670G, 670GP, 672G, and 672GP Motor Graders

(PIN: 1DW670G_ _ _F656526—)

(PIN: 1DW672G_ _ _F656526—)

OPERATOR'S MANUAL

670G, 672G, 670GP, and 672GP

OMT314823 ISSUE F1 (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.

Additional Proposition 65 Warnings can be found in this manual.

Worldwide Construction And Forestry Division

PRINTED IN U.S.A.

CARB Non-road Emissions Control Warranty Statement—Compression Ignition

Emissions Control Warranty Statement 2019 through 2021

DXLOGOV1 —UN—28APR09

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 CARB regulations for nonroad 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 2019 through 2021 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.

Continued on next page

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.

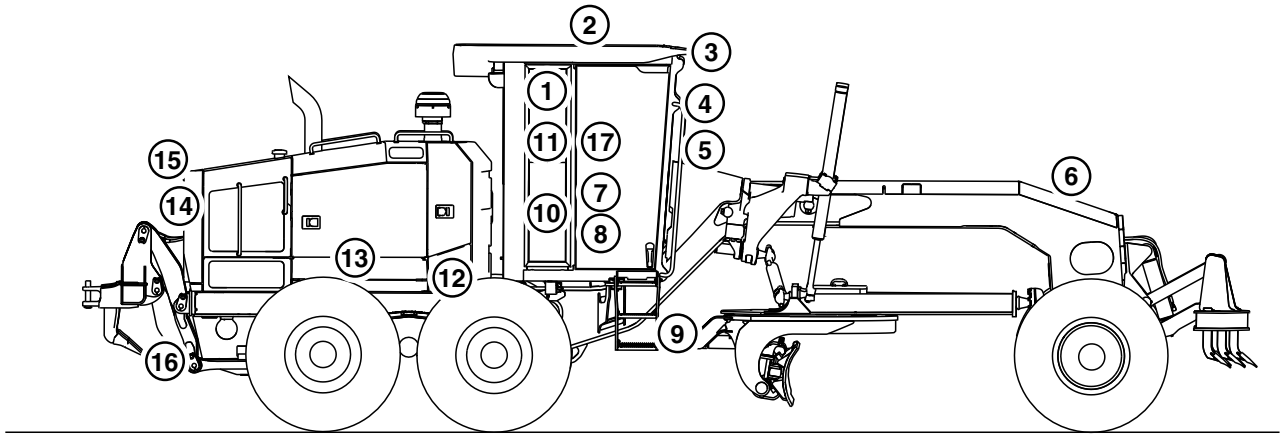
14. Assignment by Licensor. Licensor may assign this Agreement without your prior consent to any company or entity affiliated with Licensor, or by an assignment associated with a corporate restructuring, merger or acquisition.

15. Governing Law and Forum. This Agreement will be 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.

Continued on next page

Safety and Operator Convenience Features



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TX1141679

Safety Features

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

1. **Pressurized Cab with Heater/Defroster—if equipped.** Positive pressure ventilation system circulates both outside and inside air through filters for a clean working environment. Built-in defroster vents direct air flow for effective window defogging/deicing. Rear window has defrost grid.
2. **ROPS, FOPS, and OPS.** Structures designed to help protect the operator are certified to ISO and OSHA standards. Enclosures also deflect sun and rain.
3. **Mirrors.** Large exterior mirrors on both sides and an inside mirror offers operator a broad view of area behind machine. Optional heated mirrors are also available.
4. **Large Windshield Wiper.** Extra-long wiper cleans large windshield area.
5. **Handholds.** Large conveniently placed handholds make it easy to enter or exit the operator's station.
6. **Bright Halogen Lights.** High intensity halogen driving lights with high and low beams are standard. Turn indicators are standard. Optional work lights are available.
7. **Park Start.** Park start feature prevents the engine from being started unless the transmission shift control is in the BRAKE ON position P.
8. **Park Brake.** Park brake is easily engaged simply by moving the transmission shift control to the park brake P position. The park brake automatically engages whenever the engine is stopped.
9. **Steps.** Wide, skid-resistant steps provide excellent footing while getting in/out of the operator's station.
10. **Seat Belt Retractor.** Seat belt retractor helps keep belts clean and convenient to use.
11. **Fire Extinguisher—if equipped.** A fire extinguisher is provided in the cab.
12. **Articulation Lock.** A self-storing lock pin can be installed to prevent articulation during maintenance or transport.
13. **Bypass Start Protection.** Shielding over the starter solenoid terminals helps prevent dangerous bypass starting.
14. **Fan Guard.** A fan guard inside the radiator compartment helps prevent contact with the rotating fan blades.
15. **Stop and Turn Signal Lights.** Highly visible stop lights and turn signal lights are standard equipment.
16. **Backup Alarm.** Alerts bystanders when reverse travel direction is selected by operator.
17. **Electrohydraulics (Grade Pro Machines Only).** Press the hydraulic enable switch ON to activate hydraulics (both armrests must be lowered). Press the hydraulic enable switch OFF to deactivate hydraulics.

JS93577,000056D -19-05AUG13-1/1

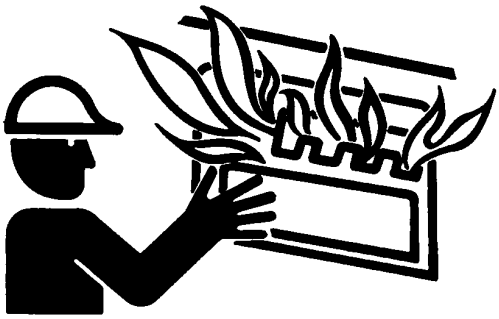
Clean Debris from Machine

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.



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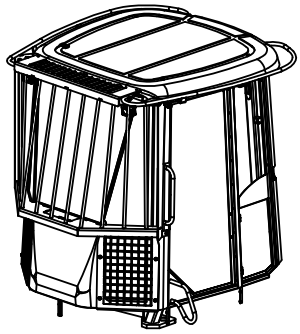
Add Cab Guarding for Special Uses

Special work situations or machine attachments could create an environment with falling or flying objects. Working near an overhead bank, demolition work, using a hydraulic hammer or winch, working in a forestry application or wooded area, or working in a waste management application, for example, could require added guarding to protect the operator.

Additional level II FOPS (falling object protective structure), forestry protection packages, and special screens or guarding should be installed when falling or flying objects could enter or damage the machine. A rear screen should always be used with a winch to protect against a snapping cable. Before operating in any special work environments, follow the operator protection recommendations of the manufacturer of any specialized attachment or equipment. Contact your authorized John Deere dealer for information on protective guarding.



Cab Guarding

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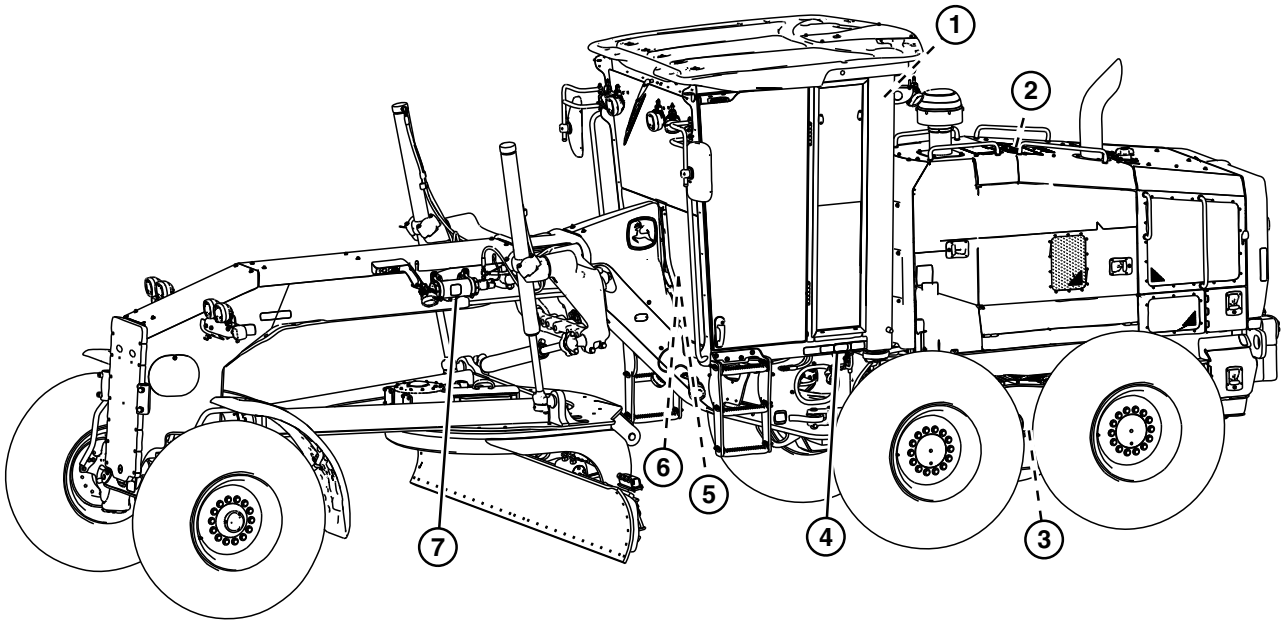
Safety Signs



TX1141348 —UN—26JUL13

TX1141348

Safety Signs—Left Side Shown

1— Protective Structure Certification
2— WARNING, Pressurized System
3— WARNING, Spring Under Pressure
4— WARNING, Install Articulation Lock
5— WARNING, Seat Belt Should Be Worn At All Times
6— CAUTION, Operate Machine Safely
7— WARNING, Avoid Injury From Escaping Fluid

Continued on next page

MB60223,000001A -19-22NOV16-1/14

25—Filter Restriction Indicators:

IMPORTANT: Prevent possible damage to machine. Change filters as soon as possible if a problem occurs.

Any of the following filter restrictions cause the respective indicator to appear in this location. Service required indicator will also illuminate. If more than one filter restriction occurs at the same time, indicators will alternate at 1-second intervals.

- **Engine Air Filter Restriction Indicator:** When engine is running and air filter elements are restricted, indicator and service required indicator illuminate.
- **Transmission Oil Filter Restriction Indicator:**

  IMPORTANT: Prevent possible transmission damage. Change transmission oil filter as soon as possible when a problem occurs.

  NOTE: Cold oil may cause transmission oil filter restriction indicator to illuminate temporarily.

  When transmission filter element is restricted, indicator and service required indicator illuminate.
- **Axle Oil Filter Restriction Indicator:** When axle filter element is restricted, indicator and service required indicator illuminate.
- **Hydraulic Oil Filter Restriction:**

  IMPORTANT: Prevent possible hydraulic pump damage. Change hydraulic oil filter as soon as possible when a problem occurs.

