

120C and 160CLC Excavator



OPERATOR'S MANUAL 120C and 160CLC Excavator OMT188255 ISSUE H5 (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**

LITHO IN U.S.A.

Introduction

Introduction

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 authorized 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.

JH91824,000092D -19-08DEC09-1/1

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	Aftertreatment Devices
Fuel System	Crankcase Ventilation Valves
Ignition System	Sensors
Exhaust Gas Recirculation Systems	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**

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 | Aftertreatment Devices |
| Fuel System | Crankcase Ventilation Valves |
| Ignition System | Sensors |
| Exhaust Gas Recirculation Systems | 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)

TS1721 —UN—15JUL13

Click on the image link below for the full version of the service manual



CARB Non-road Emissions Control Warranty Statement—Compression Ignition

Emissions Control Warranty Statement 2013 through 2015

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 2013 through 2015 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.

Introduction

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 catalyts

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.

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Emissions Control Warranty Statement 2013 through 2015

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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 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 2013 through 2015 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.

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Introduction

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 catalyts

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.

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TS1723 —UN—15JUL13

Emissions Control Warranty Statement 2016 through 2018

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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 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 2016 through 2018 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.

Introduction

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.

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.

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Emissions Control Warranty Statement 2016 through 2018

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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 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 2016 through 2018 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.

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DX,EMISSIONS,CARB -19-01AUG14-7/8

RG26035 —UN—24JUN14

Introduction

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 <ul style="list-style-type: none">• Intake manifold• Turbocharger• Charge air cooler	Emission control labels	Advanced Oxides of Nitrogen (NOx) Controls <ul style="list-style-type: none">• NOx absorbers and catalysts
Fuel Metering system <ul style="list-style-type: none">• Fuel injection system	Particulate Controls <ul style="list-style-type: none">• Any device used to capture particulate emissions• Any device used in the regeneration of the capturing system• Enclosures and manifolding• Smoke Puff Limiters	SCR systems and urea containers/dispensing systems
Exhaust Gas Recirculation <ul style="list-style-type: none">• EGR valve	Positive Crankcase Ventilation (PCV) System <ul style="list-style-type: none">• PCV valve• Oil filler cap	Miscellaneous Items used in Above Systems <ul style="list-style-type: none">• Electronic control units, sensors, actuators, wiring harnesses, hoses, connectors, clamps, fittings, gasket, mounting hardware
Catalyst or Thermal Reactor Systems <ul style="list-style-type: none">• Catalytic converter• Exhaust manifold		

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 (13Jun14)

DX,EMISSIONS,CARB -19-01AUG14-8/8

RG26036 —UN—24JUN14

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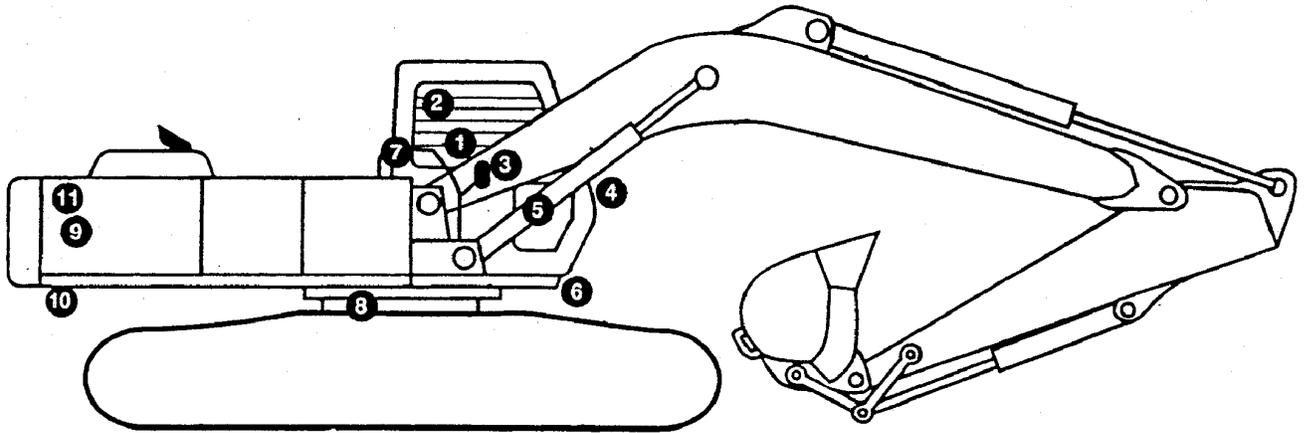
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Safety—Safety and Operator Conveniences

Safety and Operator Convenience Features



T140544

T140544—UN—26MAR01

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

- 1. Seat belt.** A seat belt is provided for the operator.
- 2. Window Guarding.** Window bars prevent contact with a moving boom.
- 3. Rearview Mirrors.** Rearview mirrors offer the operator a view of activity behind him.
- 4. Secondary Exit.** The front window provides a large exit path if the cab door is blocked in an emergency situation. A secondary exit tool is also provided.
- 5. Pilot Control Shutoff.** A lever near the cab exit reminds the operator to deactivate hydraulic functions before leaving the machine.
- 6. Steps.** Wide, slip-resistant steps make entry and exit easier. Steps also provide a place to clean shoes.
- 7. Handholds.** Large, conveniently placed handholds make it easy to enter or exit the operator's station or service area.
- 8. Swing Brake.** Swing brake engages automatically when the swing is not operated. Helps secure upperstructure when transporting the machine.
- 9. Bypass Start Protection.** Shielding over the starter helps prevent dangerous bypass starting.
- 10. Travel Alarm.** Alerts bystanders of machine movement when travelling.
- 11. Engine Fan Guard.** A secondary fan guard inside the engine compartment helps prevent contact with the engine fan blades.

JH91824,00001EE -19-26FEB09-1/1

Safety—General Precautions

Recognize Safety Information

This is the safety alert symbol. When this symbol is noticed on the 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 the 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.



TX03679,00016CC -19-03JAN07-1/1

TI 133555 —UN—15APR13

TI 133558 —19—28AUG00

Follow Safety Instructions

Read the safety messages in this manual and on the machine. Follow these warnings and instructions carefully. Review them frequently.

Be sure all operators of this machine understand every safety message. Replace operator's manual and safety labels immediately if missing or damaged.



TX03679,00016F9 -19-03JAN07-1/1

TI 133556 —UN—24AUG00

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.

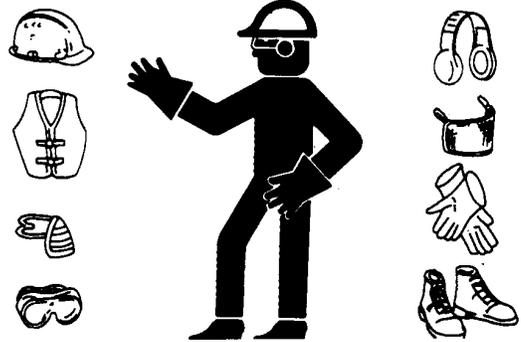
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Wear Protective Equipment

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.

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.



TS206—UN—15APR13

TX03679.00016D0 -19-03JAN07-1/1

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.

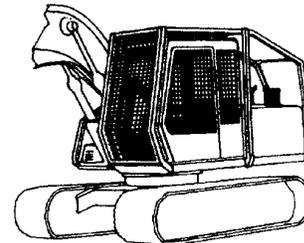
Always contact an authorized dealer before making machine modifications that change the intended use, weight or balance of the machine, or that alter machine controls, performance, or reliability.

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

Add Cab Guarding for Special Uses

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

FOPS (falling object protective structures) and special screens or guarding should be installed when falling or flying objects may enter or damage the machine. Contact your authorized dealer for information on devices intended to provide protection in special work situations.



T133733—UN—15SEP00

TX03679.00016CE -19-03JAN07-1/1

Inspect Machine

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

Inspect and Clean the Polycarbonate Windows. See Inspect and Clean Polycarbonate Windows. (Section 4-1.)

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

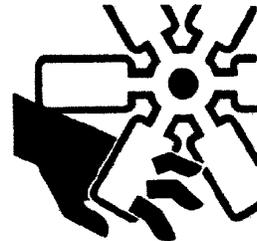
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Stay Clear of Moving Parts

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

TX03679,00016D2 -19-03JAN07-1/1

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.

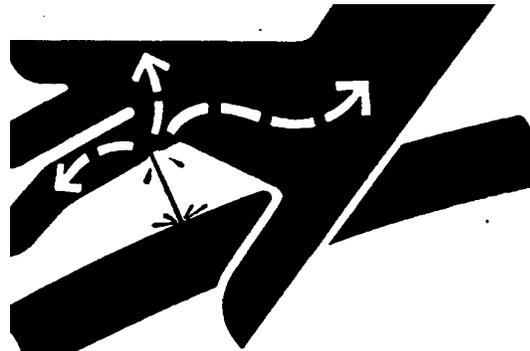
Replace worn or damaged hose assemblies immediately with John Deere approved replacement parts.

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



X9811 —UN—23AUG88

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.

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, see a doctor immediately. Injected oil must be removed surgically within hours or gangrene may result. Contact a knowledgeable medical source or the Deere & Company Medical Department in Moline, Illinois, U.S.A.



TX03679,00016D3 -19-03NOV08-1/1

T133509 —UN—15APR13

T133840 —UN—20SEP00

Beware of Exhaust Fumes

Prevent asphyxiation. Engine exhaust fumes can cause sickness or death.

If you must operate in an enclosed space, provide adequate ventilation. Use an exhaust pipe extension to remove the exhaust fumes or open doors and windows to bring outside air into the area.



TX03679,00016D4 -19-03NOV08-1/1

T133546 —UN—24AUG00

Prevent Fires

Handle Fuel Safely: Store flammable fluids away from fire hazards. Never refuel machine while smoking or when near sparks or flame.

Clean Machine Regularly: Keep trash, debris, grease and oil from accumulating in engine compartment, around fuel lines, hydraulic lines, exhaust components, and electrical wiring. Never store oily rags or flammable materials inside a machine compartment.

Maintain Hoses and Wiring: Replace hydraulic hoses 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 extinguisher properly.



T133553 —UN—07SEP00



T133554 —UN—07SEP00



TX03679,00016F5 -19-03NOV08-1/1

T133552 —UN—15APR13

Prevent Battery Explosions

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

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

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



TX03679,000174A -19-03NOV08-1/1

TS204 —UN—15APR13

Handle Chemical Products Safely

Exposure to hazardous chemicals can cause serious injury. Under certain conditions, lubricants, coolants, paints and adhesives used with this machine may be hazardous.

If uncertain about safe handling or use of these chemical products, contact your authorized dealer for a Material Safety Data Sheet (MSDS) or go to internet website <http://www.jdmsds.com>. The MSDS describes physical and health hazards, safe use procedures, and emergency response techniques for chemical substances. Follow



MSDS recommendations to handle chemical products safely.

TX03679,00016D7 -19-03JAN07-1/1

T133580 —UN—25AUG00

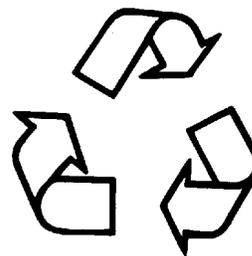
Dispose of Waste Properly

Improper disposal of waste can threaten the environment. Fuel, oils, coolants, filters and batteries used with this machine may be harmful if not disposed of properly.

Never pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants can damage the atmosphere. Government regulations may require using a certified service center to recover and recycle used refrigerants.

If uncertain about the safe disposal of waste, contact your local environmental or recycling center or your authorized dealer for more information.



T133567 —UN—25AUG00

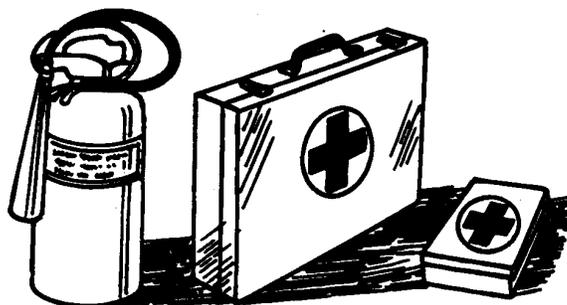
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Prepare for Emergencies

Be prepared if an emergency occurs or 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

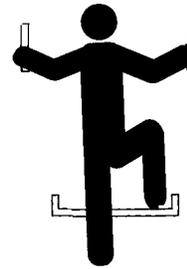
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Safety—Operating Precautions

Use Steps and Handholds Correctly

Prevent falls by facing the machine when getting 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

TX03679,00016F2 -19-24APR13-1/1

Start Only From Operator's Seat

Avoid unexpected machine movement. Start engine only while sitting in operator's seat. Ensure 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.



T133715 —UN—15APR13

TX03679,0001799 -19-22APR10-1/1

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.

Examine seat belt frequently. Be sure webbing is not cut or torn. Replace seat belt immediately if any part is damaged or does not function properly.

The complete seat belt assembly should be replaced every three years, regardless of appearance.



USE SEAT BELT

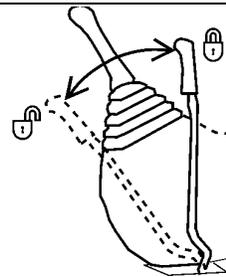
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TX03679,00016DD -19-02DEC08-1/1

Prevent Unintended Machine Movement

Be careful not to accidentally actuate control levers when co-workers are present. Pull pilot control shutoff lever to locked position during work interruptions. Pull pilot control shutoff lever to locked position and stop engine before allowing anyone to approach machine.

Always lower work equipment to the ground and pull pilot control shutoff lever to locked position before standing up or leaving the operator's seat. Stop engine before exiting.



T133863 —UN—20SEP00

TX03679,0001746 -19-24JAN07-1/1

Avoid Work Site Hazards

Avoid contact with gas lines, buried cables, and water lines. Call utility line location services to identify all underground utilities before digging.

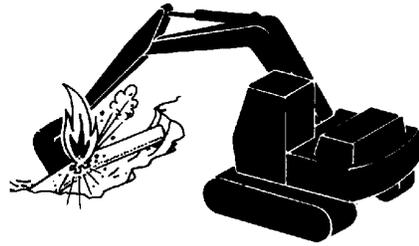
Prepare work site properly. Avoid operating near structures or objects that could fall onto the machine. Clear away debris that could move unexpectedly if run over.

Avoid boom or arm 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 bystanders. 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. When working close to an excavation, position travel motors away from the hole.

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 seat belt.



Work Site Hazards



Work Site Hazards



Work Site Hazards

TX03679.0001748 -19-08JUL15-1/1

T134986—UN—31OCT00

T133650—UN—27SEP00

T133549—UN—24AUG00

Keep Riders Off Machine

Only allow operator on machine.

Riders are subject to injury. They may fall from machine, be caught between machine parts, or be struck by foreign objects.

Riders may obstruct operator's view or impair the ability to operate machine safely.



TX03679.0001726 -19-08JUL15-1/1

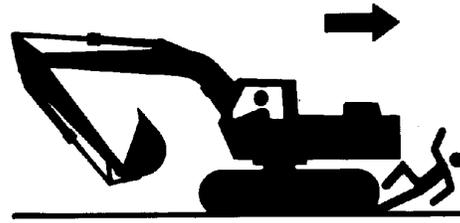
T7273AH—UN—08JUN90

Avoid Backover Accidents

Before moving machine, be sure all persons are clear of both travel and swing paths. 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 travel 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.



T133548 —UN—24AUG00

TX03679,00016F3 -19-03JAN07-1/1

Avoid Machine Tip Over

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 on a firm level surface. Use loading ramps and attach them properly to truck bed. Avoid trucks with steel beds because tracks slip more easily on steel.

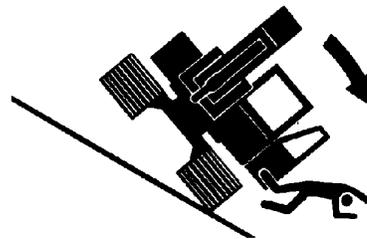
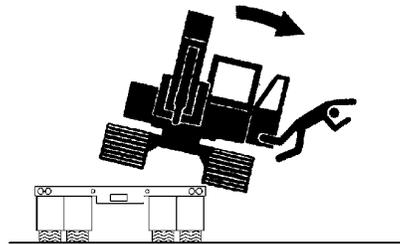
Be careful on slopes. Use extra care on soft, rocky or frozen ground. Machine may slip sideways in these conditions. When traveling up or down slopes, keep the bucket on uphill side and just above ground level.

Be careful with heavy loads. Using oversize buckets or lifting heavy objects reduces machine stability. Extending a heavy load or swinging it over side of undercarriage may cause machine to tip.

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



**USE
SEAT
BELT**



T133716 —19—17APR13

T133545 —UN—15SEP00

T133803 —UN—27SEP00

TX03679,00016DF -19-03JAN07-1/1

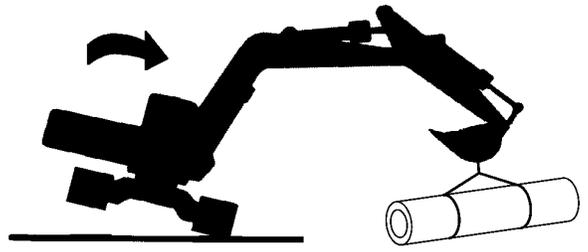
Use Special Care When Lifting Objects

Never use this machine to lift people.

Never lift a load above another person. Keep bystanders clear of all areas where a load might fall if it breaks free. Do not leave the seat when there is a raised load.

Do not exceed lift capacity limits posted on machine and in this manual. Extending heavy loads too far or swinging over undercarriage side may cause machine to tip over.

Use proper rigging to attach and stabilize loads. Be sure slings or chains have adequate capacity and are in good condition. Use tether lines to guide loads and prearranged hand signals to communicate with co-workers.



Use Special Care When Lifting Objects

T133839 —UN—27SEP00

TX03679,00016E1 -19-08JUL15-1/1

Add and Operate Attachments Safely

Always verify compatibility of attachments by contacting your authorized dealer. Adding unapproved attachments may affect machine stability or reliability and may 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.

TX03679,00016F0 -19-12FEB07-1/1

Safety—Maintenance Precautions

Park and Prepare for Service Safely

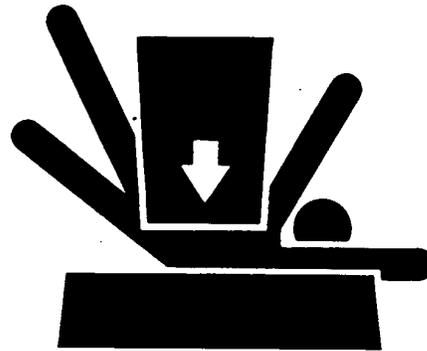
Warn others of service work. Always park and prepare your machine for service or repair properly.

- Park machine on a level surface and lower equipment and attachments to the ground.
- Place pilot shutoff lever in “lock” position. Stop engine and remove key.
- Attach a “Do Not Operate” tag in an obvious place in the operator’s station.

Securely support machine or attachment before working under it.

- Do not support machine with boom, arm, or other hydraulically actuated 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.

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



T133332—19—17APR13

TS229—UN—23AUG88

TX03679,00016E9 -19-03JAN07-1/1

Service Cooling System Safely

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

Shut off engine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.



TS281—UN—15APR13

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

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.



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

TS220—UN—15APR13

Make Welding Repairs Safely

IMPORTANT: Disable electrical power before welding. Turn off main battery switch or disconnect positive battery cable. Separate harness connectors to engine and vehicle microprocessors.

Avoid welding or heating near pressurized fluid lines. Flammable spray may result and cause severe burns if pressurized lines fail 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. Use a qualified welding technician for structural repairs.



Make sure there is good ventilation. Wear eye protection and protective equipment when welding.

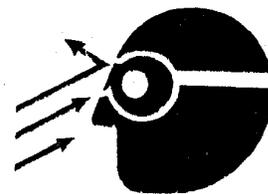
TX03679,00016D5 -19-25APR08-1/1

T133547—UN—15APR13

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 may dislodge chips at high velocity.

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



TX03679,0001745 -19-03JAN07-1/1

T133738—UN—15APR13

Safety—Safety Signs

Safety Signs

WARNING

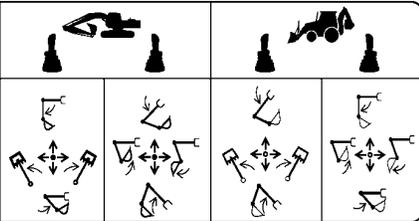
- AVOID SERIOUS CRUSHING INJURY FROM BOOM
- NEVER place any part of body beyond window bars or frame. It could be crushed by the boom if boom control lever is accidentally bumped or otherwise engaged.
- DO NOT remove window bars. If window is missing or broken, replace immediately.

T145668

CAUTION

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

T201519



DANGER



Serious injury or death can result from contact with electric lines. Never move any part of unit or load closer to electric line than 3M (10 FT.) plus twice the line insulator length.

CAUTION

- AVOID DEATH OR SERIOUS INJURY - READ AND UNDERSTAND THE OPERATOR'S MANUAL AND SAFETY MANUAL PRIOR TO OPERATING THIS MACHINE.
- Controls may be changed for attachment or operator preference. Try control pattern before operating.
- Always lower working tools to the ground and engage hydraulic control lockout lever before leaving operator's seat.
- Keep riders off machine.
- Avoid contact between boom/attachments and overhead obstacles whenever operating, traveling or transporting machine.
- Keep bystanders clear of machine, especially before moving boom, swinging upperstructure or traveling.
- Upperstructure position affects travel direction. Try pedals or levers to determine travel direction before moving machine.
- Avoid tipping - Do not lift or move objects that exceed machine stability.
- Avoid parking machine on an incline.

T152567

CAUTION

PRESSURIZED TANK CAP REMOVAL

1. Insert 4 mm Allen Wrench in base and turn to release locking pin.
2. Slowly turn cap counter clockwise a few degrees to relieve pressure. Pressure may suddenly cause cap to lift off tank.
3. To replace, align notches and turn clockwise.

T187710

DANGER



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

T147110

CAUTION

To prevent injury from the front window falling, lock window in place with the lock pin.

T187535

CAUTION

PRESSURIZED DO NOT OPEN HOT

Remove Slowly
15 P.S.I.
A1173610

WARNING

Operator may swing or reverse machine
STAY CLEAR

T10230

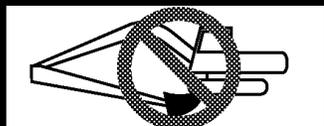
T188680

T188680 —19—26MAR03

TX14740.0000043 -19-27MAR03-1/1

Safety Signs Installed in Cab—Hydraulic Coupler—If Equipped

⚠ WARNING



CLEARANCE HAZARD!
COUPLER MOUNTED AND SOME DIRECT MOUNTED ATTACHMENTS COULD POSSIBLY CONTACT CAB OR BOOM. MAINTAIN CLEARANCE BETWEEN ATTACHMENT, CAB AND BOOM.

A57967

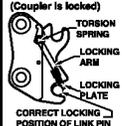
⚠ WARNING



CRUSH HAZARD!
Improperly locked attachment could release and cause serious injury or death. Do not operate attachment when supplemental lock is primary locking device.

- Release supplemental lock by going to full curl before picking up the attachment.
- Engage supplemental lock by moving toggle switch to lock position and extending bucket cylinder and holding until locking plate wedges under attachment pin. Uncurl the bucket.

Make sure locking plate is tight under attachment pin.
Supplemental lock must be engaged before using the coupler.



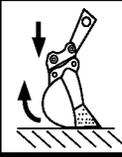
(Coupler is locked)
TORSION SPRING
LOCKING ARM
LOCKING PLATE
CORRECT LOCKING POSITION OF LINK PIN

A58270

⚠ WARNING



CRUSH HAZARD!
GROUND TEST REQUIRED!
BEFORE USING THE ATTACHMENT, PERFORM A GROUND TEST TO VERIFY IT IS PROPERLY LOCKED TO THE COUPLER. PLACE ATTACHMENT FLAT ON THE GROUND. WHILE APPLYING SLIGHT DOWN PRESSURE, TRY TO UNCURL THE ATTACHMENT. THE ATTACHMENT SHOULD STAY IN TIGHT CONTACT WITH THE COUPLER WITH LITTLE OR NO MOVEMENT.



A57965

⚠ WARNING



CRUSH HAZARD!
ATTACHMENT MAY DROP WITHOUT WARNING IF NOT PROPERLY ATTACHED. CONSULT OWNERS MANUAL FOR PROPER INSTALLATION PROCEDURES.

TO LOCK COUPLER	TO UNLOCK COUPLER
<p>1. Engage front hook on pin. LOCK UNLOCK</p> 	<p>1. Keep attachment close to ground. LOCK UNLOCK</p> 
<p>2. Rotate to full-curl position. Move switch to lock position. Hold in full-curl position for 5 seconds. LOCK UNLOCK</p> 	<p>2. Rotate coupler to full-curl position to release supplemental lock. LOCK UNLOCK</p> 
<p>3. Slowly uncurl coupler. Visually verify supplemental lock contacts locking plate. Visually verify lock plate is behind attachment pin. LOCK UNLOCK</p> 	<p>3. Move lock to unlock position. Hold in full-curl position for 5 seconds. LOCK UNLOCK</p> 
<p>4. Continue to slowly uncurl coupler. Verify attachment is properly locked. LOCK UNLOCK</p> 	<p>4. Slowly uncurl coupler. Attachment will release from hooks. LOCK UNLOCK</p> 

A58273

TX1025651

VD76477,000137C -19-11MAR11-1/1

TX1025651 — 19—03JUL07

Safety Signs Installed on Hydraulic Coupler—If Equipped

⚠ WARNING



CLEARANCE HAZARD!
COUPLER MOUNTED AND SOME DIRECT MOUNTED ATTACHMENTS COULD POSSIBLY CONTACT CAB OR BOOM. MAINTAIN CLEARANCE BETWEEN ATTACHMENT, CAB AND BOOM.

A5787

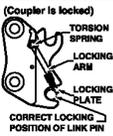
⚠ WARNING



CRUSH HAZARD!
Improperly locked attachment could release and cause serious injury or death. Do not operate attachment when supplemental lock is primary locking device.

- Release supplemental lock by going to full curl before picking up the attachment.
- Engage supplemental lock by moving toggle switch to lock position and extending bucket cylinder and holding until locking plate wedges under attachment pin. Uncurl the bucket.

Make sure locking plate is tight under attachment pin. Supplemental lock must be engaged before using the coupler.

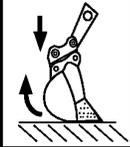


A58270

⚠ WARNING



CRUSH HAZARD!
GROUND TEST REQUIRED!
BEFORE USING THE ATTACHMENT, PERFORM A GROUND TEST TO VERIFY IT IS PROPERLY LOCKED TO THE COUPLER. PLACE ATTACHMENT FLAT ON THE GROUND. WHILE APPLYING SLIGHT DOWN PRESSURE, TRY TO UNCURL THE ATTACHMENT. THE ATTACHMENT SHOULD STAY IN TIGHT CONTACT WITH THE COUPLER WITH LITTLE OR NO MOVEMENT.



A57965

⚠ WARNING



CRUSH HAZARD!
ATTACHMENT MAY DROP WITHOUT WARNING IF NOT PROPERLY ATTACHED. CONSULT OWNERS MANUAL FOR PROPER INSTALLATION PROCEDURES.

TO LOCK COUPLER	TO UNLOCK COUPLER
<p>1. Engage front hook on pin. LOCK  UNLOCK </p> 	<p>1. Keep attachment close to ground. LOCK  UNLOCK </p> 
<p>2. Rotate to full-curl position. Move switch to lock position. Hold in full-curl position for 5 seconds. LOCK  UNLOCK </p> 	<p>2. Rotate coupler to full-curl position to release supplemental lock. LOCK  UNLOCK </p> 
<p>3. Slowly uncurl coupler. Visually verify supplemental lock contacts locking plate. Visually verify lock plate is behind attachment pin. LOCK  UNLOCK </p> 	<p>3. Move lock to unlock position. Hold in full-curl position for 5 seconds. LOCK  UNLOCK </p> 
<p>4. Continue to slowly uncurl coupler. Verify attachment is properly locked. LOCK  UNLOCK </p> 	<p>4. Slowly uncurl coupler. Attachment will release from hooks. LOCK  UNLOCK </p> 

A58273

TX1025651

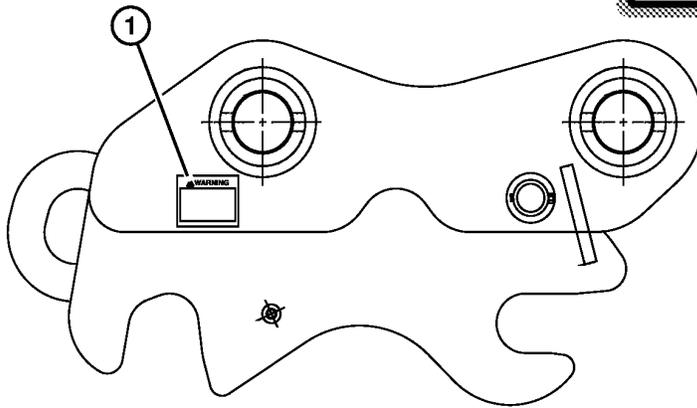
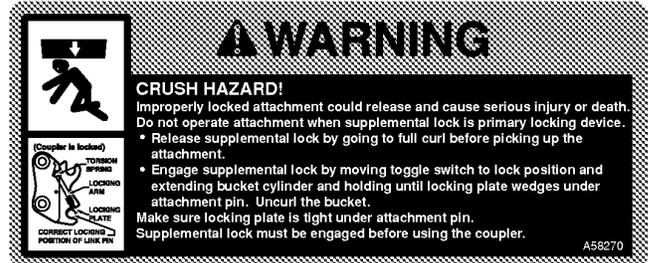
Safety Signs Installed in Cab—Hydraulic Coupler—If Equipped

Continued on next page

DW90712.0000457 -19-05JUN14-1/3

1. Install four warning decals to right window inside of cab next to electrical box.

DW90712,0000457 -19-05JUN14-2/3



TX1025652

Safety Label on Hydraulic Coupler

1—Warning Decal

2. Install warning decals (1) to both sides of hydraulic coupler as shown.

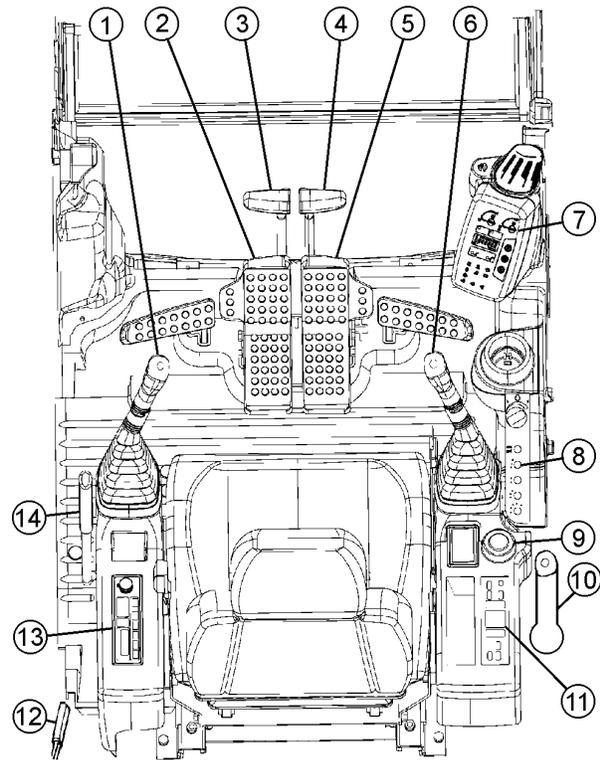
DW90712,0000457 -19-05JUN14-3/3

TX1025652—19—03JUL07

Operation—Operator's Station

Pedals, Levers, and Panels

- | | |
|---|---------------------------------------|
| 1— Left Control Lever/Horn Switch (on top of lever) | 8— Switch Panel |
| 2— Left Travel Pedal | 9— Key Switch |
| 3— Left Travel Lever | 10— Backfill Blade Lever—If Equipped |
| 4— Right Travel Lever | 11— Air Conditioner Panel—If Equipped |
| 5— Right Travel Pedal | 12— Cab Door Release Lever |
| 6— Right Control Lever | 13— Radio |
| 7— Monitor Panel | 14— Pilot Control Shutoff Lever |

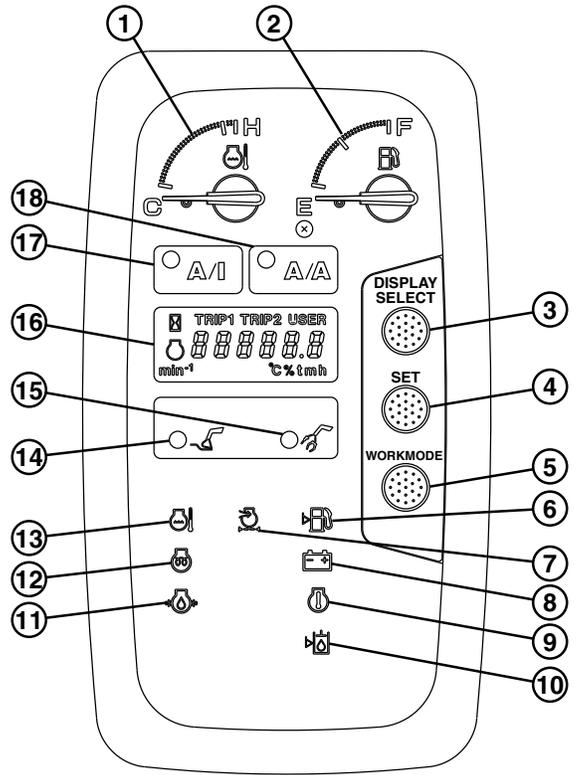


T150318 —UN—18JAN02

TX14740,0001E14 -19-23MAY07-1/1

Monitor Panel

- | | |
|-------------------------------------|--|
| 1— Engine Coolant Temperature Gauge | 10— Hydraulic Oil Filter Restriction Indicator—If Equipped |
| 2— Fuel Gauge | 11— Engine Oil Pressure Indicator |
| 3— Display Select Switch | 12— Pre-Heat Indicator (not used) |
| 4— Set Switch | 13— Engine Coolant Temperature Indicator |
| 5— Work Mode Switch | 14— Dig Mode Indicator |
| 6— Fuel Level Indicator | 15— Attachment Mode Indicator (not used) |
| 7— Air Filter Restriction Indicator | 16— Monitor Display |
| 8— Alternator Voltage Indicator | 17— Auto-Idle Indicator |
| 9— Check Engine Indicator | 18— Auto-Acceleration Indicator |



T188029—UN—31MAR03

TX14740,0001C8F -19-18MAY06-1/1

Monitor Panel Functions

1. Engine Coolant Temperature Gauge:

IMPORTANT: If needle points to "RED" zone, idle engine to bring back needle to "GREEN" zone before stopping engine. If needle continues to rise, stop engine.

2. Fuel Gauge: Fuel machine before needle reaches "E".

3. Display Select Switch: Press switch to display Hour Meter, Trip Meter 1 or Trip Meter 2 information in that order on the monitor display.

4. Set Switch: Press switch to change settings in Trip Meter 1 or Trip Meter 2.

5. Work Mode Switch: Press switch to select Dig Mode.

6. Fuel Level Indicator: Indicator will light when approximately 40 liters (10 gal) of fuel remain.

7. Air Filter Restriction Indicator: Indicator will light when the air filter elements are clogged.

8. Alternator Voltage Indicator: Indicator will light with no or low alternator output.

9. Check Engine Indicator: Indicator will flash when the engine derate reaches 50% due to the following conditions: Low fuel pressure, high fuel temperature, crank sensor fault, defective fuel injection pump ECU, or a failure in ECU to injection pump ECU communications.

10. Hydraulic Oil Filter Restriction indicator—If Equipped: Indicator will light when main hydraulic filter element is restricted.

11. Engine Oil Pressure Indicator:

IMPORTANT: If engine oil pressure light comes on while operating, stop engine immediately.

Indicator will light and buzzer will sound when engine oil pressure is low. Stop engine immediately.

NOTE: Cold oil, low oil level, or extreme off level operation may cause indicator to light.

12. Pre-Heat Indicator: Not used

13. Engine Coolant Temperature Indicator:

IMPORTANT: DO NOT stop engine when coolant temperature light comes on or temperature will rise further. Reduce load and run engine at slow idle for 15 seconds. If temperature light continues to stay ON, stop engine.

Indicator will light and buzzer will sound when engine coolant overheats. Reduce load immediately and run engine at slow idle for 15 seconds. Inspect for debris around radiator. Check coolant level in the radiator recovery tank.

14. Dig Mode Indicator: Indicator will light when Dig Mode is selected.

15. Attachment Mode Indicator: Not used.

16. Monitor Display: Displays Hour Meter, Trip Meter 1 and Trip Meter 2 information.

17. Auto-Idle Indicator: Indicator will light when the auto-idle/auto-acceleration switch is turned to the A/I or the A/A position. Indicator will flash when engine is started and either auto-idle or auto-acceleration mode is already activated.

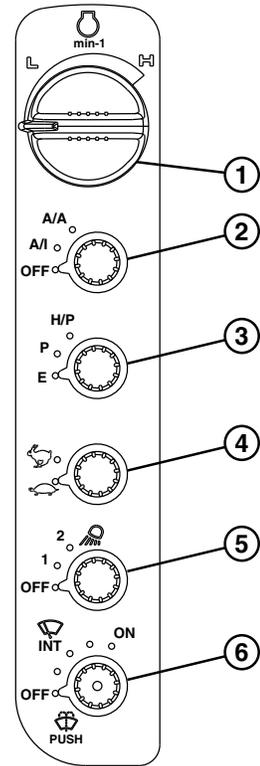
18. Auto-Acceleration Indicator: Indicator will light when the auto-idle/auto-acceleration switch is turned to the A/A position. Indicator will flash when engine is started and auto-acceleration mode is already activated.

TX14740,0001C91 -19-11MAY06-1/1

Front Switch Panel

- 1— Engine Speed Dial
- 2— Auto-Idle/Auto-Acceleration Switch
- 3— Power Mode Switch

- 4— Travel Speed Switch
- 5— Operating Lights Switch
- 6— Washer/Wiper Switch



TX14740,0001C90 -19-24JAN07-1/1

T136155 —UN—18DEC00

Front Switch Panel Functions

1. Engine Speed Dial: Turn dial clockwise to increase engine speed or counterclockwise to decrease engine speed.

2. Auto-Idle/Auto-Acceleration Switch: With engine on, move auto-idle/auto-acceleration switch to A/I. Auto-idle indicator will light when auto-idle is on.

The engine will run at the engine speed dial setting for 4 seconds after turning key switch ON. The auto-idle system will then slow the engine to auto-idle engine speed.

The auto-idle circuit automatically reduces engine speed after 4 seconds when control levers are placed in neutral position.

Engine speed increases to engine speed dial setting when any control lever is operated.

With engine on, move auto-idle/auto-acceleration switch to AA. Auto-acceleration indicator will light.

Engine rpm will change depending on speed dial setting and position of control levers. Typically used for grading operations.

Turn auto-idle/auto-acceleration switch OFF and set engine speed dial to improve machine control in difficult work areas, loading and unloading.

3. Power Mode Switch: Move switch to select engine speed mode.

H/P (High Power) Mode

Use H/P mode when extra horse power is needed for rolling in the arm in excavation work.

P Mode

Use P mode when general digging work is needed.

E (Economy) Mode

Use E mode to improve fuel efficiency and reduce noise level with a small difference in engine speed.

4. Travel Speed Switch: Turn switch to select fast or slow speed travel.

5. Operating Lights Switch: Turn switch to first position to turn on operating light. Monitor panel will also light.

Turn light switch to second position to turn on boom light, cab lights, and operating light. Monitor panel lights will go off.

6. Wiper Switch: Wiper switch has several positions:

OFF ... Wiper automatically stops operating and is retracted.

INT ... Wiper operates intermittently at the interval selected by the switch position.

ON ... Wiper operates continuously

NOTE: The wiper and washer do not operate unless the upper front window is completely closed. Alarm will sound if either washer or wiper is operated with the window open.

Washer Switch: Push and hold switch to squirt fluid on windshield. Do not hold down switch for more than 20 seconds.

TX14740,0001C92 -19-24JAN07-1/1

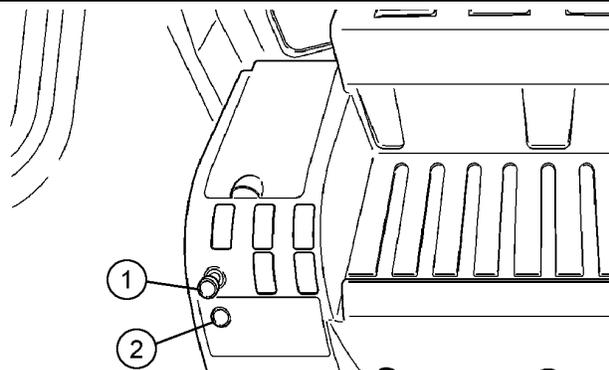
Rear Switch Panel

1. Lighter: For operator convenience. Can also be used as an electrical port for service and maintenance for 24-volt appliances.

