450DLC, 650DLC and 850DLC Excavator

OPERATOR'S MANUAL
450DLC, 650DLC and 850DLC Excavator

OMT221101 Issue A9 (ENGLISH)

CALIFORNIA
Proposition 65 Warning

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

If this product contains a gasoline engine:

⚠ WARNING

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

The State of California requires the above two warnings.

Worldwide Construction And Forestry Division
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.

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

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

DW90712,0000082 –19–04APR06–1/5

ISUZU

Non-Road Diesel Engine
Emission Control System Warranty Statement

EMISSION RELATED SYSTEM DEFECT WARRANTY

Isuzu Motors America Inc. warrants to the initial owner and subsequent owner of a certified non-road diesel engine (powering non-road machines and equipment), that such engine is:

1. Designed, built, and equipped so as to conform, at the time of sale, to all applicable regulations adapted by the United States Environmental Protection Agency (EPA) and the California Air Resource Board (CARB).

2. Free from defects in materials and workmanship in specific emission-related parts:

- For a period of two (2) years or 1,500 hours of operation whichever occurs first, after date of delivery to the initial owner of non-road diesel engine less than 19kW (25hp) except constant speed engine with rated speeds greater than or equal to 3000 rpm.
- For a period of two (2) years or 1,500 hours of operation whichever occurs first, after date of delivery to the initial owner of non-road diesel engine for constant speed engine less than 37kW (50hp) with rated speeds greater than or equal to 3000 rpm.
- For a period of five (5) years or 3,000 hours of operation whichever occurs first, after date of delivery to the initial owner of non-road diesel engine (19kW (25hp) and greater engines) except above constant speed engine.

If an emission-related parts fails during the warranty period, it will be repaired or replaced under warranty and is warranted for the remainder of the warranty periods.

During the terms of this warranty, Isuzu Motors America Inc. will provide, through an Isuzu engine dealer or other establishment authorized by Isuzu Motors America Inc., repair or replacement of any warranted parts at no charge to the non-road diesel engine owner.

In an emergency, repairs may be performed at any service establishment, or by the owner, using any replacement part.

Isuzu Motors America Inc. will reimburse the owner for their expenses, including diagnostic charges for such emergency repair. These expenses shall not exceed Isuzu Motors America Inc. suggested retail price for all warranted parts replaced, and labor charges based on Isuzu Motors America Inc. recommended time allowance for the warranty repair and the geographically appropriate hourly labor rate.

A part not available within 30 days or a repair not being complete within 30 days constitute an emergency.

As a condition of reimbursement, replaced parts and receipt invoices must be presented at a place of business of an authorized Isuzu engine dealer or other establishment authorized by Isuzu Motors America Inc.

This warranty covers the following emission-related parts and components for Common Rail System.

- Fuel Metering System
  - Fuel Supply Pump
  - Fuel Rail (Common Rail)
  - Injectors and High Pressure Lines
- Air Induction System
  - Intake Manifold
  - Turbocharger
  - Charge Air Cooler and Charge Air Cooler Hoses
- Exhaust Gas Recirculation (EGR) System
  - EGR valve
- Thermal Reactor System
  - Exhaust Manifold
- Positive Crankcase Ventilation System (If equipped)
- Miscellaneous items Used in Above Systems.
  - Ambient Temperature Sensor
  - Common Rail Pressure Sensor

TX1003606

TX1003606 –19–06MAR06

- Coolant Temperature Sensor
- Boost Pressure Sensor
- Cylinder Detection Sensor
- Electronic Control Unit
- Engine Speed/Crankshaft Position Sensor
- Hoses, connectors, sealing or devices

If failure of one of these components results in failure of another part, both will be covered by this warranty.
Any replacement part may be used for maintenance or repairs. The owner should ensure that such parts are equivalent in design and durability to Isuzu genuine parts.
Use of non-genuine Isuzu parts does not invalidate the warranty.
However Isuzu Motors America Inc. is not liable for parts, which are not genuine Isuzu parts.

LIMITATIONS AND RESPONSIBILITIES

These warranties are subject to the following:

ISUZU MOTORS AMERICA INC. RESPONSIBILITIES

During the emission warranty period, if a defect in material or workmanship of a warranted part or component is found, Isuzu Motors America Inc. will provide;

- New, remanufactured, or repaired parts and/or components required to correct the defect.

Note: Items replaced under this warranty become the property of Isuzu Motors America Inc.

- Labor, during normal working hours, required to make the warranty repair.

This includes diagnosis and labor to remove and install the engine, if necessary.

OWNER RESPONSIBILITIES

During the emission warranty period, the owner is responsible for:

- The performance of all required maintenance. A warranty claim will not be denied because the scheduled maintenance was not performed. However, if the lack of required maintenance was the reason for the repair, then the claim will be denied.
- Premium of overtime costs.
- Costs to investigate complaints, which are not caused by a defect in Isuzu Motors America Inc. material or workmanship.
- Providing timely notice of a warrantable failure and promptly making the product available for repair.

LIMITATIONS

Isuzu Motors America Inc. is not responsible for resultant damages to an emission-related part or component resulting from:

- Any application or installation Isuzu Motors America Inc. deems improper as explained in the Instruction Manual.
- Attachments, accessory items, or parts not authorized for use by Isuzu Motors America Inc.
- Improper non-road diesel engine maintenance, repair, or abuse.
- Owner's unreasonable delay in making the product available after being notified of a potential product problem. This warranty is in addition to Isuzu Motors America Inc. standard warranty, applicable to the non-road diesel engine product involved.

Remedies under this warranty are limited to the provision of material and services as specified herein. Isuzu Motors America Inc. is not responsible for incidental or consequential damages such as downtime or loss-use of engine powered equipment.

TX1003608 –19–06MAR06

TX1003608

Off-Road Compression-Ignition Engines
CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT
YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board (CARB) and Isuzu Motors America Inc. are pleased to explain the emission control system warranty on your 2006 and later engine. In California, new off-road compression-ignition engines must be designed, built, and equipped to meet the State's stringent anti-smog standards.
Isuzu Motors America Inc. 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 air induction system. Also included may be hoses, belts, connectors, and other emission-related assemblies.

Where a warrantable condition exists, Isuzu Motors America Inc. will repair your off-road compression-ignition engine at no cost to you including diagnosis, parts, and labor.

MANUFACTURER'S WARRANTY COVERAGE:

The 2006 and later off-road compression-ignition engines:

(1) Power rating at 19kW (25hp) and greater engines.
For a period of five (5) years or 3,000 hours of operation, whichever occurs first, after date of delivery to the initial owner.

(2) Power rating at less than 19kW (25hp), and for constant speed engines rated under 37kW (50hp) with rated speeds greater than and equal to 3,000 rpm engines.
For a period of two (2) years of 1,500 hours of operation, whichever occurs first, after date of delivery to the initial owner.

If any emission related part on your engine is defective, the part will be repaired or replaced by Isuzu Motors America Inc.

OWNER'S WARRANTY RESPONSIBILITIES:

- As the off-road compression-ignition engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. Isuzu Motors America Inc. recommends that you retain all receipts covering maintenance on your off-road compression-ignition engine, but Isuzu Motors America Inc. cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.
- As the off-road compression-ignition engine owner, you should however be aware that Isuzu Motors America Inc. may deny your warranty coverage if your off-road compression-ignition engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.
- Your engine is designed to operate on diesel fuel only. Use of any other fuel may result in your engine no longer operating in compliance with California's emissions requirements.
- You are responsible for initiating the warranty process. The CARB suggests that you present your off-road compression-ignition engine to an Isuzu Motors America Inc. dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible.

If you have any questions regarding your warranty rights and responsibilities, you should contact Isuzu Motors America Inc. PowerTrain Division, at 46401 Commerce Center Drive Plymouth, MI 48170 (Tel. No. : 734-582-9470).

MAINTENANCE RECOMMENDATION:

Some Isuzu Motors America Inc. off-road engines are certified by the United States Environmental Protection Agency (EPA) and California Air Resource Board (CARB) to comply with smoke and gaseous emission standards prescribed by Federal laws at the time of maintenance.

The engine is certified if it has a special certification label. An Isuzu engine dealer can also inform you if the engine is certified.

TX1003609

TX1003609 –19–06MAR06

Efficiency of emission control and engine performance depends on adherence to proper operation and maintenance recommendations and use of recommended fuels and lubricating oils. It is recommended that major adjustments and repair be made by your authorized Isuzu engine dealer.

Various chemical fuel additives, which claim to reduce visible smoke, are available commercially. Although additives have been used by individuals to solve some isolated smoke problems in the field, they are not recommended for general use.
Federal smoke regulations require that engines be certified without smoke depressants.

The corrective step taken immediately on discovery of worn parts, which may affect emission levels, will help assure proper operation of emission control systems. The use of genuine Isuzu parts recommended.
Suppliers of non-Isuzu parts must assure the owner that the use of such parts will not adversely affect emission levels.

Regular maintenance intervals, along with special emphasis on the following items, are necessary to keep exhaust emissions within acceptable limit for the useful life of the engine.

Refer to the maintenance intervals. If the engine is operating under severe conditions, adjust the maintenance schedule accordingly. See your authorized Isuzu engine dealer to help analyze your specific application, operating environment and maintenance schedule adjustments.

The following is an explanation of maintenance for emission-related components.
See the Maintenance Schedule for the specific interval for the following items.

FUEL INJECTION PUMP OR NOZZLES - Fuel injection pumps or nozzles are subject to tip wear as a result to fuel contamination. This damage can cause an increase in fuel consumption, the engine to emit black smoke misfire or run rough.
Inspect, test, and replace if necessary. Fuel injection pumps can be tested by an authorized Isuzu engine dealer.

TURBOCHARGER - Check for any unusual sound or vibration in the turbocharger. Inspect inlet and exhaust piping and connections. Check bearing condition and perform maintenance as described in the Maintenance Schedule.

Slow engine response and low power may indicate a need for adjustment or repair.
Your Isuzu engine dealer is equipped with the necessary tools, personnel, and perform this service.

Owner is encouraged to keep adequate maintenance records, but the absence of such , in and of itself, will not invalidate the warranty.

The machine or equipment owner may perform routine maintenance, repair s and other non-warranty work or have it done at any repair facility. Such non-warranty work need not be performed at a designated warranty station in order for the warranty to remain in force.

CUSTOMER ASSISTANCE - EMISSION CONTROL SYSTEM WARRANTY:

Isuzu Motors America Inc. aims to ensure that the Emission Control Systems Warranty is properly administrated. In the event that you do not receive the warranty service to which you believe you are entitled under the Emission Control System Warranty, call or write:

Isuzu Motors America Inc.
PowerTrain Division
46401 Commerce Center Drive Plymouth, MI 48170
Tel: 734-582-9470

Authorized dealers are recommended for major maintenance and repair work as they are staffed with trained personnel, proper tools and are aware of the latest maintenance methods and procedures. Owners and others who desire to perform their own work should purchase a Service Manual and obtain current information from their Isuzu engine dealer.

TX1003611 –19–06MAR06

TX1003611

IMPORTANT

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

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

VD76477,0000414 –19–05JAN06–1/1

Technical Information Feedback Form

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

SEND TO: John Deere Dubuque Works
P.O. Box 538
Attn: Publications Supervisor, Dept. 303
Dubuque, IA 52004-0538

FAX NUMBER: 563-589-5800

Ideas, Comments (Please State Page Number): _____

OVERALL, how would you rate the quality of this publication? (Check one)

Poor		Fair		Good		Very Good		Excellent	
1	2	3	4	5	6	7	8	9	10

Company Name: _____

Technician Name: _____

Address: _____

Phone: _____

Fax No.: _____

Dealer Acct. No.: _____

THANK YOU!

