirements

The petroleum diesel portion of all biodiesel blends must meet the requirements of ASTM D975 (US) or EN 590 (EU) commercial standard.

When using biodiesel fuel, the fuel filter may require more frequent replacement due to premature plugging. Check engine oil level daily prior to starting engine. A rising oil level may indicate fuel dilution of the engine oil.

John Deere approved fuel conditioners containing detergent/dispersant additives are required when using B20 blends and recommended when using lower biodiesel blends. Biodiesel blends up to B20 must be used within 90 days of the date of biodiesel manufacture. Biodiesel blends above B20 must be used within 45 days from the date of biodiesel manufacture.

Biodiesel Use Recommendations

When using biodiesel blends up to B20 the following must be considered:

- Cold weather flow degradation
- Stability and storage issues (moisture absorption, oxidation, microbial growth)
- Possible filter restriction and plugging (usually a problem when first switching to biodiesel on used engines)

Request a certificate of analysis from an authorized fuel distributor to ensure that the fuel is compliant with the specifications provided in this Operator's Manual.

Consult an authorized John Deere dealer. for approved fuel conditioners to improve storage and performance with biodiesel fuels.

The following must also be considered when using biodiesel blends above B20:

- Possible coking and/or blocked injector nozzles, resulting in power loss and engine misfire if John Deere approved fuel conditioners containing detergent/ dispersant additives are not used
- Possible crankcase oil dilution, requiring more frequent oil changes
- Possible lacquering and/or seizure of internal components
- Possible formation of sludge and sediments
- Possible thermal oxidation of fuel at elevated temperatures
- Possible compatibility issues with other materials (including copper, lead, zinc, tin, brass, and bronze) used in fuel handling equipment
- Possible reduction in water separator efficiency
- Possible damage to paint if exposed to biodiesel

IMPORTANT: Raw pressed vegetable oils are NOT acceptable for use as fuel in any concentration in John Deere engines. The use could cause engine failure.

OUT4001,0000671-19-25JAN16-1/1

Testing Diesel Fuel

A fuel analysis program can help to monitor the quality of diesel fuel. The fuel analysis can provide critical data such as calculated cetane index, fuel type, sulfur content, water content, appearance, suitability for cold weather operations, bacteria, cloud point, acid number, particulate contamination, and whether the fuel meets ASTM D975 or equivalent specification.

Contact your John Deere dealer for more information on diesel fuel analysis.

DX,FUEL6-19-13JAN18-1/1

Minimizing the Effect of Cold Weather on Diesel Engines

John Deere diesel engines are designed to operate effectively in cold weather.

However, for effective starting and cold weather operation, a little extra care is necessary. The following information outlines steps that can minimize the effect that cold weather may have on starting and operation of your engine. See your John Deere dealer for additional information and local availability of cold weather aids.

Use Winter Grade Fuel

When temperatures fall below 0°C (32°F), winter grade fuel (No. 1D in North America) is best suited for cold weather operation. Winter grade fuel has a lower cloud point and a lower pour point.

Cloud point is the temperature at which wax will begin to form in the fuel and this wax causes fuel filters to plug. **Pour point** is the lowest temperature at which movement of the fuel is observed.

NOTE: On an average, winter grade diesel fuel has a lower BTU (heat content) rating. Using winter grade fuel may reduce power and fuel efficiency, but should not cause any other engine performance effects. Check the grade of fuel being used before troubleshooting for low power complaints in cold weather operation.

Air Intake Heater

An air intake heater is an available option for some engines to aid cold weather starting.

Ether

An ether port on the intake is available to aid cold weather starting.

CAUTION: Ether is highly flammable. Do not use ether when starting an engine equipped with glow plugs or an air intake heater.

Coolant Heater

An engine block heater (coolant heater) is an available option to aid cold weather starting.

Seasonal Viscosity Oil and Proper Coolant Concentration

Use seasonal grade viscosity engine oil based on the expected air temperature range between oil changes and a proper concentration of low silicate antifreeze as recommended.

Diesel Fuel Flow Additive

Use John Deere PREMIUM DIESEL FUEL CONDITIONER (winter formula), which contains antigel chemistry, or equivalent fuel conditioner to treat non-winter grade fuel (No. 2D in North America) during the cold weather season. This generally extends operability to about 10°C (18°F) below the fuel cloud point. For operability at even lower temperatures, use winter grade fuel.

IMPORTANT: Treat fuel when outside temperature drops below 0°C (32°F). For best results, use with untreated fuel. Follow all recommended instructions on label.

BioDiesel

When operating with biodiesel blends, wax formation can occur at warmer temperatures. Begin using John Deere PREMIUM BIODIESEL FUEL CONDITIONER (winter formula) at 5°C (41°F) to treat biodiesel fuels during the cold-weather season. Use B5 or lower blends at temperatures below 0°C (32°F). Use only winter grade petroleum diesel fuel at temperatures below -10°C (14°F). In colder weather, engines operating with biodiesel may have more frequent parked cleanings, soot accumulation, and increased intervals for ash removal from the exhaust filter.

Winterfronts

Use of fabric, cardboard, or solid winterfronts is not recommended with any John Deere engine. Their use can result in excessive engine coolant, oil, and charge air temperatures. This can lead to reduced engine life, loss of power and poor fuel economy. Winterfronts may also put abnormal stress on fan and fan drive components potentially causing premature failures. If winterfronts are used, they should never totally close off the grill frontal area. Approximately 25% area in the center of the grill should remain open at all times. At no time should the air blockage device be applied directly to the radiator core.

Radiator Shutters

If equipped with a thermostatically controlled radiator shutter system, this system should be regulated in such a way that the shutters are completely open by the time the coolant reaches 93°C (200°F) to prevent excessive intake manifold temperatures. Manually controlled systems are not recommended. If air-to-air aftercooling is used, the shutters must be completely open by the time the intake manifold air temperature reaches the maximum allowable temperature out of the charge air cooler. For more information, see your John Deere dealer.

OUT4001,0000632-19-11AUG15-1/1

John Deere Break-In Plus™ Engine Oil

New engines are filled at the factory with John Deere Break-In Plus™ Engine Oil. During the break-in period, add John Deere Break-In Plus Engine Oil as needed to maintain the specified oil level.

Operate the engine under various conditions, particularly heavy loads with minimal idling, to help seat engine components properly.

Change the oil and filter at 500 hours maximum for Break-In Plus Oil during the initial operation of a new or rebuilt engine.

After engine overhaul, fill the engine with John Deere Break-In Plus Engine Oil.

If John Deere Break-In Plus Engine Oil is not available, use a 10W-30 diesel engine oil meeting one of the following during the first 500 hours of operation:

- API Service Classification CE
- API Service Classification CD
- API Service Classification CC
- ACEA Oil Sequence E2
- ACEA Oil Sequence E1

Break-In Plus is a trademark of Deere & Company
Plus-50 is a trademark of Deere & Company.

IMPORTANT: Do not use Plus-50™ II, Plus-50, or engine oils meeting any of the following for the initial break-in of a new or rebuilt engine:

API CJ-4	**ACEA E9**
API CI-4 PLUS	**ACEA E7**
API CI-4	**ACEA E6**
API CH-4	**ACEA E5**
API CG-4	**ACEA E4**
API CF-4	**ACEA E3**
API CF-2	
API CF	

These oils will not allow the engine to break in properly.

John Deere Break-In Plus Engine Oil can be used for all John Deere diesel engines at all emission certification levels.

After the break-in period, use John Deere Plus-50 II, John Deere Plus-50, or other diesel engine oil as recommended in this manual.

OUT4001,0000B8E-19-01MAR12-1/1

Diesel Engine Oil

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

John Deere Plus-50™ II is the recommended engine oil.

Extended service intervals may apply when John Deere Plus-50 II engine oil is used. Refer to the engine oil drain interval table and consult your John Deere dealer for more information.

If John Deere Plus-50 II engine oil is not available, engine oil meeting one or more of the following may be used:

- API Service Category CJ-4
- ACEA Oil Sequence E9
- ACEA Oil Sequence E6

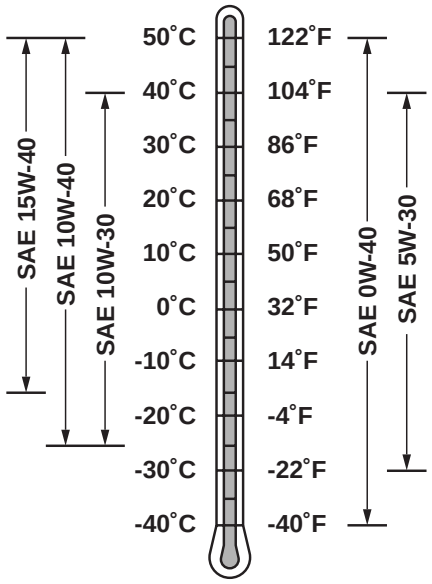
DO NOT use engine oil containing more than 1.0% sulfated ash, 0.12% phosphorus, or 0.4% sulfur.

Multi-viscosity diesel engine oils are preferred.

Diesel fuel quality and fuel sulfur content must comply with all existing emissions regulations for the area in which the engine operates.

IMPORTANT: Use only ultra low sulfur diesel (ULSD) fuel with a maximum sulfur content of 15 mg/kg (15 ppm).

Plus-50 is a trademark of Deere & Company



Oil Viscosities for Air Temperature Ranges

OUT4001,0000B93-19-02OCT12-1/1

Engine Oil and Filter Service Intervals

NOTE: The following engine oil and filter service interval information is specified for engines that meet Interim Tier 4 and Stage III B emission levels.

Recommended oil and filter service intervals are based on a combination of oil pan capacity, type of engine oil and filter used, and sulfur content of the diesel fuel. Actual service intervals also depend on operation and maintenance practices.

Use oil analysis to evaluate the condition of the oil and to aid in selection of the proper oil and filter service interval. Contact your John Deere dealer for more information on engine oil analysis.

Change the oil and oil filter at least once every 12 months even if the hours of operation are fewer than the otherwise recommended service interval.

Diesel fuel sulfur content affects engine oil and filter service intervals. Higher fuel sulfur levels reduce oil and filter service intervals.

Use of diesel fuel with sulfur content less than 15 mg/kg (15 ppm) is REQUIRED.

IMPORTANT: To avoid engine damage:

- **Reduce oil and filter service intervals by 50% when using biodiesel blends greater than B20. Oil analysis may allow longer service intervals.**
- **Use only approved oil types.**

Approved Oil Types:

- John Deere Plus-50™ II.
- “Other Oils” include API CJ-4, ACEA E9, and ACEA E6.

NOTE: The 500 hour extended oil and filter change interval is only allowed if all of the following conditions are met:

- *Use of diesel fuel with sulfur content less than 15 mg/kg (15 ppm).*
- *Use of John Deere Plus-50™ II oil.*
- *Use of an approved John Deere oil filter.*

Engine Oil and Filter Service Intervals	
John Deere Plus-50™ II	500 hours
Other Oils	250 hours

Plus-50 is a trademark of Deere & Company

OUT4001,0000B94-19-06MAR12-1/1

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.

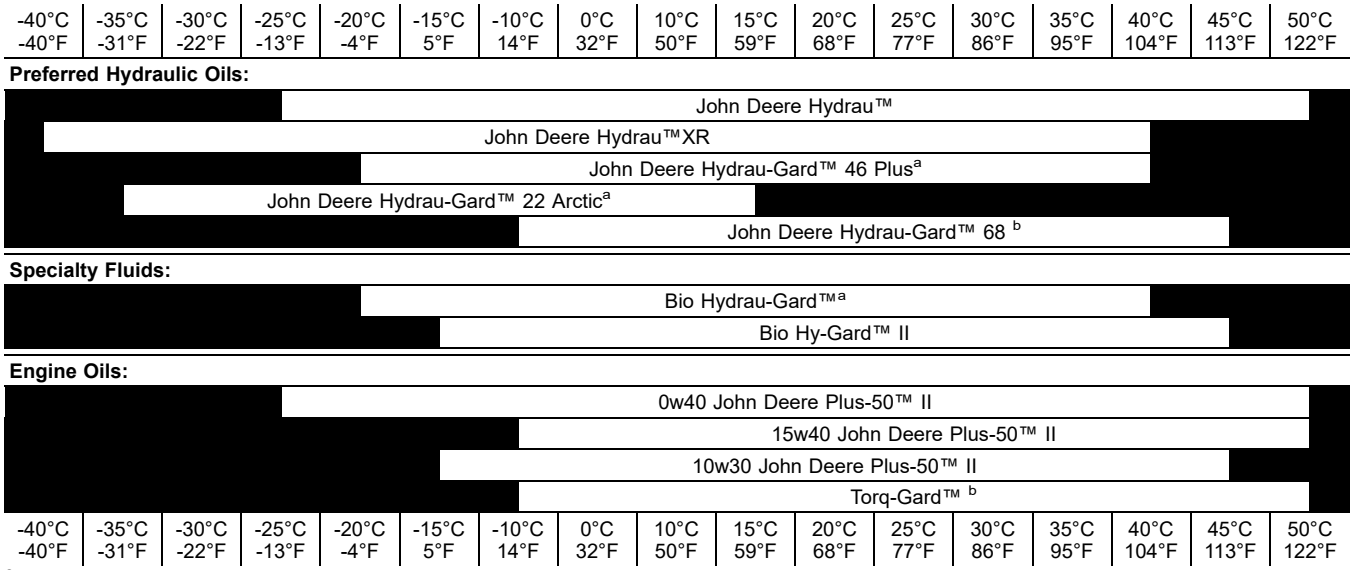
The temperature limits and service intervals shown in this manual apply to John Deere branded fluids or fluids that have been tested and/or approved for use in John Deere equipment.

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

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

Hydraulic Oil

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



[a] *Not available in the United States or Canada*
[b] *Brazil only.*

Hydrau is a trademark of Deere & Company
Hydrau-Gard is a trademark of Deere & Company
Hydrau-Gard is a trademark of Deere & Company
Bio Hydrau-Gard is a trademark of Deere & Company
Bio Hy-Gard is a trademark of Deere & Company
Plus-50 is a trademark of Deere & Company
Torq-Gard is a trademark of Deere & Company

IMPORTANT: To avoid machine damage. Do not mix fluids of different type or brand. Do not mix zinc-free and zinc-based. Mixing fluids can result in additive fall-out and lubricant degradation.

Alternative hydraulic oils may be used, at a 50% reduced service interval, if they meet the following specification.

- Anti-Wear Hydraulic Oils (AWHO):
  - ISO 11158 Category HV
  - DIN 51524-3

TX,HYDOIL,A-19-20OCT21-1/1

Transmission, Axles, and Mechanical Front Wheel Drive (MFWD) Oil

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

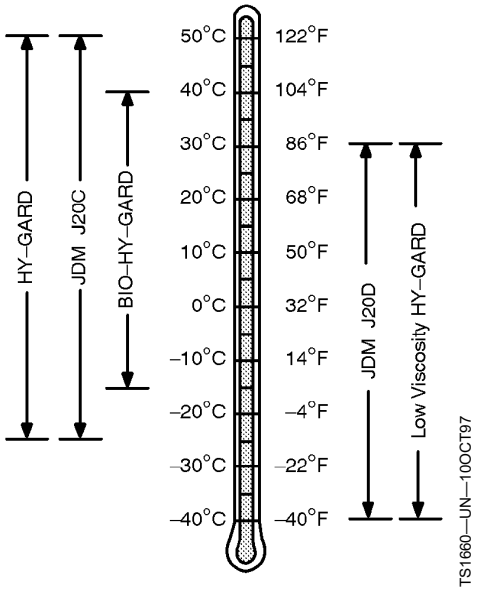
The following oils are preferred:

- John Deere Hy-Gard™
- John Deere Low Viscosity Hy-Gard™

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

- John Deere Standard JDM J20C
- John Deere Standard JDM J20D

Use John Deere Bio-Hy-Gard™ oil when a biodegradable fluid is required.



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

OUT4001,0000B4D-19-10FEB12-1/1

Grease

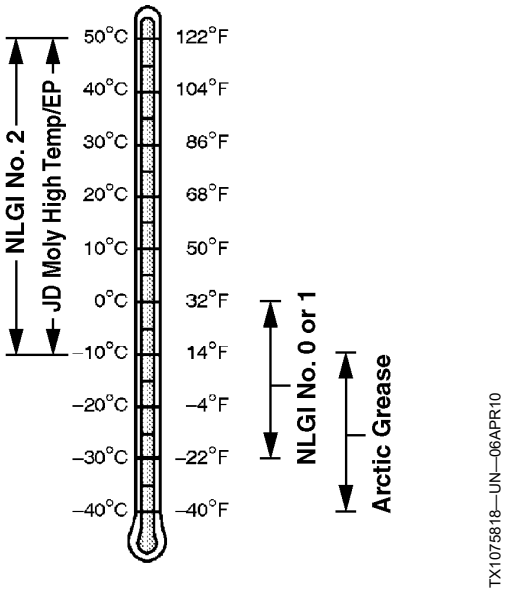
Use grease based on NLGI consistency numbers and the expected air temperature range during the service interval.

John Deere Moly High Temperature/EP Grease is preferred.

The following greases are also recommended:

- SAE Multipurpose EP Grease containing 3-5% molybdenum disulfide
- SAE Multipurpose EP Grease

IMPORTANT: Some types of grease thickeners are not compatible with others. Consult your grease supplier before mixing different types of grease.



VD76477,00012D0-19-19MAY10-1/1

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

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

Diesel Engine Coolant (engine with wet sleeve cylinder liners)

Failure to follow applicable coolant standards and drain intervals can result in severe engine damage that may not be covered under warranty. Warranties, including the emissions warranty, are not conditioned on the use of John Deere coolants, parts, or service.

Preferred Coolants

The following pre-mix engine coolants are preferred:

- **John Deere COOL-GARD™II**
- **John Deere COOL-GARD II PG**

COOL-GARD II pre-mix coolant is available in several concentrations with different freeze protection limits as shown in the following table.

COOL-GARD II Pre-Mix	Freeze Protection Limit
COOL-GARD II 20/80	-9°C (16°F)
COOL-GARD II 30/70	-16°C (3°F)
COOL-GARD II 50/50	-37°C (-34°F)
COOL-GARD II 55/45	-45°C (-49°F)
COOL-GARD II PG 60/40	-49°C (-56°F)
COOL-GARD II 60/40	-52°C (-62°F)

Not all COOL-GARD II pre-mix products are available in all countries.

Use COOL-GARD II PG when a non-toxic coolant formulation is required.

Additional Recommended Coolants

The following engine coolant is also recommended:

- John Deere COOL-GARD II Concentrate in a 40—60% mixture of concentrate with quality water.

IMPORTANT: When mixing coolant concentrate with water, do not use less than 40% or greater than 60% concentration of coolant. Less than 40% gives inadequate additives for corrosion protection. Greater than 60% can result in coolant gelation and cooling system problems.

Other Coolants

Other ethylene glycol or propylene glycol base coolants may be used if they meet the following specification:

- Pre-mix coolant meeting ASTM D6210 requirements
- Is formulated with a 2-ethylhexanoic acid (2-EHA) free additive package
- Coolant concentrate meeting ASTM D6210 requirements in a 40—60% mixture of concentrate with quality water

If coolant meeting one of these specifications is unavailable, use a coolant concentrate or pre-mix coolant that has a minimum of the following chemical and physical properties:

- Provides cylinder liner cavitation protection according to either the John Deere Cavitation Test Method or a fleet study run at or above 60% load capacity
- Is formulated with a nitrite-free additive package
- Is formulated with a 2-ethylhexanoic acid (2-EHA) free additive package
- Protects the cooling system metals (cast iron, aluminum alloys, and copper alloys such as brass) from corrosion

Water Quality

Water quality is important to the performance of the cooling system. Deionized or demineralized water is recommended for mixing with ethylene glycol and propylene glycol base engine coolant concentrate.

Coolant Drain Intervals

Drain and flush the cooling system and refill with fresh coolant at the indicated interval, which varies with the coolant used.

When COOL-GARD II or COOL-GARD II PG is used, the drain interval is 6 years or 6000 hours of operation.

If a coolant other than COOL-GARD II or COOL-GARD II PG is used, reduce the drain interval to 2 years or 2000 hours of operation.[1]

IMPORTANT: Do not use cooling system sealing additives or antifreeze that contains sealing additives.

Do not mix ethylene glycol and propylene glycol base coolants.

Do not use coolants that contain nitrites.

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[1] *Coolant analysis may extend the service interval of other "Coolants" to a maximum not to exceed the interval of Cool-Gard II coolants. Coolant analysis means taking a series of coolant samples at 1000 hour increments beyond the normal service interval until either the data indicate the end of useful coolant life or the maximum service interval of Cool-Gard II is reached.*

DX,COOL3-19-25AUG20-1/1

Drain Intervals for Diesel Engine Coolant

Drain and flush the cooling system and refill with fresh coolant at the indicated interval, which varies with the coolant used.

John Deere COOL-GARD™ II Premix, COOL-GARD II PG Premix and COOL-GARD II Concentrate are maintenance free coolants for up to six years or 6000 hours of operation, provided that the cooling system is topped off using only John Deere COOL-GARD II Premix or COOL-GARD II PG Premix.

Test the coolant condition annually with Coolant Test Strips designed for use with John Deere COOL-GARD II coolants. If the test strip chart indicates that additive is required, add John Deere COOL-GARD II Coolant Extender as directed.

If John Deere COOL-GARD™ II Premix, COOL-GARD II PG Premix, or COOL-GARD II Concentrate is used, but the coolant is not tested OR additives are not replenished by adding John Deere COOL-GARD II Coolant Extender, the drain interval is four years or 4000 hours of operation. This drain interval only applies to COOL-GARD II coolants that have been maintained within a 40—60% mixture of concentrate with quality water.

If a coolant other than COOL-GARD II, or COOL-GARD II PG is used, reduce the drain interval to two years or 2000 hours of operation.

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DX,COOL11-19-14APR11-1/1

John Deere COOL-GARD™ II Coolant Extender

Some coolant additives gradually deplete during engine operation. For COOL-GARD™ II pre-mix and COOL-GARD II Concentrate, replenish coolant additives between drain intervals by adding COOL-GARD II Coolant Extender.

COOL-GARD II Coolant Extender should not be added unless indicated by COOL-GARD II Test Strips. These test strips provide a simple, effective method to check the freeze point, additive levels, and pH of your engine coolant.

Test the coolant solution at intervals of 12 months and whenever excessive coolant is lost through leaks or overheating.

IMPORTANT: Do not use COOL-GARD II Test Strips with COOL-GARD II PG.

COOL-GARD II Coolant Extender is a chemically matched additive system for use with all COOL-GARD II coolants. COOL-GARD II Coolant Extender is not intended for use with nitrite-containing coolants.

IMPORTANT: Do not add a supplemental coolant additive when the cooling system is drained and refilled with any of the following:

- **John Deere COOL-GARD II**
- **John Deere COOL-GARD II PG**

The use of non-recommended supplemental coolant additives can result in additive drop-out, gelation of the coolant, or corrosion of cooling system components.

Add the recommended concentration of COOL-GARD II Coolant Extender. DO NOT add more than the recommended amount.

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DX,COOL16-19-15MAY13-1/1

Supplemental Coolant Additives

Some coolant additives will gradually deplete during engine operation. For nitrite-containing coolants, replenish coolant additives between drain intervals by adding a supplemental coolant additive as determined necessary by coolant testing.

John Deere Liquid Coolant Conditioner is recommended as a supplemental coolant additive for nitrite-containing coolants.

John Deere Liquid Coolant Conditioner is not designed for use with John Deere COOL-GARD™ II Premix, COOL-GARD II PG Premix, or COOL-GARD II Concentrate.

IMPORTANT: Do not add a supplemental coolant additive when the cooling system is drained and refilled with any of the following:

- **John Deere COOL-GARD II**
- **John Deere COOL-GARD II PG**

If other coolants are used, consult the coolant supplier and follow the manufacturer's recommendation for use of supplemental coolant additives.

The use of non-recommended supplemental coolant additives may result in additive drop-out and gelation of the coolant.

Add the manufacturer's recommended concentration of supplemental coolant additive. DO NOT add more than the recommended amount.

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DX,COOL4-19-14APR11-1/1

Operating in Warm Temperature Climates

John Deere engines are designed to operate using recommended engine coolants.

Always use a recommended engine coolant, even when operating in geographical areas where freeze protection is not required.

IMPORTANT: Water may be used as coolant *in emergency situations only.*

Foaming, hot surface aluminum and iron corrosion, scaling, and cavitation occur when water is used as the coolant, even when coolant conditioners are added.

Drain cooling system and refill with recommended engine coolant as soon as possible.

DX,COOL6-19-17FEB20-1/1

Additional Information About Diesel Engine Coolants and John Deere COOL-GARD™ II Coolant Extender

Engine coolants are a combination of three chemical components: ethylene glycol (EG) or propylene glycol (PG) antifreeze, inhibiting coolant additives, and quality water.

Coolant Specifications

John Deere COOL-GARD™ II Premix either EG or PG, are fully formulated coolants that contain all three components in their correct concentrations. DO NOT add an initial charge of John Deere COOL-GARD II Coolant Extender to COOL-GARD II Premix. DO NOT add any other supplemental coolant additive or water to COOL-GARD II Premix.

John Deere COOL-GARD II Concentrate contains both ethylene glycol and inhibiting coolant additives. Mix this product with quality water, but DO NOT add an initial charge of John Deere COOL-GARD II Coolant Extender or any other supplemental coolant additive.

Replenish Coolant Additives

Some coolant additives will gradually deplete during engine operation. Periodic replenishment of inhibitors is required, even when John Deere COOL-GARD II Premix or COOL-GARD II Concentrate is used. Follow the recommendations in this manual for the use of John Deere COOL-GARD II Coolant Extender.

Why use John Deere COOL-GARD II Coolant Extender?

Operating without proper coolant additives will result in increased corrosion, cylinder liner erosion and pitting, and other damage to the engine and cooling system. A simple mixture of ethylene glycol or propylene glycol and water will not give adequate protection.

John Deere COOL-GARD II Coolant Extender is a chemically matched additive system designed to fortify the proprietary additives used in John Deere COOL-GARD II Premix and COOL-GARD II Concentrate and to provide optimum protection for up to six years or 6000 hours of operation.

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Avoid Automotive-type Coolants

Never use automotive-type coolants (such as those meeting ASTM D3306). These coolants do not contain the correct additives to protect heavy-duty diesel engines. Do not treat an automotive engine coolant with supplemental coolant additives because the high concentration of additives can result in additive fallout.

Water Quality

Water quality is important to the performance of the cooling system. Distilled, deionized, or demineralized water is recommended for mixing with ethylene glycol and propylene glycol base engine coolant concentrate.All water used in the cooling system should meet the following minimum specifications for quality:

Chlorides	<40 mg/L
Sulfates	<100 mg/L
Total dissolved solids	<340 mg/L
Total hardness	<170 mg/L
pH	5.5 to 9.0

Freeze Protection

The relative concentrations of glycol and water in the engine coolant determine its freeze protection limit.

Ethylene Glycol	Freeze Protection Limit
40%	-24°C (-12°F)
50%	-37°C (-34°F)
60%	-52°C (-62°F)
Propylene Glycol	**Freeze Protection Limit**
40%	-21°C (-6°F)
50%	-33°C (-27°F)
60%	-49°C (-56°F)

DO NOT use a coolant-water mixture greater than 60% ethylene glycol or 60% propylene glycol.

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Testing Diesel Engine Coolant

Maintaining adequate concentrations of glycol and inhibiting additives in the coolant is critical to protect the engine and cooling system against freezing, corrosion, and cylinder liner erosion and pitting.

Test the coolant solution at intervals of 12 months or less and whenever excessive coolant is lost through leaks or overheating.

Coolant Test Strips

Coolant test strips are available from your John Deere dealer. These test strips provide a simple, effective method to check the freeze point and additive levels of your engine coolant.

When Using John Deere COOL-GARD II

John Deere COOL-GARD II Premix™ , COOL-GARD II PG Premix and COOL-GARD II Concentrate are maintenance free coolants for up to six years or 6000 hours of operation, provided that the cooling system is topped off using only John Deere COOL-GARD II Premix or COOL-GARD II PG premix. Test the coolant condition annually with coolant test strips designed for use with John Deere COOL-GARD II coolants. If the test strip chart indicates that additive is required, add John Deere COOL-GARD II Coolant Extender as directed.

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Add only the recommended concentration of John Deere COOL-GARD II Coolant Extender. DO NOT add more than the recommended amount.

When Using Nitrite-Containing Coolants

Compare the test strip results to the supplemental coolant additive (SCA) chart to determine the amount of inhibiting additives in your coolant and whether more John Deere Liquid Coolant Conditioner should be added.

Add only the recommended concentration of John Deere Liquid Coolant Conditioner. DO NOT add more than the recommended amount.

Coolant Analysis

For a more thorough evaluation of your coolant, perform a coolant analysis. The coolant analysis can provide critical data such as freezing point, antifreeze level, pH, alkalinity, nitrite content (cavitation control additive), molybdate content (rust inhibitor additive), silicate content, corrosion metals, and visual assessment.

Contact your John Deere dealer for more information on coolant analysis.

DX,COOL9-19-11APR11-1/1

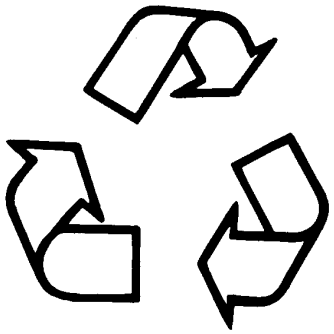
Disposing of Coolant

Improperly disposing of engine coolant can threaten the environment and ecology.

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 a local environmental or recycling center, or from an authorized John Deere dealer.



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Recycle Waste

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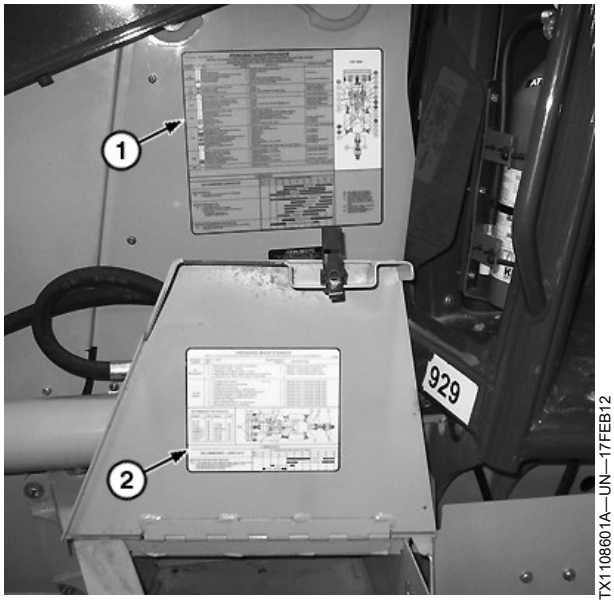
Service Machine at Specified Intervals

Lubricate and make service checks and adjustments at intervals shown on the periodic maintenance chart (1), grease chart (2), and in the maintenance sections of this manual.

Perform service on items at multiples of the original requirement. For example, at 500 hours also service those items (if applicable) listed under 250 hours and 10 hours or daily.

Intervals shown on charts and in this manual are for normal conditions. If operating in difficult conditions, service at shorter intervals.

1—Periodic Maintenance Chart 2—Grease Chart



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Periodic Maintenance Chart

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Check Hour Meter Regularly

Check the hour meter (3) in the display window to determine when the machine needs periodic maintenance.

To check the hour meter, press engine start switch once and press the NEXT button on standard display monitor (SDM) until the hour meter is displayed.

To check the hour meter with the engine off, press and hold the SELECT button on the SDM.

1—Transmission Gear
2—Tachometer
3—Hour Meter (shown), Transmission Oil Temperature, Battery Voltage, and Job Timer Display

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Normal Display Window

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Prepare Machine for Maintenance

IMPORTANT: Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment includes such items as oil, fuel, coolant, brake fluid, filters, and batteries. Do not pour waste onto the ground, down a drain, or into any water source.

Before performing procedures in the maintenance sections and before leaving the operator's seat, park the machine, and release hydraulic pressure.

CAUTION: Prevent serious injury or death from unexpected machine movement. Always install the loader boom service lock, or lower the front loader boom fully to the ground, and move control levers to release hydraulic pressure before working near front of machine. See Loader Boom Service Lock in this section for installation instructions.

Raise the front loader boom and install the loader boom service lock before performing maintenance in the engine compartment. See Loader Boom Service Lock in this section.

If the machine is equipped with ride control, discharge hydraulic pressure from the ride control system before performing maintenance. See Discharge Ride Control System Hydraulic Pressure—If Equipped (4-1).

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Fuel Tank

CAUTION: Fuel is flammable and may ignite if spilled on hot engine. To prevent injury, handle fuel carefully. If engine is hot or running, DO NOT fill the fuel tank. DO NOT smoke while filling fuel tank or working on fuel system.

To avoid condensation, fill the fuel tank at the end of each work day. Shut off engine before filling.

Specification

Fuel Tank—Capacity	155.2 L 41.0 gal.

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Loader Boom Service Lock

Install loader boom service lock (1) when front loader must be raised for service procedures.

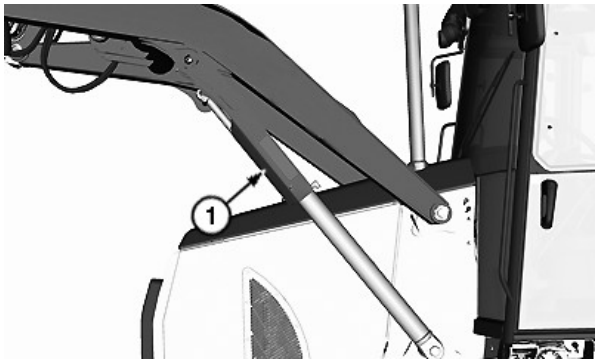
IMPORTANT: Do not raise or lower front loader boom while the engine hood is open. Always close engine hood fully before moving front loader boom, or severe damage to engine hood will occur.

Installing the Loader Boom Service Lock:

1. Close engine hood.
2. Empty loader bucket and move bucket to dump position.
3. Raise boom until loader boom service lock can fit over cylinder rod.
4. Stop engine.
5. Remove cotter pin and retaining pin. Lower loader boom service lock onto cylinder rod.
6. Install retaining pin and cotter pin to attach loader boom service lock on cylinder rod.
7. Slowly lower boom until its weight settles onto the loader boom service lock.

Removing the Loader Boom Service Lock:

1. Close engine hood.



Locked Position

1—Loader Boom Service Lock

2. Start engine and raise boom slightly to allow clearance between loader boom service lock and cylinder.
3. Remove cotter pin and retaining pin.
4. Lift loader boom service lock to storage position. Install retaining pin and cotter pin to retain.

OUT4001,00009EB-19-21FEB12-1/1

Opening and Closing Engine Hood

CAUTION: Prevent serious injury or death from unexpected machine movement. Always install the loader boom service lock, or lower the front loader boom fully to the ground, and move control levers to release hydraulic pressure before working near the front of the machine.

IMPORTANT: Do not raise or lower front loader boom while the engine hood is open. Always close engine hood fully before moving front loader boom, or severe damage to engine hood will occur.

NOTE: The engine hood can be partially opened when the front loader boom is lowered fully to the ground. To fully open the engine hood, the front loader boom must be fully raised and the loader boom service lock must be installed. See Loader Boom Service Lock in this section for installation instructions.

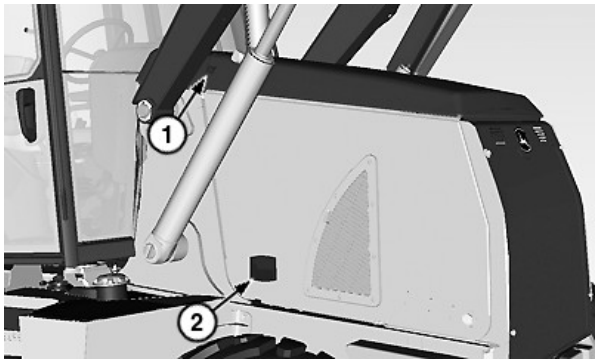
To open hood, push in on hood tilt latch (1) and lift hood using handhold (2).

Hood support rail (3) has two positions:

- Partial open position (4)
- Full open position (5)

To close hood pull out on support arm (6) and push hood closed until latch engages.

1—Hood Tilt Latch
2—Handhold
3—Hood Support Rail
4—Partial Open Position
5—Full Open Position
6—Support Arm



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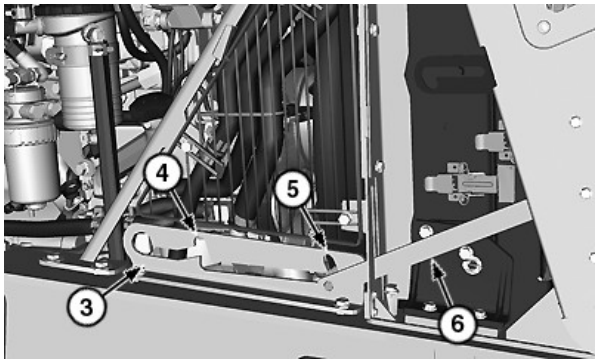
Engine Hood



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Open Positions

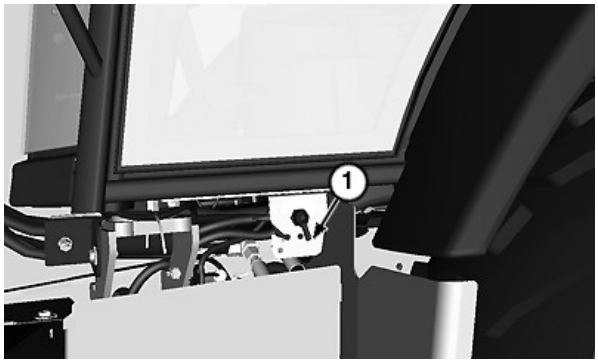
OUT4001,00009EC-19-08FEB12-1/1

Battery Disconnect—If Equipped

Turn battery disconnect switch (1) clockwise to turn ON machine electrical system.

Turn switch counterclockwise to turn OFF machine electrical system.

1—Battery Disconnect Switch



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Battery Disconnect Switch

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Fluid Analysis Program Test Kits and 3-Way Coolant Test Kit

Fluid Analysis Program Test Kits and the 3-Way Coolant Test Kit are John Deere fluid sampling products to help you monitor machine maintenance and system condition. The objective of a fluid sampling program is to ensure machine availability when you need it and to reduce repair costs by identifying potential problems before they become critical.

Engine, hydraulic, power train, and coolant samples should be taken from each system on a periodic basis, before a filter or fluid change interval. Certain systems require more frequent sampling. Consult your authorized John Deere dealer on a maintenance program for your specific application. Your authorized John Deere dealer has the sampling products and expertise to assist you in lowering your overall operating costs through fluid sampling.