2. Accessory Power Port: 12-volt, 5-amp electrical port provided for service and maintenance.

1—Lighter

2—Accessory Power Port



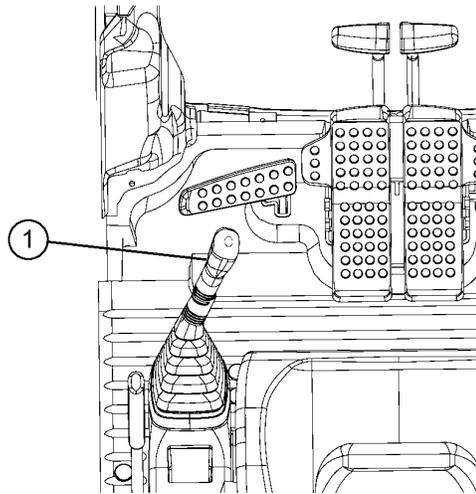
T146581—UN—11OCT01

TX14740,0001D8C -19-11OCT01-1/1

Horn

Horn switch (1) is located on top of left control lever.

1—Horn Switch



T140123—UN—20MAR01

TX14740,0001CEA -19-03JAN07-1/1

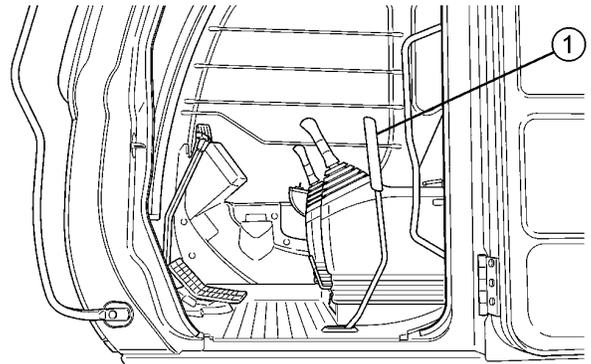
Pilot Control Shutoff Lever

The pilot control shutoff lever (1) shuts off hydraulic pilot pressure to all pilot control valves. When pilot control shutoff lever is in locked (back) position, the machine will not move if a lever or pedal is accidentally moved.

Always pull pilot control shutoff lever to locked position when you stop the engine or leave the operator's seat.

Push pilot control shutoff lever forward to unlocked position to operate machine.

1—Pilot Control Shutoff Lever



Lever In Locked Position

T136162—UN—18DEC00

TX14740,0001C93 -19-23MAY07-1/1

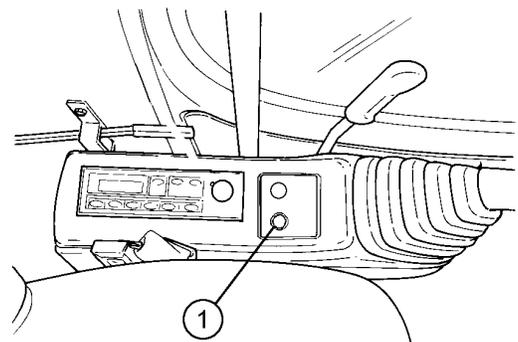
Travel Alarm and Travel Alarm Cancel Switch

The travel alarm sounds when a travel pedal or lever is activated and will continue as long as the tracks are moving. When travel motion stops, the travel alarm switch is reset.

After the initial 15 second alarm, alarm can be silenced by depressing the travel alarm cancel switch (1).

IMPORTANT: If alarm is not operating during normal transport, or if alarm sounds when engine is running and machine is stationary see your authorized dealer.

1—Travel Alarm Cancel Switch



T140078—UN—20MAR01

TX14740,0001CE9 -19-11MAY06-1/1

Cab Heater and Air Conditioner

1. Blower OFF Switch: Press OFF switch to turn blower off. When blower OFF switch is pressed, all displays on the monitor display will disappear and the blower will stop in both the auto and manual modes.

2. Blower Fan Speed Switches: Press blower switches to select desired blower fan speed. Selected fan speed will be displayed on the bottom of the monitor display.

3. Monitor Display: Displays blower fan speed, selected air vent, and temperature setting.

4. Temperature Control Switches: Press switches to set temperature. The temperature will be displayed on the center of the monitor display. Press both "A" and "V" switches at the same time and hold for 5 seconds to change the temperature mode (Centigrade—Fahrenheit).

5. Mode Switch: Press to select desired air vent. Selected air vent is displayed on the top of the monitor display.

6. AUTO A/C Switch: Press AUTO switch to turn AUTO and A/C indicators on. Air flow-in temperature at the vent, blower speed, vent locations and fresh air port are automatically controlled. Press AUTO switch again to turn off indicator light and select manual mode. Air flow-in temperature at the vent, blower speed, vent locations and fresh air port can be manually selected.

7. A/C Switch: Air conditioner will turn on when A/C switch is pressed and fan display of the blower switch is on. A/C indicator will also light.

8. Fresh Air Mode Switch: Press fresh air mode switch to open fresh air vent and route outside air into the cab. Indicator will also light.

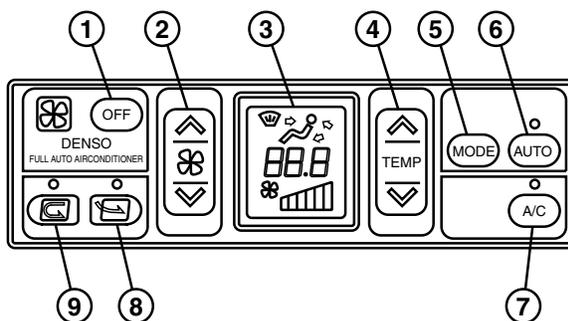
9. Recirculating Mode Switch: Press recirculating mode switch to close fresh air vent and circulate air already in cab. Indicator will also light.

Cab Heater Operation

1. Press AUTO switch , **or press AUTO switch again and:**
2. Press temperature control switch to set temperature.
3. Press mode switch for desired vent air flow.
4. Press blower switch to select desired blower speed.
5. Press fresh air mode switch to maintain the air vent in the fresh air circulation mode.
6. Press recirculating mode switch to maintain the air suction port in the circulation mode.
7. Press temperature control switches and blower switches to adjust cab temperature

Air Conditioner Operation

1. Press AUTO switch. The AUTO and A/C indicators will light, **or press AUTO switch again and:**



- | | |
|---|------------------------------|
| 1— Blower OFF Switch | 6— AUTO A/C Switch |
| 2— Blower Fan Speed Switches | 7— A/C Switch |
| 3— Monitor Display | 8— Fresh Air Mode Switch |
| 4— Temperature Control Switches | 9— Recirculating Mode Switch |
| 5— Mode Switch (air flow to front and rear vents, and defroster vent) | |

2. Press temperature control switch to set temperature.
3. Press mode switch for desired vent air flow.
4. Press blower switch to select desired blower speed.
5. Press fresh air mode switch to maintain the air vent in the fresh air circulation mode.
6. Press recirculating mode switch to maintain the air suction port in the circulation mode.
7. Press temperature control switches and blower switches to adjust cab temperature

Defroster Operation

1. Press AUTO switch. Temperature controlled air blows out, **or press AUTO switch again and:**
2. Press temperature control switch to set temperature.
3. Press fresh air vent switch to select fresh air circulation mode.
4. Press mode switch to select the front vents or the front and rear vents.
5. Adjust the louvers on front vent and defroster vent to control air flow direction.
6. Press temperature control switches and blower switches to adjust cab temperature.
7. Press A/C switch on if windows become clouded or if dehumidifying is required.

Continued on next page

TX14740,0001CEB -19-29JUN06-1/2

Cab Heater and Air Conditioner Monitor Display Diagnostic Function

Press both “^” and “v” temperature control switches at the same time and hold for 3 seconds with the blower fan turned OFF to display the operating conditions of the sensors and dampers as shown below.

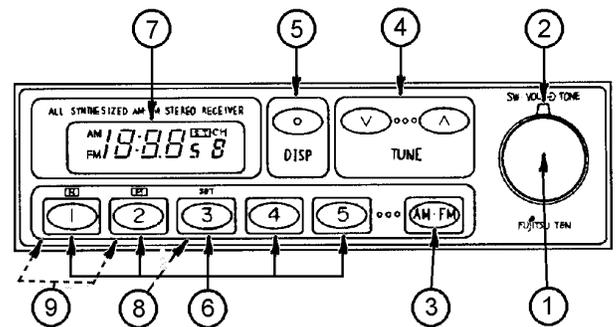
NOTE: In case more than one fault is detected, press either “^” or “v” switch to display the fault code on the monitor display in order.

If any fault codes are detected through diagnoses, see your authorized dealer.

Monitor Display	
Code Displayed	Fault
E—	No fault
E11	Broken recirculation air sensor
E12	Short-circuited recirculation air sensor
E13	Broken fresh air sensor
E14	Short-circuited fresh air sensor
E15	Broken coolant temperature sensor
E16	Short-circuited coolant temperature sensor
E18	Short-circuited insolation sensor
E21	Broken air vent sensor
E22	Short-circuited air vent sensor
E43	Abnormal air vent damper
E44	Abnormal air mix damper
E45	Abnormal recirculation and fresh air damper
E51	Abnormal refrigerant pressure

Operating AM/FM Radio

Press power switch (1) to turn radio on, and repeatedly press one of tuning switches (4) until desired station is reached. To preset a station, select the desired station using tuning switches. Press and hold station preset (6) for more than 2 seconds until an electronic tone is heard. The frequency of the preset station will be indicated on digital display (7).



Setting The Clock

NOTE: In order to set the clock, digital display (7) must be in the time display mode.

While pressing display mode change switch (5) use time set switches (9) and set switch (8) to set the clock.

Press set switch (8) to reset the minute display to “00.”

Press time set switch labeled 1 to set correct hour.

Press time set switch labeled 2 to set correct minute.

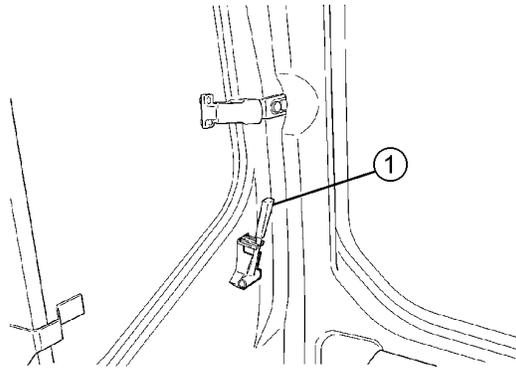
- 1— Power Switch/Volume Control Knob
- 2— Tone Adjustment Ring
- 3— AM/FM Switch
- 4— Tuning Switches
- 5— Display Mode Change Switch

- 6— Station Presets
- 7— Digital Display
- 8— Set Switch
- 9— Time Set Switches

Secondary Exit Tool

IMPORTANT: FOR SECONDARY EXIT. Use tool (1) to break window. Always keep tool in machine.

1—Secondary Exit Tool



T137043—UN—08JAN01

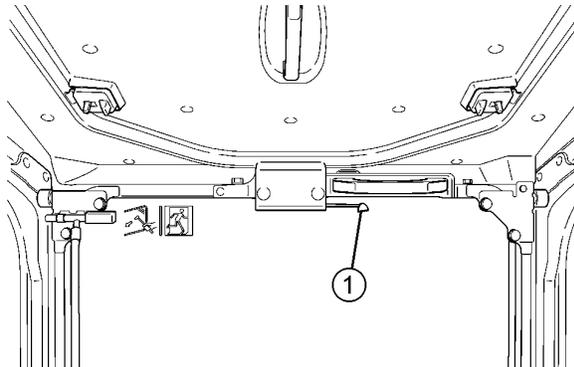
TX14740,0001C99 -19-08JAN01-1/1

Opening Upper Front (Secondary Exit) Window

NOTE: The washer and wiper cannot operate with the upper front window opened.

1. Press lock release lever (1).

1—Lock Release Lever



T136284—UN—18DEC00

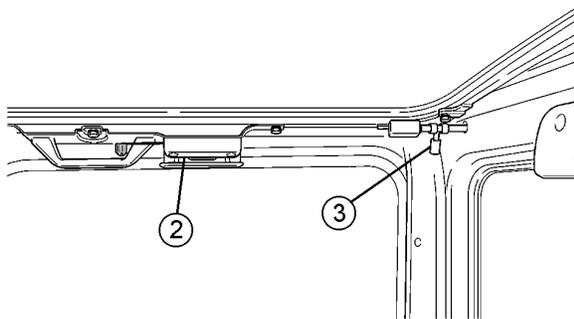
TX14740,0001C96 -19-08JAN01-1/2

2. While holding the upper and lower handles on the window, pull window up and back until it catches in auto lock (2) for convenient storage overhead.

CAUTION: Prevent possible injury from window closing. **DO NOT** rely on auto lock alone to hold the window in the up position. Always lock the pin in the cab frame boss hole.

3. Slide the lock pin (3) into the cab frame boss hole and turn to lock.

CAUTION: Prevent possible injury from window closing. Upper front window comes down very forcefully. Close window only when sitting on operator's seat. Guide window down slowly.



2—Auto Lock

3—Lock Pin

T136265—UN—18DEC00

TX14740,0001C96 -19-08JAN01-2/2

Removing And Storing Lower Front Window

NOTE: Upper front window must be raised before lower front window can be removed.

1. While pulling in on window, raise window to remove.



T136266—UN—18DEC00

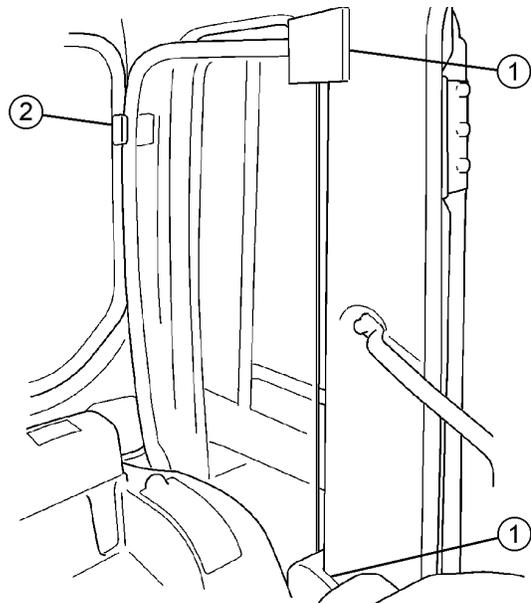
TX14740,0001C97 -19-27FEB02-1/2

2. Store window in rear-left storage area of cab. Install in protectors (1 and 2) as shown.

NOTE: In cold weather some operators may choose to work with the top glass open and the bottom glass in place. This provides excellent visibility and tends to hold the heat being circulated around the operator's feet.

1— Protector

2— Protector



T136267—UN—18DEC00

TX14740,0001C97 -19-27FEB02-2/2

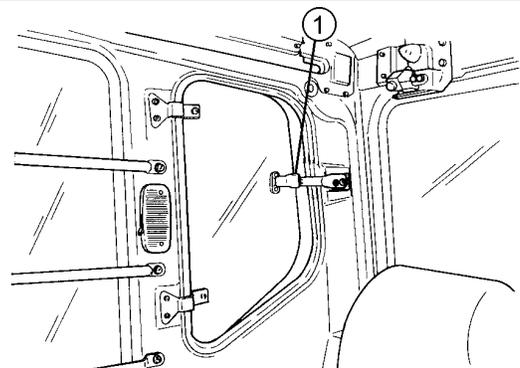
Opening Side Windows

CAUTION: Avoid serious crushing injury from boom. Never place any part of body beyond window bar or frame. It could be crushed by the boom if boom control lever is accidentally bumped or otherwise engaged.

DO NOT remove window bars. If window or bars are missing or broken, replace immediately.

Both right side window and cab door window can be opened.

1. Right-rear side window: Unlock the latch (1). Push joint part of latch to open window.
2. Cab door window: Slide front pane to the rear and rear pane to the front.



1— Latch

T136268—UN—18DEC00

TX14740,0001C98 -19-08JAN01-1/1

Opening And Closing Roof Exit Cover

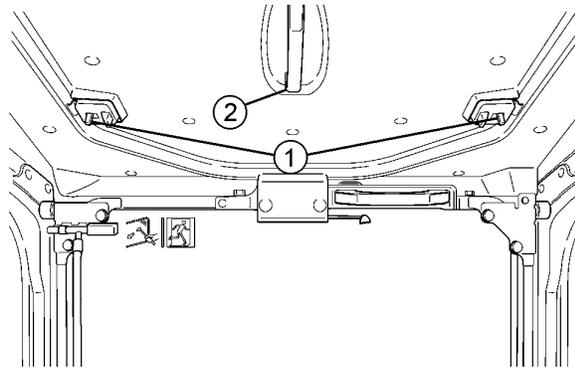
Opening:

1. Move lock levers (1) toward center of roof exit.
2. Push on handle (2) to open roof exit cover.

Closing:

Hold handle and pull window down until levers lock in position.

IMPORTANT: To maintain the impact resistance of the roof hatch, the following replacement guidelines are recommended. Replace the hatch if it has been impacted by fallen objects, or if there is visible damage, or if the transparent hatch has been in service for 5 years or more.



1— Lock Lever

2— Handle

T136270—UN—18DEC00

TX14740,0001C9A -19-20OCT04-1/1

Adjusting Operator Seat

Push down lever (1) while sitting or while pulling up on seat while standing to obtain desired height. Release lever. Push down lever while sitting on seat to adjust seat to desired angle. Release lever.

Pull up handle (2) to unlock seat. Slide seat to desired distance from control levers. Release handle.

Turn knob (3) to adjust seat to weight of operator.

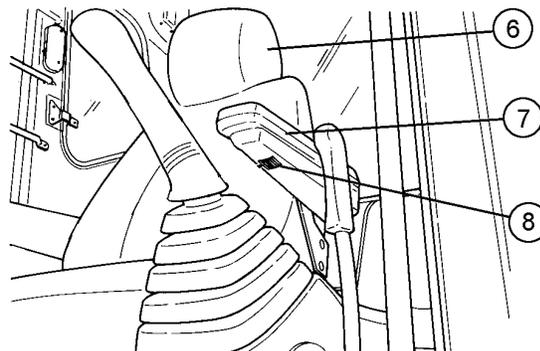
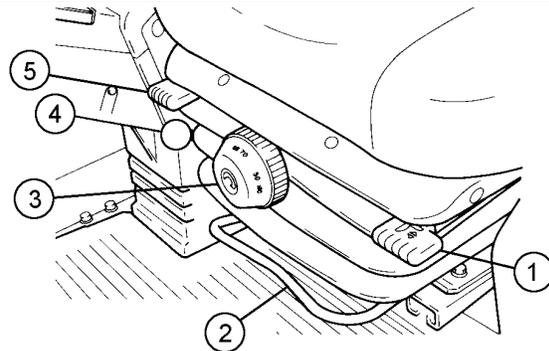
Squeeze ball (4) to add air for lumbar firmness. Press button next to ball to release air.

Pull up lever (5) to release backrest lock. Move backrest to desired position. Release lever.

Pull headrest (6) upward or push downward to desired height. Move headrest to desired angle.

Pull up on armrest (7) to move armrest out of way when exiting.

Turn dial (8) to adjust angle of armrest.



- | | |
|-------------------------------------|------------------------------|
| 1— Seat Height And Angle Adjustment | 5— Backrest Adjustment |
| 2— Seat Fore-Aft Adjustment Handle | 6— Headrest Height And Angle |
| 3— Weight Adjustment Knob | 7— Armrest |
| 4— Lumbar Adjustment Ball | 8— Armrest Dial |

T140132—UN—02MAY01

T140133—UN—02MAY01

TX14740,0001CEC -19-19MAR01-1/1

Operation—Operating the Machine

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.



Reading Operator's Manual

T133566 —UN—24AUG00

TX03679,0001780 -19-23APR15-1/1

Operator's Daily Machine Check Before Starting

Safety and Protective Devices Checks

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

Check condition of guards, shields, and covers

Overall Machine Checks

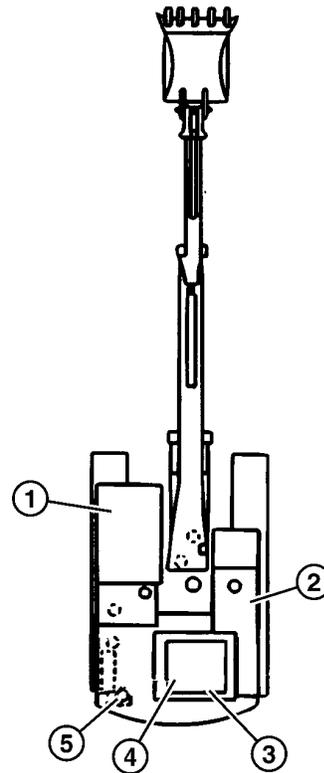
Check for worn or frayed electrical wires and loose or corroded connections.

Check for bent, broken, loose, or missing boom, bucket, sheet metal, track parts.

Check for loose or missing hardware

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

- | | |
|--|---|
| 1— Check Pedal And Lever Movement/Clean Out Cab Debris | 4— Check/Clean Radiator And Oil Cooler Outer Fins |
| 2— Check Hydraulic Oil Level | 5— Check Coolant Recovery Tank Level |
| 3— Check Engine Oil Level | |



T151954 —UN—26FEB02

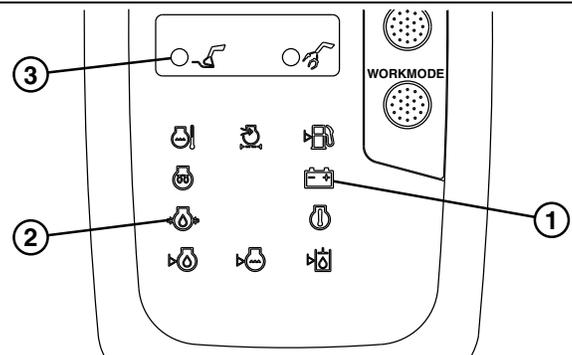
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Starting Engine

Before Starting the Engine

Turn key switch to ON position. All indicator lights will stay on for 3 seconds then go off except for alternator voltage indicator (1), engine oil pressure indicator (2), and dig mode indicator (3) which will continue to stay on.

- | | |
|----------------------------------|-----------------------|
| 1— Alternator Voltage Indicator | 3— Dig Mode Indicator |
| 2— Engine Oil Pressure Indicator | |



T150322 —UN—18JAN02

Continued on next page

TX14740,0001D3C -19-23MAY07-1/2

Starting the Engine

1. Move engine speed dial (1) to slow idle position.
2. Sound horn to alert persons nearby.

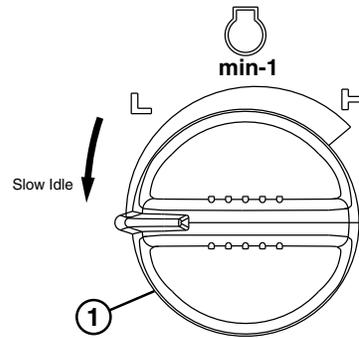
IMPORTANT: Prevent starter damage. Never operate starter for more than 20 seconds at a time. If engine fails to start, return key switch to OFF. Wait for about 2 minutes, then try again. After a false start, DO NOT turn key switch until engine stops.

3. Turn key switch to START. (All indicator lights will stay on for approximately 3 seconds). Release key; switch will return to ON position.

After Starting Check

IMPORTANT: Prevent possible damage to engine. If indicator lights do not go out after starting engine, IMMEDIATELY STOP THE ENGINE. Find and correct the problem.

After the engine is started, the indicator lights should go out. If they do not, stop the engine immediately. Find and correct the problem.



1— Engine Speed Dial

Warming the Engine

1. Run engine at 1/3 speed for 30 seconds. Do not run engine at fast or slow idle. Do not accelerate rapidly during warm-up.
2. Operate machine at less-than-normal loads and speeds until engine is at normal operating temperature.

T136300—UN—24.JAN01

TX14740,0001D3C -19-23MAY07-2/2

Cold Weather Warm-Up

⚠ CAUTION: Prevent possible injury from unexpected machine movement. If hydraulic oil is cold, hydraulic functions move slowly. DO NOT attempt normal machine operation until hydraulic functions move at close-to-normal cycle times.

In extremely cold conditions, an extended warm-up period will be necessary. Under such conditions, the radiator and oil cooler should be covered to maintain correct operating temperature.

Avoid sudden operation of all functions until the engine and hydraulic oil are thoroughly warm.

1. Run engine at 1/2 speed for 5 minutes. Do not run at fast or slow idle.

⚠ CAUTION: Prevent possible injury from unexpected machine movement. Clear the area of all persons before running your machine through the warm-up procedure. If machine is inside a building, warm the travel circuit first and move the machine to a clear area outside. Cold oil will cause machine functions to respond slowly.

2. Exercise travel and swing functions slowly, initially moving only short distances.
3. Operate boom, arm, and bucket functions by moving cylinders a short distance each direction for the first time.
4. Continue cycling cylinders by increasing the travel each cycle until full stroke is obtained.

5. Swing upperstructure so boom is perpendicular to tracks.

⚠ CAUTION: Prevent possible injury from machine sliding backwards. Keep angle between boom and arm 90—110°.

6. Keeping the angle between boom and arm 90—110°, fully actuate bucket close function (cylinder extend) and lower bucket to raise track off ground.

IMPORTANT: Holding function actuated for more than 10 seconds can cause damage from hot spots in the control valve.

7. While rotating raised track in forward direction, actuate bucket curl function (cylinder extend) for 10 seconds and release for 5 seconds for a period of 2-1/2 minutes.
8. Repeat procedure with track rotating in reverse direction.
9. Lower machine to ground.
10. Repeat steps 5—9 on opposite track.
11. Operate all hydraulic functions to distribute warm oil in all cylinders, motors, and lines.
12. If hydraulic functions still move slowly, repeat steps 6 and 7.

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Travel Pedals and Levers

CAUTION: Keep bystanders clear of machine when traveling.

Keep bystanders clear of machine when traveling.

The instructions below apply when the travel motors (4) are to the rear of the machine. If the travel motors are to the front of the machine, the machine moves **OPPOSITE** to the direction described.

FORWARD TRAVEL: Push down on front (1) of both pedals or push both levers forward (1).

REVERSE TRAVEL: Push down on rear (2) of both pedals or pull both levers rearward (2).

NEUTRAL POSITION (3): Travel brakes will automatically stop and hold the machine.

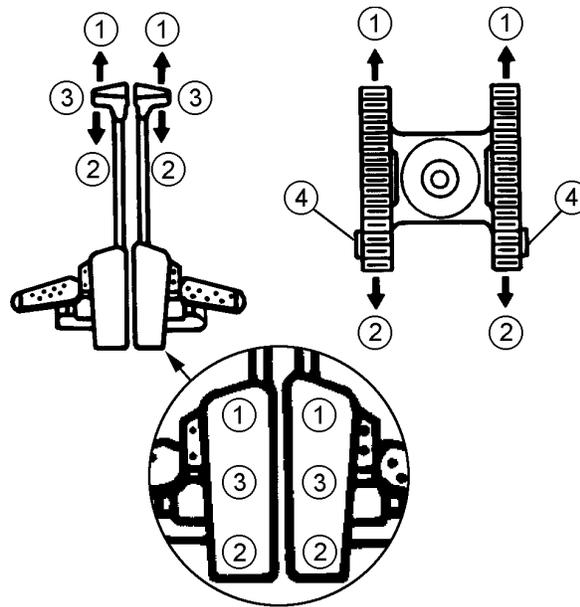
RIGHT TURN: Push down on front of left pedal or push left lever forward.

LEFT TURN: Push down on front of right pedal or push right lever forward.

SHORT TURN (COUNTER-ROTATE): Push down the front of one pedal and the rear of the other or push one lever forward and pull the other rearward.

CAUTION: Prevent possible injury from machine tipping. Operate control pedals or levers slowly when traveling down a slope.

TRAVELING DOWN A SLOPE: Operate control pedals or levers slowly when traveling down a slope.



1— Forward Travel
2— Reverse Travel

3— Neutral Position
4— Travel Motors

COLD WEATHER OPERATION: Travel pedal and lever dampers are provided for smooth control. In extremely cold weather, pedal or lever effort will increase. Operate pedals or levers several times with pilot control shutoff lever in locked position.

T137492—JN—25JAN01

TX14740,0001C3B -19-17JAN07-1/1

Locking the Hydraulic Coupler to the Attachment

CAUTION: Make sure hydraulic coupler is attached correctly to attachment. The supplemental lock can be engaged with the attachment in an incorrect lock position. A visual check is required each time the lock operation is performed. Failure to do so could result in serious injury or death.

CAUTION: Attaching the bucket in a reverse orientation on the hydraulic coupler is not recommended. When installed in the reverse orientation, the bucket or the lift hook interferes with the arm of the excavator when the bucket is in full curl position by extending the bucket cylinder. This is an inherent part of the design of the original equipment.

Since the hydraulic coupler interacts with the arm at full curl position to unlock the supplemental lock, the hydraulic coupler will **NOT** operate properly when the bucket is attached in reverse orientation.

NOTE: A safety buzzer will sound to alert personnel the lock/unlock function has been activated.

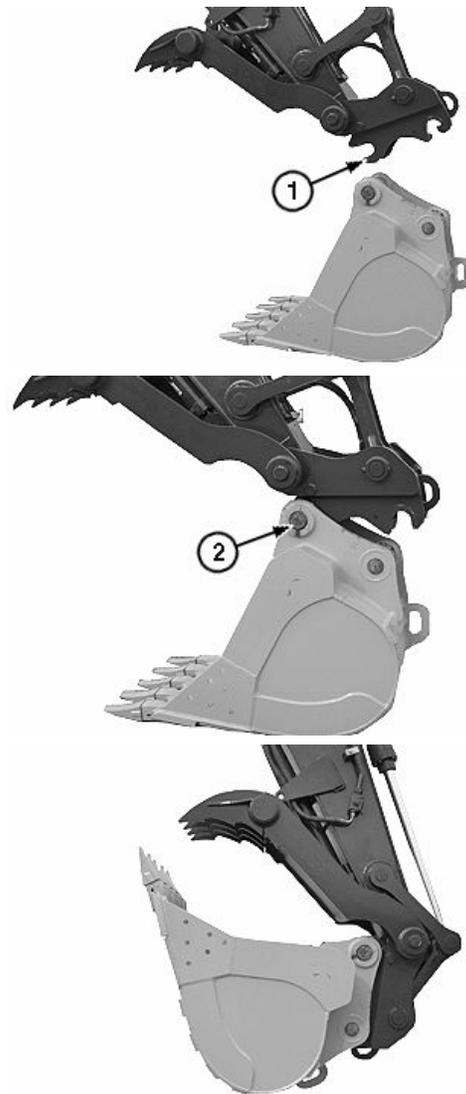
1. Engage front hook (1) on pin (2). Toggle switch on control box should be in UNLOCK position.

NOTE: The hydraulic coupler must be held over relief in order to lock/unlock the hydraulic coupler cylinder.

2. Rotate to full-curl position. Move toggle switch to LOCK position. Hold in full-curl position for 5 seconds.
3. Slowly uncurl hydraulic coupler. Visually verify supplemental lock contacts locking plate. Visually verify lock plate is behind attachment pin. Toggle switch on the control box should be in the LOCK position.

NOTE: Do not operate attachment when the supplemental lock is used as the primary locking device. Doing so could result in hydraulic coupler failure.

4. Continue to slowly uncurl hydraulic coupler. Verify attachment is properly locked. Toggle switch on the control box should be in LOCK position.



Bucket Rotated to Full-Curl Position

1— Front Hook

2— Pin

TX1017664A —UN—17JAN07

TX1017662A —UN—17JAN07

TX1017663A —UN—17JAN07

DW90712,0000450 -19-27JUN07-1/1

Unlocking the Hydraulic Coupler From the Attachment

1. Keep attachment close to ground. Toggle switch should be in LOCK position.

NOTE: The hydraulic coupler must be held over relief in order to unlock the hydraulic coupler cylinder.

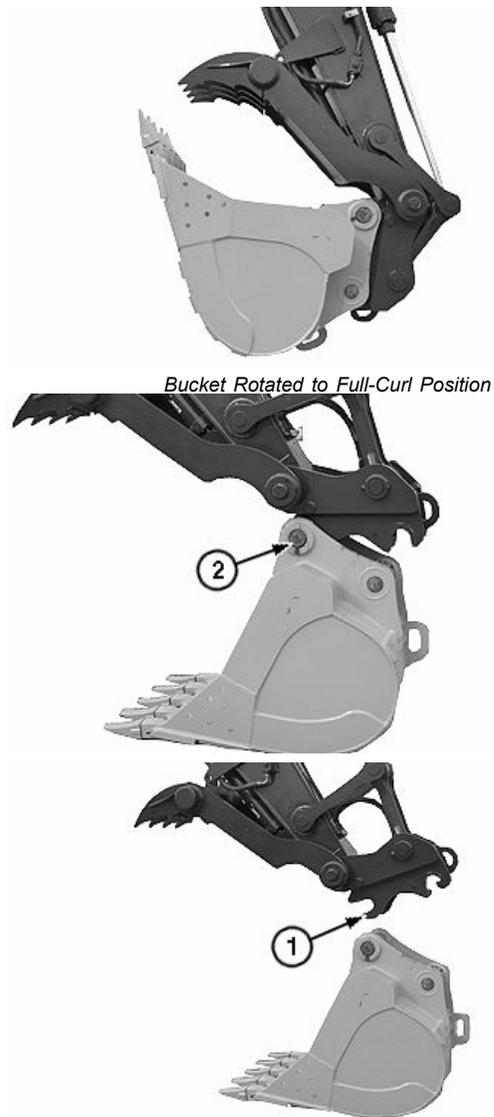
2. Rotate hydraulic coupler to full-curl position to release supplemental lock. Toggle switch should be in LOCK position.

NOTE: A safety buzzer will sound to alert personnel the unlock function has been activated.

3. Move toggle switch to UNLOCK position. Hold in full-curl position for 5 seconds.
4. Slowly uncurl hydraulic coupler. Front hook (1) will release from pin (2). Toggle switch should be in UNLOCK position.

1—Front Hook

2—Pin



TX1017663A—UN—17JAN07

TX1017662A—UN—17JAN07

TX1017664A—UN—17JAN07

DW90712,0000451 -19-27JUN07-1/1

Control Lever Pattern Operation

CAUTION: Never place any part of body beyond window frame to avoid serious crushing injury from boom. Boom could lower if the control lever is accidentally bumped or otherwise engaged. Immediately replace a missing or broken window.

Never place any part of the body beyond the window frame. Replace missing or broken windows immediately.

CAUTION: Prevent injury from unexpected control lever function. Be aware of the control lever pattern used on the machine before operating.

The machine comes equipped from the factory with the excavator control lever pattern and has the corresponding black-on-white labels installed on the left and right control consoles.

When changed to the backhoe control lever pattern the corresponding black-on-yellow labels must be installed on the left and right control consoles.

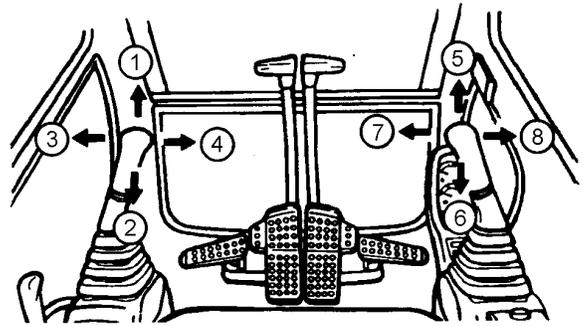
Check the pattern on the labels and then carefully operate the machine to verify that the correct labels are installed.

See Control Lever Pattern Conversion. (See procedure in this section.)

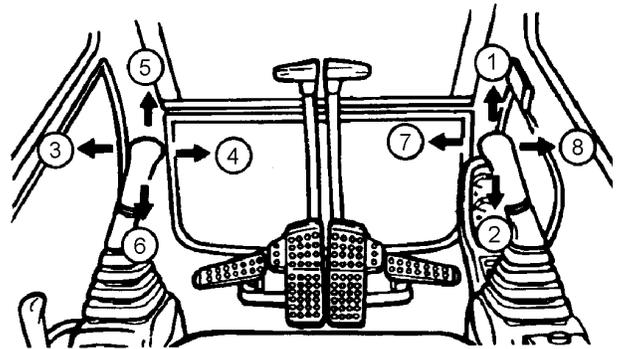
NOTE: A Control Pattern Selector Kit is available through parts, that when installed, changes the control lever pattern using a solenoid valve.

Control levers return to neutral when released. Functions will stop and remain positioned. Also the parking brake for swing and travel will engage.

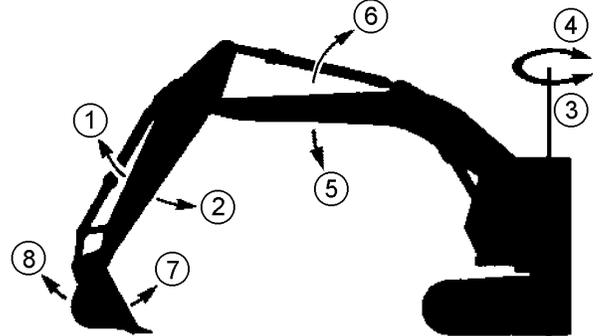
- | | |
|----------------|----------------|
| 1— Arm Out | 5— Boom Down |
| 2— Arm In | 6— Boom Up |
| 3— Swing Left | 7— Bucket Load |
| 4— Swing Right | 8— Bucket Dump |



Excavator Control Lever Pattern



Backhoe Control Lever Pattern



Boom, Arm, Bucket Movement

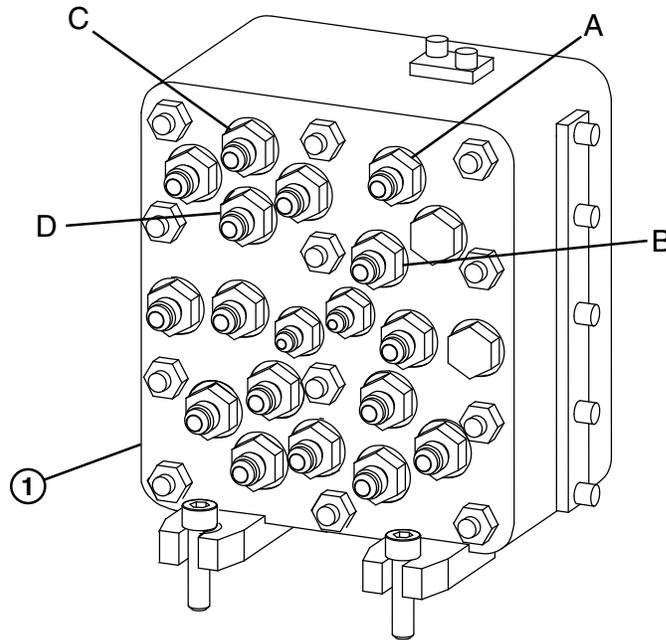
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T137500—UN—25JAN01

T137498—UN—25JAN01

T137499—UN—25JAN01

Control Lever Pattern Conversion



T144944

1—Pilot Signal Manifold

A—Port A
B—Port B

C—Port C
D—Port D

1. Lower bucket to the ground.
2. Stop the engine. Remove the key from switch.

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. **SLOWLY** loosen hydraulic cap to relieve air pressure.

3. **SLOWLY** loosen hydraulic cap to relieve air pressure. (See Check Hydraulic Oil Level in section 3-4.)
4. Remove panel on top of machine to access pilot signal manifold.

NOTE: DO NOT use manufacturer's hose tags or markings on hose ends to identify hoses for this conversion procedure. The conversion must be done on the side of flow regulator valve that is connected to the pilot controllers.

5. Disconnect and connect hoses on the pilot controller side (FRONT) of the pilot signal manifold as follows:

- Switch hose to Port A (A) with hose to Port D (D).

- Switch hose to Port B (B) with hose to Port C (C).

Port designations (letters) are on the pilot signal manifold next to the ports.

CAUTION: Prevent injury from unexpected control lever function. Install new labels on control consoles.

6. When changing to the backhoe control lever pattern, remove the old labels and install the black-on-yellow labels on the left and right control consoles near base of control levers. Labels are enclosed in Operator Manual package.

When changing to the excavator control lever pattern, remove the old labels and install the black-on-white labels on the left and right control consoles.

Additional labels can be purchased from your authorized dealer.

A control pattern selector kit is available through service parts. When installed, it changes the control lever pattern using a solenoid valve.

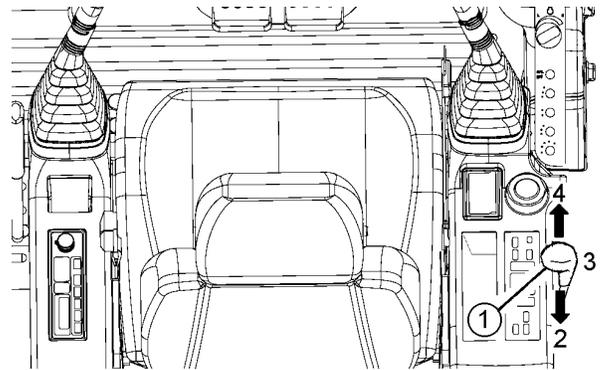
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T144944 — UN—30AUG01

Operating Backfill Blade—If Equipped

When the lever is released, it automatically returns to neutral, keeping the blade in position until the lever is moved again.