TX,TM,FAX –19–03JUL01–1/1

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Continued on next page

All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

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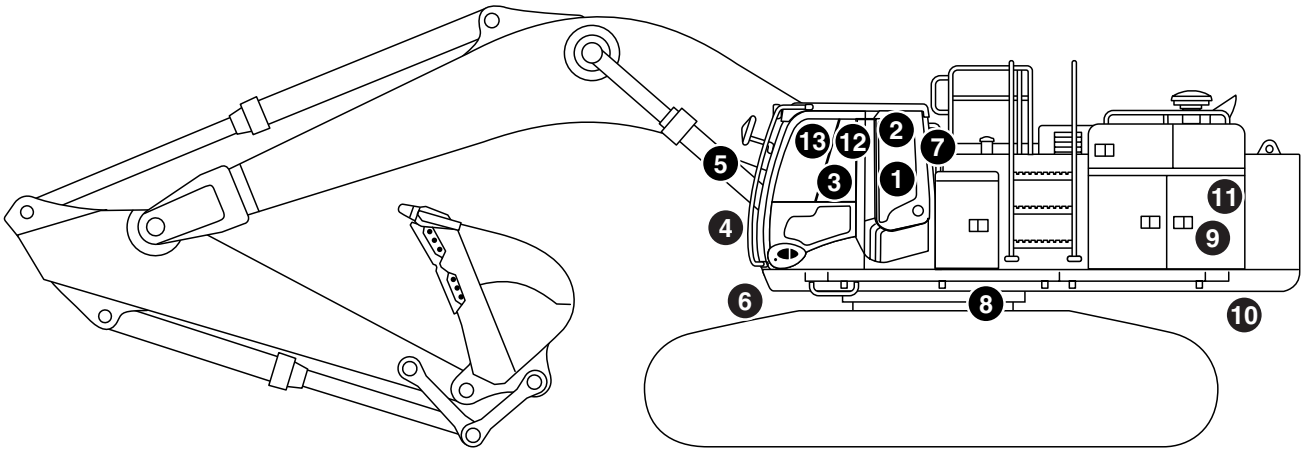
Safety and Operator Convenience Features



TX1001837 –UN–04JAN06

TX1001837

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

1. Seat belt with Retractors. Seat belt retractors help keep belts clean and convenient to use.

2. Window Guarding. The stationary window with 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. The rear window is an alternate secondary exit, a secondary exit tool is also provided.

5. Pilot Shutoff Lever. 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. Travel Alarm. Alerts bystanders of forward or reverse machine movement.

10. Engine Fan Guard. A fan guard inside the engine compartment helps prevent contact with the hydraulically driven fan.

11. Horn. Standard horn is useful when driving or signaling co-workers.

12. Cab with Heater, Defroster, and Air Conditioner. Ventilation system circulates both outside and inside air through filters for a clean working environment. Built in defroster vents direct air flow for effective window defogging/deicing. Air conditioner provides a comfortable, temperature-controlled working environment.

DW90712,0000061 –19–18JAN07–1/1

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.

T133555 –UN–28AUG00

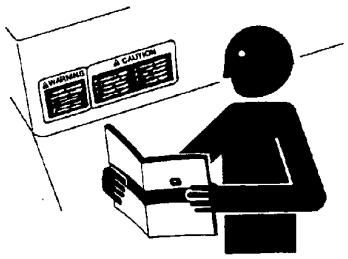
T133588 –19–28AUG00

TX03679,00016CC –19–03JAN07–1/1

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.



T133556 –UN–24AUG00

TX03679,00016F9 –19–03JAN07–1/1

Operate Only If Qualified

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

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

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

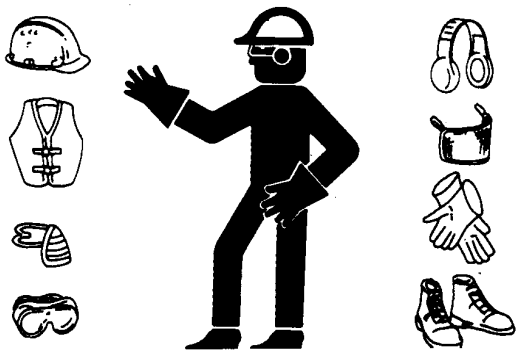
TX03679,00016FA –19–03JAN07–1/1

Wear Protective Equipment

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

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

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–23AUG88

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 failures 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.

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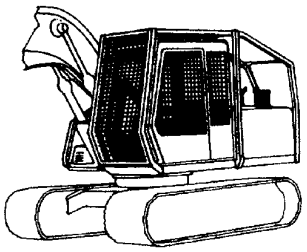
Add Cab Guarding for Special Uses



T133733 –UN–15SEP00

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.

Additional Level II 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.

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Inspect Machine

T6607AQ –UN–18OCT88

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

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

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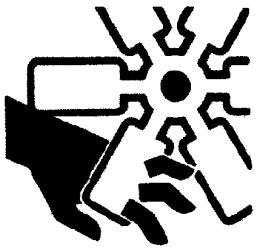
Stay Clear of Moving Parts



T133592 –UN–12SEP01

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.

TX03679,00016D2 –19–03JAN07–1/1

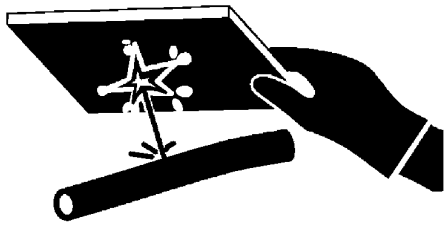
Avoid High-Pressure Oils

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.

T133509 –UN–17MAR06



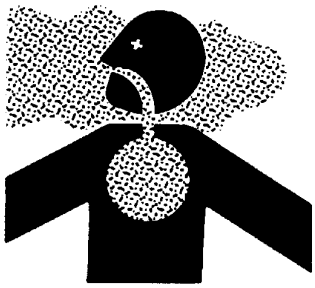
T133840 –UN–20SEP00

TX03679,00016D3 –19–03NOV08–1/1

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.



T133546 –UN–24AUG00

TX03679,00016D4 –19–03NOV08–1/1

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.

T133552 –UN–14SEP00

T133553 –UN–07SEP00

T133554 –UN–07SEP00

TX03679,00016F5 –19–03NOV08–1/1

Prevent Battery Explosions

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

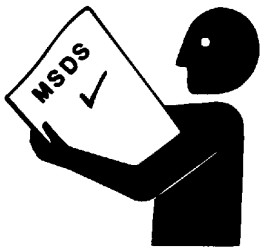
Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.

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

TS204 –UN–23AUG88

TX03679,000174A –19–03NOV08–1/1

Handle Chemical Products Safely



T133580 –UN–25AUG00

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.

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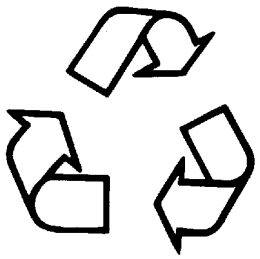
Dispose of Waste Properly



T133567 –UN–25AUG00

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.

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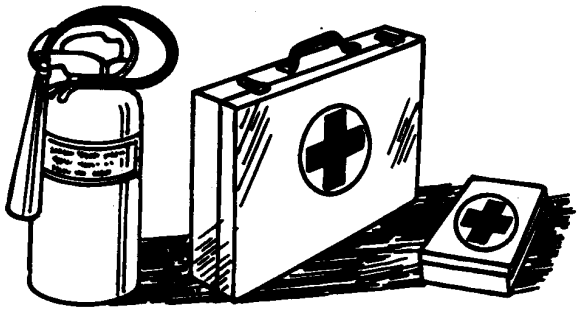
Prepare for Emergencies



TS291 –UN–23AUG88

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.

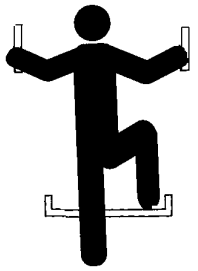
TX03679,000174B –19–03JAN07–1/1

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–30AUG00

TX03679,00016F2 –19–15MAR07–1/1

Start Only From Operator's Seat

Avoid unexpected machine movement. Before starting engine, sit in operator's seat. Ensure park lock lever is in "lock" position.

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

T133715 –UN–07SEP00

TX03768,0000B71 –19–28FEB06–1/1

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 3 years, regardless of appearance.

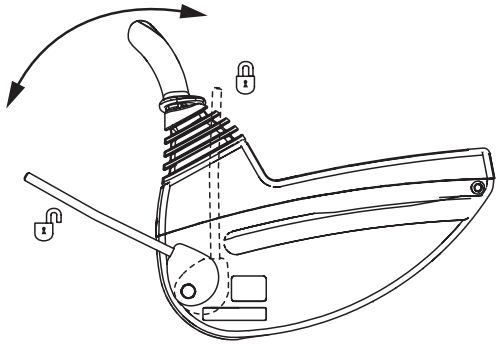
T133716 –19–14SEP00

TX03679,00016DD –19–03NOV08–1/1

Prevent Unintended Machine Movement

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

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



T216779 –UN–22NOV05

DW90712,000005B –19–03FEB06–1/1

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 you dig.

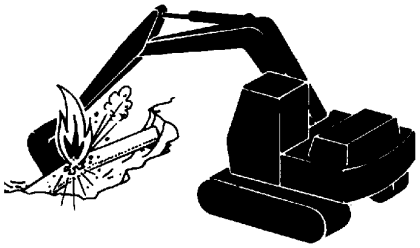
Prepare work site properly. Avoid operating near structures or objects that could fall onto the machine. Clear away debris that could move unexpectedly if run over.

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.

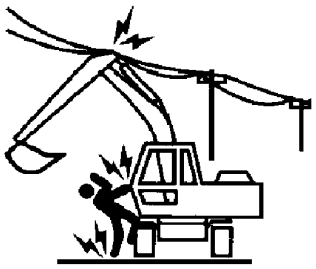
Keep bystanders clear at all times. Keep bystanders away from raised booms, attachments, and unsupported loads. Avoid swinging or raising booms, attachments, or loads over or near personnel. Use barricades or a signal person to keep vehicles and pedestrians away. Use a signal person if moving machine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

Operate only on solid footing with strength sufficient to support machine. When working close to an excavation, position travel motors away from the hole.

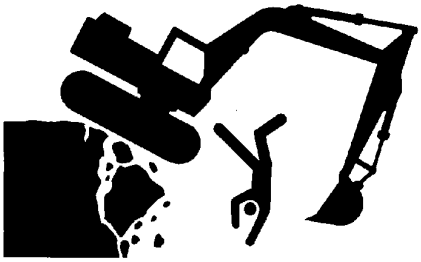
Reduce machine speed when operating with tool on or near ground when obstacles may be hidden (e.g., during snow removal or clearing mud, dirt, etc). At high speeds, hitting obstacles (rocks, uneven concrete or manholes) can cause a sudden stop. Always wear your seat belt.



T134986 –UN–31OCT00



T133650 –UN–27SEP00



T133549 –UN–24AUG00

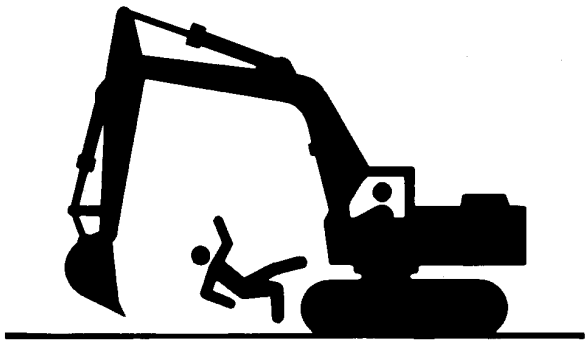
TX03679,0001748 –19–29JUL08–1/1

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.

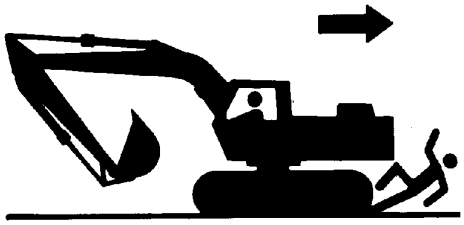
Riders may obstruct operator's view or impair his ability to operate machine safely.



T7273AH –UN–08JUN90

TX03679,0001726 –19–03JAN07–1/1

Avoid Backover Accidents



T133548 –UN–24AUG00

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.

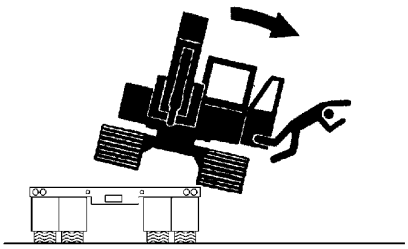
Be certain travel alarm is working properly.

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.

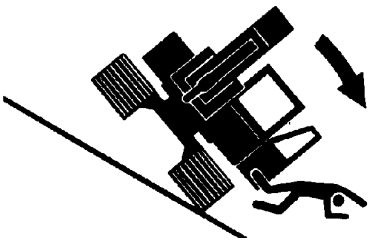
TX03679,00016F3 –19–03JAN07–1/1

Avoid Machine Tip Over

T133716 –19–14SEP00



T133545 –UN–15SEP00



T133803 –UN–27SEP00

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. Properly attach ramps to truck bed. Avoid trucks with steel beds because tracks slip more easily on steel.