  NOTE: Cold oil can cause hydraulic oil filter restriction indicator to illuminate until oil is warm.

  When hydraulic filter element is restricted, indicator and service required indicator illuminate.

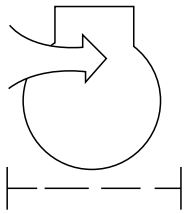
26—Articulation Gauge: Direction and amount of articulation are shown. Total articulation of machine either left or right is 22 degrees. Pointer will deflect full left if a sensor error occurs.

27—Transmission Oil Temperature Gauge: Shows whether transmission oil is in normal operating range or in danger zone. Indicator illuminates, the STOP indicator flashes, and the audible alarm activates when pointer is in red zone, indicating that oil temperature is too high. Stop machine and allow machine to cool. Stop engine and see your authorized dealer.

If machine is warmed up and pointer deflects to the far left side of the scale, electronic communication is lost or a sensor error is active. Indicator will not come on.

Temperature reading and other operating parameter data can be obtained by selecting DIAGNOSTICS—TRANSMISSION SENSORS from main menu on display unit.

TX1052895 —UN—10DEC08



Engine Air Filter Restriction Indicator

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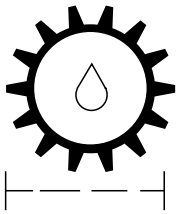

Transmission Oil Filter Restriction Indicator

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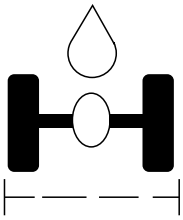

Axle Oil Filter Restriction Indicator

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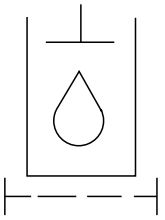


Hydraulic Oil Filter Restriction Indicator

28—Hydraulic Oil Temperature Gauge: Shows whether hydraulic oil temperature is in normal operating range or in danger zone. Indicator illuminates and service required indicator lights when pointer is in red zone. Stop work and cycle hydraulic functions without load to lower oil temperature.

6WD Machines: If pointer still stays in red zone, stop machine and see your authorized dealer.

Standard Axle Machines: If pointer still stays in red zone, stop engine and check for cause.

If machine is warmed up and pointer deflects to the far left side of the scale, electronic communication is lost or a sensor error is active. Indicator will not come on.

Temperature reading and other operating parameter data can be obtained by selecting DIAGNOSTICS—HYDRAULIC SENSORS from main menu on display unit.

29—Engine Coolant Temperature Gauge: Coolant temperature gauge shows whether engine coolant temperature is in normal operating range or in danger zone. If temperature is too high, the pointer will be in red segment. STOP indicator will flash and the audible alarm will activate. Immediately take load off the machine and run engine at idle. If temperature doesn't drop quickly, stop engine and see your authorized dealer.

Temperature readings can be obtained by selecting DIAGNOSTICS—ENGINE SENSORS from main menu on display unit.

30—Left Turn Indicator: Indicator illuminates when left turn signal switch or hazard light switch is engaged.

31—Not Used

Continued on next page

Pedals

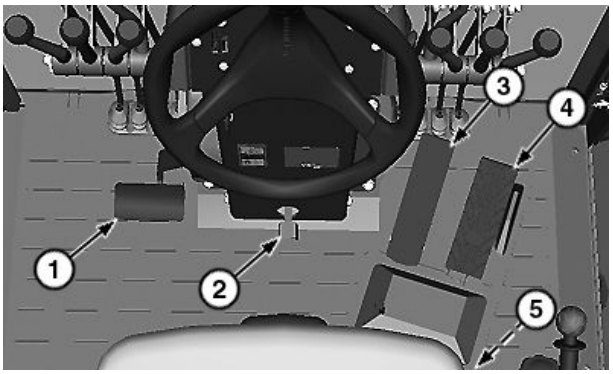
Push inching pedal (1) down to disengage clutch. Use inching pedal for precise control.

Push down accelerator pedal (4) to increase engine speed.

The decelerator pedal—if equipped (5) only functions when the auto/manual engine speed control is active and an engine speed higher than slow idle is set. The decelerator pedal allows the operator to decrease engine speed without canceling the auto/manual engine speed control setting. Push the decelerator pedal down to decrease engine speed to desired level or to slow idle. When pedal is released, engine speed will return to the previously set engine speed.

To stop machine, press brake pedal (3).

To tilt console, press down console tilt pedal (2) to release console.



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Pedals

1— Inching Pedal
2— Console Tilt Pedal
3— Brake Pedal
4— Accelerator Pedal
5— Decelerator Pedal (if equipped)

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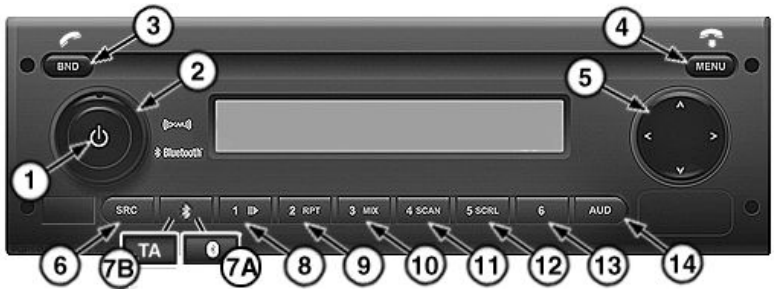
Radio—If Equipped



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Radio (premium radio shown)

1— Power Button
2— Volume Control Dial
3A— BND Button
3B— Pickup Call Button (if equipped)
4A— MENU Button
4B— Hang-Up Call Button (if equipped)
5— Multi-Function Rocker Switch
6— Source Button
7A— Bluetooth® Button (if equipped)
7B— TA Button
8— Preset Button 1
9— Preset Button 2
10— Preset Button 3
11— Preset Button 4
12— Preset Button 5
13— Preset Button 6
14— Audio Button

NOTE: The radio can be turned on using the power button (1) even when the ignition is off. The radio is then turned off automatically after a preset time to preserve the vehicle battery (see Adjust Turn-Off Time in this section).

1. Power—Press power button (1) to turn radio on. Press and hold power button to turn radio off.

   Adjust Turn-Off Time:
   - Press menu button (4a) until HOUR and the current turn-off time setting are displayed.
   - Turn volume control dial (2) counterclockwise or clockwise to adjust the turn-off time from 1 to 60 minutes.
   - Press the menu button several times to exit the menu.

2. Mute—Press power button to silence radio audio. Turn radio audio on by pressing power button or turning volume control dial.
3. AM/FM—Press BND button (3a) to change between AM bands (AM1 and AMT) and FM bands (FM1, FM2, and FMT).
4. Preset Stations—Six numbered preset buttons (8—13) store and recall stations for each AM and FM band. To store a station, select a band and then select a station. Press and hold preset button for 3 seconds. Current station will be stored and corresponding preset number will appear in display. To recall a station, select a band and then press preset button. Radio will automatically tune to stored station.

   NOTE: Radio will only change sources if media is plugged in and available.

5. Press source button (6) to select between radio, USB, AUX, and SiriusXM® Radio.

Audio and Menu Adjustment:

Audio Adjustment—Press audio button (14) to step through the following audio adjustment options: bass, treble, balance (left to right), and restore radio to factory settings. When desired option appears on display, rotate volume control dial to adjust audio feature. When no adjustments have been made for 3 seconds, radio will resume normal operation.

Menu Adjustment:

Press menu button to enter menu adjustment mode and adjust any of the menu options.

When desired option appears on display, rotate volume control dial to adjust that option. When no adjustments have been made for 3 seconds, the radio will resume normal operation.

The following menu options may be adjusted using this feature:

1. Beep confirm (on and off)—Determines if a beep will be heard each time a button is pressed.
2. Display brightness (-5 min to +5 max)—Determines brightness level of display.
3. Turn on volume (5—25)—Selects desired volume level for radio to assume when turned on.
4. Turn on Bluetooth®.

Volume Adjustment:

Increase volume—Turn volume control dial clockwise to increase volume setting.

Decrease volume—Turn volume control dial counterclockwise to decrease volume setting.

Tuning Radio:

Increase manual tune frequency—Press up on multi-function rocker switch (5) to tune frequency one notch higher.

Decrease manual tune frequency—Press down on multi-function rocker switch to tune frequency one notch lower.

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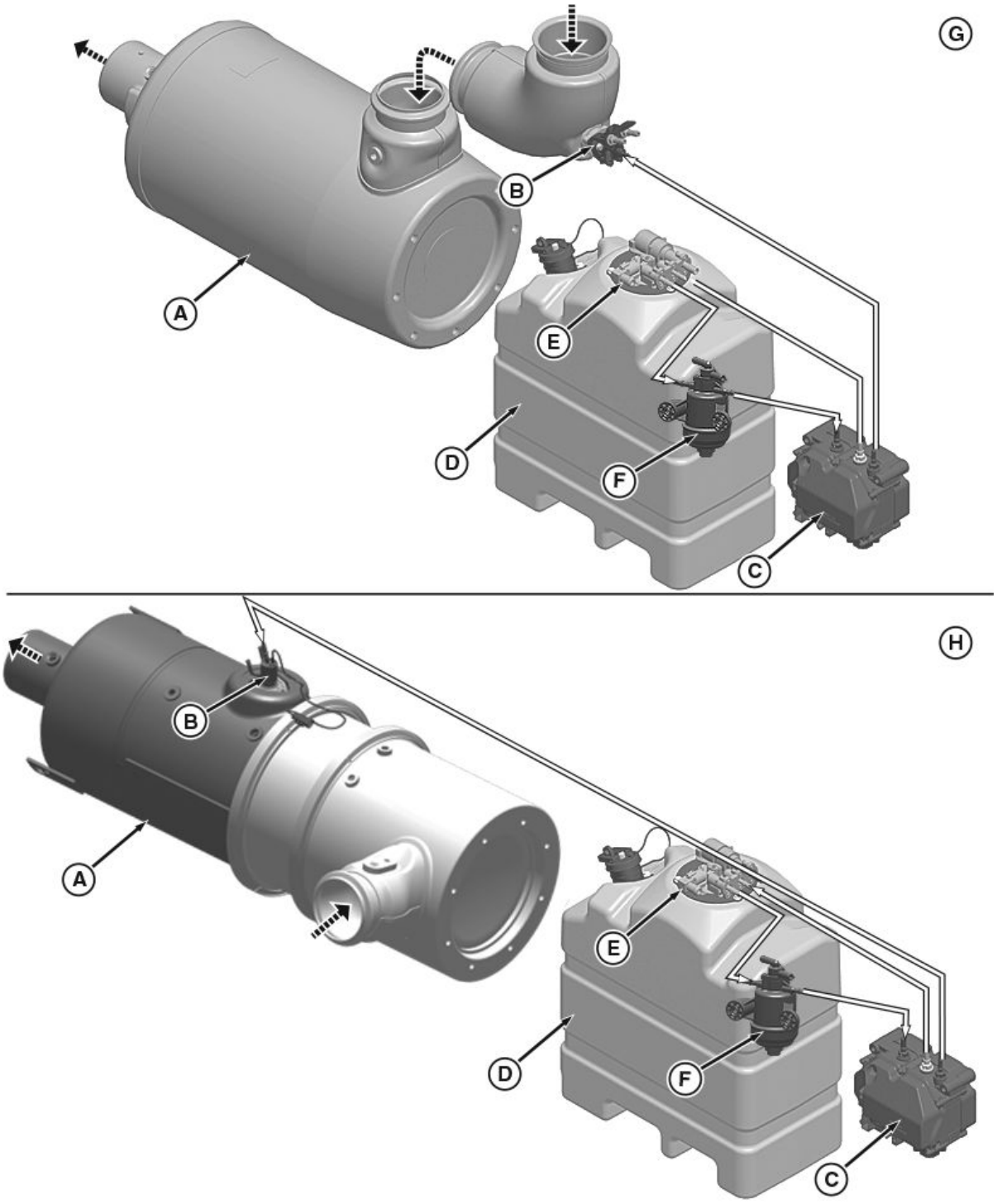
Selective Catalytic Reduction (SCR) System Overview