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TX,ANALYSIS-19-20JAN11-1/1

Service Intervals

Model: 310SK	PIN/Serial Number:
Hour Meter Reading:	
SERVICE INTERVALS	
Service your machine at intervals shown on this chart. Also, perform service on items at multiples of the original requirement. For example, at 500 hours also service those items listed under 250 hours and 10 hours or daily.	
FLUID SAMPLING	
Take fluid samples from each system as indicated on this form. The manufacturer of the fluid analysis kits will provide maintenance recommendations based upon the results of the fluid analysis and the operating information you supply. Regular fluid sampling extends the operational life of your machine.	
As Required	
□ Add coolant extender as indicated by COOL-GARD™ II test strips	□ Service exhaust filter
□ Inspect tires and check pressure	□ Clean or replace engine air cleaner elements
□ Check wheel fasteners	□ Inspect and clean cooling system
□ Clean cab fresh air and recirculation filters (if equipped)	□ Lubricate non-powered front wheel bearings (if equipped)
□ Drain water and sediment from fuel filters	
Every 10 Hours or Daily	
□ Check coolant level	□ Lubricate backhoe boom, crowd cylinders and pivots
□ Check hydraulic reservoir oil level	□ Lubricate backhoe coupler mechanical jack (if equipped)
□ Check engine oil level	□ Lubricate backhoe bucket cylinder and pivots
□ Lubricate loader pivot points	□ Lubricate backhoe swing cylinder and pivots
□ Lubricate loader quick coupler (if equipped)	□ Lubricate MFWD front axle and universal joints (if equipped)
□ Lubricate front axle pivot pin	□ Lubricate non-powered front axle steering pivots (if equipped)
□ Lubricate stabilizer pivots and cylinder pins	□ Lubricate multipurpose bucket pivots (if equipped)
Every 250 Hours	
□ Take engine oil sample	□ Check rear axle oil level
□ Check MFWD planetary housing oil level (if equipped)	□ Check transmission oil level
□ Check MFWD front axle housing oil level (if equipped)	□ Lubricate MFWD drive shaft spline (if equipped)
□ Check battery electrolyte level and terminals	
Every 500 Hours	
□ Take transmission oil sample	□ Check boom-to-dipperstick pin bolt torque
□ Take hydraulic oil sample	□ Drain water and sediment from fuel tank
□ Take rear axle oil sample	□ Drain and refill engine oil
□ Take engine coolant sample	□ Replace engine oil filter
□ Take diesel fuel sample	□ Replace primary fuel filter
□ Check air intake hose	□ Replace final fuel filter
Every 1000 Hours	
□ Check coolant	□ Replace cab fresh air and recirculation filters (if equipped)
□ Clean, pack, and adjust non-powered front wheel bearings (if equipped)	□ Replace hydraulic reservoir breather
□ Drain and refill transmission oil	□ Replace fuel breather
□ Replace transmission oil filter	□ Replace engine air cleaner elements
□ Replace hydraulic oil filter	□ Inspect serpentine belt
Every 2000 Hours	
□ Drain and refill MFWD planetary housing oil (if equipped)	□ Inspect and clean hydraulic reservoir fill screen
□ Drain and refill MFWD front axle housing oil (if equipped)	□ Drain and refill hydraulic reservoir oil
□ Drain and refill rear axle and planetary oil	□ Replace open crankcase ventilation (OCV) filter

Continued on next page

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Every 3000 Hours
□ Adjust engine valve lash
Every 6000 Hours
□ Drain and refill cooling system

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Required Parts

REQUIRED PARTS						
Ensure machine performance and availability; use only genuine John Deere parts. Verify part numbers are current and that any associated parts are also on hand, i.e., filter O-rings.						
Description	**Every 250 Hours**	**Every 500 Hours**	**Every 1000 Hours**	**Every 2000 Hours**	**Every 3000 Hours**	**Every 6000 Hours**
Engine Oil Filter		1	1	1	1	1
Primary Fuel Filter		1	1	1	1	1
Final Fuel Filter		1	1	1	1	1
Hydraulic Oil Filter			1	1	1	1
Hydraulic Reservoir Breather			1	1	1	1
Primary Engine Air Filter Element			1	1	1	1
Secondary Engine Air Filter Element			1	1	1	1
Dust Unloader Valve			1	1	1	1
Fuel Breather			1	1	1	1
Transmission Oil Filter			1	1	1	1
Cab Fresh Air Filter			1	1	1	1
Cab Recirculation Filter			1	1	1	1
OCV Filter				1		1
Engine Rocker Arm Cover Gasket					1	1
Diesel Particulate Filter (component of exhaust filter)	As Required					
John Deere Plus-50™ II Oil						
—Engine Oil[1]		13.0 L (3.4 gal)	13.0 L (3.4 gal)	13.0 L (3.4 gal)	13.0 L (3.4 gal)	13.0 L (3.4 gal)
—Hydraulic Oil[1]				37.0 L (9.8 gal)		37.0 L (9.8 gal)
Hy-Gard™ Oil						
—Transmission Oil[1]			15.0 L (4.0 gal)	15.0 L (4.0 gal)	15.0 L (4.0 gal)	15.0 L (4.0 gal)
—MFWD Axle Center Section Housing Oil[1] (each) (if equipped)				6.5 L (1.7 gal)		6.5 L (1.7 gal)
—MFWD Axle Planetary Housing Oil [1] (each) (if equipped)				1.0 L (1.0 qt)		1.0 L (1.0 qt)
—Rear Axle Housing and Planetary Oil[1]				18.0 L (4.8 gal)		18.0 L (4.8 gal)
COOL-GARD™ II Pre-Mix						32.9 L (8.7 gal)
Coolant Extender	As Required					
Fluid Analysis Kits[2]						
—Diesel Engine Oil	1	1	1	1	1	1
—Transmission and Rear Axle Oil		2	2	2	2	2
—Hydraulic Oil		1	1	1	1	1
—Diesel Fuel		1	1	1	1	1
—Engine Coolant		1	1	1	1	1
—COOL-GARD™ II Test Strips			1	1	1	1

[1]For recommended oil type and oil viscosities based on operating temperatures see Maintenance—Machine. (Section 3-1.)
[2]Based on fluid analysis results, intervals may need to be adjusted for your operating conditions. Consult an authorized John Deere dealer.

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Hy-Gard is a trademark of Deere & Company
COOL-GARD is a trademark of Deere & Company

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Check Coolant

CAUTION: Prevent possible injury from hot spraying fluids. Shut off engine. Remove filler cap only when cool enough to touch with bare hands. Slowly loosen cap to relieve pressure before removing completely.

IMPORTANT: John Deere COOL-GARD™ II Coolant Extender does not protect against freezing. Coolant extender prevents rust, scale, and liner cavitation.

NOTE: Check coolant every 1000 hours or 1 year, or when replacing 1/3 or more of coolant. Add coolant extender as indicated by John Deere COOL-GARD™ II test strips.

1. Remove surge tank cap (1). Test coolant solution using the following kit:

   - **COOL-GARD™ II Test Strips**
     Coolant test strips provide an effective method to check freeze point and additive levels of engine coolant. See your authorized dealer for COOL-GARD™ II test strips and follow instructions on kit.

2. Add John Deere COOL-GARD™ II Coolant Extender as necessary. Follow instructions on container for amount.

Specification

Cooling System—Capacity	32.9 L 8.7 gal.

3. Install surge tank cap.

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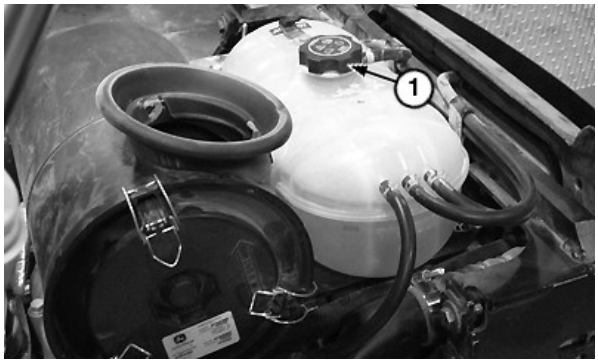
Service Cooling System Safely



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Surge Tank Location

1—Surge Tank Cap

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Inspect Tires and Check Pressure

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

Always maintain the correct tire pressure. DO NOT inflate the tires above the recommended pressure.

Inspect tires and wheels daily. DO NOT operate with low pressure, cuts, bubbles, damaged rims, or missing lug bolts and nuts.

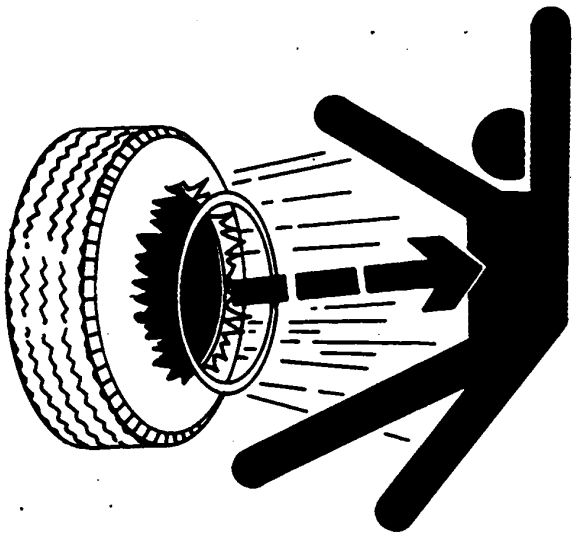
Carefully inspect any tire and rim assembly that has been run flat or severely underinflated before reinflating the tire. Damage to the rim and tire may have developed. Call your authorized dealer or a qualified repair service to inspect the rim and tire assembly and make necessary repairs.

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.

NEVER cut or weld on an inflated tire or rim assembly, rim, or rim parts. Heat from welding could cause an increase in pressure and may result in a tire explosion.

Do not attempt to mount a tire if you do not have the proper equipment and experience to perform the job. Have it done by your authorized John Deere dealer or a qualified repair service.

1. Inspect tires for cuts, bubbles, damaged rims, or missing retainer bolts. Pay special attention to any tire and rim assembly that has been run flat or underinflated.
2. Check tire pressure with an accurate gauge having 6.9 kPa (0.07 bar) (1 psi) graduations. If tires contain liquid ballast, use a special air-water gauge and measure with valve stem at bottom.
3. Compare measured pressure to recommended pressure for manufacturer's tire size installed on machine. (See Tire Pressures in this section.)
4. If necessary, adjust tire pressure as follows:



Service Tires Safely

a. Shut off air supply to hose.

b. Move gauge hand to correct pressure.

c. Lock air chuck onto tire valve.

d. Stand to front or rear of tire and turn on air supply.

e. After tire is at correct pressure, shut off air supply.

f. Release air chuck from tire valve.

OUT4001,00009F1-19-14AUG14-1/1

Tire Pressures

IMPORTANT: ALWAYS follow tire manufacturer's recommendations for operating pressure and load range.

NOTE: Tire shipping pressure may not be the same as tire operating pressure. Tire pressures may be changed based on machine configuration and actual working conditions.

IMPORTANT: The tire pressure stamped on the sidewall of a tire is the manufacturer's recommended pressure for that specific tire. If there is a pressure difference between the sidewall stamp and this chart, use the pressure listed on chart. These pressures have been approved by the tire manufacturer. The pressure difference on these tires may be to alleviate tire squat, improve stability, and prevent premature tire malfunction.

NOTE: Some or all of these tires options may not be available on specific backhoe models.

Front Axle	
Tire Size	**Pressure**
10.5/80-18	372 kPa 3.7 bar 54 psi
11L-16	441 kPa 4.4 bar 64 psi
12.5/80-18 12PR	372 kPa 3.7 bar 54 psi
12.5/80-18 14PR	427 kPa 4.3 bar 62 psi
12-16.5 8PR	345 kPa 3.4 bar 50 psi
12-16.5 10PR R-3	276 kPa 2.8 bar 40 psi
12-16.5 10PR SS 12-16.5 10PR NHS	448 kPa 4.5 bar 65 psi
14.5/75-16.1	276 kPa 2.8 bar 40 psi
15-19.5	410 kPa 2.8 bar 60 psi
16.5L-16.1	276 kPa 2.8 bar 40 psi
340/80R18 IT530	317 kPa 3.2 bar 46 psi
340/80R18 XMCL	400 kPa 4.0 bar 58 psi
LT245/75R16	551 kPa 5.5 bar 80 psi

Tire Inflation Pressures

Rear Axle	
Tire Size	**Pressure**
16.9-28	221 kPa 2.2 bar 32 psi
19.5L-24 10PR R-3	165 kPa 1.7 bar 24 psi
19.5L-24 10PR R-4	193 kPa 1.9 bar 28 psi
19.5L-24 12PR	234 kPa 2.3 bar 34 psi
20.5-25 12PR L-3	248 kPa 2.5 bar 36 psi
21L-24 10PR	179 kPa 1.8 bar 26 psi
21L-24 12PR	234 kPa 2.3 bar 32 psi
21L-28	248 kPa 2.5 bar 36 psi
500/70R24 IT530	317 kPa 3.2 bar 46 psi
500/70R24 XMCL	317 kPa 3.2 bar 46 psi
540/70R24	317 kPa 3.2 bar 46 psi
21L-24 16PR	280 kPa 2.8 bar 40 psi

Tire Inflation Pressures

OUT4001,00009F2-19-01OCT12-1/1

Check Wheel Fasteners

NOTE: Tighten wheel fasteners:

- *after first 50-100 hours of loaded operation*
- *after replacing or installing a new wheel; then again after first 50-100 hours of loaded operation*

Continue to check and adjust wheel fastener torque every 50-100 hours until wheel fastener torque is maintained.

Verify rear and front wheel fasteners (1 and 2) meet torque specification.

Specification	
Rear Wheel Fastener—Torque	725 N·m (535 lb.-ft.)
Front Wheel Fastener (non-powered front axle)—Torque	230 N·m (170 lb.-ft.)
Front Wheel Fastener (MFWD)—Torque	565 N·m (417 lb.ft)

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Wheel Fastener Location (right side shown)

1—Rear Wheel Fastener (10 used per tire)
2—Front Wheel Fastener (8 used per tire)

OUT4001,00009F3-19-06SEP23-1/1

Clean Cab Fresh Air and Recirculation Filters —If Equipped

Cab Fresh Air Filter

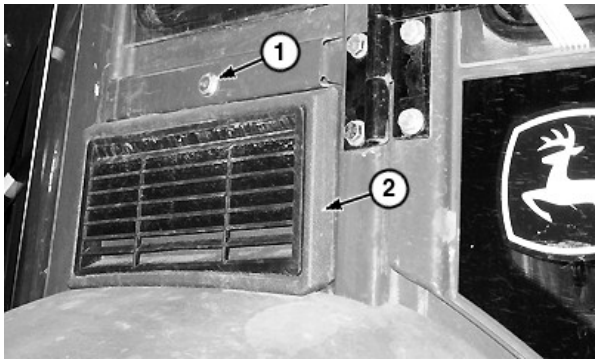
1. Release latch (1) located on outside of right window frame.
2. Remove filter cover (2) and cab fresh air filter (3).

NOTE: Always replace damaged air filters.

3. Inspect filter. Replace if damaged.

CAUTION: Prevent possible injury from flying chips and dirt. Reduce compressed air to less than 210 kPa (2.10 bar) (30 psi) when using for cleaning purposes. Clear area of bystanders, guard against flying debris, and wear personal protection equipment, including eye protection.

4. Clean filter using one of the following methods:
   - Tap filter on a flat surface with the dirty side down.
   - Use compressed air opposite to the normal air flow.
   - Wash filter in warm soapy water. Flush filter thoroughly with clean water. Let filter dry before installing.
5. Clean dust from filter housing. Replace cab fresh air filter as required.
6. Install filter into housing and install filter cover.
7. Secure latch.



TX1105193A—UN—15FEB12

Filter Cover

TX1105212A—UN—15FEB12

Cab Fresh Air Filter

1—Latch
2—Filter Cover
3—Cab Fresh Air Filter

Continued on next page

OUT4001,00009F4-19-18FEB15-1/2

Cab Recirculating Air Filter

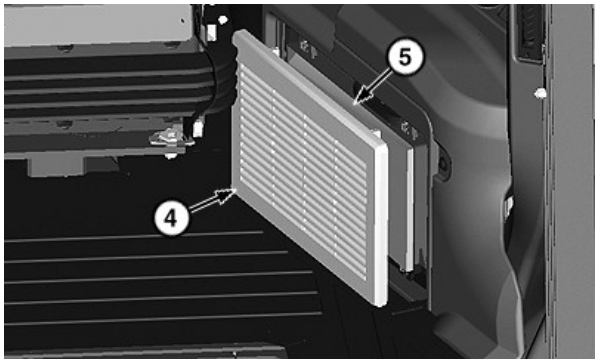
1. Remove filter cover (4) and cab recirculating air filter (5).

NOTE: Always replace damaged air filters.

2. Inspect filter. Replace if damaged.

CAUTION: Prevent possible injury from flying chips and dirt. Reduce compressed air to less than 210 kPa (2.10 bar) (30 psi) when using for cleaning purposes. Clear area of bystanders, guard against flying debris, and wear personal protection equipment, including eye protection.

3. Clean filter using one of the following methods:
   - Tap filter on a flat surface with the dirty side down.
   - Use compressed air opposite to the normal air flow.
   - Wash filter in warm soapy water. Flush filter thoroughly with clean water. Let filter dry before installing.
4. Clean dust from filter housing. Replace cab recirculating air filter as required.



Cab Recirculating Air Filter

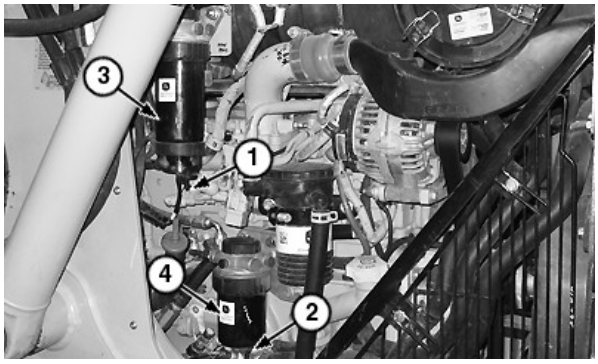
4—Filter Cover **5—Cab Recirculating Air Filter**

5. Install filter into housing and install filter cover.

OUT4001,00009F4-19-18FEB15-2/2

Drain Water and Sediment from Fuel Filters

1. Fuel filters are located on right side of engine compartment.
2. Clean area around primary and final fuel filters (3 and 4).
3. Place suitable container under primary fuel filter drain valve (1) to collect waste.
4. Loosen valve and allow water and sediment to drain from primary fuel filter assembly.
5. Tighten valve. Dispose of waste properly.
6. Place suitable container under final fuel filter drain valve (2) to collect waste.
7. Loosen valve and allow water and sediment to drain from final fuel filter assembly.
8. Tighten valve. Dispose of waste properly.



1—Primary Fuel Filter Drain Valve
2—Final Fuel Filter Drain Valve
3—Primary Fuel Filter
4—Final Fuel Filter

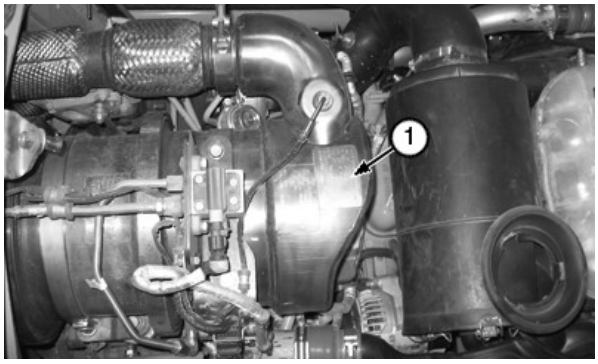
OUT4001,00009F5-19-29FEB12-1/1

Service Exhaust Filter

CAUTION: Under federal, state, and/or local laws or regulations, exhaust filter ash may be classified as a hazardous waste. Hazardous waste must be disposed of in accordance with all applicable federal, state and local laws or regulations governing hazardous waste disposal. Only a qualified service provider should remove ash from the exhaust filter. See your authorized dealer for exhaust filter ash handling and disposal.

The exhaust filter (1) is designed to retain residual ash, which is a noncombustible result of additives used in crankcase lubrication oils and the fuel. As ash levels rise, the capacity for soot storage is reduced. Engine performance can be reduced due to increased exhaust system back pressure. The residual ash must be removed from the filter.

The standard display monitor (SDM) will indicate when the exhaust filter is restricted and requires ash removal service. It is expected that the service interval for exhaust filter ash removal will be at least 4500 hours, however, actual service should take place when indicated by the SDM. Exhaust filter service may involve removing accumulated ash from the exhaust filter using an approved ash removal method, exchanging the exhaust filter for a comparable exhaust filter in which accumulated ash has been removed, or replacing with a new exhaust filter.



Exhaust Filter

1—Exhaust Filter

Do **NOT** attempt to remove exhaust filter from machine. **Contact your authorized dealer to remove exhaust filter for ash removal or replacement.**

Failure to follow the approved ash removal methods may violate U.S. federal, state and local hazardous waste laws, along with damage to the exhaust filter resulting in potential denial of the emissions warranty.

BG71631,000008D-19-27JAN12-1/1

Clean or Replace Air Cleaner Elements

1. Open engine hood.
2. Remove air cleaner cover by releasing clips (1).
3. Remove primary element (2).
4. Remove secondary element (3).
5. If engine air filter restriction indicator on standard display monitor (SDM) is illuminated, replace both elements.

IMPORTANT: A damaged or dirty element may cause engine damage.

Install a new primary element:

1. **If the element shows damage.**
2. **If element will not clean.**
3. **After 1000 hours service.**

Install a new secondary element:

1. **If the primary element is damaged and needs to be replaced.**
2. **If the element is visibly dirty.**
3. **After 1000 hours service.**

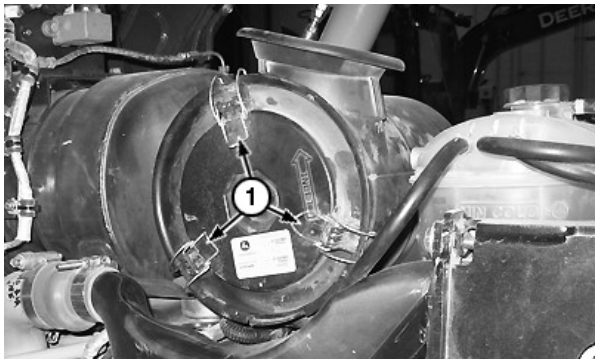
DO NOT clean a secondary element. Install a new element carefully centering it in the canister.

6. Inspect each element and gasket (4) for damage. Hold a bright light inside primary element and check for holes.

NOTE: Engine air filter restriction indicator will not signal correctly if an element has a break or is not correctly sealed in air cleaner housing. Replace damaged elements.

7. Be sure outer screen (5) is not dented. Vibration can quickly wear a hole in filter.
8. Install secondary element into housing making sure it is centered in canister, then install primary element.
9. Install air cleaner cover and secure clips.
10. Close engine hood.

1—Clip (3 used)
2—Primary Element
3—Secondary Element
4—Gasket
5—Outer Screen



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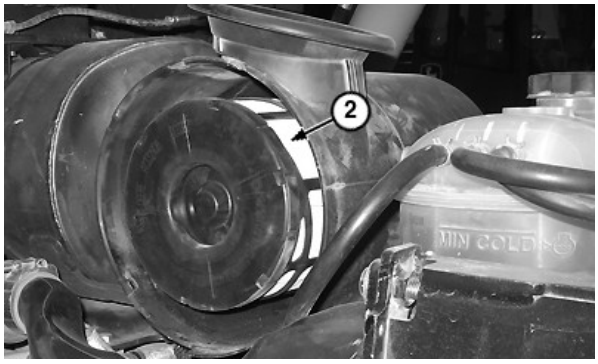
Air Cleaner Cover



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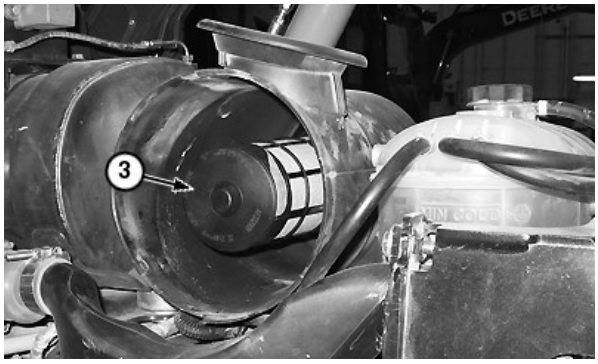
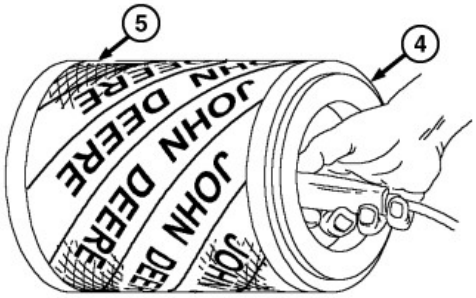
Primary Air Filter



TX1105359—UN—07FEB12

Secondary Air Filter



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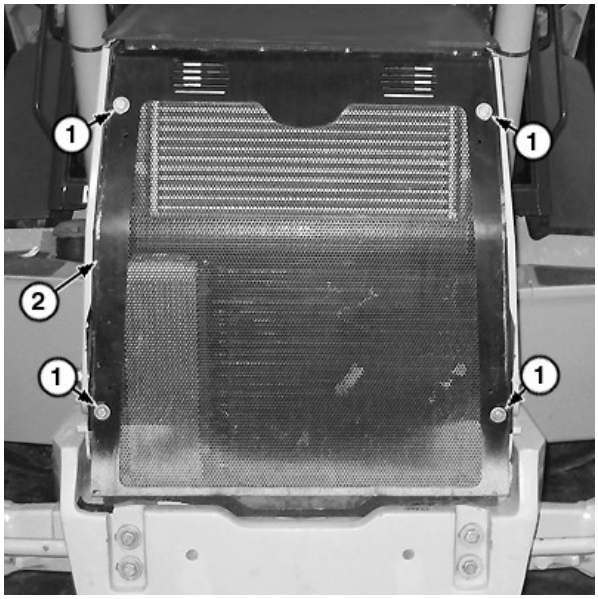
Air Cleaner Element Inspection

BG71631,0000008-19-07FEB12-1/1

Inspect and Clean Cooling System

1. Lift loader boom and install boom service lock.
2. Remove cap screws (1) and front grille cover (2).

1—Cap Screw (4 used) **2—Front Grille Cover**



TX1109379—UN—23AUG13

Front Grille Cover

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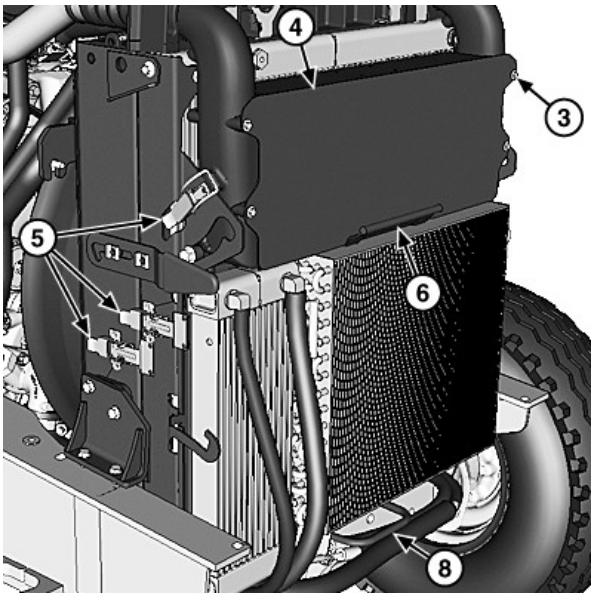
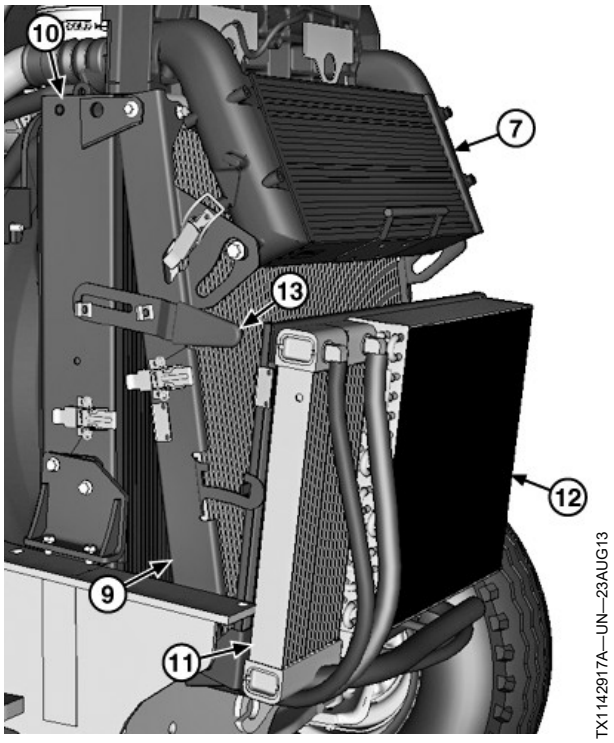


Cooling Package



Cooling Package (open position)

3—Cap Screw (4 used)
4—Screen
5—Latch (6 used)
6—Handle (CAC)
7—Charge Air Cooler (CAC) (if equipped)
8—Handle (cooling package assembly)
9—Low Temperature Radiator
10—High Temperature Radiator
11—Fuel Cooler (if equipped)
12—Air Conditioner Condenser (if equipped)
13—Lock Lever (cooling package assembly)

3. Remove cap screws (3) and screen (4).
4. Open hood.
5. Release latches (5) on each side of cooling package.

IMPORTANT: Prevent injury from falling object. Ensure all cooling assemblies are securely seated in their hold open notch position after opening each assembly.

6. If equipped, using handle (6), pull and rotate charge air cooler (7) up until cooler is locked in notch on guide brackets.
7. Using handle (8), pull and rotate low temperature radiator (9), charge air cooler (7) (if equipped), fuel cooler (11) (if equipped), and air conditioner condenser (12) (if equipped) up as an assembly. Push down on lock lever (13) to lock cooling assembly open.
8. If equipped, pull and rotate fuel cooler (11) and air conditioner condenser (12) outward until assembly rests against end of guide bracket.

IMPORTANT: If dust or debris is light, clean coolers by blowing air through fins. Do not exceed pressure of 600 kPa (6 bar) (90 psi).

If compressed air fails to clean coolers, use a high pressure washer with soap and water. Do not exceed pressure of 4800 kPa (48 bar) (700 psi).

Ensure to direct air or water straight through to avoid bending fins.

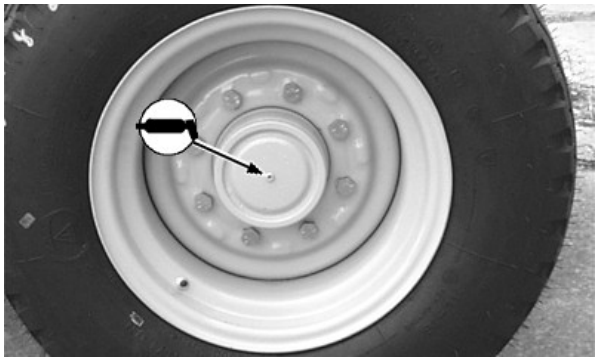
9. Clean cooling system.
10. Rotate coolers to original position and secure latches.
11. Close hood, install screen (4) and front grille cover (2).
12. Remove loader boom service lock and lower boom.

BG71631,0000006-19-23AUG13-2/2

Lubricate Non-Powered Front Wheel Bearings —If Equipped

IMPORTANT: Lubricate daily when machine is used in mud to minimize wear and corrosion.

1. Remove plug and install lubrication fitting.
2. Lubricate with approximately five low pressure strokes of grease. See Grease. (Section 3-1.)
3. Remove lubrication fitting and install plug.
4. Repeat procedure for opposite side wheel.



Non-Powered Front Wheel Bearings

OUT4001,00009FA-19-09FEB12-1/1

Check Coolant Level

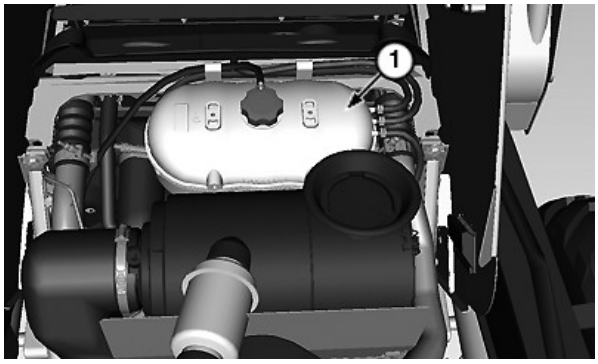
CAUTION: Prevent possible injury from hot spraying fluids. Shut off engine. Remove filler cap only when cool enough to touch with bare hands. Slowly loosen cap to relieve pressure before removing completely.

1. With engine cold, coolant level must be between MAX COLD and MIN COLD marks on coolant surge tank (1).
2. If coolant is below MIN COLD mark, add coolant to surge tank.
3. If surge tank is empty, check for leaks and repair as necessary. Add coolant at surge tank cap. See Heavy Duty Diesel Engine Coolant. (Section 3-1.)

1—Coolant Surge Tank

TS281—UN—15APR13

Service Cooling System Safely



TX1106094—UN—07FEB12

Coolant Surge Tank

LB82152,0000AB8-19-05JUN13-1/1

Check Hydraulic Reservoir Oil Level

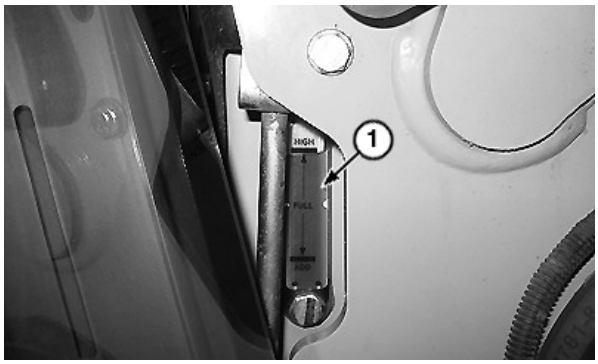
The most accurate oil level reading is obtained when the machine is parked on a level surface, with backhoe and stabilizers in transport position, front loader bucket lowered to ground, and when oil is cool.

1. Stop engine. Allow time for hydraulic oil to cool.
2. Check oil level in sight glass (1). Oil level should be in mid-range of decal.

Adding Oil To the Hydraulic Reservoir

1. Open hydraulic reservoir cover with key to access fill cap.
2. If oil is below ADD range, remove fill cap (2) and add oil. See Hydraulic Oil. (Section 3-1.)
3. Install fill cap.

1—Sight Glass **2—Fill Cap**



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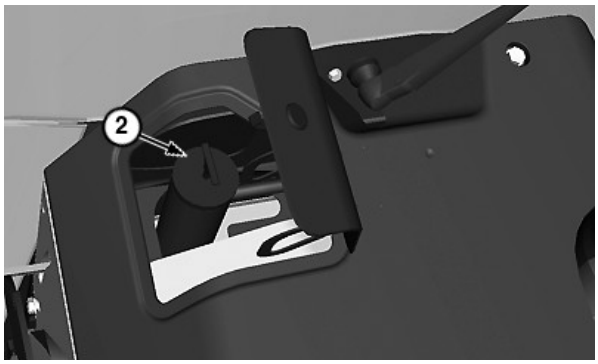
Hydraulic Reservoir Sight Glass



TX1106081—UN—07FEB12

Hydraulic System Fill Cap

LB82152,0000AB9-19-06JUN13-1/1

Check Engine Oil Level

IMPORTANT: Prevent possible engine damage. DO NOT run engine when oil level is below the ADD mark.

The most accurate oil level reading is obtained when engine is cold before operation.

1. Park machine on a level surface. Engage park brake.

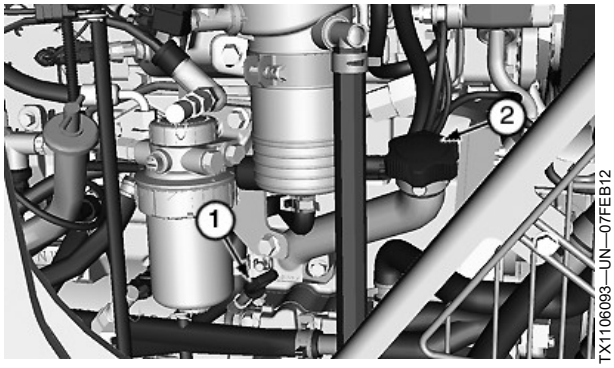
CAUTION: Prevent serious injury or death from unexpected machine movement. Always install the loader boom service lock, or lower the front loader boom fully to the ground, and move control levers to release hydraulic pressure before working near the front of the machine.

2. Raise front loader boom and install loader boom service lock.
3. Stop engine.
4. Fully open engine hood.
5. Remove engine oil dipstick (1) and check oil level.

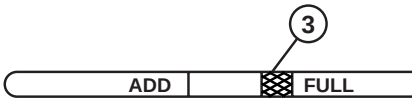
   BEFORE THE ENGINE IS STARTED: Engine is full when oil level is within cross-hatched area (3). It is acceptable to run engine as long as oil level is above the ADD mark.

   AFTER THE ENGINE HAS BEEN RUN: Allow oil to drain into oil pan for 10 minutes before checking the oil level. Ten minutes after shutdown, oil level must be above the ADD mark.

6. Remove engine oil fill cap (2) and add oil as necessary. See Diesel Engine Oil. (Section 3-1.)



Engine Oil Fill Cap and Dip Stick Location



1—Engine Oil Dipstick
2—Engine Oil Fill Cap
3—Cross-Hatched Area

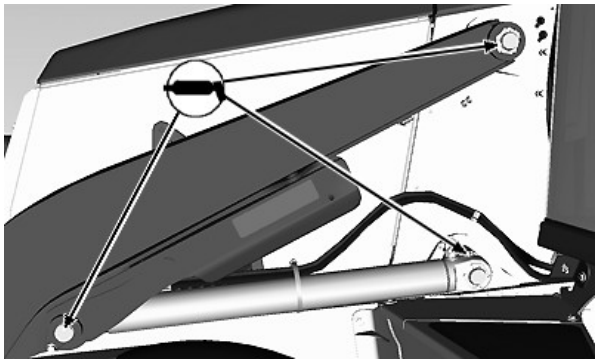
7. Close engine hood.

LB82152,0000ABA-19-07FEB12-1/1

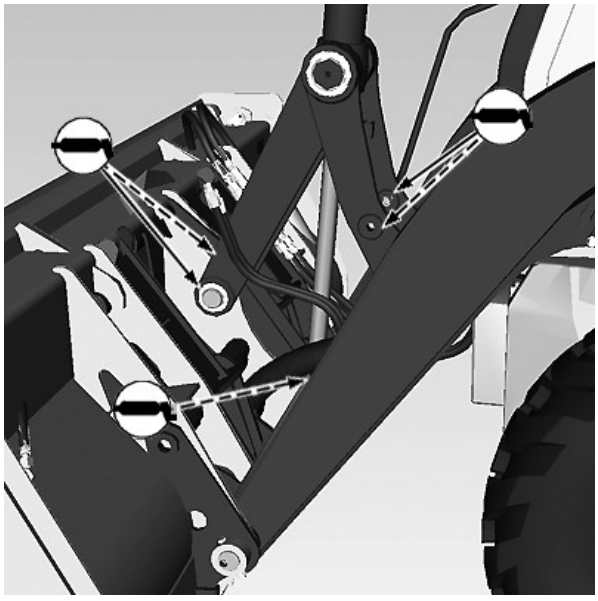
Lubricate Loader Pivots

NOTE: Machines equipped with synthetic bushings do not require lubrication.

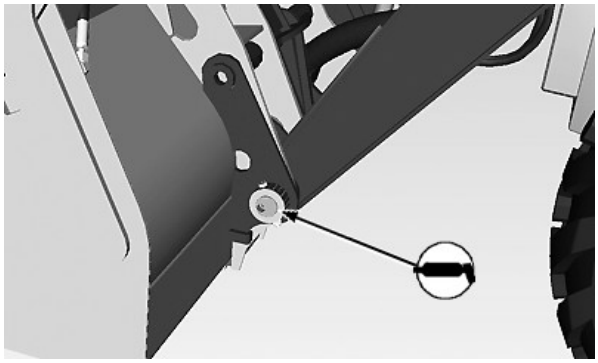
Apply grease to lubrication fittings until it escapes from joints. See Grease. (Section 3-1.)



6 Points—Left Side Shown



5 Points



2 Points—Left Side Shown

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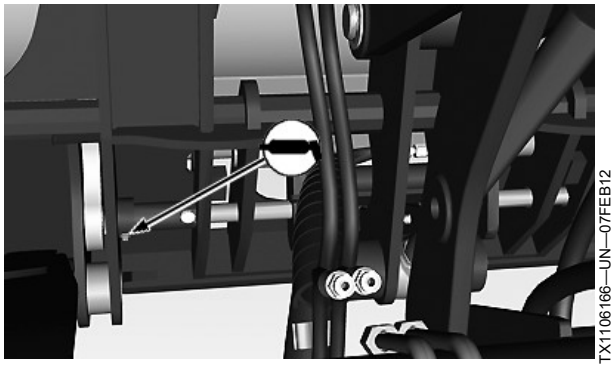
Lubricate Loader Quick Coupler—If Equipped

Apply grease to lubrication fittings until it escapes from joints. See Grease. (Section 3-1.)