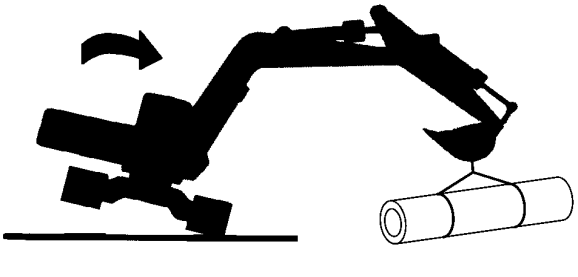
Be careful on slopes. Use extra care on soft, rocky or frozen ground. Machine may slip sideways in these conditions. When traveling up or down slopes, keep the bucket on uphill side and just above ground level.

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.

TX03679,00016DF –19–24JAN07–1/1

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.

TX03679,00016E1 –19–03JAN07–1/1

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.

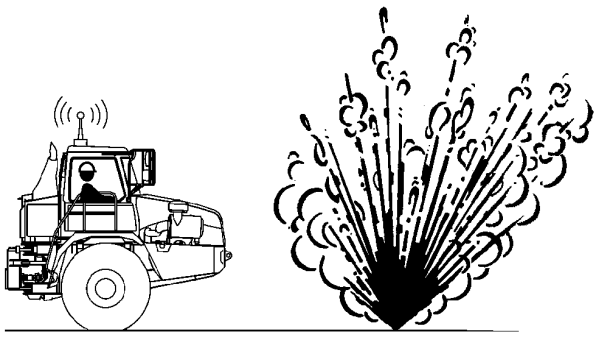
Ensure that a qualified person is involved in attachment installation. Add guards to machine if operator protection is required or recommended. Verify that all connections are secure and attachment responds properly to controls.

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 –19–24JAN07–1/1

Prevent Unintended Detonation of Explosive Devices

Avoid serious injury or death from an explosion hazard. Deactivate all cellular or radio frequency devices on equipment stored or operating in an area, such as a blasting zone, where the use of radio transmitting devices are prohibited.



VD76477,0001543 –19–08JAN08–1/1

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.

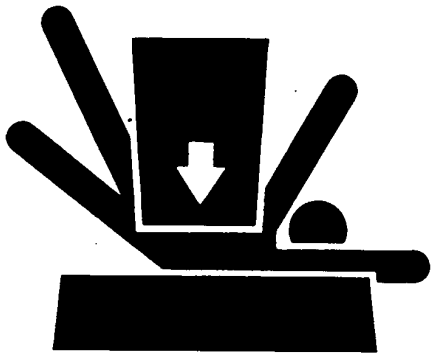
- Park machine on a level surface and lower equipment to the ground.
- Place pilot control shutoff lever in “lock” position. Stop engine and remove key.
- Attach a “Do Not Operate” tag in an obvious place in the operator’s station.

Securely support machine or equipment 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 –19–14DEC01



TS229 –UN–23AUG88

TX03679,00016E9 –19–24JAN07–1/1

Service Cooling System Safely

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

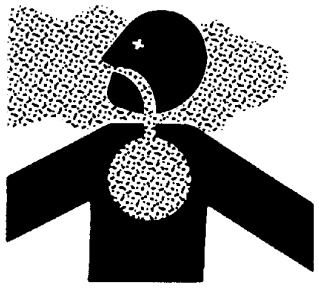
Do not service radiator through the radiator cap. Only fill through the surge tank filler cap.

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

TS281 –UN–23AUG88

DW90712,00003B1 –19–27NOV06–1/1

Remove Paint Before Welding or Heating



T133546 –UN–24AUG00

Hazardous fumes can be generated when paint is heated by welding or using a torch. Dust from sanding or grinding paint can also be hazardous.

Remove paint to at least 76 mm (3 in.) from area to be heated. Wear an approved respirator when sanding or grinding paint. If a solvent or paint stripper is used, wash area with soap and water. Remove solvent or paint stripper containers from work area and allow fumes to disperse at least 15 minutes before welding or heating.

Work outside or in a well-ventilated area. Dispose of waste, paint and solvents properly.

TX03679,0001732 –19–28FEB06–1/1

Make Welding Repairs Safely

T133547 –UN–31AUG00

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.

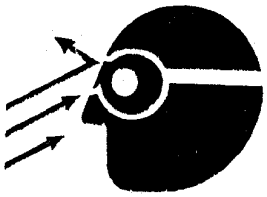
Remove paint properly. Do not inhale paint dust or fumes. Use a qualified welding technician for structural repairs. Make sure there is good ventilation. Wear eye protection and protective equipment when welding.

TX03679,00016D5 –19–25APR08–1/1

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.

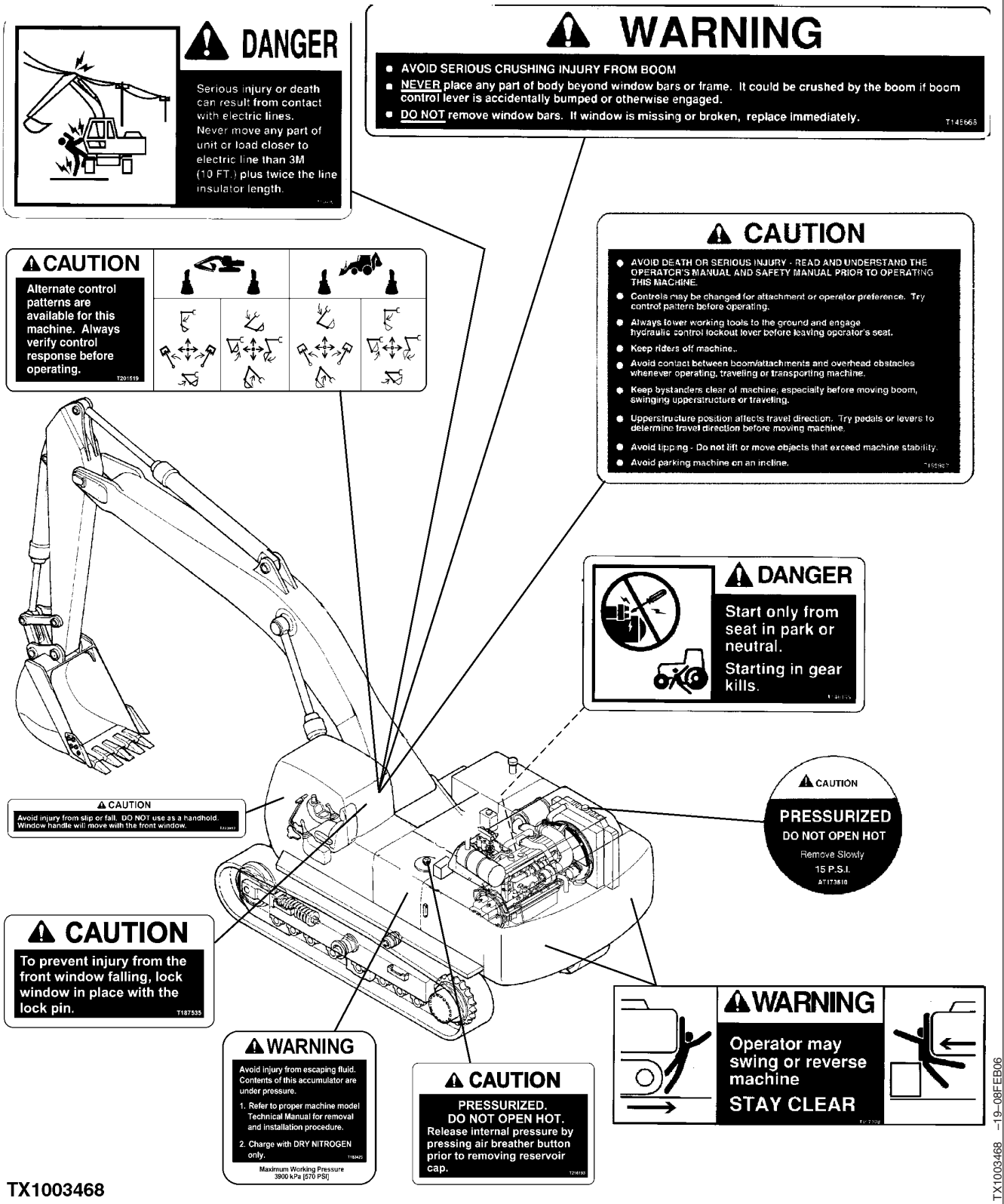
Use a soft hammer or a brass bar between hammer and object to prevent chipping.



T133738 –UN–14SEP00

TX03679,0001745 –19–03JAN07–1/1

Safety Signs

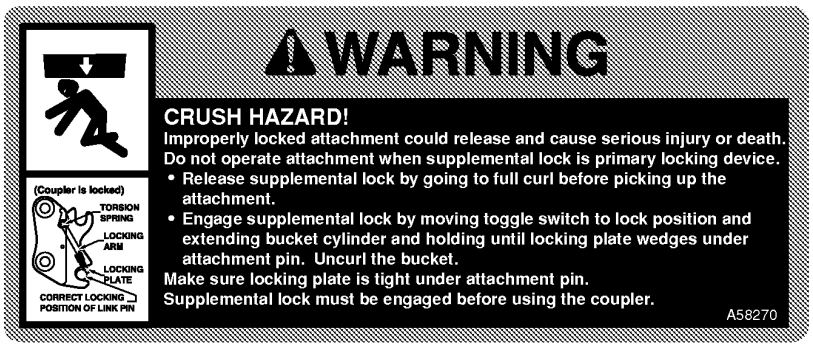


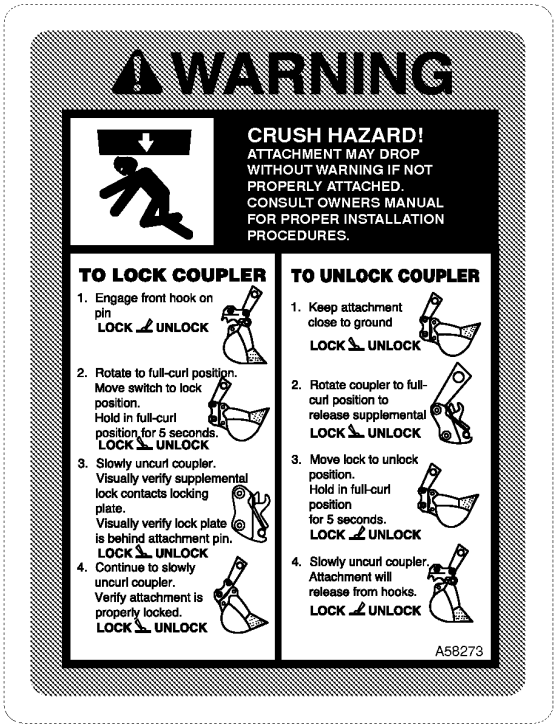
TX1003468

TX1003468 –19–08FEB06

AM40430,00002FD –19–07FEB06–1/1

Safety Signs Installed in Cab—Hydraulic Coupler (If Equipped)

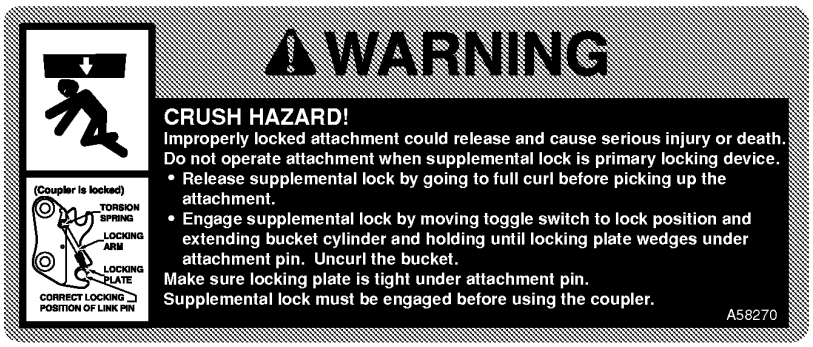


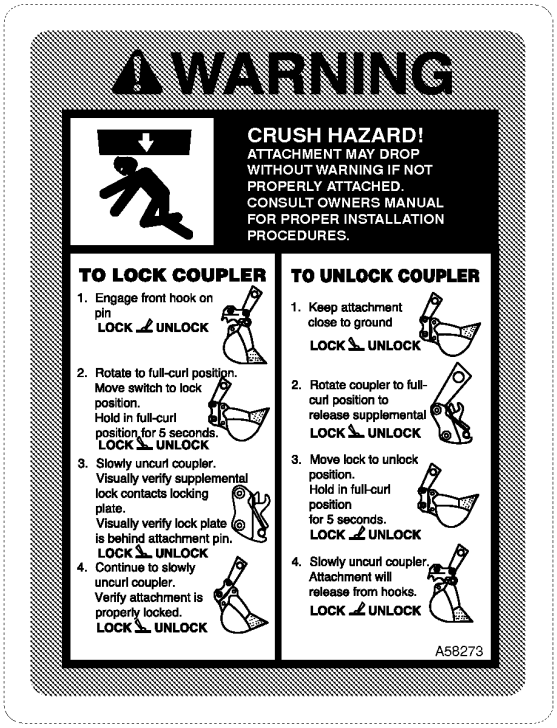


TX1025651

TX1025651 –19–03JUL07

Safety Signs Installed on Hydraulic Coupler—Hydraulic Coupler (If Equipped)





TX1025651

TX1025651 –19–03JUL07

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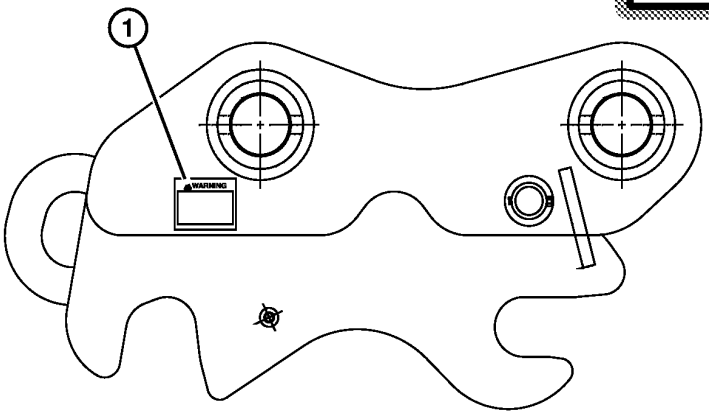
1. Install four warning decals to right window inside of cab next to electrical box.