- 1— Blade Lever
- 2— Blade Raise
- 3— Neutral
- 4— Blade Lower



T152023 —UN—27FEB02

TX14740,0001E5C -19-27FEB02-1/1

Operating Tips—Backfill Blade

- Use blade only for moving loose material and for backfilling.

- Load the blade evenly.
- Do not use blade to dig.
- Do not run the machine into a load.
- Do not use the blade to stabilize machine.

TX,35,DH5943 -19-07SEP06-1/1

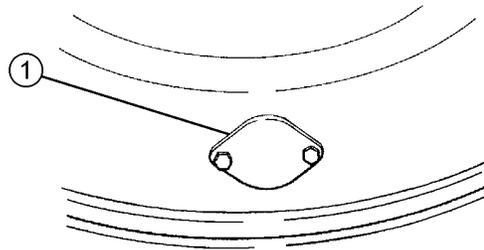
Operating In Water and Mud

Be careful not to operate the machine in water or mud above the upper deck surface of the undercarriage, causing the swing bearing and rotary manifold to be submerged.

If the swing bearing and rotary manifold are submerged, remove cover from underneath center of machine. Remove drain plug (1) to drain water and mud.

Clean swing gear area. Install plug and cover. Grease swing gear and swing bearing.

- 1— Drain Plug



T136459 —UN—18DEC00

TX14740,0001CAF -19-15MAR07-1/1

Driving Up a Steep or Slippery Slope

CAUTION: Prevent possible injury from machine rollover. Use this technique only on a short slope. Machine depends on support of boom/arm/bucket during entire procedure until machine reaches top of slope. Repositioning the bucket during this procedure is NOT recommended. DO NOT swing upperstructure during this procedure. DO NOT reposition bucket during this procedure.

1. Wear seat belt.

2. Position undercarriage so travel motors will be on uphill end of machine.
3. Push bucket into the ground.
4. When boom is on uphill end of machine: Pull machine using boom and arm cylinder to help travel motors.

When boom is on downhill end of machine: Push machine using boom and arm cylinder to help travel motors.

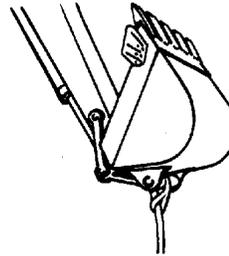
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Lifting

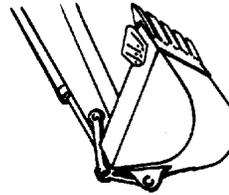
CAUTION: Lifting requires special care. Observe these rules when lifting with the machine:

- Never use machine to lift people
- Do not exceed lift capacity limits
- Keep everyone clear of raised loads
- Never attach sling or chain to bucket teeth
- Use tether lines to guide loads
- Use hand signals to communicate with others

1. Use proper rigging to attach and stabilize loads.
2. Without bucket loop: Curl bucket and retract arm. Fasten sling or chain to bucket pivot pin.
With bucket loop: Curl bucket and retract arm. Fasten sling or chain to bucket loop.
3. Check stability by carefully doing a trial lift:
 - Raise load just off of ground
 - Swing load all the way to one side
 - Move load slowly away from machine
 - Lower load immediately if machine is not stable



Without Bucket Loop



With Bucket Loop

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T135070—JUN—02NOV00

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Lower Boom With Engine Stopped

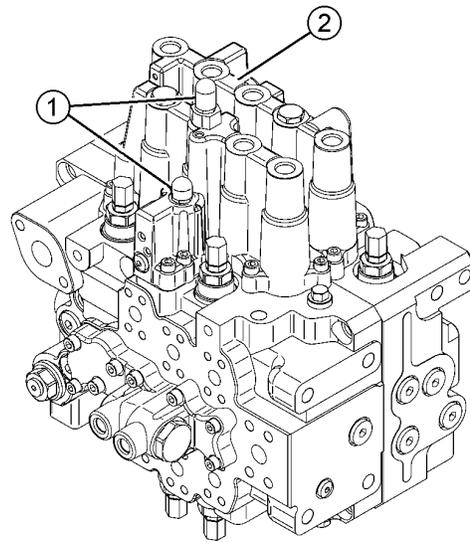
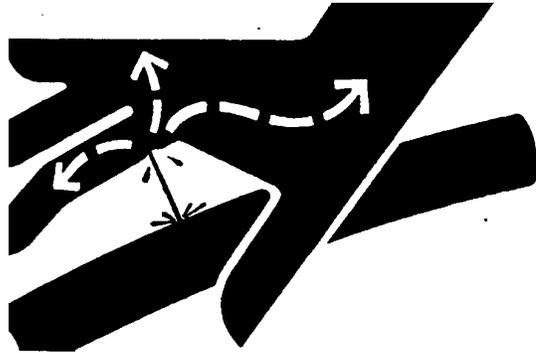
When an engine stops during operation, the boom cannot be lowered using the pilot controller because there is no pilot pressure oil to move the boom valve spool.

⚠ CAUTION: Prevent possible injury from unexpected machine movement. Clear all persons from the area before lowering the boom with the engine stopped.

1. Lift control valve access door.
2. Remove rubber caps (1) from the boom I section (2).

1— Rubber Caps

2— Boom 1 Section



X8811 —UN—23AUG88

T149405 —UN—15JAN02

Continued on next page

TX14740,0001E12 -19-16JAN02-1/2

- Turn nut (8) counterclockwise to remove.

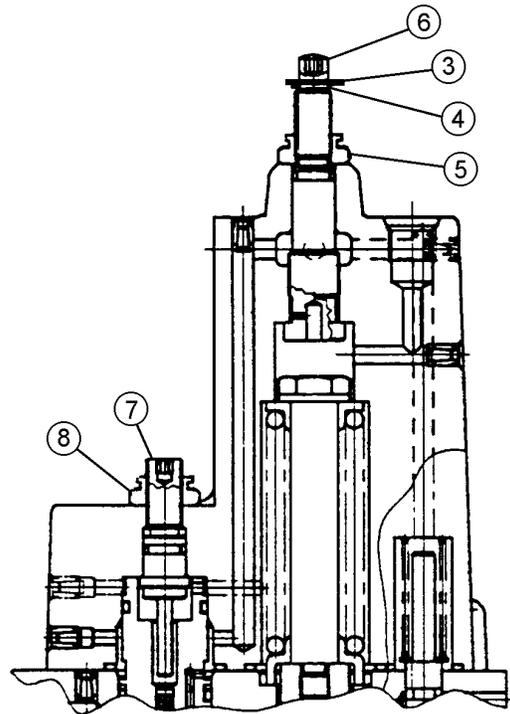
IMPORTANT: Work on socket-head screw (7) before working on socket-head screw (6).

- Turn socket-head screw (7) clockwise to the stop.
- Turn nut (5) counterclockwise to loosen.
- Turn socket-head screw (6) clockwise, while closely watching the boom lower. Adjust the boom lowering speed as required.
- After the bucket is lowered to the ground, turn screws (6) and (7) counterclockwise to the stops. **DO NOT** remove snap ring (3) and washer (4).
- Turn screw (7) clockwise 1/8 of a turn to loosen.
- Tighten lock nuts (5) and (8)
- Install rubber caps.

Specification

Nut (5 and 8) Tool—Size.....	17 mm (Hex wrench)
Socket-head screw (6 and 7) tool—Size.....	4 mm (Hex wrench)
Nut (5 and 8)—Torque.....	19.5 N·m 14.4 lb-ft

- | | |
|-------------|---------------------|
| 3—Snap Ring | 6—Socket-Head Screw |
| 4—Washer | 7—Socket-Head Screw |
| 5—Lock Nut | 8—Lock Nut |



T149407—UN—15JAN02

TX14740,0001E12 -19-16JAN02-2/2

Parking

IMPORTANT: During freezing weather, prevent damage to undercarriage components from frozen mud and dirt. Machine must be parked on a solid level surface to prevent tracks freezing in the ground.

- Park machine on a solid level surface.

During freezing weather, clean mud and dirt from tracks, rollers and track frames.

If tracks are frozen in the ground, slowly raise the machine using boom to free the tracks. Move machine carefully.

- Lower equipment to the ground.
- Turn auto-idle/auto-acceleration switch OFF.

IMPORTANT: Turbocharger can be damaged if procedure to shut down engine is not done properly.

- Run engine with engine speed dial at 1/3 position without load for 2 minutes.
- Turn engine speed dial to slow idle position.
- Turn key switch to OFF. Remove key from switch.
- Pull pilot control shutoff lever to locked position.

IMPORTANT: Prevent cab electrical component damage from bad weather. Windows, roof vent, and cab door must be closed to prevent enter of rain.

- Close windows, roof vent, and cab door.
- Lock all access doors and compartments.

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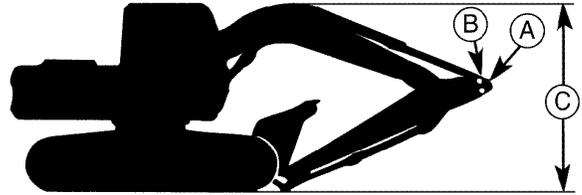
Transporting 120C Excavator Equipped With Long Arm

⚠ CAUTION: Prevent possible injury or machine damage from unexpected machine movement. Connect long arm to pin bore (B) only for machine transportation. When long arm is connected to pin bore (B), the working radius changes and the bucket will hit the cab.

Pin hole (B) is for transport only. Use pin hole (B) to make boom height lower than cab height. If necessary, remove bucket.

Converting long arm machine from operating to transporting position:

1. Position the bucket cylinder with rod slightly retracted from the fully extended position.
2. Position the arm cylinder with rod slightly retracted from the fully extended position.
3. Lower the boom until the arm top comes into contact with the ground.



A—Pin Position For Operating Machine
 B—Pin Position For Transporting Machine
 C—Height For Transporting Machine

TRANSPORTING DIMENSIONS		
Arm Cylinder Rod End Connected To:	Height (C) Without Bucket ^a	Height (C) With Bucket ^a
Pin Bore A	2810 mm (9 ft 2 in.)	3100 mm (10 ft 2 in.)
Pin Bore B	2540 mm (8 ft 3 in.)	2680 mm (8 ft 9 in.)

^aDimensions include shoe lug height.

TX14740,0001DEB -19-21DEC01-1/1

T109421—UN—06MAY97

Loading And Unloading For Transport

⚠ CAUTION: Use extra care to prevent tipover or unexpected movement when loading and unloading machine for transport. Observe these rules when loading and unloading machine:

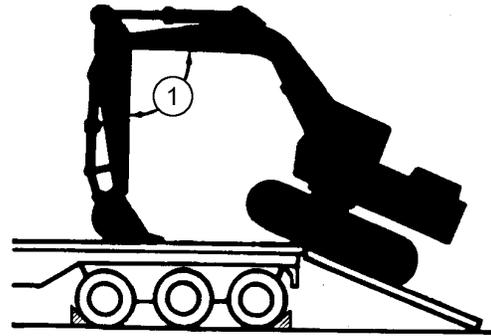
- Always wear seat belt.
- Locate trailer on a level and stable surface. Chock trailer wheels.
- Use loading ramps. Keep ramps at a low angle and firmly attached to trailer.
- Turn auto-idle/auto acceleration switch to OFF. Use low speed operating modes and move machine carefully.

1. When loading machine, use bucket for support with angle (1) of arm to boom at 90°.

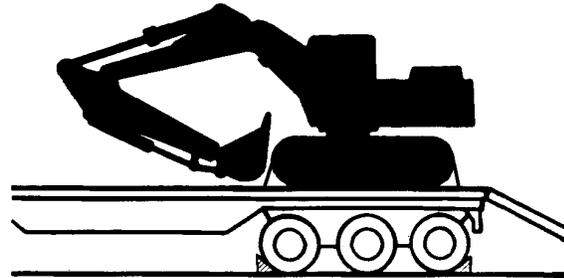
IMPORTANT: Prevent machine or trailer damage. **DO NOT** allow machine or bucket to impact trailer.

2. Position machine on trailer as shown. Fasten each corner of machine to trailer.
3. When unloading machine, use bucket for support with angle of arm to boom at 90°.

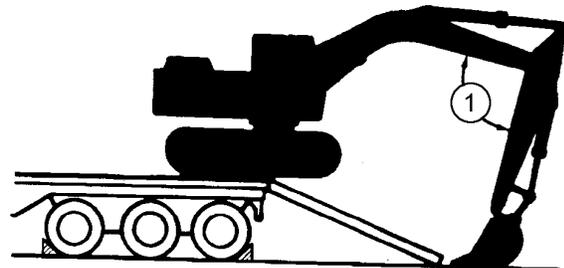
1—90° Arm to Boom



T137507—UN—25JAN01



T157837—UN—23JUL02



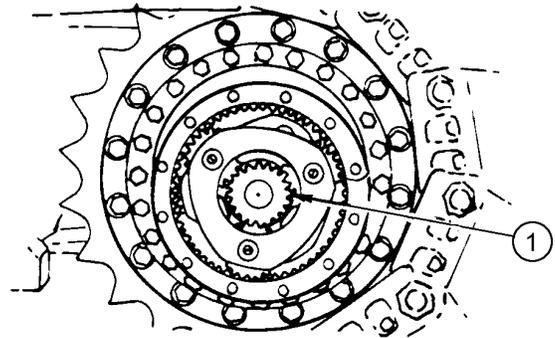
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Towing

CAUTION: Prevent possible injury from unexpected machine movement. Block both tracks when disconnecting travel gearboxes. When travel gearboxes are disconnected, machine has no brakes and can move. The machine will roll free on a slope or while being towed.

1. Block tracks.
2. Drain oil from each travel gearbox.
3. Remove cover from each gearbox.
4. Remove sun gear (1) from each gearbox.
5. Install cover. Fill gearbox with oil.



1— Sun Gear

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T137511 —UN—25JAN01

Lifting Machine

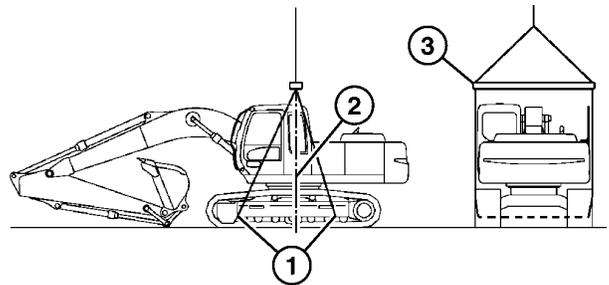
CAUTION: Prevent possible injury from unexpected machine movement when lifting the machine. Check lifting capacity of crane before lifting the excavator. Lift load only as high as necessary.

Keep all people clear of raised load.

NOTE: The center of gravity (2) will vary depending on the kind of attachment.

NOTE: Refer to decals on machine for correct lifting points (1). There are 2 lift points on each side of the undercarriage.

1. Fully extended boom, arm, and bucket cylinders.
2. Position boom straight ahead of the upperstructure.
3. Turn key switch to OFF position. Remove key from key switch.
4. Pull pilot control shutoff lever to locked (UP) position.
5. Close and lock all doors and covers.
6. Route appropriate lifting device through lifting point (1) and under both sides of the track frame as illustrated.



Lifting Machine

1— Lifting Point (4 used)
2— Center of Gravity

3— Support Bar

7. Attach appropriate lifting device to crane.
8. Slowly lift machine.

Specification

120C—Approximate	
Weight.....	13 000 kg (28,700 lb)
160CLC—Approximate	
Weight.....	15 600 kg (34,400 lb)

TX14740,0001E74 -19-07AUG15-1/1

TX1156707 —UN—27MAR14

Maintenance—Machine

Diesel Engine Oil — Tier 2 and Stage II

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

John Deere Plus-50™ II oil is preferred.

John Deere Plus-50™ is also recommended.

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

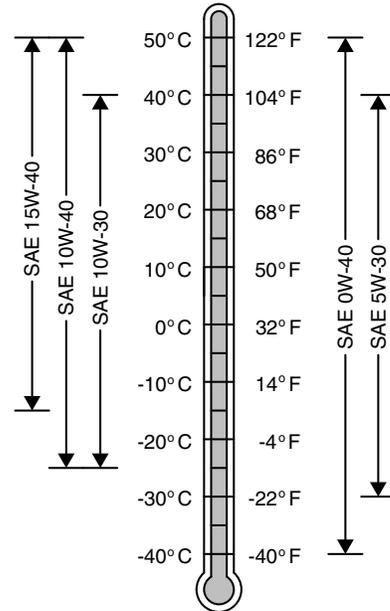
- John Deere Torq-Gard™
- API Service Category CJ-4
- API Service Category CI-4 PLUS
- API Service Category CI-4
- API Service Category CH-4
- ACEA Oil Sequence E9
- ACEA Oil Sequence E7
- ACEA Oil Sequence E6
- ACEA Oil Sequence E5
- ACEA Oil Sequence E4

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.

DO NOT use diesel fuel with sulfur content greater than 10000 mg/kg (10000 ppm).

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



Oil Viscosities for Air Temperature Ranges

TS1689—UN—18JUL07

DX,ENOil7 -19-17JUN13-1/1

Diesel Engine Oil and Filter Service Intervals

The oil and filter service intervals in the following table should be used as guidelines. Actual service intervals also depend on operation and maintenance practices. It is suggested to use oil analysis to determine the actual useful life of the oil and to aid in selection of the proper oil and filter service interval.

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.

Engine Oil and Filter Service Intervals		
	Standard Drain Oil Pan	Extended Drain Oil Pan
Fuel Sulfur	Less than 0.05% (500 mg/kg)	
Plus-50	375 hours	500 hours
Other Oils	250 hours	250 hours
Fuel Sulfur	0.05 - 0.50% (500 - 5000 mg/kg)	
Plus-50	275 hours	400 hours
Other Oils	150 hours	150 hours
Fuel Sulfur	0.50 - 1.00% (5000 - 10 000 mg/kg)	
Plus-50	187 hours	250 hours
Other Oils	125 hours	125 hours
The service interval of "Other Oils" may be extended only if oil analysis is performed to determine the actual service life, to a maximum not to exceed that of Plus-50.		

Diesel fuel sulfur level will affect engine oil and filter service intervals. Higher fuel sulfur levels reduce oil and filter service intervals as shown in the table.

- Use of diesel fuel with sulfur content less than 0.05% (500 mg/kg) is strongly recommended.

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Torq-Gard Supreme is a trademark of Deere & Company*

- Use of diesel fuel with sulfur content 0.05% (500 mg/kg) to 0.50% (5000 mg/kg) may result in REDUCED oil and filter change intervals as shown in the table.
- BEFORE using diesel fuel with sulfur content greater than 0.50% (5000 mg/kg), contact your John Deere dealer.

IMPORTANT: When using biodiesel blends greater than B20, reduce the oil and filter service interval by 50% or monitor engine oil based on test results from Oilscan.

Oil types in the table include:

- John Deere Plus-50™ II and John Deere Plus-50 oils.
- "Other Oils" include John Deere Torq-Gard Supreme™, API CJ-4, API CI-4 PLUS, API CI-4, API CH-4, ACEA E9, ACEA E7, ACEA E6, ACEA E5, ACEA E4, or ACEA E3 oils.

NOTE: The 500 hour extended oil and filter change interval is only allowed if all the following conditions are met:

- Engine equipped with an extended drain interval oil pan
- Use of diesel fuel with sulfur content less than 0.05% (500 mg/kg)
- Use of John Deere Plus-50™ II or John Deere Plus-50 oil
- Use of an approved John Deere oil filter

DX,ENOil12 -19-03AUG09-1/1

Diesel Engine Coolant (engine without wet sleeve cylinder liners)

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 Water-Base	0 °C (32 °F)
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 one of the following specifications:

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- Pre-mix coolant meeting ASTM D6210 requirements
- Coolant concentrate meeting ASTM D6210 requirements in a 40—60% mixture of concentrate with quality water
- Pre-mix coolant meeting ASTM D3306 requirements
- Coolant concentrate meeting ASTM D3306 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:

- Is formulated with a nitrite-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. Distilled, 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.

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.

DX,COOL18 -19-15MAY13-1/1

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.

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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.

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.

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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.

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:

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- 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.

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 -19-15MAY13-1/1

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.

DX,COOL17 -19-20APR11-1/1

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

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 40 minimum. Cetane number greater than 47 is preferred, especially for temperatures below -20°C (-4°F) or elevations above 1675 m (5500 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 0.52 mm as measured by ASTM D6079 or ISO 12156-1. A maximum scar diameter of 0.45 mm is preferred.

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 Interim Tier 4, Final Tier 4, Stage III B, and Stage IV Engines

- Use **ONLY** ultra low sulfur diesel (ULSD) fuel with a maximum of 15 mg/kg (15 ppm) sulfur content.

Sulfur Content for Tier 3 and Stage III A Engines

- Use of diesel fuel with sulfur content less than 1000 mg/kg (1000 ppm) is **RECOMMENDED**.
- Use of diesel fuel with sulfur content 1000—2000 mg/kg (1000—2000 ppm) **REDUCES** the oil and filter change interval.
- **BEFORE** using diesel fuel with sulfur content greater than 2000 mg/kg (2000 ppm), contact your John Deere dealer.

Sulfur Content for Tier 2 and Stage II Engines

- Use of diesel fuel with sulfur content less than 2000 mg/kg (2000 ppm) is **RECOMMENDED**.
- Use of diesel fuel with sulfur content 2000—5000 mg/kg (2000—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 interval.

IMPORTANT: Do not mix used diesel engine oil or any other type of lubricating oil with diesel fuel.

Improper fuel additive usage may cause damage on fuel injection equipment of diesel engines.

DX,FUEL1 -19-24OCT14-1/1

BioDiesel Fuel

BioDiesel fuel is comprised of mono-alkyl 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 and regulations can encourage or prohibit the use of biofuels. Operators should consult with appropriate governmental authorities prior to using biofuels.

All John Deere Engines with Exhaust Filter (Released 2011 and After)

While 5% blends (B5) are preferred, BioDiesel concentrations up to a 20% blend (B20) in petroleum diesel fuel can be used. BioDiesel blends up to B20 can be used ONLY if the BioDiesel (100% BioDiesel or B100) meets ASTM D6751, EN 14214, or equivalent specification. Expect a 2% reduction in power and a 3% reduction in fuel economy when using B20.

BioDiesel concentrations above B20 can harm the engine's emission control systems and should not be used. Risks include, but are not limited to, more frequent stationary regeneration, soot accumulation, and increased intervals for ash removal.

John Deere approved fuel conditioners, which contain detergent and dispersant additives, are required when using BioDiesel blends from B10—B20, and are recommended when using lower BioDiesel blends.

All John Deere Engines Excluding Exhaust Filter (Primarily Released Prior to 2012)

While 5% blends (B5) are preferred, BioDiesel concentrations up to a 20% blend (B20) in petroleum diesel fuel can be used. BioDiesel blends up to B20 can be used ONLY if the BioDiesel (100% BioDiesel or B100) meets ASTM D6751, EN 14214, or equivalent specification. Expect a 2% reduction in power and a 3% reduction in fuel economy when using B20.

These John Deere engines can operate on BioDiesel blends above B20 (up to 100% BioDiesel). Operate at levels above B20 ONLY if the BioDiesel is permitted by law and meets the EN 14214 specification (primarily available in Europe). Engines operating on BioDiesel blends above B20 might not fully comply with or be permitted by 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, which contain detergent and dispersant additives, are required when using BioDiesel blends from B10—B20, and are recommended when using lower BioDiesel blends.

BioDiesel Use Requirements and Recommendations

The petroleum diesel portion of all BioDiesel blends must meet the requirements of ASTM D975 (US) or EN 590 (EU) commercial standard.

BioDiesel users in the U.S. are strongly encouraged to purchase BioDiesel blends from a BQ-9000 Certified Marketer and sourced from a BQ-9000 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>.

BioDiesel contains residual ash. Ash levels exceeding the maximums allowed in either ASTM D6751 or EN14214 can result in more rapid ash loading and require more frequent cleaning of the Exhaust Filter (if present).

The fuel filter can require more frequent replacement, when using BioDiesel fuel, particularly if switching from diesel. Check engine oil level daily prior to starting engine. A rising oil level can indicate fuel dilution of the engine oil. 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.

When using BioDiesel blends up to B20, the following must be considered:

- Cold-weather flow degradation
- Stability and storage issues (moisture absorption, microbial growth)
- Possible filter restriction and plugging (usually a problem when first switching to BioDiesel on used engines)
- Possible fuel leakage through seals and hoses (primarily an issue with older engines)
- Possible reduction of service life of engine components

Request a certificate of analysis from your fuel distributor to ensure that the fuel is compliant with the specifications provided in this Operator's Manual.

Consult your John Deere dealer for approved fuel conditioners to improve storage and performance with BioDiesel fuels.

The following must also be considered if using BioDiesel blends above B20:

- Possible coking or blocked injector nozzles, resulting in power loss and engine misfire if John Deere approved fuel conditioners are not used
- Possible crankcase oil dilution (requiring more frequent oil changes)
- Possible lacquering 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

Continued on next page

DX,FUEL7 -19-15MAY13-1/2

- Possible reduction in water separator efficiency
- Possible damage to paint if exposed to BioDiesel
- Possible corrosion of fuel injection equipment
- Possible elastomeric seal and gasket material degradation (primarily an issue with older engines)
- Possible high acid levels within fuel system
- Because BioDiesel blends above B20 contain more ash, using blends above B20 can result in more rapid

ash loading and require more frequent cleaning of the Exhaust Filter (if present)

IMPORTANT: Raw pressed vegetable oils are NOT acceptable for use as fuel in any concentration in John Deere engines. Their use could cause engine failure.

DX,FUEL7 -19-15MAY13-2/2

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 cetane number, fuel type, sulfur content, water content, appearance, suitability for cold weather

operations, bacteria, cloud point, acid number, particulate contamination, and whether the fuel meets specification.

Contact your John Deere dealer for more information on diesel fuel analysis.

DX,FUEL6 -19-14APR11-1/1

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 practicable 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 and prevent water condensation. Contact your fuel supplier or John Deere dealer for recommendations.

DX,FUEL4 -19-15FEB13-1/1

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.

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 both conventional and synthetic oils.

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

If alternative hydraulic oils are required, the hydraulic system needs to be completely flushed. This may require large amounts of oil to properly drain previous product.

IMPORTANT: Avoid mixing different brands or types of oils. Oil manufacturers blend base

stock and additives to create their oils and to meet certain specifications and performance requirements. Mixing different oils can interfere with proper functioning of these formulations and degrade lubricant performance.

This machine is factory filled with Super EX 46HN extended life zinc-free hydraulic oil. Avoid servicing this machine with products that do not meet this specification. If oils have been mixed or if alternate service oils are desired, the complete hydraulic system needs to be totally flushed by an authorized dealer.

Consult your authorized dealer to obtain specific information and recommendations.

DW90712,000057F -19-07DEC10-1/1

Diesel Engine Break-In Oil

New engines are filled at the factory with John Deere ENGINE BREAK-IN OIL. During the break-in period, add John Deere ENGINE BREAK-IN OIL as needed to maintain the specified oil level.

Change the oil and filter after the first 250 hours of operation of a new or rebuilt engine.

After engine overhaul, fill the engine with John Deere ENGINE BREAK-IN OIL.

If John Deere ENGINE BREAK-IN OIL is not available, use a diesel engine oil meeting one of the following during the first 250 hours of operation:

- API Service Classification CE
- API Service Classification CD
- API Service Classification CC
- ACEA Oil Sequence E2
- ACEA Oil Sequence E1

PLUS-50 is a trademark of Deere & Company.

After the break-in period, use John Deere PLUS-50™ or other diesel engine oil as recommended in this manual.

IMPORTANT: Do not use PLUS-50 oil or engine oils meeting any of the following during the first 100 hours of operation of a new or rebuilt engine:

API CJ-4	ACEA E7
API CI-4 PLUS	ACEA E6
API CI-4	ACEA E5
API CH-4	ACEA E4
API CG-4	ACEA E3
API CF-4	
API CF-2	
API CF	

These oils will not allow the engine to break-in properly.

DW90712,0000454 -19-17JAN07-1/1

Hydraulic Oil

IMPORTANT: Excavators are factory filled with Super EX 46HN extended life zinc-free hydraulic oil.

DO NOT MIX ZINC-BASED AND ZINC-FREE OILS.

Flushing system is required when changing from zinc-free to zinc-based oils. Contact authorized dealer for the flushing procedure.

Avoid mixing different brands of oils. Oil manufacturers engineer their oils to meet certain specifications and requirements. Mixing different oils can degrade lubricant and machine performance.

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

Low Temperature Operation

- Do not mix zinc-based and zinc-free oils.
- A preferred ISO 32 hydraulic oil may be added to the machine for low temperature operations. Hydraulic system oil viscosity must be 32Cst at 40°C minimum and must not be operated when ambient temperature exceeds 30°C (86°F).
- When switching back to warm weather operation a preferred ISO46 hydraulic oil may be added to the machine. The hydraulic system oil viscosity must be 40Cst at 40°C minimum and must not be operated when ambient temperature exceeds 40°C (104°F).

Seasonal Hydraulic Flushing

- Do not mix zinc-based and zinc-free oils.
- Two hydraulic tank flushes are required when changing hydraulic oils for seasonal operation. Drain and refill tank with new oil (ISO32-cold, ISO46-warm.). Operate machine to mix oil in system. Drain and refill tank again. Check oil viscosity.

The following oil is preferred:

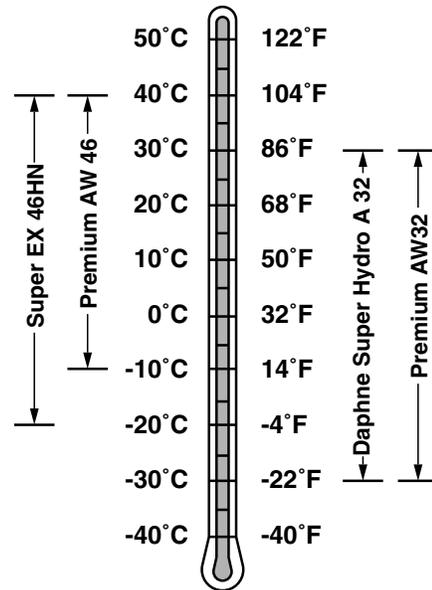
4000 hour change interval:

- Zinc-Free Super EX 46HN Hitachi excavator oil from John Deere

2500 hour change interval:

- Zinc-Free Daphne Super Hydro A 32 (For low temperature operation.)
- Shell Tellus Oil S46

1500 hour change interval:



Hydraulic Oil

The following products can be used provided a complete hydraulic system flush has been performed. Contact your dealer for this procedure.

Other Premium AW oils may be used:

The following oils are zinc-based and must not be mixed with 2500 hour and 4000 hour zinc-free oils.

- Texaco Inc.: Rando Oil HD46 or 32 (For low temperature operation.)
- Mobil Oil: DTE25-46 or 32 (For low temperature operation.)
- Shell Oil: Tellus Oil T46 or T32 (For low temperature operation.)

Biodegradable Hydraulic Oil:

Use only Exxon Mobil EAL Envirosyn 46H Synthetic Esther Oil when a biodegradable oil is required. (Contact your John Deere dealer for Registration and Routine Oil Analysis to meet warranty requirements.)

IMPORTANT: Other fire resistant and readily biodegradable oil (also called FR oil) are not approved in John Deere Construction and Forestry equipment.

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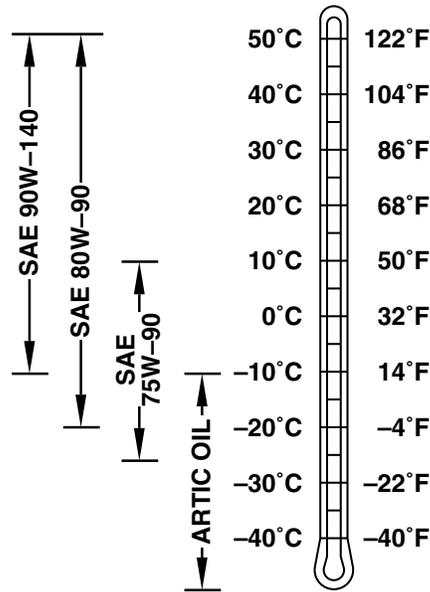
Swing Gearbox And Travel Gearbox Oils

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

The following oils are preferred:

- John Deere GL-5 GEAR LUBRICANT
- John Deere EXTREME-GARD™

Other oils may be used if they meet API Service Classification GL-5.



T153833 —UN—10APR02

EXTREME-GARD is a trademark of Deere & Company.

TX14740,0001EB2 -19-18MAY06-1/1

Track Adjuster, Working Tool Pivot, Swing Bearing, and Swing Bearing Gear Grease

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

The following greases are preferred:

- John Deere SD POLYUREA GREASE

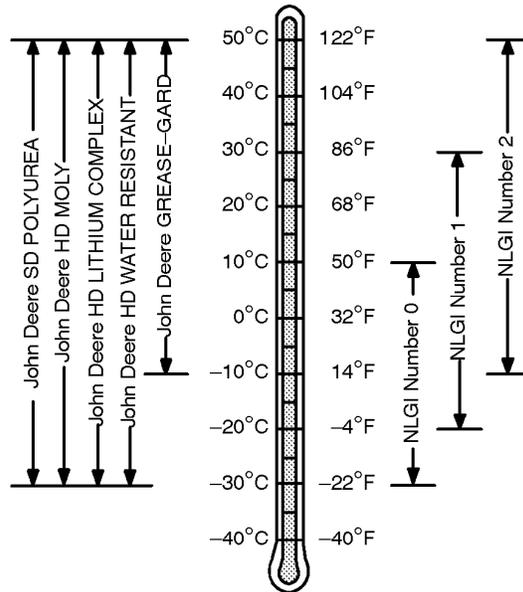
The following greases are also recommended:

- John Deere HD MOLY GREASE
- John Deere HD LITHIUM COMPLEX GREASE
- John Deere HD WATER RESISTANT GREASE
- John Deere GREASE-GARD

Other greases may be used if they meet the following:

- NLGI Performance Classification GC-LB

IMPORTANT: Some types of grease thickener are not compatible with others.



TS1667 —UN—30JUN99

CED, TX14740,6952 -19-15DEC09-1/1

Maintenance—Periodic Maintenance

Service Machine at Specified Intervals

Lubricate, make service checks, and make adjustments at intervals shown on the periodic maintenance chart and on the following pages.

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, 100 hours, 50 hours, and 10 hours or daily.

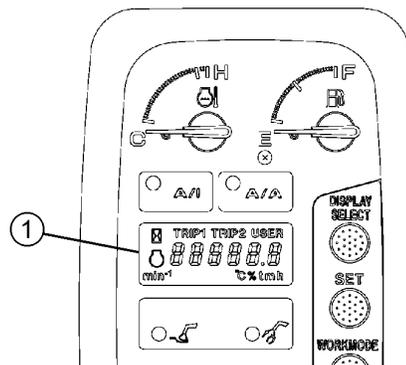
TX14740,0001C9F -19-17JUL07-1/1

Check Hour Meter Regularly

Check the hour meter (1) trip meter 1 and trip meter 2 to determine when your machine needs periodic maintenance.

Intervals on the periodic maintenance chart are for operating in normal conditions. If you operate your machine in difficult conditions, you should service it at **SHORTER INTERVALS**.

1— Hour Meter



T136354 —UN—19DEC00

TX14740,0001CA0 -19-09APR02-1/1

Prepare Machine for Maintenance

1. Park machine on a level surface as shown.
2. Stop engine.



T6811A1 —UN—18OCT88

TX14740,0001C3D -19-06MAY08-1/1

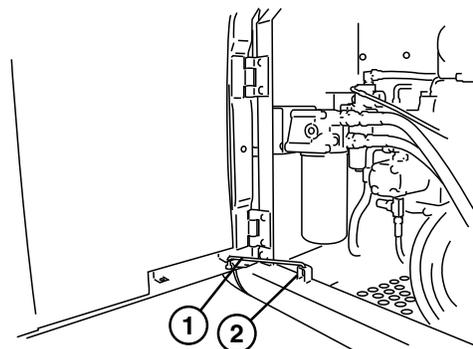
Open Access Doors—160DLC

CAUTION: Prevent possible injury from door closing. Secure door in the **OPEN** position.

To hold door open, remove rod (1) from stored position and insert in tab (2) on door.

1— Rod

2— Tab



T149534 —UN—15JAN02

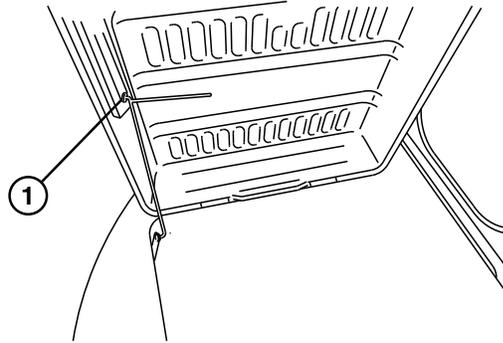
TX14740,0001E75 -19-26OCT06-1/1

Open Engine Hood

CAUTION: Prevent possible injury. Unlock latch. Pull open latch to unlock hood. Raise the hood until the end of the rod is securely locked into catch.

Raise hood using handle on hood until the end of the rod is securely locked into catch (1).

1— Catch



T153899 —UN—11APR02

TX14740.0001EB6 -19-13MAY02-1/1

Fuel Tank

CAUTION: Handle fuel carefully. If the engine is hot or running, **DO NOT** fill the fuel tank. **DO NOT** smoke while you fill fuel tank or work on fuel system.

Specification

Fuel Tank—Capacity..... 250.0 L (66.0 gal)

To avoid condensation, fill the fuel tank at the end of each day's operation.

TX14740.0001DEE -19-02JAN02-1/1

Hydraulic Breaker and Crusher Attachments

IMPORTANT: Avoid mixing different brands or types of oils. Oil manufacturers engineer their oils to meet certain specifications and performance requirements. Mixing different oil types can degrade lubricant and machine performance.

This excavator is factory filled with Super EX 46HN extended life zinc-free hydraulic oil. Avoid servicing this excavator with products that do not meet this specification. If oils have been mixed or if alternate service oils are desired,

the complete hydraulic system needs to be totally flushed by an authorized dealer.

Hydraulic breaker or crusher operation subjects the machine's hydraulic system to possible contamination and accelerated deterioration. The hydraulic return filter and hydraulic oil must be replaced more often to prevent damage to hydraulic pumps and other hydraulic components. Change the hydraulic return filter and oil at the intervals recommended below based on the amount of machine operating time the attachment is used.

Percentage of Operating Time Breaker or Crusher Used	Hydraulic Return Filter Change Interval (hours)	Hydraulic Oil Change Interval (hours)
100	100	600
60	150	800
40	200	1000
20	300	1300

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Maintenance and Repair Record Keeping System

The checklist in this section summarizes scheduled maintenance, and parts and oil required at each maintenance interval.

Use the checklist to:

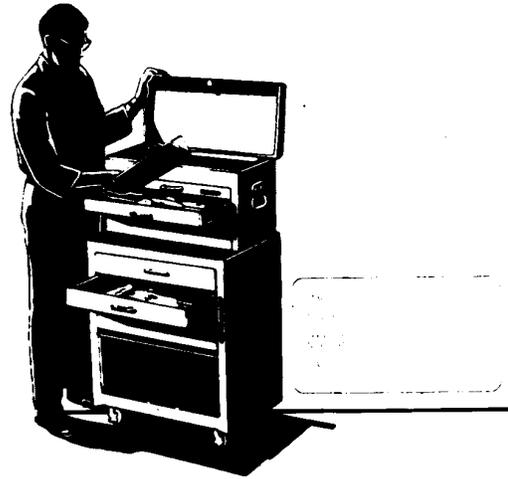
- Remind you to perform machine maintenance at specified intervals to minimize downtime.
- Calculate cost of machine operation and ownership allowing you to make better job estimates.
- Place yourself in a stronger position at trade-in time.
- Satisfy your SECURE contract requirements.

As maintenance is performed, check off each item on the list and record date and hour meter reading.

Do not tear out or mark on checklist in this section; keep it to make extra copies.

MARKS

MAINTENANCE AND REPAIR RECORD KEEPING SYSTEM FOR JOHN DEERE MACHINE OWNERS



TX,50,FF2898 -19-17JUL07-1/1

T7511CO —UN—27JUN91

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, usually prior to a filter and/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.



Fluid Analysis Kits

AM40430,00002FE -19-19OCT11-1/1

TX1003513A —UN—20FEB06

Periodic Maintenance Record Keeping System

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 (if applicable) listed under 250 hours, 100 hours, and 10 hours or daily.