SCR System

A—SCR Catalyst
B—DEF Dosing Injector
C—DEF Dosing Unit
D—DEF Tank
E—DEF Tank Header Assembly
F—Inline DEF Filter (If Equipped)
G—Modular Canning Configuration
H—Inline Canning Configuration

Continued on next page

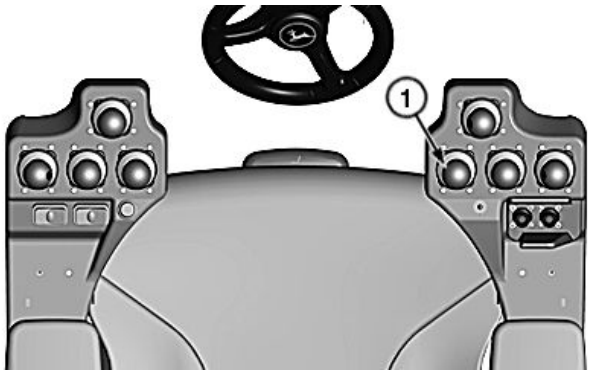
DX,SCR,OVERVIEW -19-30MAR20-1/2

Circle Side Shift Lever

Pull circle side shift lever (1) back to shift circle right.

Push circle side shift lever forward to shift circle left.

1— Circle Side Shift Lever



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Circle Side Shift Lever

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Articulation Lever

This lever is a 2-axis lever. Forward/back operates the articulation.

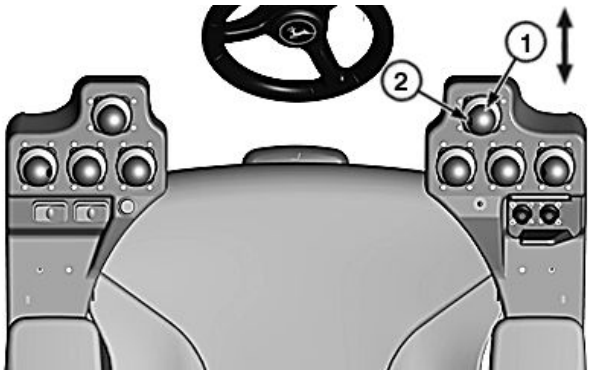
Pull articulation lever (1) back to steer machine right.

Push articulation lever forward to steer machine left.

Use articulation lever:

- To place rear wheels on solid ground while offset front wheels are on wet or unstable ground.
- With wheel lean to make short turn.
- With hydrostatic front wheel drive as needed.

Pushing the return-to-straight button (2) will cause the machine to automatically align the front and rear frames.



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Articulation Lever

1— Articulation Lever **2— Return-to-Straight Button**

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JS93577,0000396 -19-09FEB21-7/10

Precision Mode Operation—If Equipped

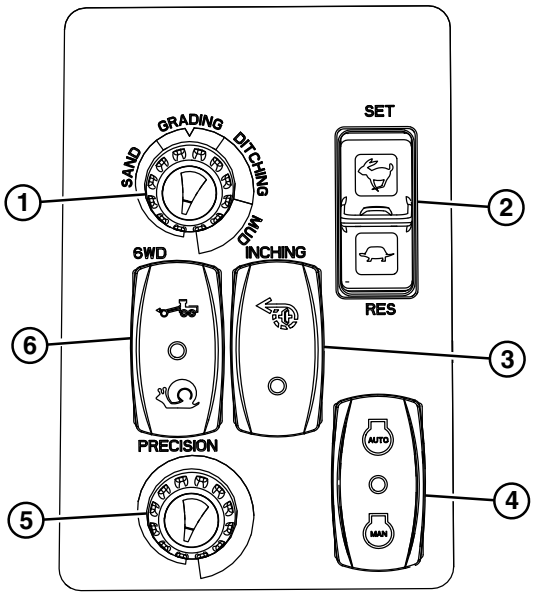
Precision mode allows the machine to operate at slower speeds than can be achieved by using the transmission. The system accomplishes this by using only the front wheels to move the machine.

When precision mode is engaged, ground speed is infinitely variable between 0.40 km/h (0.25 mph) and 7.65 km/h (4.75 mph) based on engine rpm, gear shift lever position, and precision mode speed dial (5). The precision mode speed dial divides each forward gear 1—3 into 15 separate speed increments. The desired precision speed control range can be selected at any time, including on-the-fly adjustment to obtain the desired speed.

To initiate precision mode, ensure that the transmission is in a gear 1—3 forward and push 6WD/Precision switch to the precision mode position. The precision mode indicator will display on the monitor when engaged. See Display Unit Functions. (Section 2-1.)

During operation, the machine will disable precision mode if any of the following occur:

- 6WD/Precision switch is placed in middle (OFF) or forward (ON) position.
- The transmission selected gear is 4th or higher.
- The transmission is shifted into any reverse gear.



Side Console Switch Panel

1— Aggressiveness Mode Dial
2— Engine Speed Control Switch
3— Inching Mode Switch
4— Engine Speed Auto/Manual Switch
5— Precision Mode Speed Dial
6— 6WD/Precision Switch

JS93577,000039C -19-09SEP13-1/1

Aftertreatment Indicators Overview

IMPORTANT: The operator will be informed by the operator warning system when the emission control system does not function correctly and/or an engine malfunction is detected by the engine control unit. Ignoring the operator warning signals will lead to an emission related derate, resulting in an effective disablement of non-road mobile machinery operation.

It is essential to take prompt action to rectify any incorrect operation, use or maintenance of the emissions control system in accordance with the rectification measures indicated by the warnings referenced below.

The Diesel Exhaust Fluid (DEF) indicator illuminates when the DEF is low. Fill DEF tank.

When the DEF indicator is combined with the warning indicator or engine stop indicator engine performance is reduced by the Engine Control Unit (ECU) because the DEF is below a measurable level. Fill DEF tank.

When engine emissions temperature indicator illuminates exhaust gas temperature is high, elevated idle is active, or exhaust filter cleaning is in process. The machine can be operated as normal unless the operator determines the machine is not in a safe location for high exhaust temperatures and disables auto cleaning.

When engine emissions temperature indicator is combined with the warning indicator or engine stop indicator engine performance is reduced by the ECU because the exhaust gas temperature is higher than expected. Follow Diagnostic Trouble Code (DTC) procedure or see your authorized servicing dealer.

When the exhaust filter indicator illuminates the exhaust filter cleaning is in process, aftertreatment system has a fault, or the exhaust filter is in need of cleaning and the operator has disabled auto exhaust filter cleaning. If conditions are safe, the operator should enable the auto exhaust filter clean setting or perform manual service regeneration or follow DTC procedure.

When the exhaust filter indicator is combined with the warning indicator engine performance is reduced by the ECU because there is an aftertreatment system fault or the soot level of the exhaust filter is moderately high. If conditions are safe, the operator should enable the auto exhaust filter clean function. If conditions are not safe, the operator should move the machine to a safe location and engage the auto exhaust filter cleaning mode. Perform manual service regeneration or follow DTC procedure.

When the exhaust filter indicator is combined with the engine stop indicator engine performance is further reduced by the ECU because there is an aftertreatment system fault or the soot level of the exhaust filter is extremely high. If this combination is present, see your authorized servicing dealer.

The auto cleaning disabled indicator illuminates when the operator has engaged the request to disable the auto exhaust filter cleaning function. This icon remains illuminated until the operator re-engages automatic exhaust filter cleaning from the diagnostic gauge. Disabling auto mode is not recommended for any situation unless it is safety-related or if the fuel tank lacks the required fuel to complete the cleaning process.

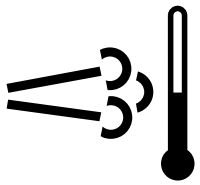
The engine emissions system malfunction indicator illuminates when engine emissions are outside of normal operating range or engine emissions system fault. Follow DTC procedure or see your authorized servicing dealer.

When the engine emissions system malfunction indicator is combined with the warning indicator engine performance is reduced by the ECU because the engine emissions are outside of normal operating range or engine emissions system fault. Follow DTC procedure or see your authorized servicing dealer.

RG22487 —UN—21AUG13

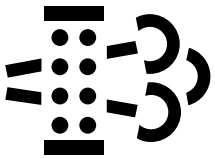
Diesel Exhaust Fluid Indicator

RG22488 —UN—21AUG13



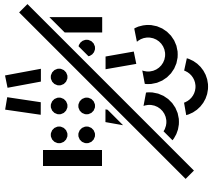
Engine Emissions Temperature Indicator

RG22489 —UN—21AUG13



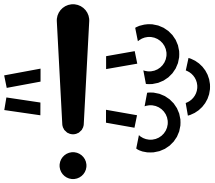
Exhaust Filter Indicator

RG22490 —UN—21AUG13



Auto Cleaning Disabled Indicator

RG22491 —UN—21AUG13

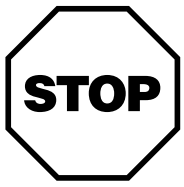


Engine Emissions System Malfunction Indicator

RG22492 —UN—21AUG13

Warning Indicator

RG22493 —UN—21AUG13



Engine Stop Indicator

Continued on next page

DX,AFTRTREAT,INDCATRS -19-12FEB18-1/2

Display Unit—Main Menu—Diagnostics—Hydraulic Sensors

This menu displays data from hydraulic system sensors that provide input to the flex load controller (FLC).