DW90712,0000457 –19–25JAN08–2/3



TX1025652

TX1025652 –19–03JUL07

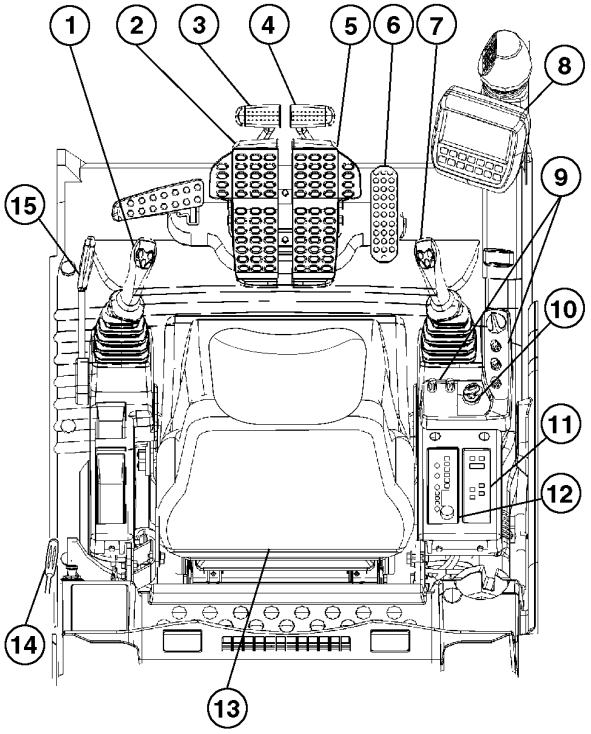
1—Warning Decal

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

DW90712,0000457 –19–25JAN08–3/3

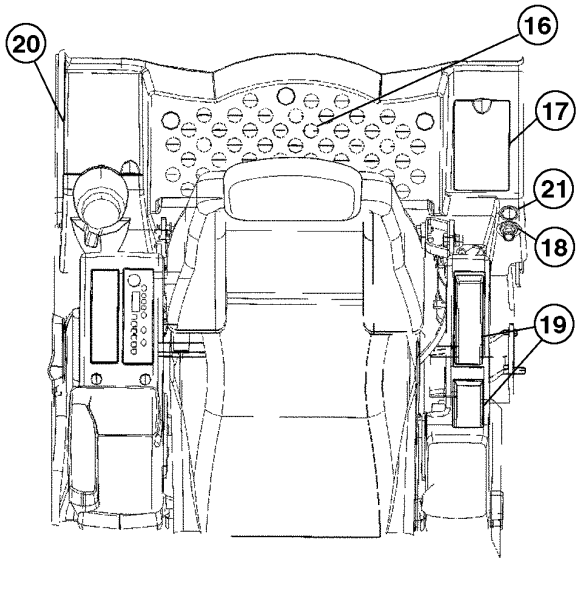
Pedals, Levers, and Panels

1—Left Pilot Control Lever (3 Button Lever Optional) / Horn Button (bottom button on top of lever)
2—Left Travel Pedal
3—Left Travel Lever
4—Right Travel Lever
5—Right Travel Pedal
6—Attachment Pedal (Optional)
7—Right Pilot Control Lever / Power Dig Button (bottom button on top of lever)
8—Monitor
9—Front Switch Panel
10—Key Switch
11—Air Conditioner Panel
12—Radio
13—Operator's Seat
14—Cab Door Release Lever
15—Pilot Shutoff Lever
16—Rear Deck
17—Fuse Box
18—Lighter
19—Left Console
20—Hot and Cold Storage Compartment
21—Accessory Power Port
22—Engine Stop Switch



T214897

T214897 –UN–03DEC05



TX1000415 –UN–07JAN06

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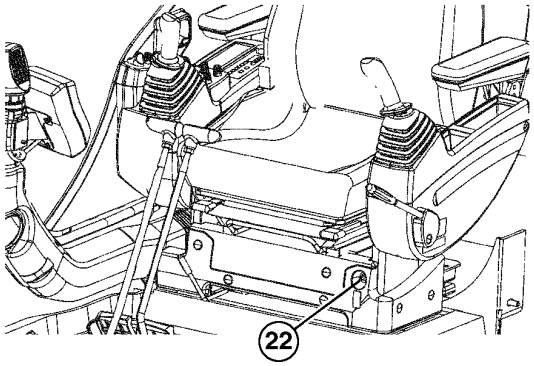
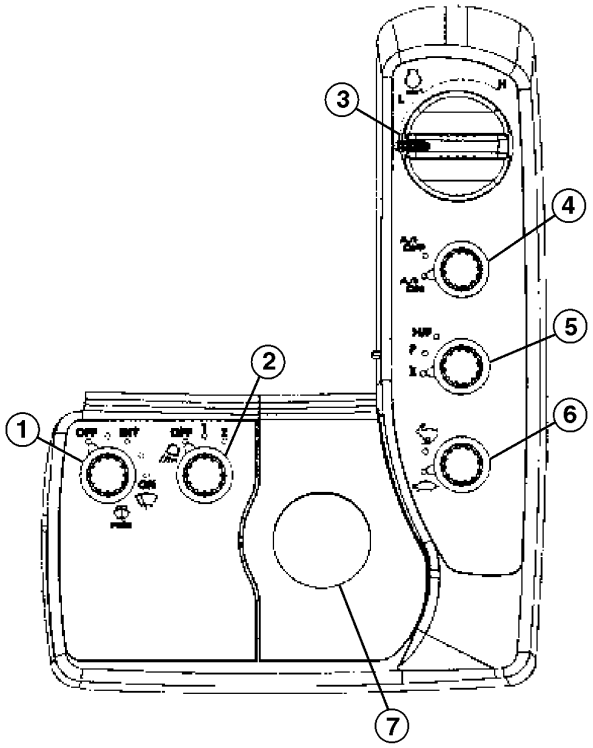
DW90712,0000193 –19–10AUG06–1/2



DW90712,0000193 –19–10AUG06–2/2

Front Switch Panel

1—Washer/Wiper Switch
2—Operating Lights Switch
3—Engine Speed Dial
4—Auto-Idle Switch
5—Power Mode Switch
6—Travel Mode Switch
7—Key Switch



VD76477,0000336 –19–13DEC05–1/1

Front Switch Panel Functions

NOTE: The wiper does not operate unless the upper front window is completely closed.

1. Wiper Switch: Wiper switch has several positions:

OFF ... Wiper stops operating and is retracted.

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

ON ... Wiper operates continuously.

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

2. Operating Lights Switch: Turn switch to first position to turn on drive light. Front Switch Panel will also light.

Turn light switch to second position to turn on boom work light, cab lights, and drive light. If default screen is displayed on monitor, the background goes from white to black.

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

4. Auto-Idle Switch: With engine on, move auto-idle switch to A/I ON and the engine speed dial to above auto-idle speed. Auto-idle indicator will appear on monitor default screen when auto-idle is on.

The engine will run at the engine control 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 control dial setting when any control lever is operated.

Engine rpm will change depending on engine control dial setting and position of control levers.

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

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

H/P (High Power) Mode

Use H/P mode when more flow is desired for booming up or 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.

6. Travel Mode Switch: Turn switch to select fast or slow speed travel.

7. Key Switch: The key switch has 4 positions: OFF, ACC, ON, and START.

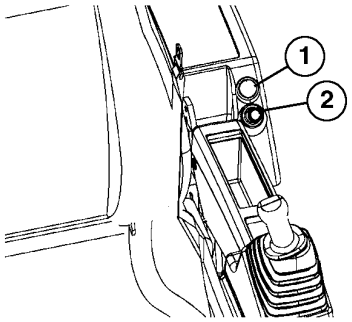
DW90712,000002E –19–07FEB06–1/1

Rear Panel

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

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

1—Accessory Power Port
2—Lighter



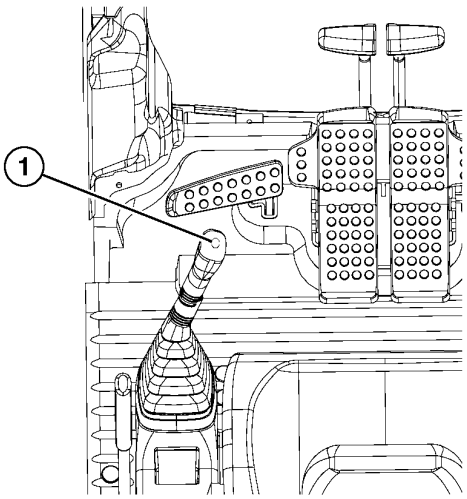
T214900 –UN–17NOV05

DW90712,0000002 –19–28DEC05–1/1

Horn

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

1—Horn Button



TX1001366 –UN–15DEC05

VD76477,00003B8 –19–09DEC05–1/1

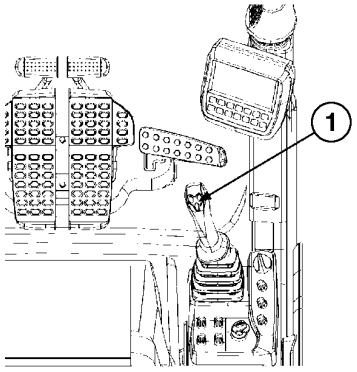
Power Dig Button

Press and hold down power dig button (1) on top of right pilot control lever for an 8 second increase in hydraulic power. Release button to reset power dig function.

Power dig is automatically activated when the following conditions are met:

- Boom Up
- No Arm In
- High Delivery Pressure

1—Power Dig Button



3 Button Pilot Control Lever Shown

T214908 –UN–29NOV05

VD76477,0000367 –19–03JAN06–1/1

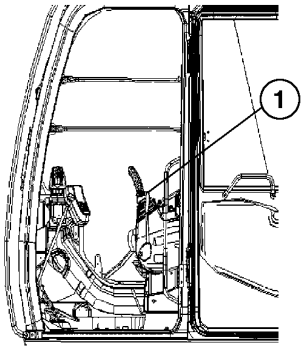
Pilot Shutoff Lever

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

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

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

1—Pilot Shutoff Lever



Lever In Locked Position

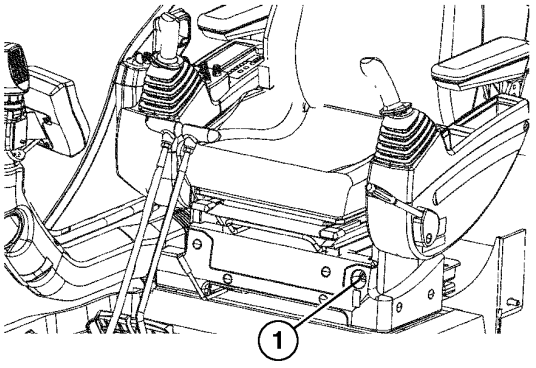
T214909 –UN–29NOV05

VD76477,0000346 –19–31OCT06–1/1

Engine Stop Switch

If the engine does not stop even if the key switch is turned OFF due to failure of the machine, move switch (1) located at the front-left side of the seat stand downward to stop the engine. After operating switch (1), be sure to return the switch back to the upward position.