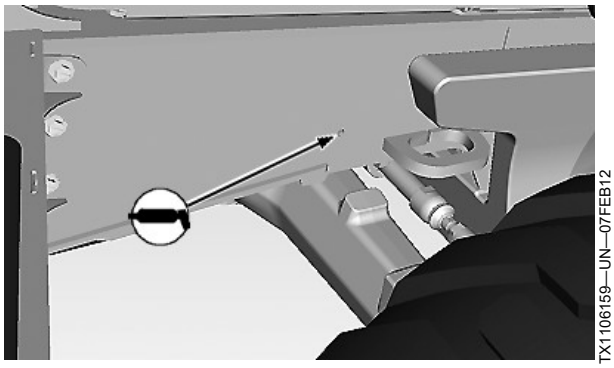


2 Points—Left Side Shown

LB82152,0000AC1-19-07FEB12-1/1

Lubricate Front Axle Pivot Pin

Apply two pumps of grease to lubrication fitting on right side of frame to lubricate front axle oscillating pivot. See Grease. (Section 3-1.)

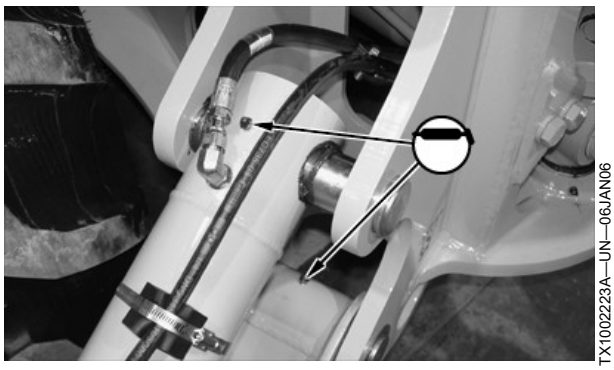


1 Point

OUT4001,0000B58-19-19FEB12-1/1

Lubricate Stabilizer Pivots and Cylinder Pins

Apply grease to lubrication fittings until it escapes from joint. See Grease. (Section 3-1.)



4 Points—Left Side Shown

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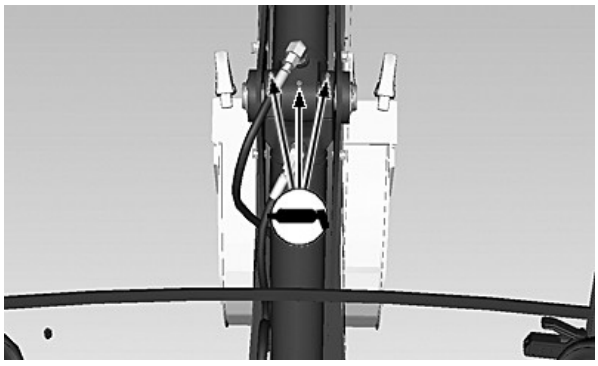
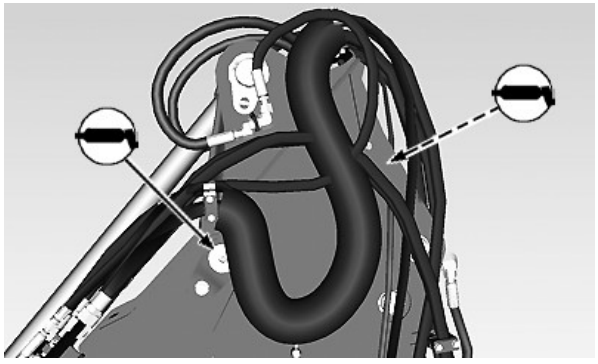
Lubricate Backhoe Boom, Crowd Cylinders and Pivots

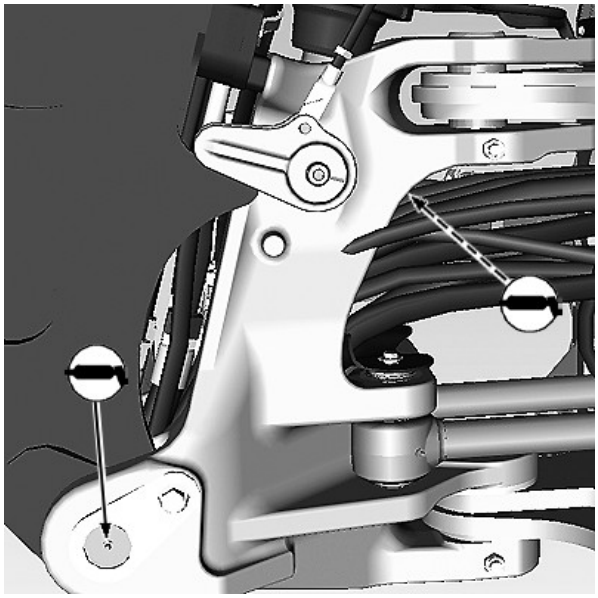


3 Points



2 Points

Apply grease to lubrication fittings until it escapes from joint. See Grease. (Section 3-1.)

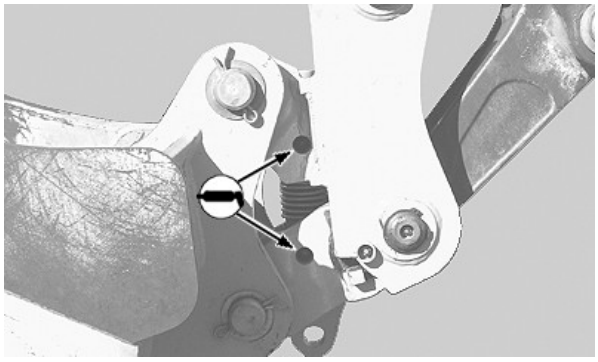


3 Points—Right Side Shown

LB82152,0000ABD-19-29FEB12-1/1

Lubricate Backhoe Coupler Mechanical Jack —If Equipped

Apply grease to each lubrication fitting until it escapes from the joint. See Grease. (Section 3-1.)

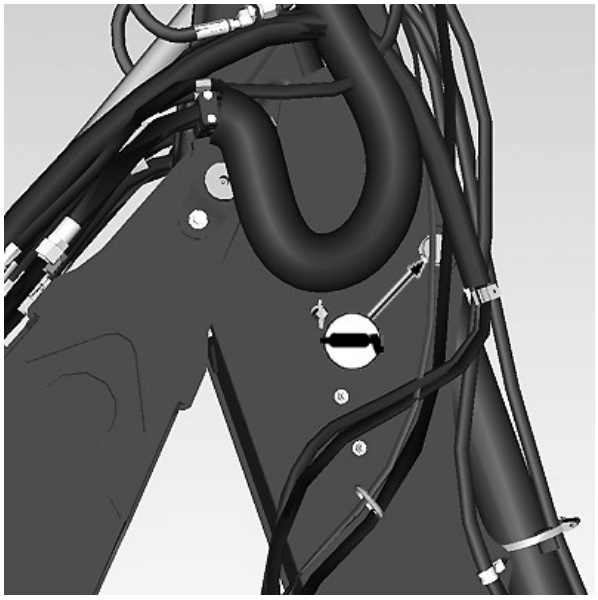


2 Points

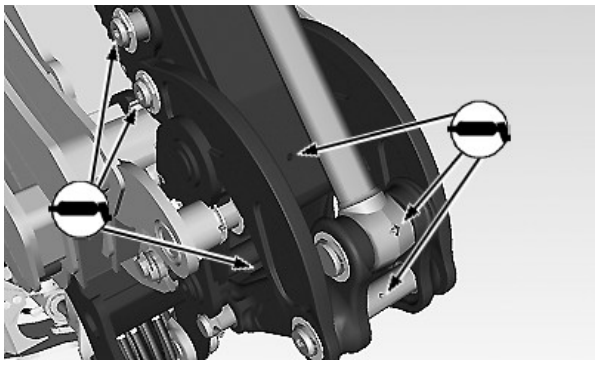
LB82152,0000AC5-19-02MAR12-1/1

Lubricate Backhoe Bucket Cylinder and Pivots

Apply grease to lubrication fittings until it escapes from joint. See Grease. (Section 3-1.)



1 Point

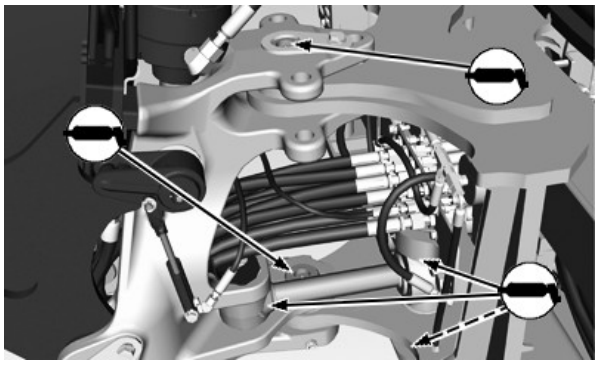


6 Points

LB82152,0000ABE-19-29FEB12-1/1

Lubricate Backhoe Swing Cylinder and Pivots

Apply grease to lubrication fittings until it escapes from joint. See Grease. (Section 3-1.)

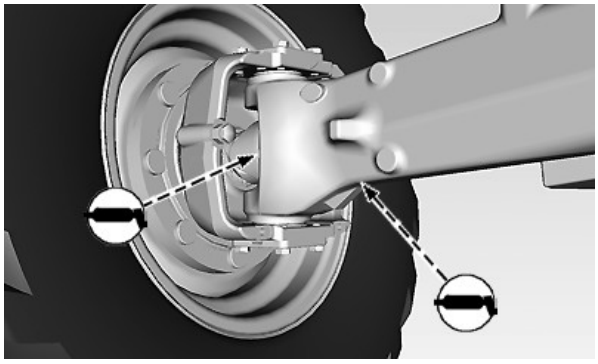


8 Points—Right Side Shown

LB82152,0000AC4-19-24JAN12-1/1

Lubricate MFWD Front Axle and Universal Joints—If Equipped

Apply grease to lubrication fittings until it escapes from joint. See Grease. (Section 3-1.)

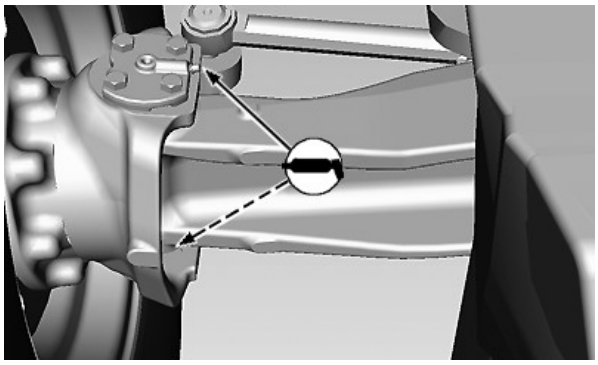


4 Points—Left Side Shown

LB82152,0000ABF-19-07FEB12-1/1

Lubricate Non-Powered Front Axle Steering Pivots—If Equipped

Apply grease to lubrication fittings on steering pivots until it escapes from joints. See Grease. (Section 3-1.)

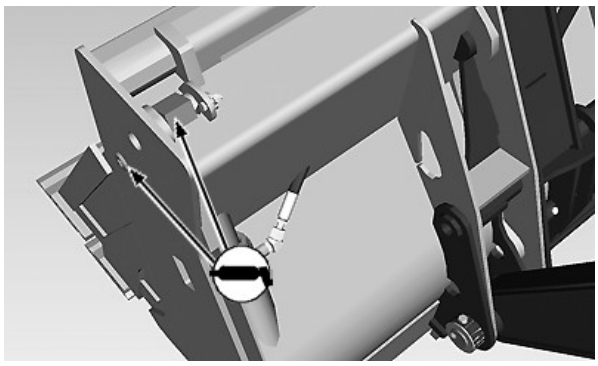


4 Points—Left Side Shown

LB82152,0000ABC-19-07FEB12-1/1

Lubricate Multipurpose Bucket Pivots—If Equipped

Apply grease to lubrication fittings until it escapes from joints. See Grease. (Section 3-1.)



4 Points—Left Side Shown

LB82152,0000AC0-19-07FEB12-1/1

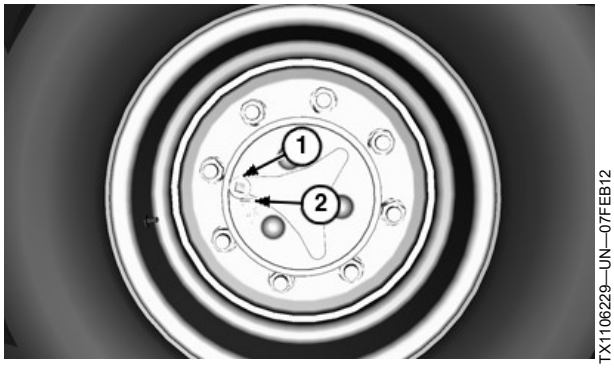
Take Engine Oil Sample

See your authorized dealer.

LB82152,0000AC6-19-24JAN12-1/1

Check MFWD Planetary Housing Oil Level—If Equipped

1. Park machine on level surface.
2. Rotate housing until oil level line (2) is horizontal and fill/drain plug (1) is above line as shown.
3. Remove plug and check that oil is filled to bottom of plug hole.
4. Add oil to plug hole if necessary. See Transmission, Axles, and Mechanical Front Wheel Drive (MFWD) Oil. (Section 3-1.)
5. Install fill/drain plug.
6. Repeat procedure for opposite side wheel.



MFWD Planetary Housing Oil Fill Plug

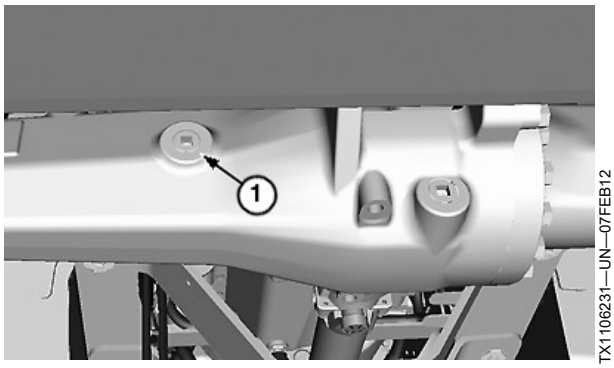
1—Fill/Drain Plug **2—Oil Level Line**

LB82152,0000AC7-19-28FEB12-1/1

Check MFWD Axle Oil Level—If Equipped

1. Park machine on level surface.
2. Remove fill plug (1) to check oil level. Oil should be filled to bottom of plug.
3. Add oil to plug hole if necessary. See Transmission, Axles, and Mechanical Front Wheel Drive (MFWD) Oil. (Section 3-1.)
4. Install fill plug.

1—Fill Plug



MFWD Axle Oil Fill Plug

LB82152,0000AC8-19-10FEB12-1/1

Check Battery Electrolyte Level and Terminals

CAUTION: 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 it last.

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

Avoid the hazard by:

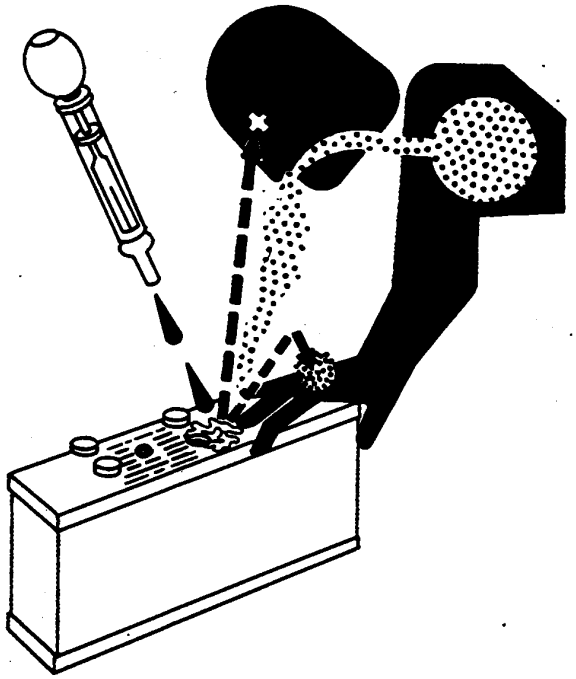
1. **Filling batteries in a well-ventilated area.**
2. **Wearing eye protection and rubber gloves.**
3. **Avoiding breathing fumes when electrolyte is added.**
4. **Avoiding spilling or dripping electrolyte.**
5. **Use proper jump start procedure.**

If acid is spilled on skin:

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.**
4. **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 1.9 L (2 quarts).**
3. **Get medical attention immediately.**



TS203—UN—23AUG88

Avoid Acid Burns

1. Remove battery box cover.

Continued on next page

TX14740,0001CBE-19-01DEC15-1/3

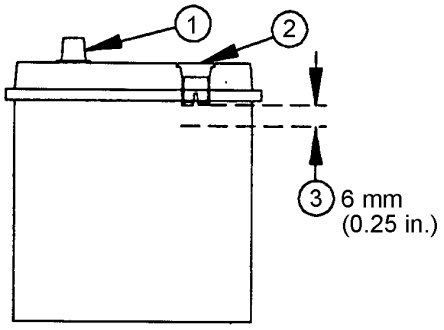
IMPORTANT: If water is added to batteries during freezing weather, batteries must be charged after water is added to prevent batteries from freezing. Charge battery using a battery charger or by running the engine.

2. Fill each cell to within specified range with distilled water. DO NOT overfill.

CAUTION: Prevent possible injury. ALWAYS remove grounded (-) battery clamp first and replace it last.

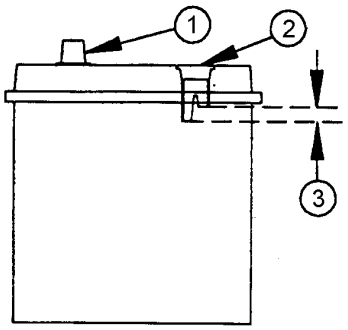
3. Disconnect battery clamps, grounded clamp first.

1—Battery Post
2—Fill Tube
3—Electrolyte Level Range



T137535—UN—25JAN01

Battery Terminal and Fill Hole



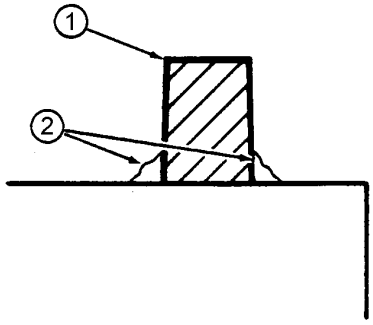
T137536—UN—25JAN01

Fill Level

TX14740,0001CBE-19-01DEC15-2/3

4. Clean battery terminals (1) and clamps with a stiff brush.
5. Apply lubricating grease (2) around battery terminal base only.
6. Install and tighten clamps, grounded clamp last.

1—Battery Terminal
2—Lubricating Grease



T137537—UN—25JAN01

Terminal and Grease

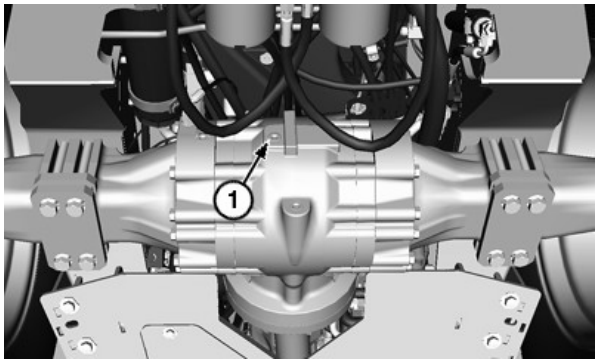
TX14740,0001CBE-19-01DEC15-3/3

Check Rear Axle Oil Level

NOTE: If the backhoe has been run in high-speed transport, wait 30 minutes for the axle oil level to stabilize before checking oil.

1. Park machine on a level surface.
2. Remove rear axle oil level plug (1). Oil should run out of plug hole if the oil level is correct.
3. If oil level is not correct, add oil as necessary. See Transmission, Axles, and Mechanical Front Wheel Drive (MFWD) Oil. (Section 3-1.)
4. Install plug.

1—Rear Axle Oil Level Plug



Rear Axle Oil Level Plug

LB82152,0000ACA-19-09FEB12-1/1

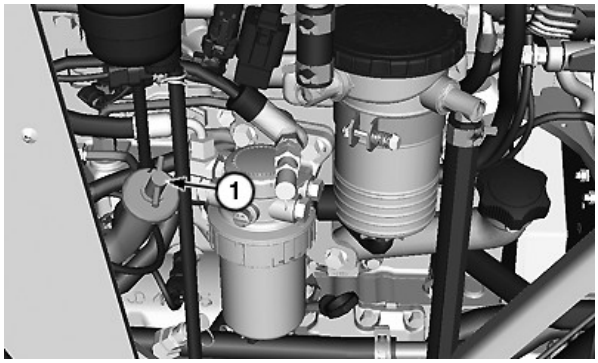
Check Transmission Oil Level

CAUTION: Prevent possible injury from unexpected machine movement. Never rely on transmission control lever (TCL) to keep machine from moving. Always engage park brake to hold machine.

1. Run engine for 3 minutes to warm transmission oil. Park machine on a level surface. Move transmission control lever (TCL) to neutral (N). Engage park brake.
2. With engine running at slow idle, turn handle of transmission dipstick (1) counterclockwise and remove.

NOTE: Normal hot oil can be above full mark.

3. Check oil level on dipstick. If oil is not within operating range, add oil through dipstick tube. See Transmission, Axles, and Mechanical Front Wheel Drive (MFWD) Oil. (Section 3-1.)



Transmission Dipstick

1—Transmission Dipstick

4. Install transmission dipstick and turn handle clockwise to tighten.

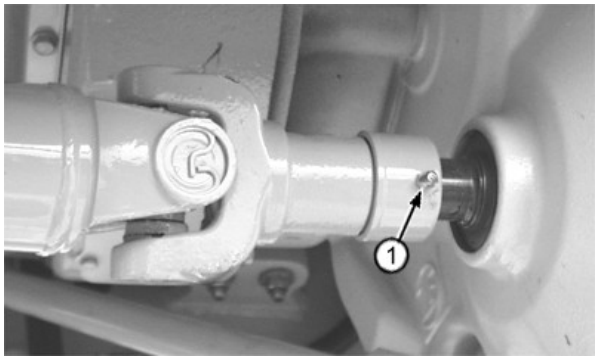
LB82152,0000ACB-19-16MAR12-1/1

Lubricate MFWD Drive Shaft Spline—If Equipped

IMPORTANT: Lubricate daily when machine is used in mud to minimize wear and corrosion.

Apply grease to lubrication fitting (1) until it escapes from joint. See Grease. (Section 3-1.)

1—Lubrication Fitting



LB82152,0000ACC-19-19FEB12-1/1

Take Fluid Samples

See your authorized dealer for taking the following fluid samples:

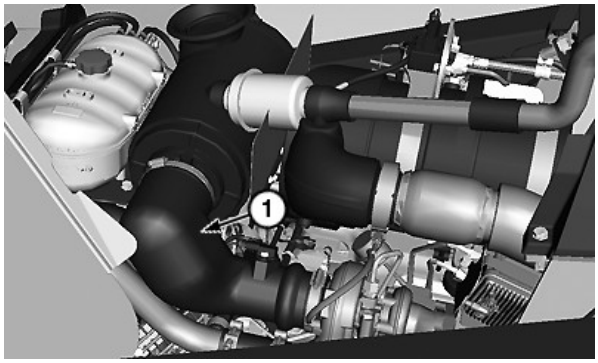
- Hydraulic Oil
- Transmission Oil
- Rear Axle Oil
- Engine Coolant
- Diesel Fuel

LB82152,0000ACD-19-24JAN12-1/1

Check Air Intake Hose

1. Check engine air intake hose (1) for cracks and replace as necessary.
2. Check for loose connections and tighten hose clamps as necessary.

1—Engine Air Intake Hose



TX1106234—UN—07FEB12

Air Intake Hose

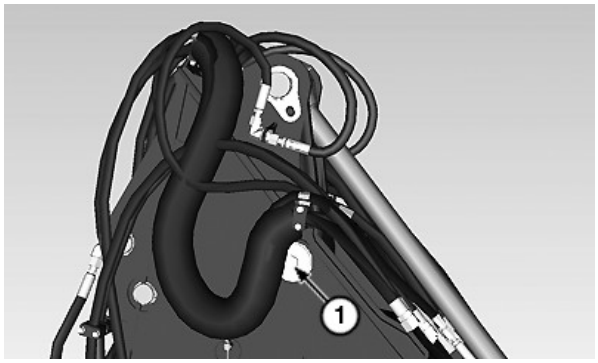
LB82152,0000ACE-19-06FEB12-1/1

Check Boom-to-Dipperstick Pin Bolt Torque

Check torque on the backhoe boom-to-dipperstick pivot pin bolt (1). Tighten to specification.

Specification	
Backhoe Boom-to-Dipperstick Pivot Pin Bolt—Torque	620 N·m 460 lb-ft

1—Backhoe Boom-to-Dipperstick Pivot Pin Bolt



TX1109819A—UN—08MAR12

Backhoe Boom-to-Dipperstick Pivot Pin Bolt

LB82152,0000ACF-19-08MAR12-1/1

Drain Fuel Tank Water and Sediment

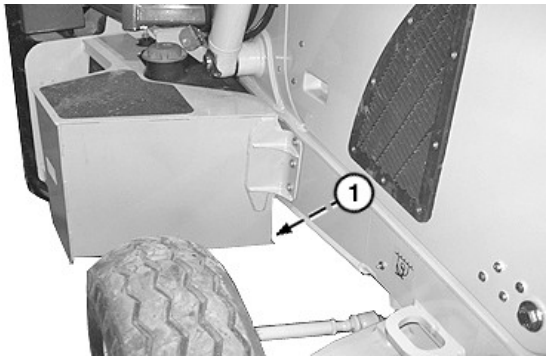
CAUTION: Handle fuel carefully. If the engine is hot or running, DO NOT drain fuel tank. DO NOT smoke while draining fuel tank or working on fuel system.

NOTE: To ensure that all of the water drains properly, use the right stabilizer to lift the right rear wheel off of the ground.

Dispose of waste properly.

1. Loosen sediment drain plug (1) on front of fuel tank and allow fuel to flow for several seconds.
2. Tighten plug securely to stop fuel flow.

1—Sediment Drain Plug



TX1014055A—UN—25OCT06

Fuel Tank Sediment Drain Plug

LB82152,0000AD0-19-29FEB12-1/1

Change Engine Oil and Replace Filter

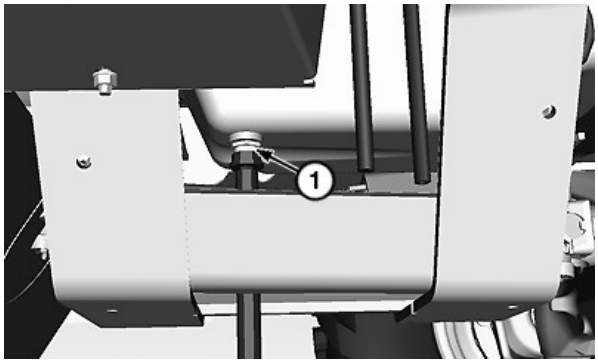
1. Run engine to warm oil. Park machine on a level surface. Engage park brake. Stop engine.
2. Remove engine oil drain plug (1). Allow oil to drain into a container. Dispose of waste oil properly.
3. Using a suitable filter wrench, turn engine oil filter (2) counterclockwise and remove from base. Clean mounting surfaces of base as necessary.
4. Apply a thin film of oil to sealing ring on new filter, and turn new filter clockwise by hand until gasket touches mounting surface. Torque an additional 1/2—3/4 turn with filter wrench.
5. Install engine oil drain plug.
6. Remove engine oil fill cap (3) and fill engine with oil to specification. See Diesel Engine Oil. (Section 3-1.) Install cap.

Specification

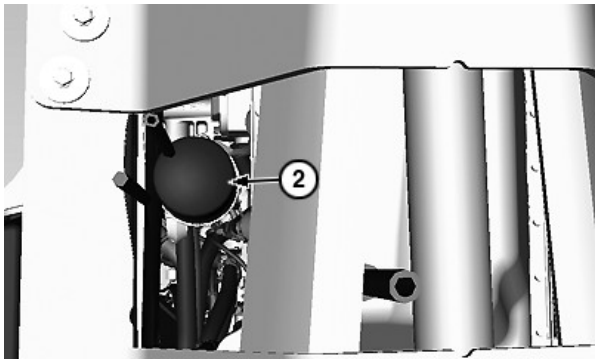
Engine Oil—Capacity. . . . . 13.0 L
3.4 gal.

7. Run engine for 2 minutes and then stop engine. Check for leaks around drain plug and filter. Tighten as necessary. Check oil level on dipstick (4).

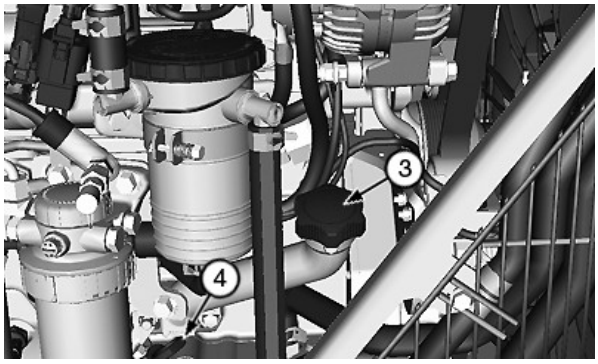
1—Engine Oil Drain Plug
2—Engine Oil Filter
3—Engine Oil Fill Cap
4—Dipstick



Engine Oil Drain Plug



Engine Oil Filter—View Shown From Under Machine



Oil Fill Cap and Dipstick

LB82152,0000AD1-19-18FEB12-1/1

Replace Primary and Final Fuel Filters

NOTE: Dispose of waste properly.

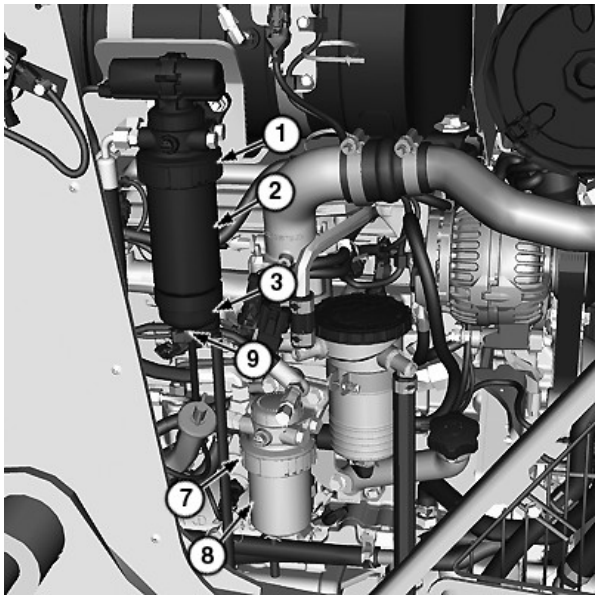
1. Thoroughly clean primary and final fuel filters, water separator assembly, and surrounding area.
2. Turn retaining ring (1) counterclockwise and remove primary fuel filter (2).
3. Disconnect water-in-fuel sensor (9).
4. Remove water separator bowl (3) from primary fuel filter. Drain and clean separator bowl.
5. Install water separator bowl onto new primary fuel filter. Tighten securely.
6. Turn retaining ring (7) counterclockwise and remove final fuel filter (8).
7. Clean filter base (4) and thoroughly inspect filter base seal ring. Replace as needed.

NOTE: The fuel filter must be indexed properly and the key on canister must be oriented in slot of mounting base for correct installation.

Do not attempt to turn filters into base.

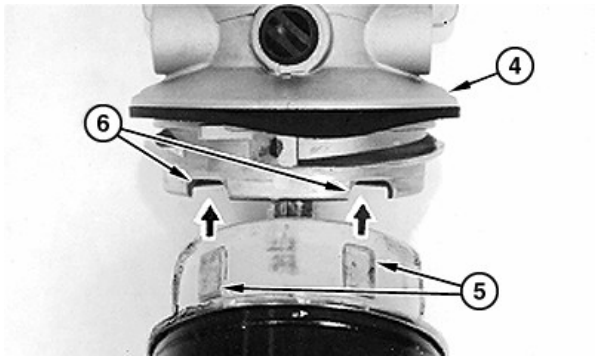
8. Install new primary and final fuel filters by aligning vertical locators (6) into slots (5) on filter base. Push filters up firmly until filter snaps against base.
9. Turn retaining ring clockwise onto filter base until retaining ring clicks tightly into place.
10. Connect water-in-fuel sensor.
11. Prime fuel system. See Fuel System Bleed Procedure. (Section 4-1.)

1—Retaining Ring
2—Primary Fuel Filter
3—Water Separator Bowl
4—Filter Base
5—Slots
6—Vertical Locator
7—Retaining Ring
8—Final Fuel Filter
9—Water-In-Fuel Sensor



TX1106449—UN—07FEB12

Primary and Final Fuel Filters



TX10022310A—UN—06JAN06

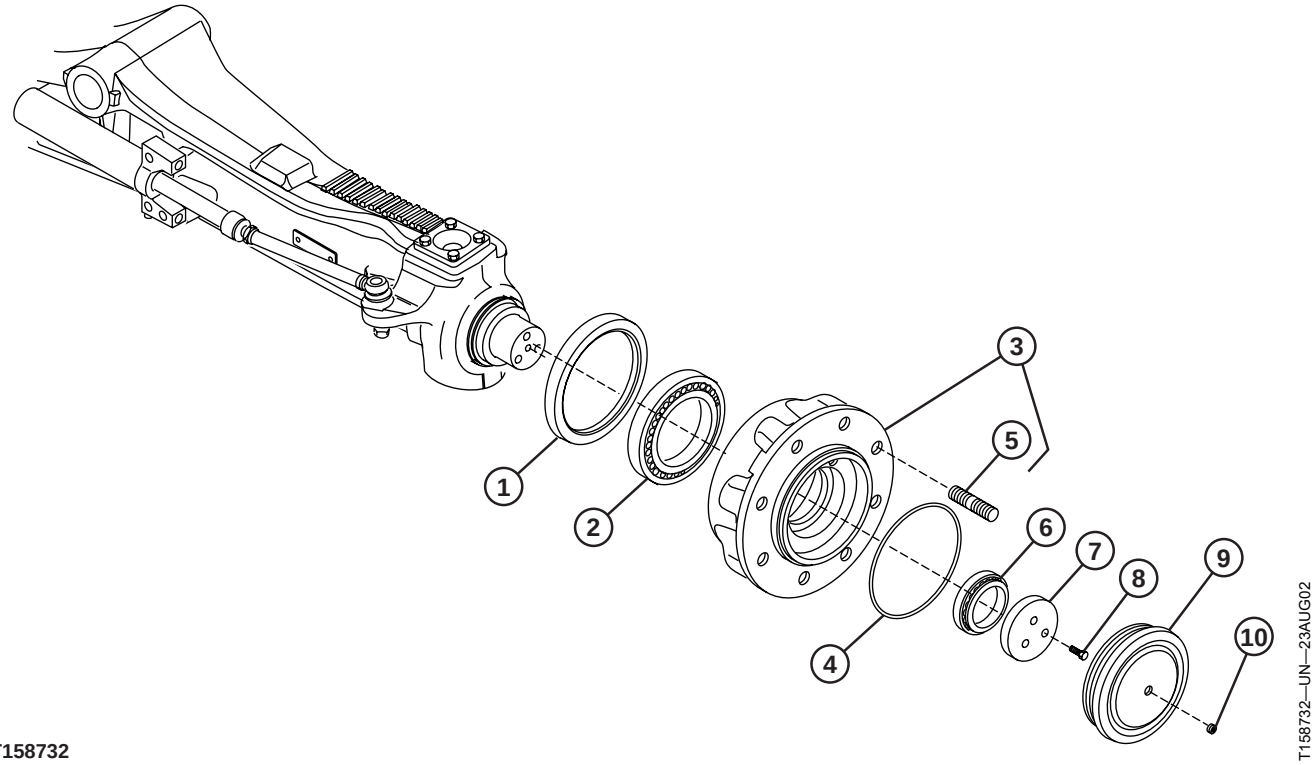
LB82152,0000AD2-19-14MAR12-1/1

Check Coolant

See Check Coolant. (Section 3-3.)

OUT4001,0000365-19-28JUL14-1/1

Clean, Pack, and Adjust Non-Powered Front Wheel Bearings—If Equipped



Wheel Hub Assembly

1—Seal Ring
2—Inner Bearing Cone
3—Wheel Hub
4—O-Ring
5—Stud
6—Outer Bearing Cone
7—Thrust Washer
8—Cap Screw (3 used)
9—Wheel Hub Cover
10—Wheel Hub Cover Plug

1. Raise machine and install jack stands so front wheels are off ground.

⚠ CAUTION: Prevent injury from falling components. Secure wheel hub (3) with a lift strap before removing any components.

2. Remove wheel.
3. Remove wheel hub cover plug (10) and remove wheel hub cover (9) using wedges. Remove and inspect O-ring (4), replace if necessary.
4. Remove three cap screws (8) and thrust washer (7).
5. Remove outer bearing cone (6).
6. Remove and inspect wheel hub (3) with bearing cups. To replace bearing cups, place wheel hub on flat surface and drive bearing cups out with a hammer and driver.

IMPORTANT: Removing seal ring (1) will destroy it. Do not remove seal ring unless damage is noted.

7. Remove inner bearing cone (2) using wedges.
8. Clean all dirt and grease from bearings, spindle and hub assembly.
9. Inspect grease seals for damage or hardened lips and replace as necessary.
10. Pack bearings and coat seal lips with John Deere multi-purpose grease or equivalent.
11. Install inner bearing cone on spindle using a hammer and driver.
12. Install wheel hub on spindle.
13. Install outer bearing cone to hub and spindle.
14. Apply PM37421 Loctite® to cap screws (8). Position thrust washer on spindle in hub and install cap screws. Tighten cap screws to specification.

Specification

Thrust Plate Cap Screws—Torque. . . . . 120 N·m
89 lb-ft

15. Lubricate and install O-ring on wheel hub cover. Drive wheel hub cover into wheel hub.
16. Install wheel hub cover plug and tighten to specification.

Specification

Wheel Hub Cover Plug—Torque. . . . . 15 N·m
133 lb-in

Continued on next page

LB82152,0000AD8-19-26JUN13-1/2

17. Install wheel and repeat process for other side.

Loctite is a trademark of Henkel Corporation

LB82152,0000AD8-19-26JUN13-2/2

Change Transmission Oil and Replace Filter

NOTE: Only approximately 8.0—8.5 L (2.1—2.3 gal.) of oil will drain.

It is intended that the remainder of oil will remain in the cooler and torque converter.

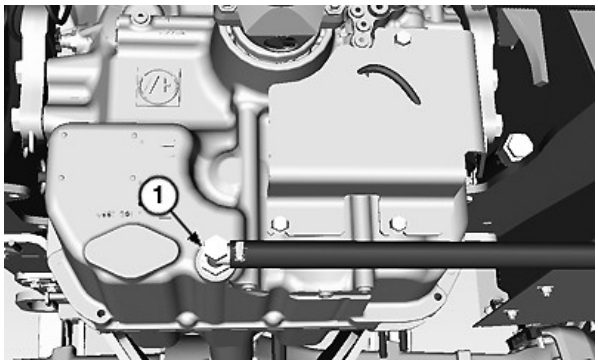
1. Remove cover under transmission. Remove transmission drain plug (1) and drain oil into suitable container. Dispose of waste properly.

Specification

Powershift Transmission
Oil—Capacity. . . . . 15.0 L
4.0 gal.