As Required

- Clean fuel tank inlet screen
- Drain fuel tank sump
- Clean radiator air inlet screen
- Drain water separator
- Check air cleaner unloader valve
- Check and adjust track sag
- Check windshield washer fluid

Every 10 Hours or Daily

- Check engine oil level
- Check coolant level at recovery tank
- Check hydraulic oil tank level
- Grease hydraulic coupler (if equipped)

Every 100 Hours

- Grease working tool pivots

Initial Service - 250 Hours*

- Change engine break-in oil and replace filter
- * Perform Initial Service once after the first 250 hours of operation.

REQUIRED PARTS

Insure 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.

	Part Number	Initial Service - 250 Hours	Every 250 Hours	Every 500 Hours	Every 1000 Hours	Every 2000 Hours	Every 4000 Hours
Engine Oil Filter	RE504836	1		1	1	1	1
Fuel Filter Element	RE509031			1	1	1	1
Water Separator Element	RE509036			1	1	1	1
Hydraulic System Return Oil Filter	4443596				1	1	1
Air Filter Primary	AP35310				1	1	1
Air Filter Secondary	AT175345				1	1	1
Dust Cup/Unloader Valve	4486015				1	1	1
Pilot Control Oil Filter	AT186554				1	1	1
Engine Rocker Arm Cover Gasket	8973262510					1	1
Cab Fresh Air Filter	4S00640				As Needed		
Cab Recirculating Air Filter	4S00683				As Needed		
PLUS-50™ Oil	TY6389*	14.0 L (15.0 qt)		14.0 L (15.0 qt)	14.0 L (15.0 qt)	14.0 L (15.0 qt)	14.0 L (15.0 qt)
API GL-5 Gear Oil (120C)	TY6296*				2.6 L (2.8 qt)	9.0 L (9.6 qt)	9.0 L (9.6 qt)
API GL-5 Gear Oil (160CLC)	TY6296*				4.5 L (5.0 qt)	10.9 L (11.8 qt)	10.9 L (11.8 qt)
Pre-diluted Coolant	TY16036					26.5 L (7.0 gal)	26.5 L (7.0 gal)
Coolant Conditioner	TY16004				As Needed		
Hitachi SUPER EX 46HN Hydraulic Oil	2908-050*						76.0 L (20.0 gal)
Fluid Analysis Kits							
•Diesel Engine Oil	AT317904		1	1	1	1	1
•Hydraulic Oil	AT303189		1	1	1	1	1
•Travel Gearbox Oil	AT303189			2	2	2	2
•Swing Gearbox Oil	AT303189			1	1	1	1
DieselScan™	AT180344			1	1	1	1
COOLSCAN PLUS™ Kit	AT183016			1	1	1	1

Continued on next page

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Maintenance—Periodic Maintenance

	Part Number	Initial Service - 250 Hours	Every 250 Hours	Every 500 Hours	Every 1000 Hours	Every 2000 Hours	Every 4000 Hours
3-Way Heavy Duty Coolant Test	TY16175			1	1	1	1

* For recommended oil types and oil viscosities based on operating temperatures, see Maintenance-Machine. (Section 3-1.)

Model: 120C and 160CLC

Customer: _____

PIN/Serial Number: _____

Delivery Date: _____ Hour Meter Reading: _____

OIL SAMPLING

Oil samples should be taken from each system prior to its recommended drain/change interval indicated on this form: 250, 500, 1000, 2000 hours. Maintenance recommendations supplied by OILSCAN will be provided based upon the oil analysis and operating information you supply. Regular oil sampling will extend the operational life of your machine's systems.

Every 250 Hours

- | | |
|---|---|
| <ul style="list-style-type: none"> <input type="checkbox"/> Check swing gearbox oil level <input type="checkbox"/> Drain hydraulic oil tank sump <input type="checkbox"/> Check radiator coolant level <input type="checkbox"/> Check and adjust A/C belt | <ul style="list-style-type: none"> <input type="checkbox"/> Check battery electrolyte level and terminals <input type="checkbox"/> Check travel gearbox oil level <input type="checkbox"/> Clean air cleaner elements <input type="checkbox"/> Take engine oil sample |
|---|---|

Every 500 Hours

- | | |
|--|---|
| <ul style="list-style-type: none"> <input type="checkbox"/> Grease front end pivot joints <input type="checkbox"/> Grease swing bearing gear <input type="checkbox"/> Replace water separator filter <input type="checkbox"/> Replace fuel filter <input type="checkbox"/> Clean fresh air and recirculation filters (replace filters 6th cleaning) <input type="checkbox"/> Take swing gearbox oil sample <input type="checkbox"/> Take hydraulic oil sample | <ul style="list-style-type: none"> <input type="checkbox"/> Change engine oil and replace filter <input type="checkbox"/> Check air intake hoses <input type="checkbox"/> Grease swing bearing <input type="checkbox"/> Take engine coolant sample <input type="checkbox"/> Take travel gearbox oil sample <input type="checkbox"/> Take diesel fuel sample |
|--|---|

Every 1000 Hours

- | | |
|---|--|
| <ul style="list-style-type: none"> <input type="checkbox"/> Change swing gearbox oil <input type="checkbox"/> Replace hydraulic oil tank filter <input type="checkbox"/> Replace pilot system oil filter | <ul style="list-style-type: none"> <input type="checkbox"/> Clean engine crankcase vent tube <input type="checkbox"/> Check fan belt <input type="checkbox"/> Replace air cleaner elements and unloader valve |
|---|--|

Every 2000 Hours

- | | |
|--|--|
| <ul style="list-style-type: none"> <input type="checkbox"/> Drain and flush radiator, change coolant <input type="checkbox"/> Check and adjust engine valve lash | <ul style="list-style-type: none"> <input type="checkbox"/> Change travel gearbox oil |
|--|--|

Every 4000 Hours

- Change hydraulic oil, clean suction screen

*PLUS-50 is a trademark of Deere & Company
 DieselScan is a trademark of Deere & Company
 COOLSCAN PLUS is a trademark of Deere & Company*

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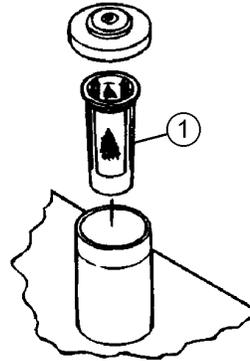
Maintenance—As Required

Clean Fuel Tank Inlet Screen

Clean screen (1) to remove any debris. Use solvent or diesel fuel.

Replace screen if damaged.

1—Fuel Tank Inlet Screen



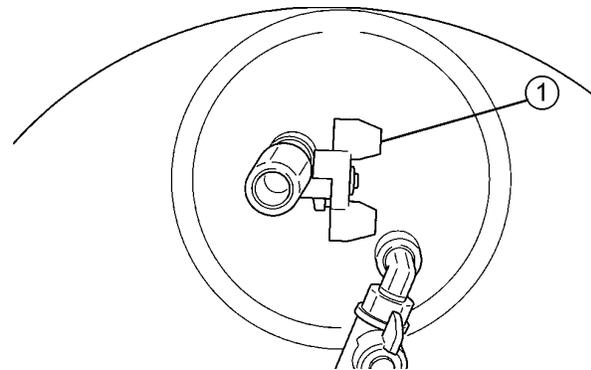
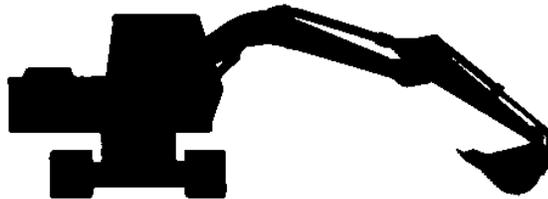
T135186—JUN—06NOV00

TX14740,0001C80 -19-03JAN07-1/1

Drain Water and Sediment From Fuel Tank Sump

1. Park machine on a level surface. Rotate upperstructure 90° for easier access.
2. Stop engine.
3. Remove fuel tank fill cap.
4. Open drain valve (1) for several seconds to drain water and sediment into a container. Dispose of waste properly. Close drain valve.
5. Install fill cap.

1—Drain Valve



T6811AJ—JUN—18OCT88

T136406—JUN—18DEC00

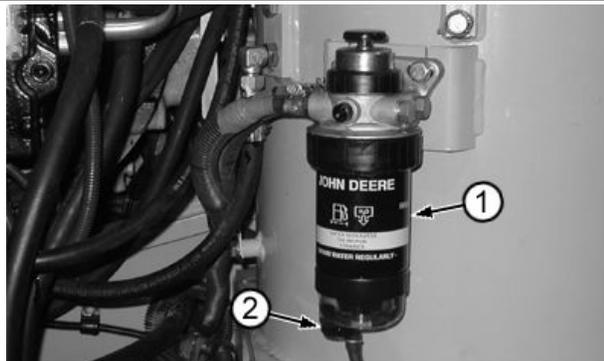
TX14740,0001CA4 -19-05APR10-1/1

Drain Water Separator

1. Open right access door to access water separator (1).
2. Open drain valve (2) to extract water from fuel system. Collect waste in a container and dispose of it properly.
3. Close drain valve.
4. Bleed fuel system. (See Bleed Fuel System in this Section.)

1—Water Separator

2—Drain Valve



T150379B—JUN—18JAN02

TX14740,0001E15 -19-18JAN02-1/1

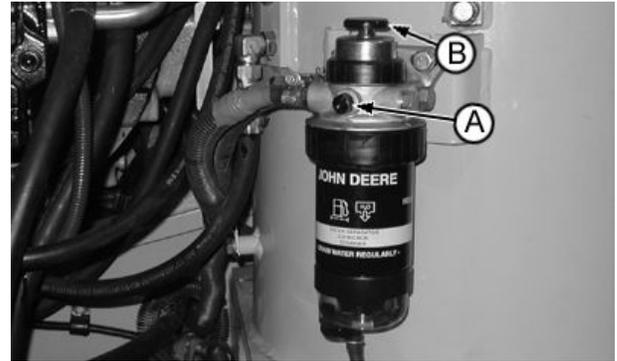
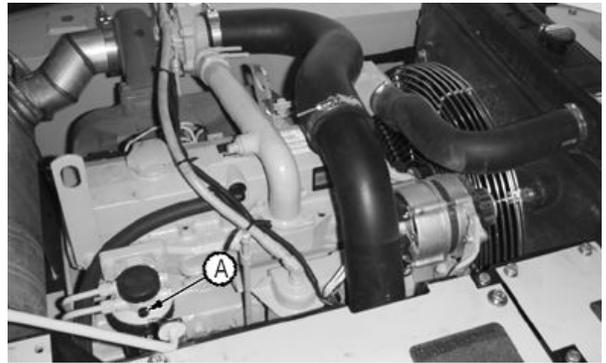
Bleed Fuel System

NOTE: Whenever the fuel system has been opened up for service (lines disconnected or filters removed), or if machine has run out of fuel, it will be necessary to bleed air from the system.

1. Open bleed screws (A) on fuel filter and on water separator.
2. Pump water separator primer (B) until fuel fills separator bowl and until fuel escapes from water separator bleed screw.
3. Tighten water separator bleed screw.
4. Pump water separator primer (B) until fuel escapes from final fuel filter bleed screw.
5. Tighten final fuel filter bleed screw.

A—Bleed Screw

B—Water Separator Primer



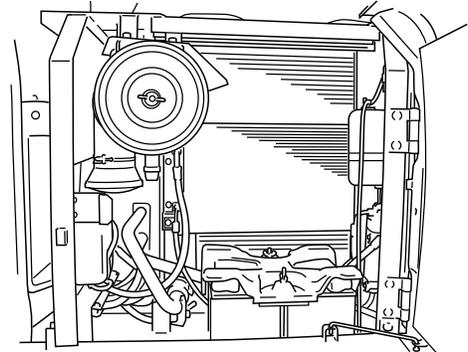
T105654G—UN—12DEC96

T150381B—UN—18JAN02

TX14740,0001E11 -19-23JAN03-1/1

Clean Radiator Air Inlet Screen

1. Open radiator access door and engine hood.
2. Slide screen up for cleaning.



T149636—UN—15JAN02

TX14740,0001DF0 -19-03JAN02-1/1

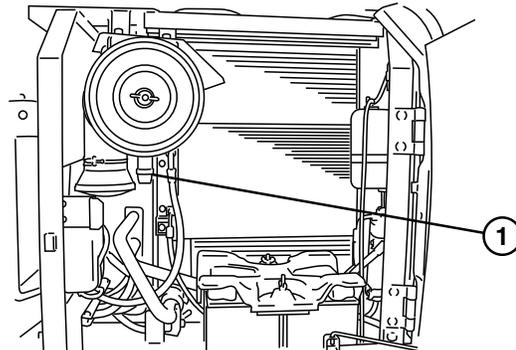
Clean Air Cleaner Dust Valve

IMPORTANT: A missing, damaged, or hardened dust unloader valve will make the dust cup precleaner ineffective, causing very short element life. Valve should suck closed above 1/3 engine speed.

Squeeze dust valve (1) to remove dust from the air cleaner.

If operating in high dust conditions, squeeze dust valve every couple of hours of operation to release dust.

1— Air Cleaner Dust Unloader Valve



T152026—UN—01MAR02

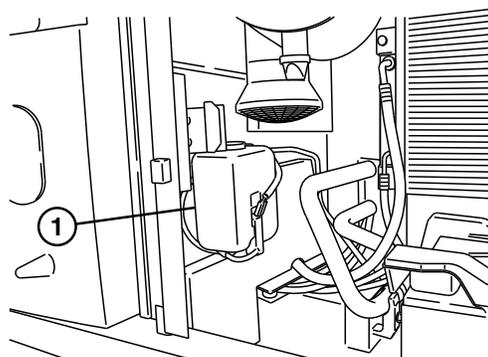
TX14740,0001E5D -19-08MAR02-1/1

Check Windshield Washer Fluid Level

Check fluid in windshield washer tank (1). If necessary, remove fill cap to add fluid.

During winter season, use all season windshield washer fluid which will not freeze.

1—Windshield Washer Tank



T148639 —UN—15JAN02

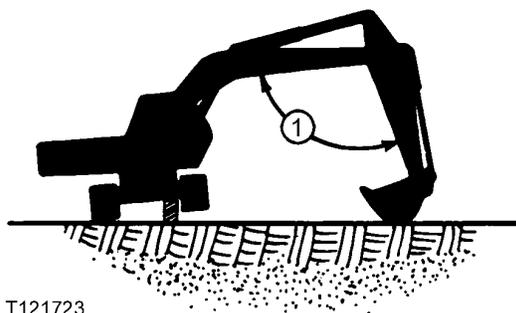
TX14740,0001DF1 -19-03JAN02-1/1

Check And Adjust Track Sag

1. Swing upperstructure 90° and lower bucket to raise track off ground.
2. Keep the angle (1) between boom and arm 90—110° and position the bucket's round side on the ground.

CAUTION: Prevent possible injury from unexpected machine movement. Place blocks under machine frame to support machine while measuring track sag.

3. Place blocks under machine frame to support machine.
4. Rotate track forward two full rotations and then in reverse two full rotations.



T121723

1—Boom-To-Arm Angle

T121723 —UN—10JUN99

TX14740,0001ED1 -19-06JUN02-1/3

5. Measure distance (1) at middle track roller from bottom of track frame to top surface of track shoe.

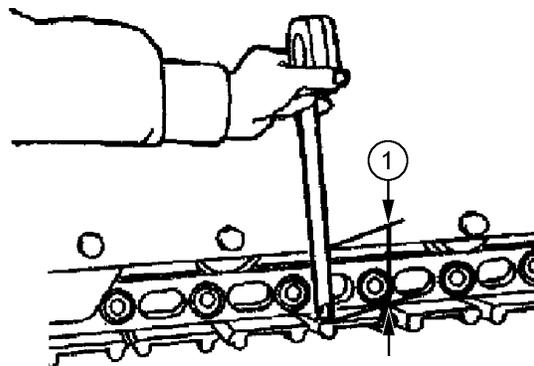
120C—Specification

Track—Sag.....250—280 mm (9-7/8—11.0 in.)

160CLC—Specification

Track—Sag.....285—320 mm (11-1/4—12-5/8 in.)

1—Distance



T137528 —UN—24JAN01

Continued on next page

TX14740,0001ED1 -19-06JUN02-2/3

IMPORTANT: Prevent possible damage to track components. **DO NOT** use the grease fitting on the track adjusting cylinder for lubrication. Use this fitting **ONLY** for track adjustment.

1. To tighten track, connect a grease gun to grease fitting (1) (located through access hole (4) in track frame). Add grease until sag is within recommended limits.

⚠ CAUTION: Prevent possible injury from high pressure grease. **DO NOT** remove grease fitting (1) from nut (2).

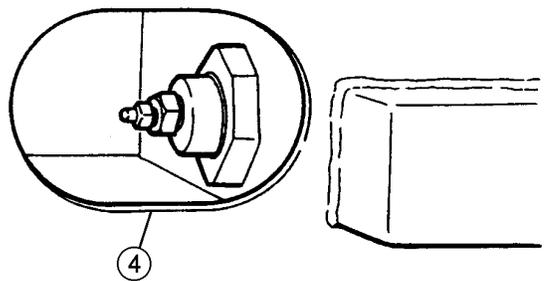
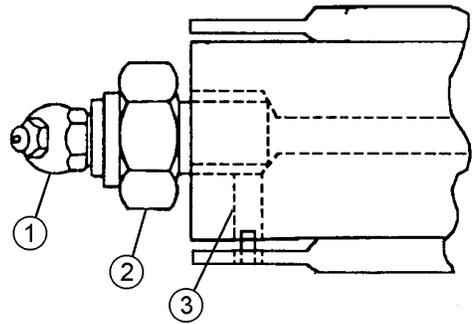
2. To loosen, slowly turn nut (2) counterclockwise; grease will escape through the bleed hole (3).
3. When amount of track sag is satisfactory, turn nut clockwise to tighten.

Specification

Nut—Torque..... 147 N·m (108 lb-ft)

1— Grease Fitting
2— Nut

3— Bleed Hole
4— Access Hole



T135187—UN—06NOV00

T135188—UN—06NOV00

TX14740,0001ED1 -19-06JUN02-3/3

Maintenance—Every 10 Hours or Daily

Check Engine Oil Level

IMPORTANT: Prevent engine damage. Do not run engine when oil level is below the ADD mark.

The most accurate oil level reading is obtained when the engine is cold before starting the engine for the day's operation.

1. Make sure dipstick (A) is fully seated.
2. Remove dipstick to check oil level.

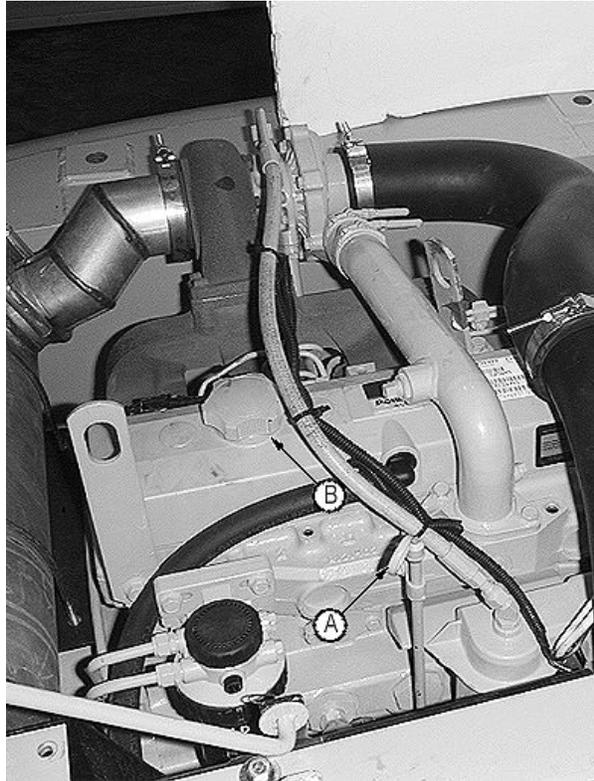
BEFORE THE ENGINE IS STARTED: The engine is full when oil level is in the cross hatch area (C). It is acceptable to run the engine when the oil level is above the ADD mark.

AFTER THE ENGINE HAS BEEN RUN: Allow the oil to drain into the oil pan for 10 minutes before checking the oil level. Ten minutes after shutdown the engine oil level must be above the ADD mark.

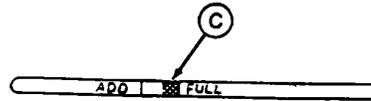
3. If necessary, remove filler cap (B) to add oil.

A—Dipstick
B—Filler Cap

C—Cross Hatch Area



T105664B—UN—12DEC96



RC5421—UN—15DEC88

TX,60,DH5197 -19-27AUG96-1/1

Check Recovery Tank Coolant Level

With the engine cold, coolant level must be between the FULL and LOW marks on the recovery tank (A).

If coolant is below the FULL mark, add coolant to the recovery tank.

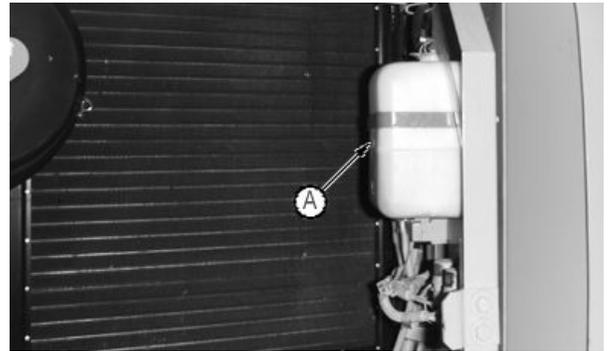
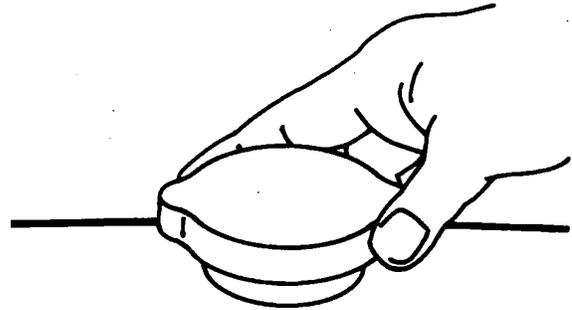
CAUTION: Prevent possible injury from hot spraying water. **DO NOT** remove radiator filler cap unless engine is cool. Then turn cap slowly to the stop. Release all pressure before you remove cap.

IMPORTANT: Avoid mixing different brands or types of coolant. Coolant manufacturers engineer their coolants to meet certain specifications and performance requirements. Mixing different coolant types can degrade coolant and machine performance.

If recovery tank is empty, check for leaks. Repair as required. Add coolant to the radiator and the recovery tank.

NOTE: If recovery tank is full and radiator is low, check for leaks in radiator cap and hose connections between radiator and coolant recovery tank.

Coolant level must be at bottom of the filler neck.



A—Recovery Tank

T6274AQ—UN—18OCT88

T105656C—UN—12DEC96

VD76477.00000DF -19-21JUL05-1/1

Check Hydraulic Oil Tank Level

IMPORTANT: Prevent damage to hydraulic system components. **DO NOT** run engine without oil in hydraulic tank.

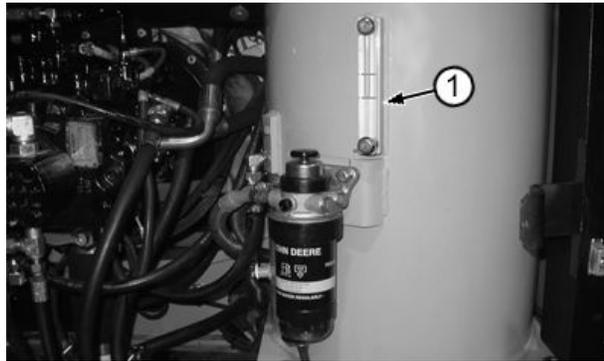
Avoid mixing different brands or types of oils. Oil manufacturers engineer their oils to meet certain specifications and performance requirements. Mixing different oil types can degrade lubricant and machine performance.

This excavator is factory filled with Super EX 46HN extended life zinc-free hydraulic oil. Avoid servicing this excavator with products that do not meet this specification. If oils have been mixed or if alternate service oils are desired, the complete hydraulic system needs to be totally flushed by an authorized dealer.

1. Park machine on a level surface and position machine with arm cylinder fully retracted and bucket cylinder fully extended.
2. Stop engine.
3. Check oil level gauge (1) on hydraulic tank. Oil must be between marks on window.

If necessary, add oil.

To add oil:



1— Hydraulic Oil Level Window

Continued on next page

DW90712,0000778 -19-14JUN07-1/2

T6811A1—UN—18OCT88

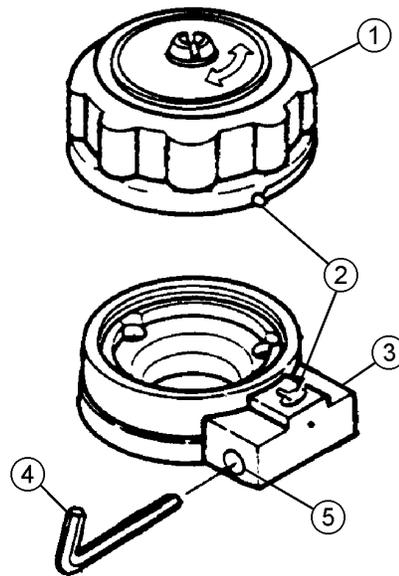
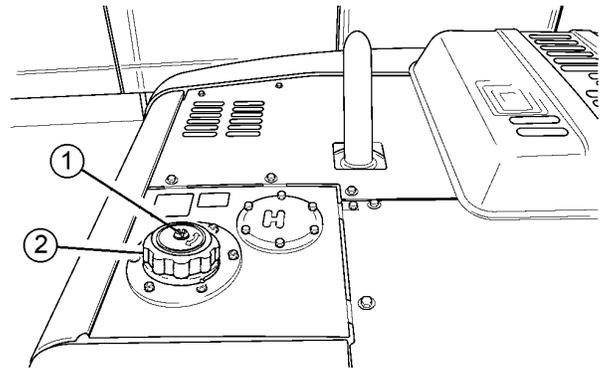
T150383B—UN—18JAN02

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by **SLOWLY** loosening cap (1).

4. Insert 4 mm hex wrench (4) into hole (5) and turn counterclockwise to release locking pin.
5. Slowly turn cap (1) counterclockwise a few degrees to relieve pressure. Remove cap.
6. Remove hydraulic oil tank cover.
7. Add oil.
8. Install hydraulic oil tank cover.
9. Install cap to case assembly (3) by aligning marks (2) and turning cap clockwise to lock position.
10. Tighten cap.

1— Cap
2— Aligning Marks
3— Case Assembly

4— Hex Wrench
5— Hole



DW90712,0000778 -19-14JUN07-2/2

T152652—UN—13MAR02

T135189—UN—06NOV00

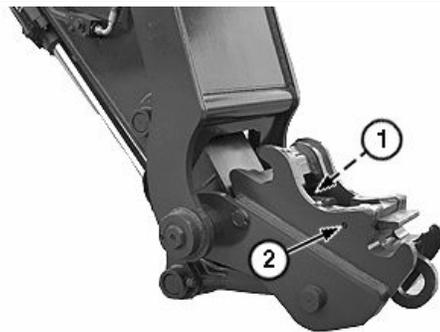
Lubricate Hydraulic Coupler—If Equipped

NOTE: Cylinders that are supplied without grease zerks DO NOT need to be lubricated.

To keep hydraulic coupler in proper working condition, hydraulic coupler must be lubricated on a daily basis.

Most hydraulic couplers are supplied with a cylinder grease zerk (1) located on the head end of the cylinder or cylinder barrel, a lock arm grease zerk (2), and a grease zerk on each side of the hydraulic coupler for the locking wedge.

Apply grease to fittings until grease escapes from joints. See Track Adjuster, Working Tool Pivot, Swing Bearing, and Swing Bearing Gear Grease. (Section 3-1.)



Lubrication Points

1— Cylinder Grease Zerk

2— Lock Arm Grease Zerk

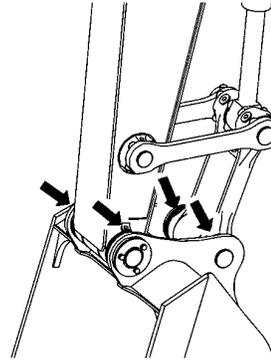
VD76477,0001376 -19-16JUN15-1/1

TX1017854A—UN—22JAN07

Maintenance—Every 100 Hours

Grease Working Tool Pivots

Grease working tool pivots (4 points) until grease escapes from joints. Grease every 4 hours for first 20 hours. Grease every 10 hours during first 30—100 hours and when working in mud and water.



Four Points

T153885 —UN—11APR02

TX14740,0001EB4 -19-11APR02-1/1

Maintenance—Initial Service - 250 Hours

Change Engine Break-in Oil And Replace Filter

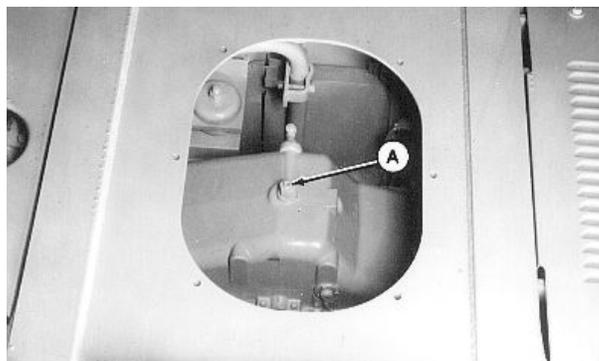
NOTE: Break-in oil should be changed after the first 250 hours of operation. (See Section 3-1.)

1. Run engine to warm oil.
2. Park machine on a level surface and stop engine.
3. Remove drain plug (A) from bottom of engine oil pan, or open drain valve on side of engine oil pan. Allow oil to drain into a container. Dispose of waste oil properly.
4. Turn filter (located behind engine block) counterclockwise to remove. Clean mounting surface on base.
5. Apply thin film of oil to rubber gasket of new filter.
6. Install new filter. Turn filter clockwise by hand until gasket touches mounting surface.
7. Tighten filter 1/2—3/4 turn more.
8. Install drain plug or close drain valve.
9. Remove filler cap.

Specification

Engine Oil With Filter
Change—Capacity..... 14.0 L (15.0 qt)

10. Fill engine with oil.



T1102302—UN—30JUL96

A—Drain Plug

11. Install filler cap.
12. Start engine. Engine oil pressure indicator on monitor must go out within 15-20 seconds. If not, stop engine immediately and find the cause.
13. Stop engine. Check oil level.

Check for any leakage at filter. Tighten filter just enough to stop leakage.

DW90712,0000135 -19-01JUN06-1/1

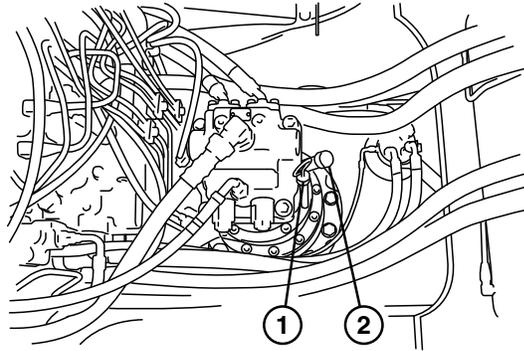
Maintenance—Every 250 Hours

Check Swing Gearbox Oil Level

1. Park machine on a level surface.
2. Remove dipstick (1). Oil must be between marks.
3. If oil is needed, remove filler cap (2) and add oil.
4. Check oil level.

1—Dipstick

2—Filler Cap



T149730 —UN—15JAN02

TX14740,0001E02 -19-07JAN02-1/1

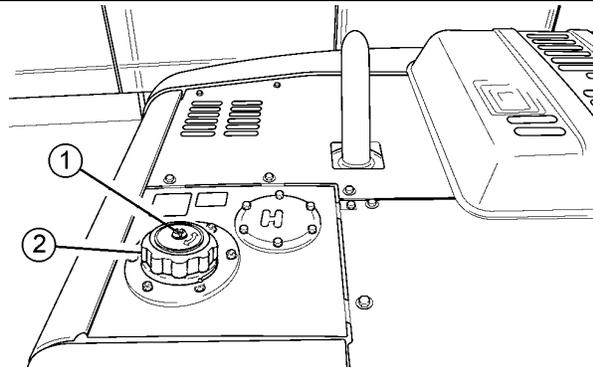
Drain Hydraulic Oil Tank Sump

⚠ CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. **DO NOT** remove hydraulic cap. Relieve pressure by **SLOWLY** loosening cap.

1. **SLOWLY** loosen cap (1) to relieve pressure.

1—Hydraulic Cap

2—Hydraulic Oil Tank Cover

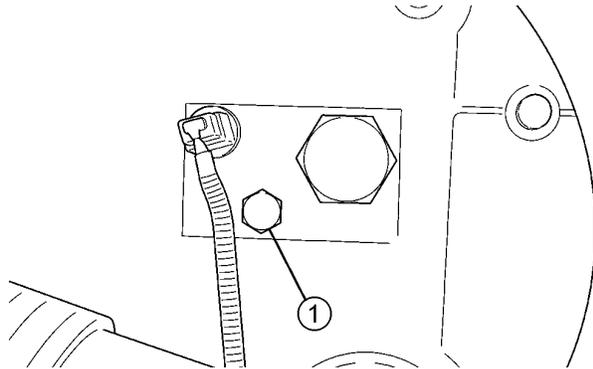


T162652 —UN—13MAR02

VD76477,00000E1 -19-18MAY06-1/2

2. Loosen sump plug (1) for several seconds to drain water and sediment into a container. Do not remove plug completely. Dispose of waste properly.
3. Tighten sump plug and hydraulic cap.

1—Sump Plug



T136450 —UN—18DEC00

VD76477,00000E1 -19-18MAY06-2/2

Check Radiator Coolant Level

⚠ CAUTION: Prevent possible injury from hot spraying water. **DO NOT** remove radiator filler cap (1) unless engine is cool. Then turn cap slowly to the stop. Release air to relieve all pressure before you remove cap.

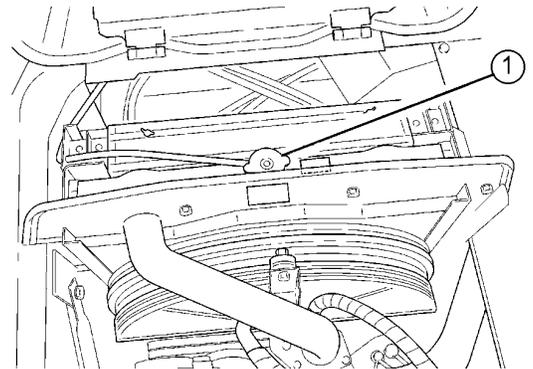
1. Slowly remove cap (1). Coolant level must be at bottom of the filler neck.

NOTE: If radiator coolant level is low, check for leaks on radiator cap, and hose connections between radiator and coolant recovery tank.

IMPORTANT: Avoid mixing different brands or types of coolant. Coolant manufacturers engineer their coolants to meet certain specifications and performance requirements. Mixing different coolant types can degrade coolant and machine performance.

2. Add coolant, if necessary.
3. Install filler cap.

1— Radiator Cap



T6642EK—UN—01NOV88

T152650—UN—13MAR02

VD76477.00000E2 -19-21JUL05-1/1

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 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.



Avoid Acid Burns

2. Drink large amounts of water or milk, but do not exceed 1.9 L (2 quarts).
3. Get medical attention immediately.

1. Remove battery box cover.

Continued on next page

TX14740,0001CBE -19-05MAR13-1/3

TS203 —UN—23AUG88

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.

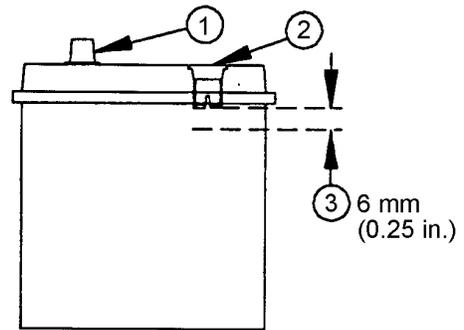
2. Fill each cell to within specified range with distilled water. DO NOT overfill.

CAUTION: Prevent possible injury. ALWAYS remove grounded (-) battery clamp first and replace it last.

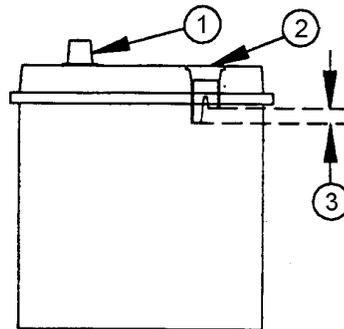
3. Disconnect battery clamps, grounded clamp first.

1— Battery Post
2— Fill Tube

3— Electrolyte Level Range



Battery Terminal and Fill Hole



Fill Level

TX14740,0001CBE -19-05MAR13-2/3

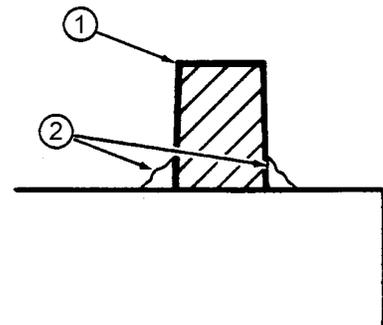
T137535—UN—25JAN01

T137536—UN—25JAN01

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



Terminal and Grease

TX14740,0001CBE -19-05MAR13-3/3

T137537—UN—25JAN01

Check and Adjust A/C Belt

Visually check the belt for wear. Replace if necessary.

NOTE: When a new belt is installed, be sure to readjust the tension after operating the engine for 3 to 5 minutes at slow idle speed to be sure that the new belt is seated correctly.

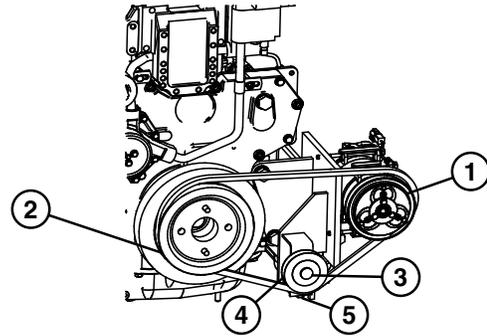
Use the following steps to adjust compressor belt tension:

1. Check compressor belt tension by depressing the midpoint between compressor pulley (1) and crank pulley (2) with thumb.

Specification

Compressor	
Belt—Deflection.....	9 mm to 12 mm 0.35 in. to 0.47 in.
—Depressing Force.....	98 N 22 lb-force

2. If tension is not within specifications, loosen bolt (3).
3. Move the tension pulley (4) by bolt (5) until tension is correct. Tighten bolt (3).



- | | |
|----------------------|-------------------|
| 1— Compressor Pulley | 4— Tension Pulley |
| 2— Crank Pulley | 5— Bolt |
| 3— Bolt | |

VD76477,000154F -19-18JUN07-1/1

TX1001241 —UN—20DEC05

Take Engine Oil Sample

See your authorized dealer.

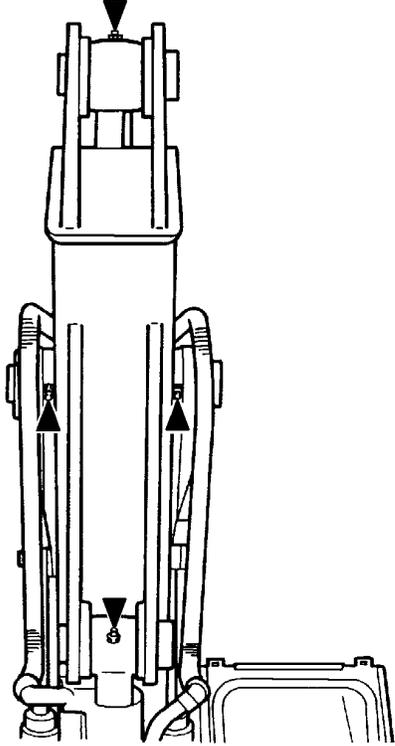
OUT4001,000039B -19-14MAR12-1/1

Maintenance—Every 500 Hours

Grease Front End Pin Joints

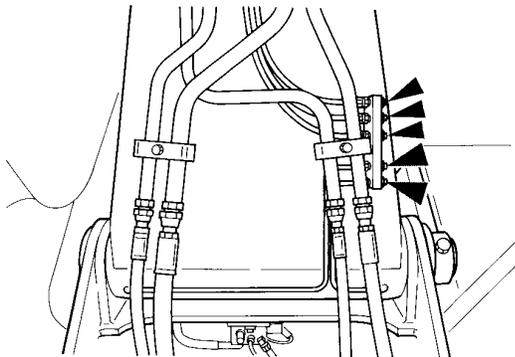
Grease front end pin joints (15 points) until grease escapes from joints. Grease every 4 hours for first 20

hours. Grease every 10 hours during first 30—100 hours and when working in mud and water.