1—Engine Stop Switch



TX1009920 –UN–24JUL06

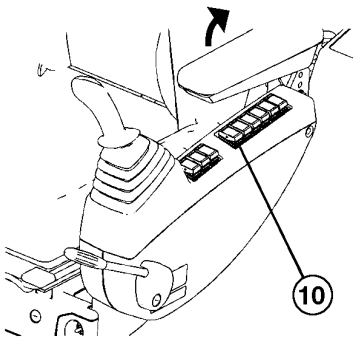
DW90712,0000194 –19–07JUL06–1/1

Left Console

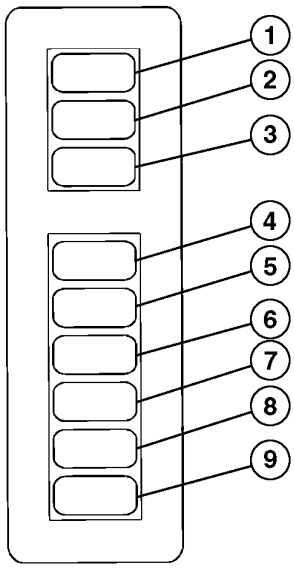
NOTE: There are standard and optional switches on the left console. Before using the switches on the console, be aware of what kind of optional devices are equipped on the machine.

Raise the armrest when operating the switches.

1—Travel Alarm and Travel Alarm Cancel Switch
2—Seat Heater Switch
3—Not Used
4—Boom Mode Switch
5—Engine Oil Level / Coolant Level Switch
6—Not Used
7—Rear Light Switch (Optional)
8—Not Used
9—Reversing Cooling Fan Switch (Optional)
10—Left Console Switches



TX1001988 –UN–05JAN06



TX1001989 –UN–05JAN06

Switch Location

DW90712,0000062 –19–07FEB06–1/1

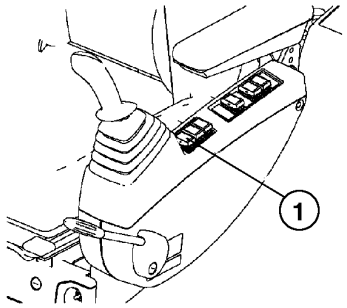
Travel Alarm and Travel Alarm Cancel Switch

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.

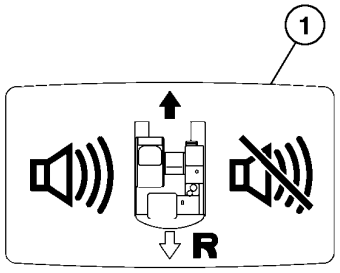
The travel alarm sounds when a travel pedal or lever is activated and will continue as long as the tracks are moving. When travel motion stops, the travel alarm switch is reset.

After the initial 13 second alarm, alarm can be silenced by depressing the right half of the travel alarm cancel switch (1).

1—Travel Alarm Cancel Switch



TX1000414 –UN–22NOV05

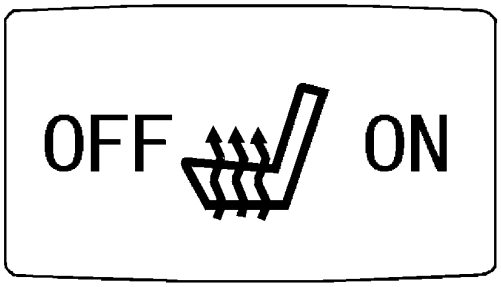


TX1001227 –UN–14DEC05

DW90712,000002F –19–03FEB06–1/1

Seat Heater Switch

Use switch to turn seat heater ON or OFF.



TX1000703 –UN–29NOV05

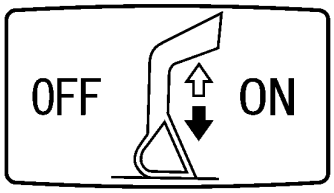
Seat Heater Switch

DW90712,0000030 –19–20JAN06–1/1

Boom Mode Switch

When the boom mode switch is turned ON, the machine cannot be raised off the ground with the front attachment.

When turned OFF, the machine can be raised off the ground with the front attachment.



TX1001992 –UN–29MAR06

Boom Mode Switch

VD76477,0000405 –19–29DEC05–1/1

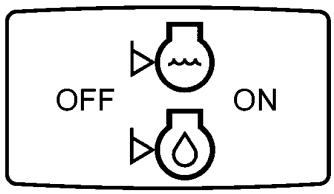
Engine Oil Level / Coolant Level Switch

While the engine oil level / coolant level switch is turned ON, the engine oil level / coolant level indicators are displayed on the default screen.

When the indicator is red, the fluid level is low. When the indicator is green, the fluid level is normal.

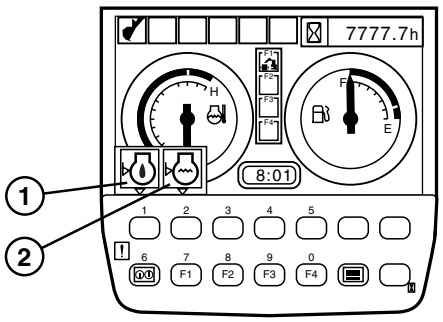
When releasing the engine oil level / coolant level switch, the indicators no longer display.

1—Engine Oil Level Indicator
2—Coolant Level Indicator



TX1001993 –UN–04JAN06

Engine Oil Level / Coolant Level Switch



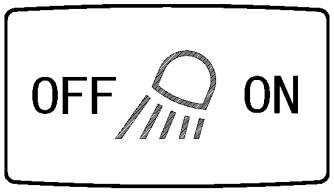
TX1001986 –UN–05JAN06

Default Screen

DW90712,0000031 –19–20JAN06–1/1

Rear Light Switch—If Equipped

When the rear light switch is turned ON, the rear light at the rear of the cab roof comes ON.



TX1001995 –UN–04JAN06

Rear Light Switch (Optional)

VD76477,0000408 –19–29DEC05–1/1

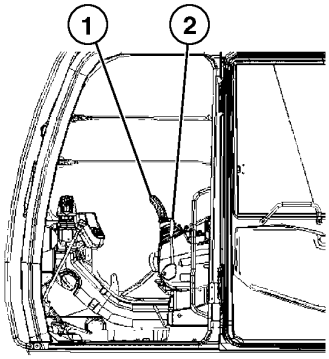
Reversing Cooling Fan Switch—If Equipped

IMPORTANT: In case the pilot control shutoff lever (2) is not in the LOCK position, the fan rotating direction switch device deactivates. Air conditioner may be damaged if the fan rotating direction switch (4) is pressed with using air conditioner.

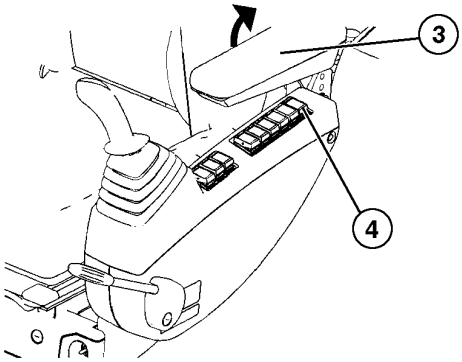
When fan rotating direction switch (4) is turned ON, the fan rotates in reverse, and the radiator, the oil cooler, and the inter cooler core can be cleaned.

1. Turn all control levers (1) to neutral with engine running. Pull the pilot control shutoff lever (2) up to the LOCK position.
2. Turn off the air conditioner switch.
3. Raise the armrest (3), press fan rotating direction switch (4) to down the engine speed. After approx. 20 seconds, the fan rotates in reverse for approx. 60 seconds.
4. After approx. 20 seconds, the fan rotating direction returns to normal.

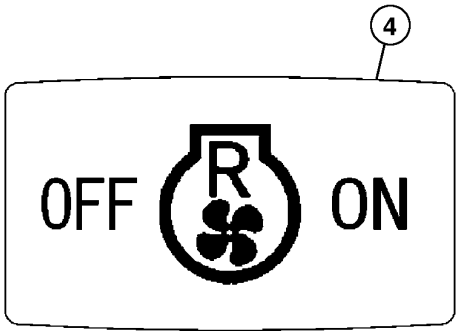
1—Control Levers
2—Pilot Control Shutoff Lever
3—Armrest
4—Fan Rotating Direction Switch



TX1003472 –UN–08FEB06



TX1003473 –UN–08FEB06



TX1003474 –UN–08FEB06

DW90712,0000063 –19–31OCT06–1/1

Cab Heater and Air Conditioner

1. Blower OFF Button: Press OFF button 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 Buttons: Press blower buttons 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 Buttons: Press buttons to set temperature. The temperature will be displayed on the center of the monitor display. Press both "^" and "v" switches at the same time, and hold for 5 seconds to change the temperature mode (Centigrade—Fahrenheit).

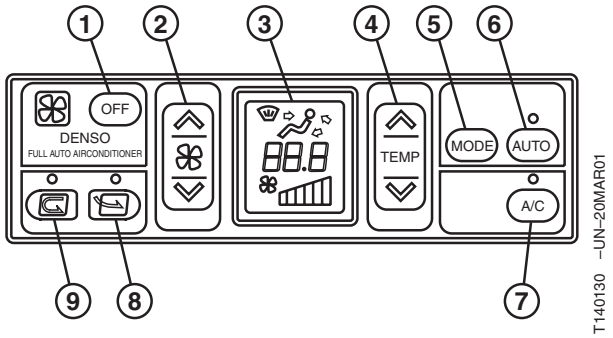
5. Mode Button: Press to select desired air vent. Selected air vent is displayed on the top of the monitor display.

6. AUTO A/C Button: Press AUTO button 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 button 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 Button: Air conditioner will turn on when A/C button is pressed and fan display of the blower button is on. A/C indicator will also light.

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

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



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

Continued on next page

Cab Heater Operation

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

Air Conditioner Operation

1. Press AUTO button. The AUTO and A/C indicators will light, **or press AUTO button again and:**
2. Press temperature control button to set temperature.
3. Press mode button for desired vent air flow.
4. Press blower button to select desired blower speed.
5. Press fresh air mode button to maintain the air vent in the fresh air circulation mode.
6. Press recirculating mode button to maintain the air suction port in the circulation mode.
7. Press temperature control buttons and blower buttons to adjust cab temperature.

Defroster Operation

1. Press AUTO button. Temperature controlled air blows out, **or press AUTO button again and:**
2. Press temperature control button to set temperature.
3. Press fresh air vent button to select fresh air circulation mode.

Continued on next page

4. Press mode button 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 buttons and blower buttons to adjust cab temperature.

7. Press A/C button on if windows become clouded or if dehumidifying is required.

DW90712,0000033 –19–03FEB06–3/3

Operating the AM/FM Radio

Press power button (1) to turn radio on, and repeatedly press one of tuning buttons (5) until desired station is reached. To preset a station, select the desired station using tuning buttons. Press and hold one of the station preset buttons (4) 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

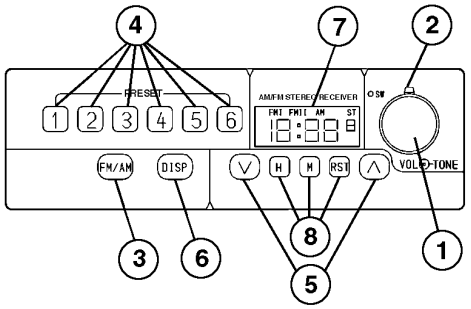
NOTE: In order to set the clock, the power switch must be on, and the digital display (7) must be in the time display mode.

Press and hold the reset button labeled RST (8) until the time is flashing.

Press the time set button labeled M (8) to set the correct minute.

Press the time set button labeled H (8) to set the correct hour.

Press and hold the reset button to set time.



T214911 –UN–17NOV05

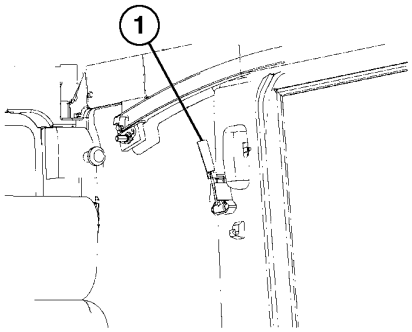
1—Power Button/Volume Control Knob
2—Tone Adjustment Ring
3—AM/FM Button
4—Station Preset Buttons
5—Tuning Buttons
6—Display Mode Change Button
7—Digital Display
8—Time Set / Reset Buttons

DW90712,0000034 –19–18JAN07–1/1

Secondary Exit Tool

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

1—Secondary Exit Tool



DW90712,0000001 –19–16NOV05–1/1

Opening Upper Front (Secondary Exit) Window

CAUTION: Avoid injury from slip or fall. DO NOT use as a handhold. Window handle will move with the front window.