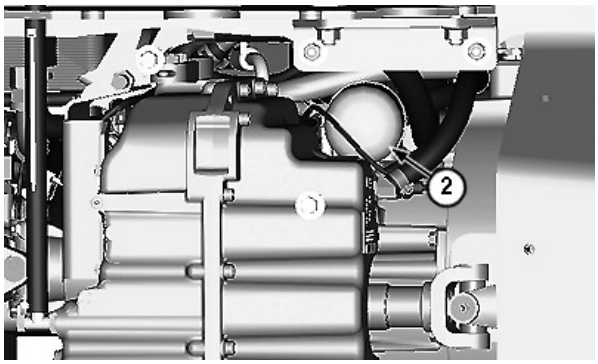
2. Install drain plug.
3. Turn transmission filter (2) counterclockwise and remove.
4. Apply film of oil to sealing ring on new transmission oil filter and install. Turn filter clockwise until sealing ring touches mounting surface, then tighten an additional 3/4—1 turn with a suitable filter wrench.
5. Turn handle of transmission dipstick (3) counterclockwise and remove. Fill transmission with oil through dipstick tube. See Transmission, Axles, and Mechanical Front Wheel Drive (MFWD) Oil. (Section 3-1.)
6. Start engine and run for 3 minutes to purge air from charge circuit.
7. With engine running at slow idle, remove transmission dipstick. Check transmission oil level and add oil through dipstick tube as necessary.
8. Install transmission dipstick and turn handle clockwise to tighten.
9. Install cover under transmission.

1—Transmission Drain Plug
2—Transmission Filter
3—Transmission Dipstick



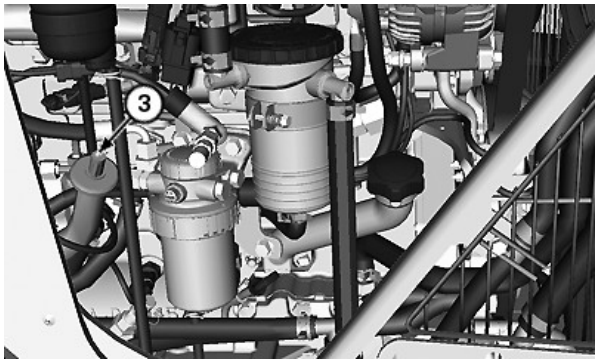
TX1106298—UN—07FEB12

Transmission Drain Plug



TX1108047—UN—15FEB12

Transmission Filter—View Shown From Under Machine



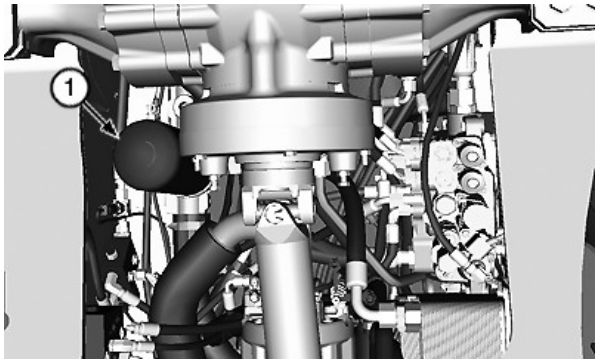
TX1106302—UN—07FEB12

Transmission Dipstick

LB82152,0000AD9-19-29FEB12-1/1

Replace Hydraulic Oil Filter

1. Turn hydraulic oil filter (1) counterclockwise and remove.
2. Apply film of oil to sealing ring on new hydraulic oil filter and install. Turn hydraulic oil filter clockwise until sealing ring touches mounting surface, then tighten an additional 3/4—1 turn with a suitable filter wrench.
3. Check hydraulic oil level.
4. Start engine and run for 2 minutes to allow hydraulic oil filter to fill with oil and to purge air from charge circuit.
5. Stop engine and check hydraulic oil level. See Check Hydraulic Reservoir Oil Level. (Section 3-4.)
6. Check for leakage around hydraulic filter. Tighten just enough to stop leaks, if necessary.



Hydraulic Oil Filter—View Shown From Under Machine

1—Hydraulic Oil Filter

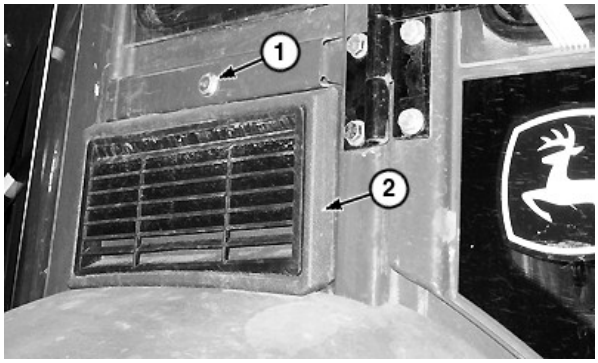
LB82152,0000ADA-19-09FEB12-1/1

Replace Cab Fresh Air and Recirculation Filters—If Equipped

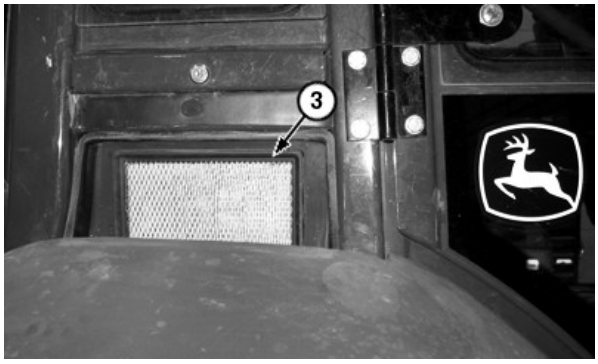
Cab Fresh Air Filter

1. Unlock latch (1) located on outside of right window frame.
2. Remove fresh air filter cover (2) and fresh air filter (3).
3. Replace filter.
4. Install filter into housing and install filter cover.
5. Close and lock latch.

1—Filter Cover Latch
2—Cab Fresh Air Filter Cover
3—Cab Fresh Air Filter



Cab Fresh Air Filter Cover



Cab Fresh Air Filter

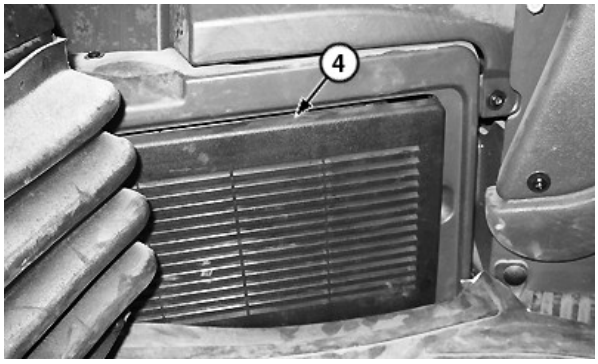
Continued on next page

OUT4001,0000B5C-19-23FEB12-1/2

Cab Recirculating Air Filter

1. Remove cab recirculating air filter cover (4) and cab recirculating air filter.
2. Replace filter.
3. Install filter into housing and install filter cover.

4—Cab Recirculating Air Filter Cover



Cab Recirculating Air Filter Cover

OUT4001,0000B5C-19-23FEB12-2/2

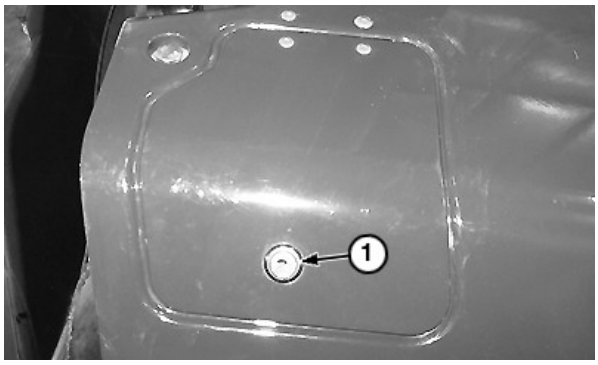
Replace Hydraulic Reservoir Breather

1. Open hydraulic reservoir cover (1) with key to access hydraulic reservoir breather (2).
2. Remove hydraulic reservoir breather.

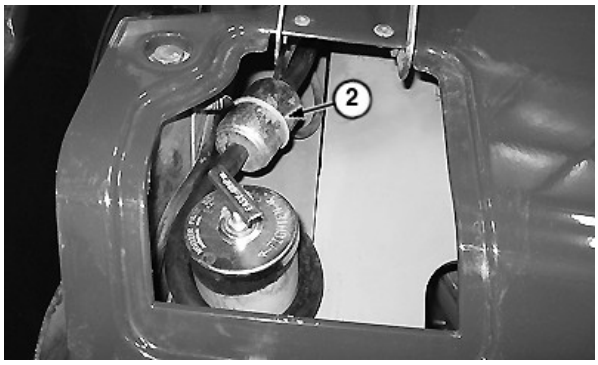
NOTE: Avoid dripping hydraulic oil. Do not reroute hydraulic reservoir breather hoses.

3. Install new hydraulic reservoir breather with arrow pointing toward reservoir.
4. Close hydraulic reservoir cover and lock with key.

1—Hydraulic Reservoir Cover **2—Hydraulic Reservoir Breather**



Hydraulic Reservoir Cover



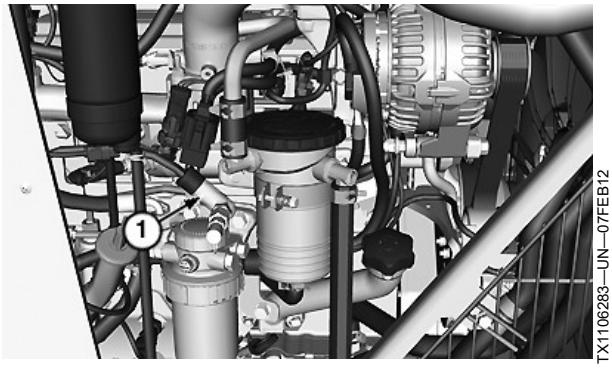
Hydraulic Reservoir Breather

LB82152,0000ADB-19-10FEB12-1/1

Replace Fuel Breather

1. Open engine hood.
2. Pull fuel breather (1) off hose.
3. Install new fuel breather with arrow on breather pointing toward hose.
4. Close engine hood.

1—Fuel Breather



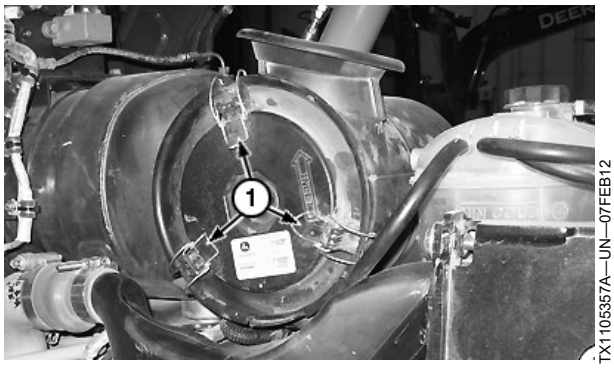
Fuel Breather

LB82152,0000ADC-19-25JAN12-1/1

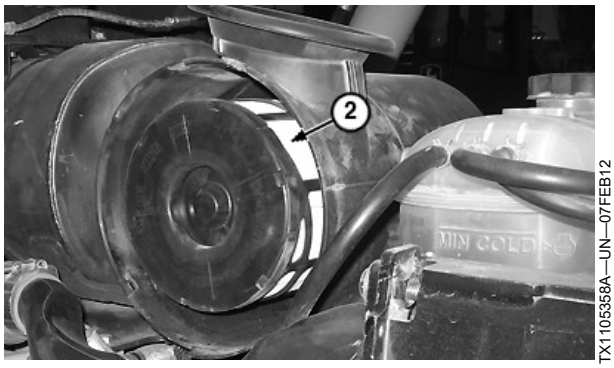
Replace Engine Air Cleaner Elements

1. Open engine hood.
2. Remove air cleaner cover by releasing clips (1).
3. Remove primary element (2).
4. Remove secondary element (3).
5. Clean inside of air cleaner canister.
6. Install new elements into housing, one at a time, making sure secondary element is centered in canister.
7. Install cover and secure latches.

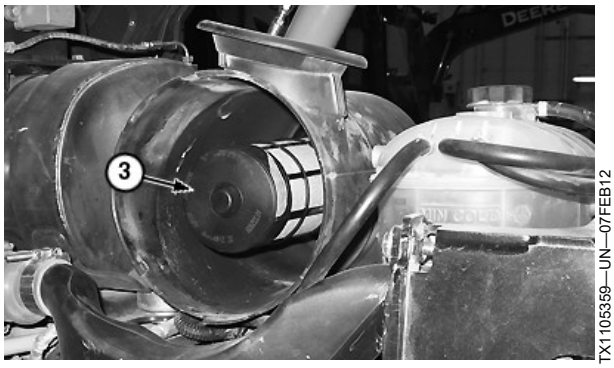
1—Clip (3 used)
2—Primary Element
3—Secondary Element



Air Cleaner Cover



Primary Air Filter



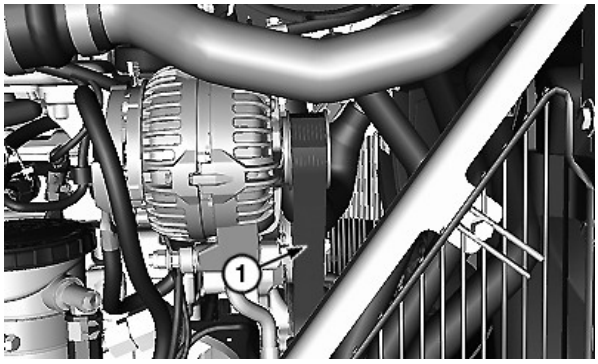
Secondary Air Filter

OUT4001,00009F7-19-15JUL14-1/1

Inspect Belt

Inspect serpentine belt (1) for wear and damage. See your authorized dealer for replacement.

1—Serpentine Belt



Serpentine Belt

LB82152,0000ADF-19-25JAN12-1/1

Change MFWD Planetary Housing Oil—If Equipped

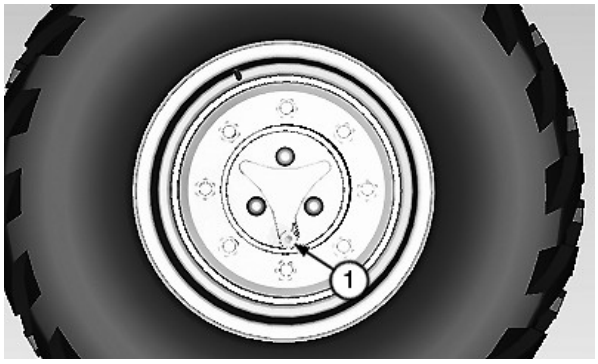
1. Rotate wheel so fill/drain plug (1) is at its lowest point. Remove plug and drain oil. Dispose of waste oil properly.

Specification

MFWD Planetary Housing
Oil—Capacity (each). . . . . 1.0 L
1.0 qt

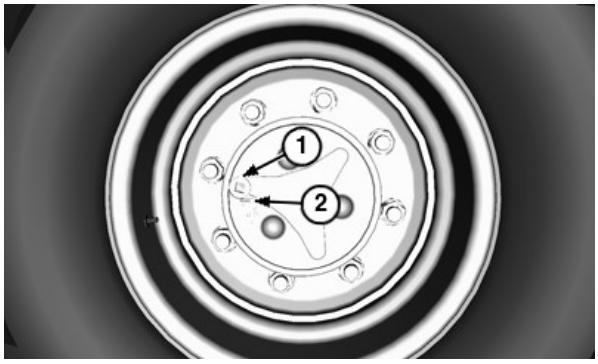
2. Install fill/drain plug.
3. Rotate wheel so fill/drain plug is above oil level line (2) when line is horizontal.
4. Add oil to bottom of fill plug hole and install plug. See Transmission, Axles, and Mechanical Front Wheel Drive (MFWD) Oil. (Section 3-1.)

1—Fill/Drain Plug **2—Oil Level Line**



TX1106208—UN—28JAN12

Drain Position



TX1106229—UN—07FEB12

Fill Position

LB82152,0000AE1-19-07MAR12-1/1

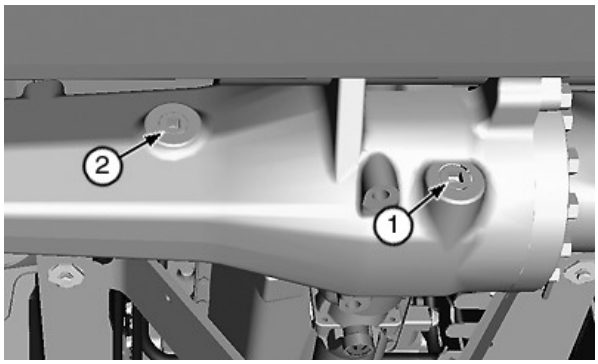
Change MFWD Front Axle Housing Oil—If Equipped

1. Remove drain plug (1) to drain oil. Dispose of waste oil properly.

Specification

MFWD Front Axle Housing
Oil—Capacity. . . . . 6.5 L
1.7 gal.

2. Install drain plug.
3. Remove fill plug (2) and add oil so it is level with bottom of fill plug hole. See Transmission, Axles, and Mechanical Front Wheel Drive (MFWD) Oil. (Section 3-1.)
4. Install fill plug.



TX1106318—UN—07FEB12

MFWD Axle Drain and Fill Plug

1—Drain Plug **2—Fill Plug**

LB82152,0000AE2-19-07FEB12-1/1

Change Rear Axle and Planetary Housing Oil

1. Remove rear axle drain plug (1).
2. Drain oil onto a suitable container. Dispose of waste oil properly.
3. Rotate each wheel so planetary housing drain/fill plugs (2) are at the bottom of wheel housing. Remove drain/fill plug.
4. Drain oil onto a suitable container. Dispose of waste oil properly.

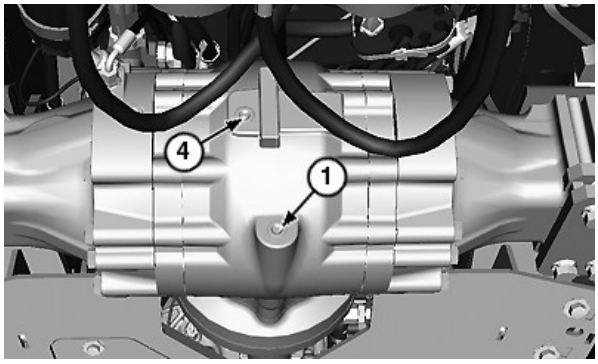
Specification

Rear Axle and Planetary Housing Oil—Capacity. . . . . 18.0 L 4.8 gal.

5. Install plugs.
6. Rotate wheel housing until oil level line (3) is horizontal and drain/fill plug is above line as shown.
7. Remove rear axle oil level plug (4) and fill with oil until level with bottom of fill plug hole. See Check Rear Axle Oil Level. (Section 3-5.)

NOTE: It will take approximately 5 minutes for oil to settle into outer housing when oil is warm.

8. Wait 5—10 minutes for oil to settle, then check level again and add oil as necessary. If oil is cold, settle time may increase.
9. Install rear axle oil level plug.



Rear Axle

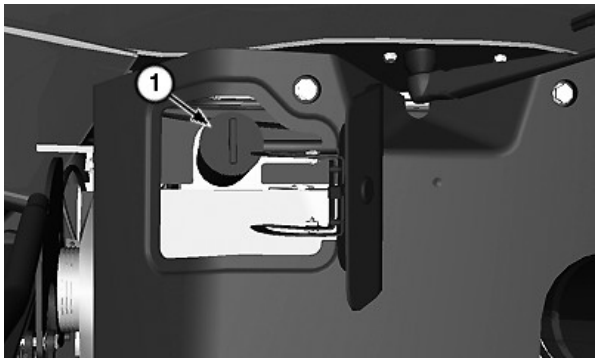
Planetary Drain/Fill Plug

1—Rear Axle Drain Plug
2—Planetary Housing Drain/Fill Plug (2 used)
3—Oil Level Line
4—Rear Axle Oil Level Plug

LB82152,0000AE3-19-29FEB12-1/1

Inspect and Clean Hydraulic Reservoir Fill Screen

1. Use key to open hydraulic reservoir cover.
2. Remove hydraulic reservoir fill cap (1) from fill tube.
3. Remove retaining clip and hydraulic reservoir fill screen from fill tube.
4. Inspect hydraulic reservoir fill screen and clean as necessary.
5. Install hydraulic reservoir fill screen and retaining clip in fill tube.
6. Install hydraulic reservoir fill cap in fill tube.
7. Close and lock hydraulic reservoir cover.



Hydraulic Reservoir Fill Cap

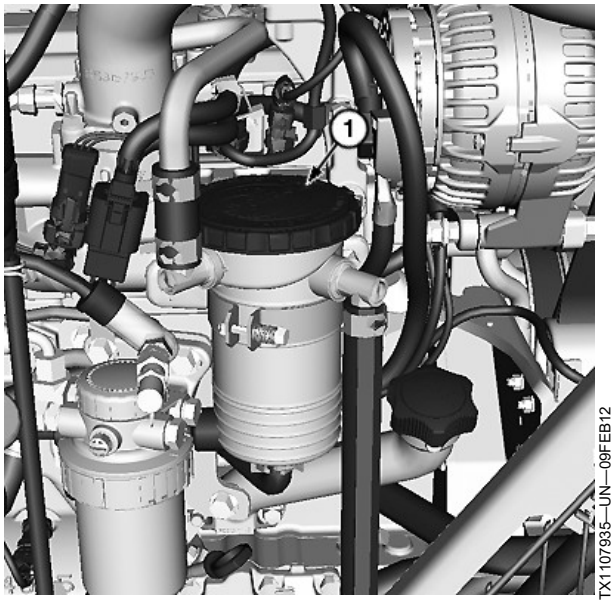
1—Fill Cap

LB82152,0000AE4-19-07FEB12-1/1

Replace Open Crankcase Ventilation (OCV) Filter

1. Open engine hood.
2. Remove open crankcase ventilation (OCV) filter cap (1) by turning counterclockwise.
3. Remove OCV filter element.
4. Inspect filter housing for dirt and debris.
5. Install new OCV filter element.
6. Install OCV filter cap. Hand tighten only.
7. Close engine hood.

1—OCV Filter Cap



Open Crankcase Ventilation Filter

LB82152,0000BF5-19-18FEB12-1/1

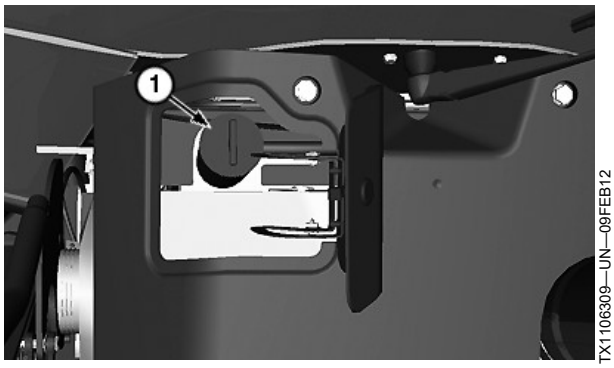
Change Hydraulic Reservoir Oil

1. Park machine on a level surface.
2. Move backhoe and stabilizers to transport position and lower loader bucket to ground. Stop engine.
3. Use key to open hydraulic reservoir cover.
4. Remove hydraulic reservoir fill cap (1).
5. Remove cap screw (2) and bracket (3). Route drain hose (4) into a suitable container.
6. Remove plug (5) from end of drain hose and drain oil. Allow adequate time for oil to drain. Dispose of waste oil properly.

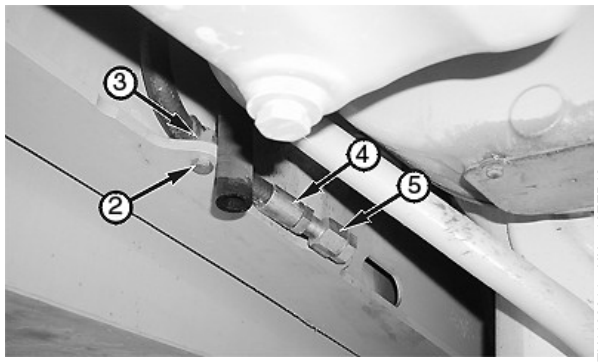
Specification

Hydraulic Reservoir Oil—Capacity. . . . . 37.0 L
9.8 gal.

7. Replace hydraulic oil filter. See Replace Hydraulic Oil Filter. (Section 3-7.)
8. Install plug on drain hose.
9. Route drain hose for storage. Install bracket and cap screw.
10. Fill hydraulic reservoir with oil. See Hydraulic Oil. (Section 3-1.)
11. Check oil level on sight glass.
12. Install hydraulic reservoir fill cap.



Hydraulic Reservoir Fill Cap



View Shown From Under Machine

1—Fill Cap
2—Cap Screw
3—Bracket
4—Drain Hose
5—Plug

LB82152,0000AE6-19-10FEB12-1/1

Adjust Engine Valve Lash (Clearance)

See your authorized dealer.

OUT4001,00009A6-19-09NOV11-1/1

Draining the Cooling System

CAUTION: Prevent possible injury from hot spraying fluids. Shut off engine. Remove filler cap only when cool enough to touch with bare hands. Slowly loosen cap to relieve pressure before removing completely.

NOTE: Drain and flush cooling system every 6000 hours using clean water, and refill with new coolant.

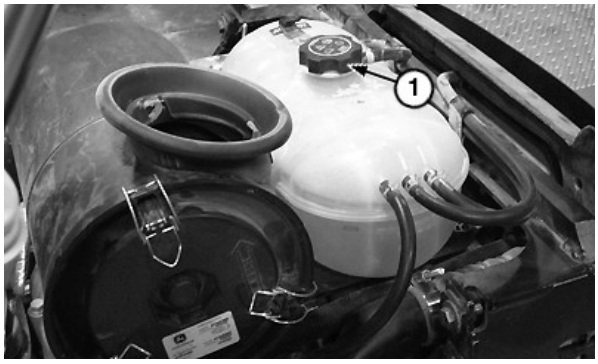
Specification

Cooling System—Capacity. . . . . 32.9 L
8.7 gal.

1. Remove surge tank cap (1).
2. Remove low temperature radiator drain plug (2) from end of attached hose.
3. Allow coolant to drain into suitable container. Dispose of waste properly.
4. Remove high temperature radiator drain plug (3) from end of attached hose.
5. Allow coolant to drain into suitable container. Dispose of waste properly.
6. Install both high temperature and low temperature radiator drain plugs.

1—Surge Tank Cap
2—Low Temperature Radiator Drain Plug
3—High Temperature Radiator Drain Plug

TS281—UN—15APR13



TX1105228A—UN—01FEB12

Surge Tank Location

TX1107940—UN—09FEB12

Cooling System Drain Hoses

LB82152,0000BEF-19-21MAR13-1/1

Filling the Cooling System

CAUTION: Prevent possible injury from hot spraying water. Shut off engine. Remove filler cap only when cool enough to touch with bare hands. Slowly loosen cap to relieve pressure before removing completely.

IMPORTANT: Use only permanent type, low silicate, ethylene glycol base antifreeze in coolant solution. Other types of antifreeze may damage cylinder seals.

If not using premixed coolant, use only distilled water when mixing with ethylene glycol concentrate.

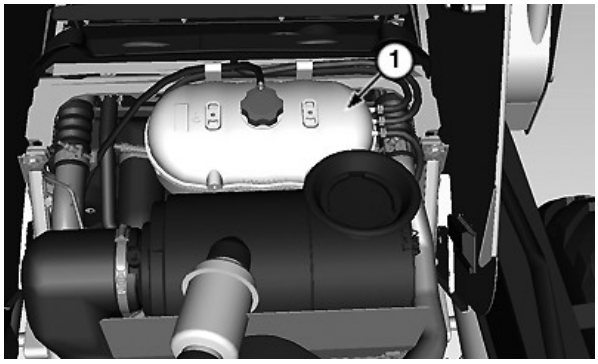
NOTE: Premixed coolant provides winter freeze protection to -37°C (-34°F). If protection at lower temperatures is required, consult your John Deere dealer.

1. Fill system with coolant to the MAX COLD mark on surge tank (1). See Heavy Duty Diesel Engine Coolant. (Section 3-1.)

Specification	
Cooling System —Capacity	32.9 L 8.7 gal.

2. Install surge tank cap.

NOTE: Coolant level MUST be repeatedly checked after draining and refilling to ensure that all air is out of system to allow coolant level to stabilize.



Coolant Surge Tank

1—Surge Tank

Cooling system will not deaerate during normal operation. Several warmup and cool-down cycles will be required to remove trapped air from system.

3. Deaerate cooling system as follows:
   a. Start and run engine until coolant reaches a warm temperature.
   b. Stop engine and allow coolant to cool.
   c. Check coolant level at surge tank. Add coolant as required.
   d. Repeat steps a—c until coolant level in surge tank is repeatedly at the same level.

LB82152,0000BF4-19-21FEB13-1/1

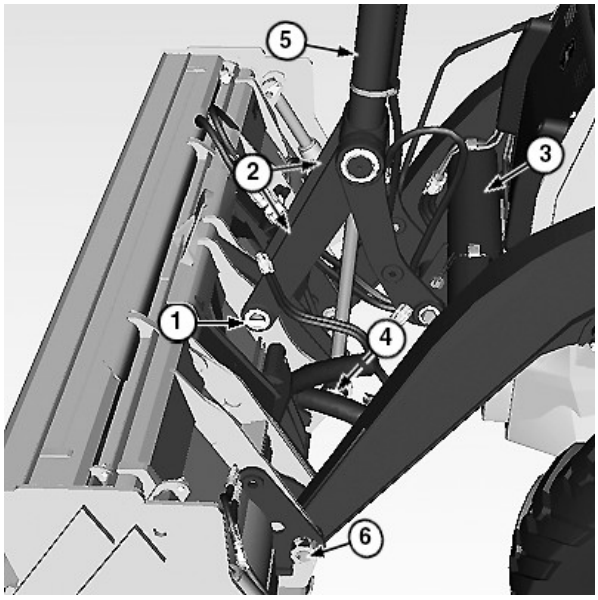
Changing Loader Buckets

CAUTION: Possible injury may occur from falling hardware. Bucket cylinder and links can fall forward if bucket is in dig position when pins are removed. Position bucket securely on ground before removing hardware.

1. Position bucket as shown.
2. Attach a hoist to cylinder (5).
3. Remove pin (1) and rotate pivot links (2) to rear against cross tube (3).
4. Remove pin (4) and carefully lay cylinder on cross tube.
5. Tie pivot links to the cross tube.
6. Remove retaining hardware, pins (6) and bucket.

CAUTION: Bucket is heavy and can cause injury if not moved properly. Use adequate lifting device to move bucket.

7. Position new bucket in dig position. Install pins (6).
8. Untie pivot links from cross tube.
9. Connect pivot links and cylinder using previously removed pins (1 and 4) and retaining hardware.
10. Remove hoist from cylinder.



Changing Loader Bucket

1—Pin
2—Pivot Link (2 used)
3—Cross Tube
4—Pin
5—Cylinder
6—Pin (2 used)

LB82152,0000B11-19-06MAR12-1/1

Check and Adjust Backhoe Boom Lock

Checking Boom Lock Operation

1. Operate the boom lock lever repeatedly to verify proper operation.
2. If boom lock is out of adjustment, adjust per procedure.

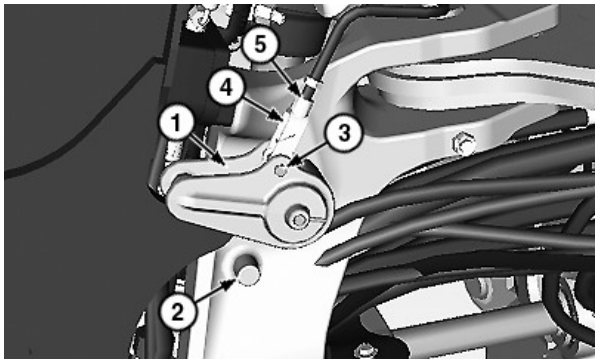
Adjusting the Boom Lock

IMPORTANT: To avoid damage to lock system, adjust lock so it is able to pass through full range of motion. Lock must completely clear boom hook (1) when boom lock lever is pulled, and go down to stop (2) when lever is released with boom moved away from latch area.

Perform the following adjustment for both the left and right boom locks:

NOTE: Boom lock is not shim adjustable.

1. Start machine and lower stabilizers.
2. Move boom in slightly towards machine to relieve tension on boom lock.
3. Pull in on boom lock lever. While moving boom away from machine, verify boom locks completely clear boom hooks (1).
4. Once boom is away from latch area, verify locks contact stops (2) on both sides of machine when boom lock lever is released.
5. Move boom back into transport position. Stop the engine.



TX1106355—UN—20FEB12

Right Side Shown

1—Boom Hook (2 used)
2—Stop (4 used)
3—Pin (2 used)
4—Yoke (2 used)
5—Jam Nut (2 used)

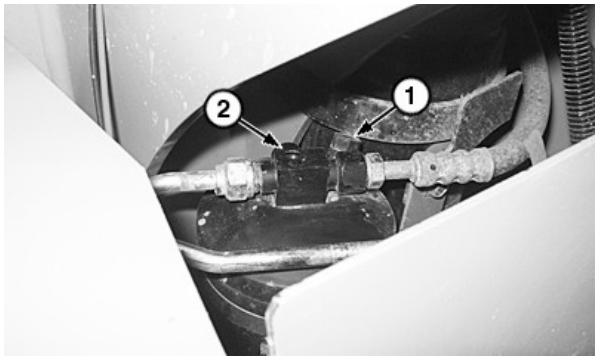
6. Remove pin (3) and spring from boom lock.
7. Adjust position of yoke (4) so when the boom lock control lever is at rest, yoke is aligned with pin mounting hole.
8. Tighten jam nut (5) to hold yoke in adjusted position.
9. Install pin.
10. Repeat yoke adjust procedure on opposite side of machine.
11. Check boom lock operation per procedure to verify proper operation.

LB82152,0000B12-19-25JAN12-1/1

Check Receiver-Dryer—If Equipped

IMPORTANT: Prevent possible compressor damage. If moisture sight glass color indicates wet (pink), dryer is saturated and should be changed within the next 100 machine hours to prevent further buildup of moisture in refrigerant.

1. Receiver-dryer is located through opening behind the steps on the left side of machine.
2. Check color in moisture sight glass (1). Color should be blue, indicating that refrigerant is dry.
3. Check air bubble sight glass (2) for air bubbles. No air bubbles, or few air bubbles, should be visible.
4. If moisture sight glass shows wet (pink), or if excessive air bubbles are visible, see your authorized dealer within the next 100 machine hours to service the receiver-dryer.



TX1106356—UN—21FEB12

Receiver-Dryer Location

1—Moisture Sight Glass
2—Air Bubble Sight Glass

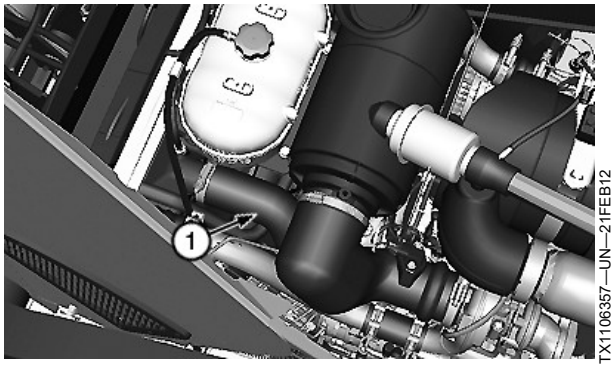
LB82152,0000B13-19-16FEB12-1/1

Checking Coolant Hoses and Radiator

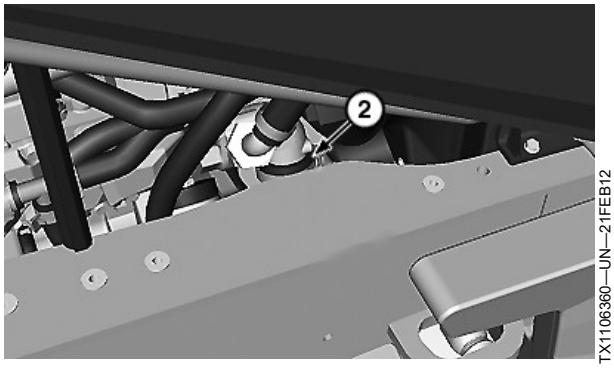
Check upper radiator hose (1) and lower radiator hose (2) for cracks and leaks. Tighten hose clamps at each end of hose as necessary.

Check radiator for dirt, damage, leaks, and loose or broken mountings. Clean radiator fins.

1—Upper Radiator Hose **2—Lower Radiator Hose**



Left Side of Machine Shown



Right Side of Machine Shown

LB82152,0000B14-19-25JAN12-1/1

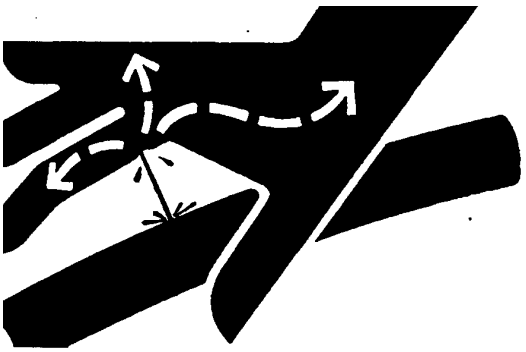
Checking Ride Control Accumulator—If Equipped

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

CAUTION: Avoid personal injury. Clear area of bystanders. The boom will jump upward during this check. Make sure area around bucket is clear.

1. Start engine.
2. Run engine at high idle.
3. Press ride control switch (1) on sealed switch module (SSM) (LED illuminated).
4. Raise boom to maximum height.
5. Power boom down half-way to ground.
6. Stop suddenly by releasing loader control lever.
7. If boom is not cushioned when loader valve is released, see your authorized dealer for servicing the accumulator.

1—Ride Control Switch



X9811—UN—23AUG88

TX1107813A—UN—13FEB12

Sealed Switch Module (SSM)

LB82152,0000B15-19-25JAN12-1/1

Checking Starting System

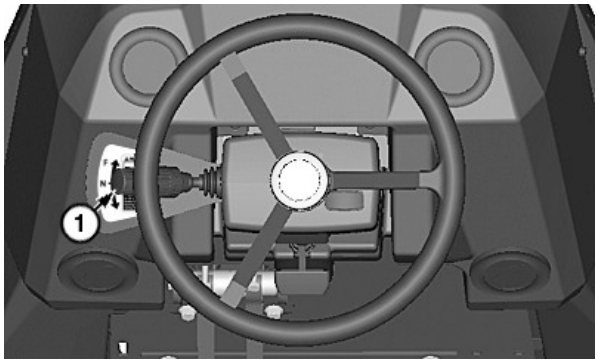
CAUTION: Avoid possible injury or death. DO NOT attempt to start machine unless sitting in operator's seat. DO NOT bypass or disable any of the starting system parts.

Set park brake before attempting to start engine.

1. Fasten seat belt.
2. Place operator's seat in loader operating position and lock in position.
3. Move transmission control lever (TCL) (1) to first gear forward (1F).
4. Apply service brakes.

*NOTE: The engine **will** start with the TCL in forward (F) or reverse (R), but the controller will automatically shift the transmission to neutral (N).*

5. Start the engine.
6. Display will show RELEASE PARK BRAKE. Display will not show (F) or (R), until TCL is cycled back to neutral and park brake is released.



TX1107786A—UN—07FEB12

Transmission Control Lever (TCL)

1—Transmission Control Lever (TCL)

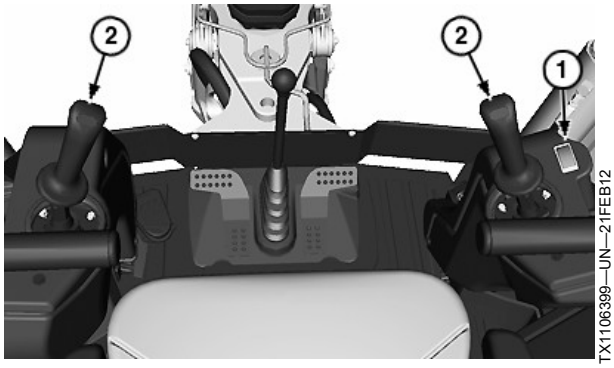
LB82152,0000B16-19-23AUG16-1/1

Discharge Pilot Control System Hydraulic Pressure—If Equipped

CAUTION: Prevent injury from unexpected machine movement. Turn engine off. Keep bystanders clear of machine.

Before servicing or performing maintenance on the machine, discharge hydraulic oil pressure from the pilot control system as follows:

1. Ensure that area around backhoe bucket is clear.
2. Turn engine OFF.
3. Press and release engine start switch. Do NOT start engine.
4. Rotate seat to backhoe operation position.
5. Pull pilot control towers back to operating position.
6. Momentarily press upper half of pilot enable switch (1) to unlock position to enable pilot controls. Three-position rocker switch will return to middle position and the joystick enable indicator on the monitor will illuminate.