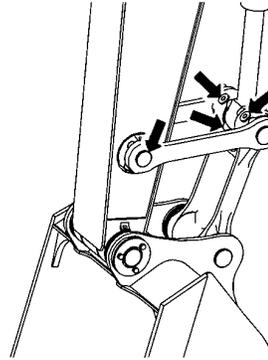
Four Points

T134954 —UN—01NOV00



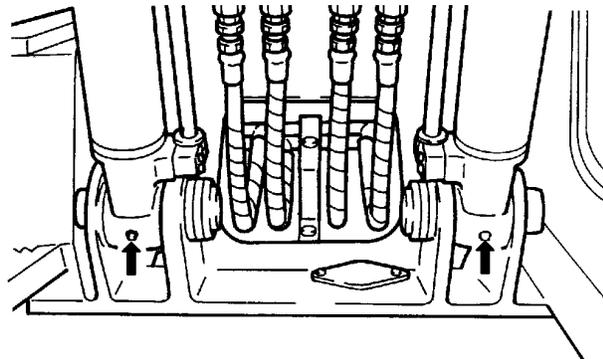
Five Points

T134956 —UN—01NOV00



Four Points

T153896 —UN—11APR02



Two Points

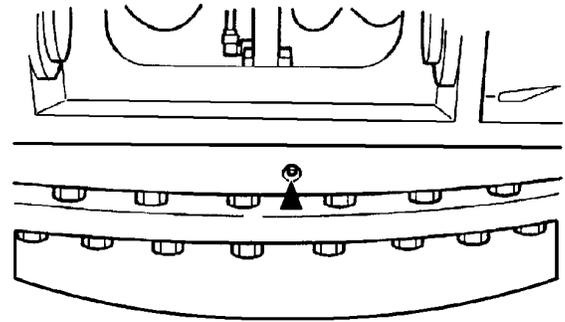
T153897 —UN—11APR02

TX14740,0001EB5 -19-11APR02-1/1

Grease Swing Bearing

CAUTION: Prevent possible injury from unexpected machine movement if controls are moved by another person. Lubricating swing bearing and rotating the upperstructure must be done by one person. Before you lubricate swing bearing, clear the area of all persons.

1. Park machine on a level surface.
2. Stop engine.
3. Lubricate swing bearing with 10 shots of grease at both grease fittings.
4. Start engine. Raise bucket several inches off the ground and turn upperstructure 45 degrees.
5. Repeat steps 2—4 three times.



NOTE: It is not necessary to start the engine the last time.

TX14740,0001C73 -19-02NOV00-1/1

T134968 —UN—01NOV00

Grease Swing Bearing Gear

CAUTION: Prevent possible injury from unexpected machine movement if controls are moved by another person. Lubricating swing bearing gear and rotating the upperstructure must be done by one person.

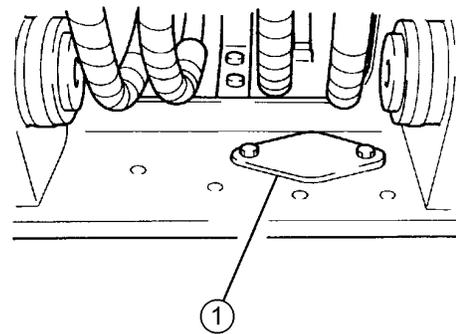
1. Remove swing bearing gear access cover (1).
2. Grease must be 13—25 mm (1/2—1 in.) deep measured from the bottom of the ring gear. The grease must also be free of contamination by dirt and water.

If the grease is contaminated, remove grease and replace with clean grease.

IMPORTANT: If water or mud is found in swing gear area, see **Operating in Water and Mud** in Section 2-2.

3. Add grease as required (When grease bath is completely dry or after running in mud or water swing bearing gear capacity is approximately 4.5 kg (10 lb).

IMPORTANT: Excessive grease can damage the swing gearbox seal.



1— Access Cover

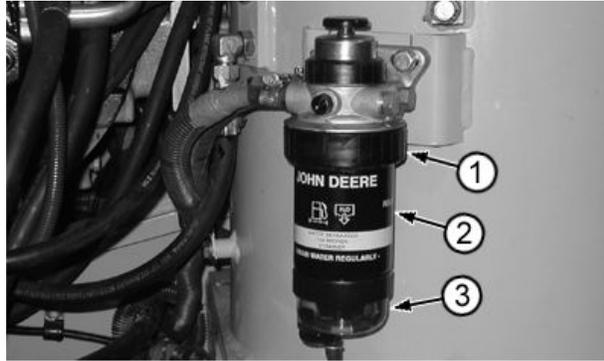
4. Remove any excess grease from over the top of the swing drive pinion.
5. Install access cover.

TX14740,0001E05 -19-07JAN02-1/1

T149747 —UN—15JAN02

Replace Water Separator

1. Turn retaining ring (1) counterclockwise to remove filter (2). Allow sediment to drain into a container. Dispose of waste properly.
2. Turn sediment bowl (3) counterclockwise to remove from filter assembly. Clean bowl.
3. Install new filter. (Follow instructions on filter.)
4. Install sediment bowl.
5. Bleed fuel system.



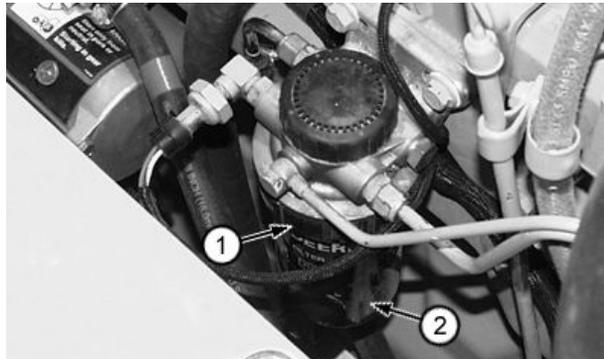
- 1— Retaining Ring 3— Sediment Bowl
2— Water Separator

T150382B —UN—18JAN02

TX14740,0001E16 -19-18JAN02-1/1

Replace Fuel Filter

1. Turn retaining ring (1) clockwise to remove filter (2). Allow sediment to drain into a container. Dispose of waste properly.
2. Clean filter base.
3. Install new filter. Follow instructions on filter.
4. Bleed fuel system.



- 1— Retaining Ring 2— Fuel Filter

T145740B —UN—19SEP01

TX14740,0001C81 -19-15APR02-1/1

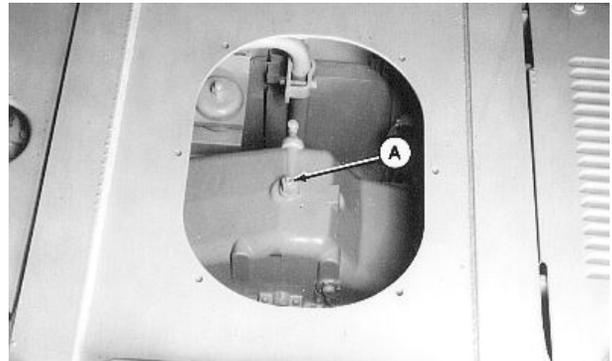
Change Engine Oil And Replace Filter

1. Run engine to warm oil.
2. Park machine on a level surface and stop engine.
3. Remove drain plug (A) from bottom of engine oil pan, or open drain valve on side of engine oil pan. Allow oil to drain into a container. Dispose of waste oil properly.
4. Turn filter (located behind engine block) counterclockwise to remove. Clean mounting surface on base.
5. Apply thin film of oil to rubber gasket of new filter.
6. Install new filter. Turn filter clockwise by hand until gasket touches mounting surface.
7. Tighten filter 1/2—3/4 turn more.
8. Install drain plug or close drain valve.
9. Remove filler cap.

Specification

Engine Oil With Filter
 Change—Capacity..... 14.0 L (15.0 qt)

10. Fill engine with oil.
11. Install filler cap.



T102302—UN—30JUL96

A—Drain Plug

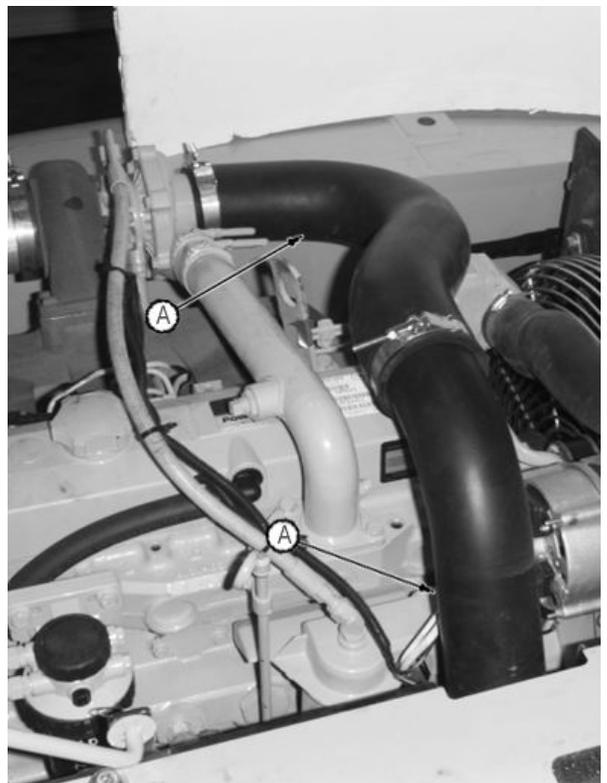
12. Start engine. Engine oil pressure indicator on monitor must go out within 15-20 seconds. If not, stop engine immediately and find the cause.
 13. Stop engine. Check oil level.
- Check for any leakage at filter. Tighten filter just enough to stop leakage.

TX14740,0001DF9 -19-04JAN02-1/1

Check Air Intake Hoses

Check hoses (A) for cracks. Replace as necessary.
 Tighten clamps.

A—Air Intake Hose



T106654E—UN—12DEC96

TX.80.DH5352 -19-14DEC96-1/1

Clean Cab Fresh Air and Recirculating Air Filters

IMPORTANT: Replace filters every 6th cleaning.

Removing Cab Fresh Air Filter:

1. Tilt cab seat forward.
2. Push both sides of filter cover (1) and lift filter cover to remove.
3. Lift fresh air filter (2) straight up to remove.

Removing Cab Recirculating Air Filter:

NOTE: Recirculating air filter is located under rear deck.

1. Pull clips (4) and remove outer filter (3).
2. Remove inner filter behind outer filter.

Cleaning and Installing Filters

1. Clean filters in one of 3 ways:
 - Tap filter on a flat surface with dirty side down.

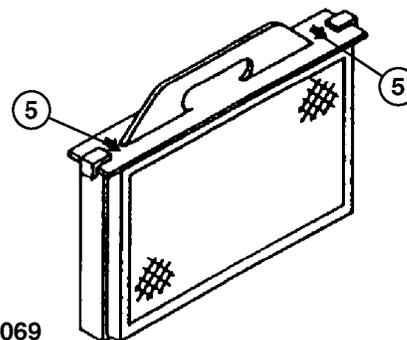
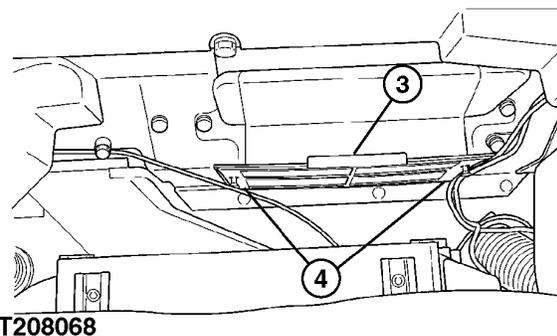
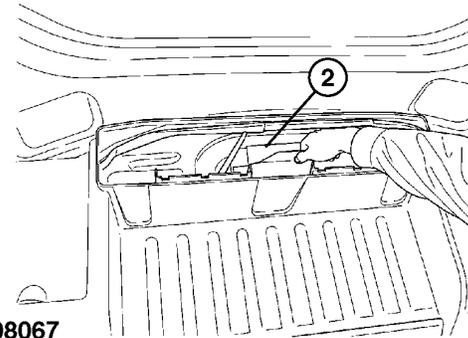
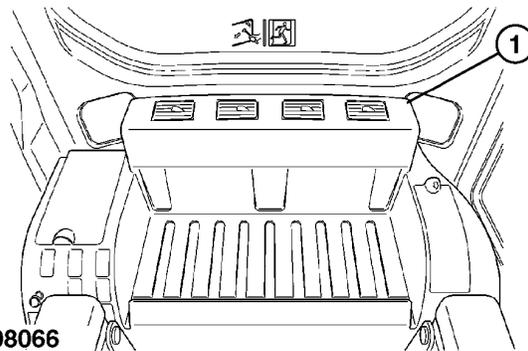
⚠ CAUTION: Reduce compressed air to less than 196 kPa (1.96 bar) (28.4 psi) when using for cleaning purposes. Clear area of bystanders, guard against flying chips, and wear personal protection equipment including eye protection.

- Use compressed air opposite to the normal air flow.
- Wash filter in warm, soapy water. Flush filter. Allow filter to dry before using heater, defroster, or air conditioner.

NOTE: Install fresh air filter so the stamped arrows (5) are toward the air conditioner.

2. Install filter.
3. Install filter cover (1).
4. Install recirculating air filter with the clips (4) aligned with the duct mounting holes.

- | | |
|----------------------------|--------------------------|
| 1—Filter Cover | 4—Clip (2 used) |
| 2—Fresh Air Filter | 5—Stamped Arrow (2 used) |
| 3—Recirculating Air Filter | |



T208066 —UN—10FEB05

T208067 —UN—10FEB05

T208068 —UN—10FEB05

T208069 —UN—10FEB05

VD76477,000018E -19-24JAN07-1/1

Maintenance—Every 1000 Hours

Change Swing Gearbox Oil

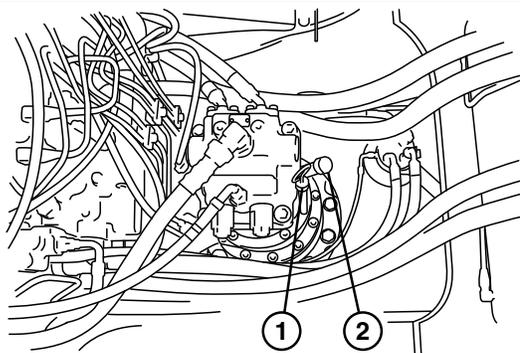
120C—Specification

Swing Gearbox—Oil
Capacity.....2.6 L (2.8 qt)

160CLC—Specification

Swing Gearbox—Oil
Capacity.....4.5 L (5.0 qt)

1. Remove plug mounted on end of drain pipe to drain oil into a container. Dispose of waste oil properly.
2. Install plug.
3. Remove filler cap (2) and add oil.
4. Install filler cap.
5. Check oil level on dipstick (1).



1—Dipstick

2—Filler Cap

TX14740,0001ED2 -19-06JUN02-1/1

T149730 —UN—15JAN02

Replace Hydraulic Oil Tank Filter

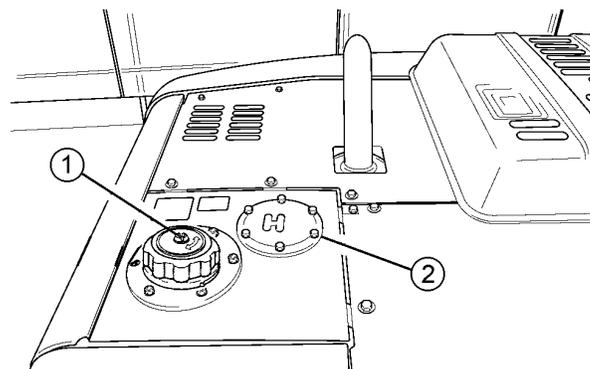
1. Park machine on a level surface with arm cylinder fully retracted and bucket cylinder fully extended.
2. Stop engine.

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. DO NOT remove hydraulic cap. Relieve pressure by SLOWLY loosening cap.

3. SLOWLY loosen cap (1) to relieve pressure.
4. Hold down filter cover (2) against light spring load when removing the last two cap screws.

1—Hydraulic Cap

2—Hydraulic Oil Tank Filter Cover



Continued on next page

VD76477,00000E3 -19-18MAY06-1/2

T6811A1 —UN—18OCT88

T152655 —UN—13MAR02

5. Remove spring (3), valve (5), and filter element (4).
6. Remove and discard filter element and O-ring (6).

NOTE: Remove element and inspect for metal particles and debris in bottom of filter canister. Excessive amounts of brass and steel particles can indicate a hydraulic pump, motor, or valve malfunction, or a malfunction in process. A rubber type of material can indicate cylinder packing problem.

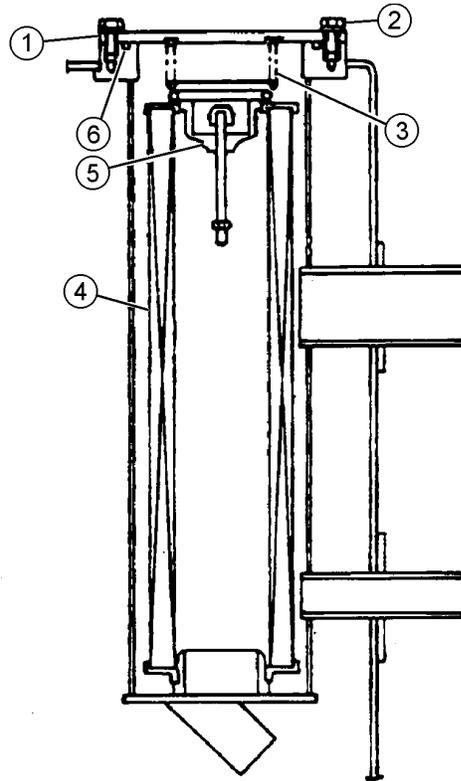
7. Install filter element, valve, and spring.
8. Install cover (1) and tighten cap screws (2).

Specification

Cap Screw—Torque..... 49 N·m (36 lb-ft)

9. Tighten cap.

- | | |
|-------------|------------------|
| 1—Cover | 4—Filter Element |
| 2—Cap Screw | 5—Valve |
| 3—Spring | 6—O-Ring |



VD76477,00000E3 -19-18MAY06-2/2

T135192—UN—06NOV00

Clean the Engine Crankcase Ventilation Tube

Clean the engine crankcase ventilation tube.

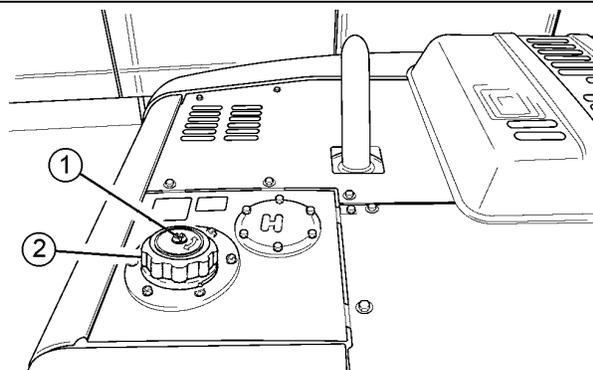
TX,85,DH5151 -19-28JUN06-1/1

Replace Pilot System Oil Filter

⚠ CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. **DO NOT** remove hydraulic cap. Relieve pressure by **SLOWLY** loosening cap.

1. **SLOWLY** loosen cap (1) to relieve hydraulic pressure.

- | | |
|-----------------|----------------------------|
| 1—Hydraulic Cap | 2—Hydraulic Oil Tank Cover |
|-----------------|----------------------------|



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TX14740,0001E6B -19-12MAR02-1/2

T152652—UN—13MAR02

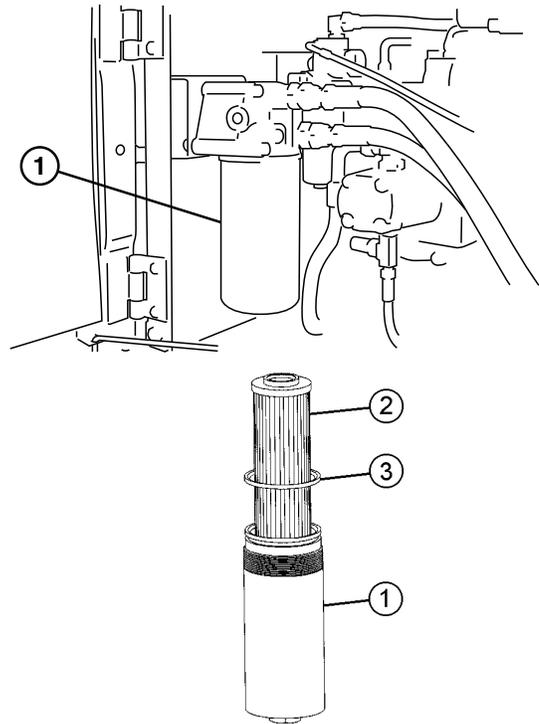
2. Remove filter canister (1).
3. Remove filter element (2).
4. Remove O-ring (3).
5. Install new O-ring and filter element.

Specification

Filter Canister—Torque..... 39 N·m (29 lb-ft)

6. Install filter canister.
7. Tighten hydraulic cap.

- | | |
|--------------------|-----------|
| 1— Filter Canister | 3— O-Ring |
| 2— Filter Element | |



TX14740,0001E6B -19-12MAR02-2/2

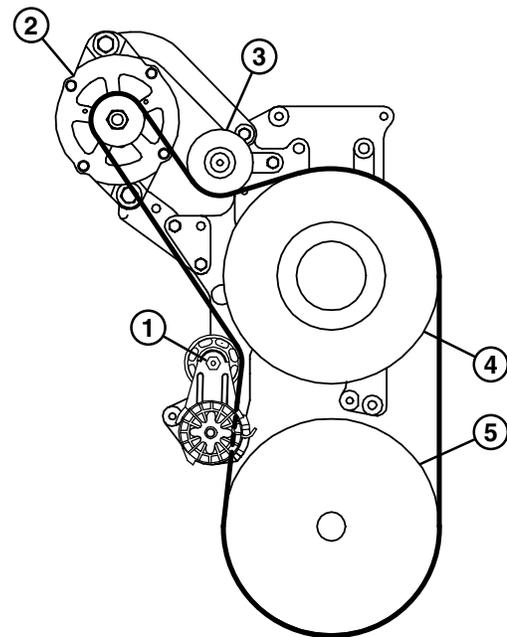
T149890 —UN—15JAN02

T136461 —UN—19DEC00

Inspect Fan Belt

1. Check belt regularly for wear, especially for cracks at the bottom of grooves and for frayed edges.
2. If necessary, replace belt.
3. Install a 15 mm wrench to the TOP pulley (1) of belt tension adjuster. Turn wrench counterclockwise to pull tension adjuster pulley away from belt, releasing belt tension.
4. Hold tension adjuster away from belt while removing old belt and installing new belt.
5. Slowly release wrench tension to allow tension adjuster to move clockwise against new belt. Tension is automatically adjusted.
6. Remove wrench.

- | | |
|-------------------------------------|----------------------|
| 1— Belt Tension Adjuster Top Pulley | 4— Fan Pulley |
| 2— Alternator | 5— Crankshaft Pulley |
| 3— Idler Pulley | |



T136624

CED,OUOE003,8534 -19-14NOV00-1/1

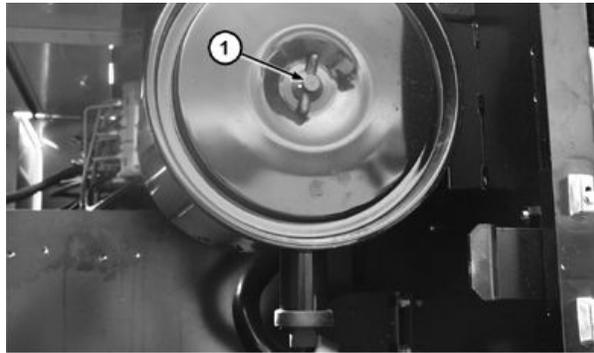
T136624 —UN—15DEC00

Replace Air Cleaner Elements

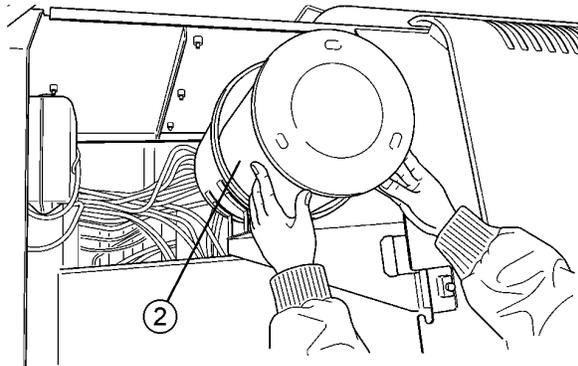
1. Loosen clamps (1) to remove cover.
2. Remove primary element (2).
3. Remove secondary element.
4. Clean the inside of filter canister.
5. Install elements, making sure the secondary element is centered in canister.
6. Install cover, tighten clamps.

1—Clamps

2—Primary Element



T147443C—UN—02NOV01



T139485—UN—18DEC00

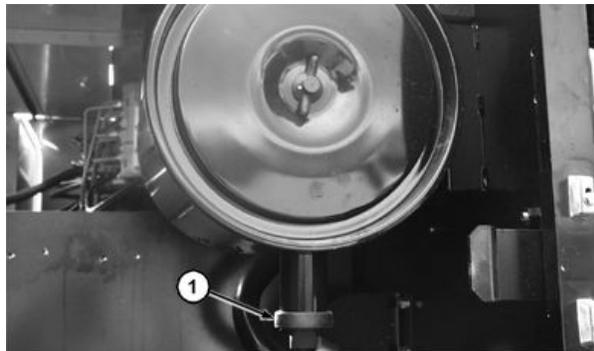
TX14740,0001CB4 -19-15FEB02-1/1

Replace Air Cleaner Dust Valve

NOTE: A missing, damaged, or hardened dust valve will cause the air filter elements to be ineffective.

Replace dust valve (1).

1—Air Cleaner Dust Valve



T147443B—UN—02NOV01

TX14740,0001CB5 -19-15FEB02-1/1

Maintenance—Every 2000 Hours

Drain Cooling System

Drain and flush cooling system using commercial products, replace radiator cap, and refill with new coolant.

1. Check coolant hoses for cracks and leaks. Replace if necessary.
2. Tighten clamps.
3. Check radiator and oil cooler for dirt, grease, leaks, and loose or broken mountings. Clean radiator and oil cooler fins.

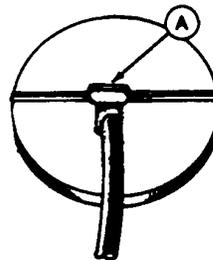
⚠ CAUTION: Prevent possible injury from hot spraying water. DO NOT remove radiator filler cap unless engine is cool. Then turn cap slowly to the stop.

4. Release air to relieve pressure. Remove filler cap.

Specification

Cooling System—Refill
Capacity..... 26.5 L (7.0 gal)

5. Turn radiator drain valve (A) counterclockwise to open valve. Allow coolant to drain into a container. Dispose of waste coolant properly.



A—Drain Valve

6. Turn engine block drain valve (located behind rear of injection pump) counterclockwise to drain engine block. Drain coolant into a container. Dispose of waste properly.

T6457EY—UN—18OCT88

TX14740,0001E1E -19-07FEB02-1/1

Diesel Engine Coolant (engine with wet sleeve cylinder liners)

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

COOL-GARD is a trademark of Deere & Company

- 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
- 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. Distilled, 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.

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.

DX,COOL3 -19-15MAY13-1/1

Cooling System Fill and Deaeration Procedure

Specification

Cooling System—Refill
Capacity.....26.5 L (7.0 gal)

IMPORTANT: Use only permanent-type low silicate ethylene glycol base antifreeze in coolant solution. Other types of antifreeze may damage cylinder seals.

FREEZING TEMPERATURES: Fill with permanent-type, low silicate, ethylene glycol antifreeze (without stop-leak additive) and clean, soft water.

Fill

Fill radiator to the bottom of the radiator fill neck.

Fill the recovery tank to FULL mark.

Deaeration

The cooling system requires several warm-up and cool down cycles to deaerate. It will NOT deaerate during

normal operation. Only during warm-up and cool down cycles will the system deaerate.

1. Start engine. Run engine until coolant reaches a warm temperature.
2. Stop engine. Allow coolant to cool.
3. Check coolant level at recovery tank.
4. Repeat Steps 1—3 until recovery tank coolant level is repeatedly at the same level (stabilized).

NOTE: The level of the coolant in the cooling system MUST BE repeatedly checked after all drain and refill procedures to insure that all air is out of the system which allows the coolant level to stabilize. Check coolant level only when the engine is cold.

5. If necessary, fill recovery tank to FULL mark.
6. Install recovery tank and radiator caps.

TX14740,0001E1F -19-26OCT06-1/1

Adjust Engine Valve Lash

See your authorized dealer for engine valve clearance adjustment.

AM40430,0000082 -19-05APR10-1/1

Change Travel Gearbox Oil

1. Park the machine on level ground rotating travel gearbox until bottom of the oil level check plug (2) is even with the horizontal centerline (4).
2. Stop engine.

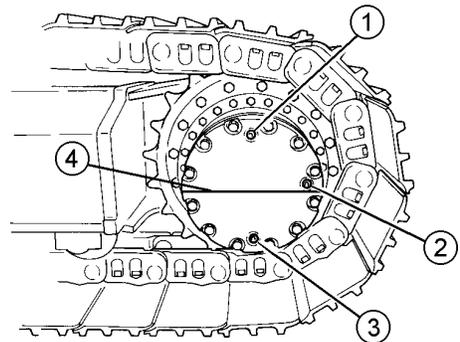
CAUTION: High pressure release of oils from pressurized system can cause serious burns. Wait for travel gearbox oil to cool. Keep body and face away from check plug. Gradually loosen check plug to release pressure.

3. After travel gearbox has cooled, slowly loosen check plug to release pressure.

Specification

Travel Gearbox—Oil
Capacity (each).....3.2 L (3.4 qt)

4. Remove drain plug (3). Allow oil to drain into a container. Dispose of waste oil properly.
5. Wrap threads of drain plug with a sealing-type tape. Install plug. Tighten plug to 49 N·m (430 lb-in.).
6. Remove oil fill plug (1).



1— Fill Plug
2— Check Plug

3— Drain Plug
4— Horizontal Centerline

7. Add oil until oil flows out of oil level check plug hole.
8. Wrap threads of check plug and fill plug with sealing-type tape. Install plugs. Tighten plugs to 49 N·m (36 lb-ft).
9. Change oil of second travel gearbox.

TX14740,0001E1C -19-26OCT06-1/1

T1 34964 —UN—01NOV00

Maintenance—Every 4000 Hours

Change Hydraulic Tank Oil and Clean Suction Screen—120C

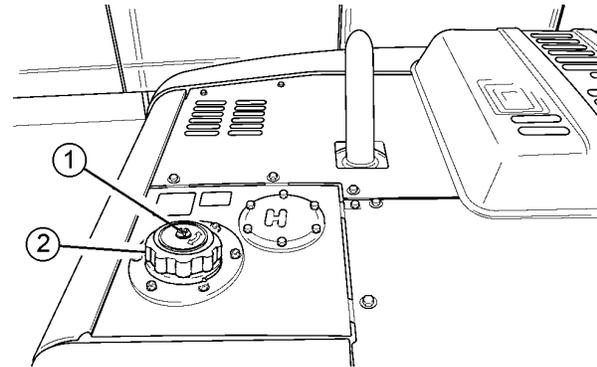
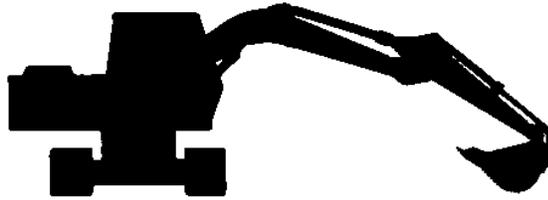
NOTE: Change original factory fill hydraulic oil after first 4000 hours. Change every 4000 hours thereafter if using Super EX 46HN, if using alternative oils, see Hydraulic Oil. (Section 3-1.)

IMPORTANT: Prevent damage to hydraulic system components. **DO NOT** run engine without oil in the tank.

Avoid mixing different brands or types of oils. Oil manufacturers engineer their oils to meet certain specifications and performance requirements. Mixing different oil types can degrade lubricant and machine performance.

This excavator is factory filled with Super EX 46HN extended life zinc-free hydraulic oil. Avoid servicing this excavator with products that do not meet this specification. If oils have been mixed or if alternate service oils are desired, the complete hydraulic system needs to be totally flushed by an authorized dealer.

1. Park machine on level surface with upperstructure rotated 90° for easier access.
2. Position machine with arm cylinder fully retracted and bucket cylinder fully extended.
3. Stop engine.



1— Hydraulic Oil Cap

2— Hydraulic Oil Tank Cover

TX14740,0001E77 -19-14JUN07-1/6

T6811AJ—UN—18OCT88

T152652—UN—13MAR02

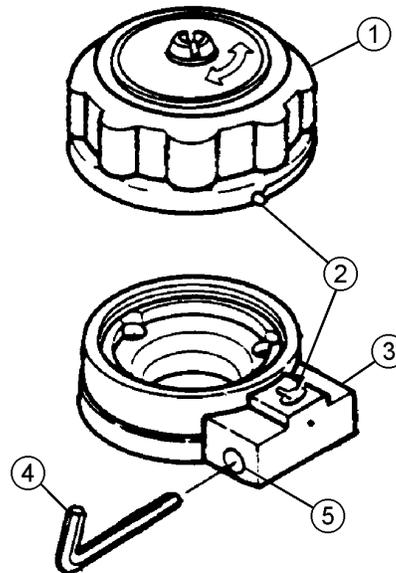
CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. **DO NOT** remove hydraulic cap. Relieve pressure by **SLOWLY** loosening cap.

4. Insert 4 mm hex wrench (4) into hole (5) and turn counterclockwise to release locking pin.
5. Slowly turn cap (1) counterclockwise a few degrees to relieve pressure. Remove cap.

Specification

Hydraulic Oil
 Tank—Capacity..... 76.0 L
 20.0 gal

- | | |
|-------------------|---------------|
| 1— Cap | 4— Hex Wrench |
| 2— Aligning Marks | 5— Hole |
| 3— Case Assembly | |



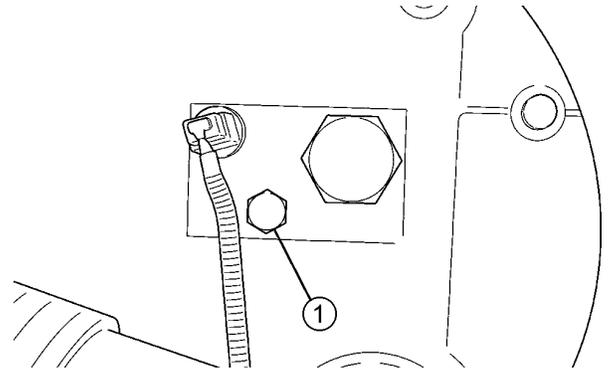
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TX14740,0001E77 -19-14JUN07-2/6

T135189—UN—06NOV00

- Remove drain plug (1). Allow oil to drain into a container. Dispose of waste oil properly.

1— Drain Plug



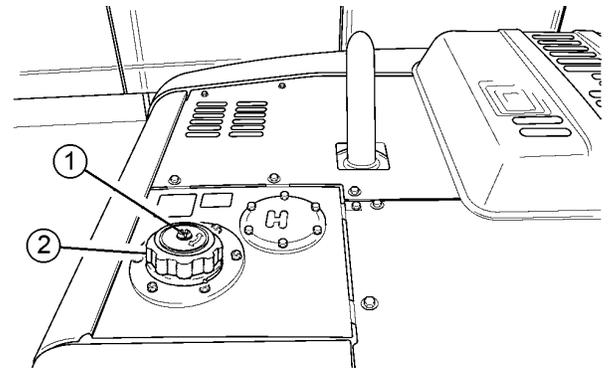
TX14740,0001E77 -19-14JUN07-3/6

T136450 —UN—18DEC00

- Remove cover (2) with suction screen.
- Clean inside of tank and suction screen.
- Replace hydraulic oil filter.
- Replace pilot system oil filter.

1— Hydraulic Oil Cap

2— Hydraulic Oil Tank Cover



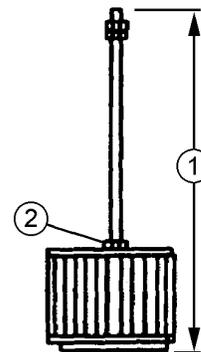
TX14740,0001E77 -19-14JUN07-4/6

T152652 —UN—13MAR02

- Install suction screen with cover. Suction screen must seal against outlet pipe in bottom of tank. If necessary, loosen nut (2) to adjust rod length.
- Install tank drain plug.
- Add oil until it is between marks on sight glass.

Specification

Suction Screen Rod	
(1)—Length.....	732 mm
	28.8 in.
Suction Screen Rod	
Nut—Torque.....	14.7—19.6 N·m
	10.8—14.5 lb-ft
Hydraulic Cover Cap	
Screw—Torque.....	49 N·m
	36 lb-ft



1— Suction Screen Rod

2— Suction Screen Rod Nut

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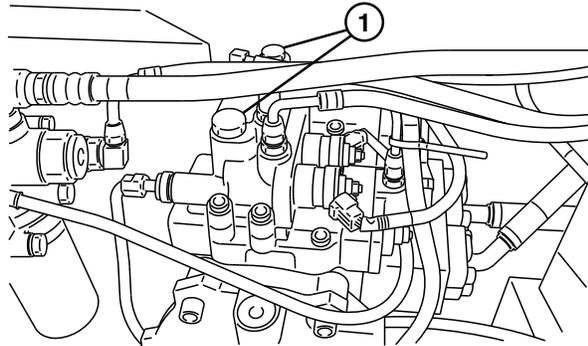
TX14740,0001E77 -19-14JUN07-5/6

T135193 —UN—06NOV00

IMPORTANT: If the hydraulic pump is not filled with oil, it will be damaged when the engine is started.

14. Remove air bleed plugs (1) from hydraulic pump and add oil until oil flows from bleed holes.
15. Install air bleed plugs in hydraulic pump.
16. Check oil level in sight glass. Add oil, if necessary. Install tank cap. Tighten cap.
17. Purge air from cylinders and swing motor by cycling hydraulic functions.

1—Bleed Plug



T148898 —UN—15JAN02

TX14740,0001E77 -19-14JUN07-6/6

Change Hydraulic Tank Oil and Clean Suction Screen—160CLC

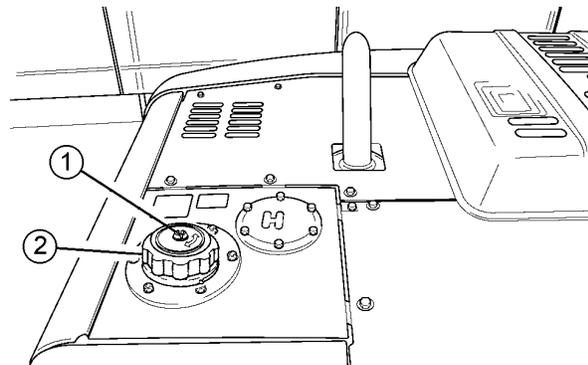
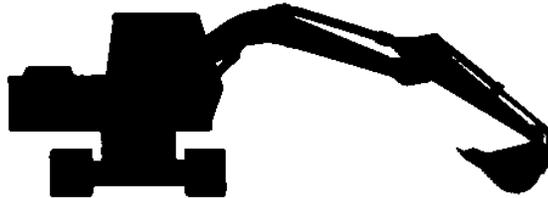
NOTE: Change original factory fill hydraulic oil after first 4000 hours. Change every 4000 hours thereafter if using Super EX 46HN, if using alternative oils, see Hydraulic Oil. (Section 3-1.)

IMPORTANT: Prevent damage to hydraulic system components. DO NOT run engine without oil in the tank.

Avoid mixing different brands or types of oils. Oil manufacturers engineer their oils to meet certain specifications and performance requirements. Mixing different oil types can degrade lubricant and machine performance.

This excavator is factory filled with Super EX 46HN extended life zinc-free hydraulic oil. Avoid servicing this excavator with products that do not meet this specification. If oils have been mixed or if alternate service oils are desired, the complete hydraulic system needs to be totally flushed by an authorized dealer.

1. Park machine on level surface with upperstructure rotated 90° for easier access.
2. Position machine with arm cylinder fully retracted and bucket cylinder fully extended.
3. Stop engine.



1—Hydraulic Oil Cap

2—Hydraulic Oil Tank Cover

T6811AJ —UN—18OCT88

T152652 —UN—13MAR02

Continued on next page

TX14740,0001E78 -19-14JUN07-1/6

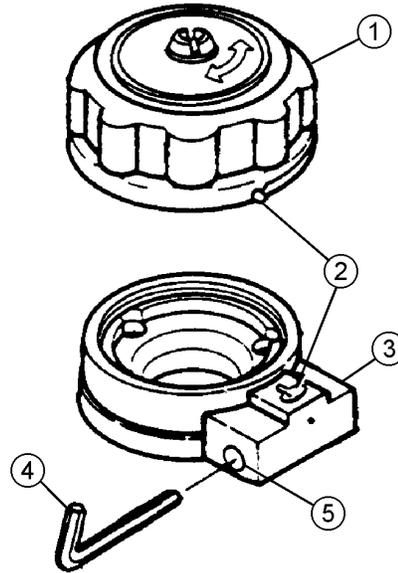
CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. **DO NOT** remove hydraulic cap. Relieve pressure by **SLOWLY** loosening cap.