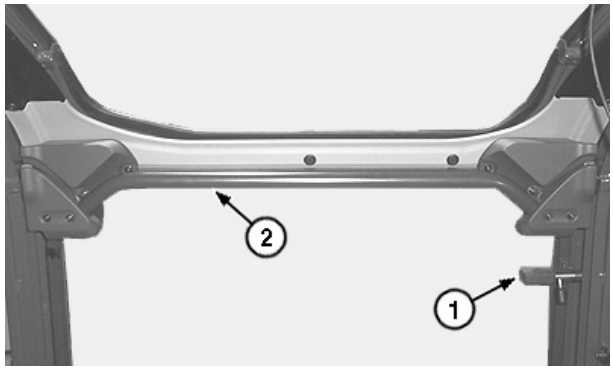
NOTE: The wiper cannot operate with the upper front window open. The washer can operate with the upper front window open.

1. Slide the lock pin (1) inward then down into notch.
2. Pull the lock release bar (2) toward operator.
3. While holding the lower handle on the window, pull window up and back as far as it can go.

CAUTION: Prevent possible injury from window closing. Always lock the pin in the cab frame boss hole.

4. Slide the lock pin (1) into the cab frame boss hole, and rotate downward into the lock position.

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



1—Lock Pin
2—Lock Release Bar

DW90712,0000035 –19–23JAN06–1/1

Removing and Storing the Lower Front Window

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

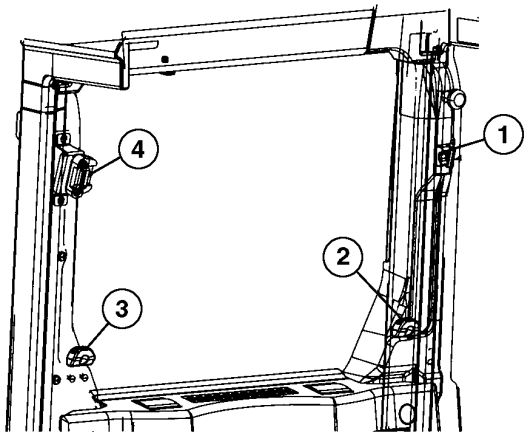
1. While pulling in on window, raise window to remove.

VD76477,00001C3 –19–18JAN07–1/2

2. Store window in rear storage area of cab. Install in protectors (1-4) 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
3—Protector
4—Protector

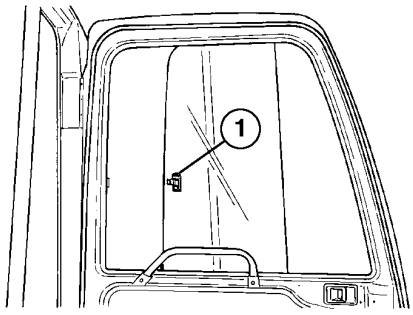


VD76477,00001C3 –19–18JAN07–2/2

Opening Cab Door Window

To open cab window, pinch latch (1), and slide rear pane forward.

1—Latch



DW90712,0000054 –19–23JAN06–1/1

Opening and Closing the Polycarbonate Type Roof Exit Cover

Opening:

1. Move lock levers (1) toward center of roof exit.

2. Push on handle (2) to open roof exit cover.

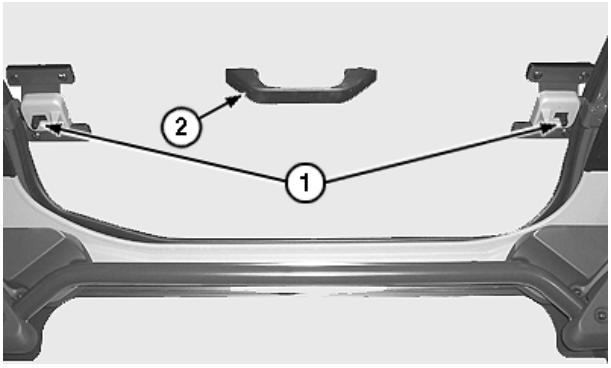
Closing:

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

IMPORTANT: Replace the polycarbonate type roof with a new one every 5 years, even if undamaged. In case it was remarkably damaged or has received severe shock loads, replace it even if it has been not in use for 5 years.

When cleaning the polycarbonate type roof, use a neutral detergent. If acidic or alkaline detergent is used, the polycarbonate type roof may become discolored or crack.

Keep organic solvent away from polycarbonate type roof. Failure to do so may cause the polycarbonate type roof to become discolored or crack.



1—Lock Lever
2—Handle

DW90712,0000728 –19–21MAY07–1/1

Adjusting the Air Suspension Seat

Push down lever (1) 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.

Pull button (3) to decrease seat firmness. With key switch in the ON position, press and hold button to increase seat firmness.

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

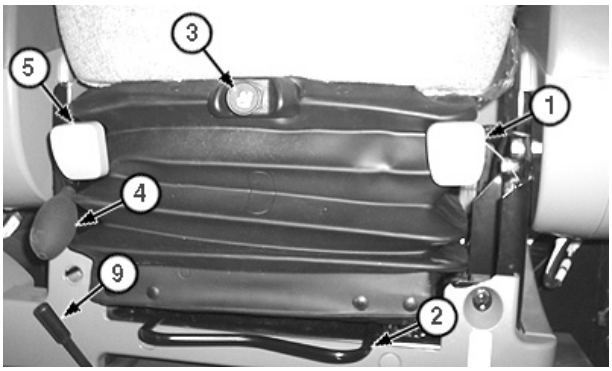
Pull up lever (5) to release backrest lock. Move backrest to desired position. Release lever.

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

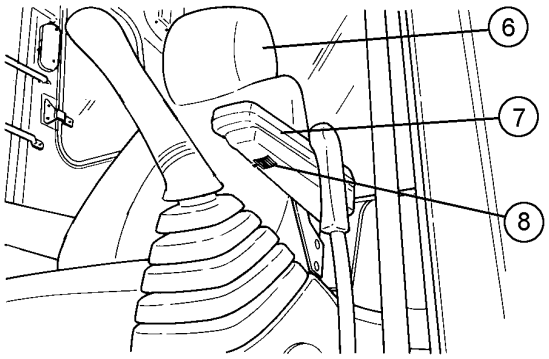
Pull up on armrest (7) to move armrest out of way when exiting.

Turn dial (8) to adjust angle of armrest.

Rotate handle (9) toward operator. Slide entire seat and controls to desired distance from travel pedals. Release handle.



TX1000940A –UN–30NOV05



T140133 –UN–02MAY01

1—Seat Angle Adjustment
2—Seat Fore-Aft Adjustment Handle
3—Firmness Adjustment Button
4—Lumbar Adjustment Ball
5—Backrest Adjustment
6—Headrest Height And Angle
7—Armrest
8—Armrest Dial
9—Seat Console Adjustment Handle

VD76477,00003B1 –19–06DEC05–1/1

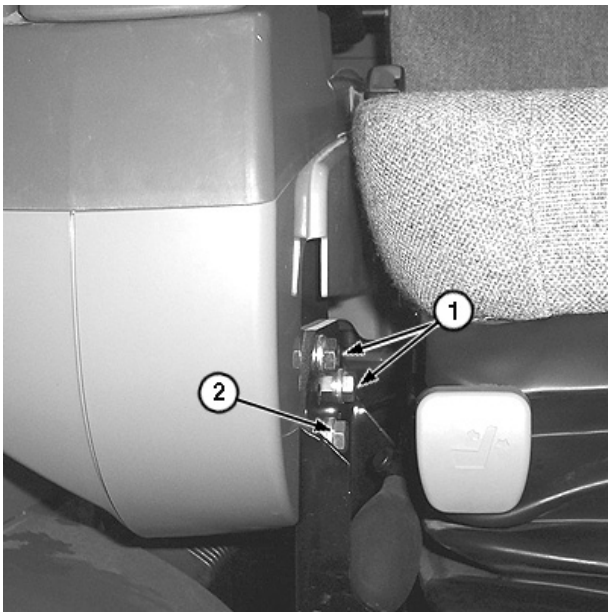
Adjusting Pilot Control Lever Console Height

CAUTION: Avoid possible crushing injury from console unexpectedly dropping. Before loosening the holding cap screws, support the console.

1. Ensure engine is off and pilot shutoff lever is in the LOCK position.
2. Remove left and right console holding cap screws (1).
3. Loosen cap screw (2), and adjust the pilot control lever console height relative to the cab floor.
4. Tighten cap screw (2), and install holding cap screws (1).

Specification

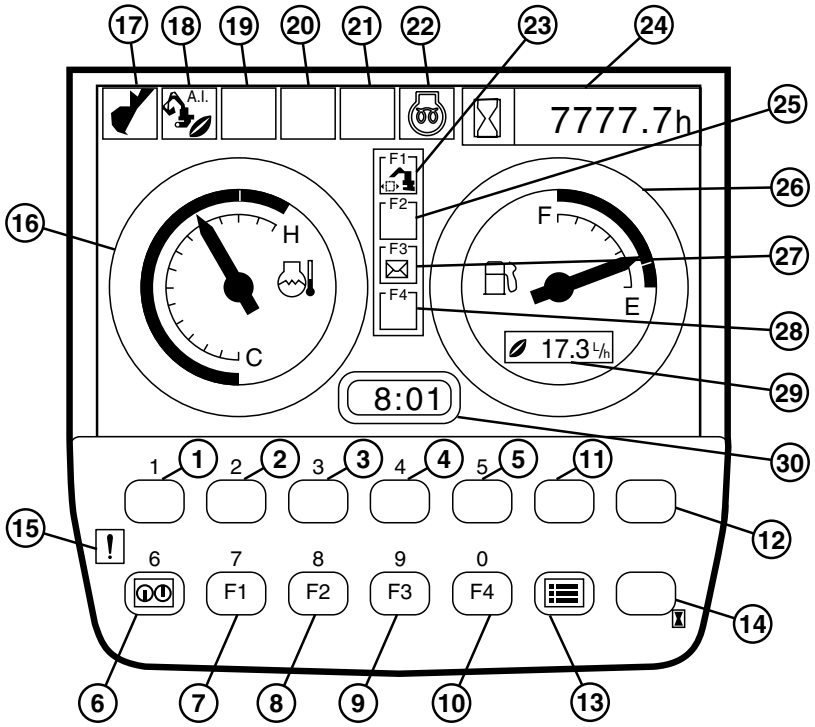
Cap Screws—Torque	49 N•m 36 lb-ft



1—Holding Cap Screws
2—Cap Screw

DW90712,0000037 –19–18JAN07–1/1

Monitor



TX1001230 —UN–04JAN06

TX1001230

1—Button 1
2—Button 2
3—Button 3
4—Button 4
5—Button 5
6—Button 6 / Return to Default Screen Button
7—Button 7 / F1 Function Button
8—Button 8 / F2 Function Button
9—Button 9 / F3 Function Button
10—Button 0 / F4 Function Button
11—Select Button
12—Back Button
13—Menu Button
14—Hour Meter Button
15—Alarm Indicator Light
16—Coolant Temperature Gauge
17—Work Mode Indicator
18—Auto-Idle Indicator
19—Auxiliary Indicator
20—Auxiliary Indicator
21—Auxiliary Indicator
22—Engine Preheat Indicator
23—F1 Function Button Indicator
24—Hour Meter
25—F2 Function Button Indicator
26—Fuel Gauge
27—F3 Function Button Indicator
28—F4 Function Button Indicator
29—Fuel Rate Display
30—Clock

VD76477,00003B2 –19–31OCT06–1/1

Monitor Functions

1. Button 1: Press button to key in the number 1, or use as instructed depending on current screen.

2. Button 2: Press button to key in the number 2, or use as instructed depending on current screen.

3. Button 3: Press button to key in the number 3, or use as instructed depending on current screen.

4. Button 4: Press button to key in the number 4, or use as instructed depending on current screen.

5. Button 5: Press button to key in the number 5, or use as instructed depending on current screen.

6. Button 6 / Return to Default Screen Button: Press button to key in the number 6 / Press button to return to the default screen.

7. Button 7 / F1 Function Button: Press button to key in the number 7 / Press button to select the desired preset optional function from any screen.

8. Button 8 / F2 Function Button: Press button to key in the number 8 / Press button to select the desired preset optional function from any screen.