DIAGNOSTICS menu page 1 menu items on display include:

1. MACHINE ID
2. BATTERY MONITOR
3. ENGINE SENSORS
4. TRANSMISSION SENSORS
5. HYDRAULIC SENSORS
6. SWITCH MODULE
7. MACHINE SENSORS

At DIAGNOSTICS menu, press DOWN button to highlight HYDRAULIC SENSORS.

Press SELECT button to display the HYDRAULIC SENSORS menu.

NOTE: Values are displayed in either English or metric units, depending on which has been selected using the MONITOR SETTINGS—DISPLAY UNITS menu on the display unit. See Display Unit—Main Menu—Settings in this section.

HYDRAULIC SENSORS menu items on display include:

- FAN SPEED
- HYDRAULIC OIL TEMP (hydraulic oil temperature is displayed in °C or °F)
- 6WD LOOP OIL (if equipped)
- HYDRAULIC PUMP PRESSURE (if equipped)

Press BACK button to return to previous screen.

DB84312,000006C -19-09SEP13-1/1

Display Unit—Main Menu—Diagnostics—Switch Module

This screen allows the operator or technician to perform continuity checks on the switches in the sealed switch module.

DIAGNOSTICS menu page 1 menu items on display include:

1. MACHINE ID
2. BATTERY MONITOR
3. ENGINE SENSORS
4. TRANSMISSION SENSORS
5. HYDRAULIC SENSORS
6. SWITCH MODULE
7. MACHINE SENSORS

At DIAGNOSTICS menu, press DOWN button to highlight SWITCH MODULE.

Press SELECT button to display the SWITCH MODULE menu.

NOTE: Functions associated with the sealed switch module are still active in this mode.

Press a switch on the sealed switch module. The corresponding icon on the screen changes to green to indicate switch continuity.

Press BACK button to return to previous screen.

DB84312,000006D -19-01JUL13-1/1

Display Unit—Main Menu—Diagnostics—Machine Sensors

This menu displays data from various machine sensors that provide input to the flex load controller (FLC).

DIAGNOSTICS menu page 1 menu items on display include:

1. MACHINE ID
2. BATTERY MONITOR
3. ENGINE SENSORS
4. TRANSMISSION SENSORS
5. HYDRAULIC SENSORS
6. SWITCH MODULE
7. MACHINE SENSORS

At DIAGNOSTICS menu, press DOWN button to highlight MACHINE SENSORS.

Press SELECT button to display the MACHINE SENSORS menu.

MACHINE SENSORS menu items on display include:

- ARTICULATION ANGLE
- FUEL SENDER %
- STEERING ANGLE

Press BACK button to return to previous screen.

DB84312,000006E -19-01JUL13-1/1

Display Unit—Main Menu—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 2-2.)

The **EXHAUST FILTER** menu allows the operator to enable or disable auto filter cleaning. It also allows the operator to initiate a parked filter cleaning.

The submenus under MAIN MENU that appear on the display (6) include:

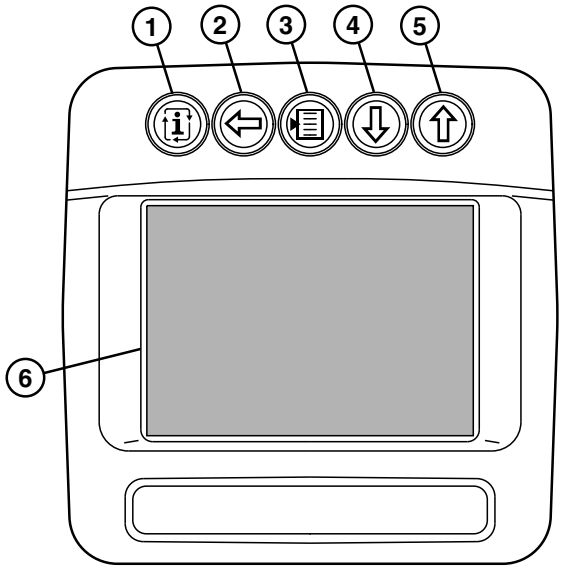
1. **CODES**
2. **SETTINGS**
3. **DIAGNOSTICS**
4. **SECURITY**
5. **EXHAUST FILTER**
6. **SOFTWARE DELIVERY**

NOTE: Only Grade Pro machines will show the seventh submenu.

7. **MACHINE CONFIGURATION**

At MAIN MENU, press DOWN button (4) to highlight EXHAUST FILTER.

Press SELECT button (3) to display EXHAUST FILTER menu.



TX1051892 —UN—25NOV08

Display Unit

1— INFO Button
2— BACK Button
3— SELECT Button
4— DOWN Button
5— UP Button
6— Display

EXHAUST FILTER menu items on display include:

FILTER SOOT LEVEL—Displays LOW, MODERATE, HIGH, VERY HIGH, or SERVICE to describe the soot level of restriction in the exhaust filter.

1. **AUTO CLEANING**
2. **PARKED CLEANING**

Press DOWN button to highlight desired menu item.

Press SELECT button to activate chosen menu item.

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

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

DB84312,000007C -19-21APR15-1/1

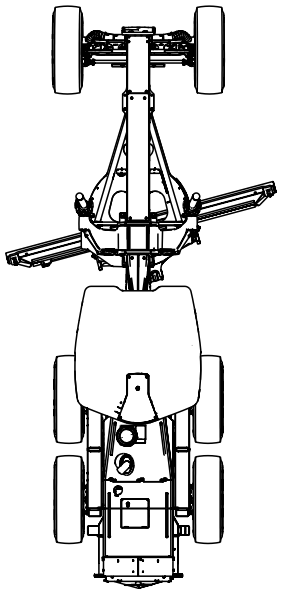
Position the blade so that it is rotated approximately 15 degrees to the left as shown.

Slowly rotate the blade back towards center until the notch on the draft frame is aligned with the outside surface of the left supporting arm.

NOTE: If the blade is rotated past the notch, reposition the blade at approximately 15 degrees to the left and try again.

Press SELECT again. Calibration process is complete.

Press BACK button to return to previous screen.



TX1057540 —UN—24MAR09

Blade Rotated 15 Degrees To Left

DB84312,0000081 -19-28AUG13-2/2

Display Unit—Main Menu—Machine Configuration—Valve Cals—Blade Side Shift (Grade Pro Machines Only)

The calibration should be performed when the following changes are observed:

- Inconsistent response from function to function
- Change in the response of a function over time
- Replacing a hydraulic valve section or other hydraulic valve components

Failure to properly position function during calibration procedure will cause an incorrect calibration.

The submenus under MACHINE CONFIGURATION menu display include:

- **CROSS SLOPE SENSOR CAL**
- **VALVE CALS**

Press DOWN button to highlight VALVE CALS.

Press SELECT button to display VALVE CALS menu.

The submenus under VALVE CALS menu display include:

Screen 1

- ARTICULATION
- BLADE SIDE SHIFT
- CIRCLE ROTATE
- CIRCLE SIDE SHIFT
- LEFT BLADE LIFT
- RIGHT BLADE LIFT
- WHEEL LEAN
- MORE

Screen 2

- STEERING
- BLADE PITCH
- REAR AUX 1
- REAR AUX 2
- REAR AUX 3
- FRONT AUX 1
- FRONT AUX 2
- FRONT AUX 3

Press DOWN button to highlight BLADE SIDE SHIFT.

Press SELECT button to display BLADE SIDE SHIFT cal menu.

The following steps should be completed to calibrate the blade side shift valve:

1. Position the machine on a level surface with the gear selector in PARK.
2. The following conditions must be maintained throughout the calibration procedure:
   - Place the gear selector in PARK.
   - Enable the hydraulics on the sealed switch module and lower both armrests.
   - Turn off both cross slope and electronic grade control on the sealed switch module.
   - Set the engine speed to 1600 rpm +/- 100 rpm.
   - Warm up the hydraulic oil temperature to a minimum of 38°C (100°F). Cycle functions as required prior to beginning calibration to warm up hydraulic oil.
3. Position the blade approximately 15 cm (6 in.) off the ground.
4. Select BLADE SIDE SHIFT from the hydraulic valve calibration menu.
5. Once all conditions have been satisfied, the calibration routine will proceed.

NOTE: Failure to position the blade so that the blade side shift cylinder is fully extended will cause an incorrect calibration. Move the control lever forward several times to ensure that the cylinder is fully extended.

6. When prompted to BLADE SIDE SHIFT ALL THE WAY TO THE LEFT, the blade side shift control lever should be moved forward to fully shift the blade to the left side.
7. Once the function is properly positioned, press SELECT on the monitor to continue calibration. Do not actuate any hydraulic functions during the calibration ramping sequence. To abort the calibration procedure, press BACK on the monitor.
8. When calibration is complete for the left side, the monitor will prompt to BLADE SIDE SHIFT ALL THE WAY TO THE RIGHT. The blade side shift control lever should be moved back, shifting the blade to the right. Move the control lever back several times to ensure the cylinder is fully retracted.
9. Once the function is properly positioned press SELECT on the monitor to continue calibration. Do not actuate any hydraulic functions during the calibration ramping sequence.

NOTE: If calibration is not successful, verify that the function is properly positioned and that no hydraulic function was actuated during the ramping sequence. If problem persists, contact your authorized dealer.

10. Wait for the calibration complete message. Calibration values are saved once the monitor displays CALIBRATION SUCCESSFUL.

DB84312,0000086 -19-28AUG13-1/1

Display Unit—Main Menu—Machine Configuration—Valve Cals—Steering Cal (Grade Pro Machines Only)

The calibration should be performed when the following changes are observed:

- Inconsistent response from function to function
- Change in the response of a function over time
- Replacing a hydraulic valve section or other hydraulic valve components

Failure to properly position function during calibration procedure will cause an incorrect calibration.

The submenus under MACHINE CONFIGURATION menu display include:

- **CROSS SLOPE SENSOR CAL**
- **VALVE CALS**

Press DOWN button to highlight VALVE CALS.

Press SELECT button to display VALVE CALS menu.

The submenus under VALVE CALS menu display include:

Screen 1

- ARTICULATION
- BLADE SIDE SHIFT
- CIRCLE ROTATE
- CIRCLE SIDE SHIFT
- LEFT BLADE LIFT
- RIGHT BLADE LIFT
- WHEEL LEAN
- MORE

Screen 2

- STEERING
- BLADE PITCH
- REAR AUX 1
- REAR AUX 2
- REAR AUX 3
- FRONT AUX 1
- FRONT AUX 2
- FRONT AUX 3

Press DOWN button to highlight MORE.

Press SELECT button to advance to Screen 2.

Press DOWN button to highlight STEERING.

Press SELECT button to display STEERING cal menu.