Backhoe Pilot Controls

1—Pilot Enable Switch **2—Pilot Control Lever (2 used)**

7. Actuate pilot control levers (2) in a circular pattern for five to ten rotations.

LB82152,0000B30-19-06SEP12-1/1

Discharge Ride Control System Hydraulic Pressure—If Equipped

CAUTION: Prevent possible injury from unexpected boom or bucket movement when equipped with ride control. Ride control accumulator energy must be discharged when working on hydraulic components. Press and release engine start switch. Do NOT start engine. Press ride control switch on SSM to activate ride control and move loader control lever to FLOAT.

Do not have ride control activated when starting the machine; the machine may move if ride control is activated when the machine is started.

Do not have ride control activated when operating the loader; the ride control system may cause unexpected movement.

The ride control system has an accumulator and valve in the loader circuit.

Before servicing or performing maintenance on the machine, discharge hydraulic oil pressure from the ride control system as follows:

1. Ensure that area around bucket is clear.
2. Ensure ride control switch (1) is OFF on sealed switch module (SSM) (LED is not illuminated).
3. Start the engine.
4. Position front loader boom so that the bucket is approximately 30 cm (1 ft.) off the ground.
5. Stop the engine.
6. Press and release engine start switch. Do NOT start engine. Press ride control switch on SSM (LED illuminated) to activate ride control.
7. Move loader control lever to float position. Bucket should lower to ground.
8. If ride control accumulator has lost gas charge, see Checking Ride Control Accumulator—If Equipped in this section.

Sealed Switch Module (SSM)

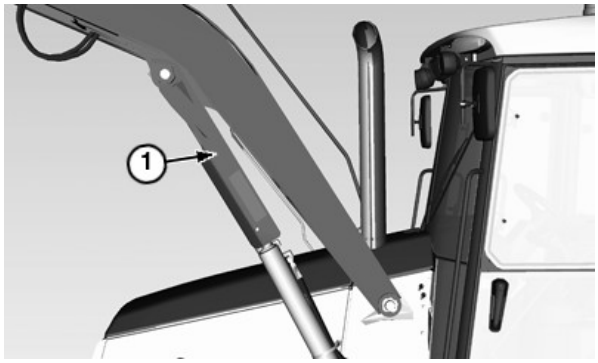
1—Ride Control Switch

LB82152,0000B17-19-25JAN12-1/1

Inspect Loader Boom Service Lock

1. Inspect loader boom service lock (1), cotter pin, and retaining pin to ensure that all are in good condition.
2. Verify that warning decal is in place.
3. See your authorized dealer for replacement parts.

1—Loader Boom Service Lock



Loader Boom Service Lock

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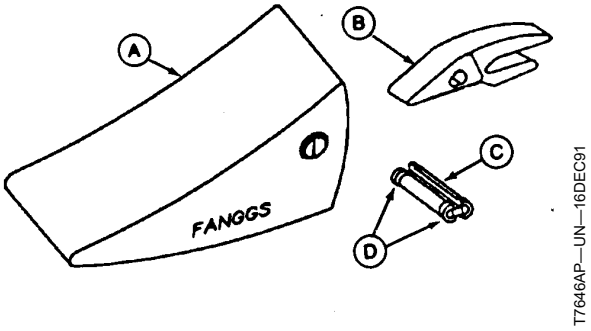
Replacing Bucket Teeth—Flex Pin



Backhoe Bucket Teeth Hardware

1. Position flex pin (C) with grooves (D) toward the tooth tip. The grooves are the locking mechanism.

NOTE: If "back" is stamped on the pin, this word must face the shank.

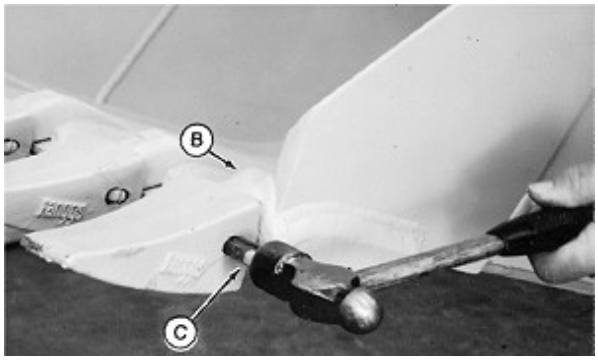
If shank is badly worn, install new shank.

Install special teeth for digging in rock or frost.

2. To remove tooth tip (A), drive out flex pin.
3. To fasten tooth tip to shank (B), drive flex pin in place.

A—Tooth Tip
B—Tooth Shank
C—Flex Pin
D—Groove

Flex Pin Removal



Flex Pin Installation

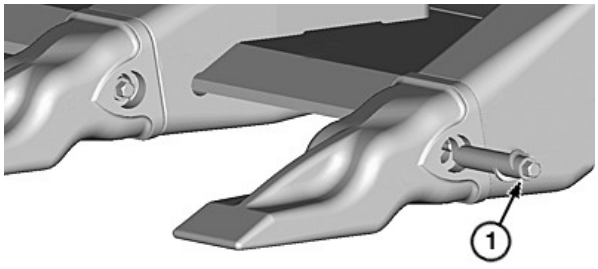
LB82152,0000B1A-19-19AUG20-1/1

Replacing Bucket Teeth—TK Series

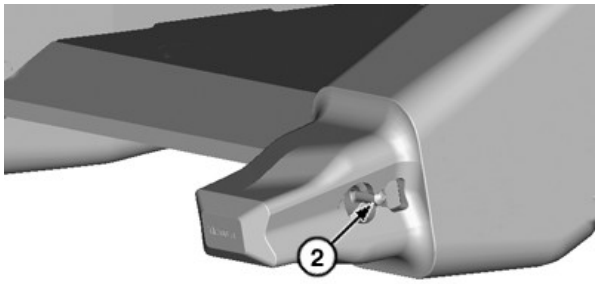
IMPORTANT: Prevent machine damage. Check bucket teeth periodically so that wear does not extend to the bucket tooth shank.

1. Remove pin (1) by rotating counterclockwise 180° using a ratchet and socket.
2. Remove tooth.
3. Inspect pin and rubber locks (2) for damage. Replace if necessary.
4. Position the new tooth over the tooth shank.
5. Install pin by rotating clockwise 180°. Install pin in same orientation as removed. Check alignment of pin.

1—Pin
2—Rubber Lock (2 used)



Pin



Rubber Lock

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Lowering Boom Without Electrical Power—For Machines With Pilot Controls

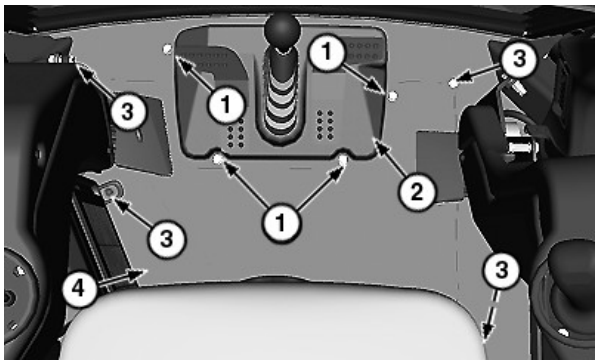
1. Remove rear half of floor mat.
2. Remove cap screws (1) and plastic cover (2).
3. Remove cap screws (3) and rear cab access floor plate (4).
4. Disconnect hose (5) from pilot pressure bulkhead fitting (6).
5. Connect remote pressure source to bulkhead fitting. Pressure source must be within specification.

Specification

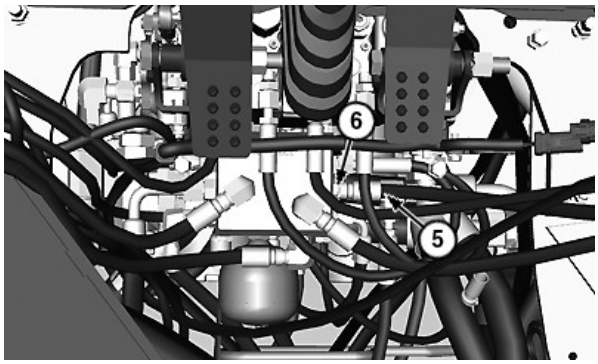
Remote Pressure Source—Pressure . . . . . 1379—24 821 kPa
14—248 bar
200—3600 psi

6. Lower boom using pilot controls.
7. Disconnect remote pressure source.
8. Connect hose to pilot pressure bulkhead fitting.
9. Install rear access floor plate.
10. Install plastic cover and floor mat.

1—Cap Screw (4 used)
2—Plastic Cover
3—Cap Screw (4 used)
4—Rear Cab Access Floor Plate
5—Hose
6—Pilot Pressure Bulkhead Fitting



Rear Floor Plate Access



Pilot Control Hose Bulkhead

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Reversing Stabilizer Feet

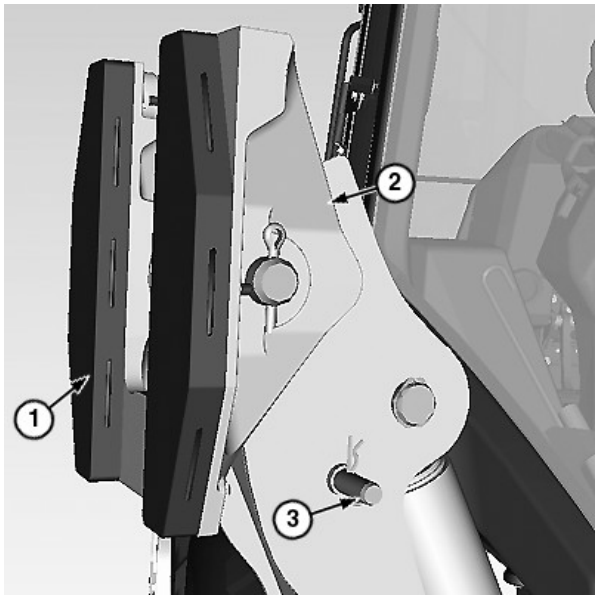
Use rubber pad side (1) of stabilizer foot when operating on paved surface to prevent damaging work area.

Use cleat side (2) of stabilizer foot when operating in dirt to prevent slipping.

To change foot surface:

1. Remove pin (3).
2. Rotate stabilizer foot 180° to opposite surface.
3. Install pin to keep foot from turning back around.

1—Rubber Pad Side
2—Cleat Side
3—Pin



Stabilizer Foot

LB82152,0000B1C-19-26JAN12-1/1

Service Recommendations For Snap-To-Connect (STC®) Fittings

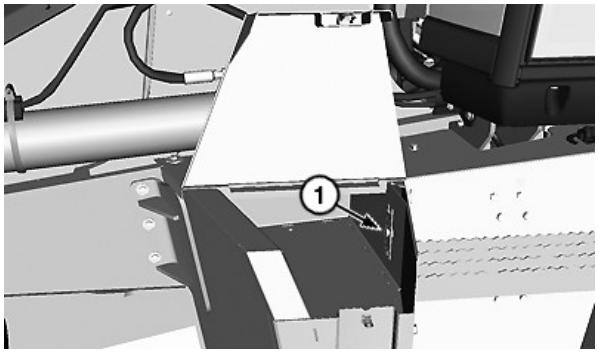
Snap-to-Connect (STC)® fittings are used on this machine. The fittings are designed to allow the hydraulic hose to rotate as needed when the system is not pressurized. This prevents the hydraulic hoses from binding when components are put back to their operating position.

Fittings are easily disconnected using JDG1385 special tool (1) (supplied with machine). The special tool has a different size slot cut into each end. The narrow slot is for -06 size fittings. The wide slot is for -08 size fittings. Use appropriate end of special tool on fitting being disconnected. To connect fittings, simply push each half of fitting together.

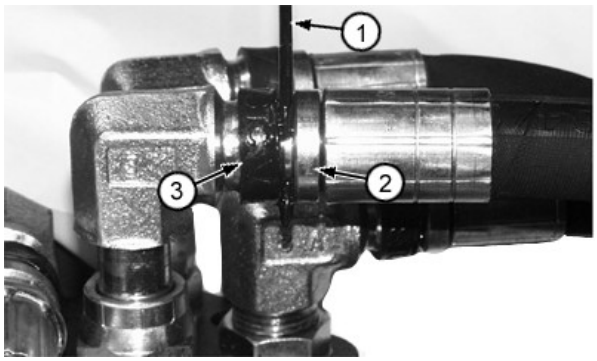
IMPORTANT: DO NOT pry against release sleeve or damage to fitting may result.

DO NOT force release sleeve beyond normal range of travel, otherwise, release sleeve may fall off when hose is disconnected. If this happens and fitting is connected without the release sleeve installed, fitting will not be able to be disconnected again.

1. Disconnect STC type fittings:
   a. Clean area around fitting, especially around the release sleeve (3).
   b. While keeping JDG1385 special tool perpendicular to the fitting, insert tool between release sleeve and shoulder (2).
   c. Gently push, **DO NOT PRY**, release sleeve away from shoulder to disconnect the fitting.
   d. Pull hose to disconnect.



JD1385 Special Tool Storage Location in Toolbox



STC Fitting and JDG1385 Special Tool

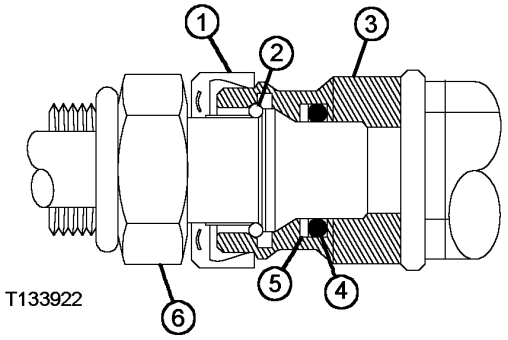
1—JDG1385 Special Tool
2—Shoulder
3—Release Sleeve

Snap-to-Connect (STC) is a trademark of Eaton Corporation

Continued on next page

LB82152,0000B1D-19-26JAN12-1/2

2. Inspect STC fittings:
   a. Check seal mating surfaces for nicks, scratches, or flat spots.
   b. Check O-ring (4), backup ring (5), and retaining ring (2) for wear or damage.
   c. Make sure O-ring, backup ring, and retaining ring are in position before connecting fitting halves together.
3. Connect STC fittings:
   a. Make sure both female half (3) and male half (6) of STC fittings are clean and free of contaminants.
   b. Make sure release sleeve (1) is on male half of STC fitting before connecting fitting halves together.
   c. Push fitting halves together until a definite snap and solid stop is felt.
   d. Pull back on hose to make sure fitting halves are locked together.



STC Fitting Cross Section

1—Release Sleeve
2—Retaining Ring
3—Female Half
4—O-Ring
5—Backup Ring
6—Male Half

e. To prevent hoses from binding, move component into position before pressurizing hydraulic system.

LB82152,0000B1D-19-26JAN12-2/2

Toe-In Check and Adjust

NOTE: Check and adjust tracking angle before checking and adjusting axle toe-in.

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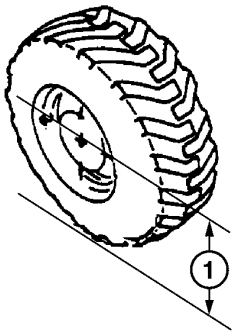
Toe-In Measurement Check

1. Measure distance from ground to center of hubs (1) on both sides of machine. If distance from ground to center of both hubs is not equal, check and adjust tire pressure. See Inspect Tires and Check Pressure. (Section 3-3.)

1—Ground to Center of Hub (2 used)



Center of Hub

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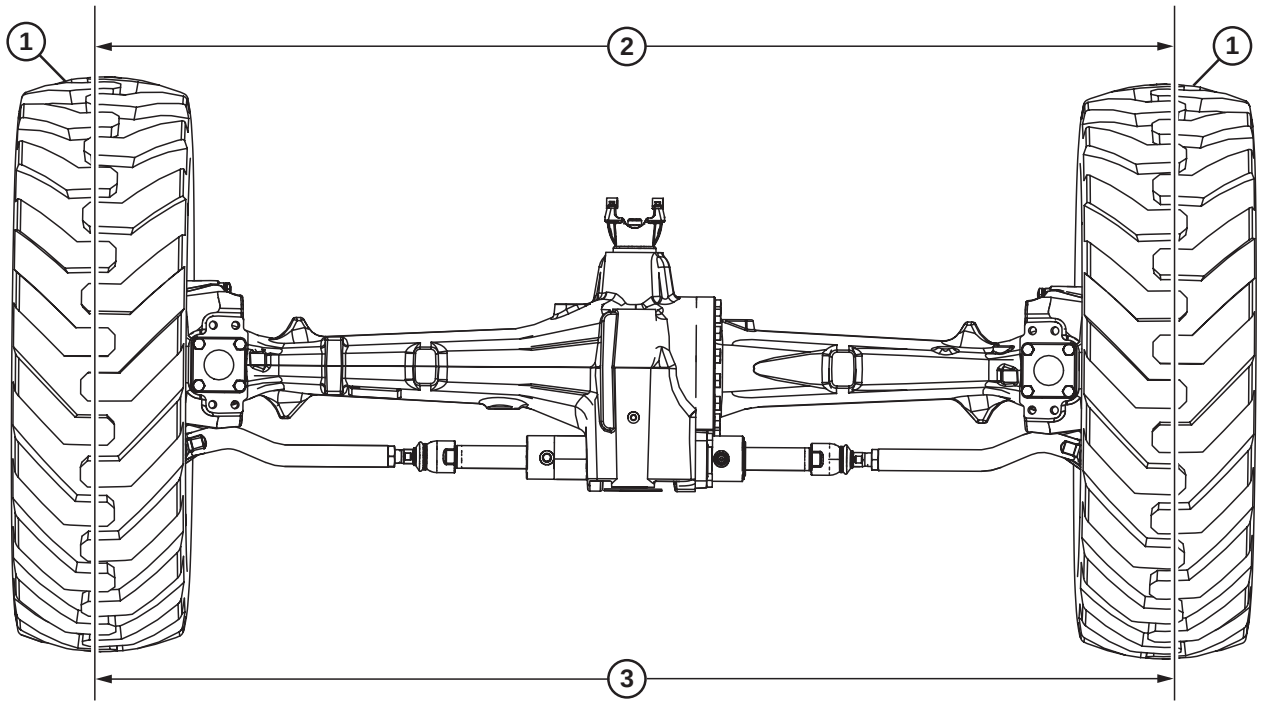


TX1108444

Tracking Angle Adjustment

1—Tire (2 used)

2—Wheel-to-Wheel Distance (rear of tire)

3—Wheel-to-Wheel Distance (front of tire)

2. Measure wheel-to-wheel distance (2 and 3) for front of wheels and for rear of wheels.
3. Front wheel-to-wheel distance (3) must be smaller than rear wheel-to-wheel distance (2) within specification.

Specification

Front Wheel-to-Wheel Measurement—Distance. . . . . 3—6 mm (less than rear wheel-to-wheel measurement)
0.13—0.25 in. (less than rear wheel-to-wheel measurement)

KR46761,000096D-19-12JUN13-3/4

Toe-In Adjustment

1. Loosen jam nuts (5).

NOTE: Adjust toe-in equally on both tie rods.

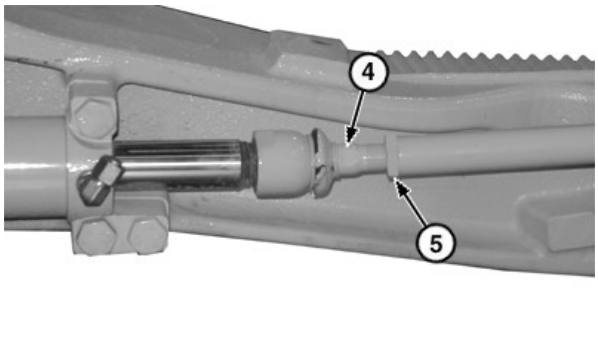
2. Turn threaded rod (4) to adjust toe-in to meet specification.

Specification

Front Wheel-to-Wheel Measurement—Distance. . . . . 3—6 mm (less than rear wheel-to-wheel measurement)
0.13—0.25 in. (less than rear wheel-to-wheel measurement)

NOTE: If tracking angle and toe-in adjustment procedures are performed on mechanical front wheel drive (MFWD) axle, maximum steering angle stop screws must be adjusted. See Steering Angle Check and Adjust in this section.

3. Tighten jam nut to specification.



Jam Nut

4—Threaded Rod (2 used)

5—Jam Nut (2 used)

Specification

Tie Rod Jam Nut—Torque. . . . . 120 N·m 89 lb.-ft.

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Steering Angle Check and Adjust

This procedure is only used on mechanical front wheel drive (MFWD) axle. Non-powered front axle is not adjustable. Check and adjust tracking angle before checking and adjusting steering angle.

KR46761,000096E-19-23AUG16-1/2

1. Check if steering angle stop cap screw (1) distance is within specification.

Specification

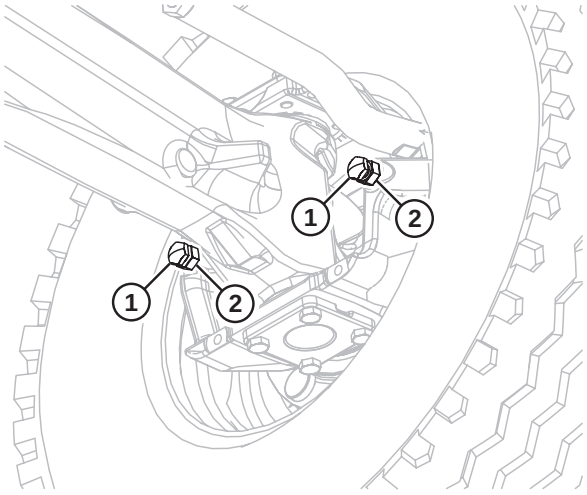
Maximum Steering Angle Stop Cap Screw—Distance. . . . . 32—34 mm 1.26—1.34 in

2. If not within specification, loosen jam nut (2) and adjust stop cap screw to specification.
3. Tighten jam nut to specification.

Specification

Maximum Steering Angle Stop Screw Jam Nut—Torque. . . . . 150 N·m 111 lb·ft

1—Cap Screw (4 used) **2—Jam Nut (4 used)**



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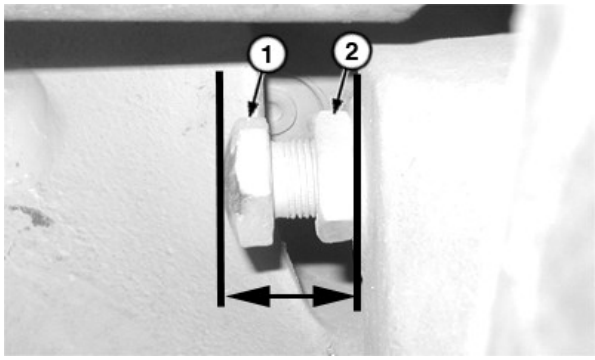
Maximum Steering Angle Stop Screw (left side shown)



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Maximum Steering Angle Stop Screw

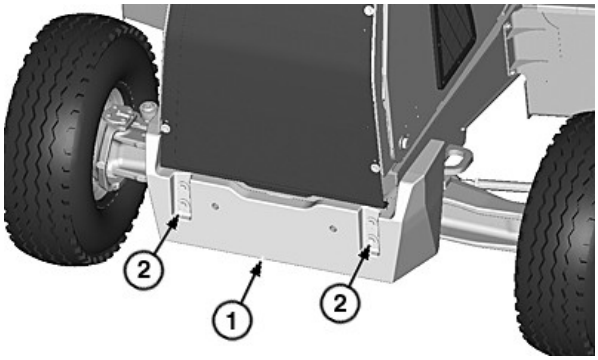
KR46761,000096E-19-23AUG16-2/2

Adding Front Counterweights

CAUTION: Avoid personal injury. Counterweights are heavy and can cause serious injury if dropped. Ensure counterweights are properly supported with a forklift or other adequate lifting device before removing.

Install front counterweight (1) for added stability as necessary.

1. Support counterweight with a forklift before adding or removing weight.
2. Remove cap screws (2).
3. Remove or add counterweight as necessary.
4. Install cap screws.



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Front Counterweight

1—Counterweight **2—Cap Screw (4 used)**

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Adding Liquid Ballast to Front Tires

See Tire Pressures. (Section 3-3.)

Weights given are for front tires 75 percent full of water or a 1.6 kg (3.5 lb) per liter (gallon) of water calcium chloride ($CaCl_2$) solution.

NOTE: Approximately 1.6 kg (3.5 lb) $CaCl_2$ per liter (gallon) of water will stay slush free to -24°C (-12°F) and will freeze solid at -47°C (-52°F).

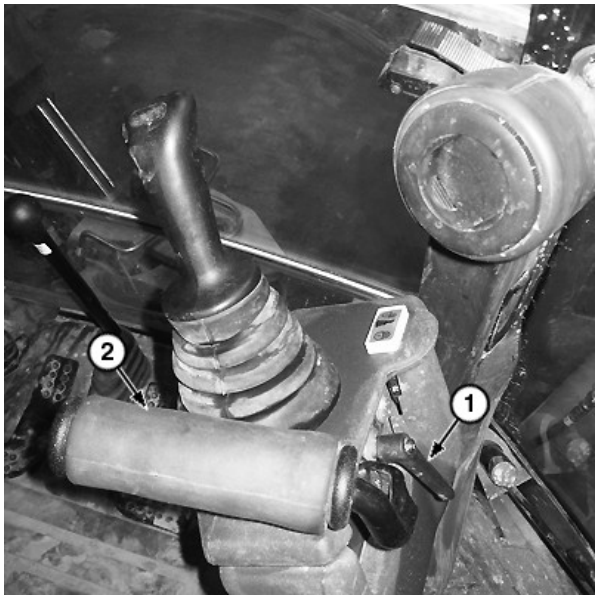
	Water Only		Water/$CaCl_2$ Solution		
Tire Size	**Volume**	**Weight**	**Volume**	**Weight**	**Total Weight Per Tire**
11L-15	53.0 L 14.0 gal	53 kg 117 lb	45.0 L 12.0 gal	19 kg 42 lb	64 kg 141 lb
11L-16	57.0 L 15.0 gal	57 kg 126 lb	49.0 L 13.0 gal	21 kg 46 lb	70 kg 154 lb
12-16.5	57.0 L 15.0 gal	57 kg 126 lb	49.0 L 13.0 gal	21 kg 46 lb	70 kg 154 lb
12.5/80-18	83.0 L 22.0 gal	83 kg 183 lb	64.0 L 17.0 gal	38 kg 84 lb	102 kg 225 lb
14.5/75-16.1	102.0 L 27.0 gal	102 kg 225 lb	87.0 L 23.0 gal	37 kg 82 lb	124 kg 273 lb
15-19.5	109.0 L 29.0 gal	109 kg 240 lb	95.0 L 25.0 gal	39 kg 86 lb	134 kg 295 lb
16.5L-16.1	156.0 L 41.0 gal	156 kg 344 lb	133.0 L 35.0 gal	55 kg 121 lb	188 kg 414 lb

LB82152,0000B20-19-23AUG16-1/1

Pilot Control Wrist Rest Adjustment—If Equipped

1. Turn lever (1) counterclockwise to loosen.
2. Adjust wrist rest (2) up or down to desired position.
3. Turn lever clockwise to tighten.

1—Lever **2—Wrist Rest**



Wrist Rest

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Fuel System Bleed Procedure

IMPORTANT: DO NOT prefill fuel filters. Debris in unfiltered fuel will damage fuel system components.

NOTE: This procedure should be performed after each fuel filter change or when the engine has run out of fuel.

Air can enter fuel system when changing fuel filters or when machine has run out of fuel. Air in the fuel system can prevent the engine from starting or cause rough idle. This machine is equipped with an electric priming pump. Prime fuel system and bleed air as follows:

1. Press and release engine start switch to energize ignition system and fuel pump. Do NOT start engine. Let pump run for 2 minutes to prime fuel system.
2. After 2 minutes, press and hold engine start switch until engine starts. Release switch when engine starts.
3. Run engine for 5 minutes at slow idle.

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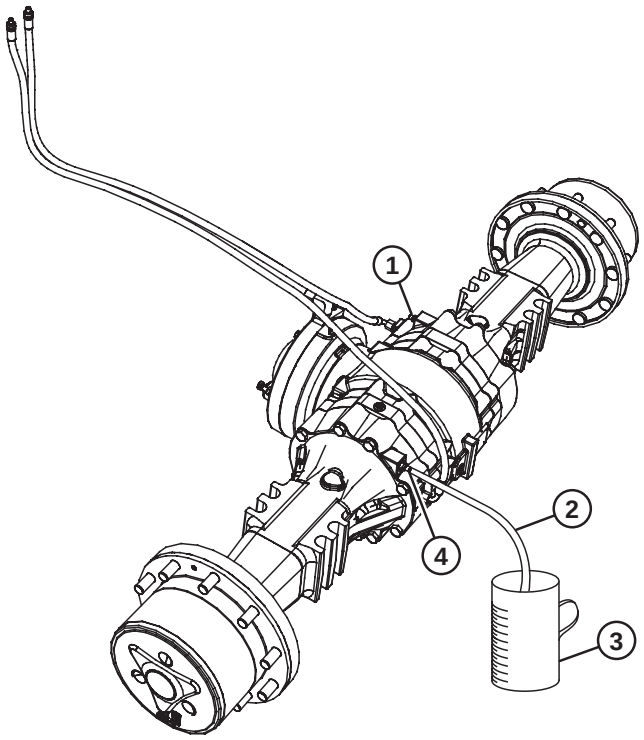
Service Brake Bleed Procedure



TX1074504

TX1074504—UN—07APR10

Brake Bleeding Procedure Using Bleed Screw Method

1—Bleed Screw (right side) **2—Clear Plastic Tube** **3—Container** **4—Bleed Screw (left side)**

CAUTION: Avoid personal injury. Do not operate machine if pedal travel exceeds 133 mm (5.25 in) while applying 267 N (60 lbf) force. Operating machine with excessive brake travel could cause brakes not to stop machine on first application.

NOTE: Air will "gravity bleed" from the brake system through brake valve without use of bleed screws, but the procedure takes much longer time so bleed screw method is the recommended procedure. Brake lines must be inclined toward brake valve for procedures other than bleed method.

Low ambient temperature or aeration of oil slows bleeding process.

The rear axle is equipped with two brake bleed screws, one for each wheel. Brake bleeding must be done whenever the brake system has been opened to repair or after replacing the brake valve, brake lines, fitting, O-rings, or axle internal brake parts.

Both brake pedals may be depressed at one time even though bleeding is done one side at a time.

All fittings must be inspected for leaks and tightened if leaks occur.

The preferred method for the brake bleeding procedure is to use the bleed screw method. The vacuum and manual methods are much slower methods but may be used as alternates.

Bleed Screw Method

NOTE: Two people are required to bleed brake system oil, one to operate brake valve and other to open and close bleed screws.

CAUTION: Hot oil can cause serious burn injury. Secure drain hose on bleed screw and in container to prevent it from blowing off when bleed screw is opened while brakes are applied.

1. Secure a clear plastic tube (2) on bleed screw (4) with hose clamp and secure other end in a small container (3).
2. Start engine and run at slow idle with park brake on.
3. Steer from right to left stop-to-stop three times to fill the brake valve reservoir.
4. Shut off engine.

NOTE: Only two pedal bleeding applications can be done without refilling the brake valve reservoir.

Bleed screw must be closed before the fully depressed pedal reaches the floor.

5. Depress and hold the brake pedal. Open one (side) service brake bleed screw to allow air and oil mixture into

Continued on next page

LB82152,0000B21-19-24JUL18-1/3

a container. Close bleed screw before pedal reaches maximum travel or floor.

If the bleeding procedure (applying brake pedal full distance or travel) is done more than twice, fill the brake valve reservoir again by starting the machine and steering from stop-to-stop three times.

Repeat the process until oil from bleed screw runs clear and without air.

6. Repeat process for opposite side.
7. After bleeding process is completed, pump each pedal to check if pedal is firm.

LB82152,0000B21-19-24JUL18-2/3

8. Check brake pedal travel (6) distance to specifications as shown.

Specification	
Dual Brake Pedal Travel (lock bar engaged)—Distance (maximum)	95 mm 3.75 in
Single Brake Pedal Travel (lock bar disengaged)—Distance (maximum)	114 mm 4.5 in

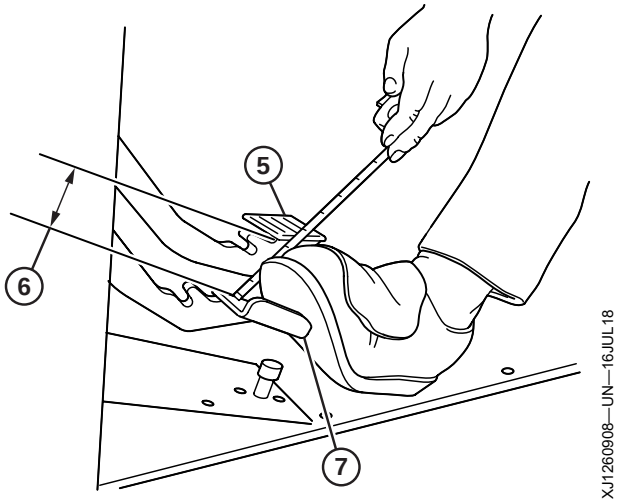
9. Recycle old oil.

Vacuum Method

1. Engage park brake. Connect a vacuum to breather port on hydraulic reservoir. After 10 minutes, disconnect air pressure.
2. Leave hose from breather port to vacuum device connected until brake circuit is filled with oil. Both pedals should become solid.
3. Check brake pedal travel (6) distance to specifications as shown.

Manual Method

1. Engage park brake. Run engine at slow idle.
2. Steer from stop-to-stop three or four times to fill the brake valve reservoir.
3. Pump left brake pedal five times, allowing 2 seconds between each pump for air to escape.



Brake Pedal Travel

5—Right Brake Pedal
6—Brake Pedal Travel
7—Left Brake Pedal

4. Repeat steps 2 and 3 until the left brake pedal is solid.
5. Pump right brake pedal until pedal is solid, then pump both pedals together until pedals are solid.
6. Check brake pedal travel (6) distance to specifications as shown.

LB82152,0000B21-19-24JUL18-3/3

Do Not Service Control Valves, Cylinders, Pumps, or Motors

Special tools and information are needed to service control valves, cylinders, pumps, or motors.

If these parts need service, see an authorized John Deere dealer.

TX,90,DH2537-19-13AUG20-1/1

Precautions for Alternator and Regulator

When batteries are connected, follow these rules:

1. Disconnect negative (-) battery cable when working on or near alternator or regulator.
2. DO NOT TRY TO POLARIZE ALTERNATOR OR REGULATOR.
3. Be sure that alternator wires are correctly connected BEFORE connecting batteries.
4. Do not ground alternator output terminal.
5. Do not disconnect or connect any alternator or regulator wires while batteries are connected or while the alternator is operating.
6. Connect batteries or a booster battery in the correct polarity (positive [+] to positive [+] and negative [-] to negative [-]).
7. Do not disconnect the batteries when engine is running and alternator is charging.
8. Disconnect battery cables before connecting battery charger to the batteries. If machine has more than one battery, each battery must be charged separately.
9. Before washing machine, place a water repellent cover over the alternator.
10. To prevent component damage, the water jets need to be set at a 45-degree angle with reduced water pressure. Avoid direct contact with electrical and electronic connectors.

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Handling, Checking and Servicing Batteries Carefully

CAUTION: 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 it last.

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

Avoid the hazard by:

1. **Filling batteries in a well-ventilated area.**
2. **Wearing eye protection and rubber gloves.**
3. **Avoiding breathing fumes when electrolyte is added.**
4. **Avoiding spilling or dripping electrolyte.**
5. **Use proper jump start procedure.**

If you spill acid on yourself:

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

If acid is swallowed:

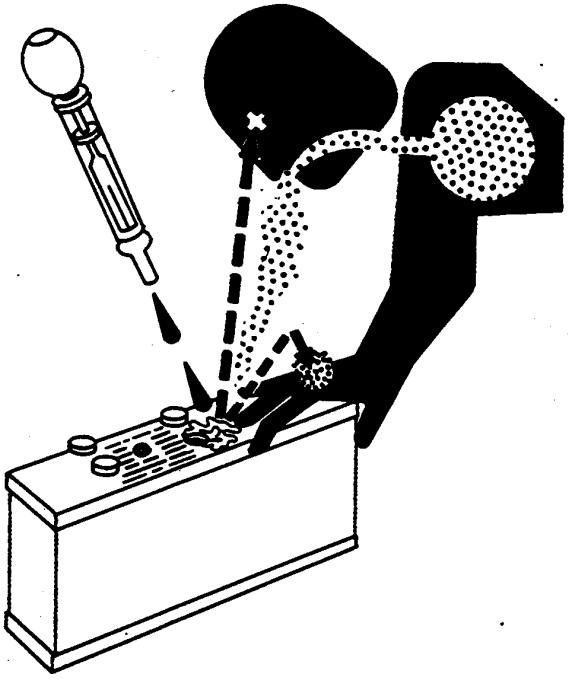
1. **Do not induce vomiting.**
2. **Drink large amounts of water or milk, but do not exceed 1.9 L (2 qt).**
3. **Get medical attention immediately.**

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.**

If electrolyte spills on the floor, use one of the following mixtures to neutralize the acid: 0.5 kg (1 lb) baking soda in 4 L (1 gal) water, or 0.47 L (1 pt) household ammonia in 4 L (1 gal) water.

IMPORTANT: Do not overfill the battery cells.

TS204—UN—15APR13



TS203—UN—23AUG88

Check the specific gravity of electrolyte in each battery cell.

Continued on next page

See your authorized dealer for JT05460 SERVICEGARD™ battery and coolant tester. Follow directions included with the tester.

A fully charged battery will have a corrected specific gravity reading of 1.260. If the reading is below 1.200, charge the battery.

T85402—UN—10NOV88

Battery And Coolant Tester

SERVICEGARD is a trademark of Deere & Company

LB82152,0000B22-19-25JAN12-2/2

Using Battery Charger

12-Volt System

CAUTION: Prevent possible injury from exploding battery. Do not charge a battery if ambient temperature is below 0°C (32°F). Warm battery to 16°C (60°F) before charging.

Turn off charger before connecting or disconnecting it.

IMPORTANT: Do not use battery charger as a booster if a battery has a 1.150 specific gravity reading or lower.

Disconnect battery ground (-) clamp before charging batteries in the machine to prevent damage to electrical components.

NOTE: Some battery chargers may also be used as a booster to start the engine. Follow battery charger manufacturer's operating instruction before boosting.

1. Turn the battery disconnect switch (if equipped) to the OFF position.
2. Ventilate the area where battery is being charged.
3. Connect positive (+) cable to the positive (+) terminal of machine battery.
4. Connect negative (-) cable to the negative (-) terminal of machine battery.

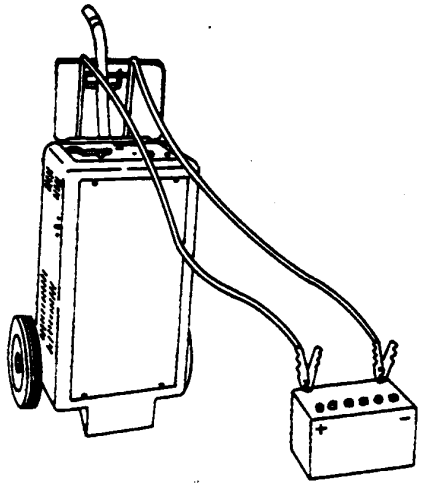
CAUTION: Prevent possible injury from exploding battery. Follow battery charger manufacturer's operating instructions before charging.

IMPORTANT: Prevent battery or machine damage from improper use of charger. Follow battery charger manufacturer's operation instruction before charging.

5. Stop or cut back charging rate if battery case becomes hot or is venting electrolyte. Battery temperature must not exceed 52°C (125°F).
6. Remove charger cables in reverse order of connection.