9. Button 9 / F3 Function Button: Press button to key in the number 9 / Press button to select the desired preset optional function from any screen.

10. Button 0 / F4 Function Button: Press button to key in the number 0 / Press button to select the desired preset optional function from any screen.

11. Select Button: Use button as instructed depending on current screen.

12. Back Button: Use button as instructed depending on current screen.

13. Menu Button: Press button to display main menu from any screen.

14. Hour Meter Button: Without key inserted or with key switch OFF, press and hold button to display default screen and hour meter.

15. Alarm Indicator Light: Lights when an abnormality has occurred.

16. Coolant Temperature Gauge:

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

Indicates the engine coolant temperature. Needle should be around the center of the scale during operation.

17. Work Mode Indicator: The icon for the current attachment being used displays.

18. Auto-Idle Indicator: When selecting auto-idle from the front switch panel, the auto idle icon displays.

19. Auxiliary Indicator: Optional auxiliary data icon displays.

20. Auxiliary Indicator: Optional auxiliary data icon displays.

21. Auxiliary Indicator: Optional auxiliary data icon displays.

22. Engine Preheat Indicator:

IMPORTANT: Prevent engine damage. Do not use ether in machines equipped with the preheat option.

When preheating is required, the preheat icon is automatically lit. If preheating is not required, the icon will not be lit.

Continued on next page

23. F1 Function Button Indicator: Optional indicator icon is displayed.

24. Hour Meter: Total machine operation hours counted since the machine started working are displayed in the unit of hour (h). One digit after the decimal point indicates tenths of an hour (6 minutes).

25. F2 Function Button Indicator: Optional indicator icon is displayed.

26. Fuel Gauge: Fuel machine before needle reaches “E”.

27. F3 Function Button Indicator: Optional indicator icon is displayed.

28. F4 Function Button Indicator: Optional indicator icon is displayed.

29. Fuel Rate Display: Fuel consumption is displayed.

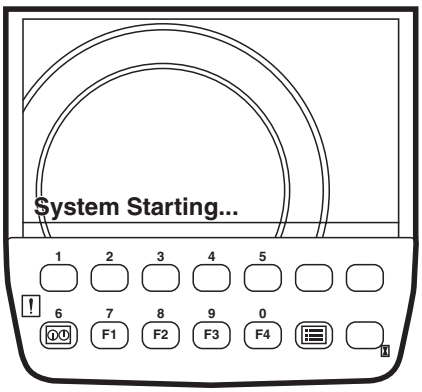
30. Clock: Indicates present time.

VD76477,000038A –19–31OCT06–2/2

Monitor Start-Up

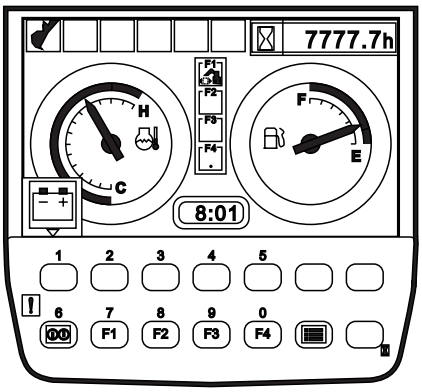
IMPORTANT: Start the engine after the default screen is displayed.

When the key switch is turned to the ON position, the system starting screen displays for about 2 seconds. The default screen will then be displayed.



TX1000374 –UN–29NOV05

System Starting Screen



TX1000365 –UN–07DEC05

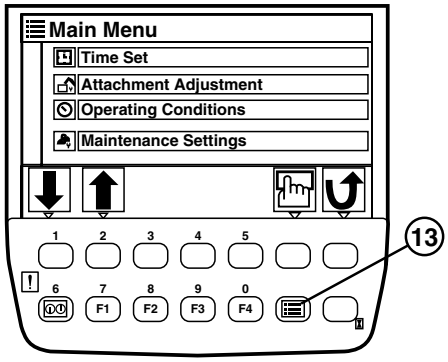
Default Screen

VD76477,0000301 –19–24JAN07–1/1

Main Menu

Press the menu button (13) to display the main menu screen.

13—Menu Button



TX1000974 –19–12DEC05

Main Menu Screen

VD76477,0000316 –19–31OCT06–1/1

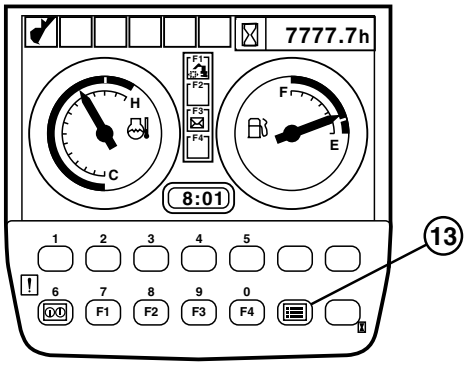
Time Set Menu

Press menu button (13) on the default screen to display the main menu screen. Choose the Time Set menu by pressing button (1) or (2) under the arrow icons on the screen, then press the select button (11).

Time Adjustment:

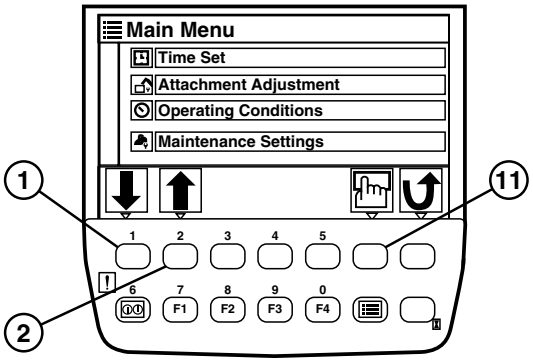
1. On the time set screen, press button (1) or (2) to navigate to the setting you want to change.
2. Use buttons (3) or (4) to decrease or increase the chosen setting.
3. Navigate to each setting until all desired changes are made.
4. Once desired settings are reached, navigate to the apply setting icon (15).
5. Press the select button (11) to apply the new settings. The message “Data is being applied.” will display on the screen.

1—Button 1
2—Button 2
3—Button 3
4—Button 4
11—Select Button
13—Menu Button
15—Apply Settings Icon



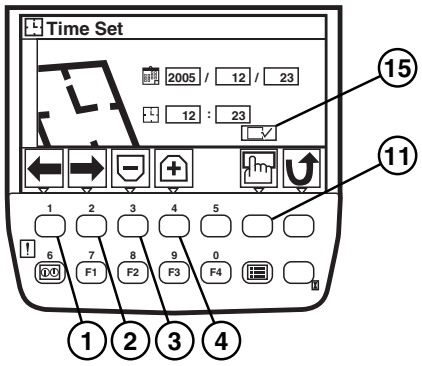
TX1001142 –UN–12DEC05

Default Screen



TX1001143 –19–05JAN06

Main Menu Screen



TX1001146 –19–13DEC05

Time Set Screen

VD76477,000030E –19–31OCT06–1/1

Selecting an Attachment From Default Screen

1. When the default screen appears, push button F1 (7) to display the work mode screen.

2. On the work mode screen, push a button located under an attachment to be used in order to select the attachment.

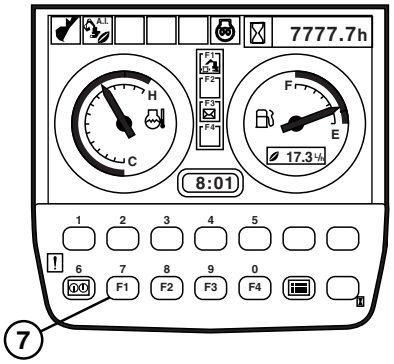
NOTE: When the Digging mode is selected, the default screen will reappear.

3. On the attachment specification screen, confirm if specification of the installed attachment agrees with that displayed on the screen.

NOTE: Pushing the back button (12), displays previous screen.

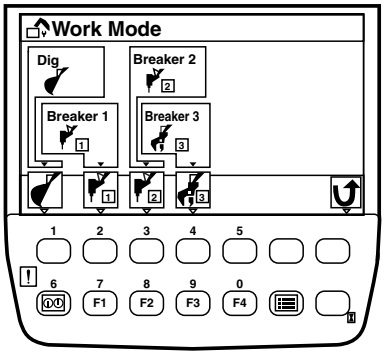
4. Push the select button (11), and the default screen appears.

7—F1
11—Select Button
12—Back Button



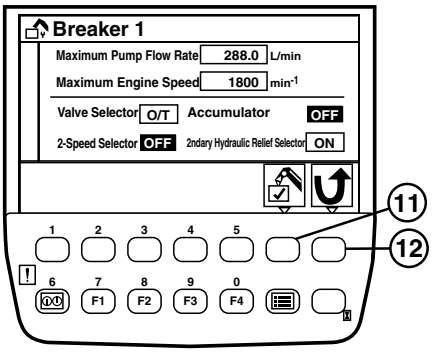
Default Screen

TX1001319 –UN–13DEC05



Work Mode Screen

TX1001687 –19–21DEC05



Attachment Specification Screen

TX1001690 –19–21DEC05

DW90712,000005C –19–24JAN07–1/1

Selecting an Attachment From Main Menu

1. When the default screen appears, push the menu button (13) to display main menu.

2. Select work mode from main menu by using buttons (1) and (2). Push select button (11). The work mode screen appears.

3. Push the button located under an attachment to be used in order to select the attachment.

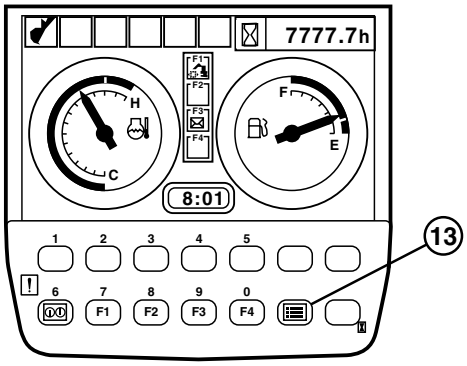
NOTE: When the Digging mode is selected, the default screen will reappear.

4. On the attachment specification screen, confirm if specification of the installed attachment agrees with that displayed on the screen. In this example, the Crusher 1 attachment was selected

NOTE: Pushing the back button (12), displays previous screen.

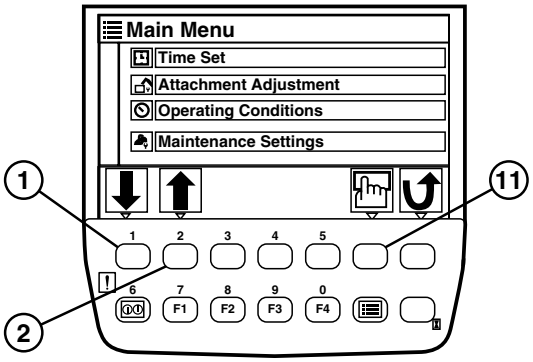
5. Push the select button (11), and the default screen appears.