The following steps should be completed to calibrate the steering valve:

1. Position the machine on a level surface with the gear selector in PARK.
2. The following conditions must be maintained throughout the calibration procedure:
   - Place the gear selector in PARK.
   - Enable the hydraulics on the sealed switch module and lower both armrests.
   - Turn off both cross slope and electronic grade control on the sealed switch module.
   - Set the engine speed to 1600 rpm +/- 100 rpm.
   - Warm up the hydraulic oil temperature to a minimum of 38°C (100°F). Cycle functions as required prior to beginning calibration to warm up hydraulic oil.
3. Use the blade to raise the front wheels fully off the ground.
4. Select STEERING from the hydraulic valve calibration menu.
5. Once all conditions have been satisfied, the calibration routine will proceed.
6. When prompted to STEER ALL THE WAY TO THE LEFT, the steering control lever should be moved left or the steering wheel should be turned to the left to steer the wheels to the left against the steering stop.

NOTE: The front wheels should be raised off the ground during the calibration procedure. Failure to position the wheels so that they are off the ground and the wheels are fully steered to the left will cause an incorrect calibration. Move the control lever left several times to ensure that the wheels are fully steered against the steering stop.

7. Once the function is properly positioned press SELECT on the monitor to continue calibration. Do not actuate any hydraulic functions during the calibration ramping sequence. To abort the calibration procedure, press BACK on the monitor.
8. When calibration is complete for the left side, the monitor will prompt to STEER ALL THE WAY TO THE RIGHT. The steering control lever should be moved right or the steering wheel should be turned to the right, steering the wheels to the right. Move the control lever right several times to ensure the wheels are fully steered to the right against the stops.
9. Once the function is properly positioned press SELECT on the monitor to continue calibration. Do not actuate any hydraulic functions during the calibration ramping sequence.
10. When calibration is complete for the left side, the monitor will prompt to STEER ALL THE WAY TO THE RIGHT.

NOTE: If calibration is not successful, verify that the function is properly positioned and that no hydraulic function was actuated during the ramping sequence. If problem persists, contact your authorized dealer.

11. Wait for the calibration complete message. Calibration values are saved once the monitor displays CALIBRATION SUCCESSFUL.

DB84312,000008C -19-28AUG13-1/1

Testing Diesel Exhaust Fluid (DEF)

IMPORTANT: Using DEF with the correct concentration is critical to engine and aftertreatment system performance. Extended storage and other conditions can adversely alter the DEF concentration.

If DEF quality is questionable, draw a sample out of the DEF tank or storage tank into a clear container. DEF must be crystal clear with a light ammonia smell. If DEF appears cloudy, has a colored tint, or has a profound ammonia smell, it is likely not within specification. DEF in this condition should not be used. Drain tank, flush with distilled water and refill with new or good DEF. After refilling the tank, check the DEF concentration.

If the DEF passes the visual and smell test, check the DEF concentration with a handheld refractometer calibrated to measure DEF.

DEF concentration should be checked when the engine has been stored for extended periods, or if there is suspicion the engine or packaged DEF fluid has been contaminated with water.

Two approved tools are available through your John Deere dealer:

- JDG11594 Digital DEF Refractometer—A digital tool providing an easy to read concentration measurement
- JDG11684 DEF Refractometer—Low-cost alternative tool providing an analog reading

Follow instructions included with either tool to obtain the measurement.

The correct DEF concentration is 31.8—33.2% urea. If the DEF concentration is not within specification, drain the DEF tank, flush with distilled water and fill with new or good DEF. If packaged DEF is not within specification, dispose of DEF packages and replace with new or good DEF.

DX,DEF,TEST -19-13JUN13-1/1

Storing Diesel Exhaust Fluid (DEF)

CAUTION: Avoid contact with eyes. In case of contact, immediately flush eyes with large amounts of water for a minimum of 15 minutes. Reference the Materials Safety Data Sheet (MSDS) for additional information.

Do not ingest DEF. In the event DEF is ingested, contact a physician immediately. Reference the Materials Safety Data Sheet (MSDS) for additional information.

IMPORTANT: It is unlawful to tamper with or remove any component of the aftertreatment system. Do not use DEF that does not meet the required specifications or operate the engine with no DEF.

Never attempt to create DEF by mixing agricultural grade urea with water. Agricultural grade urea does not meet the necessary specifications and can damage the aftertreatment system.

Do not add any chemicals or additives to DEF in an effort to prevent freezing. Any chemicals or additives added to DEF can damage the aftertreatment system.

Never add water or any other fluid in place of, or in addition to DEF. Operating with a modified DEF or using an unapproved DEF can damage the aftertreatment system.

Storage information provided below is for reference and is to be used as a guideline only.

It is preferred to store DEF out of extreme ambient temperatures. DEF freezes at –11°C (12°F). Exposure to temperatures greater than 30°C (86°F) can degrade DEF over time. Do not store DEF in direct sunlight.

Dedicated DEF storage containers must be sealed between uses to prevent evaporation and contamination. Containers made of polyethylene, polypropylene, or stainless steel are recommended to transport and store DEF.

Ideal conditions for storage of DEF are:

- Store at temperatures between –5°C and 30°C (23°F and 86°F)
- Store in dedicated containers sealed to avoid contamination and evaporation

Under these conditions, DEF is expected to remain useable for a minimum of 18 months. Storing DEF at higher temperatures can reduce its useful life by approximately 6 months for every 5°C (9°F) temperature above 30°C (86°F).

If unsure how long or under what conditions DEF has been stored, test DEF. See Testing Diesel Exhaust Fluid (DEF).

Long-term storage in the DEF tank (over 12 months) is not recommended. If long-term storage is necessary, test DEF prior to operating engine. See Testing Diesel Exhaust Fluid (DEF).

It is recommended to purchase DEF in quantities that will be consumed within 12 months.

DX,DEF,STORE -19-15JUL20-1/1

Water Quality for Mixing with Coolant Concentrate

Engine coolants are a combination of three chemical components: ethylene glycol (EG) or propylene glycol (PG) antifreeze, inhibiting coolant additives, and quality water.

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.

All water used in the cooling system should meet the following minimum specifications for quality:

Chlorides	<40 mg/L
Sulfates	<100 mg/L
Total solids	<340 mg/L
Total dissolved I hardness	<170 mg/L
pH	5.5—9.0

IMPORTANT: Do not use bottled drinking water because it often contains higher concentrations of total dissolved solids.

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.

DX,COOL19 -19-13JAN18-1/1

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

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	Initial Service —500 Hours[1]	Every 500 Hours	Every 1000 Hours	Every 2000 Hours	Every 4000 Hours	Every 6000 Hours
Engine Coolant			1	1	1	1	1

[1]*Perform initial service once after the first 500 hours of operation.*
[2]*For recommended oil type and oil viscosities based on operating temperatures, see Maintenance—Machine. (Section 3-1.)*
[3]*Based on fluid analysis results, intervals may need to be adjusted for operating conditions. Consult and authorized John Deere dealer.*

JS93577,00002B6 -19-11SEP17-2/2

Inspect Accessory Belt and Belt Tensioner Spring

Belt drive systems equipped with automatic (spring) belt tensioner (3) cannot be adjusted or repaired. The automatic belt tensioner is designed to maintain proper belt tension over the life of the belt.

A belt tension gauge will not give an accurate measure of belt tension when automatic spring tensioner is used.

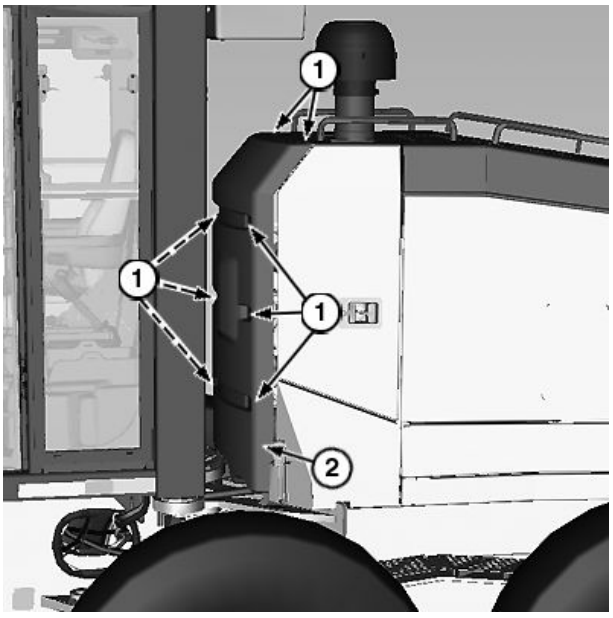
The following procedure will check belt and belt tensioner operation:

1. With engine shields in place, set park brake and put transmission in park position.
2. Start engine and run at fast idle.

   Accessory belt must not emit a loud squealing sound at slow idle, high idle, or rapid acceleration. If belt produces a squealing sound under any of these conditions, shut off engine and proceed to step 4. If belt does not produce a squealing sound, proceed to next step.
3. Turn on air conditioning and headlights (high beam). If accessory drive produces a squealing sound under any of these conditions, shut off engine and proceed to step 4. If belt does not produce a squealing sound, belt is OK.

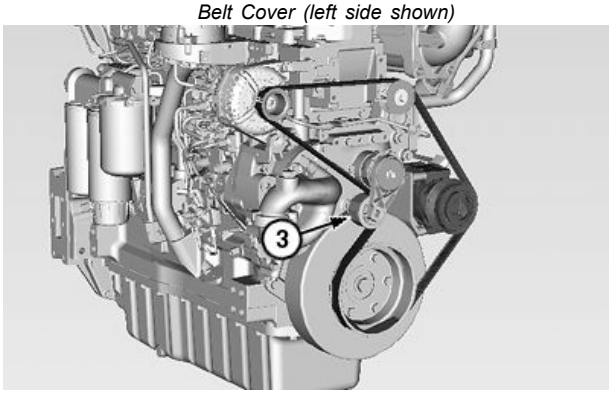
   Accessory Belt and Belt Tensioner Inspection:
4. Articulate machine.
5. Remove cap screws (1) and remove cover (2).
6. Visually inspect belt for wear, cracks, or fraying. If belt does not show any signs of excessive wear, and belt drive squealed loudly during the performance of steps 2 and 3, inspect belt tensioner (3).
7. Using a 1/2-in. breaker bar, slowly release tension from belt by rotating belt tensioner away from belt. Continue rotating until belt tensioner stop is contacted. Slowly return belt tensioner back to belt tensioned position. If the tensioner exhibited excessive “roughness” or hesitancy during removal from or return to belt tensioned position, replace belt tensioner.
8. Install cover, and cap screws.