TS204—UN—15APR13

Prevent Battery Explosions



N36890—UN—07OCT88

Charger

Continued on next page

OUT4001,0000239-19-15SEP21-1/2

24-Volt System

CAUTION: Prevent possible injury from exploding battery. Do not charge a battery if ambient temperature is below 0°C (32°F). Warm each battery to 16°C (60°F) before charging.

Turn off charger before connecting or disconnecting it.

IMPORTANT: Do not use battery charger as a booster if a battery has a 1.150 specific gravity reading or lower.

Disconnect battery ground (-) clamp before charging batteries in the machine to prevent damage to electrical components.

NOTE: Some battery chargers may also be used as a booster to start the engine. Follow battery charger manufacturer's operating instruction before boosting.

1. Turn the battery disconnect switch (if equipped) to the OFF position.
2. Ventilate the area where batteries are being charged.
3. Connect positive (+) cable to the positive (+) terminal of one machine battery.
4. Connect negative (-) cable to the negative (-) terminal of second machine battery.

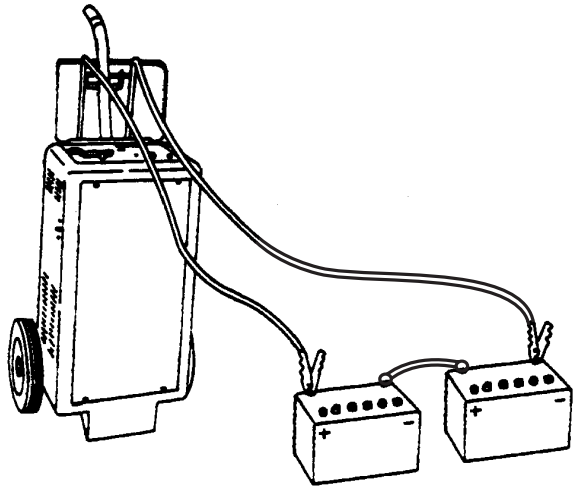
CAUTION: Prevent possible injury from exploding battery. Follow battery charger manufacturer's operating instructions before charging.

IMPORTANT: Prevent battery or machine damage from improper use of charger. Follow battery charger manufacturer's operation instruction before charging.

5. Stop or cut back charging rate if battery case becomes hot or is venting electrolyte. Battery temperature must not exceed 52°C (125°F).
6. Remove charger cables in reverse order of connection.

TS204—UN—15APR13

Prevent Battery Explosions



TX1314241—UN—22JUN21

Charger

OUT4001,0000239-19-15SEP21-2/2

Using Booster Batteries—12-Volt System

Before boost starting, machine must be properly shut down to prevent unexpected machine movement when engine starts.

CAUTION: Prevent possible injury from exploding battery. An explosive gas is produced while batteries are in use or being charged. Keep flames or sparks away from the battery area. Make sure the batteries are charged in a well-ventilated area.

IMPORTANT: The machine electrical system is a 12-volt negative (-) ground. Use only 12-volt booster batteries.

1. Connect one end of the positive cable to the positive terminal of the machine batteries and the other end to the positive terminal of the booster batteries.
2. Connect one end of the negative cable to the negative terminal of the booster batteries. Connect other end of the negative cable to the machine as far away from the machine batteries as possible.
3. Start engine.

TS204—UN—15APR13

Using Booster Batteries

4. Immediately after starting engine disconnect end of the negative cable from the machine. Then disconnect the other end of the negative cable from the negative terminal of the booster batteries.
5. Disconnect positive cable from booster batteries and machine batteries.

OUT4001,00000E1-19-21JUL17-1/1

Removing Batteries

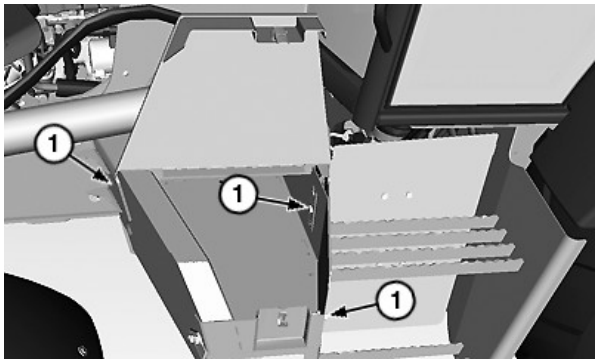
NOTE: Check for worn or frayed wires and loose or corroded connections.

NOTE: The toolbox must be removed to access the battery box. Always empty the toolbox before lifting it.

1. Remove cap screws (1) and lift toolbox out of battery box.
2. Disconnect negative (-) battery cables first, then positive (+) cables.
3. Remove nuts, washers, and hold-down brackets (2).
4. Lift batteries out of battery box.

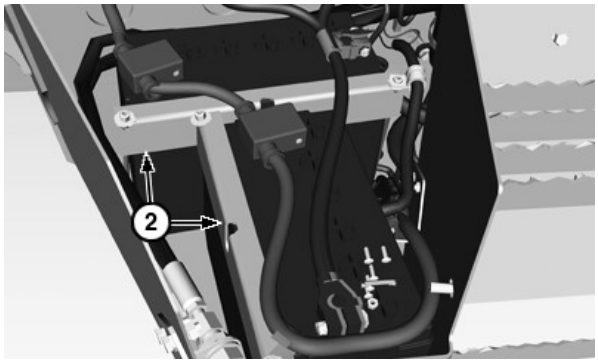
1—Cap Screw (3 used)

2—Hold-Down Bracket (1 or 2 used)



TX1106361—UN—21FEB12

Tool Box Removal



TX1106362—UN—21FEB12

Optional Dual-Battery Configuration Shown

LB82152,0000B23-19-26JAN12-1/1

Replacing Batteries

Your machine may be equipped with one or two 12-volt hybrid batteries with (-) negative ground. Use only batteries meeting following specifications:

Cold Cranking Amps			
Volts	BCI Group	-18°C (0°F)	Reserve Capacity (minutes at 25 amps)
12	31	950	190

TS204—UN—15APR13

LB82152,0000AF3-19-09MAR12-1/1

Welding On Machine

CAUTION: 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.

When sanding or grinding painted surfaces, avoid breathing the dust. Wear an approved respirator. When using 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.

IMPORTANT: Have only a qualified welder perform this job. Connect welder ground clamp close to each weld area so electrical current does not pass through any bearings, articulation joints, pivot points, or cylinders. Remove or protect all parts that can be damaged by heat or weld splatter.

1. Remove paint before welding or heating.
   - When sanding or grinding paint, avoid breathing the dust.
   - Wear an approved respirator. When using 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.

IMPORTANT: Electrical current traveling from the welder through the machine electrical system may damage the machine electrical system, including batteries, control units, or other electrical components. Disconnect battery positive and negative cables before welding on machine.

2. Disconnect the negative (-) battery cables.
3. Disconnect the positive (+) battery cables.
4. Cover, protect, or move any wiring harness sections away from welding area.
5. For machine equipped with position sensing cylinders:
   - Disconnect all position sensors before welding.
   - Never connect welder ground clamp to piston rod or barrel.
   - Never weld on or near a cylinder with a sensor installed.

For any repairs, see an authorized John Deere dealer.

TX,WOM-19-28SEP23-1/1

Welding Near Electronic Control Units

IMPORTANT: Do not jump-start engines with arc welding equipment. Currents and voltages are too high and may cause permanent damage.

1. Disconnect the negative (-) battery cable(s).
2. Disconnect the positive (+) battery cable(s).
3. Connect the positive and negative cables together. Do not attach to vehicle frame.
4. Clear or move any wiring harness sections away from welding area.
5. Connect welder ground close to welding point and away from control units.
6. After welding, reverse Steps 1—5.

DX,WW,ECU02-19-14AUG09-1/1

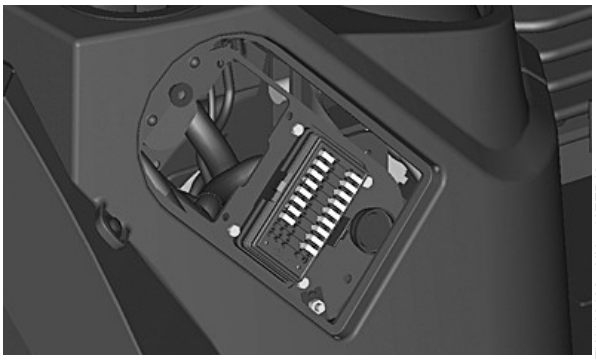
Keep Electronic Control Unit Connectors Clean

IMPORTANT: Do not open control unit and do not clean with a high-pressure spray. Moisture, dirt, and other contaminants may cause permanent damage.

1. Keep terminals clean and free of foreign debris. Moisture, dirt, and other contaminants may cause the terminals to erode over time and not make a good electrical connection.
2. If a connector is not in use, put on the proper dust cap or an appropriate seal to protect it from foreign debris and moisture.
3. Control units are not repairable.
4. Since control units are the components LEAST likely to fail, isolate failure before replacing by completing a diagnostic procedure. (See your John Deere dealer.)
5. The wiring harness terminals and connectors for electronic control units are repairable.

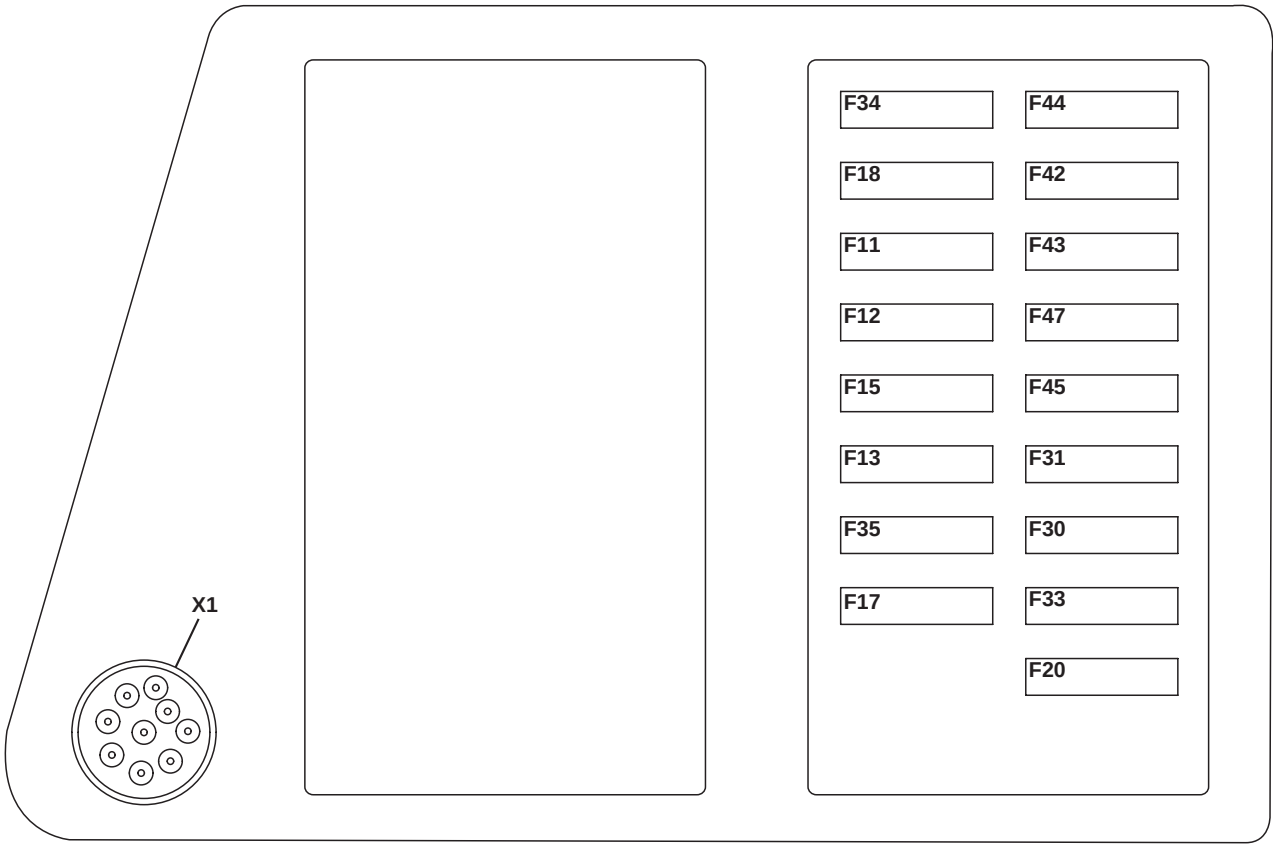
DX,WW,ECU04-19-11JUN09-1/1

Replacing Fuses



TX1108102—UN—16FEB12

Fuse Box Location



TX1108472—UN—16FEB12

TX1108472

Fuse Panel

F11—Power Port Unswitched Power 15 A Fuse
F12—Horn/Service ADVISOR™ Unswitched Power 10 A Fuse
F13—Optional Equipment Unswitched Power 15 A Fuse
F15—Monitor Unswitched Power 5 A Fuse
F17—Sealed Switch Module (SSM) 7.5 A Fuse
F18—Radio Unswitched Power 10 A Fuse
F20—Air Conditioner Control 7.5 A Fuse
F30—Monitor Switched Power 5 A Fuse
F31—Return-To-Dig 15 A Fuse
F33—VCU Switched Power 5 A Fuse
F34—Optional Equipment Switched Power 15 A Fuse
F35—Transmission Control 5 A Fuse
F42—Dome Light/Radio Switched Power 10 A Fuse
F43—Air Seat 15 A Fuse
F44—Blower Motor/Temperature Control 30 A Fuse
F45—Power Port Switched Power 15 A Fuse
F47—Optional Equipment Switched Power 15 A Fuse
X1—Service ADVISOR™ Diagnostic Connector

Continued on next page

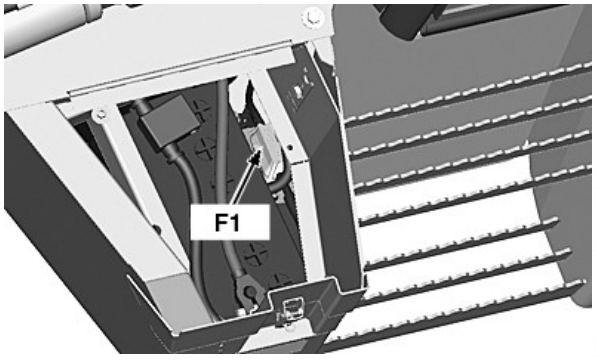
MB60223,00002AA-19-28MAR12-1/5

The fuse block is located to the right of the operator's seat below the loader control lever.

Service ADVISOR is a trademark of Deere & Company

MB60223,00002AA-19-28MAR12-2/5

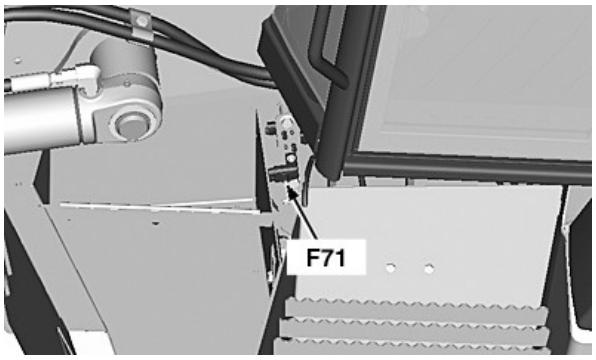
F1—Main 250 A Fuse



Main 250 A Fuse Location

MB60223,00002AA-19-28MAR12-3/5

F71—JDLink™ Ground 7.5 A Fuse



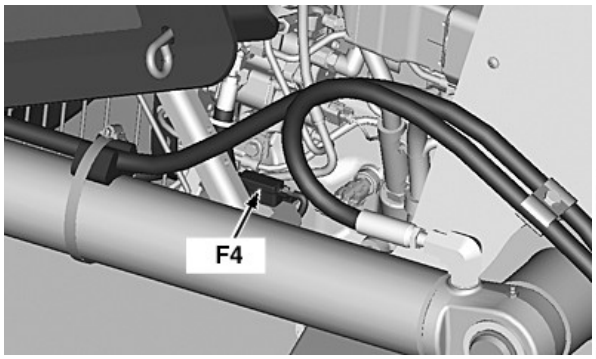
JDLink™ Fuse Location

MB60223,00002AA-19-28MAR12-4/5

Engine Control Unit (ECU) Fuse

ECU fuse (F4) is located on the mainframe on the left-hand side of machine.

F4—Engine Control Unit (ECU) Unswitched Power 40 A Fuse



Engine Control Unit (ECU) Fuse Location

MB60223,00002AA-19-28MAR12-5/5

Check Park Brake

CAUTION: Prevent possible injury from unexpected machine movement. Fasten seat belt before performing this check.

1. Fasten seat belt.
2. Start machine on dry, hard pavement.
3. Raise loader and backhoe buckets off ground.
4. Ensure park brake switch (1) is off (LED is not lit).
5. Disengage MFWD, if equipped.
6. Move the transmission control lever (TCL) to F2.
7. Depress the speed control pedal to the floor and drive approximately 7 m (20 ft.), then press park brake switch to engage the park brake. The machine must stop within 2 m (6 ft.) and transmission must shift to neutral.

1—Park Brake Switch

TX1108781A—UN—21FEB12

Sealed Switch Module (SSM)

LB82152,0000B28-19-25JAN12-1/1

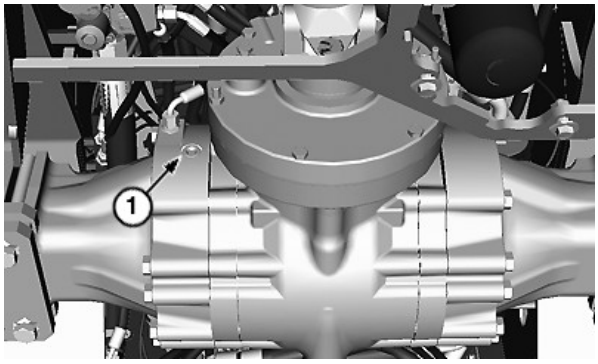
External Service Brake Inspection

Do first inspection at 2000 hours followed by 1000 hour inspection intervals after the first 2000 hour inspection.

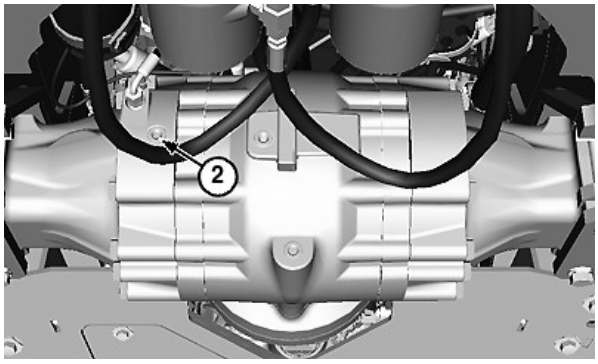
If the service brakes are subjected to severe duty, inspect more frequently.

1. Inspect brakes for wear through the right and left rear wheel external inspection ports (1 and 2).
2. Remove axle housing and replace brake disc if oil grooves (3) on facing material are no longer visible.

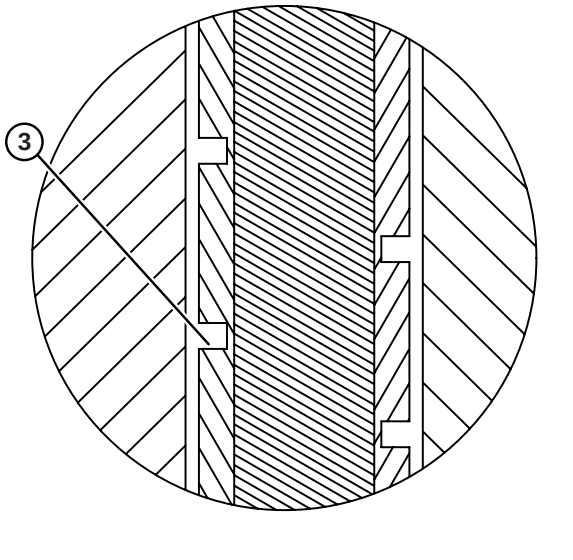
1—Right Rear Wheel External Inspection Port
2—Left Rear Wheel External Inspection Port
3—Oil Groove



Front Side of Rear Axle Shown



Back Side of Rear Axle Shown



Oil Groove

LB82152,0000B29-19-27FEB12-1/1

Keep ROPS Installed Properly

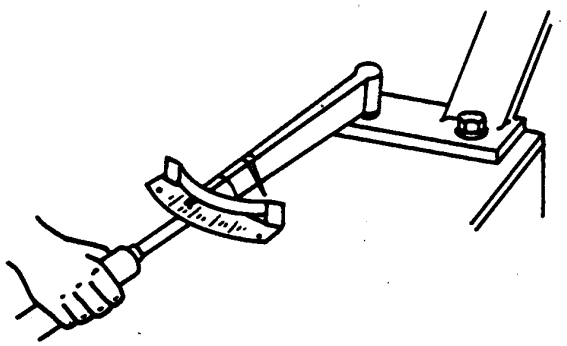
CAUTION: Avoid personal injury or death. Make certain all parts are reinstalled correctly if the rollover protective structure (ROPS) is loosened or removed for any reason. Tighten mounting bolts to proper torque.

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. A damaged ROPS should be replaced, not reused.

When installation of equipment on a machine necessitates loosening or removing ROPS, mounting bolts must be tightened to specification.

Specification

ROPS Mounting Bolts—Torque	420 N·m 310 lb·ft



TS176—UN—23AUG88

Tighten Mount Bolts to Proper Torque

LB82152,0000B2A-19-09FEB16-1/1

JDLink™ Machine Monitoring System (MMS)

JDLink™ is an equipment monitoring and information delivery system. JDLink™ automatically collects and manages information about where and how construction and forestry equipment is being used, as well as critical machine health data and service status.

JDLink is a trademark of Deere & Company

For more information, see your authorized dealer or visit www.deere.com (browse to Construction, Services and Support, JD Link).

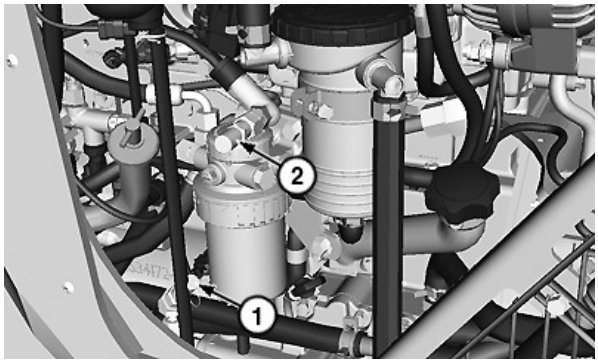
OUT4001,0000004-19-30MAR12-1/1

Fluid Sampling Test Ports—If Equipped

The engine oil sample port (1) and coolant sample port (2) are located on the right side of the engine compartment.

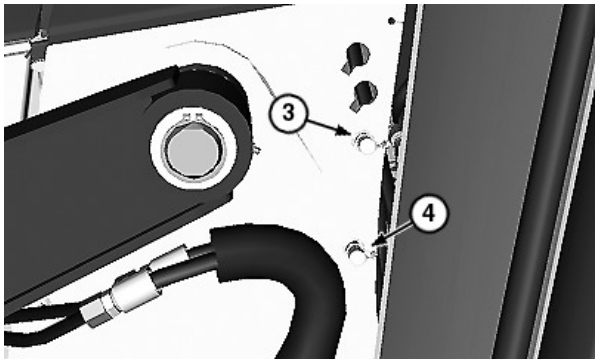
The hydraulic oil sample port (3) and transmission oil sample port (4) are located on the left side of machine.

1—Engine Oil Sample Port
2—Coolant Sample Port
3—Hydraulic Oil Sample Port
4—Transmission Oil Sample Port



TX1106380—UN—29FEB12

Right Side of Engine Shown



TX1106386—UN—27FEB12

Left Side of Machine Shown (panel in front of cab)

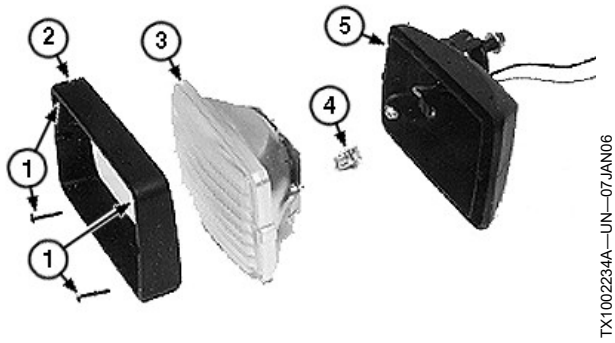
LB82152,0000B2B-19-01MAR12-1/1

Remove and Install Halogen Bulb

1. Remove screws (1), cover (2), lamp (3), and lamp housing (5).
2. Disconnect wiring lead and release retainer clip to remove bulb (4).

IMPORTANT: Do not touch the halogen bulb with bare hands. Oil and moisture may cause premature bulb malfunction. Clean bulb glass if touched, using an oil-free cloth with alcohol.

3. Install new bulb, lamp and assemble housing.



Lamp (exploded view)

1—Screw (4 used)
2—Cover
3—Lamp
4—Bulb
5—Lamp Housing

LB82152,0000AF7-19-22FEB12-1/1

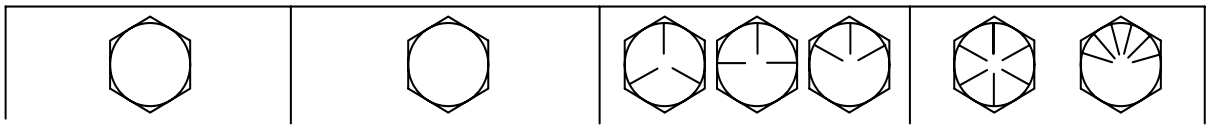
Hardware Torque Specifications

Check cap screws and nuts to be sure they are tight. If hardware is loose, tighten to torque shown on the following charts unless a special torque is specified.

TX,90,FF1225-19-15MAR93-1/1

Unified Inch Bolt and Screw Torque Values

TS1671—UN—01MAY03



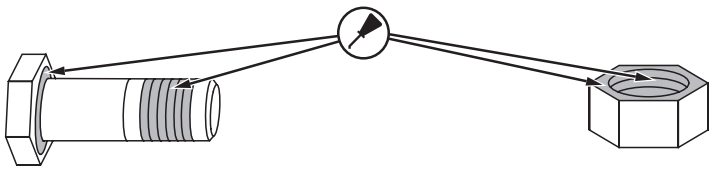
Bolt or Screw Size	SAE Grade 1[a]				SAE Grade 2[b]				SAE Grade 5, 5.1 or 5.2				SAE Grade 8 or 8.2			
	Hex Head[c]		Flange Head[d]		Hex Head[c]		Flange Head[d]		Hex Head[c]		Flange Head[d]		Hex Head[c]		Flange Head[d]	
	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in
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.

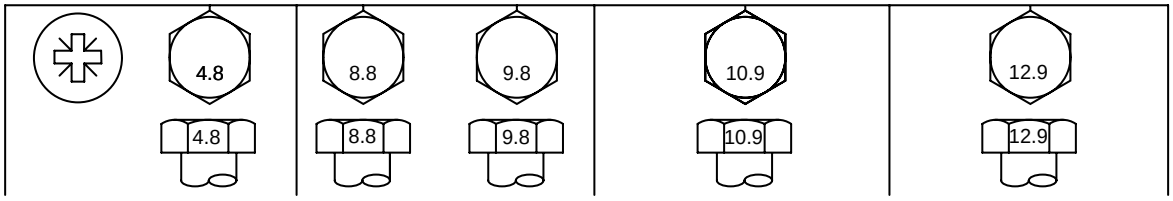
TS1741—UN—22MAY18



[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,TORQ1-19-09MAY22-1/1

Metric Bolt and Screw Torque Values



TS1742—UN—31MAY18

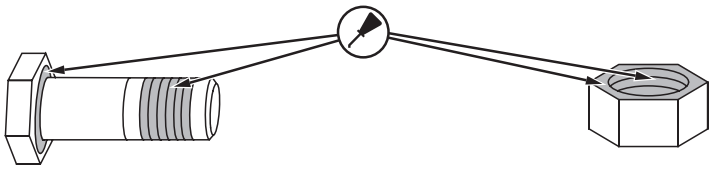
Bolt or Screw Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Hex Head[a]		Flange Head[b]		Hex Head[a]		Flange Head[b]		Hex Head[a]		Flange Head[b]		Hex Head[a]		Flange Head[b]	
	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in
M6	3.6	31.9	3.9	34.5	6.7	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,TORQ2-19-09MAY22-1/1

Tire Chains

IMPORTANT: Avoid machine damage caused by loose tire chains. Periodically check chain tightness and adjust as necessary. Always use wheel spacer kit with tire chains to avoid machine damage.

Chains are available for all four wheels from your John Deere dealer.

QEYDK2Y,1675230430679-19-08FEB23-1/1

Operational Checkout Procedure

Use this check to make a quick check of machine operation by doing a walk around inspection and performing specific checks from operator's seat.

Complete visual checks (oil levels, oil condition, external leaks, loose hardware, linkage, wiring, etc.) before performing checkout.

Most checks will require machine systems to be at normal operating temperatures and a level area with adequate space to operate machine. Some checks may require varied surfaces.

If no problem is found, go to the next check. If a problem is indicated, an additional check or repair procedure will be suggested.

No special tools are necessary to perform the checkout.

DB84312,0000131-19-19JUN13-1/57

Diagnostic Trouble Code Check

DB84312,0000131-19-19JUN13-2/57

1 Display and Clear Trouble Codes	**Always check for diagnostic trouble codes and correct them before performing the operational checkout.** Diagnostic trouble codes can be displayed by using two methods: • Standard display monitor (SDM) • Service ADVISOR™ Check for diagnostic trouble codes. *LOOK: Are diagnostic trouble codes present?*	**YES:** Correct all diagnostics trouble codes before proceeding. **NO:** Proceed with operational checkout.

Service ADVISOR is a trademark of Deere & Company

DB84312,0000131-19-19JUN13-3/57

Switched Power OFF, Engine OFF Checks

DB84312,0000131-19-19JUN13-4/57

1 Periodic Maintenance Decal Check	Periodic maintenance decal check. *LOOK: Is periodic maintenance decal legible?*	**YES:** Go to next check. **NO:** Replace decal.

DB84312,0000131-19-19JUN13-5/57

2 Cab Doors and Window Seals Check	Open and close doors and windows. Inspect seals. *LOOK: Do cab doors and windows seal properly?* *LOOK: Do cab doors latch properly?*	**YES:** Go to next check. **NO:** See your authorized dealer.

Continued on next page

DB84312,0000131-19-19JUN13-6/57

3 Battery and Hour Meter Check	 TX1106171A—UN—24JAN12 *Hour and Voltage* Press and hold SELECT button on standard display monitor (SDM) until battery voltage and hour meter are displayed. *LOOK: Does battery volts read a minimum of 12 volts?*	**YES:** Go to next check. **NO:** Test battery.

DB84312,0000131-19-19JUN13-7/57

4 Dome Light Check—If Equipped	Press the outside edge of dome light lens to turn the dome light on. *LOOK: Is dome light on?*	**YES:** Go to next check. **NO:** Check fuse and bulb. See Replacing Fuses. (Section 4-1.) **IF OK:** See your authorized dealer.

DB84312,0000131-19-19JUN13-8/57

5 Horn Check	Press horn button. *LISTEN: Does horn activate?*	**YES:** Go to next check. **NO:** Check fuse. See Replacing Fuses. (Section 4-1.) **IF OK:** See your authorized dealer.

DB84312,0000131-19-19JUN13-9/57

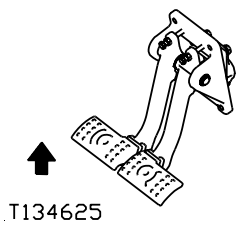
6 Seat Belt Check	Does seat belt function correctly?	**YES:** Go to next check. **NO:** See Use and Maintain Seat Belt. (Section 1-3.)

DB84312,0000131-19-19JUN13-10/57

7 Seat Control Checks	*NOTE: For seat adjustment procedures, see Seat Controls. (Section 2-1.)* Does seat raise and lower? Does seat move forward and rearward easily and lock in position? Does seat rotate from loader to backhoe position easily and lock in position? Does seat back tilt forward and rearward easily and lock in position?	**YES:** Go to next check. **NO:** See your authorized dealer.

Continued on next page

DB84312,0000131-19-19JUN13-11/57

8 Service Brake Pedal Stop Check	 T134625—UN—19OCT00 *Pedal Stop* Unlock brake pedals. Lift left and right brake pedals individually. *NOTE: Gap between pedal stop screws and plate should be 0.127—0.381 mm (0.005—0.015 in.).* *This travel ensures that brake check valves are opened and brakes are released.* *LOOK: Does each pedal have a minimal amount of travel before cap screws contact stop?*	**YES:** Go to next check. **NO:** See your authorized dealer.

DB84312,0000131-19-19JUN13-12/57

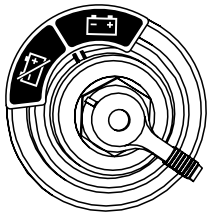
Switched Power ON, Engine OFF Checks

DB84312,0000131-19-19JUN13-13/57

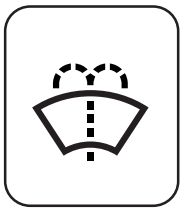
1 Standard Display Monitor (SDM) Check	*NOTE: For full display of indicators and menu, see Standard Display Monitor (SDM). (Section 2-2.)* Press and release engine start switch on the sealed switch module (SSM) to energize machine (switched power on, engine off). Observe monitor and note changes (bulbs, indicators, and gauges). *LOOK: Does the display show the correct model number for a few seconds?* *Does the display show FASTEN SEAT BELT for a few seconds?* *Do all lights and backlighting come on?* *Does the display show the voltage and hours symbol?* *Do all gauge indicators point to maximum travel position and then move to their normal operating position?*	**YES:** Go to next check. **NO:** See your authorized dealer.
	Observe monitor. Press the NEXT button. *LOOK: Does the display show gear, engine speed, and hour meter?*	**YES:** Go to next check. **NO:** See your authorized dealer.
	Observe monitor. Press the NEXT button. *LOOK: Does the display show gear, engine speed, and voltage?*	**YES:** Go to next check. **NO:** See your authorized dealer.
	Observe monitor. Press the NEXT button. *LOOK: Does the display show gear, engine speed, and job timer hours?*	**YES:** Go to next check. **NO:** See your authorized dealer.

Continued on next page

DB84312,0000131-19-19JUN13-14/57

2 Battery Disconnect Switch Check—If Equipped	 TX1105855—UN—25JAN12 *Battery Disconnect Switch* Turn battery disconnect switch to the OFF position. *LOOK: Do monitor indicator lights come on?*	**YES:** Switch is malfunctioning. Check battery disconnect switch. See your authorized dealer. **NO:** Continue check.
	Turn battery disconnect switch ON. *LOOK: Do monitor indicator lights come on?*	**YES:** Go to next check. **NO:** Switch is malfunctioning. Check battery disconnect switch. See your authorized dealer.

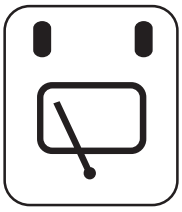
DB84312,0000131-19-19JUN13-15/57

3 Front Wiper and Washer Circuit Check —If Equipped	 TX1106752—UN—27JAN12 *Front Wiper Switch*  TX1106754—UN—27JAN12 *Front Washer Switch* Press and release front wiper switch on sealed switch module (SSM) to enable (one LED illuminated). *LOOK: Does front wiper operate in intermittent mode?* Press and release front wiper switch again to enable (two LEDs illuminated). *LOOK: Does front wiper operate in low speed mode?* Press and release front wiper switch again to enable (three LEDs illuminated). *LOOK: Does front wiper operate in fast speed mode?* **IMPORTANT: Washer motor may be damaged if washer switch is held for more than 20 seconds, or continually operated with no fluid in the washer fluid tank.** Press and hold washer switch on SSM to enable. *LOOK: Does front wiper continue to operate?* *LOOK: Does front washer pump operate?*	**YES:** Go to next check. **NO:** Check washer hose for kinks or obstructions. **NO:** Washer fluid reservoir may be empty. **NO:** Check fuse. See Replacing Fuses. (Section 4-1.) **IF OK:** See your authorized dealer.

Continued on next page

DB84312,0000131-19-19JUN13-16/57

4 Rear Wiper Check—If Equipped



TX1106753—UN—27JAN12

Rear Wiper Switch

Press and release rear wiper switch on sealed switch module (SSM) to enable (one LED illuminated).

LOOK: Does rear wiper operate intermittently?

Press and release rear wiper switch on SSM again (two LEDs illuminated).

LOOK: Does rear wiper operate in high speed mode?

YES: Go to next check.

NO: Check fuse. See Replacing Fuses. (Section 4-1.)

IF OK: See your authorized dealer.

DB84312,0000131-19-19JUN13-17/57

5 Front Work Light Check

TX1106747—UN—27JAN12

Front Work Light Switch

Press and release front work light switch on sealed switch module (SSM) to enable (one LED illuminated).

LOOK: Are inner front work lights on?

Press and release front work light switch on SSM again to enable (two LEDs illuminated).

LOOK: Are inner and outer front work lights on?

Press and hold front work light switch on SSM for more than 2 seconds (all LEDs are off).

LOOK: Are all lights off?

YES: Go to next check.

NO: Check fuse. See Replacing Fuses. (Section 4-1.)

IF OK: See your authorized dealer.

Continued on next page

DB84312,0000131-19-19JUN13-18/57

6 Rear Work Lights Check	 TX1106750—UN—27JAN12 *Rear Work Lights* Press and release rear work light switch on sealed switch module (SSM) to enable (one LED illuminated). *LOOK: Are inner rear work lights on?* Press and release rear work light switch again to enable (two LEDs illuminated). *LOOK: Are inner and outer rear work lights on?* Press and release rear work light switch again to enable (three LEDs illuminated). *LOOK: Are inner, outer, and side dock rear work lights on?* Press and release rear work light switch again to enable (far right LED illuminated). *LOOK: Are the two side dock work lights on?* Press and release rear work light switch again (all LEDs are off). *LOOK: Are all rear work lights off?*	**YES:** Go to next check. **NO:** Check fuse. See Replacing Fuses. (Section 4-1.) **IF OK:** See your authorized dealer.

DB84312,0000131-19-19JUN13-19/57

7 Turn Signal Check	Press right side of turn signal switch down on steering wheel column. *LOOK: Is right amber light flashing? Does right LED indicator arrow flash in the rocker switch?* Press left side of turn signal switch down. *LOOK: Is left amber light flashing? Does left LED indicator arrow flash in the rocker switch?*	**YES:** Go to next check. **NO:** Check fuse and bulbs. See Replacing Fuses. (Section 4-1.) **IF OK:** See your authorized dealer.

DB84312,0000131-19-19JUN13-20/57

8 Brake Light Switch Check	Depress and hold left brake pedal, then right brake pedal. *LOOK: Does brake light come on when either pedal is depressed with switched power on?*	**YES:** Go to next check. **NO:** Check fuse and bulbs. See Replacing Fuses. (Section 4-1.) **IF OK:** See your authorized dealer.

DB84312,0000131-19-19JUN13-21/57

9 Beacon Light Check—If Equipped	Press beacon light switch ON. *LOOK: Is beacon flashing?* Turn beacon light switch OFF. *LOOK: Is beacon light off?*	**YES:** Go to next check. **NO:** Check fuse and bulbs. See Replacing Fuses. (Section 4-1.) **IF OK:** See your authorized dealer.

Continued on next page

DB84312,0000131-19-19JUN13-22/57

10 Hazard Warning Signal Check

TX1106745—UN—27JAN12

Hazard Warning Signal Switch

Press the hazard warning signal switch on sealed switch module (SSM).

LOOK: Are four amber lights flashing (two front and two rear)?

Are both LED indicator arrows flashing in turn signal switch?

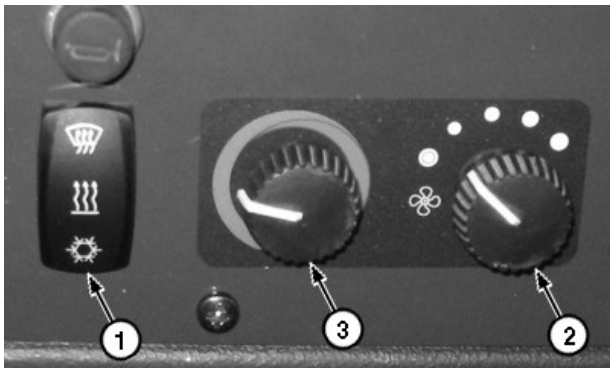
YES: Go to next check.