4. Insert 4 mm hex wrench (4) into hole (5) and turn counterclockwise to release locking pin.
5. Slowly turn cap (1) counterclockwise a few degrees to relieve pressure. Remove cap.

Specification

Hydraulic Oil
 Tank—Capacity..... 76.0 L (20.0 gal)

- | | |
|-------------------|---------------|
| 1— Cap | 4— Hex Wrench |
| 2— Aligning Marks | 5— Hole |
| 3— Case Assembly | |

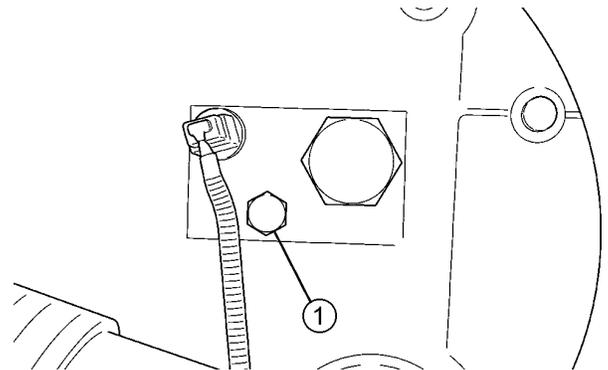


T135189—UN—06NOV00

TX14740,0001E78 -19-14JUN07-2/6

6. Remove drain plug (1). Allow oil to drain into a container. Dispose of waste oil properly.

- 1— Drain Plug

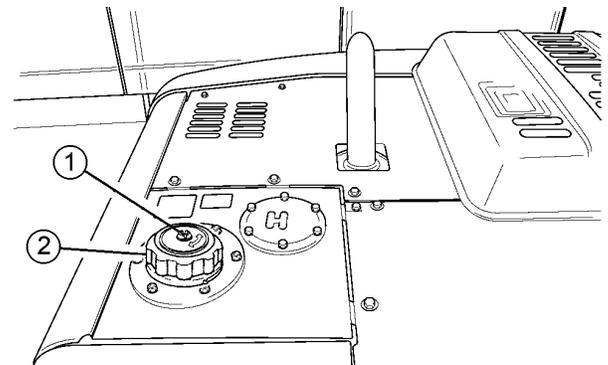


T136450—UN—18DEC00

TX14740,0001E78 -19-14JUN07-3/6

7. Remove cover (2) with suction screen.
8. Clean inside of tank and suction screen.
9. Replace hydraulic oil filter.
10. Replace pilot system oil filter.

- 1— Hydraulic Oil Cap 2— Hydraulic Oil Tank Cover



T152652—UN—13MAR02

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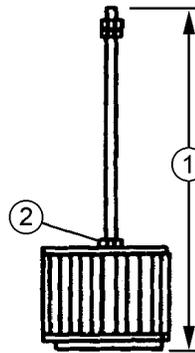
TX14740,0001E78 -19-14JUN07-4/6

11. Install suction screen with cover. Suction screen must seal against outlet pipe in bottom of tank. If necessary, loosen nut (2) to adjust suction screen rod (1) length.
12. Install tank drain plug.
13. Add oil until it is between marks on sight glass.

Specification

Suction Screen Rod	
(1)—Length.....	732 mm (28.8 in.)
Suction Screen Rod	
Nut—Torque.....	14.7—19.6 N·m (10.8—14.5 lb-ft)
Hydraulic Cover Cap	
Screw—Torque.....	49 N·m (36 lb-ft)

- 1—Suction Screen Rod 2—Suction Screen Rod Nut



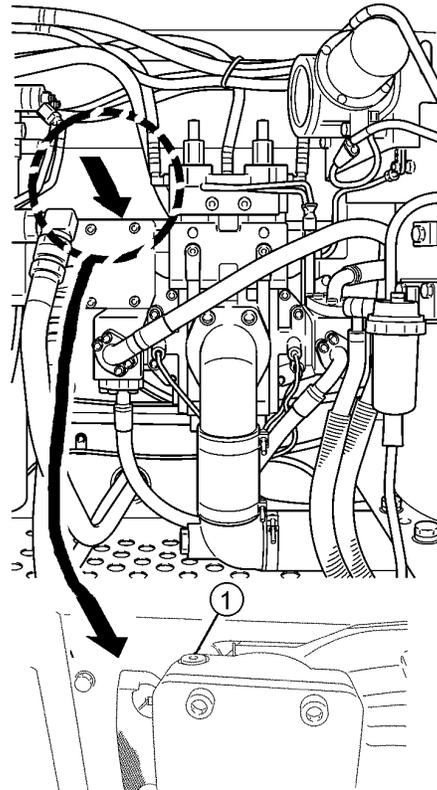
T135193—UN—06NOV00

TX14740,0001E78 -19-14JUN07-5/6

IMPORTANT: If the hydraulic pump is not filled with oil, it will be damaged when the engine is started.

14. Remove air bleed plug (1) from top of hydraulic pump and add oil until oil flows from bleed hole.
15. Install air bleed plug in hydraulic pump.
16. Check oil level in sight glass. Add oil, if necessary. Install tank cap. Tighten cap.
17. Purge air from cylinders and swing motor by cycling hydraulic functions.

- 1—Bleed Plug



T152659—UN—13MAR02

TX14740,0001E78 -19-14JUN07-6/6

Miscellaneous—Machine

Do Not Service or Adjust Injection Nozzles or High Pressure Fuel Pump

If injection nozzles are not working correctly or are dirty, the engine will not run normally. (See your authorized dealer for service.)

Changing the injection pump in any way not approved by the manufacturer will end the warranty. (See your copy of the John Deere warranty on this machine.)

Do not service an injection pump that is not operating correctly. (See your authorized injection pump service center.)

TX,90,FF3116 -19-07SEP06-1/1

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 your authorized dealer.

TX,90,FF3114 -19-03JAN07-1/1

Precautions for Alternator and Regulator

When batteries are connected, follow these rules:

1. Disconnect negative (-) battery cable when you work on or near alternator or regulator.
2. Be sure alternator wires are correctly connected BEFORE you connect batteries.
3. Do not ground alternator output terminal.
4. Do not disconnect or connect any alternator or regulator wires while batteries are connected or while alternator is operating.
5. Connect batteries or a booster battery in the correct polarity (positive [+] to positive [+] and negative [-] to negative [-]).
6. Do not disconnect the batteries when engine is running and alternator is charging.
7. Disconnect battery cables before you connect battery charger to the batteries.

T82,EXMA,I -19-03JAN07-1/1

Reading Engine Diagnostic Trouble Codes Without Laptop Computer

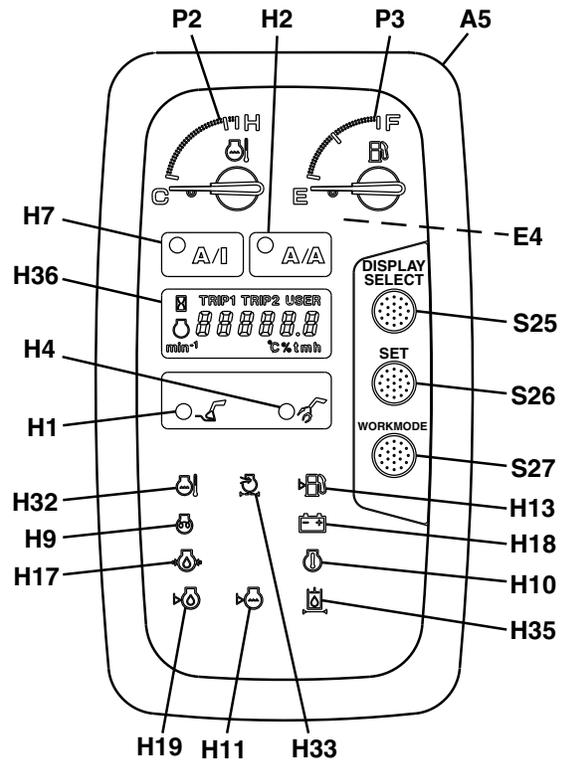
When check engine indicator light is flashing, it indicates an engine diagnostic trouble code (DTC).

Hydraulic DTC's do not cause the check engine indicator light (H10) to flash.

Check engine indicator light and diagnostic trouble code enable jumper can be used to check engine DTC's.

1. When check engine indicator light begins flashing during machine operation, lower the bucket to the ground. Stop the engine.

A5 —Monitor Controller And Display	H18 — Alternator Voltage Indicator Light
E4 — Monitor Controller And Display Backlight	H19 — Engine Oil Level Indicator Light
H1 —Dig Mode Indicator Light	H32 — Engine Coolant Temperature Indicator Light
H2 —Auto-Acceleration Indicator Light	H33 — Air Filter Restriction Indicator Light
H4 —Attachment Mode Indicator Light	H35 — Hydraulic Oil Filter Restriction Indicator Light (field option)
H7 —Auto-Idle Indicator Light	H36 — Monitor Display
H9 —Pre-Heat Indicator Light (not used)	P2 —Engine Coolant Temperature Gauge
H10 — Check Engine Indicator Light	P3 — Fuel Gauge
H11 — Coolant Level Indicator Light	S25 — Display Select Switch
H13 — Fuel Level Indicator Light	S26 — Set Switch
H17 — Engine Oil Pressure Indicator Light	S27 — Work Mode Switch



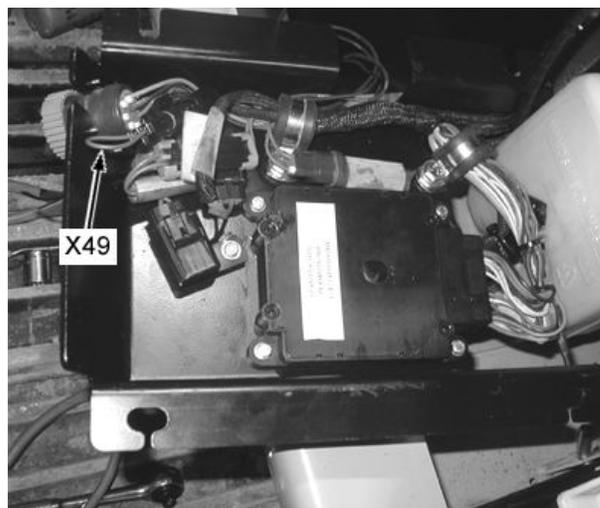
T150503—UN—01FEB02

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VD76477,00000E4 -19-18MAY06-1/2

2. Turn key switch OFF.
3. Tilt cover down to gain access to components attached to its back.
4. Disconnect the diagnostic trouble code enable jumper (X49).
5. Turn key switch ON.
6. The check engine indicator light (H10) will begin to flash a code number. For example, flash three times...short pause...flash two times...long pause. This would be blink code 32.
7. The check engine indicator light begins the flashing sequence by flashing a blink code 32. This indicates the beginning of the active DTC's. If there are any active DTC's, the check engine indicator light will flash its 2 digit blink code. If there is more than one active DTC, the check engine indicator light will flash each blink code in numerical order. If there are no active DTCs, the check engine indicator light will proceed to the stored DTC's.
8. After the active DTC's, the check engine indicator light will flash a blink code 33. This indicates the beginning of the stored DTC's. If there are any stored DTC's, the check engine indicator light will flash its 2 digit blink code. If there is more than one stored DTC, the check engine indicator light will flash each blink code in numerical order. If there are no stored DTC's, the flash sequence will start over with the active DTC's.

For example, if an engine has an active blink code 13 and a stored blink code 25, the flashing sequence would be:



X49— Diagnostic Trouble Code Enable Jumper

- flash three times...short pause
- flash two times...long pause
- flash one time...short pause
- flash three times...long pause
- flash three times...short pause
- flash three times...long pause
- flash two times...short pause
- flash five times...long pause
- sequence repeats

VD76477,00000E4 -19-18MAY06-2/2

T150629B —UN—29JAN02

Engine Diagnostic Trouble Codes

SPN (suspect parameter number)	FMI (failure mode identifier)	FC (flash code)	Code Description
28	3	13	Throttle Reference Voltage High
28	4	14	Throttle Reference Voltage Low
29	3	15	Throttle Ground Voltage High
29	4	16	Throttle Ground Voltage Low
91	3	11	Throttle Input Voltage High
91	4	12	Throttle Input Voltage Low
105	3	25	Manifold Air Temperature Input Voltage High
105	4	26	Manifold Air Temperature Input Voltage Low
105	16	66	Manifold Air Temperature High
110	0	69	Coolant Temp High - High Level (>115C)
110	3	18	Engine Coolant Temperature (ETC) Input Voltage High
110	4	19	Engine Coolant Temperature (ETC) Input Voltage Low
110	15	62	Coolant Temp High - Low Level (>110C)
110	16	63	Coolant Temp High - Moderate Level (>113C)
158	17	84	Controller Cannot Power Down
174	3	37	Fuel Temperature High-Severe Level
174	4	38	Fuel Temperature Voltage "0"
174	16	81	Fuel Temperature High-Moderate Level
620	3	21	Sensor Supply Voltage High
620	4	22	Sensor Supply Voltage Low
629	13	28	Reprogram Controller
637	2	39	Crank Position Input Noise
637	10	39	Crank Position Input Pattern Error
1076	0	71	Injection Pump Detected Defect (fuel control valve response too slow)
1076	1	72	Injection Pump Detected Defect (fuel control valve response too fast)
1076	3	77	Injection Pump Detected Defect (fuel control valve shorted to battery voltage)
1076	5	73	Injection Pump Detected Defect (fuel control valve solenoid circuit open)
1076	6	74	Injection Pump Detected Defect (fuel control valve solenoid circuit shorted to ground)
1076	7	75	Injection Pump Detected Defect (fuel control solenoid fails to close or closes slowly)
1076	10	76	Injection Pump Detected Defect (injection pump control valve current fall time slow)
1569	31	61	Fuel Derate Active
2000	6	79	Injection Pump Detected Defect (injection pump control valve current fall time too long)

TX14740,0001EBE -19-11JUN02-1/1

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

If acid is swallowed:

1. Do not induce vomiting.
2. Drink large amounts of water or milk, but do not exceed 1.9 L (2 qts.).
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.

Check the specific gravity of electrolyte in each battery cell.

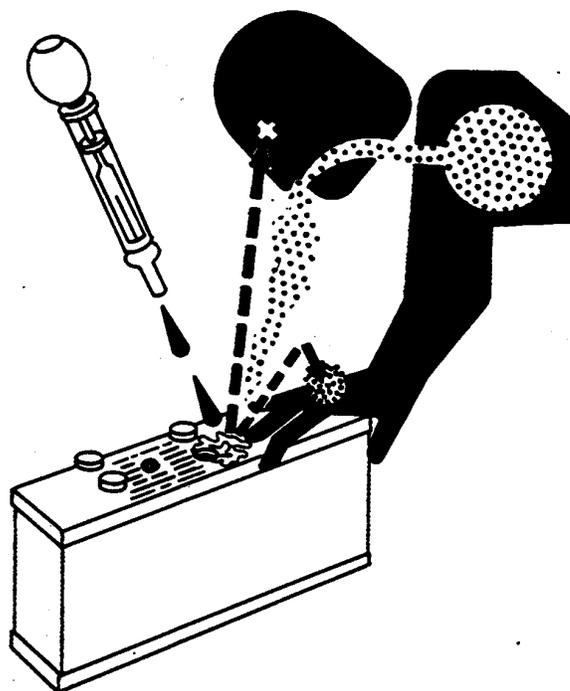
See your authorized dealer for JT05460 SERVICEGARD™ battery and coolant tester. Follow directions included with the tester.

A fully charged battery will have a corrected specific gravity reading of 1.260. If the reading is below 1.200, charge the battery.

SERVICEGARD is a trademark of Deere & Company



Exploding Battery Gas



Battery Electrolyte



Battery and Coolant Tester

TS204—UN—15APR13

TS203—UN—23AUG88

T85402—UN—10NOV88

TX03679,0001788 -19-05MAR13-1/1

Using Battery Charger

CAUTION: Prevent possible injury from exploding battery. Do not charge a battery if the battery is frozen or it may explode. 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 you charge batteries in the machine to prevent damage to electrical components.

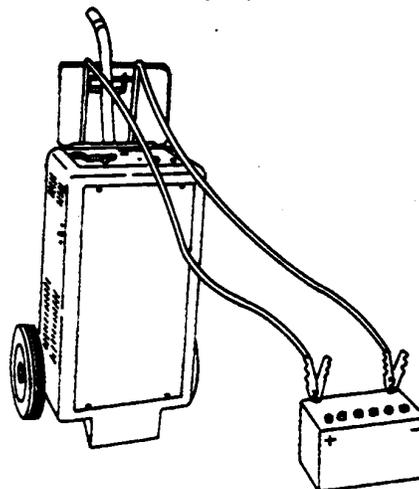
A battery charger may be used as a booster to start engine.

Ventilate the area where batteries are being charged.

Stop or cut back charging rate if battery case feels hot or is venting electrolyte. Battery temperature must not exceed 52°C (125°F).



Prevent Battery Explosions



Charger

TS204—UN—15APR13

N36890—UN—07OCT88

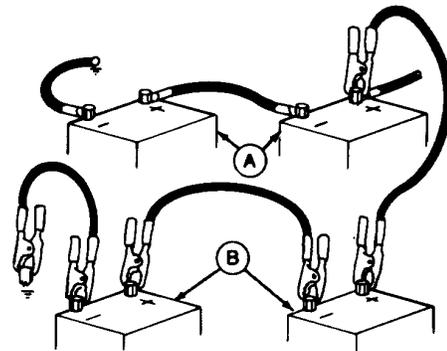
OUT4001.0000239 -19-25MAR15-1/1

Using Booster Batteries—24-Volt System

Before boost starting, machine must be properly shutdown to prevent unexpected machine movement when engine starts.

CAUTION: 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 24-volt negative (-) ground. Connect two 12-volt booster batteries together as shown for 24-volts.



Booster Batteries, 2-Battery Application

1. Connect one end of the positive cable to the positive terminal of the machine batteries (A) and the other end to the positive terminal of the booster batteries (B).
2. Connect one end of the negative cable to the negative terminal of the booster batteries. Connect the other end of the negative cable to the machine frame as far away from the machine batteries as possible.
3. Start engine.
4. Immediately after starting engine disconnect the end of the negative cable from the machine frame. Then

A—Machine Battery (2 used) B—Booster Battery (2 used)

5. Disconnect positive cable from booster batteries and machine batteries.
- disconnect the other end of the negative cable from the negative terminal of the booster batteries.

OUT4001,0000238 -19-11AUG14-1/1

Replacing Batteries

Your machine has two 12-volt batteries with negative (-) ground. Batteries must meet one of the specifications below.

	Specification
Battery—Cold Cranking	
Amps At -18°C (0°F).....	800
Battery—Minutes	
Reserve Capacity At 25	
Amps.....	180

If one battery in a 24-volt system has failed but the other is still good, replace the failed battery with one of the same type. For example, replace a failed maintenance-free battery with a new maintenance-free battery. Different types of batteries may have different rates of charge. This difference could overload one of the batteries and cause it to fail.

TX,90,DH5153 -19-03JAN07-1/1

Welding On Machine

IMPORTANT: Disconnect battery ground strap or turn battery disconnect switch to "OFF" to prevent voltage spikes through alternator or monitor.

Disable electrical power before welding. Turn off main battery switch or disconnect positive

battery cable. Separate harness connectors to engine and vehicle microprocessors.

Connect welder ground clamp close to each weld area so electrical current does not arc inside any bearings.

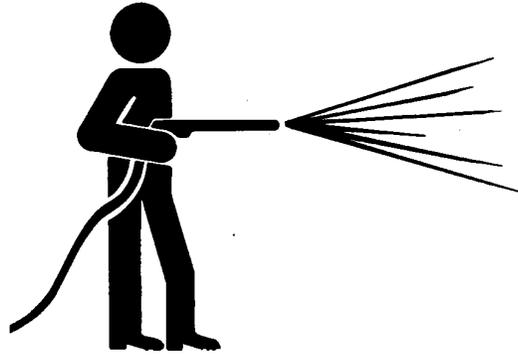
TX,90,DH5140 -19-03JAN07-1/1

Clean Machine Regularly

Remove any grease, oil, fuel, or debris build-up to avoid possible injury or machine damage.

IMPORTANT: Directing pressurized water at electronic/electrical components or connectors, bearings and hydraulic seals, fuel injection pumps or other sensitive parts and components may cause product malfunctions. Reduce pressure and spray at a 45 to 90 degree angle.

High pressure washing (greater than 1379 kPa (13.8 bar) (20 psi) can damage freshly painted finishes. Paint should be allowed to air dry for 30 days minimum after receipt of machine before cleaning with high pressure. Use low pressure wash operations until 30 days have elapsed.



T6642EJ—JN—18OCT88

Do not spray oil cooler fins at an angle. Fins may bend.

TX03679,00017E0 -19-12JUN01-1/1

Adding 12-Volt Accessories

IMPORTANT: This machine has a 24-volt electrical system. Installing 12-volt accessories without addition of 24-volt to 12-volt converter may cause battery failure.

This machine is equipped with a 12-volt, 5-amp outlet.

When possible, use 24-volt accessories. If 12-volt accessories are added, use a 24-volt to 12-volt converter. Converters are available from your John Deere dealer.

Converter capacity requirements depend on the load of the accessories installed. Follow electronic dealer

and manufacturer's recommendations to determine the capacity of the converter required and its installation requirements. If standard equipment, verify if amperage is adequate for application.

IMPORTANT: DO NOT connect an accessory to one battery. Connecting a 12-volt accessory to one battery will cause one battery to overcharge, and the other battery to undercharge, causing battery failure.

TX,90,DH3734 -19-09JAN08-1/1

Replacing Fuses

The fuse box (1) is located behind the seat.

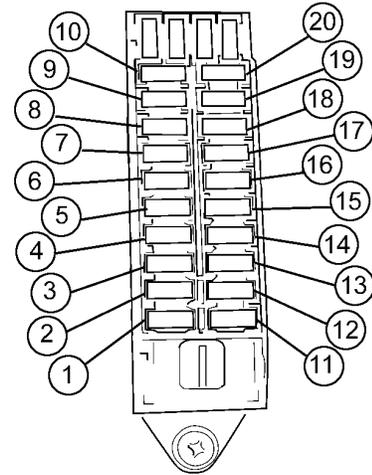
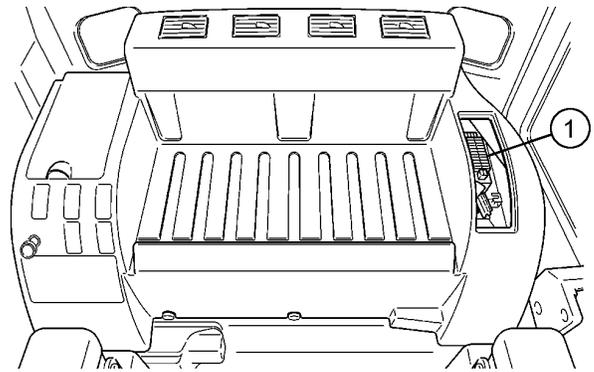
Remove cover.

IMPORTANT: Install fuse with correct amperage rating to prevent electrical system damage from overload.

Fuse (Blade-Type) Color Codes

Amperage Rating	Color
1	Black
3	Violet
4	Pink
5	Tan
7-1/2	Brown
10	Red
15	Light Blue
20	Yellow
25	Natural (white)
30	Light Green

- | | |
|---|---|
| 1— 5 Amp—Radio And Monitor Controller Backup | 11— 20 Amp—Work And Drive Lights (marked Lamp) |
| 2— 5 Amp—Pump And Valve Controller | 12— 10 Amp—Windshield Wiper And Washer |
| 3— Not Used | 13— 20 Amp—Air Con And Heater (marked Heater) |
| 4— 10 Amp—Solenoid | 14— 10 Amp—Horn |
| 5— 5 Amp—Switch Panel | 15— 5 Amp—Radio |
| 6— 5 Amp—Engine Control Unit (marked Pow. On) | 16— 10 Amp—Lighter |
| 7— 5 Amp—Air Conditioner And Heater (marked Aircon) | 17— 5 Amp—Dome Light (marked Room Lamp) |
| 8— 5 Amp—Optional | 18— 10 Amp—Aux |
| 9— 10 Amp—Optional | 19— 5 Amp—Propel Alarm |
| 10— 5 Amp—Optional | 20— 20 Amp—Start Aid (optional) (marked Glow Relay) |



T140322 —UN—22MAR01

T140484 —UN—28MAR01

JH91824.00001F0 -19-02JUL08-1/1

Replacing Bucket Teeth

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

IMPORTANT: Angle the drift toward the bucket to avoid damaging the rubber pin lock.

1. Use a hammer and drift to drive out locking pin.

NOTE: Alternate buckets may use different tooth assemblies.

2. Remove tooth.



Bucket Teeth

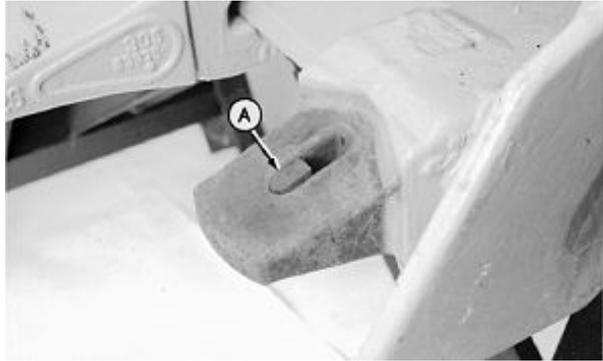
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04T.90.M16 -19-28MAR11-1/3

T85784 —UN—10NOV88

3. Inspect rubber pin lock (A) for damage. Replace if necessary.
4. If rubber pin lock has moved, reposition in slot in adapter tooth shank.

A—Rubber Pin Lock



Rubber Pin Lock

T95785 —UN—10NOV88

04T,90,M16 -19-28MAR11-2/3

5. Position the new tooth over the tooth shank.
6. Drive the locking pin into the hole fully.

NOTE: Check bucket teeth periodically so that wear does not extend to the bucket tooth shank.



Tooth Shank

T95786 —UN—10NOV88

04T,90,M16 -19-28MAR11-3/3

Replacing Bucket Tooth Tip—Heavy-Duty Bucket

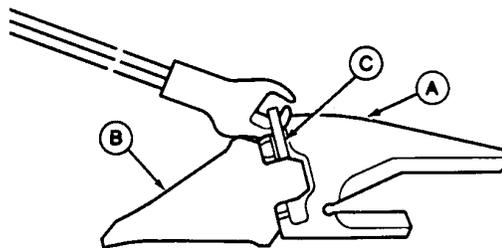
1. Clean tooth (A) and tooth tip (B).
2. Insert lock removal tool under U-shaped pin (C).

CAUTION: Avoid possible injury. Pin may fly after it is released from tooth tip. Keep a firm grip on pin to prevent injury.

3. Remove pin.
4. Turn tooth tip counterclockwise and pull tooth tip towards you to remove.
5. Clean tooth shank.
6. Replace U-shaped pin at same time you replace tooth tip.
7. Insert tooth tip on shank turning tip clockwise.
8. Install U-shaped pin. Side of pin marked "FRONT" (D) must face tooth tip. Make sure pin is firmly engaged over tooth tip.

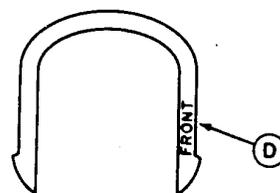
A—Tooth
B—Tooth Tip

C—Pin
D—"Front" Mark



T6879EE

Bucket Tooth Tip—Heavy-Duty Bucket



U-Shaped Pin—Heavy-Duty Bucket

04T,90,K273 -19-18AUG14-1/1

T6879EE—UN—06DEC88

T7527DO—UN—27JUN91

Adjusting Bucket to Arm Joint

Your machine has a bucket adjustment system to take up play. When play increases, remove shims as follows:

1. Slide O-ring out of way.



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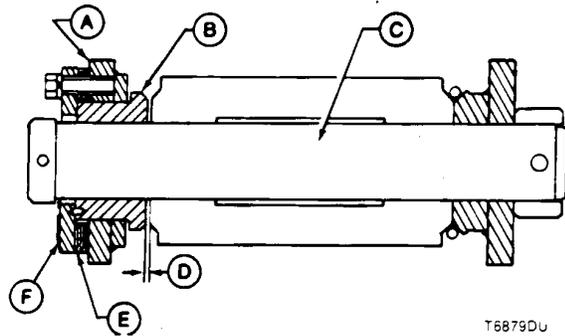
04T,90,M210 -19-03JUL07-1/3

T95775—UN—10NOV88

2. Measure distance (D) between the bushing (B) and the arm. This distance should not be adjusted below 0.5 mm (0.020 in.).
3. Remove plate (F).

A—Bucket
B—Bushing
C—Pin

D—Clearance
E—Shim
F—Plate



T6879DU

T6879DU — UN — 06DEC88

04T,90,M210 -19-03JUL07-2/3

NOTE: Alternate buckets may have different adjustment procedures.

4. Remove shim(s) according to distance measured. This will allow the bushing to move to the right and take up the excessive play.
5. Install plate and tighten cap screws.
6. Slide O-ring back into position.



T95788 — UN — 10NOV88

04T,90,M210 -19-03JUL07-3/3

Removing Bucket

1. Lower bucket to the ground.
2. Remove snap rings and locking pins.
3. Slide O-ring seals out of way. Remove bucket pins.
4. Install bucket. For bucket adjustment, see Adjusting Bucket To Arm Joint in this section.

04T,90,M35 -19-16NOV00-1/1

Track Sag General Information

To maximize undercarriage life, keep track sag within specification. Tracks may require adjustment several times during a working day due to changing soil type and moisture content.

Adjust tracks in the actual operating conditions.

TIGHT TRACK: Packing causes a tight track. If material packs in the undercarriage, adjust tracks with the material packed in the components.

While the track spring will recoil and the machine can continue to operate with a tight track, continued operation

will result in excessive pin and bushing wear, sprocket popping, tooth tip wear, and excessive loads on the entire undercarriage and propel drive system.

Machine productivity and fuel consumption are also adversely affected because increased horsepower is needed to move the machine.

LOOSE TRACK: A loose track has more side to side motion, increasing side wear on the links, rollers and front idler. An excessively loose track will slap at high ground speeds, resulting in high impact loads on the sprocket teeth, bushings, and carrier rollers.

JH91824,00001F1 -19-02JUL08-1/1

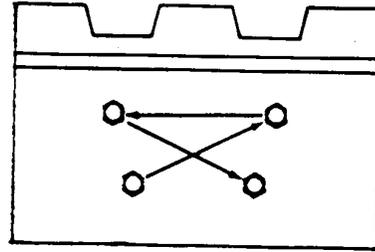
Check Track Shoe Hardware

Tracks shoes should be checked periodically for loose or missing cap screws and nuts. For shoes with missing or loose cap screws and nuts, remove shoes and clean the mating surface of shoes and links before tightening cap screws and nuts. The cap screws should be replaced because they have been stretched to yield previously.

Operating a machine with loose shoes can cause the cap screws and holes in the shoes and links to wear making it difficult to keep the shoes tight. Loose shoes can also cause hardware failure and loss of shoes.

1. Clean the mating surface of shoe and links. Install shoes.
2. Apply a light coating of oil to cap screw threads before installing.
3. Install nuts with the rounded corners against milled surface of link and chamfered side is away from link.

Check that nuts are square with the milled surface of link and there is full contact between nut and milled surface. As necessary, hold the nut so it does not turn.



IMPORTANT: To avoid machine damage tighten cap screws to torque specification using a crisscross pattern. Then repeat torque pattern again.

4. Tighten cap screws using torque-turn method.

Specification

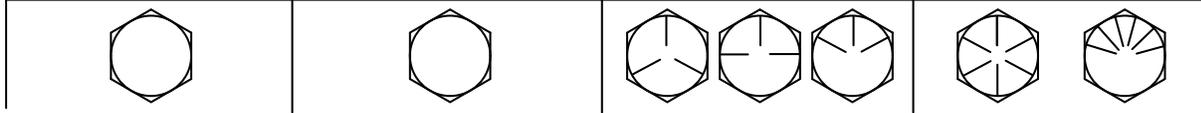
Cap Screws—Torque.....	244 N·m
	180 lb-ft

TX14740,0001CFC -19-12NOV09-1/1

T6352AH—UN—23FEB89

Unified Inch Bolt and Screw Torque Values

TS1671 —UN—01MAY03



Bolt or Screw Size	SAE Grade 1				SAE Grade 2 ^a				SAE Grade 5, 5.1 or 5.2				SAE Grade 8 or 8.2			
	Lubricated ^b		Dry ^c		Lubricated ^b		Dry ^c		Lubricated ^b		Dry ^c		Lubricated ^b		Dry ^c	
	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	3.7	33	4.7	42	6	53	7.5	66	9.5	84	12	106	13.5	120	17	150
													N·m	lb.-ft.	N·m	lb.-ft.
5/16	7.7	68	9.8	86	12	106	15.5	137	19.5	172	25	221	28	20.5	35	26
									N·m	lb.-ft.	N·m	lb.-ft.				
3/8	13.5	120	17.5	155	22	194	27	240	35	26	44	32.5	49	36	63	46
			N·m	lb.-ft.	N·m	lb.-ft.	N·m	lb.-ft.								
7/16	22	194	28	20.5	35	26	44	32.5	56	41	70	52	80	59	100	74
	N·m	lb.-ft.														
1/2	34	25	42	31	53	39	67	49	85	63	110	80	120	88	155	115
9/16	48	35.5	60	45	76	56	95	70	125	92	155	115	175	130	220	165
5/8	67	49	85	63	105	77	135	100	170	125	215	160	240	175	305	225
3/4	120	88	150	110	190	140	240	175	300	220	380	280	425	315	540	400
7/8	190	140	240	175	190	140	240	175	490	360	615	455	690	510	870	640
1	285	210	360	265	285	210	360	265	730	540	920	680	1030	760	1300	960
1-1/8	400	300	510	375	400	300	510	375	910	670	1150	850	1450	1075	1850	1350
1-1/4	570	420	725	535	570	420	725	535	1280	945	1630	1200	2050	1500	2600	1920
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2140	1580	2700	2000	3400	2500
1-1/2	990	730	1250	930	990	730	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

Torque values listed are for general use only, based on the strength of the bolt or screw. DO NOT use these values if a different torque value or tightening procedure is given for a specific application. For plastic insert or crimped steel type lock nuts, for stainless steel fasteners, or for nuts on U-bolts, see the tightening instructions for the specific application. Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Replace fasteners with the same or higher grade. If higher grade fasteners are used, tighten these to the strength of the original. Make sure fastener threads are clean and that you properly start thread engagement. When possible, lubricate plain or zinc plated fasteners other than lock nuts, wheel bolts or wheel nuts, unless different instructions are given for the specific application.

^aGrade 2 applies for hex cap screws (not hex bolts) up to 6 in. (152 mm) long. 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.

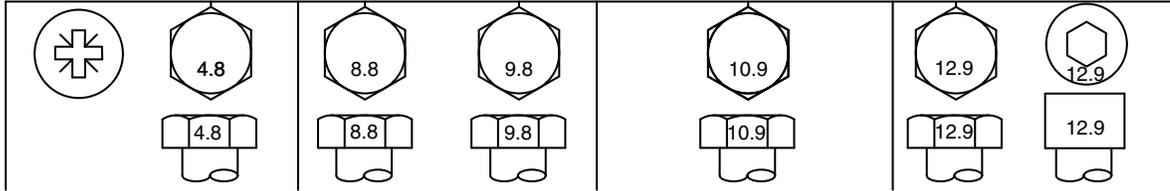
^b"Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or 7/8 in. and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.

^c"Dry" means plain or zinc plated without any lubrication, or 1/4 to 3/4 in. fasteners with JDM F13B, F13E or F13H zinc flake coating.

DX,TORQ1 -19-12JAN11-1/1

Metric Bolt and Screw Torque Values

TS1670 —UN—01MAY03



Bolt or Screw Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated ^a		Dry ^b		Lubricated ^a		Dry ^b		Lubricated ^a		Dry ^b		Lubricated ^a		Dry ^b	
	N·m	lb.-in.	N·m	lb.-in.												
M6	4.7	42	6	53	8.9	79	11.3	100	13	115	16.5	146	15.5	137	19.5	172
M8	11.5	102	14.5	128	22	194	27.5	243	32	23.5	40	29.5	37	27.5	47	35
M10	23	204	29	21	43	32	55	40	63	46	80	59	75	55	95	70
M12	40	29.5	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	46	80	59	120	88	150	110	175	130	220	165	205	150	260	190
M16	100	74	125	92	190	140	240	175	275	200	350	255	320	235	400	300
M18	135	100	170	125	265	195	330	245	375	275	475	350	440	325	560	410
M20	190	140	245	180	375	275	475	350	530	390	675	500	625	460	790	580
M22	265	195	330	245	510	375	650	480	725	535	920	680	850	625	1080	800
M24	330	245	425	315	650	480	820	600	920	680	1150	850	1080	800	1350	1000
M27	490	360	625	460	950	700	1200	885	1350	1000	1700	1250	1580	1160	2000	1475
M30	660	490	850	625	1290	950	1630	1200	1850	1350	2300	1700	2140	1580	2700	2000
M33	900	665	1150	850	1750	1300	2200	1625	2500	1850	3150	2325	2900	2150	3700	2730
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2770	4750	3500

Torque values listed are for general use only, based on the strength of the bolt or screw. DO NOT use these values if a different torque value or tightening procedure is given for a specific application. For stainless steel fasteners or for nuts on U-bolts, see the tightening instructions for the specific application. Tighten plastic insert or crimped steel type lock nuts by turning the nut to the dry torque shown in the chart, unless different instructions are given for the specific application.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class. 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 fastener threads are clean and that you properly start thread engagement. When possible, lubricate plain or zinc plated fasteners other than lock nuts, wheel bolts or wheel nuts, unless different instructions are given for the specific application.

^a"Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or M20 and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.

^b"Dry" means plain or zinc plated without any lubrication, or M6 to M18 fasteners with JDM F13B, F13E or F13H zinc flake coating.

Miscellaneous—Operational Checkout

Operational Checkout

Use this procedure to check all systems and functions on the machine. It is designed so you can make a quick check of machine operation while doing a walk around inspection and performing specific checks from the operator's seat.

Should you experience a problem with your machine, you will find helpful diagnostic information in this checkout that will pinpoint the cause. This information may allow you to perform a simple adjustment yourself which will reduce the down time of your machine. Use the table of contents to help find adjustment procedures.

The information you provide after completing the operational checkout will allow you or your authorized dealer to pinpoint a specific test or repair needed to restore the machine to design specifications.

A location will be required which is level and has adequate space to complete the checks. No tools or equipment are needed to perform the checkout.

Complete the necessary visual checks (oil levels, oil condition, external leaks, loose hardware, linkage, wiring, etc.) prior to doing the checkout. The machine must be at operating temperature for many of the checks.

Start at the top of the left column and read completely down column before performing check. Follow this sequence from left to right. In the far right column, if no problem is found, you will be instructed to go to next check. If a problem is indicated, you will be referred to either a section in this manual or to your authorized dealer for repair.

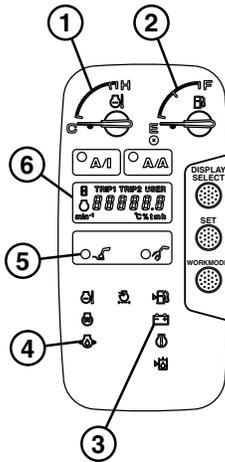
VD76477,00000E6 -19-12SEP12-1/27

Operator Station Checks—Key Switch On, Engine Off

Continued on next page

VD76477,00000E6 -19-12SEP12-2/27

**Gauges, Monitor, And
Battery Disconnect
Relay Checks**



T189134 —UN—02APR03

- 1— Engine Coolant Temperature Gauge
- 2— Fuel Gauge
- 3— Alternator Voltage Indicator
- 4— Engine Oil Pressure Indicator
- 5— Dig Mode Indicator
- 6— Monitor Display

NOTE: Monitor buzzer is not checked during this procedure.

NOTE: If engine coolant temperature is below 30°C (86°F) engine temperature gauge needle may not move to the right. Run engine a few minutes to warm coolant before check.

Engine OFF.

Key switch ON.

Does battery relay click?

Do engine coolant temperature gauge (1) and fuel gauge (2) needles move to the right?

Do all monitor indicators light and after 2—3 seconds only the alternator voltage indicator (3), engine oil pressure indicator (4), and dig mode indicator (5) remain lit?

Does monitor display (6) show 888888.8 for 2—3 seconds, then indicate machine hours?

YES: Go to next check.

NO: Check monitor fuse 1 in the fuse box.

NO: Check and replace bulb if any bulb fails to come on. Go to your authorized dealer.