1— Cap Screw (8 used)
2— Cover
3— Automatic Belt Tensioner



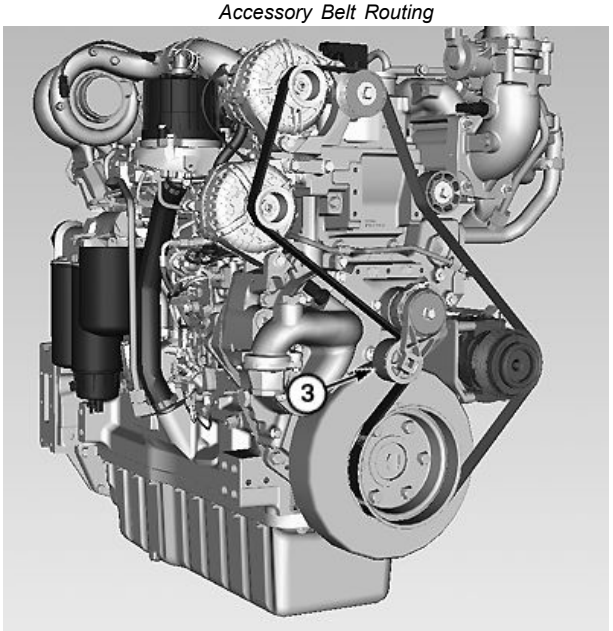
TX1143203A —UN—30AUG13

Belt Cover (left side shown)



TX1138339A —UN—05JUN13

Accessory Belt Routing

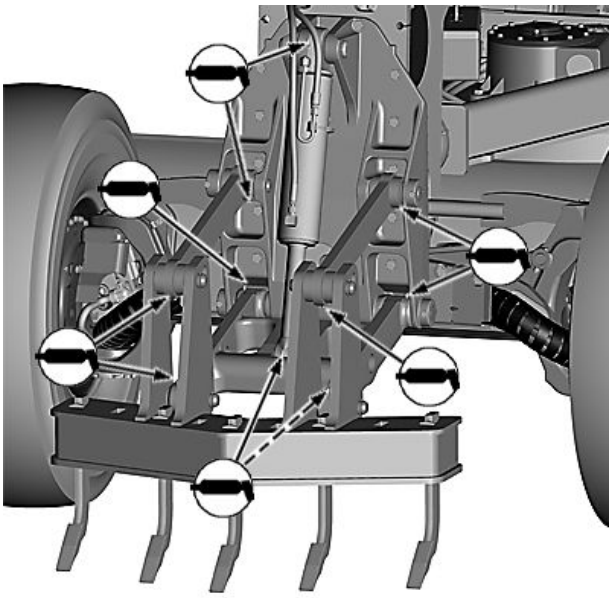


TX1143206A —UN—30AUG13

Dual Alternator Belt Routing

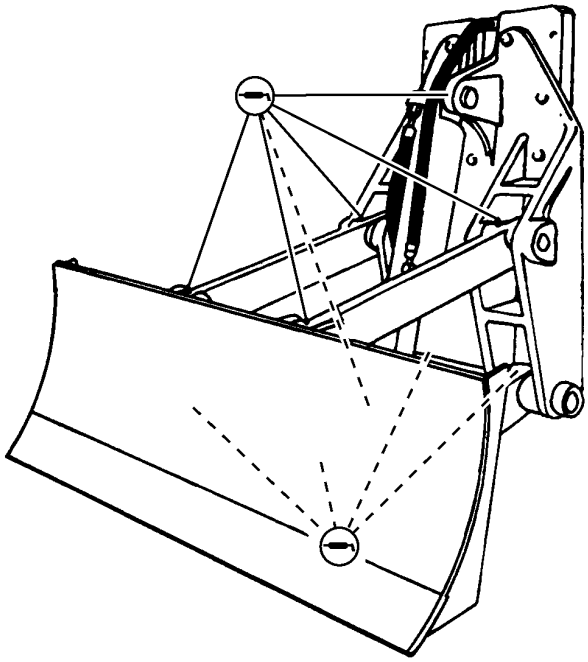
JS93577,00002C1 -19-28FEB14-1/1

Lubricate Front Mounted Scarifier or Dozer Blade—If Equipped



TX1051946A —UN—16DEC08

Front Mounted Scarifier—10 Lubrication Points



TX1143215 —UN—29AUG13

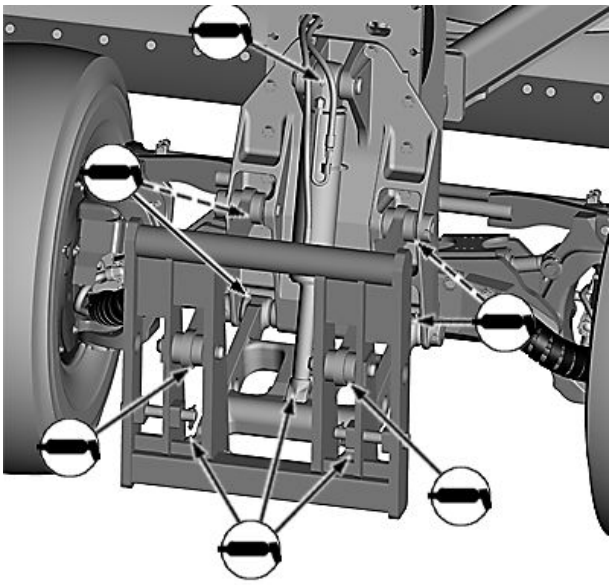
Dozer Blade—10 Lubrication Points

Lubricate scarifier or dozer blade until grease escapes at joints. See Grease. (Section 3-1.)

JS93577,00002D3 -19-29AUG13-1/1

Lubricate Balderson™ Style Front Lift Group—If Equipped

Lubricate Balderson™ style front lift group until grease escapes at joints. See Grease. (Section 3-1.)



TX1051943A —UN—17DEC08

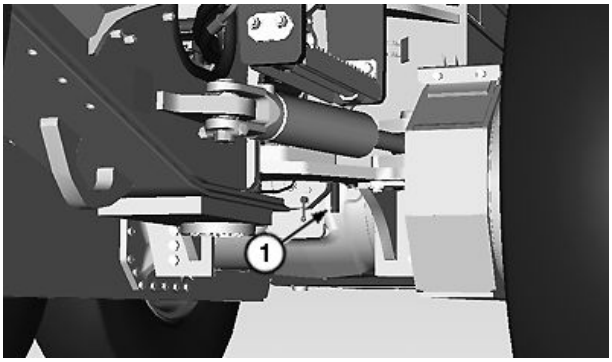
Balderson™ Style Front Lift Group—10 Lubrication Points

Balderson is a trademark of Caterpillar Inc.

JS93577,00002D4 -19-27JUN13-1/1

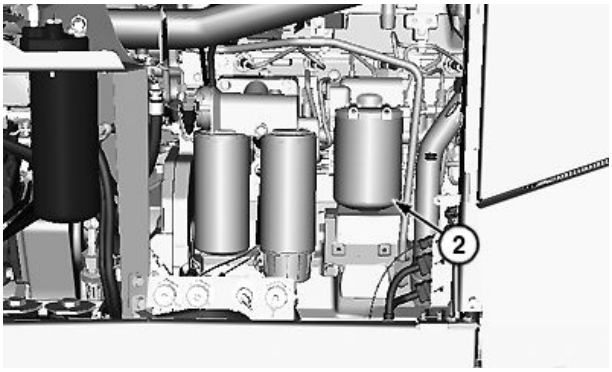
Drain and Refill Engine Oil and Replace Filter

IMPORTANT: If fuel sulphur content exceeds 0.5 percent, change engine oil at half the normal interval.



TX1139612A —UN—29AUG13

Engine Oil Drain Hose



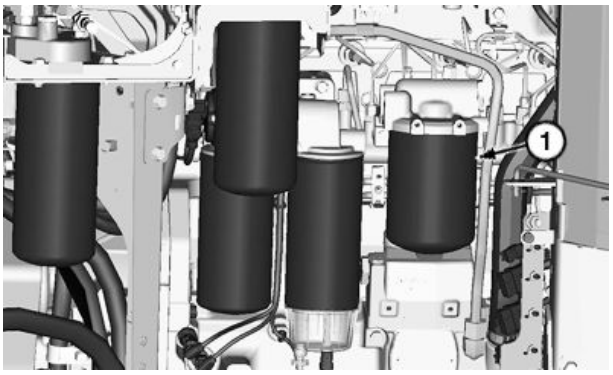
TX1139613A —UN—01JUL13

Engine Oil Filter

1. Run engine to warm oil. Stop the engine.
2. Place suitable container under engine oil drain hose (1).
3. Open left engine maintenance door and drop down panel.
4. Open drain valve (3). Allow oil to drain into container.
5. Open right engine maintenance door and drop down panel.
6. Turn engine oil filter (2) counterclockwise to remove.
7. Clean mounting surface. Apply thin film of oil to gasket of new engine oil filter.
8. Install new engine oil filter. Turn filter clockwise by hand until gasket touches mounting surface.
9. Turn engine oil filter 3/4 turn more.
10. Close drain valve. Dispose of waste oil properly.
11. Remove fill cap (5) and fill with oil. For recommended oil, see Maintenance—Machine. (Section 3-1.)
12. Install fill cap.

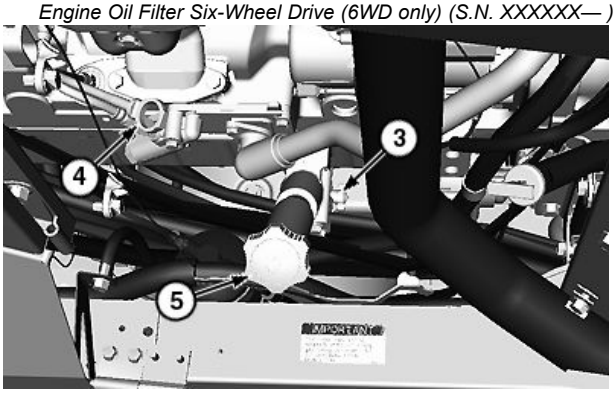
Specification

Engine Oil—Capacity..... 27.0 L
7.1 gal



TX1210630 —UN—10FEB16

Engine Oil Filter Six-Wheel Drive (6WD only) (S.N. XXXXXX—)



TX1139727A —UN—02JUL13

Engine Oil Fill Cap, Dipstick, and Drain Valve

1— Engine Oil Drain Hose
2— Engine Oil Filter
3— Drain Valve
4— Dipstick
5— Fill Cap

IMPORTANT: Engine oil pressure indicator must come on immediately when engine is started. If oil pressure light does not go off, shut down machine immediately and find cause for low oil pressure.

13. Start engine and run at slow idle.

NOTE: Wait 10 minutes after machine shutdown to check engine oil level. Ten minutes after shutdown the engine oil level must be above the ADD mark.

14. Stop the engine. Check oil level on dipstick (4).
15. Check for any leakage at filter. Tighten filter enough to stop leakage.
16. Close right and left engine maintenance doors and drop down panels.