NO: Check fuse and bulbs. See Replacing Fuses. (Section 4-1.)

IF OK: See your authorized dealer.

DB84312,0000131-19-19JUN13-23/57

11 Blower Switch and Function Check—If Equipped



TX1107357A—UN—02FEB12

Defroster, Heater, and Air Conditioner Controls

1—Defroster, Heater, and Air Conditioner Switch
2—Blower Speed Switch
3—Temperature Control Knob

Turn blower speed switch (2) to LOW, MED, HIGH, and PURGE.

LISTEN/FEEL: Does blower speed change as each different speed is selected?

YES: Go to next check.

NO: Check fuse. See Replacing Fuses. (Section 4-1.)

IF OK: See your authorized dealer.

Continued on next page

DB84312,0000131-19-19JUN13-24/57

12 Ride Control Electrical Check—If Equipped	 TX1106755—UN—27JAN12 *Ride Control Switch* Press ride control switch on the sealed switch module (SSM) to enable ride control (LED illuminated). *LOOK: Does the ride control symbol illuminate on the SSM?* Turn ride control switch OFF (all LEDs are off). *LOOK: Is the ride control symbol turned off on the SSM?*	**YES:** Go to next check. **NO:** See your authorized dealer.

DB84312,0000131-19-19JUN13-25/57

Switched Power ON, Engine ON Checks

DB84312,0000131-19-19JUN13-26/57

1 Loader Boom Lock Check	Raise loader boom and install boom lock. *LOOK: Does boom lock work properly?*	**YES:** Go to next check. **NO:** Repair or replace if necessary. See your authorized dealer.

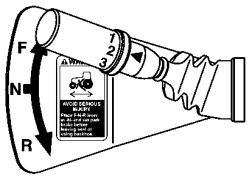
DB84312,0000131-19-19JUN13-27/57

2 Park Brake Indicator and Switch Check	Fasten seat belt. Operator's seat facing loader position and locked. Apply service brakes. Start the engine. Engine speed at slow idle. *LOOK: Is the park brake indicator displayed on the standard display monitor (SDM)?* *LOOK: Is the park brake switch LED illuminated?* Release park brake. *LOOK: Is the park brake indicator off on the SDM?* *LOOK: Is the park brake switch LED off?* Apply park brake. Stop the engine.	**YES:** Go to next check. **NO:** See your authorized dealer.

Continued on next page

DB84312,0000131-19-19JUN13-28/57

3 Start Circuit Check



TX1107403—UN—02FEB12

Transmission Control Lever (TCL)

Fasten seat belt.

Operator's seat facing loader position and locked.

Move transmission control lever (TCL) to first gear forward (1F).

Apply service brakes.

Start the engine.

Engine speed at slow idle.

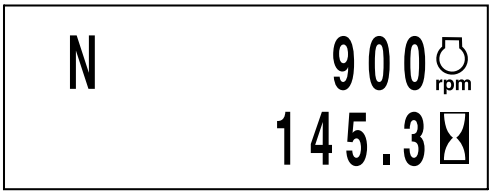
NOTE: The engine will start with TCL in forward (F) or reverse (R) but the controller will automatically shift the transmission to neutral (N).

LOOK/LISTEN: Does the engine start?

Does standard display monitor (SDM) show RETURN TCL TO NEUTRAL?

Apply service brakes.

Release park brake.



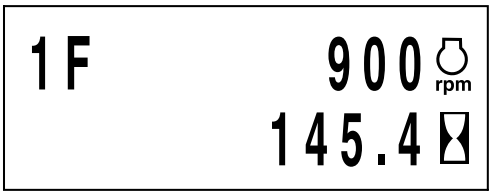
TX1003148—UN—02FEB06

Neutral on Display

Move TCL to neutral.

NOTE: SDM will not show (F) forward or (R) reverse until the TCL is cycled to neutral and the park brake has been released.

LOOK: Does SDM show N?



TX1003149—UN—30JAN06

TCL to first gear forward (1F).

LOOK: Does SDM show 1F?

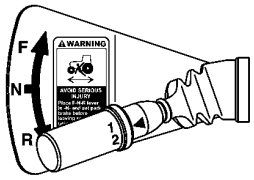
YES: Go to next check.

NO: See your authorized dealer.

Continued on next page

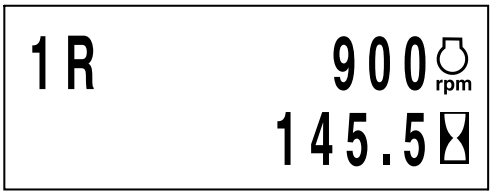
DB84312,0000131-19-19JUN13-29/57

4 Reverse Warning Alarm Check



TX1107404—UN—02FEB12

1R Transmission Control Lever (TCL)



TX1003150—UN—30JAN06

1R Display

Engine speed at slow idle.

Operator's seat facing loader position and locked.

Apply service brakes.

Release park brake.

Move transmission control lever (TCL) to first gear reverse (1R).

LOOK/LISTEN: Does display show correct gear and direction?

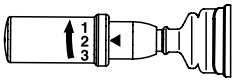
Does the reverse warning alarm sound?

YES: Go to next check.

NO: See your authorized dealer.

DB84312,0000131-19-19JUN13-30/57

5 Transmission Gearshift Detent Check



TX1003176—UN—30JAN06

Gearshift Detent

Fasten seat belt.

Start the engine.

Engine speed at slow idle.

Operator's seat facing loader position and locked.

Apply service brakes.

Release park brake.

Move transmission control lever (TCL) into forward (F).

Turn TCL to shift into each gear.

LOOK: Does gear number align with pointer in each speed detent position?

Does twist handle remain in detented positions?

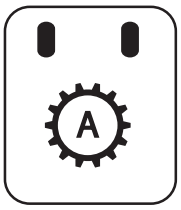
Does display indicate correct gear and direction?

YES: Go to next check.

NO: Replace TCL switch. See your authorized dealer.

Continued on next page

DB84312,0000131-19-19JUN13-31/57

6 Autoshift Transmission Check—If Equipped	 TX1106744—UN—27JAN12 *Automatic Transmission Switch* *NOTE: Autoshift transmission mode allows the machine to automatically shift in gear range two through highest gear range in forward and two through three in reverse but the transmission control lever's (TCL) current position determines the highest range or shift band autoshift will operate in. If the TCL is in forward (3F), autoshift will only shift automatically between gears two and three.* Fasten seat belt. Start the engine. Press and release automatic transmission switch on sealed switch module (SSM) to enable (both LEDs illuminated). Apply service brakes. Release park brake. Move transmission control lever (TCL) to forward (4). Drive machine at various travel and engine speeds in forward. *LOOK: Does the gear range show on the standard display monitor (SDM)?* *LOOK/LISTEN: Does machine automatically shift up and down in gears two through highest forward gear?* Move TCL to reverse (4). Drive machine at various travel and engine speeds in reverse. *LOOK: Does the gear range change on the SDM?* *LOOK/LISTEN: Does machine automatically shift up and down in gears two through three in reverse?*	**YES:** Go to next check. **NO:** See your authorized dealer.

DB84312,0000131-19-19JUN13-32/57

7 Park Brake Function Check	Fasten seat belt. Start the engine. Engine speed at slow idle. Operator's seat facing loader position. Apply service brakes. Release park brake. Move transmission control lever (TCL) to third gear forward (3F). Slowly increase engine speed just enough to allow machine to start to move a few feet. Apply the park brake. *NOTE: Transmission will shift to neutral (N) as soon as park brake is applied.* *LOOK/FEEL: Does park brake engage when park brake switch is pressed and does the machine stop?*	**YES:** Go to next check. **NO:** See your authorized dealer.

Continued on next page

DB84312,0000131-19-19JUN13-33/57

8 Pilot Control Tower Operating/Stored Position Check—If Equipped	Move pilot control towers into operating position. Release towers. *LOOK/FEEL: Do towers stay in operating position?* Move pilot control towers into stored position. *LOOK/FEEL: Do towers stay in stored position?*	**YES:** Go to next check. **NO:** See your authorized dealer.

DB84312,0000131-19-19JUN13-34/57

9 Pilot Enable Switch Check—If Equipped	Run engine at slow idle. Disable pilot controls and move control levers. *LOOK: Do activated functions move?*	**NO:** Continue with check. **YES:** See your authorized dealer.

DB84312,0000131-19-19JUN13-35/57

10 Control Pattern Select Switch Check—If Equipped	 TX1003191—UN—30JAN06 *Control Pattern Select Switch* Enable pilot controls. Press and release control pattern select switch on the standard switch module (SSM) to select backhoe option (left LED illuminated). Activate left and right pilot control levers forward and backward. *LOOK: Does backhoe boom move when left pilot control lever is activated?* *Does backhoe crowd move when right pilot control lever is activated?*	**YES:** Continue with check. **NO:** See your authorized dealer.
	Press and release control pattern select switch again on the SSM to select excavator option (right LED illuminated). Activate left and right pilot control levers forward and backward. *LOOK: Does backhoe crowd move when left pilot control lever is activated?* *Does backhoe boom move when right pilot control lever is activated?*	**YES:** Go to next check. **NO:** See your authorized dealer.

DB84312,0000131-19-19JUN13-36/57

11 Pilot Control Valve Check—If Equipped	Enable pilot controls. Move pilot control levers in all directions. *FEEL/LOOK: Do levers move freely in all directions?* *FEEL/LOOK: Do levers spring back to neutral when released?*	**YES:** Go to next check. **NO:** If pilot control levers bind during travel or do not return to neutral position, inspect controls and towers. See your authorized dealer.

Continued on next page

DB84312,0000131-19-19JUN13-37/57

12 Pilot Control Accumulator Check—If Equipped

Run engine at 1500 rpm.

Operators seat in backhoe position.

Enable pilot controls.

Disengage boom from boom lock.

Hold boom up function over relief for 10 seconds.

Turn engine off. Press and release engine start switch.

NOTE: Pilot enable switch must be cycled after engine start switch is pressed and released.

Cycle pilot enable switch to enable position.

Activate boom down function.

LOOK: Does boom lower when boom down function is activated?

YES: Go to next check.

NO: See your authorized dealer.

DB84312,0000131-19-19JUN13-38/57

13 Backhoe Stabilizer Check

Engine speed at slow idle.

Operator's seat facing backhoe position.

Activate stabilizer lever to lower and raise left stabilizer.

Activate stabilizer lever to lower and raise right stabilizer.

LOOK: Do both stabilizers raise and lower?

YES: Continue check.

NO: Check hydraulic reservoir oil level. See Check Hydraulic Reservoir Oil Level. (Section 3-4.)

IF OK: See your authorized dealer.

DB84312,0000131-19-19JUN13-39/57

14 Stabilizer Cylinder Check

Engine speed at approximately 1500 rpm.

Position loader bucket off the ground.

Operator's seat facing backhoe position and locked.

Lower stabilizers to raise rear of machine off the ground.

LOOK/FEEL: Do cylinders extend and hold machine up?

Raise stabilizers.

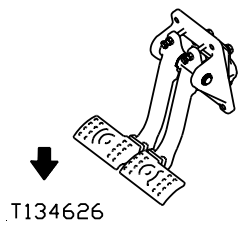
LOOK/FEEL: Do cylinders retract and remain up?

YES: Go to next check.

NO: See your authorized dealer.

DB84312,0000131-19-19JUN13-40/57

15 Brake System Leakage Check



T134626—UN—19OCT00

Brake Pedals

Depress and hold left brake pedal, then right brake pedal.

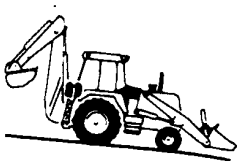
LOOK: Brake pedal must not feel spongy (caused by air in the system). Does pedal settle more than 25 mm (1.0 in.) per minute?

YES: Bleed brake system. See Service Brake Bleed Procedure. (Section 4-1.)

NO: Go to next check.

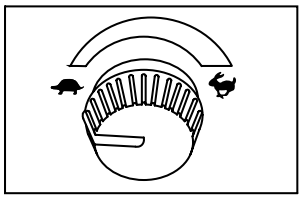
Continued on next page

DB84312,0000131-19-19JUN13-41/57

16 Brake Drag/Park Brake Check	 T6171AL—UN—09DEC88 *Position Machine On Gradual Slope* Operator's seat in loader position and locked. Position machine on a gradual slope with front of machine facing downhill. Lift loader bucket off the ground. Transmission control lever (TCL) to neutral. Differential lock not actuated. Release park brake. Release service brakes. *NOTE: If machine does not move freely on slope, drive the machine for five minutes. Feel axle housing area to locate which brake is dragging.* Let machine coast freely for several feet. Apply park brake. *LOOK: Did machine stop?* Release park brake. *LOOK: Did machine coast freely?*	**YES:** Go to next check. **NO:** See your authorized dealer.

Continued on next page

DB84312,0000131-19-19JUN13-42/57

17 Engine Speed Control Knob Check	 TX1003184—UN—30JAN06 *Engine Speed Control Knob* Engine speed at slow idle. Auto-idle off. Lower all equipment to the ground. Operator's seat facing backhoe position and locked. Transmission control lever (TCL) in neutral. Move engine speed control knob to slow idle, then to fast idle position. *NOTE: If economy mode is enabled, maximum engine speed will be limited. For more information, see Economy Mode Operation. (Section 2-3.)* *LOOK: Does tachometer read 900 rpm (slow idle) and 2400 rpm (fast idle)?*	**YES:** Continue check. **NO:** See your authorized dealer.
	Engine speed at slow idle. Operator's seat facing backhoe position. Move engine speed control knob to increase engine speed to 1200 rpm. **CAUTION: Prevent possible crushing injury from heavy component. Use appropriate lifting device. Do not crawl under machine while hydraulically supported.** Lower stabilizers to raise machine off the ground. Mechanical front wheel drive (MFWD) not actuated. Move TCL to first gear forward (1F). *LOOK/LISTEN: Does engine speed return to slow idle?*	**YES:** Go to next check. **NO:** See your authorized dealer.
	Engine speed at slow idle. Operator's seat facing loader position. TCL in neutral. Move engine speed control knob to increase engine speed to 1200 rpm. Apply service brakes. *LOOK/LISTEN: Does engine speed return to slow idle?*	**YES:** Continue check. **NO:** See your authorized dealer.
	Release service brakes. *LOOK/LISTEN: Does engine speed return to 1200 rpm?*	**NO:** Go to next check. **YES:** See your authorized dealer.

DB84312,0000131-19-19JUN13-43/57

18 Engine Speed Control Pedal Check	Engine speed at slow idle. Lower all equipment to the ground. Operator's seat facing loader position and locked. Transmission control lever (TCL) in neutral. Move the foot pedal from slow idle to fast idle. *NOTE: If economy mode is enabled, maximum engine speed will be limited. For more information, see Economy Mode Operation. (Section 2-3.)* *LOOK: Does tachometer read 900 rpm (slow idle) and 2400 rpm (fast idle)?*	**YES:** Continue check. **NO:** See your authorized dealer.

Continued on next page

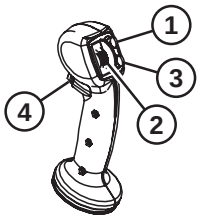
DB84312,0000131-19-19JUN13-44/57

19 Auto-Idle Circuit Check	Enable auto-idle function in the standard display monitor (SDM) menu. See Standard Display Monitor (SDM)—Main Menu—Setup—Auto Idle. (Section 2-2.) Lower all equipment to the ground. Transmission control lever (TCL) in neutral. Hydraulic functions in neutral. Operator's seat facing backhoe position and locked. Engine speed fast idle. Warm hydraulic oil to operating temperature. *LOOK/LISTEN: Does engine speed decrease after 4—6 seconds?*	**YES:** Go to next check. **NO:** See your authorized dealer.
	Slowly actuate any boom backhoe function. *LOOK/LISTEN: Does engine speed return to its original setting?*	**YES:** Go to next check. **NO:** See your authorized dealer.

DB84312,0000131-19-19JUN13-45/57

20 Loader Return-to-Dig Check	Lower all equipment to the ground. Transmission control lever (TCL) in neutral. Raise loader boom to full height. Lower loader boom by pulling the loader control lever all the way to left and let go of control lever to enable return-to-dig. *LOOK: Does bucket roll back from dump position to dig position and control lever return to neutral position?*	**YES:** Go to next check. **NO:** See Loader Operation. (Section 2-3.)

DB84312,0000131-19-19JUN13-46/57

21 Transmission Clutch Disconnect Circuit Check	 TX1107050—UN—30JAN12 *Single Lever Loader Control with Auxiliary—If Equipped (shown)* **1—Mechanical Front Wheel Drive (MFWD) Switch** **2—Proportional Loader Auxiliary Switch** **3—Clutch Disconnect Switch** **4—Momentary MFWD Switch** Fasten seat belt. Operator's seat facing loader position and locked. Engine speed approximately 2000 rpm. Raise loader bucket off the ground. Shift transmission into fourth gear. Release park brake. Shift transmission control lever (TCL) to forward (F). *LISTEN: Does engine rpm drop (approximately 50 rpm) when the TCL is shifted into forward (F)?* Press clutch disconnect switch (3) on loader control lever and note sound of engine. *LISTEN: Does engine rpm increase when the clutch disconnect switch is pressed?*	**YES:** Go to next check. **NO:** See your authorized dealer.

Continued on next page

DB84312,0000131-19-19JUN13-47/57

22 Differential Lock Check

T6295AD—UN—19OCT88

Differential Lock Check

Raise machine off the ground with loader and stabilizers.

Unlock the brake pedals.

Turn mechanical front wheel drive (MFWD) switch OFF (if equipped).

Release park brake.

Press differential lock foot switch.

NOTE: Differential lock speed limit option, if enabled, limits differential lock use when engine is operated over 1000 rpm.

Operate machine at 1000 rpm maximum in first forward (1F).

Apply one brake pedal.

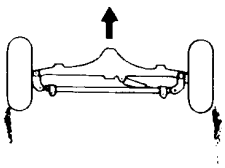
LOOK: Do both rear wheels stop?

YES: Go to next check.

NO: See your authorized dealer.

DB84312,0000131-19-19JUN13-48/57

23 Front Wheel Alignment (Toe-In) Check



T6264AI—UN—22OCT91

Drive machine in fourth gear forward (4F) on a surface with loose material.

LOOK: Is material from behind front wheels thrown excessively inward or outward?

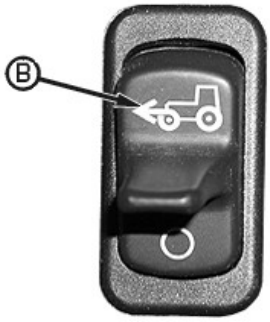
YES: See your authorized dealer.

NO: Go to next check.

Continued on next page

DB84312,0000131-19-19JUN13-49/57

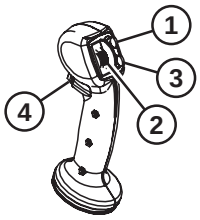
24 Mechanical Front Wheel Drive (MFWD) Driving Check—If Equipped



T131717B—UN—15JUN00

MFWD Switch

B—Mechanical Front Wheel Drive (MFWD) Switch



TX1107050—UN—30JAN12

Single Lever Loader Control with Auxiliary—If Equipped

1—Mechanical Front Wheel Drive (MFWD) Switch
2—Proportional Loader Auxiliary Switch
3—Clutch Disconnect Switch
4—Momentary MFWD Switch

Engine speed at slow idle.

Operator's seat facing loader position.

CAUTION: Prevent possible crushing injury from heavy component. Use appropriate lifting device. Do not crawl under machine while hydraulically supported.

Raise machine off the ground using loader and stabilizers.

Release park brake.

Shift transmission to first gear and operate engine at approximately 1500 rpm.

Move transmission control lever (TCL) to forward (F) position.

Press MFWD switch (1 or B) ON.

LOOK: Do the front wheels turn?

Turn MFWD switch OFF.

LOOK: Do the front wheels stop turning?

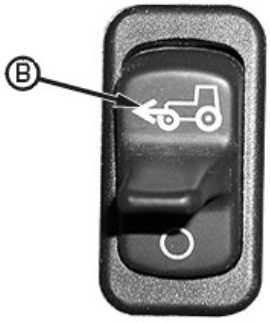
YES: Go to next check.

NO: See your authorized dealer.

Continued on next page

DB84312,0000131-19-19JUN13-50/57

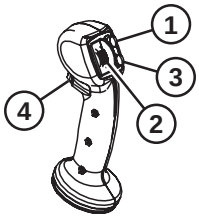
25 Mechanical Front Wheel Drive (MFWD) Differential Check—If Equipped



T131717B—UN—15JUN00

MFWD Switch

B—Mechanical Front Wheel Drive (MFWD) Switch



TX1107050—UN—30JAN12

Single Lever Loader Control with Auxiliary—If Equipped

1—Mechanical Front Wheel Drive (MFWD) Switch
2—Proportional Loader Auxiliary Switch
3—Clutch Disconnect Switch
4—Momentary MFWD Switch

CAUTION: Prevent possible crushing injury from heavy component. Use appropriate lifting device. Do not crawl under machine while hydraulically supported.

Raise machine off the ground using loader and stabilizers.

Operator's seat facing loader position.

Release park brake.

Shift transmission in first gear forward (1F).

Press MFWD switch (1 or B) ON.

Lower front wheels to just contact ground.

LOOK: Does at least one front wheel turn?

YES: Go to next check.

NO: See your authorized dealer.

DB84312,0000131-19-19JUN13-51/57

26 Steering System Checks

Operator's seat facing loader position.

Raise the loader bucket off the ground with the bottom level with the ground.

CAUTION: Prevent possible crushing injury from heavy component. Use appropriate lifting device. Do not crawl under machine while hydraulically supported.

Raise rear of machine off the ground using stabilizers.

Operate engine at approximately 1000 rpm.

Turn the steering wheel full left to full right several times.

NOTE: Internal leakage or a sticking steering valve spool can cause wheels to continue to move after steering wheel is stopped.

LOOK: Did the front wheels move smoothly in both directions? When the steering wheel was stopped, did the wheels stop moving?

YES: Go to next check.

NO: See your authorized dealer.

Continued on next page

DB84312,0000131-19-19JUN13-52/57

27 Cylinder Cushion Check

Engine speed at slow idle.

Operator's seat facing backhoe position.

CAUTION: Prevent possible crushing injury from heavy component. Use appropriate lifting device. Do not crawl under machine while hydraulically supported.

Raise rear of machine off the ground.

Boom must be lowered from the transport position.

Activate backhoe swing left and right.

Make a note of the sound and speed as cylinders near end of their stroke.

LOOK: Does swing speed decrease near the end of the cylinder stroke?

Repeat check using backhoe boom raise function.

YES: Go to next check.

NO: Remove and repair cylinder cushion. See your authorized dealer.

DB84312,0000131-19-19JUN13-53/57

28 Backhoe and Loader Function Drift Check

CAUTION: Make sure area is clear and large enough to operate all functions of machine.

NOTE: All systems must be warmed up to operating range to get accurate test results.

Warm hydraulic oil to operating temperature for this check.

Specification

Hydraulic Oil—Temperature. . . . . 60—70°C
140—160°F

Engine speed at slow idle.

Position backhoe fully extended with bucket at a 45° angle to the ground.

Lower boom until the bucket cutting edge is 50 mm (2.0 in.) off the ground.

Position loader bucket the same distance off of the ground as backhoe bucket.

Observe both bucket cutting edges for 1 minute.

LOOK: Are both bucket cutting edges still off the ground after 1 minute?

YES: Go to next check.

NO: See your authorized dealer.

DB84312,0000131-19-19JUN13-54/57

29 Ride Control System Check—If Equipped

TX1106755—UN—27JAN12

Ride Control Switch

Run engine at fast idle.

Press ride control switch on sealed switch module (SSM) to enable ride control (LED illuminated).

Operator's seat facing loader position and locked.

Raise loader boom to maximum height.

Power boom down half way to the ground.

Stop suddenly by releasing loader control lever.

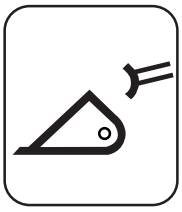
LOOK: Is boom cushioned when loader control lever is released?

YES: Go to next check.

NO: See your authorized dealer.

Continued on next page

DB84312,0000131-19-19JUN13-55/57

30 Hydraulic Loader Coupler Check—If Equipped	 TX1106751—UN—27JAN12 *Loader Coupler Switch* **CAUTION: Avoid possible injury from unexpected movement. Position attachment on ground before releasing pin.** Operator's seat facing loader position and locked. Press and hold loader coupler switch on the sealed switch module (SSM) until chime sounds and standard display monitor (SDM) displays LOADER COUPLER DISENGAGED. *LOOK/LISTEN: Do coupler pins retract?* *LISTEN: Is there a beeping sound?* *LISTEN: Does beeping sound continue at 2 second intervals while coupler is disengaged?* *LOOK: Is the switch LED indicator illuminated?*	**YES:** Go to next check. **NO:** See your authorized dealer.
	Press switch to engage loader coupler. *LOOK/LISTEN: Do coupler pins extend to engage?* *LISTEN: Does beeping sound stop?* *LOOK: Is the switch LED off?*	**YES:** Go to next check. **NO:** See your authorized dealer.

Continued on next page

DB84312,0000131-19-19JUN13-56/57

31 Cycle Times Check

CAUTION: Prevent possible injury from unexpected machine movement. Clear all persons from the area before operating machine.

IMPORTANT: Warm hydraulic oil to operating temperature for this check.

Engine at fast idle.

NOTE: If economy mode is enabled, maximum engine speed will be limited. For more information, see Economy Mode Operation. (Section 2-3.)

Record cycle time for each function.

Does machine perform within specifications?

Specification	
Loader Boom Raise (bucket flat on ground-to-full height)—Maximum Cycle Time	5.5 seconds
Loader Boom Lower—Powered (full height-to-bucket flat on ground)—Maximum Cycle Time	2.2 seconds
Loader Boom Lower—Float (full height-to-bucket flat on ground)—Maximum Cycle Time	2.2 seconds
Loader Bucket Dump (boom just above ground)—Maximum Cycle Time	2.4 seconds
Loader Bucket Curl (boom just above ground)—Maximum Cycle Time	2.6 seconds
Backhoe Boom Raise (backhoe at maximum reach, bucket teeth on ground-to-boom at cushion)—Maximum Cycle Time	2.9 seconds
Backhoe Boom Lower (backhoe at maximum reach, bucket teeth on ground-to-boom at cushion)—Maximum Cycle Time	2.9 seconds
Crowd In (boom in transport position)—Maximum Cycle Time	3.1 seconds
Crowd Out (boom in transport position)—Maximum Cycle Time	2.7 seconds
Backhoe Bucket Dump—Maximum Cycle Time	2.4 seconds
Backhoe Bucket Curl—Maximum Cycle Time	2.8 seconds
Backhoe Swing (boom raised to cushion, bucket curled, dipperstick parallel to ground cylinder-cushion-to-cylinder-cushion (180°))—Maximum Cycle Time	3.3 seconds

Specification	
Extendable Dipperstick Extend—If Equipped—Maximum Cycle Time	2.4 seconds
Extendable Dipperstick Retract—If Equipped—Maximum Cycle Time	2.6 seconds
Right Stabilizer Down (full up-to-ground level)—Maximum Cycle Time	2.5 seconds
Right Stabilizer Up (ground level-to-full up)—Maximum Cycle Time	2.5 seconds
Left Stabilizer Down (full up-to-ground level)—Maximum Cycle Time	2.5 seconds
Left Stabilizer Up (ground level-to-full up)—Maximum Cycle Time	2.5 seconds
Steering Right to Left—Turns	2.3 to 3
Steering Left to Right—Turns	2.3 to 3
Steering Right to Left (MFWD)—Turns	2.3 to 3
Steering Left to Right (MFWD)—Turns	2.3 to 3

YES: Operational checkout complete.

NO: Check hydraulic oil level. See Check Hydraulic Reservoir Oil Level. (Section 3-4.)

NO: See your authorized dealer.

DB84312,0000131-19-19JUN13-57/57

Troubleshooting Procedure

NOTE: Troubleshooting charts are arranged from the simplest to verify, to least likely, more difficult to verify. When diagnosing a problem, use all possible means to isolate the problem to a single component or system. Use the following steps to diagnose problems:

Step 1. Operational Checkout Procedure

Step 2. Troubleshooting Charts

Step 3. Adjustments

Step 4. See your authorized John Deere dealer.

TX,TROUBLESHOOT-19-20JAN11-1/1

Engine

Symptom	Problem	Solution
Engine Will Not Crank	Corroded or loose battery connections	Clean battery terminals and connections.
	Weak battery	Check battery charge. Charge or replace battery. See Using Battery Charger. (Section 4-1.)
	Blown ECU unswitched power fuse (F4)	Replace fuse.
	Battery disconnect switch malfunction	Repair or replace switch as required. See you authorized dealer.
	Starter solenoid malfunction	Replace solenoid. See your authorized dealer.
	Starter malfunction	Replace starter. See your authorized dealer.
	Start circuit malfunction	Check wiring, fuses, and relays. See your authorized dealer.
Engine Cranks, But Will Not Start	Fuel quality and quantity	If quality is poor, replace fuel with proper fuel. If quantity is low, fill fuel tank.
	Restricted or plugged fuel tank breather	Remove fuel tank cap and listen for sound of air entering tank. Replace cap. See Replace Fuel Breather. (Section 3-7.)
	Oil viscosity	Check for correct oil viscosity.
	Restricted or plugged air filters	Replace air filters. See Replace Engine Air Cleaner Elements. (Section 3-7.)
	Restricted or plugged fuel filters	Replace fuel filters. See Replace Primary and Final Fuel Filters. (Section 3-6.)
	Air leak on suction side of fuel system	Check for bubbles in fuel filter and tighten connections. Inspect fuel lines for damage.
	Restricted exhaust	Locate and repair restriction. See your authorized dealer.
	Starter motor turns too slowly	Check battery charge. Charge or replace battery.
	Electronic control system problem or basic engine	See your authorized dealer.
	Cold start aid not functioning properly	See your authorized dealer.

Continued on next page

Symptom	Problem	Solution
Engine Misfires, Runs Irregularly	Fuel quality and quantity	If quality is poor, replace fuel with proper fuel. If quantity is low, fill fuel tank.
	Restricted or plugged fuel tank breather	Remove fuel tank cap and listen for sound of air entering tank. Replace cap. See Replace Fuel Breather. (Section 3-7.)
	Restricted or plugged air filters	Replace air filters. See Replace Engine Air Cleaner Elements. (Section 3-7.)
	Restricted or plugged fuel filters	Replace fuel filters. See Replace Primary and Final Fuel Filters. (Section 3-6.)
	Air in fuel	Check fuel system for loose connections or damage. See your authorized dealer.
	Engine accessories cycling on and off	Check engine accessories (air conditioning or fan drives), cycling on and off.
	Electronic interference	Check for improperly installed radios, or other accessories.
	Electronic control system problem or basic engine	See your authorized dealer.
Engine Does Not Develop Full Power	Restricted or plugged air filters	Replace air filters. See Replace Engine Air Cleaner Elements. (Section 3-7.)
	Restricted or plugged fuel filters	Replace fuel filters. See Replace Primary and Final Fuel Filters. (Section 3-6.)
	Fuel quality and quantity	If quality is poor, replace fuel with proper fuel. If quantity is low, fill fuel tank.
	Unbalanced liquid ballast	Verify correct ballast volume and weight in tires.
	Auxiliary drives have abnormally high loads	Reduce auxiliary drive load.
	Engine is overloaded	Reduce engine load.
	Electronic control system problem or basic engine	See your authorized dealer.
Engine Emits Excessive White Exhaust Smoke	Low engine coolant temperature	Warm engine coolant. Check cooling system operation.
	Fuel quality and quantity	If quality is poor, replace fuel with proper fuel. If quantity is low, fill fuel tank.

Continued on next page

Symptom	Problem	Solution
	Water in fuel supply	Drain and refill fuel tank. Drain fuel filters and bleed fuel system. See Drain Water and Sediment From Fuel Filters. (Section 3-3.) See Fuel System Bleed Procedure. (Section 4-1.)
Engine Emits Excessive Black Or Gray Exhaust Smoke	After service filter cleaning is performed or new exhaust filter installed	Normal operation. Smoke may be emitted for a short period of time after a service filter cleaning cycle or a new exhaust filter is installed.
	Fuel quality and quantity	If quality is poor, replace fuel with proper fuel. If quantity is low, fill fuel tank.
	Engine is overloaded	Reduce engine load.
	Restricted or plugged air filters	Replace air filters. See Replace Engine Air Cleaner Elements. (Section 3-7.)
	Electronic control system problem or basic engine	See your authorized dealer.
	Exhaust filter is cracked or damaged	See your authorized dealer.
Engine Emits Excessive Blue Exhaust Smoke	Engine oil level too high	Drain to correct level. See Check Engine Oil Level. (Section 3-4.)
Engine Idles Poorly	Fuel quality and quantity	If quality is poor, replace fuel with proper fuel. If quantity is low, fill fuel tank.
	Air leak on suction side of fuel system	Check for bubbles in fuel filter and tighten connections. Inspect fuel lines for damage.
	Electronic control system problem or basic engine	See your authorized dealer.
Excessive Fuel Consumption	Engine is overloaded	Reduce engine load.
	Restricted or plugged air filters	Replace air filters. See Replace Engine Air Cleaner Elements. (Section 3-7.)
	Improper type of fuel	Use proper type of fuel. See Diesel Fuel. (Section 3-1.)
	Poor fuel quality	Drain fuel and replace with quality fuel of the proper grade. See Diesel Fuel. (Section 3-1.)
	Leaks in fuel supply system	Locate source of leak and repair as needed. See your authorized dealer if necessary.
	Low engine temperature	Coolant temperature too low. Check and repair cooling system. See Check Coolant Level. (Section 3-4.)

Continued on next page

Symptom	Problem	Solution
	Fuel delivery system	See your authorized dealer.
Engine Overheats	Engine is overloaded	Reduce engine load.
	Low coolant level	Fill surge tank to proper level. Check radiator and hoses for loose connections or leaks. See Check Coolant Level. (Section 3-4.)
	Drive belt slipping	Inspect, adjust, or replace drive belt. See Inspect Belt. (Section 3-7.)
	Blocked radiator	Clean radiator. See Inspect and Clean Cooling System. (Section 3-3.)
	Faulty radiator cap	Replace cap.
	Low engine oil level	Check engine oil level. Add engine oil as required. See Check Engine Oil Level. (Section 3-4.)
	Incorrect grade of fuel	Use correct grade of fuel. See Diesel Fuel. (Section 3-1.)
	Temperature sensor	See your authorized dealer.

DB84312,00000F3-19-21FEB12-4/4

Electrical System

Symptom	Problem	Solution
Nothing Works	Battery disconnect switch (if equipped)	Check switch knob position.
	Batteries undercharged or dead	Charge or replace batteries.
	Battery cables making poor connection	Clean cable connections at battery and starter solenoid.
	SSM fuse (F17) malfunction	Replace fuse.
	Main 250 A fuse (F1)	Replace fuse.
	Power circuit components	See your authorized dealer.
Starter Motor Will Not Crank Engine	Batteries undercharged or dead	Charge or replace batteries.
	Battery cables making poor connection	Clean cable connections at battery and starter solenoid.
	Starter relay problem	See your authorized dealer.
	Starter solenoid problem	See your authorized dealer.
	Starter motor problem	See your authorized dealer.
	Starter motor pinion stuck in flywheel gear	Repair starter motor. See your authorized dealer.
	Major engine problem	See your authorized dealer.
Engine Cranks Slowly	Batteries undercharged	Charge or replace batteries.
	Starter armature bearings worn causing starter "drag"	Repair or replace starter. See your authorized dealer.
	Battery cable connections loose or corroded	Clean and/or tighten connections.
Starter Motor Turns, But Engine Will Not Crank	Starter pinion not engaging flywheel ring gear	See your authorized dealer.
	Starter pinion or flywheel gear teeth broken	See your authorized dealer.
Starter Motor Continues To Run After Engine Starts	Starter solenoid stuck	See your authorized dealer.
	Starter not disengaging	See your authorized dealer.
	Starter relay stuck	See your authorized dealer.
	Wiring harness shorted	See your authorized dealer.
Battery Using Too Much Water	Battery being overcharged	See your authorized dealer.
	High ambient temperature	Refill with distilled water.

Continued on next page

OUT4001,0000A4D-19-24FEB12-1/5

Symptom	Problem	Solution
	Cracked battery case	Replace battery. Install hold-down correctly.
Low Battery Output	Low water level	See Battery Using Too Much Water in this group.
	Dirty or wet battery top, causing discharge	Clean battery and wipe dry.
	Corroded or loose battery cable ends	Clean and tighten cable end clamps. Recharge battery. If machine has two batteries, recharge separately.
	Broken or loose battery posts	Wiggle posts by hand. If posts are loose or will turn, replace battery. If machine has two batteries, replace both batteries.
	Loose drive belt or worn pulleys	Inspect belt or pulley. Adjust or replace as necessary.
Starter Solenoid Chatters	Poor connections at batteries or starter	Clean cable connections at battery and starter solenoid.
	Low battery charge	Recharge or replace battery.
	Starter solenoid "hold-in"	See your authorized dealer.
Engine Cranks But Does Not Start	Engine circuit electrical problem	Check diagnostic trouble codes.
	Wiring harness problem	See your authorized dealer.
Noisy Alternator	Worn drive belt	Inspect and replace.
	Alternator pulley misaligned	Adjust alternator mount.
	Alternator bearing worn	Loosen alternator belts. Turn pulley by hand. If any roughness is felt, repair or replace alternator. See your authorized dealer.
	Internal alternator malfunction	Repair or replace alternator. See your authorized dealer.
Voltage Indicator Remains On	Loose or glazed drive belt	Check belt. Replace if glazed, tighten if loose.
	Engine speed low	Raise engine speed. If light remains on, see your authorized dealer.
	Excessive electrical load from added accessories	Remove accessories or install higher output alternator.
	Loose or corroded electrical connections on battery, ground strap, starter, or alternator	Inspect, clean, or tighten electrical connections.
	Wiring harness problem	See your authorized dealer.

Continued on next page

OUT4001,0000A4D-19-24FEB12-2/5

Symptom	Problem	Solution
	Alternator problem	Repair or replace alternator. See your authorized dealer.
	Display monitor problem	See your authorized dealer.
Fuel Gauge Does Not Work	Fuel gauge problem	See your authorized dealer.
	Fuel gauge sender problem	See your authorized dealer.
	Display monitor problem	See your authorized dealer.
	Wiring harness problem	See your authorized dealer.
Engine Coolant Temperature Gauge Always Indicates HIGH	Wire harness or bad connection at bulkhead connector	See your authorized dealer.
	Gauge	See your authorized dealer.
	Sender	See your authorized dealer.
	Wiring harness	See your authorized dealer.
Engine Oil Pressure Indicator Indicates Low	Low oil level	Stop engine. Check engine oil level.
	Low oil viscosity	Drain engine oil and add correct oil.
	Wiring harness	See your authorized dealer.
	Sender	See your authorized dealer.
Torque Converter Oil Temperature Gauge Always Indicates HOT	Gauge	See your authorized dealer.
	Sender	See your authorized dealer.
	Wiring harness	See your authorized dealer.
Hydraulic Oil Filter Restriction Indicator Does Not Work: Switched Power On	Wiring harness or bulkhead connector	See your authorized dealer.
	Hydraulic oil filter restriction switch	See your authorized dealer.
Hydraulic Oil Filter Restriction Indicator Light Stays On All The Time	Restricted hydraulic oil filter	Replace filter.
	Hydraulic oil filter restriction switch	See your authorized dealer.
Engine Air Filter Restriction	Restricted engine air filter	Replace filter.
	Engine air filter restriction	See your authorized dealer.
Display Monitor Does Not Work	Monitor fuse	Replace fuse.
	Wiring Harness	See your authorized dealer.