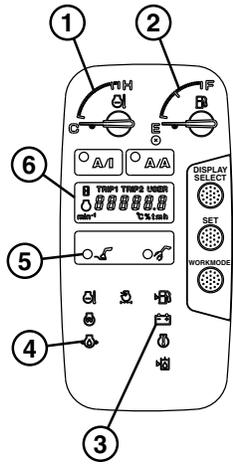
VD76477,00000E6 -19-12SEP12-3/27

Operator Station Checks—Engine On

Continued on next page

VD76477,00000E6 -19-12SEP12-4/27

Monitor Circuit, Gauge Checks



T189134 —UN—02APR03

- 1— Engine Coolant Temperature Gauge
- 2— Fuel Gauge
- 3— Alternator Voltage Indicator
- 4— Engine Oil Pressure Indicator
- 5— Dig Mode Indicator
- 6— Monitor Display

Start engine.

Are all monitor indicator lights OFF after engine starts except for the dig mode indicator (5)?

Is coolant temperature gauge needle (1) in normal operating zone after a few minutes?

Does fuel gauge (2) indicate fuel level?

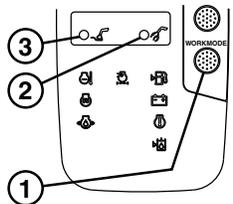
Does monitor display (6) indicate machine hours?

YES: Go to next check.

NO: Check alternator belt if alternator voltage indicator lights after engine starts. Go to your authorized dealer.

VD76477,00000E6 -19-12SEP12-5/27

Work Mode Circuit Checks



T189135 —UN—02APR03

- 1— Mode Selection Switch
- 2— Dig Mode Indicator
- 3— Attachment Mode Indicator

Auto-idle/auto-acceleration switch OFF.

Pilot shutoff lever in LOCKED position.

Push work mode selection switch (1) to select desired work mode.

Do corresponding dig mode (2) or attachment mode (3) indicators light as switch is pushed?

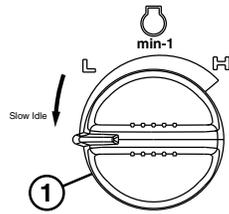
YES: Go to next check.

NO: Check fuse 1 in fuse box. Go to your authorized dealer.

Continued on next page

VD76477,00000E6 -19-12SEP12-6/27

Engine Speed Dial Checks



T137611 —UN—05FEB01

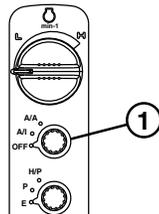
1— Engine Speed Dial

Start engine.
 Auto-idle/auto-acceleration switch OFF.
 Move engine speed dial (1) clockwise.
 Does engine speed increase?
 Move engine speed dial counterclockwise.
 Does engine speed decrease?

YES: Go to next check.
NO: Go to your authorized dealer.

VD76477,00000E6 -19-12SEP12-7/27

Auto-Idle/Auto-Acceleration Circuit Check



T137676 —UN—02FEB01

1— Auto-Idle/Auto-Acceleration Switch

Run engine at fast idle.
 Power mode switch in H/P mode.
 Auto-idle/auto-acceleration switch OFF.
 Pilot shutoff lever in UNLOCKED position.
 Move auto-idle/auto-acceleration switch (1) to A/I.
 Does auto-idle indicator come on?
 Does engine speed decrease after 4 seconds?
 Slowly actuate any dig function control lever.
 Does engine speed return to fast idle?
 Move auto-idle/auto-acceleration switch to A/A.
 Do auto-idle and auto-acceleration indicators come on?
 Does engine speed decrease after 4 seconds?
 Slowly actuate any dig function control lever.
 Does engine speed return to pre-set higher rpm?

YES: Go to next check.
NO: Check fuse 1 in fuse box. Go to your authorized dealer.

Continued on next page

VD76477,00000E6 -19-12SEP12-8/27

Pilot Shutoff Valve Checks



T7351CC —UN—22AUG90

Run engine at slow idle.

Pilot shutoff lever in LOCKED (rearward) position.

Actuate all dig and travel function controls.

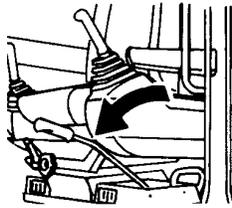
Do any dig or travel functions operate?

YES: Go to your authorized dealer.

NO: Continue check.

VD76477,00000E6 -19-12SEP12-9/27

Pilot Shutoff Valve Checks—(Continued)



T7351CB —UN—22AUG90

Move pilot shutoff lever to UNLOCKED position (forward).

Operate all dig and travel functions.

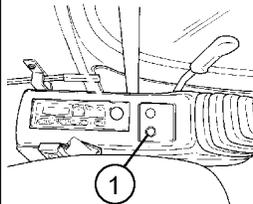
Do all functions operate?

YES: Go to next check.

NO: Go to your authorized dealer.

VD76477,00000E6 -19-12SEP12-10/27

Travel Alarm and Travel Alarm Cancel Switch Checks



T141257 —UN—12APR01

1—Travel Alarm Cancel Switch

Pilot shutoff lever in UNLOCKED position (forward).

Push travel pedals or levers forward or pull travel pedals or levers rearward.

Does travel alarm sound?

Push travel pedals or levers and allow travel alarm to operate for a minimum of 15 seconds.

While continuing travel, push travel alarm cancel switch (1).

Does travel alarm stop sounding?

YES: Go to next check.

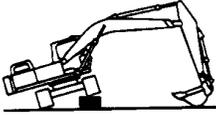
NO: Check fuse 19 in fuse box. Go to your authorized dealer.

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VD76477,00000E6 -19-12SEP12-11/27

Miscellaneous—Operational Checkout

Pilot Controller Pattern Check	Engine at slow idle. Operate machine in clear area. Move pilot shutoff lever to UNLOCKED position. Slowly move hydraulic levers to all positions on decals. Do bucket, boom, arm, and swing move as decals show? See Section 2-2 for more detailed information.	YES: Go to next test. NO: Install decals for pattern (operator preference). Go to your authorized dealer. VD76477,00000E6 -19-12SEP12-12/27
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Swing Circuit Leakage Check	 T6479AZ —UN—19OCT88 Engine at slow idle. Position machine on a side hill or raise one side of machine 300 mm (1 ft) with the boom and ease block under track. Raise bucket 300 mm (1 ft) off the ground at maximum reach. Bottom bucket cylinder and hold lever in the actuated position. <i>NOTE: Actuating the bucket function releases the mechanical swing brake.</i> Does upperstructure move only slightly?	YES: Go to next check. NO: Go to your authorized dealer. VD76477,00000E6 -19-12SEP12-13/27
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Dig Function Drift Check	 T6290AF —UN—19OCT88 Engine at slow idle. Fill bucket with dirt and position bucket at maximum reach with bucket 2 in. (50 mm) above ground. Observe bucket for 1 minute. Does bucket drift down to ground within 1 minute?	YES: Go to your authorized dealer. NO: Go to next check. Continued on next page VD76477,00000E6 -19-12SEP12-14/27
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**Control Valve Lift
Check Test**



T6292AZ —UN—19OCT88

Engine at slow idle.

Position machine as illustrated.

Slowly actuate pilot controller to lower boom, extend arm (retract cylinder), and dump bucket (retract cylinder).

Do functions move in opposite direction as control levers are moved, then change direction as levers are moved further?

YES: If functions move in opposite direction first, a leak within the cylinder or lift check valve is indicated. Go to your authorized dealer.

NO: Go to next check.

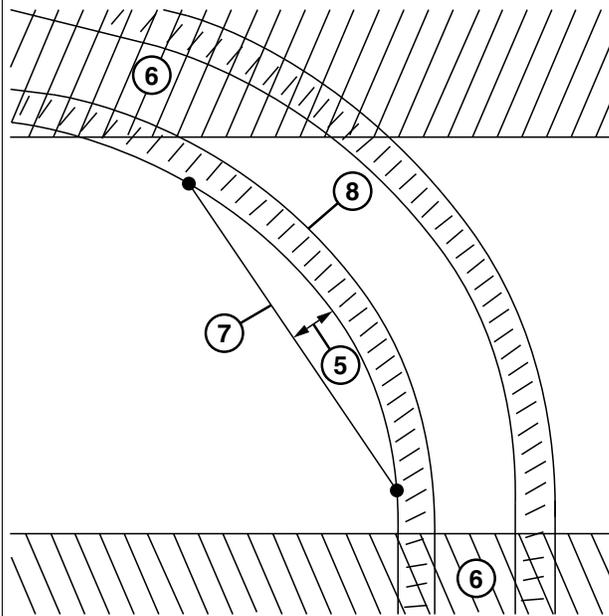
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VD76477,00000E6 -19-12SEP12-15/27

Travel System Tracking Checks (Travel Only)

Engine at fast idle.

Travel speed switch in fast position.



TX1120481 —UN—17AUG12

Tracking Check

5— Distance of Mistrack

6— Acceleration and Deceleration Zone (approximately): 3—5 m (10—16 ft.)

7— Test Line (distance): 20 m (66 ft.)

8— Track Print

Operate machine at full travel forward speed on a flat and level surface approximately 30 m (99 ft.).

NOTE: When machine mistracks right, hydraulic pump 1 circuit oil flow may be less than specification. When machine mistracks left, hydraulic pump 2 circuit oil flow may be less than specification.

Observe direction of mistrack.

Create a straight test line 20 m (66 ft.) (7) long between two points on track print (8).

Measure and record greatest distance of mistrack (5) between inside edge of track print and test line.

Repeat procedure in reverse travel.

LOOK: Do both tracks move and machine does not mistrack excessively in forward or reverse?

YES: Go to next check.

NO: Note which track does not move, or if machine mistracks note the mistrack pattern. Go to your authorized dealer.

VD76477,00000E6 -19-12SEP12-16/27

Travel System Tracking Checks (While Operating A Digging Function)

Engine at fast idle.

Travel speed switch in fast position.

Drive machine at full speed forward on a flat and level area.

After machine is moving, slowly move the arm control lever from neutral to full actuation to extend the arm.

Does machine mistrack excessively when the arm is extended?

NOTE: Machine will slow down during this test.

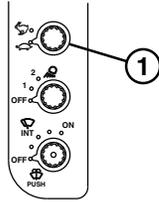
YES: Go to your authorized dealer.

NO: Go to next check.

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VD76477,00000E6 -19-12SEP12-17/27

Travel Speed Selection Check



T137725 —UN—02FEB01

1— Travel Speed Switch

Engine at fast idle.
 Travel speed switch in fast position.
 Park machine on a level area.
 Move travel speed switch (1) to slow speed position.
 Does engine speed decrease?

YES: Go to next check.
NO: Go to your authorized dealer.

VD76477,00000E6 -19-12SEP12-18/27

Cycle Times Check—120C

Engine at fast idle.
 Auto-idle/auto-acceleration switch OFF.
 Travel speed switch in fast position
 Record cycle time for each function.

Specification

Boom Raise (cylinder extend)—Cycle Time (seconds).....	2.7 ± 0.3
Boom Lower (cylinder retract)—Cycle Time (seconds).....	2.3 ± 0.3
Blade Raise From Ground (cylinder retract)—Cycle Time (seconds).....	1.0 ± 0.3
Blade Lower To Ground (cylinder extend)—Cycle Time (seconds).....	0.9 ± 0.3
Arm In (cylinder extend)—Cycle Time (seconds).....	3.3 ± 0.3
Arm Out (cylinder retract)—Cycle Time (seconds).....	2.3 ± 0.3
Bucket Load (cylinder extend)—Cycle Time (seconds).....	3.5 ± 0.3
Bucket Dump (cylinder retract)—Cycle Time (seconds).....	2.1 ± 0.3
Swing Left Or Right, 3 Revolutions From A Running Start—Cycle Time (seconds).....	13.1 ± 1.0
Track Raised For 3 revolutions From A Running Start. Check In Forward And Reverse With Travel Speed Switch In FAST Position.—Cycle Time (seconds).....	14.0 ± 1.0
Track Raised For 3 revolutions From A Running Start. Check In Forward And Reverse With Travel Speed Switch In SLOW Position.—Cycle Time (seconds).....	22.7 ± 2.0

Does machine perform within specifications?

YES: Go to next check.

NO: Go to your authorized dealer.

Continued on next page

VD76477,00000E6 -19-12SEP12-19/27

Miscellaneous—Operational Checkout

<p>Cycle Times Check—160CLC</p>	<p>Engine at fast idle.</p> <p>Auto-idle/auto-acceleration switch OFF.</p> <p>Travel speed switch in fast position</p> <p>Record cycle time for each function.</p> <p style="text-align: center;">Specification</p> <p>Boom Raise (cylinder extend)—Cycle Time (seconds)..... 3.2 ± 0.3</p> <p>Boom Lower (cylinder retract)—Cycle Time (seconds)..... 2.5 ± 0.3</p> <p>Arm In (cylinder extend)—Cycle Time (seconds)..... 3.8 ± 0.3</p> <p>Arm Out (cylinder retract)—Cycle Time (seconds)..... 2.8 ± 0.3</p> <p>Bucket Load (cylinder extend)—Cycle Time (seconds)..... 3.5 ± 0.3</p> <p>Bucket Dump (cylinder retract)—Cycle Time (seconds)..... 2.0 ± 0.3</p> <p>Swing Left Or Right, 3 Revolutions From A Running Start—Cycle Time (seconds)..... 13.3 ± 1.0</p> <p>Track Raised For 3 revolutions From A Running Start. Check In Forward And Reverse With Travel Speed Switch In FAST Position.—Cycle Time (seconds)..... 16.1 ± 1.0</p> <p>Track Raised For 3 revolutions From A Running Start. Check In Forward And Reverse With Travel Speed Switch In SLOW Position.—Cycle Time (seconds)..... 28.5 ± 2.0</p> <p>Does machine perform within specifications?</p>	<p>YES: Go to next check.</p> <p>NO: Go to your authorized dealer.</p>
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VD76477,00000E6 -19-12SEP12-20/27

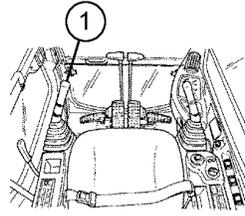
<p>Track Sag Roller And Idler Leakage Checks</p>	<p>Swing upperstructure to side and raise track off ground.</p> <p>Operate track in reverse.</p> <p>Stop engine.</p> <p>Measure distance between top of track shoe to center of lower surface of track frame.</p> <p>Is track sag to specifications?</p> <p><i>NOTE: If track sag is less than specified, track chain wear will be accelerated. If it is less than specified on one side only, the machine may mistrack.</i></p> <p>Check rollers and idlers for oil leaks.</p> <p>Is oil leaking from rollers or idlers?</p> <p>Raise other side of machine and repeat checks.</p> <p>See Section 3-3 for more detailed information.</p>	<p>YES: Go to your authorized dealer for repair if oil leakage is noted from idlers or rollers.</p> <p>NO: Go to next check.</p>
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VD76477,00000E6 -19-12SEP12-21/27

Miscellaneous—Operational Checkout

Horn Circuit Check



T137734 —UN—01FEB01

1—Horn Button

Key switch ON.

Press horn button (1) on top of left control lever.

Does horn sound?

YES: Go to next check.

NO: Check fuse 14 in fuse box. Go to your authorized dealer.

VD76477,00000E6 -19-12SEP12-22/27

Air Conditioner

Engine at fast idle.

Turn air conditioner switch to ON position.

Turn blower switch to high speed.

Wait for any warm air in duct system to dissipate.

Is air from ducts cool?

See Section 2-1 for more detailed information.

YES: Check complete.

NO: Go to your authorized dealer

VD76477,00000E6 -19-12SEP12-23/27

Miscellaneous Checks

VD76477,00000E6 -19-12SEP12-24/27

Seat Control Checks

Does seat raise and lower easily?

Does seat angle change easily?

Does lever unlock easily and then lock to hold seat and consoles in position?

Does lever move easily to unlock seat support?

Does seat move forward and rearward easily?

Does lever lock seat support in position when released?

Does seat back tilt forward and rearward easily?

Does lever unlock and lock easily to hold seat back in position?

See Section 2-1 for more detailed information.

YES: Go to next check.

NO: Inspect linkage and repair. Go to your authorized dealer.

VD76477,00000E6 -19-12SEP12-25/27

Window Checks

Pull window up and back until it catches in latch (B) for convenient storage overhead.

Does pin move smoothly to lock and unlock window?

Do latches operate freely?

Does pin engage rear hole and lock window securely in full open position?

Do side window panes slide freely to left and right?

Does roof exit cover open and close freely?

Does cylinder hold roof exit cover in the open position?

See Section 2-1 for more detailed information.

YES: Go to next check.

NO: Inspect. Repair.

Continued on next page

VD76477,00000E6 -19-12SEP12-26/27

Miscellaneous—Operational Checkout

**Miscellaneous Machine
Components Checks**

Verify the following are working properly and all mounting brackets and hardware are tight.

- All latches and locks.
- Hood and access doors.
- Hoses and clamps.
- Fan shroud and fan guard
- Fan direction

YES: Check complete.
NO: Repair or replace if
necessary.

VD76477,00000E6 -19-12SEP12-27/27

Miscellaneous—Troubleshooting

Using Troubleshooting Charts

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 dealer.

TX,FF,105 -19-27FEB02-1/1

Engine

Symptom	Problem	Solution
Engine Cranks But Will Not Start Or Hard To Start	No fuel	Add fuel. Bleed air.
	Wrong fuel	Use correct fuel.
	Fuel filter clogged	Replace filter. Bleed air. Clean fuel tank inlet screen.
	Water separator clogged or not primed	Check water separator.
	Water in fuel	Check, drain, and refill.
	Leaks in fuel system	Check fuel system connections.
	Contaminated fuel	Drain tank. Add clean fuel. Check water separator.
	Air in fuel system	Bleed air.
	Low battery power	Charge or install new batteries.
	Slow cranking speed (poor electrical connection)	Clean and tighten battery and starter connections.
	Wrong engine oil	Use correct oil.
	Air filter clogged	Clean or replace elements.
	Starter	Replace starter.
Engine Knocks, Runs Irregularly, Or Stops	Air filter clogged	Clean or replace elements. Clean system.
	Fuel filter clogged	Replace filter. Bleed air. Clean fuel tank inlet screen.
	Water separator clogged or air in water separator	Check water separator. Bleed.
	Air in water separator	Bleed air from fuel system.
	Engine oil level low	Add oil.
	Contaminated fuel	Drain tank. Add clean fuel. Replace water separator.
	Coolant temperature low	Thermostat not working correctly or too "cool."
	Injection pump	Go to your authorized dealer.
Engine Starts But Will Not Continue To Run	Power-on (POW.ON) fuse	Replace fuse.

Continued on next page

TX14740,0001D0A -19-28FEB02-1/3

Symptom	Problem	Solution
Engine Not Developing Full Power	Air filters clogged	Clean or replace filter elements.
	Fuel filter clogged	Change filter. Bleed air.
	Water separator	Change. Bleed air.
	Contaminated fuel	Drain fuel tank. Change water separator, change fuel filter, bleed air. Add clean fuel.
	Wrong fuel	Use correct fuel.
	Fuel line restricted	Repair or replace fuel line. Bleed air.
	Clogged vent in fuel tank cap	Clean or install new cap.
	Exhaust restriction	Install new muffler.
	Wrong valve clearance	Check and adjust valves.
	Wrong oil	Use correct oil.
Engine Overheats	Coolant level low	Add coolant to recovery tank. Remove cap when cool. Check coolant level in radiator.
	Radiator screen clogged	Remove and clean screen.
	Radiator core or oil cooler core clogged	Clean radiator and oil cooler.
	Air filter clogged	Clean or replace elements. Check inlet screen.
	Air cleaner inlet clogged	Clean air inlet screen.
	Radiator cap	Go to your authorized dealer.
	Fan on backwards	Install fan correctly.
	Cooling system passages clogged	Flush cooling system.
Low Engine Oil Pressure	Oil level low	Add oil.
	Oil filter clogged	Install new oil filter.
	Wrong oil	Use correct oil.
	Oil leaks	Go to your authorized dealer.
	Engine temperature too high	Check cooling system.

Continued on next page

TX14740,0001D0A -19-28FEB02-2/3

Miscellaneous—Troubleshooting

Symptom	Problem	Solution
Engine Uses Too Much Oil	Wrong oil	Use correct oil.
	Oil leaks	Check engine oil drain plug.
	Engine temperature too high	Check cooling system.
	Air cleaner clogged	Clean element or install new element.
	Inlet screen clogged or missing	Clean or replace.
Engine Uses Too Much Fuel	Clogged or dirty air intake system	Clean air intake system.
	Wrong fuel	Use correct fuel.
Excessive Black Or Gray Exhaust Smoke	Wrong fuel	Use correct fuel.
	Clogged or dirty air intake or exhaust system	Clean air intake and exhaust system.
Exhaust Smoke Is White	Wrong fuel	Use correct fuel.
	Cold engine	Run engine until warm.
Turbocharger Excessively Noisy Or Vibrates Oil Dripping From Turbocharger Adapter	Air leak in engine, intake, or exhaust manifold	Inspect, repair.
	Excessive crankcase pressure	Check vent tube to ensure tube is not clogged. Clean.
	Turbocharger oil return line carbon buildup where line passes exhaust manifold	Remove line. Inspect, clean.

TX14740,0001D0A -19-28FEB02-3/3

Electrical System

Symptom	Problem	Solution
Nothing Works	Battery	Recharge or replace.
Batteries Undercharged	Loose or corroded connections	Clean and tighten or replace batteries.
Batteries Will Not Take A Charge	Loose or corroded connections	Clean and tighten.
	Low battery power	Replace both batteries.
Battery Uses Too Much Water	Cracked battery case	Replace batteries.
	High ambient temperature	Refill with water.
Cracked Battery Case	No battery hold down clamp	Replace both batteries and install hold down clamp.
	Loose battery hold down clamp	Replace both batteries and install hold down clamp.
	Frozen battery	Replace both batteries. Keep batteries fully charged in cold weather.
Low Battery Output	Low water level	Add water.
	Dirty or wet battery top, causing discharge	Clean and wipe battery top dry.
	Corroded or loose battery cables	Clean and tighten battery cables.
	Broken battery post	Wiggle battery post by hand. If post wiggles or turns, replace both batteries.
Starter Will Not Turn	Battery undercharged or dead	Recharge or replace both batteries.
	Battery cables making poor connections	Clean connections.
	Starter	Repair or replace starter.
	Starter pinion jammed in flywheel gear	Repair or replace starter, or ring gear.
Starter Turns But Will Not Crank Engine	Starter	Repair or replace starter.
Engine Cranks Slowly	Battery cables damaged or broken internally	Inspect and replace cables.
	Battery or starter cable connections loose or corroded	Clean and tighten connections.
	Battery discharged or will not hold a charge	Recharge or replace both batteries.
	Starter	Repair or replace starter.
	Low battery voltage	Recharge or replace both batteries.

Continued on next page

TX14740,0001D0B -19-23MAY07-1/2

Miscellaneous—Troubleshooting

Symptom	Problem	Solution
Starter Continues To Run After Engine Starts	Starter	Repair or replace starter.
	Key switch malfunction	Disconnect battery ground.
Charging Indicator Light On, Engine Running	Loose or glazed alternator belt	Check belt. Replace if glazed.
	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.
	Battery voltage low	Charge or replace both batteries.
Noisy Alternator	Worn drive belt	Replace belt.
	Worn pulleys	Replace pulleys and belt.
	Pulley misaligned	Adjuster alternator mount.
	Alternator bearing	Loosen alternator belts. Turn pulley by hand. If any roughness is felt, repair alternator.
No Monitor Panel Indicators or Gauges Work	Fuse	Replace fuse.
Individual Indicators Not Working In Monitor Panel	LED	Replace circuit board.
No Switch Panel Switches or Speed Dial Work	Fuse	Replace fuse.

TX14740,0001D0B -19-23MAY07-2/2

Hydraulic System

Symptom	Problem	Solution
No Hydraulic Functions	Low hydraulic oil	Add oil.
	Pump and valve controller (PVC) fuse	Replace fuse.
	Clogged suction filter	Clean.
Hydraulic Functions Are Slow or Have Little or no Power	Low oil level	Fill reservoir to full mark.
	Cold oil	Push hydraulic warm-up switch.
	Wrong oil	Use correct oil.
	Suction screen clogged	Inspect and clean.
	Hydraulic tank cap	Replace cap.
Power Boost Does Not Work	Fuse	Check fuse.
Hydraulic Oil Overheats	Wrong oil	Use correct oil.
	Clogged radiator or oil cooler	Clean and straighten fins.
	Radiator screen clogged	Remove and clean.
	Clogged filters	Install new filters.
	Low oil level	Fill tank to full mark.
	Contaminated oil	Drain oil and refill.
Oil Foams	High or low oil level	Correct level.
	Wrong oil	Use correct oil.
	Water in oil	Change oil.
	Kinks or dents in oil lines	Check lines.
No Swing Function	Pilot control hoses pinched or kinked	Inspect and correct.
Swing Function Is "Jerky"	Lack of grease	Fill with grease
Slow Travel Speed only	Fuse	Replace fuse.
	Pilot controller hoses pinched or kinked	Inspect and correct.
Travel Is "Jerky"	Track sag adjustment	Adjust tension.

Continued on next page

TX14740,0001D0C -19-11MAY06-1/2

Miscellaneous—Troubleshooting

Symptom	Problem	Solution
	Rocks or mud jammed in track frame	Remove and repair.
Engine Stops When Travel Or Control Lever Moved	Water separator clogged	Drain. Change element.

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

TX14740,0001DOC -19-11MAY06-2/2

Miscellaneous—Storage

Prepare Machine for Storage

1. Repair worn or damaged parts. Install new parts, if necessary, to avoid needless delays later.
2. Clean primary air cleaner.

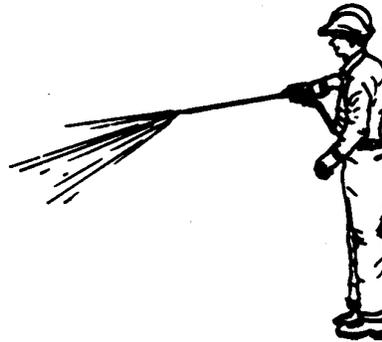
IMPORTANT: High pressure washing greater than 1379 kPa (13.8 bar) (200 psi) can damage freshly painted finishes. Paint should be allowed to air dry for 30 days minimum after receipt of machine before cleaning parts or machines with high pressure. Use low pressure wash operations until 30 days have elapsed.

3. Wash the machine. Use low pressure wash operations (less than 1379 kPa (13.8 bar) (200 psi) until 30 days after receipt of machine have elapsed. Paint areas to prevent rust. Replace decals, where needed.
4. Apply waste oil to track chains. Run machine back and forth several times. Park machine on a hard surface to prevent tracks from freezing to ground.
5. Store machine in a dry, protected place. If stored outside, cover with a waterproof material.

IMPORTANT: LPS 3 Rust Inhibitor can destroy painted finish. DO NOT spray LPS 3 Rust Inhibitor on painted areas.

6. Retract all hydraulic cylinders, if possible. If not, coat exposed cylinder rods with LPS ® 3 Rust Inhibitor.
7. Place a "DO NOT OPERATE" tag on the right control lever.

LPS is a trademark of the Holt Lloyd Corporation.



8. Lubricate all grease points.
9. Remove batteries.
10. Remove seat cushion and other perishable items.
11. Remove keys and lock all covers and doors.

T47764 —JUN—09NOV88

T5613AM —JUN—09FEB89

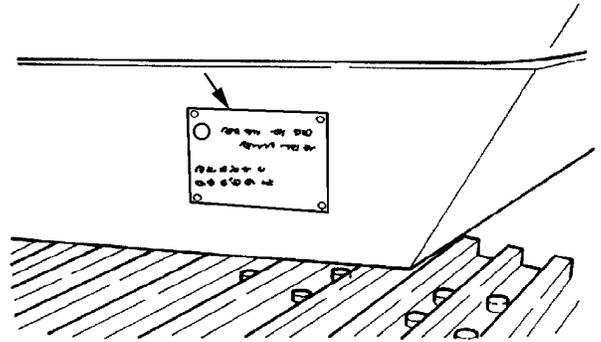
TX,105,FF2313 -19-22JUN06-1/1

Miscellaneous—Machine Numbers

Record Product Identification Number (PIN)

Purchase Date _____

NOTE: Record all 13 characters of the Product Identification Number.



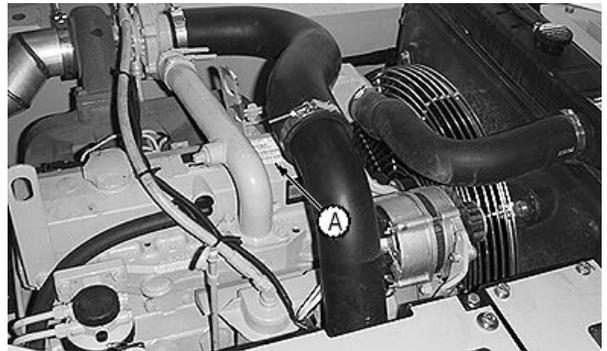
T140690 —UN—11APR01

TX14740,0001D05 -19-01DEC05-1/1

Record Engine Serial Number

Engine Serial Number (A) _____

A—Engine Serial Number



T105654H —UN—09JAN97

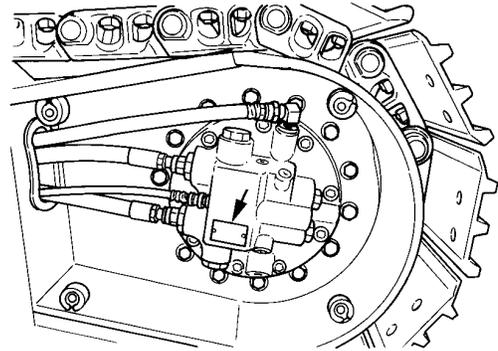
TX,110,DH5378 -19-09JAN97-1/1

Record Travel Motor Serial Numbers

Travel Motor Serial Number _____

Travel Motor Serial Number _____

NOTE: Cover removed for clarity of photograph.

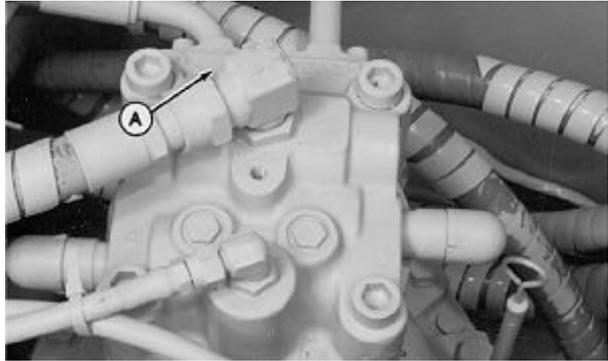


T157585 —UN—19JUL02

TX14740,0001D4C -19-18MAY06-1/1

Record Swing Motor Serial Number

Swing Motor Serial Number _____

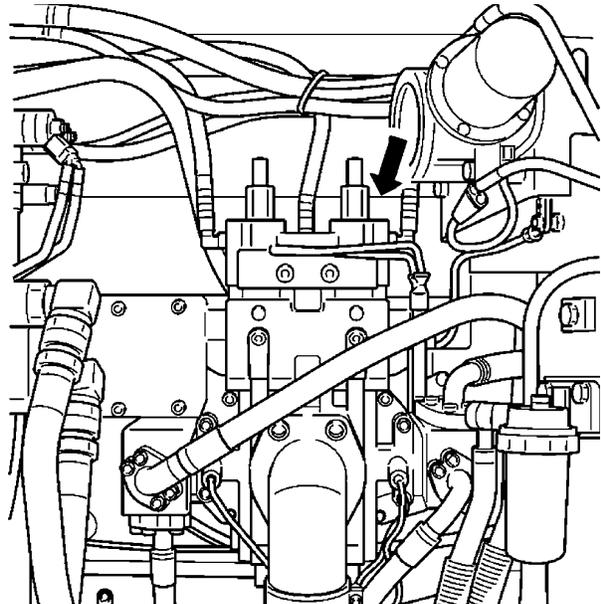


T6569AQ —UN—18OCT88

TX14740,0001E1D -19-07FEB02-1/1

Record Hydraulic Pump Serial Number

Hydraulic Pump Serial Number _____



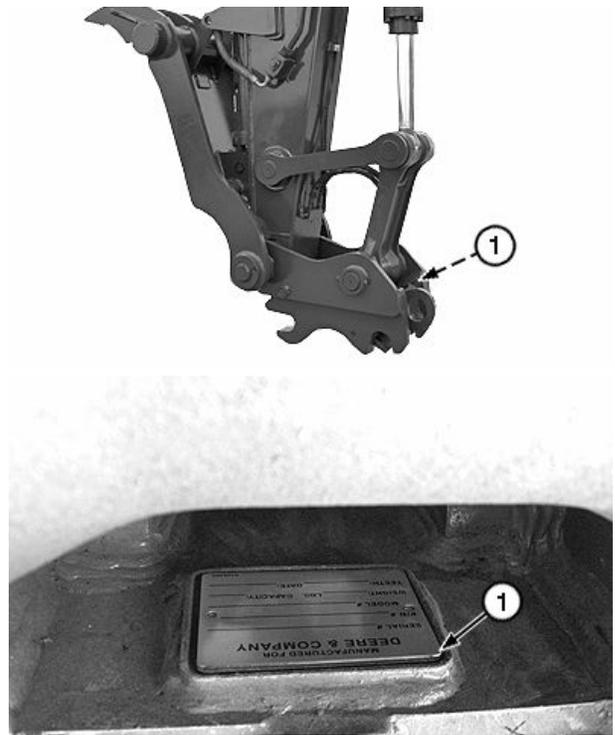
T152633 —UN—12MAR02

TX14740,0001E67 -19-11MAR02-1/1

Hydraulic Coupler Serial Number—If Equipped

Hydraulic Coupler Serial Number

1— Hydraulic Coupler Serial Number Plate



TX1017852A —UN—22JAN07

TX1017853A —UN—22JAN07

VD76477,0001375 -19-27AUG10-1/1

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 you can take:
 - Mark your machine with your own numbering system
 - Take color photographs from several angles of each machine

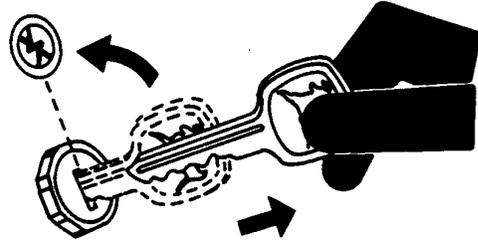


TS1680 —UN—09DEC03

DX,SECURE1 -19-18NOV03-1/1

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 any keys and batteries
3. When parking indoors, put large equipment in front of exits and lock your 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 your John Deere dealer of any losses.



TS230—JN—24MAY89

DX,SECURE2 -19-18NOV03-1/1

Miscellaneous—Specifications

120C Engine Specifications

Item	Measurement	Specification
John Deere PowerTech 4.5	Type	4-Stroke Cycle, Turbocharged, Aftercooled
	Bore and Stroke	106 x 127 mm 4.17 x 5.0 in.
	Cylinders	6
	Displacement	4.5 L 274 cu in.
	Net Torque @ 1400 rpm	353 N·m 260 lb-ft
	Compression Ratio	17:1
	Power at 2100 rpm	67 kW 90 hp Net SAE
	Lubrication	Pressure System With Full-Flow Filter
	Cooling Fan	Suction
	Electrical system	24 Volt
	Batteries (2) 12 volt	180 Minutes Reserve Capacity:

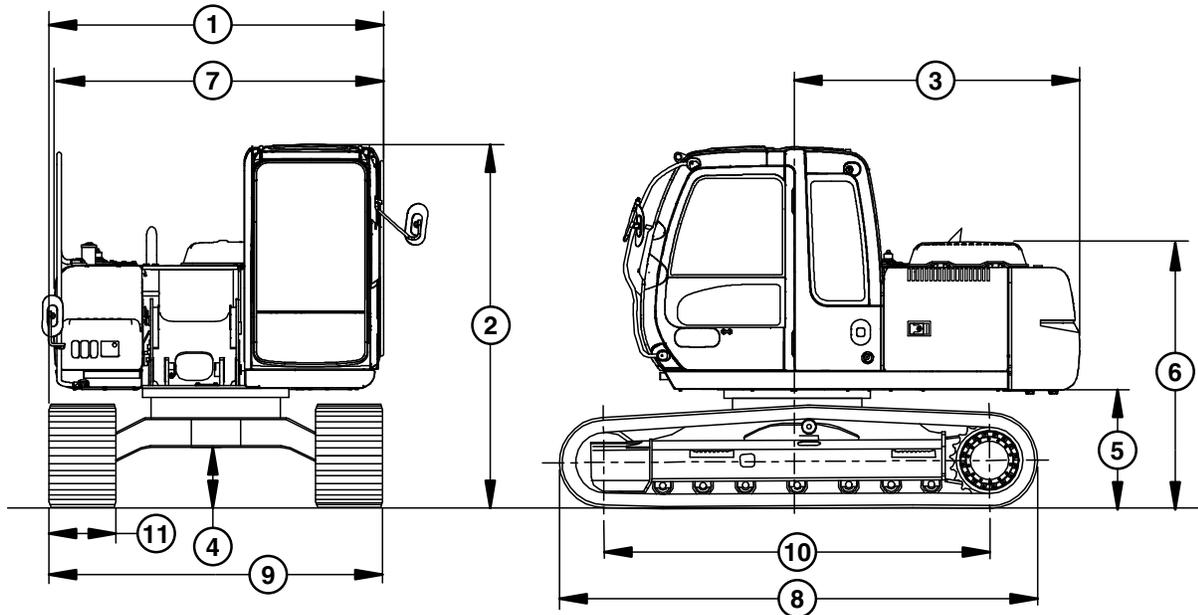
DW90712,0000736 -19-23MAY07-1/1

120C Drain and Refill Capacities

Item	Measurement	Specification
Fuel Tank	Capacity	250.0 L
		66.0 gal
Cooling System	Capacity	26.5 L
		7.0 gal
Engine	Oil Capacity, Including Filter Change	14.0 L
		15.0 qt
Hydraulic Tank	Oil Capacity	76.0 L
		20.0 gal
Swing Gearbox	Oil Capacity	2.6 L
		2.8 qt
Travel Gearbox (each)	Oil Capacity	3.2 L
		3.4 qt

DW90712,0000737 -19-23MAY07-1/1

120C Machine Specifications



T149940

T149940—UN—16/JAN02

- | | | | |
|--|----------------------------|-----------------------------------|------------------------------------|
| 1—Overall Width (excluding rearview mirrors) | 4—Minimum Ground Clearance | 7—Overall Width of Upperstructure | 10—Sprocket Center to Idler Center |
| 2—Cab Height | 5—Counterweight Clearance | 8—Undercarriage Length | 11—Track Shoe Width |
| 3—Rear End Swing Radius | 6—Engine Cover Height | 9—Undercarriage Width | |

NOTE: Specifications and design subject to change without notice. Wherever applicable, specifications are in accordance with PCSA and SAE standards. Except where otherwise noted these specifications are based on a machine equipped with 700 mm

(28 in.) shoes, counterweight, 3.01 m (9 ft 10 in.) arm, 420 kg (925 lb) 0.60 m³ (0.79 yd³) bucket, full fuel tank, 79 kg (175 lb) operator and standard equipment.

Item	Measurement	Specification
1—Overall Width (excluding rearview mirrors)	Distance	2500 mm 8 ft 2 in.
2—Cab	Height	2740 mm 9 ft 0 in.
3—Rear End Swing Radius	Distance	2130 mm 7 ft 0 in.
4—Minimum Ground Clearance	Distance	440 mm 1 ft 5 in.
5—Counterweight Clearance	Distance	890 mm 2 ft 11 in.
6—Machine	Engine Cover Height	2000 mm 6 ft 7 in.
7—Upperstructure	Overall Width	2460 mm 8 ft 1 in.
8—Undercarriage	Length	3580 mm 11 ft 9 in.