Continued on next page

JS93577,00002F7 -19-11FEB16-1/2

Adjust Front Wheel Bearings—Standard Axle Only

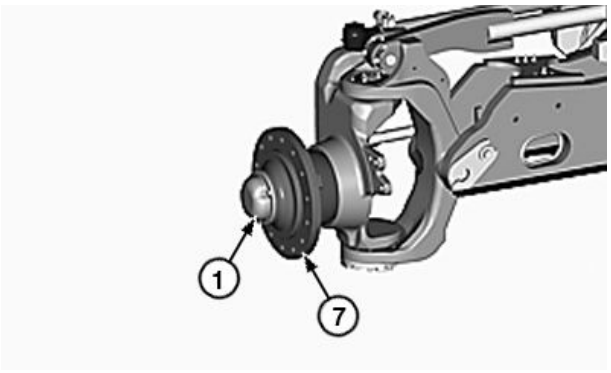
1. Place blocks under front axle to support machine while adjusting front wheel bearings.
2. Remove wheel. Remove hub cap (1) and gasket (2).
3. Remove cotter pin (4) and slotted nut (3).
4. Remove retainer washer (6) and bearing cone (5).
5. Remove hub (7).
6. Remove bearing cone (10), oil seal cup (11), and oil seal (12).
7. Clean all parts. Replace worn or damaged parts.
8. Pack bearing cones with grease. See Grease. (Section 3-1.)
9. Assemble bearing cone, oil seal cup, and oil seal into hub.
10. Place hub on axle. Install bearing cone (5) and retainer washer.
11. Apply lubricant to threads.
12. Install slotted nut. Tighten nut to specification while turning front wheel hub to seat bearings. Loosen nut to the nearest alignment of slot with hole in shaft. Install cotter pin.

Specification

Slotted Nut—Torque.....95 N·m
70 lb.-ft.

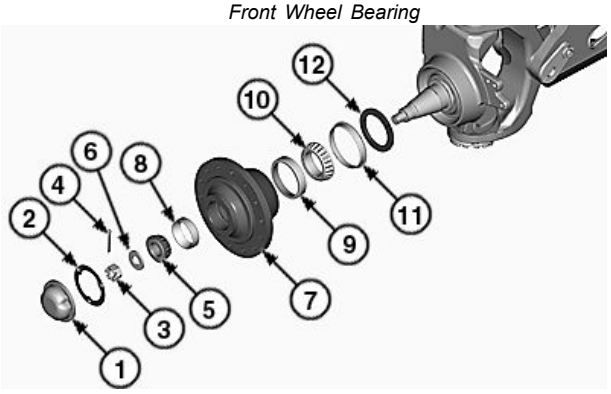
13. Install hub cap and gasket.
14. Install wheel.

NOTE: If you operate the machine often in wet or muddy conditions, clean and pack bearings as necessary.



TX1052738A —UN—13DEC08

Front Wheel Bearing



TX1052740A —UN—08DEC08

Front Wheel Bearing Exploded View

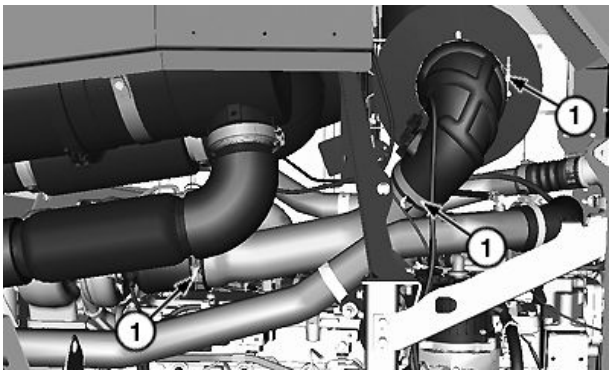
1— Hub Cap
2— Gasket
3— Slotted Nut
4— Cotter Pin
5— Bearing Cone
6— Retainer Washer
7— Hub
8— Bearing Cup
9— Bearing Cup
10— Bearing Cone
11— Oil Seal Cup
12— Oil Seal

JS93577,0000303 -19-01AUG13-1/1

Check Engine Air Intake Hoses

1. Open right front maintenance door, right engine maintenance door, and drop down panel.
2. Check hoses for cracks or damage.
3. Tighten clamps (1). Replace if necessary.
4. Close right front maintenance door, right engine maintenance door, and drop down panel.

1— Clamp (3 used)



TX1139819A —UN—03JUL13

Clamps

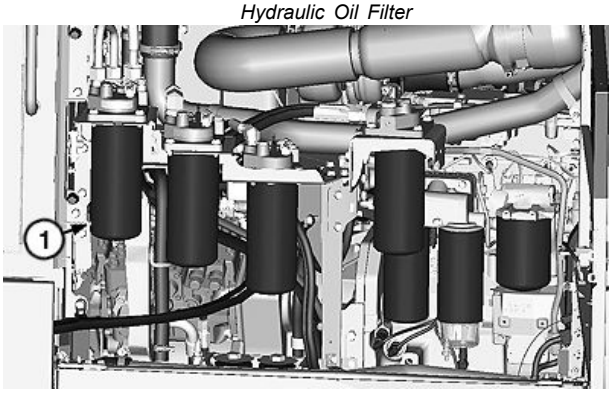
JS93577,0000304 -19-10FEB14-1/1

Replace Hydraulic Oil Filter

1. Lower all equipment to the ground.
2. Stop the engine.
3. Open right engine maintenance door and drop down panel to access hydraulic oil filter (1).
4. Place a suitable container under filter.
5. Clean all dirt and debris from filter housing before removal.
6. Turn hydraulic oil filter counterclockwise to remove.
7. Install new hydraulic oil filter.
8. Clean the mounting surface of filter housing.
9. Apply thin film of oil to gasket of filter housing.
10. Add approximately 1.9 L (2.0 qt) of oil to filter. For recommended oil, see Maintenance—Machine. (Section 3-1.)
11. Turn filter housing clockwise by hand until gasket touches mounting surface.
12. Tighten 1/2—3/4 turn more.
13. Start engine and run at low idle, with no load for 2 minutes.
14. Stop engine. Check for leaks around filter housing. Tighten filter housing only enough to stop leaks.
15. Check oil level and add oil if necessary. See Checking Hydraulic Tank Oil Level. (Section 3-4.)
16. Close right engine maintenance door and drop down panel.

TX1139575A —UN—28JUN13

Hydraulic Oil Filter

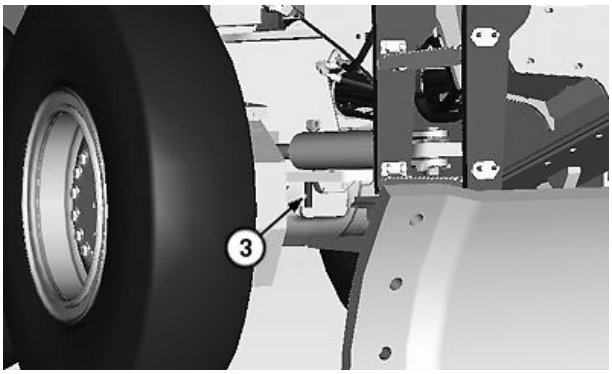


TX1210779 —UN—12FEB16

Hydraulic Oil Filter Six-Wheel Drive (6WD only) (S.N. XXXXXX—)

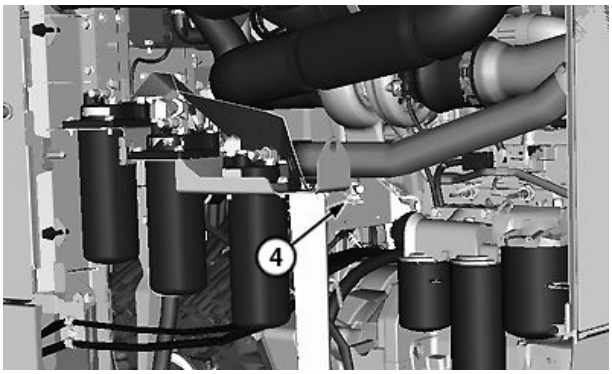
1— Hydraulic Oil Filter

JS93577,000030F -19-12FEB16-1/1



TX1139657A —UN—09JUL13

Coolant Hose Drain Valve



TX1140322A —UN—11JUL13

Upper Coolant Drain Valve

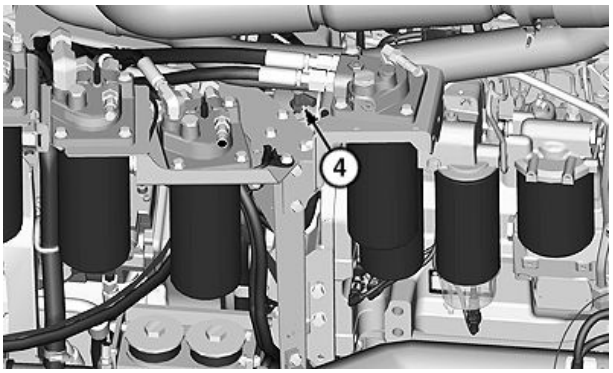
NOTE: Coolant drain hose (3) is supplied on machine.

3. Turn upper coolant drain valve (4) and lower coolant drain valve (5) counterclockwise to open. Allow coolant to drain into suitable container. Close drain valves. Dispose of used coolant properly.

IMPORTANT: Avoid engine damage from over-diluted coolant. Drain engine block after flushing procedure to remove excess water.

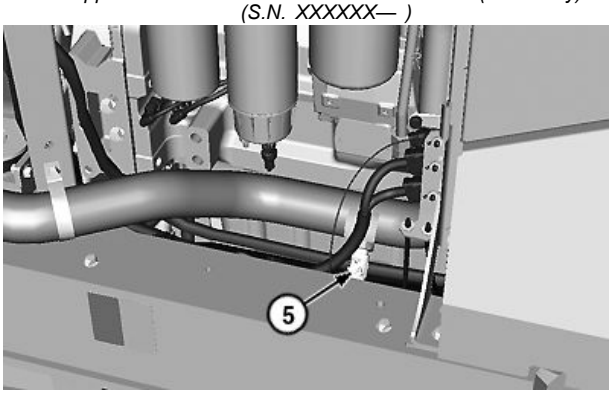
4. Flush system using a commercial product. Drain engine block after flushing procedure.