Continued on next page

OUT4001,0000A4D-19-24FEB12-3/5

Symptom	Problem	Solution
Horn Does Not Sound	Horn	See your authorized dealer.
	Horn fuse	Replace fuse.
	Horn switch	See your authorized dealer.
	Wiring harness	See your authorized dealer.
Backup Alarm Does Not Sound	Wiring harness	See your authorized dealer.
	Backup alarm	See your authorized dealer.
Front or Rear Wiper Does Not Work (if equipped)	Wiper fuse	Replace fuse.
	Wiper switch problem	See your authorized dealer.
	Wiper motor problem	See your authorized dealer.
	Wiring harness problem	See your authorized dealer.
Blower Motor Does Not Work	Blower motor fuse	Replace fuse.
	Blower motor speed switch	See your authorized dealer.
	Blower motor speed resistor problem	See your authorized dealer.
	Wiring harness problem	See your authorized dealer.
Defrost Does Not Work	Blower speed control in OFF position	Turn blower speed control to positions 1, 2, 3, or 4.
	Air conditioner control fuse	Replace fuse.
	Air conditioning mode switch	See your authorized dealer.
	Blower mode door motor	See your authorized dealer.
Work Lights Do Not Work	SSM light switch problem	See your authorized dealer.
	Wiring harness problem	See your authorized dealer.
Driving Lights Do Not Work	SSM driving light switch	See your authorized dealer.
	Wiring harness problem	See your authorized dealer.
Dome Light Does Not Work (if equipped)	Bulb	Replace bulb.
	Dome light fuse	Replace fuse.
	Dome light switch problem	See your authorized dealer.
	Wiring harness problem	See your authorized dealer.
Lights Are Dim	Low battery charge	Check battery connections.
	Low alternator output	Check drive belt tension.

Continued on next page

OUT4001,0000A4D-19-24FEB12-4/5

Symptom	Problem	Solution
	Light circuit has poor ground	Clean and tighten connections.

OUT4001,0000A4D-19-24FEB12-5/5

Hydraulic System

Symptom	Problem	Solution
No Hydraulic Functions	Low hydraulic oil level	Check hydraulic oil level. Add hydraulic oil to correct level.
	Hydraulic pump malfunction	See your authorized dealer.
Low Hydraulic Power	Hydraulic oil aerated	Incorrect oil, drain and refill hydraulic reservoir using correct oil.
		Inspect suction hose for air leaks, repair as necessary.
	Hydraulic oil level too low or high	Check hydraulic oil level. Add or drain hydraulic oil to correct level.
	Hydraulic pump suction hose	Check if leaking or loose, repair as necessary.
Slow Hydraulic Functions	Low hydraulic oil level	Check hydraulic oil level. Add hydraulic oil to correct level.
	Engine rpm too low	Increase engine rpm.
	Hydraulic oil aerated	Incorrect oil, drain and refill hydraulic reservoir using correct oil.
		Inspect suction hose for air leaks, repair as necessary.
	Hose or line leakage	Inspect and tighten fittings.
Hydraulic Function Makes "Chattering" Noise	Low hydraulic oil level	Check hydraulic oil level. Add hydraulic oil to correct level.
	Hydraulic pump suction hose	Check if leaking or loose, repair as necessary.
	Hydraulic oil aerated	Incorrect oil, drain and refill hydraulic reservoir using correct oil.
		Inspect suction hose for air leaks, repair as necessary.
Hydraulic Oil Overheats	Excessive load	Reduce load.
	Radiator plugged	See your authorized dealer.
	Oil cooler restricted	See your authorized dealer.
	Operator holding hydraulic system	Return levers to neutral when not in use.
	Low hydraulic oil level	Check hydraulic oil level. Add hydraulic oil to correct level.
	System relief set too low	See your authorized dealer.

Continued on next page

OUT4001,0000A4F-19-18FEB12-1/2

Symptom	Problem	Solution
	Oil lines damaged, causing excessive internal restriction	Inspect lines, repair as necessary.
	Oil viscosity too high (too thick)	Drain hydraulic oil, refill with correct oil.
Hydraulic Oil Foams	Water in oil	Drain hydraulic oil, refill using correct oil.
	Hydraulic oil level too low or high	Check hydraulic oil level. Add or drain hydraulic oil to correct level.
	Incorrect type of oil	Drain hydraulic oil, refill using correct oil.
	Oil lines damaged, causing excessive internal restriction	Inspect lines, repair as necessary.
	Hydraulic pump suction hose	Check for air leaks, repair as necessary.
Excessive Pump Noise	Cold oil	Allow machine to warm up.
	Low hydraulic oil level	Check hydraulic oil level. Add hydraulic oil to correct level.
	Hydraulic filter bypass valve chattering	Replace filter. Inspect, clean, and repair.
	Hydraulic oil lines contacting operator's station	Check and secure hydraulic oil lines.
	Oil viscosity	Drain hydraulic oil, refill using correct oil.
	System relief set too low	See your authorized dealer.
	Intake hose to hydraulic pump restricted	See your authorized dealer.
	Hydraulic pump malfunction	See your authorized dealer.

OUT4001,0000A4F-19-18FEB12-2/2

Steering System

Symptom	Problem	Solution
No Steering	Low hydraulic oil level	Check hydraulic oil level. Add oil to correct level.
	Priority valve spool	See your authorized dealer.
	Loader coupler valve (if equipped) two-way check valve	See your authorized dealer.
Slow Or Hard Steering	Hydraulic oil aerated	Incorrect hydraulic oil. Drain and refill.
		Check for loose or leaking suction hose.
	To much load in loader bucket	Reduce load.
	Pinched steering line	Inspect and repair line as required.
Erratic ("Spongy") Steering	Hydraulic oil level too high or low	Drain or add oil to correct level.
	Hydraulic oil aerated	Incorrect hydraulic oil. Drain and refill.
		Check for loose or leaking suction hose.
Machine Turns In Opposite Direction	Steering cylinder lines connected to wrong ports	Connect steering cylinder lines to opposite ports.

OUT4001,0000A4E-19-10FEB12-1/1

Power Train

Symptom	Problem	Solution
Machine Will Not Move In Forward Or Reverse	Park brake is on	Release park brake.
	Low transmission oil level	Check transmission oil level. Add oil to correct level.
	Broken drive shaft	Inspect drive shafts and universal joints for external damage. See your authorized dealer.
Transmission Slippage	Low transmission oil level	Check transmission oil level. Add oil to correct level.
	Wrong oil grade	Drain and refill using correct oil.
Machine Lacks Power Or Moves Slow	Low transmission oil level	Check transmission oil level. Add oil to correct level.
	Mechanical park brake tow release cap screws out of specification	Distance cap screws to specification. See your authorized dealer.
	Wrong or aerated oil	Change oil. See Transmission, Axles, Mechanical Front Wheel Drive (MFWD) Oil. (Section 3-1.)
	Transmission cooler lines damaged	See your authorized dealer.
	Service brake dragging	Adjust brakes. See your authorized dealer.
	Park brake dragging	Repair park brake. See your authorized dealer.
Transmission Overheats	Oil level too high or low	Drain or add oil to correct level.
	Wrong oil grade	Drain and refill using correct oil.
	Machine operating in too high of gear	Operate one gear lower.
	Oil cooler package air flow restricted	Remove debris from cooler.
	Torque converter stalls excessively	Use clutch disconnect switch in machine operations to reduce stall.
Excessive Power Train Noise	Low transmission oil level	Check transmission oil level. Add oil to correct level.
	Hydraulic lines contacting power train components	Inspect lines, reposition or repair as needed.
	Worn drive shaft universal	See your authorized dealer.
Service Brakes Are Noisy Or "Chatter"	Incorrect oil in rear axle	Drain and refill using correct oil.

Continued on next page

Symptom	Problem	Solution
	Air in brake system	Perform Service Brake System Bleed Procedure. (Section 4-1.)
	Brake valve leakage	See your authorized dealer.

DB84312,0000130-19-18FEB12-2/2

MFWD

Symptom	Problem	Solution
Excessive Noise	Low axle oil level	Check axle oil level. Add oil to correct level.

OUT4001,0000A51-19-13FEB12-1/1

Rear Axle

Symptom	Problem	Solution
No Differential Lock Operation	Differential lock electrical circuit malfunction or stuck solenoid	With engine off and switched accessory on, activate differential lock and listen for a click from solenoid valve. If no click see your authorized dealer.
Differential Lock Will Not Release	Stuck foot switch	Inspect switch.
	Low transmission oil level	Check transmission oil level. Add oil to correct level.
	Differential lock electrical circuit malfunction or stuck solenoid	With engine off and switched accessory on, activate differential lock and listen for a click from solenoid valve. If no click see your authorized dealer.
Poor Service Brakes	Low transmission oil level	Check transmission oil level. Add oil to correct level.
	Air in brake system	Perform Service Brake System Bleed Procedure. (Section 4-1.)
	Brake disks excessively worn	See you authorized dealer.
	Service brake valve leaking	See you authorized dealer.
Service Brakes Will Not Release	Brake pedal not returning to full up position	Check pedal linkage and adjustment. See your authorized dealer.
	Service brake valve malfunction	See you authorized dealer.
Service Brakes Are Noisy Or "Chatter"	Incorrect oil in rear axle	Drain and refill using correct oil.
	Air in brake system	Perform Service Brake System Bleed Procedure. (Section 4-1.)
	Brake valve leakage	See you authorized dealer.
Park Brake Will Not Engage	Mechanical park brake release cap screws out of specification	See your authorized dealer.

OUT4001,0000A52-19-21FEB12-1/1

Air Conditioning

Symptom	Problem	Solution
Air Conditioning System Does Not Operate	Blower speed control fuse (F44)	Replace fuse.
	Air conditioner control fuse (F20)	Replace fuse.
	Blower motor resistor (R43)	Replace resistor.
	Blower speed control switch	Check switch. See your authorized dealer.
	Air conditioning mode switch	Check switch. See your authorized dealer.
System Only Works On Purge Setting	Blower motor resistor (R43)	Replace resistor.
System Does Not Cool Cab Interior	Fresh air or recirculation air filter restricted (if equipped)	Clean or replace filter. See Clean Cab Fresh Air and Recirculation Filters—If Equipped. (Section 3-3.)
	Condenser fins restricted with debris	Clean condenser fins.
	Refrigerant hoses kinked or collapsed	Repair or replace hoses. See your authorized dealer.
	Evaporator core fins restricted with debris	Clean evaporator core fins.
	Refrigerant (R134a) charge too low	Recharge air conditioning system. See your authorized dealer.
Interior Windows Continue To Fog	Fresh air filter restricted	Clean or replace filter. See Clean Cab Fresh Air and Recirculation Filters—If Equipped. (Section 3-3.)
	Air conditioning system is off	Turn air conditioning system on.

OUT4001,0000A53-19-18FEB12-1/1

Software Update

Symptom	Problem	Solution
Service ADVISOR™ Remote (SAR) Updates Not Operating Properly	Software updates not operating properly	Follow screen instructions on the display monitor. If problem persists, see an authorized John Deere dealer.

Service ADVISOR is a trademark of Deere & Company

OUT4001,00006CA-19-19MAY15-1/1

Prepare Machine for Storage

IMPORTANT: Avoid machine damage. Do not use biodiesel during machine storage. When using biodiesel blends, switch to petroleum diesel for long-term storage.

1. Before storage, operate engine on at least one complete tank of petroleum diesel fuel to purge the fuel system. Ensure that the fuel tank is full during storage to prevent water buildup due to condensation.

NOTE: For blends up to and including B20, it is recommended that biodiesel be used within 3 months of its manufacture. For blends greater than B20, it is recommended that the biodiesel be used within 45 days. The poor oxidation stability characteristic of biodiesel can result in long-term storage problems. John Deere does not recommend using biodiesel in engines powering standby applications or vehicles operating on a seasonal basis. Consult an authorized John Deere dealer or fuel supplier for additives to improve fuel storage and performance of biodiesel fuels. These additives must be added to the biodiesel close to its time of production for them to be effective.

2. Repair worn or damaged parts. If necessary, install new parts to avoid needless delays later.

IMPORTANT: High-pressure washing greater than 1379 kPa (13.8 bar) (200 psi) can damage freshly painted finishes. Paint should be allowed to air dry for 30 days minimum after receipt of machine before cleaning parts or machine with high pressure. Use low-pressure wash operations until 30 days have elapsed.

3. Wash the machine using low-pressure wash operations less than, 1379 kPa (13.8 bar) (200 psi), until 30 days after receipt of machine. Paint areas to prevent rust. Replace decals where needed.
4. Fill fuel tank to prevent condensation.
5. Ensure tires are properly inflated.
6. Park machine on a hard surface to prevent tires from freezing to ground.

IMPORTANT: LPS 3® Rust Inhibitor can destroy painted finish. DO NOT spray LPS 3 Rust Inhibitor on painted surfaces.

7. Retract all hydraulic cylinders if possible. If not, coat exposed cylinder rods with LPS 3 Rust Inhibitor.
8. Apply grease at all lubrication fittings.
9. Remove batteries or disconnect terminals from batteries.
10. Store machine in a dry, protected place.

IMPORTANT: Prevent possible machine damage from unauthorized persons operating machine. Attach a DO NOT OPERATE tag to steering wheel.

11. Put a DO NOT OPERATE tag on the steering wheel.
12. Close all vent louvers in the cab.
13. Lock all covers and doors.

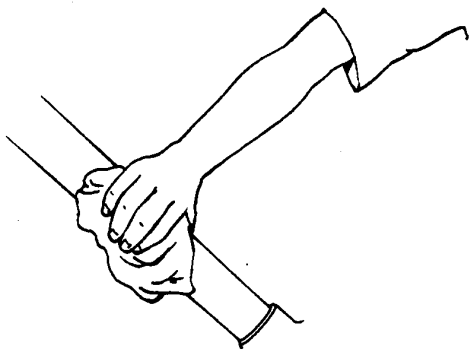
LPS 3 Rust Inhibitor is a trademark of Illinois Tool Works

VD76477,00015C2-19-08FEB16-1/1

Monthly Storage Procedure

CAUTION: Prevent possible injury or death from asphyxiation. Engine exhaust fumes can cause sickness or death. Start engine ONLY in a well-ventilated area.

1. Drain water and sediment from fuel tank when air temperature is above freezing.
2. Remove LPS 3® Rust Inhibitor from cylinder rods with a cleaning solvent.



T6191AA—UN—18OCT88

LPS 3 Rust Inhibitor is manufactured by Holt Lloyd Corporation.

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TX,STORAGE,SSM-19-20JAN11-1/2

IMPORTANT: Prevent possible engine damage. During cold temperatures, check fluidity of engine oil on dipstick. If the oil appears waxy or jelly-like rather than liquid, DO NOT attempt to start engine. Use external heat source to warm the crankcase until oil appears fluid.

3. Check all fluid levels. If low, check for leaks and add oil as required.
4. Check belts.
5. Check condition of all hoses and connections.
6. Check battery electrolyte level. Charge and install battery.
7. For machines with **tires**, check condition of tires and tire pressure.

   For machines with **tracks**, check condition of tracks and track sag.

   On crawler machines with non-sealed and non-lubricated track chains, apply oil to the pin-to-bushing joints. Run machine back and forth several times.
8. Park machine on a hard surface to prevent tracks from freezing to ground.
9. Fill fuel tank.
10. Pre-lubricate turbocharger bearings, if equipped:
    a. Disconnect fuel shutoff fuse.
    b. Crank engine for 10 seconds.
    c. Connect fuel shutoff fuse.
11. Inspect engine compartment, and remove any foreign material that may have accumulated. Start engine and run until it reaches operating temperature. Run at 1/2 speed for 5 minutes. Do not run at fast or slow idle.
    - If engine fails to start or runs poorly after starting, change fuel filter(s). Bleed fuel system.
12. Operate all controls, levers, seat adjustments, and others.

T6181AU—UN—18OCT88

CAUTION: Prevent possible injury from unexpected machine movement. Clear the area of all persons before running machine through the operation procedure.

13. Make sure that the area is clear to allow for movement. Cycle all hydraulic functions several times. Check condition of all hoses and connections.
14. Park the machine with cylinder rods retracted, if possible. Press engine stop switch.
15. Apply LPS 3 Rust Inhibitor to exposed cylinder rod areas.

TX,STORAGE,SSM-19-20JAN11-2/2

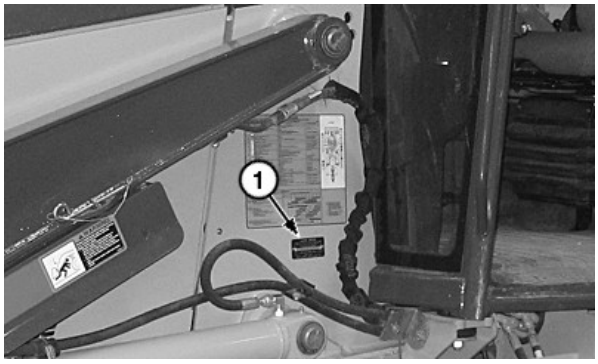
Record Product Identification Number (PIN)

Product Identification Number (PIN):

The PIN plate (1) is located on left side of machine under the periodic maintenance decal. Each machine has a 17-character PIN shown on this plate.

NOTE: Record all 17 characters of the PIN.

1—PIN plate



PIN Plate Location

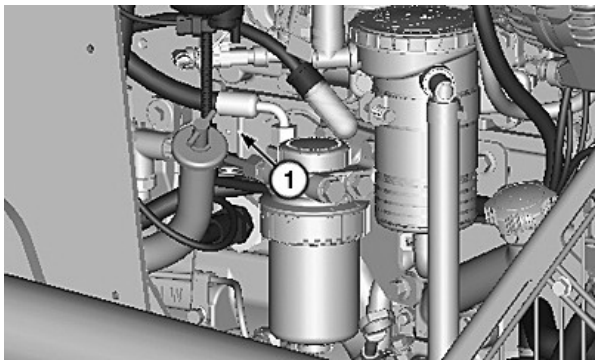
OUT4001,0000A54-19-02JUL12-1/1

Record Engine Serial Number

Engine Serial Number:

The engine serial number plate (1) is located on the right side of the engine.

1—Engine Serial Number Plate



Engine Serial Number Plate Location

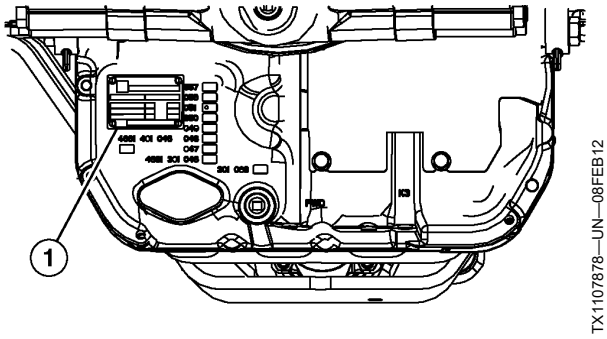
OUT4001,0000A55-19-04JAN12-1/1

Record Transmission Serial Number

Transmission Serial Number:

The transmission serial number plate (1) is located on the right side of the machine, near the lower right corner of transmission case.

1—Transmission Serial Number Plate



Transmission Serial Number Plate Location

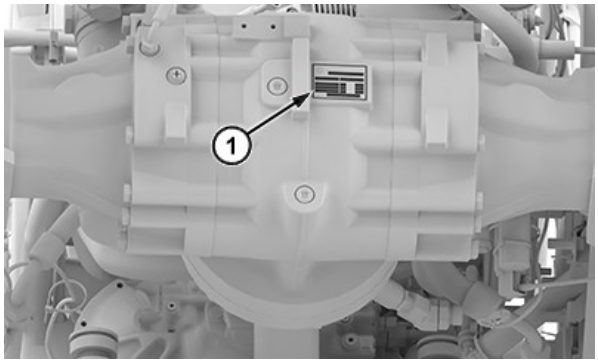
OUT4001,0000A56-19-09FEB12-1/1

Record Rear Axle Housing Serial Number

Rear Axle Housing Serial Number:

The rear axle serial number plate (1) is located on the front side of rear axle housing.

1—Rear Axle Serial Number Plate



Rear Axle Housing Serial Number Plate Location

OUT4001,0000A57-19-20JUN23-1/1

Record Mechanical Front Wheel Drive (MFWD) Front Axle Housing Serial Number—If Equipped

MFWD Front Axle Housing Serial Number:

The mechanical front wheel drive (MFWD) front axle serial number plate (1) is located on the front right side of the axle.

1—MFWD Front Axle Serial Number Plate

MFWD Front Axle Housing Serial Number Plate Location

OUT4001,0000A58-19-04JAN12-1/1

Keep Proof of Ownership

1. Maintain in a secure location an up-to-date inventory of all product and component serial numbers.
2. Regularly verify that identification plates have not been removed. Report any evidence of tampering to law enforcement agencies and order duplicate plates.
3. Other steps that can be taken:
   - Mark machine with unique numbering system.
   - Take color photographs from several angles of each machine.

OUT4001,000063E-19-17JAN19-1/1

Keep Machines Secure

1. Install vandal-proof devices.
2. When machine is in storage:
   - Lower equipment to the ground
   - Set wheels to widest position to make loading more difficult
   - Remove batteries
3. When parking indoors, put large equipment in front of exits and lock storage buildings.
4. When parking outdoors, store in a well-lighted and fenced area.
5. Make note of suspicious activity and report any thefts immediately to law enforcement agencies.
6. Notify an authorized John Deere dealer of any losses.

OUT4001,000063D-19-27JAN16-1/1

310SK Backhoe Loader Engine Specifications

NOTE: Specifications and design subject to change without notice. Wherever applicable, specifications are in accordance with standards.

Item	Measurement	Specification
John Deere PowerTech™ E 4045HT073	Cylinders	4
	Displacement	4.5 L 276 $in.^3$
	Bore and Stroke	106.5 x 127 mm 4.19 x 5.00 in.
	Net Peak Power @ 2000 rpm	72 kW 97 hp
	Engine Torque Rise	40%
	Net Peak Torque @ 1400 rpm	400 N·m 295 lb-ft
	Electrical System	12-volt
	Alternator Rating	120 amps

PowerTech is a trademark of Deere & Company

BG71631,0000083-19-06FEB12-1/1

Travel Speeds

NOTE: Heavily equipped machines and smaller tires may result in slower travel speeds.

Travel speeds are as follows for machines using 19.5L-24 rear tires:

Item	Measurement	Specification
Travel Speeds		
1 Forward	Speed	5.6 km/hr 3.5 mph
2 Forward	Speed	10.2 km/hr 6.3 mph
3 Forward	Speed	20.8 km/hr 13.0 mph
4 Forward	Speed	32.8 km/hr 20.4 mph
5 Forward	Speed	40.0 km/hr 24.9 mph
1 Reverse	Speed	7.0 km/hr 4.4 mph
2 Reverse	Speed	12.9 km/hr 8.0 mph
3 Reverse	Speed	20.6 km/hr 12.8 mph

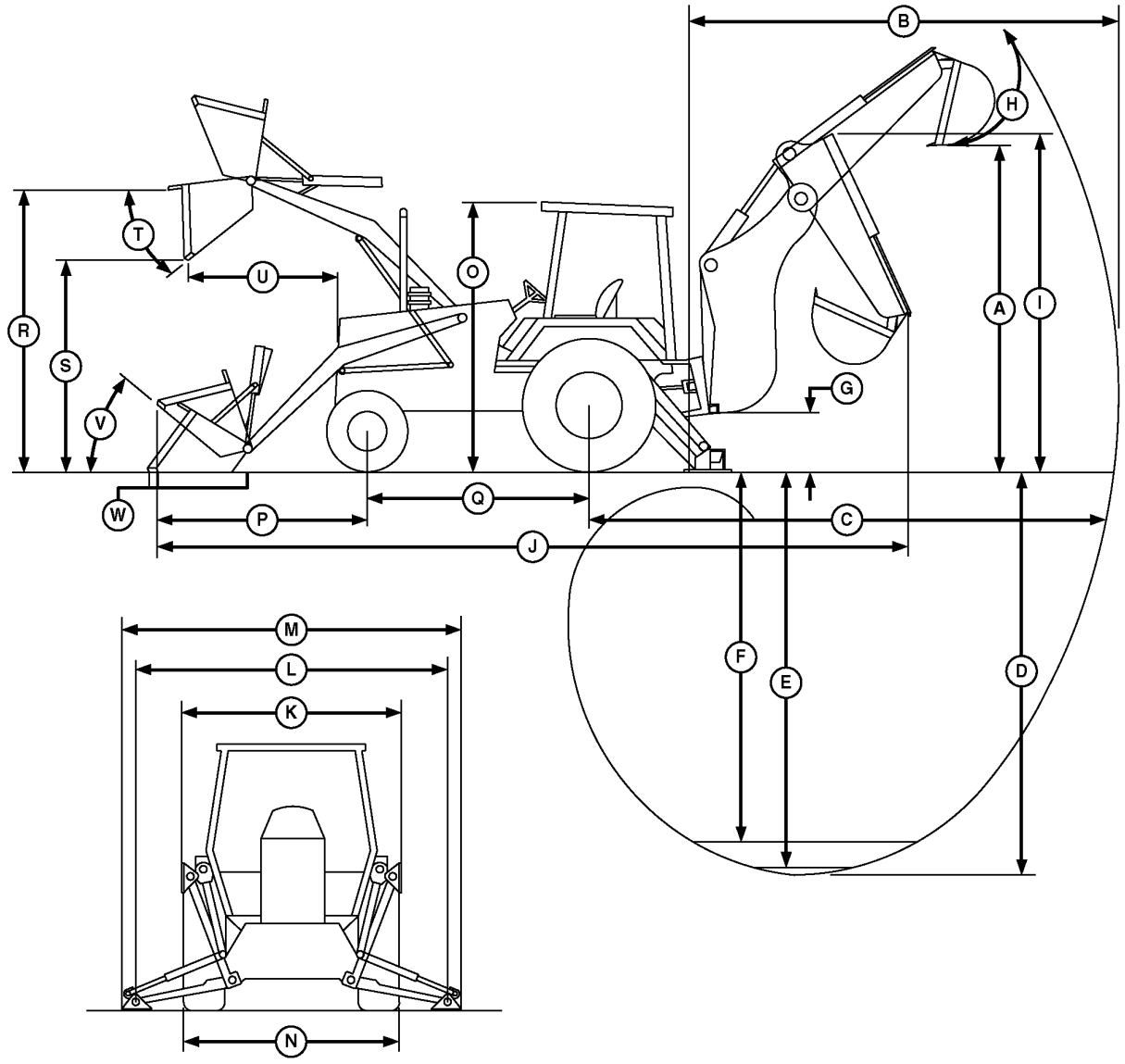
BG71631,000008A-19-06FEB12-1/1

Backhoe Loader Drain and Refill Capacities

Item	Measurement	Specification
Cooling System	Capacity	32.9 L 8.7 gal
Engine Oil (including filter)	Capacity	13.0 L 3.4 gal
Torque Converter and Transmission System	Capacity	15.0 L 4.0 gal
Rear Axle and Planetary Housing	Capacity	18.0 L 4.8 gal
MFWD Axle Center Section Housing (each)	Capacity	6.5 L 1.7 gal
MFWD Axle Planetary Housing (each)	Capacity	1.0 L 1.0 qt
Fuel Tank	Capacity	155.2 L 41.0 gal
Hydraulic System	Capacity	89.3 L 23.6 gal
Hydraulic Reservoir	Capacity	37.0 L 9.8 gal

OUT4001,0000A5A-19-09MAY17-1/1

310SK Backhoe Loader Dimensions



T115805

T115805—UN—11JUN98

Item	Measurement	Specification
A—Loading Height, Truck Loading Position		
-Backhoe w/o Ext. Dipperstick	Height	3.43 m 11 ft. 3 in.
-Backhoe w/ Ext. Dipperstick Retracted	Height	3.43 m 11 ft. 3 in.
-Backhoe w/ Ext. Dipperstick Extended	Height	4.29 m 14 ft. 1 in.
B—Reach from Center of Swing Pivot		

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BG71631,0000084-19-28JAN12-1/3

Item	Measurement	Specification
-Backhoe w/o Ext. Dipperstick	Distance	5.56 m 18 ft. 3 in.
-Backhoe w/ Ext. Dipperstick Retracted	Distance	5.66 m 18 ft. 7 in.
-Backhoe w/ Ext. Dipperstick Extended	Distance	6.68 m 21 ft. 11 in.
C—Reach from Center of Rear Axle		
-Backhoe w/o Ext. Dipperstick	Distance	6.63 m 21 ft. 9 in.
-Backhoe w/ Ext. Dipperstick Retracted	Distance	6.73 m 22 ft. 1 in.
-Backhoe w/ Ext. Dipperstick Extended	Distance	7.72 m 25 ft. 4 in.
D—Maximum Digging Depth		
-Backhoe w/o Ext. Dipperstick	Depth	4.34 m 14 ft. 3 in.
-Backhoe w/ Ext. Dipperstick Retracted	Depth	4.39 m 14 ft. 5 in.
-Backhoe w/ Ext. Dipperstick Extended	Depth	5.46 m 17 ft. 11 in.
E—Digging Depth (SAE) —610 mm (2 ft) Flat Bottom		
-Backhoe w/o Ext. Dipperstick	Distance	4.42 m 14 ft. 6 in.
-Backhoe w/ Ext. Dipperstick Retracted	Distance	4.55 m 14 ft. 11 in.
-Backhoe w/ Ext. Dipperstick Extended	Distance	5.44 m 18 ft. 5 in.
F—Digging Depth (SAE) —2440 mm (8 ft) Flat Bottom		
-Backhoe w/o Ext. Dipperstick	Distance	4.06 m 13 ft. 4 in.
-Backhoe w/ Ext. Dipperstick Retracted	Distance	4.19 m 13 ft. 9 in.
-Backhoe w/ Ext. Dipperstick Extended	Distance	5.33 m 17 ft. 6 in.
G—Ground Clearance Minimum	Distance	330 mm 13 in.
H—Bucket Rotation	Rotation	190°
I—Transport Height		
-Backhoe w/o Ext. Dipperstick	Height	3.43 m 11 ft. 3 in.
J—Overall Length, Transport	Length	7.16 m 23 ft. 6 in.
K—Stabilizer Width, Transport with ROPS	Width	3.53 m 7 ft. 7 in.
L—Stabilizer Spread, Operating	Width	4.03 m 13 ft. 3 in.
M—Overall Width, Stabilizer Spread (less loader bucket)	Width	3.45 m 11 ft. 4 in.

Continued on next page

BG71631,0000084-19-28JAN12-2/3

Item	Measurement	Specification
N—Width Over Tires	Width	2.18 m 7 ft. 2 in.
O—Height to Cab/ROPS Top	Height	2.79 m 9 ft. 2 in.
P—Front Axle Centerline to Bucket Cutting Edge		
-Heavy-Duty 0.86 m^3 (1.12 yd^3)	Length	2.03 m 6 ft. 8 in.
-Heavy-Duty 1.00 m^3 (1.31 yd^3)	Length	2.03 m 6 ft. 8 in.
-Heavy-Duty Long Lip 0.96 m^3 (1.25 yd^3)	Length	2.18 m 7 ft. 2 in.
-Multipurpose 1.00 m^3 (1.31 yd^3)	Length	2.15 m 7 ft. 1 in.
Q—Wheelbase		
-Non-Powered Front Axle	Length	2.11 m 6 ft. 11 in.
-Mechanical Front Wheel Drive Axle	Length	2.14 m 7 ft. 0 in.
R—Maximum Height to Loader Bucket Hinge Pin	Height	3.38 m 11 ft. 1 in.
S—Dump Clearance, Loader Bucket at 45°		
-Heavy-Duty 0.86 m^3 (1.12 yd^3)	Clearance	3.40 m 11 ft. 2 in.
-Heavy-Duty 0.96 m^3 (1.31 yd^3)	Clearance	3.40 m 11 ft. 2 in.
-Heavy-Duty Long Lip 0.96 m^3 (1.25 yd^3)	Clearance	3.40 m 11 ft. 2 in.
-Multipurpose 0.86 m^3 (1.31 yd^3)	Clearance	3.40 m 11 ft. 2 in.
T—Maximum Loader Bucket Dump Angle	Angle	45°
U—Reach at Full Height, Loader Bucket at 45°		
-Heavy-Duty 0.86 m^3 (1.12 yd^3)	Distance	767 mm 30.2 in.
-Heavy-Duty 1.00 m^3 (1.31 yd^3)	Distance	765 mm 30.1 in.
-Heavy-Duty Long Lip 0.96 m^3 (1.25 yd^3)	Distance	911 mm 35.9 in.
-Multipurpose 0.77 m^3 (1.31 yd^3)	Distance	818 mm 32.2 in.
V—Loader Bucket Rollback at Ground Level	Angle	40°
W—Dig Below Ground—Loader Bucket Level		
-Heavy-Duty 0.86m^3 (1.12 yd^3)	Depth	175 mm 6.9 in.
-Heavy-Duty 1.00 m^3 (1.31 yd^3)	Depth	206 mm 8.1 in.
-Heavy-Duty Long Lip 0.96 m^3 (1.25 yd^3)	Depth	147 mm 5.8 in.
-Multipurpose 1.00 m^3 (1.31 yd^3)	Depth	185 mm 7.3 in.

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310SK Backhoe Loader Weight

Item	Measurement	Specification
Transporting		
SAE Operating Weight with ROPS	Weight	6670 kg 14 708 lb
Cab Added	Weight	263 kg 580 lb
MFWD with Tires Added	Weight	220 kg 485 lb
Extendable Dipperstick	Weight	222 kg 490 lb
Front Loader Coupler	Weight	286 kg 630 lb
Backhoe Bucket Coupler	Weight	63 kg 138 lb

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310SK Buckets

Loader:	Width		Heaped Capacity		Weight	
	mm	(in.)	m^3	(cu yd)	kg	(lb)
Heavy-duty	2184	(86)	0.86	(1.12)	390	(860)
Heavy-duty	2337	(92)	0.86	(1.31)	521	(1148)
Heavy-duty long lip	2184	(86)	0.86	(1.25)	405	(892)
Multipurpose	2337	(92)	0.76	(1.31)	817	(1800)

Backhoe:	Width		Heaped Capacity		Weight	
	mm	(in.)	m^3	(cu ft)	kg	(lb)
Standard duty	457	(18)	0.13	(4.6)	118	(260)
	610	(24)	0.18	(6.5)	136	(300)
Heavy-duty with lift loops	305	(12)	0.11	(2.8)	109	(240)
	457	(18)	0.13	(4.6)	132	(290)
	610	(24)	0.18	(6.5)	154	(340)
	762	(30)	0.25	(8.8)	172	(380)

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310SK Backhoe Loader Lifting Capacities—Standard Dipperstick

NOTE: Loader bucket on ground significantly improves side stability, therefore improving lift capacity to the side. Lift capacity over the rear is not affected.

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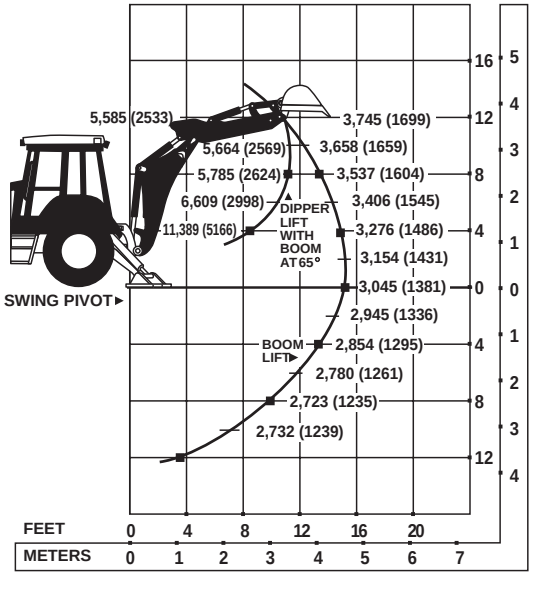
BG71631,0000087-19-20JUL12-1/2

Lifting capacity ratings are made with bucket hinge pin, loader bucket, and stabilizers on firm, level ground. Lift capacities are hydraulically limited. Lifting capacities are 87 percent of the maximum lift over any point on the swing arc and do not exceed 75 percent of the tipping load. Angle between boom and ground is 65 degrees. Machine is equipped with 610 mm (24 in.) standard bucket, standard or extendable dipperstick, and standard equipment.



Lift Capacity, Backhoe with Standard Dipperstick Based on SAE J31 (except with loader bucket on ground)

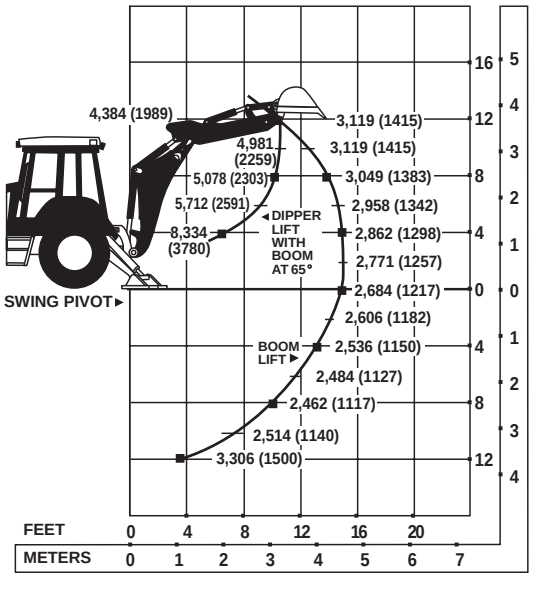
BG71631,0000087-19-20JUL12-2/2

310SK Backhoe Loader Lifting Capacities—Extendable Dipperstick (Retracted)

NOTE: Loader bucket on ground significantly improves side stability, therefore improving lift capacity to the side. Lift capacity over the rear is not affected.

BG71631,0000088-19-20JUL12-1/2

Lifting capacity ratings are made with bucket hinge pin, loader bucket, and stabilizers on firm, level ground. Lift capacities are hydraulically limited. Lifting capacities are 87 percent of the maximum lift over any point on the swing arc and do not exceed 75 percent of the tipping load. Angle between boom and ground is 65 degrees. Machine is equipped with 610 mm (24 in.) standard bucket, standard or extendable dipperstick, and standard equipment.



Lift Capacity, Backhoe with Extendable Dipperstick—Retracted Based on SAE J31 (except with loader bucket on ground)

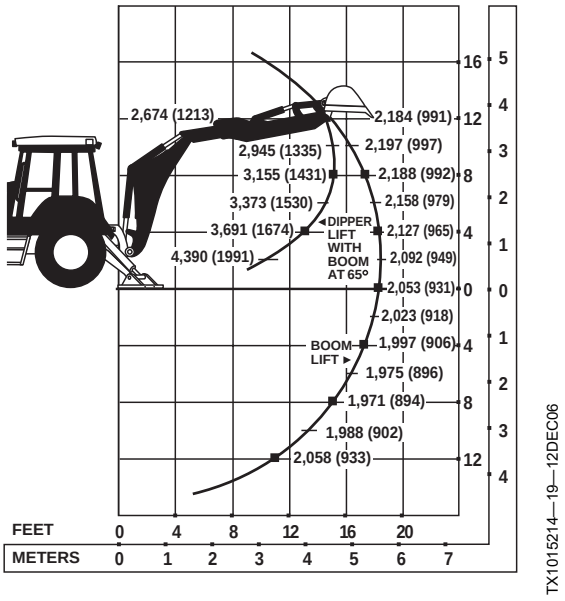
BG71631,0000088-19-20JUL12-2/2

310SK Backhoe Loader Lifting Capacities—Extendable Dipperstick (Extended)

NOTE: Loader bucket on ground significantly improves side stability, therefore improving lift capacity to the side. Lift capacity over the rear is not affected.

BG71631,0000089-19-20JUL12-1/2

Lifting capacity ratings are made with bucket hinge pin, loader bucket, and stabilizers on firm, level ground. Lift capacities are hydraulically limited. Lifting capacities are 87 percent of the maximum lift over any point on the swing arc and do not exceed 75 percent of the tipping load. Angle between boom and ground is 65 degrees. Machine is equipped with 610 mm (24 in.) standard bucket, standard or extendable dipperstick, and standard equipment.



Lift Capacity, Backhoe with Extendable Dipperstick—ExtendedBased on SAE J31 (except with loader bucket on ground)

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