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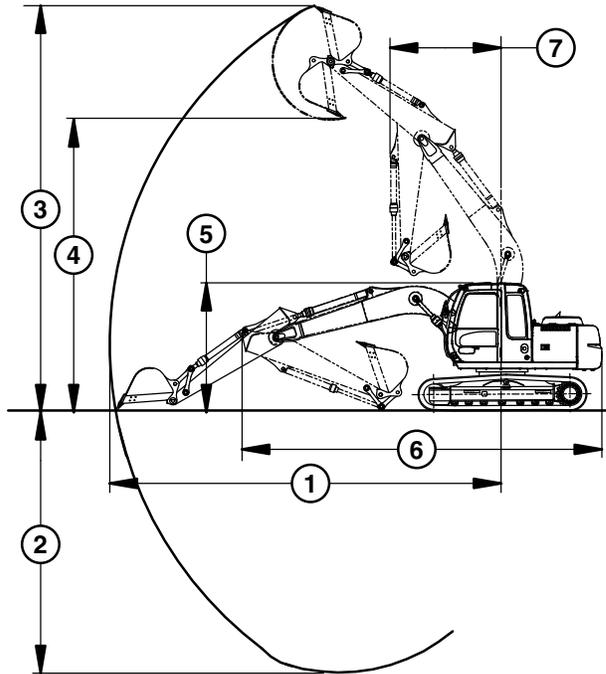
DW90712,0000738 -19-23MAY07-1/2

Miscellaneous—Specifications

Item	Measurement	Specification
9—Undercarriage	Width	2490 mm 8 ft 2 in.
10—Sprocket Center to Idler Center	Distance	2880 mm 9 ft 5 in.
11—Track Shoe	Width	500 mm 1 ft 8 in.
Machine	Operating Weight	13 000 kg 28 700 lb

DW90712,0000738 -19-23MAY07-2/2

120C Working Ranges



T149943

- 1— Maximum Digging Reach 3— Maximum Cutting Height 5— Transport Height
- 2— Maximum Digging Depth 4— Maximum Dumping Height 6— Transport Length
- 7— Minimum Swing Radius

Item	Measurement	Specification
1—Maximum Digging Reach	Distance	With 2520 mm (8 ft 3 in.) Arm: 8270 mm (27 ft 2 in.)
	Distance	With 3010 mm (9 ft 10 in.) Arm: 8740 mm (28 ft 8 in.)
2—Maximum Digging Depth	Depth	With 2520 mm (8 ft 3 in.) Arm: 5570 mm (18 ft 3 in.)
	Depth	With 3010 mm (9 ft 10 in.) Arm: 6060 mm (19 ft 11 in.)
3—Maximum Cutting Height	Height	With 2520 mm (8 ft 3 in.) Arm: 8570 mm (28 ft 1 in.)
	Height	With 3010 mm (9 ft 10 in.) Arm: 8900 mm (29 ft 2 in.)
4—Maximum Dumping Height	Height	With 2520 mm (8 ft 3 in.) Arm: 6160 mm (20 ft 3 in.)
	Height	With 3010 mm (9 ft 10 in.) Arm: 6490 mm (21 ft 4 in.)
5—Transport	Height	With 2520 mm (8 ft 3 in.) Arm: 2740 mm (9 ft 0 in.)
	Height	With 3010 mm (9 ft 10 in.) Arm: 2740 mm (9 ft 0 in.)
6—Transport	Length	With 2520 mm (8 ft 3 in.) Arm: 7610 mm (25 ft 0 in.)
	Length	With 3010 mm (9 ft 10 in.) Arm: 7610 mm (25 ft 0 in.)

Continued on next page

DW90712,0000739 -19-23MAY07-1/2

T149943—UN—16JAN02

Miscellaneous—Specifications

Item	Measurement	Specification
7—Minimum Swing Radius	Radius	With 2520 mm (8 ft 3 in.) Arm: 2340 mm (7 ft 8 in.)
	Radius	With 3010 mm (9 ft 10 in.) Arm: 2590 mm (8 ft 6 in.)

DW90712.0000739 -19-23MAY07-2/2

**Lift Capacity—KG (LB)
(without blade and rubber track)**

Arm: 2.52 m (8 ft 3 in.)	Bucket: 0.60 m ³ (0.79 yd ³)	Shoe: 500 mm (20 in.)
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Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface.

marked with a footnote entry are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures

LIFTING OVER FRONT					
Load Point Height		Horizontal Distance from Centerline of Rotation			
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)			^a 2 593 (5 717)		
4.57 (15)			^a 2 603 (5 738)	^a 2 585 (5 700)	
3.05 (10)			^a 3 275 (7 220)	2 729 (6 120)	
1.52 (5)			^a 4 230 (9 326)	2 619 (5 773)	
Ground (Line)		^a 4 547 (10 024)	3 999 (8 816)	2 515 (5 544)	
-1.52 (-5)	^a 3 136 (6 914)	8 069 (17 790)	3 898 (8 594)	2 459 (5 422)	
-3.05 (-10)	^a 6 264 (13 809)	^a 7 044 (15 529)	3 912 (8 624)	2 488 (5 485)	
-4.57 (-15)		^a 4 780 (10 539)			
LIFTING OVER SIDE					
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)			^a 2 593 (5 717)		
4.57 (15)			^a 2 603 (5 738)	1 867 (4 116)	
3.05 (10)			3 010 (6 637)	1 813 (3 996)	
1.52 (5)			2 756 (6 075)	1 710 (3 770)	
Ground (Line)		^a 4 547 (10 024)	2 549 (5 620)	1 613 (3 557)	
-1.52 (-5)	^a 3 136 (6 914)	4 741 (10 452)	2 459 (5 421)	1 562 (3 444)	
-3.05 (-10)	^a 6 264 (13 809)	4 818 (10 622)	2 471 (5 447)	1 589 (3 503)	
-4.57 (-15)		^a 4 780 (10 539)			

^aHydraulically-limited capacity

DW90712.000073A -19-23MAY07-1/1

**Lift Capacity—KG (LB)
(blade on the ground and rubber track)**

Arm: 2.52 m (8 ft 3 in.)	Bucket: 0.60 m ³ (0.79 yd ³)	Shoe: 500 mm (20 in.)
--------------------------	---	-----------------------

Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface.

marked with a footnote entry are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures

LIFTING OVER FRONT					
Load Point Height		Horizontal Distance from Centerline of Rotation			
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)			^a 2 593 (5 717)		
4.57 (15)			^a 2 603 (5 738)	^a 2 585 (5 700)	
3.05 (10)			^a 3 275 (7 220)	^a 2 916 (6 428)	
1.52 (5)			^a 4 298 (9 476)	^a 3 328 (7 338)	
Ground (Line)		^a 4 547 (10 024)	^a 5 099 (11 241)	^a 3 700 (8 157)	
-1.52 (-5)	^a 3 136 (6 914)	^a 8 100 (17 858)	^a 5 308 (11 702)	^a 3 796 (8 368)	
-3.05 (-10)	^a 6 264 (13 809)	^a 7 044 (15 529)	^a 4 834 (10 657)	^a 3 152 (6 949)	
-4.57 (-15)		^a 4 780 (10 539)			
LIFTING OVER SIDE					
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)			^a 2 593 (5 717)		
4.57 (15)			^a 2 603 (5 738)	2 044 (4 506)	
3.05 (10)			3 265 (7 197)	1 989 (4 386)	
1.52 (5)			3 010 (6 635)	1 886 (4 159)	
Ground (Line)		^a 4 547 (10 024)	2 803 (6 179)	1 790 (3 947)	
-1.52 (-5)	^a 3 136 (6 914)	5 190 (11 441)	2 712 (5 980)	1 739 (3 834)	
-3.05 (-10)	^a 6 264 (13 809)	5 267 (11 612)	2 725 (6 007)	1 766 (3 893)	
-4.57 (-15)		^a 4 780 (10 539)			

^aHydraulically-limited capacity

**Lift Capacity—KG (LB)
(blade on the ground)**

Arm: 2.52 m (8 ft 3 in.)	Bucket: 0.45 m ³ (0.59 yd ³)	Shoe: 600 mm (24 in.)
--------------------------	---	-----------------------

Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface.

marked with a footnote entry are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures

LIFTING OVER FRONT					
Load Point Height		Horizontal Distance from Centerline of Rotation			
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)			^a 2 593 (5 717)		
4.57 (15)			^a 2 603 (5 738)	^a 2 585 (5 700)	
3.05 (10)			^a 3 275 (7 220)	^a 2 916 (6 428)	
1.52 (5)			^a 4 298 (9 476)	^a 3 328 (7 338)	
Ground (Line)		^a 4 547 (10 024)	^a 5 099 (11 241)	^a 3 700 (8 157)	
-1.52 (-5)	^a 3 136 (6 914)	^a 8 100 (17 858)	^a 5 308 (11 702)	^a 3 796 (8 368)	
-3.05 (-10)	^a 6 264 (13 809)	^a 7 044 (15 529)	^a 4 834 (10 657)	^a 3 152 (6 949)	
-4.57 (-15)		^a 4 780 (10 539)			
LIFTING OVER SIDE					
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)			^a 2 593 (5 717)		
4.57 (15)			^a 2 603 (5 738)	2 048 (4 514)	
3.05 (10)			3 270 (7 209)	1 993 (4 394)	
1.52 (5)			3 015 (6 647)	1 891 (4 168)	
Ground (Line)		^a 4 547 (10 024)	2 808 (6 191)	1 794 (3 956)	
-1.52 (-5)	^a 3 136 (6 914)	5 200 (11 463)	2 718 (5 992)	1 743 (3 843)	
-3.05 (-10)	^a 6 264 (13 809)	5 277 (11 634)	2 730 (6 019)	1 770 (3 902)	
-4.57 (-15)		^a 4 780 (10 539)			

^aHydraulically-limited capacity

**Lift Capacity—KG (LB)
(without blade)**

Arm: 2.52 m (8 ft 3 in.)	Bucket: 0.45 m ³ (0.59 yd ³)	Shoe: 600 mm (24 in.)
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Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface.

marked with a footnote entry are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures

LIFTING OVER FRONT					
Load Point Height		Horizontal Distance from Centerline of Rotation			
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)			^a 2 593 (5 717)		
4.57 (15)			^a 2 603 (5 738)	^a 2 585 (5 700)	
3.05 (10)			^a 3 275 (7 220)	2 776 (6 120)	
1.52 (5)			^a 4 298 (9 476)	2 665 (5 876)	
Ground (Line)		^a 4 547 (10 024)	4 069 (8 970)	2 561 (5 647)	
-1.52 (-5)	^a 3 136 (6 914)	^a 8 100 (17 858)	3 968 (8 747)	2 506 (5 525)	
-3.05 (-10)	^a 6 264 (13 809)	^a 7 044 (15 529)	3 981 (8 777)	2 535 (5 589)	
-4.57 (-15)		^a 4 780 (10 539)			
LIFTING OVER SIDE					
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)			^a 2 593 (5 717)		
4.57 (15)			^a 2 603 (5 738)	1 899 (4 187)	
3.05 (10)			3 057 (6 739)	1 845 (4 067)	
1.52 (5)			2 802 (6 177)	1 742 (3 840)	
Ground (Line)		^a 4 547 (10 024)	2 595 (5 721)	1 646 (3 628)	
-1.52 (-5)	^a 3 136 (6 914)	4 823 (10 632)	2 505 (5 522)	1 594 (3 515)	
-3.05 (-10)	^a 6 264 (13 809)	4 900 (10 802)	2 517 (5 549)	1 621 (3 574)	
-4.57 (-15)		^a 4 780 (10 539)			

^aHydraulically-limited capacity

**Lift Capacity—KG (LB)
(blade on the ground)**

Arm: 2.52 m (8 ft 3 in.)	Bucket: 0.45 m ³ (0.59 yd ³)	Shoe: 700 mm (28 in.)
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Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface.

marked with a footnote entry are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures

LIFTING OVER FRONT					
Load Point Height		Horizontal Distance from Centerline of Rotation			
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)			^a 2 593 (5 717)		
4.57 (15)			^a 2 603 (5 738)	^a 2 585 (5 700)	
3.05 (10)			^a 3 275 (7 220)	^a 2 916 (6 428)	
1.52 (5)			^a 4 298 (9 476)	^a 3 328 (7 338)	
Ground (Line)		^a 4 547 (10 024)	^a 5 099 (11 241)	^a 3 700 (8 157)	
-1.52 (-5)	^a 3 136 (6 914)	^a 8 100 (17 858)	^a 5 308 (11 702)	^a 3 796 (8 368)	
-3.05 (-10)	^a 6 264 (13 809)	^a 7 044 (15 529)	^a 4 834 (10 657)	^a 3 152 (6 949)	
-4.57 (-15)		^a 4 780 (10 539)			
LIFTING OVER SIDE					
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)			^a 2 593 (5 717)		
4.57 (15)			^a 2 603 (5 738)	2 077 (4 579)	
3.05 (10)			^a 3 275 (7 220)	2 023 (4 459)	
1.52 (5)			3 057 (6 740)	1 920 (4 233)	
Ground (Line)		^a 4 547 (10 024)	2 851 (6 285)	1 824 (4 021)	
-1.52 (-5)	^a 3 136 (6 914)	5 274 (11 628)	2 761 (6 086)	1 773 (3 908)	
-3.05 (-10)	^a 6 264 (13 809)	5 352 (11 799)	2 772 (6 112)	1 799 (3 967)	
-4.57 (-15)		^a 4 780 (10 539)			

^aHydraulically-limited capacity

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**Lift Capacity—KG (LB)
(without blade)**

Arm: 2.52 m (8 ft 3 in.)	Bucket: 0.45 m ³ (0.59 yd ³)	Shoe: 700 mm (28 in.)
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Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface.

marked with a footnote entry are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures

LIFTING OVER FRONT					
Load Point Height		Horizontal Distance from Centerline of Rotation			
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)			^a 2 593 (5 717)		
4.57 (15)			^a 2 603 (5 738)	^a 2 585 (5 700)	
3.05 (10)			^a 3 275 (7 220)	2 819 (6 215)	
1.52 (5)			^a 4 298 (9 476)	2 708 (5 971)	
Ground (Line)		^a 4 547 (10 024)	4 132 (9 110)	2 605 (5 742)	
-1.52 (-5)	^a 3 136 (6 914)	^a 8 100 (17 858)	4 032 (8 888)	2 549 (5 620)	
-3.05 (-10)	^a 6 264 (13 809)	^a 7 044 (15 529)	4 045 (8 918)	2 578 (5 683)	
-4.57 (-15)		^a 4 780 (10 539)			
LIFTING OVER SIDE					
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)			^a 2 593 (5 717)		
4.57 (15)			^a 2 603 (5 738)	1 929 (4 252)	
3.05 (10)			3 099 (6 832)	1 874 (4 132)	
1.52 (5)			2 844 (6 270)	1 772 (3 906)	
Ground (Line)		^a 4 547 (10 024)	2 638 (5 815)	1 675 (3 693)	
-1.52 (-5)	^a 3 136 (6 914)	4 897 (10 797)	2 547 (5 616)	1 624 (3 580)	
-3.05 (-10)	^a 6 264 (13 809)	4 975 (10 968)	2 559 (5 642)	1 651 (3 639)	
-4.57 (-15)		^a 4 780 (10 539)			

^aHydraulically-limited capacity

**Lift Capacity—KG (LB)
(blade on the ground)**

Arm: 3.01 m (9 ft 10 in.)	Bucket: 0.45 m ³ (0.59 yd ³)	Shoe: 600 mm (24 in.)
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Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface.

marked with a footnote entry are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures

LIFTING OVER FRONT					
Load Point Height		Horizontal Distance from Centerline of Rotation			
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)					
4.57 (15)				^a 2 370 (5 224)	
3.05 (10)			^a 2 830 (6 240)	^a 2 627 (5 792)	^a 1 509 (3 326)
1.52 (5)			^a 3 900 (8 599)	^a 3 091 (6 814)	^a 2 285 (5 038)
Ground (Line)		^a 5 732 (12 637)	^a 4 849 (10 690)	^a 3 541 (7 806)	^a 2 431 (5 359)
-1.52 (-5)	^a 2 954 (6 513)	^a 7 537 (16 617)	^a 5 259 (11 594)	^a 3 763 (8 296)	
-3.05 (-10)	^a 6 435 (14 186)	^a 7 532 (16 606)	^a 5 026 (11 080)	^a 3 525 (7 772)	
-4.57 (-15)		^a 5 740 (12 654)	^a 3 852 (8 492)		
LIFTING OVER SIDE					
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
(6.10 20)					
4.57 (15)				2 088 (4 604)	
3.05 (10)			^a 2 830 (6 240)	2 018 (4 450)	1 295 (2 854)
1.52 (5)			3 067 (6 761)	1 902 (4 194)	1 257 (2 771)
Ground (Line)		5 274 (11 628)	2 821 (6 220)	1 788 (3 942)	1 210 (2 668)
-1.52 (-5)	^a 2 954 (6 513)	5 135 (11 321)	2 692 (5 934)	1 715 (3 782)	
-3.05 (-10)	^a 6 435 (14 186)	5 172 (11 403)	2 672 (5 891)	1 709 (3 768)	
-4.57 (-15)		5 340 (11 773)	2 764 (6 094)		

^aHydraulically-limited capacity

**Lift Capacity—KG (LB)
(without blade and rubber track)**

Arm: 3.01 m (9 ft 10 in.)	Bucket: 0.60 m ³ (0.79 yd ³)	Shoe: 500 mm (20 in.)
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Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface.

marked with a footnote entry are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures

LIFTING OVER FRONT					
Load Point Height		Horizontal Distance from Centerline of Rotation			
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)					
4.57 (15)				^a 2 370 (5 224)	
3.05 (10)			^a 2 830 (6 240)	^a 2 627 (5 792)	^a 1 509 (3 326)
1.52 (5)			^a 3 900 (8 599)	2 635 (5 809)	1 770 (3 902)
Ground (Line)		^a 5 732 (12 637)	4 018 (8 859)	2 511 (5 536)	1 720 (3 792)
-1.52 (-5)	^a 2 954 (6 513)	^a 7 537 (16 617)	3 874 (8 540)	2 433 (5 364)	
-3.05 (-10)	^a 6 435 (14 186)	^a 7 532 (16 606)	3 852 (8 492)	2 426 (5 348)	
-4.57 (-15)		^a 5 740 (12 654)	^a 3 852 (8 492)		
LIFTING OVER SIDE					
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
(6.10 20)					
4.57 (15)				1 908 (4 206)	
3.05 (10)			^a 2 830 (6 240)	1 838 (4 052)	1 156 (2 549)
1.52 (5)			2 807 (6 189)	1 722 (3 796)	1 118 (2 465)
Ground (Line)		4816 (10617)	2562 (5648)	1607 (3543)	1071 (2362)
-1.52 (-5)	^a 2 954 (6 513)	4 677 (10 310)	2 432 (5 362)	1 535 (3 384)	
-3.05 (-10)	^a 6 435 (14 186)	4 713 (10 391)	2 413 (5 319)	1 528 (3 369)	
-4.57 (-15)		4 881 (10 761)	2 505 (5 522)		

^aHydraulically-limited capacity

**Lift Capacity—KG (LB)
(blade on the ground and rubber track)**

Arm: 3.01 m (9 ft 10 in.)	Bucket: 0.60 m ³ (0.79 yd ³)	Shoe: 500 mm (20 in.)
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Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface.

marked with a footnote entry are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures

LIFTING OVER FRONT					
Load Point Height		Horizontal Distance from Centerline of Rotation			
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)					
4.57 (15)				^a 2 370 (5 224)	
3.05 (10)			^a 2 830 (6 240)	^a 2 627 (5 792)	^a 1 509 (3 326)
1.52 (5)			^a 3 900 (8 599)	^a 3 091 (6 814)	^a 2 285 (5 038)
Ground (Line)		^a 5 732 (12 637)	^a 4 849 (10 690)	^a 3 541 (7 806)	^a 2 431 (5 359)
-1.52 (-5)	^a 2 954 (6 513)	^a 7 537 (16 617)	^a 5 259 (11 594)	^a 3 763 (8 296)	
-3.05 (-10)	^a 6 435 (14 186)	^a 7 532 (16 606)	^a 5 026 (11 080)	^a 3 525 (7 772)	
-4.57 (-15)		^a 5 740 (12 654)	^a 3 852 (8 492)		
LIFTING OVER SIDE					
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
(6.10 20)					
4.57 (15)				2 084 (4 595)	
3.05 (10)			^a 2 830 (6 240)	20 148 (4 441)	1 292 (2 848)
1.52 (5)			3 061 (6 749)	1 898 (4 185)	1 254 (2 764)
Ground (Line)		5 264 (11 606)	2 815 (6 207)	1 784 (3 933)	1 207 (2 661)
-1.52 (-5)	^a 2 954 (6 513)	5 126 (11 300)	2 686 (5 921)	1 712 (3 774)	
-3.05 (-10)	^a 6 435 (14 186)	5 162 (11 381)	2 667 (5 879)	1 705 (3 759)	
-4.57 (-15)		5 330 (11 751)	2 759 (6 082)		

^aHydraulically-limited capacity

**Lift Capacity—KG (LB)
(without blade)**

Arm: 3.01 m (9 ft 10 in.)	Bucket: 0.45 m ³ (0.59 yd ³)	Shoe: 600 mm (24 in.)
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Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface.

marked with a footnote entry are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures

LIFTING OVER FRONT					
Load Point Height		Horizontal Distance from Centerline of Rotation			
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)					
4.57 (15)				^a 2 370 (5 224)	
3.05 (10)			^a 2 830 (6 240)	^a 2 627 (5 792)	^a 1 509 (3 326)
1.52 (5)			^a 3 900 (8 599)	^a 2 682 (5 912)	1 805 (3 979)
Ground (Line)		^a 5 732 (12 637)	4 088 (9 013)	2 558 (5 640)	1 755 (3 870)
-1.52 (-5)	^a 2 954 (6 513)	^a 7 537 (16 617)	3 943 (8 693)	2 480 (5 467)	
-3.05 (-10)	^a 6 435 (14 186)	^a 7 532 (16 606)	3 921 (8 645)	2 473 (5 451)	
-4.57 (-15)		^a 5 740 (12 654)	^a 3 852 (8 492)		
LIFTING OVER SIDE					
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
(6.10 20)					
4.57 (15)				1 940 (4 276)	
3.05 (10)			^a 2 830 (6 240)	1 870 (4 122)	1 181 (2 603)
1.52 (5)			2 854 (6 291)	1 754 (3 867)	1 143 (2 519)
Ground (Line)		4 897 (10 797)	2 608 (5 750)	1 639 (3 614)	1 096 (2 416)
-1.52 (-5)	^a 2 954 (6 513)	4 758 (10 490)	2 478 (5 464)	1 567 (3 455)	
-3.05 (-10)	^a 6 435 (14 186)	4 795 (10 571)	2 459 (5 421)	1 560 (3 440)	
-4.57 (-15)		4 963 (10 941)	2 551 (5 624)		

^aHydraulically-limited capacity

**Lift Capacity—KG (LB)
(blade on the ground)**

Arm: 3.01 m (9 ft 10 in.)	Bucket: 0.45 m ³ (0.59 yd ³)	Shoe: 600 mm (24 in.)
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Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface.

marked with a footnote entry are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures

LIFTING OVER FRONT					
Load Point Height		Horizontal Distance from Centerline of Rotation			
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)					
4.57 (15)				^a 2 370 (5 224)	
3.05 (10)			^a 2 830 (6 240)	^a 2 627 (5 792)	^a 1 509 (3 326)
1.52 (5)			^a 3 900 (8 599)	^a 3 091 (6 814)	^a 2 285 (5 038)
Ground (Line)		^a 5 732 (12 637)	^a 4 849 (10 690)	^a 3 541 (7 806)	^a 2 431 (5 359)
-1.52 (-5)	^a 2 954 (6 513)	^a 7 537 (16 617)	^a 5 259 (11 594)	^a 3 763 (8 296)	
-3.05 (-10)	^a 6 435 (14 186)	^a 7 532 (16 606)	^a 5 026 (11 080)	^a 3 525 (7 772)	
-4.57 (-15)		^a 5 740 (12 654)	^a 3 852 (8 492)		
LIFTING OVER SIDE					
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
(6.10 20)					
4.57 (15)				2 088 (4 604)	
3.05 (10)			^a 2 830 (6 240)	2 018 (4 450)	1 295 (2 854)
1.52 (5)			3 067 (6 761)	1 902 (4 194)	1 257 (2 771)
Ground (Line)		5 274 (11 628)	2 821 (6 220)	1 788 (3 942)	1 210 (2 668)
-1.52 (-5)	^a 2 954 (6 513)	5 135 (11 321)	2 692 (5 934)	1 715 (3 782)	
-3.05 (-10)	^a 6 435 (14 186)	5 172 (11 403)	2 672 (5 891)	1 709 (3 768)	
-4.57 (-15)		5 340 (11 773)	2 764 (6 094)		

^aHydraulically-limited capacity

**Lift Capacity—KG (LB)
(blade on the ground)**

Arm: 3.01 m (9 ft 10 in.)	Bucket: 0.45 m ³ (0.59 yd ³)	Shoe: 700 mm (28 in.)
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Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface.

marked with a footnote entry are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures

LIFTING OVER FRONT					
Load Point Height		Horizontal Distance from Centerline of Rotation			
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)					
4.57 (15)				^a 2 370 (5 224)	
3.05 (10)			^a 2 830 (6 240)	^a 2 627 (5 792)	^a 1 509 (3 326)
1.52 (5)			^a 3 900 (8 599)	^a 3 091 (6 814)	^a 2 285 (5 038)
Ground (Line)		^a 5 732 (12 637)	^a 4 849 (10 690)	^a 3 541 (7 806)	^a 2 431 (5 359)
-1.52 (-5)	^a 2 954 (6 513)	^a 7 537 (16 617)	^a 5 259 (11 594)	^a 3 763 (8 296)	
-3.05 (-10)	^a 6 435 (14 186)	^a 7 532 (16 606)	^a 5 026 (11 080)	^a 3 525 (7 772)	
-4.57 (-15)		^a 5 740 (12 654)	^a 3 852 (8 492)		
LIFTING OVER SIDE					
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
(6.10 20)					
4.57 (15)				2 118 (4 669)	
3.05 (10)			^a 2 830 (6 240)	2 048 (4 515)	1 317 (2 904)
1.52 (5)			3 109 (6 854)	1 932 (4 259)	1 280 (2 821)
Ground (Line)		5 349 (11 793)	2 864 (6 313)	1 818 (4 007)	1 233 (2 718)
-1.52 (-5)	^a 2 954 (6 513)	5 210 (11 487)	2 734 (6 027)	1 745 (3 847)	
-3.05 (-10)	^a 6 435 (14 186)	5 247 (11 568)	2 714 (5 984)	1 739 (3 833)	
-4.57 (-15)		5 415 (11 938)	2 807 (6 188)		

^aHydraulically-limited capacity

**Lift Capacity—KG (LB)
(without blade)**

Arm: 3.01 m (9 ft 10 in.)	Bucket: 0.45 m ³ (0.59 yd ³)	Shoe: 700 mm (28 in.)
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Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface.

marked with a footnote entry are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures

LIFTING OVER FRONT					
Load Point Height		Horizontal Distance from Centerline of Rotation			
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)					
4.57 (15)				^a 2 370 (5 224)	
3.05 (10)			^a 2 830 (6 240)	^a 2 627 (5 792)	^a 1 509 (3 326)
1.52 (5)			^a 3 900 (8 599)	2 725 (6 007)	1 837 (4 051)
Ground (Line)		^a 5 732 (12 637)	4 152 (9 154)	2 601 (5 734)	1 788 (3 941)
-1.52 (-5)	^a 2 954 (6 513)	^a 7 537 (16 617)	4 007 (8 834)	2 523 (5 562)	
-3.05 (-10)	^a 6 435 (14 186)	^a 7 532 (16 606)	3 985 (8 786)	516 (5 546)	
-4.57 (-15)		^a 5 740 (12 654)	^a 3 852 (8 492)		

LIFTING OVER SIDE					
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
(6.10 20)					
4.57 (15)				1 969 (4 342)	
3.05 (10)			^a 2 830 (6 240)	1 900 (4 188)	1 203 (2 653)
1.52 (5)			2 896 (6 384)	1 784 (3 932)	1 165 (2 569)
Ground (Line)		4 850 (10 692)	2 650 (5 843)	1 669 (3 680)	1 119 (2 466)
-1.52 (-5)	^a 2 954 (6 513)	4 833 (10 655)	2 521 (5 557)	1 597 (3 520)	
-3.05 (-10)	^a 6 435 (14 186)	4 870 (10 737)	2 502 (5 515)	1 590 (3 505)	
-4.57 (-15)		5 038 (11 107)	2 594 (5 718)		

^aHydraulically-limited capacity

160CLC Engine Specifications

Item	Measurement	Specification
John Deere PowerTech 4.5	Type	4-Stroke Cycle, Turbocharged, Aftercooled
	Bore And Stroke	106 x 127 mm 4.17 x 5.0 in.
	Cylinders	6
	Displacement	4.5 L 274 cu in.
	Net Torque @ 1400 rpm	410 N·m 302 lb-ft
	Compression Ratio	17:1
	Power at 2100 rpm	81 kW 109 hp Net SAE
	Lubrication	Pressure System With Full-Flow Filter
	Cooling Fan	Suction
	Electrical System	24 Volt
	Batteries (2) 12 volt	180 Minutes Reserve Capacity:

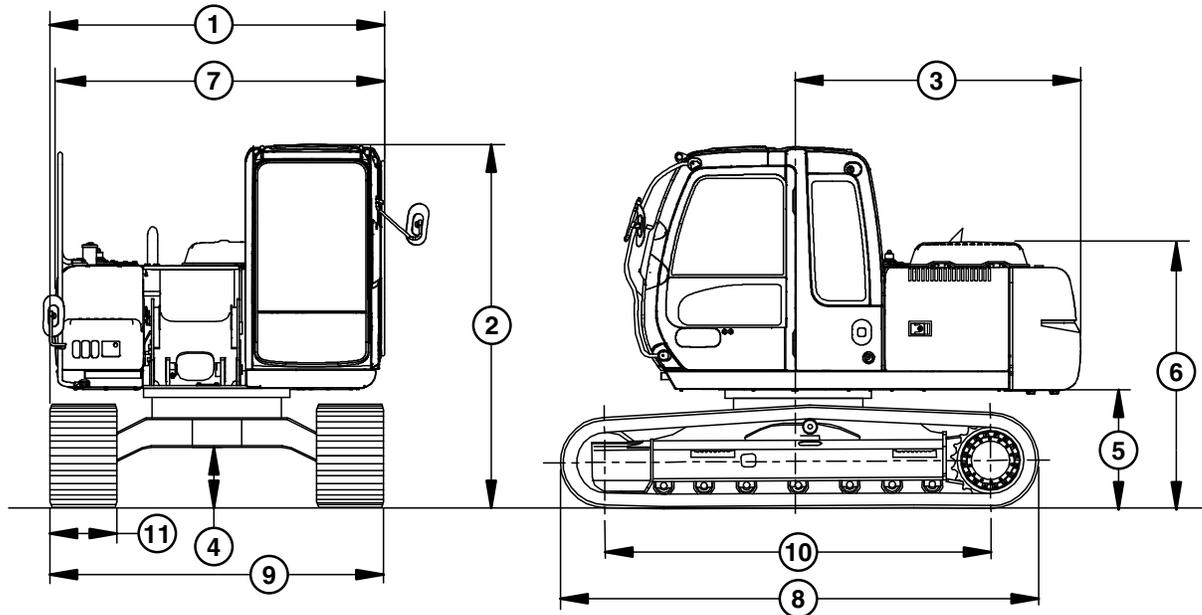
DW90712.0000747 -19-23MAY07-1/1

160CLC Drain and Refill Capacities

Item	Measurement	Specification
Fuel Tank	Capacity	250.0 L 66.0 gal
Cooling System	Capacity	26.5 L 7.0 gal
Engine	Oil Capacity, Including Filter Change	14.0 L 15.0 qt
Hydraulic Tank	Oil Capacity	76.0 L 20.0 gal
Swing Gearbox	Oil Capacity	4.5 L 5.0 qt
Travel Gearbox (each)	Oil Capacity	3.2 L 3.4 qt

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160CLC Machine Specifications



T149940

- 1—Overall Width (excluding rearview mirrors)
- 2—Cab Height
- 3—Rear End Swing Radius
- 4—Minimum Ground Clearance
- 5—Counterweight Clearance
- 6—Engine Cover Height
- 7—Overall Width of Upperstructure
- 8—Undercarriage Length
- 9—Undercarriage Width
- 10—Sprocket Center To Idler Center
- 11—Track Shoe Width

NOTE: Specifications and design subject to change without notice. Wherever applicable, specifications are in accordance with PCSA and SAE standards. Except where otherwise noted these specifications are based on a machine equipped with 700 mm

(28 in.) shoes, counterweight, 3.01 m (9 ft 10 in.) arm, 420 kg (925 lb) 0.60 m³ (0.79 yd³) bucket, full fuel tank, 79 kg (175 lb) operator and standard equipment.

Item	Measurement	Specification
1—Overall Width (excluding rearview mirrors)	Distance	2500 mm 8 ft 2 in.
2—Cab	Height	2880 mm 9 ft 5 in.
3—Rear End Swing Radius	Distance	2440 mm 8 ft 0 in.
4—Minimum Ground Clearance	Distance	470 mm 1 ft 7 in.
5—Counterweight Clearance	Distance	1000 mm 3 ft 3 in.
6—Machine	Engine Cover Height	2141 mm 7 ft 0 in.
7—Upperstructure	Overall Width	2460 mm 8 ft 1 in.
8—Undercarriage	Length	3920 mm 12 ft 10 in.

Continued on next page

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Miscellaneous—Specifications

Item	Measurement	Specification
9—Undercarriage	Width	2490 mm 8 ft 2 in.
10—Sprocket Center to Idler Center	Distance	3100 mm 10 ft 2 in.
11—Track Shoe	Width	500 mm 1 ft 8 in.
Machine	Operating Weight	15 600 kg 34 400 lb

DW90712.0000749 -19-23MAY07-2/2

Miscellaneous—Specifications

Item	Measurement	Specification
7—Minimum Swing Radius	Radius	With 2580 mm (8 ft 6 in.) Arm: 2910 mm (9 ft 7 in.)
	Radius	With 3100 mm (10 ft 2 in.) Arm: 2920 mm (9 ft 7 in.)

DW90712,000074A -19-23MAY07-2/2

Lift Capacity—KG (LB)

Arm: 2.60 m (8 ft 6 in.)	Bucket: 528 kg (1164 lb) 0.60 m ³ (0.78 yd ³)	Shoe: 600 mm (24 in.)
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Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface.

marked with a footnote entry are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures

LIFTING OVER FRONT					
Load Point Height		Horizontal Distance from Centerline of Rotation			
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)					
4.57 (15)				^a 3 007 (6 629)	
3.05 (10)		^a 6 015 (13 261)	^a 4 114 (9 070)	^a 3 464 (7 636)	^a 2 306 (5 083)
1.52 (5)			^a 5 540 (12 214)	3 729 (8 222)	2 553 (5 628)
Ground (Line)			5 687 (12 538)	3 578 (7 888)	2 489 (5 488)
-1.52 (-5)		^a 7 812 (17 223)	5 584 (12 311)	3 504 (7 724)	
-3.05 (-10)	^a 8 553 (18 856)	^a 9 373 (20 665)	5 620 (12 390)	3 528 (7 777)	
-4.57 (-15)		^a 7 294 (16 081)	^a 5 058 (11 152)		
LIFTING OVER SIDE					
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)					
4.57 (15)				2 526 (5 569)	
3.05 (10)		^a 6 015 (13 261)	3 919 (8 640)	2 397 (5 284)	1 549 (3 416)
1.52 (5)			3 531 (7 784)	2 230 (4 916)	1 487 (3 278)
Ground (Line)			3 272 (7 214)	2 092 (4 613)	1 427 (3 147)
-1.52 (-5)		6 201 (13 670)	3 183 (7 017)	2 025 (4 465)	
-3.05 (-10)	^a 8 553 (18 856)	6 329 (13 954)	3 214 (7 086)	2 047 (4 513)	
-4.57 (-15)		6 594 (14 538)	3 379 (7 448)		

^aHydraulically-limited capacity

DW90712,000074B -19-23MAY07-1/1

Lift Capacity—KG (LB)

Arm: 2.60 m (8 ft 6 in.)	Bucket: 528 kg (1164 lb) 0.60 m ³ (0.78 yd ³)	Shoe: 700 mm (28 in.)
--------------------------	--	-----------------------

Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface.

marked with a footnote entry are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures

LIFTING OVER FRONT					
Load Point Height		Horizontal Distance from Centerline of Rotation			
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)					
4.57 (15)				^a 3 007 (6 629)	
3.05 (10)		^a 6 015 (13 261)	^a 4 114 (9 070)	^a 3 464 (7 636)	^a 2 306 (5 083)
1.52 (5)			^a 5 540 (12 214)	3 729 (8 347)	2 595 (5 722)
Ground (Line)			5 772 (12 726)	3 635 (8 013)	2 531 (5 581)
-1.52 (-5)		^a 7 812 (17 223)	5 669 (12 499)	3 560 (7 849)	
-3.05 (-10)	^a 8 553 (18 856)	^a 9 373 (20 665)	5 705 (12 578)	3 584 (7 902)	
-4.57 (-15)		^a 7 294 (16 081)	^a 5 058 (11 152)		
LIFTING OVER SIDE					
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)					
4.57 (15)				2 562 (5 648)	
3.05 (10)		^a 6 015 (13 261)	3 971 (8 754)	2 433 (5 363)	1 577 (3 477)
1.52 (5)			3 582 (7 897)	2 266 (4 995)	1 515 (3 339)
Ground (Line)			3 323 (7 327)	2 129 (4 693)	1 455 (3 208)
-1.52 (-5)		6 292 (13 872)	3 235 (7 131)	2 061 (4 544)	
-3.05 (-10)	^a 8 553 (18 856)	6 421 (14 156)	3 265 (7 199)	2 083 (4 592)	
-4.57 (-15)		6 685 (14 739)	3 430 (7 562)		

^aHydraulically-limited capacity

DW90712.000074C -19-23MAY07-1/1

Miscellaneous—Specifications

Lift Capacity—KG (LB)

Arm: 3.10 m (10 ft 2 in.)	Bucket: 420 kg (925 lb) 0.40 m ³ (0.52 yd ³)	Shoe: 600 mm (24 in.)
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Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface.

marked with a footnote entry are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures

LIFTING OVER FRONT					
Load Point Height		Horizontal Distance from Centerline of Rotation			
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)				^a 2 533 (5 585)	
4.57 (15)				^a 2 642 (5 825)	
3.05 (10)			^a 3 570 (7 871)	^a 3 139 (6 921)	2 670 (5 887)
1.52 (5)			^a 5 053 (11 141)	3 871 (8 336)	2 582 (5 692)
Ground (Line)		^a 4 718 (10 402)	5 737 (12 647)	3 602 (7 941)	2 497 (5 506)
-1.52 (-5)	^b 3 476 (7 664)	^a 7 747 (17 080)	5 572 (12 284)	3 497 (7 709)	2 452 (5 406)
-3.05 (-10)	^a 7 380 (16 271)	^a 9 932 (21 897)	5 564 (12 266)	3 485 (7 683)	
-4.57 (-15)		^a 8 265 (18 222)	^a 5 687 (12 537)		
LIFTING OVER SIDE					
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)				^a 2 533 (5 585)	
4.57 (15)				2 601 (5 735)	
3.05 (10)			^a 3 570 (7 871)	2 459 (5 422)	1 593 (3 514)
1.52 (5)			3 631 (8 005)	2 274 (5 015)	1 512 (3 333)
Ground (Line)		^a 4 718 (10 402)	3 312 (7 301)	2 112 (4 656)	1 433 (3 160)
-1.52 (-5)	^a 3 476 (7 664)	6 114 (13 479)	3 169 (6 987)	2 017 (4 447)	1 392 (3 068)
-3.05 (-10)	^a 7 380 (16 271)	6 202 (13 672)	3 162 (6 971)	2 006 (4 422)	
-4.57 (-15)		6 425 (14 165)	3 277 (7 224)		

^aHydraulically-limited capacity
^bHydraulically-limited capacity

Lift Capacity—KG (LB)

Arm: 3.10 m (10 ft 2 in.)	Bucket: 420 kg (925 lb) 0.40 m ³ (0.52 yd ³)	Shoe: 700 mm (28 in.)
---------------------------	---	-----------------------

Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface.

marked with a footnote entry are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures

LIFTING OVER FRONT					
Load Point Height		Horizontal Distance from Centerline of Rotation			
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)				^a 2 533 (5 585)	
4.57 (15)				^a 2 642 (5 825)	
3.05 (10)			^a 3 570 (7 871)	^a 3 139 (6 921)	2 713 (5 981)
1.52 (5)			^a 5 053 (11 141)	^a 3 829 (8 442)	2 624 (5 786)
Ground (Line)		^a 4 718 (10 402)	5 822 (12 835)	3 659 (8 066)	2 540 (5 599)
-1.52 (-5)	^b 3 476 (7 664)	^a 7 747 (17 080)	5 657 (12 472)	3 554 (7 835)	2 495 (5 500)
-3.05 (-10)	^a 7 380 (16 271)	^a 9 932 (21 897)	5 649 (12 454)	3 542 (7 808)	
-4.57 (-15)		^a 8 265 (18 222)	^a 5 687 (12 537)		
LIFTING OVER SIDE					
m (ft)	1.52 (5)	3.05 (10)	4.57 (15)	6.10 (20)	7.62 (25)
6.10 (20)				^a 2 533 (5 585)	
4.57 (15)				2 637 (5 814)	
3.05 (10)			^a 3 570 (7 871)	2 495 (5 501)	1 622 (3 575)
1.52 (5)			3 683 (8 119)	2 311 (5 094)	1 539 (3 394)
Ground (Line)		^a 4 718 (10 402)	3 363 (7 415)	2 148 (4 736)	1 461 (3 221)
-1.52 (-5)	^a 3 476 (7 664)	6 206 (13 681)	3 221 (7 100)	2 053 (4 526)	1 419 (3 129)
-3.05 (-10)	^a 7 380 (16 271)	6 293 (13 873)	3 214 (7 085)	2 042 (4 501)	
-4.57 (-15)		6 517 (14 367)	3 328 (7 338)		

^aHydraulically-limited capacity
^bHydraulically-limited capacity

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