3— Coolant Drain Hose
4— Upper Coolant Drain Valve
5— Lower Coolant Drain Valve



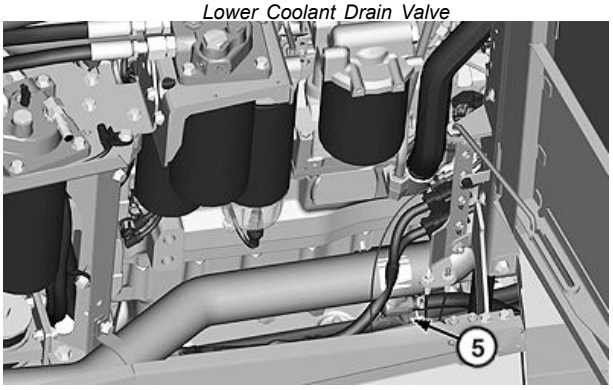
TX1211166 —UN—17FEB16

Upper Coolant Drain Valve Six-Wheel Drive (6WD only) (S.N. XXXXXX—)



TX1139660A —UN—09JUL13

Lower Coolant Drain Valve



TX1211167 —UN—17FEB16

Lower Coolant Drain Valve Six-Wheel Drive (6WD only) (S.N. XXXXXX—)

Continued on next page

Removing and Replacing Batteries

Machine has two 12-volt batteries with negative (-) ground.

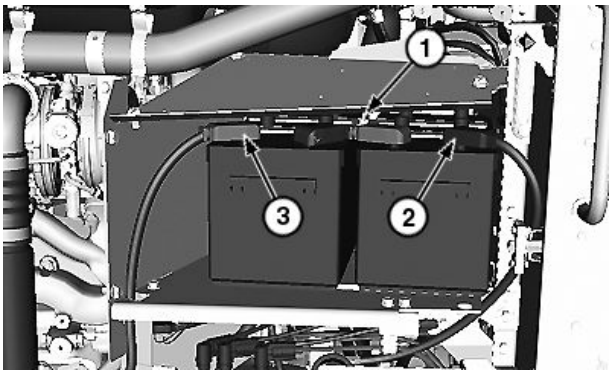
For cold weather operation below 0°C (32°F), use batteries that meet specifications below.

Specification	
Battery—Cold Cranking Amps	1400
Battery—Minutes Reserve Capacity	440

For operating temperatures above 0°C (32°F), use batteries that meet specifications below.

Specification	
Battery—Cold Cranking Amps	1000
Battery—Minutes Reserve Capacity	320

1. Turn battery disconnect switch to the OFF position. See Battery Disconnect Switch. (Section 2-2.)
2. Remove cover plate.
3. Disconnect negative (-) battery cable (2).
4. Disconnect positive (+) battery cable (3).
5. Remove battery cable connecting batteries in series.
6. Remove nut (1) and hold-down bracket.
7. Remove batteries.
8. Install new batteries in compartment using hold-down bracket and nut.



TX1139668A —UN—11JUL13

Battery Location

1— Nut
2— Negative (-) Battery Cable
3— Positive (+) Battery Cable

9. Install battery cable connecting batteries in series.
10. Connect positive (+) battery cable.
11. Connect negative (-) battery cable.
12. Install cover plate.
13. Turn battery disconnect switch to the ON position.
14. Start engine. After bulb check, verify that low battery voltage indicator on primary display unit (PDU) does not appear.

JS93577,000031E -19-03MAR17-1/1

JDLink™ Machine Monitoring System (MMS)—If Equipped

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.

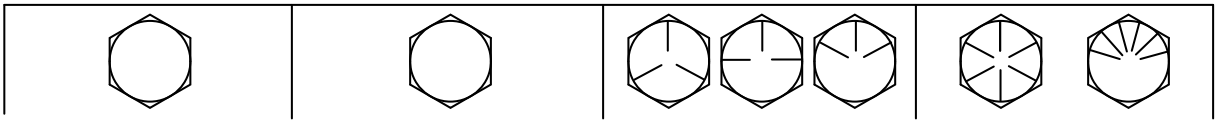
For more information, see an authorized John Deere dealer or visit www.deere.com (browse to Construction, Services and Support, JDLink™).

JDLink is a trademark of Deere & Company

VD76477,0001541 -19-26MAR15-1/1

Unified Inch Bolt and Screw Torque Values

TS1671 —UN—01MAY03



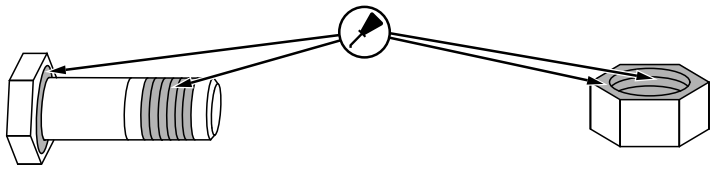
Bolt or Screw Size	SAE Grade 1[a]				SAE Grade 2[b]				SAE Grade 5, 5.1 or 5.2				SAE Grade 8 or 8.2			
	Hex Head[c]		Flange Head[d]		Hex Head[c]		Flange Head[d]		Hex Head[c]		Flange Head[d]		Hex Head[c]		Flange Head[d]	
	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in
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 -19-30MAY18-1/1

Cab Systems Checks

TX1143741A —UN—10SEP13

Sealed Switch Module (SSM) (Grade Pro shown)

1— Engine START/Ignition ON Switch
2— Engine STOP/Ignition OFF Switch
3— Beacon Light Switch (if equipped)
4— Hazard Lights Switch
5— Hydraulic Enable Switch (Grade Pro machines only)
6— Saddle Locking Pin Switch
7— Lever Steer Enable Switch (Grade Pro machines only)
8— Cab Front Work Lights Switch (if equipped)
9— Front Work Lights Switch (if equipped)
10— Marker/Drive Lights Switch
11— Not Used
12— Cab Corner Work Lights Switch (if equipped)
13— Cab Side Work Lights Switch (if equipped)
14— Front Washer Switch
15— Front Wiper Switch
16— Air Conditioning and Defog Switch
17— Heated Side Mirror Switch
18— Rear Defog Switch
19— Front Lower Washer Switch (if equipped)
20— Front Lower Wiper Switch (if equipped)
21— Auto Shift Switch
22— Auto Differential Lock Switch
23— Auto Blade Control Switch (Grade Pro machines only)
24— Rear Washer Switch
25— Rear Wiper Switch

With ignition ON, activate the following lights:

☐ Dome light switch

☐ Marker/Drive lights switch (10)

☐ Cab front work lights switch (if equipped) (8)

☐ Cab side work lights switch (if equipped) (13)

☐ Cab corner work lights switch (if equipped) (12)

☐ Front work lights switch (if equipped) (9)

☐ Beacon light switch (if equipped) (3)

YES: Go to next step in this check.

NO: If all lights do not operate (except dome light), check 120 A circuit breaker (F3) and 10 A fuse (F10). See Replacing Fuses. (Section 4-1.)

Continued on next page

JB92884,000005F -19-14SEP15-13/48

Front Wheel Drive Precision Check

T6457BP —UN—01JUN89

Grader Raised Off Ground

CAUTION: Avoid injury from unexpected machine movement. Perform this test on level surface in an area clear of bystanders and obstructions. Make sure auto and manual differential lock are OFF.

IMPORTANT: Do not operate machine above 1st gear with one set of tandems off ground for more than 1 minute. Damage to differential can result.

Make sure both auto and manual differential lock functions are OFF.

Raise front wheels and one set of tandems off ground using blade.

Press 6WD/precision switch to PRECISION position.

LOOK: Does switch backlight illuminate snail icon?

Turn precision mode dial to approximately middle position.

Run engine at approximately 1000 rpm. Move shift lever to 1st gear forward.

LOOK: Do front wheels turn smoothly without surging?

NOTE: Front wheels may surge when initially engaged.

LOOK: Do rear wheels stay stationary?

YES: Check complete.

NO: See your authorized dealer.

Continued on next page

JB92884,000005F -19-14SEP15-33/48

Engine

Symptom	Problem	Solution
Engine Will Not Crank	Weak battery	Replace battery.
	Corroded or loose battery connections	Clean battery terminals and connections. Tighten end clamps.
	Battery disconnect switch malfunction	Repair or replace switch as required. See your 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 is seized	See your authorized dealer.
Engine Cranks/Won't Start	Fuel quality and quantity	If quality is poor, replace fuel with proper fuel. If quantity is low, fill fuel tank.
	Oil viscosity	Check for correct oil viscosity.
	Restricted or plugged engine air filters	Replace engine air filters. See Replace Engine Air Intake Filter Elements. (Section 3-3.)
	Restricted or plugged fuel filters	Replace fuel filters. See Replacing Auxiliary Fuel Filter and Water Separator—If Equipped, see Replace Primary Fuel Filter and Water Separator, and see Replace Final Fuel Filter. (Section 3-8.)
	Electronic control system problem or basic engine problem	See your authorized dealer.
	Exhaust filter restricted	See your authorized dealer.
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 engine air filters	Replace engine air filters. See Replace Engine Air Intake Filter Elements. (Section 3-3.)

Continued on next page

Heater System

NOTE: If any other problems are encountered which require special tools or machine knowledge to correct, see your authorized dealer.

Symptom	Problem	Solution
Heater System Does Not Operate	Air conditioner/heater blower fuse	Replace fuse F34.
Heater Does Not Warm Interior of Cab	Fresh air filter restricted	Clean or replace filter.
	Recirculating air filter restricted	Clean or replace filter.
	Heater hose kinked, pinched or collapsed	Inspect hoses. Replace collapsed hoses.
	Heater coil fins clogged with dirt or dust	Clean heater coil fins.
	Heater valve remaining closed	Inspect, repair, adjust or replace heater valve or cable.
Interior Windows Continue to Fog	Fresh air filter restricted	Clean or replace filter.

JS93577,0000332 -19-10SEP13-1/1

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

Item	Measurement	Specification
8—Machine With Scarifier	Overall Length	9.69 m 31 ft. 9 in.
9—Machine With Scarifier and Ripper	Overall Length	10.59 m 34 ft. 9 in.
9—Machine With Pushblock and Ripper	Overall Length	9.99 m 32 ft. 9 in.

NOTE: Excessive weight may wear power train parts faster than normal and could affect the warranty. Check your warranty.

Item	Measurement	Specification
670G and 670GP SAE Operating Weights With Standard Equipment		
Front	Weight	4178 kg 9210 lb.
Rear	Weight	11 798 kg 26 010 lb.
Total	Weight	15 976 kg 35 220 lb.
670G and 670GP Typical Operating Weights With Front Push Block and Ripper		
Front [1]	Weight	5507 kg 12 140 lb.
Rear [1]	Weight	13 698 kg 30 200 lb.
Total [1]	Weight	19 205 kg 42 340 lb.
Maximum Operating Weight—Total	Weight	21 228 kg 46 800 lb.

NOTE: Excessive weight may wear power train parts faster than normal and could affect the warranty. Check your warranty.

Item	Measurement	Specification
672G and 672GP SAE Operating Weights With Standard Equipment		
Front	Weight	4781 kg 10 540 lb.
Rear	Weight	12 215 kg 26 930 lb.
Total	Weight	16 996 kg 37 470 lb.

Continued on next page