1—Button 1
2—Button 2
11—Select Button
12—Back Button
13—Menu Button



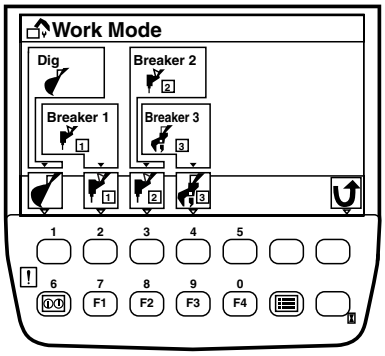
Default Screen

TX1001142 –UN–12DEC05



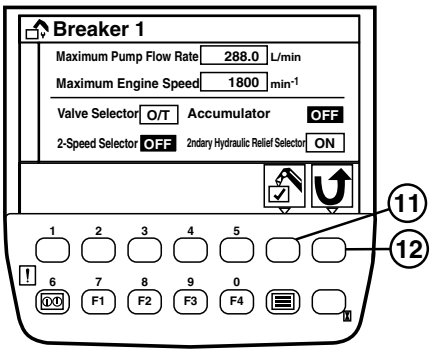
Main Menu Screen

TX1001143 –19–05JAN06



Work Mode Screen

TX1001687 –19–21DEC05

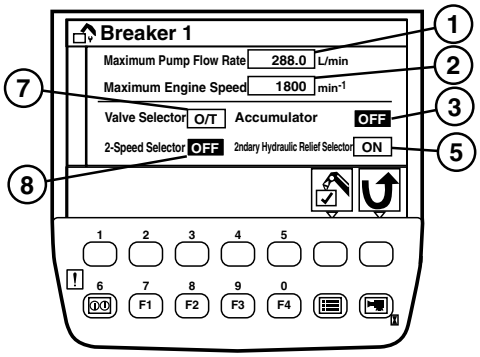


Attachment Specification Screen

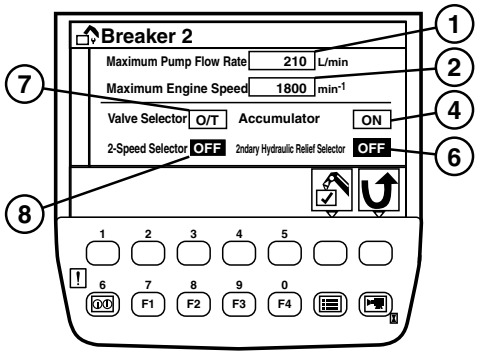
TX1001690 –19–21DEC05

DW90712,000005D –19–24JAN07–1/1

Attachment Specification Screen



TX1000775 –19–29NOV05



TX1000776 –19–29NOV05

NOTE: Breaker 3 attachment specification screen not shown

1—Maximum Pump Flow Rate
2—Maximum Engine Speed
3—Accumulator Control Solenoid Valve: OFF
4—Accumulator Control Solenoid Valve: ON
5—Secondary Relief Selector Control Solenoid Valve: ON
6—Secondary Relief Selector Control Solenoid Valve: OFF
7—Three Way Valve Control Solenoid Valve: ON
8—Auxiliary Flow Combining Solenoid Valve: OFF

VD76477,00003D1 –19–26JUN07–1/1

Pump 2 Flow Rate Adjustment

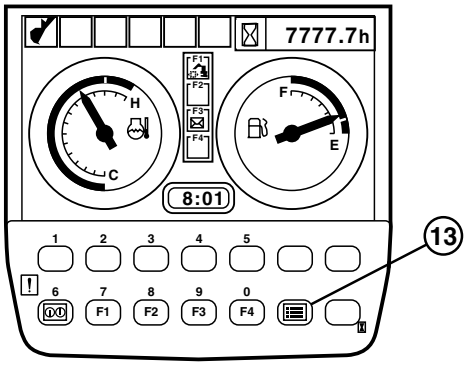
1. When the default screen displays, push the menu button (13) to display the main menu.
2. Select Attachment Adjustment from the main menu by using buttons (1) or (2).

NOTE: When the Digging Mode is selected, adjustments cannot be made.

3. Push the select button (11) to display the Attachment Adjustment screen. In this example, the Breaker 1 attachment is selected.
4. Adjust flow rate of Pump 2 by using buttons (1) or (2).

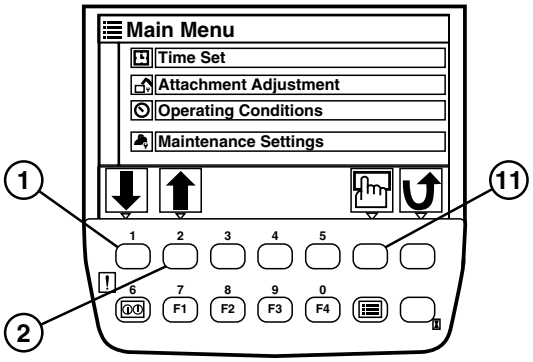
   Pushing button (1) will decrease flow rate of pump 2, and pushing button (2) will increase the flow rate of pump 2.

1—Button 1
2—Button 2
11—Select Button
13—Menu Button



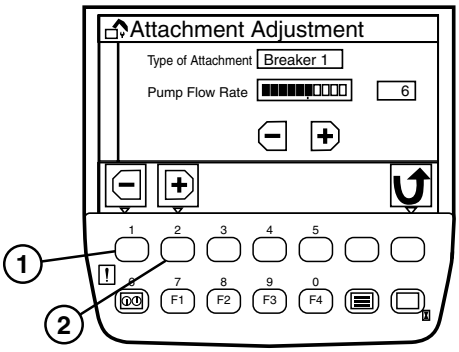
TX1001142 –UN–12DEC05

Default Screen



TX1001143 –19–05JAN06

Main Menu Screen



TX1001322 –19–16DEC05

Attachment Adjustment Screen

DW90712,0000038 –19–24JAN07–1/1

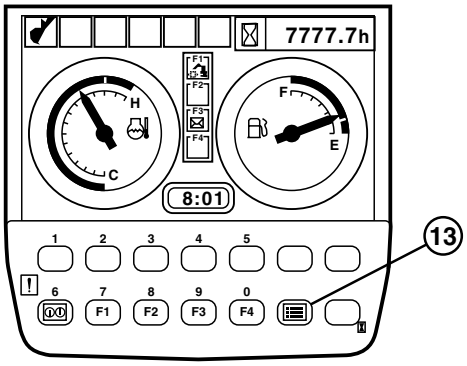
Displaying Operating Conditions

1. When the default screen appears, push the menu button (13) to display the main menu.
2. Select Operating Conditions from the main menu by using buttons (1) or (2).
3. Push the select button (11) to display the operating conditions screen.

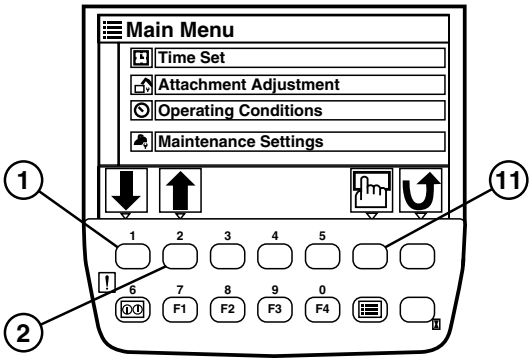
NOTE: To return to the previous screen without resetting the data, use the back button (12).

4. If resetting the operating conditions is desired, push the select button (11). The reset data confirmation screen appears.
5. Push the select button (11) to confirm resetting of data.

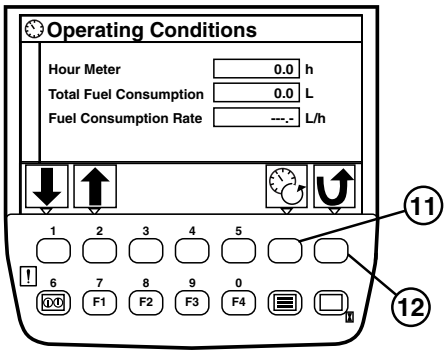
1—Button 1
2—Button 2
11—Select Button
12—Back Button
13—Menu Button



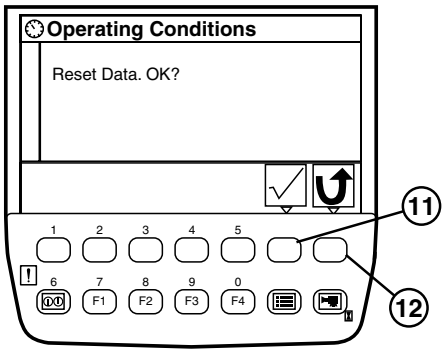
Default Screen



Main Menu Screen



Operating Conditions Screen



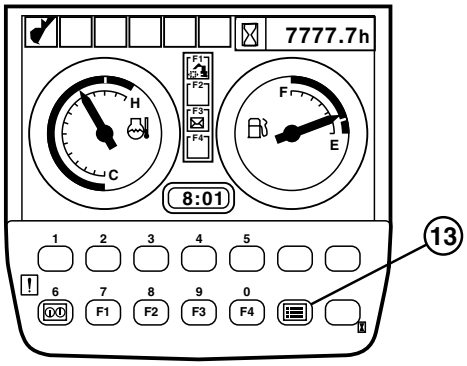
Reset Data Confirmation Screen

VD76477,0000310 –19–31OCT06–1/1

Maintenance Settings

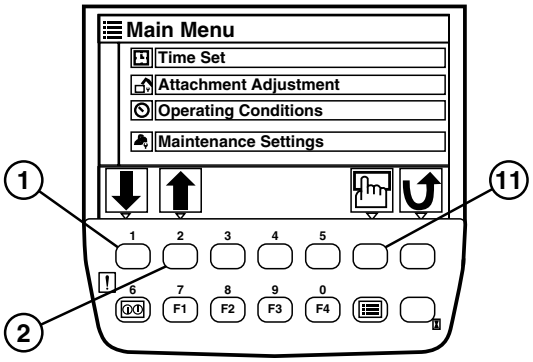
1. When the default screen appears, push the menu button (13) to display the main menu.
2. Select Maintenance Settings from the main menu by using buttons (1) and (2).
3. Push the select button (11) to display the maintenance settings screen.

1—Button 1
2—Button 2
3—Button 3
4—Button 4
11—Select Button
12—Back Button
13—Menu Button



TX1001142 –UN–12DEC05

Default Screen

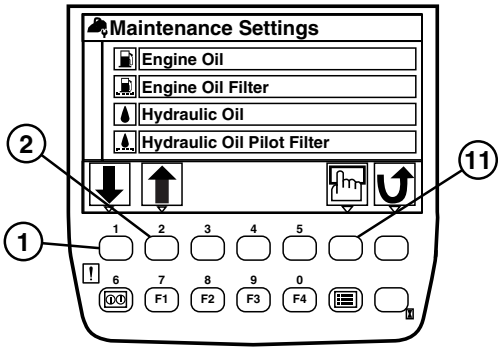


TX1001143 –19–05JAN06

Main Menu Screen

DW90712,0000039 –19–24JAN07–1/5

4. Select an item to be set from among the list of maintenance settings by using buttons (1) or (2). In this example, engine oil was selected.



TX1001285 –19–19DEC05

Maintenance Settings Screen

Continued on next page

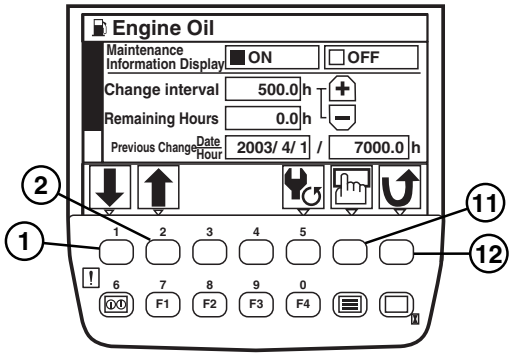
DW90712,0000039 –19–24JAN07–2/5

5. Push the select button to display the interval ON/OFF settings screen.

Maintenance Information Display ON/OFF

1. Select ON or OFF for maintenance information display by using buttons (1) or (2). Push the select button.
   - ON: When it is time to perform maintenance on the selected item, an information message is displayed on the screen.
   - OFF: No information message is displayed.
2. In order to apply setting, push the back button (12) to return to the default screen.

Change Interval Settings



TX1001284 –19–27JAN06

Interval ON/OFF Screen

DW90712,0000039 –19–24JAN07–3/5

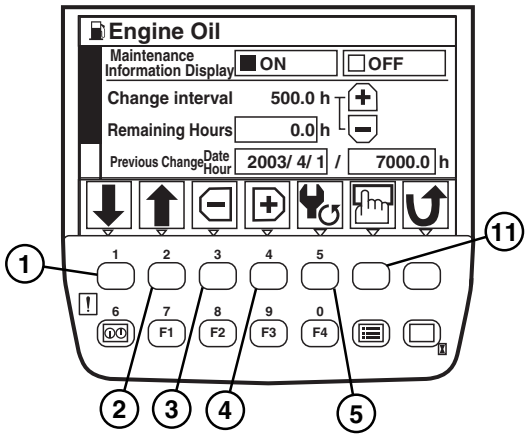
IMPORTANT: Change interval can only be set when maintenance information display is set to ON.

1. Navigate to the item Change interval by using buttons (1) or (2).
2. Set hour for change interval by using buttons (3) or (4).
3. Navigate to Remaining Hours by using buttons (1) or (2) and push the select button (11).

NOTE: To return to the previous screen without adjusting remaining hours to change interval, push the back button (12).

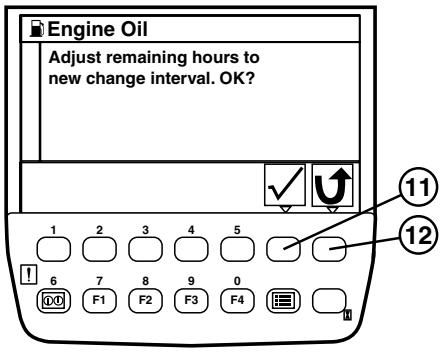
4. The message “Adjust remaining hours to new change interval. OK?” displays. Push the select button to confirm change.

Resetting Data



TX1001282 –19–27JAN06

Interval ON/OFF Screen



TX1001283 –19–15DEC05

Continued on next page

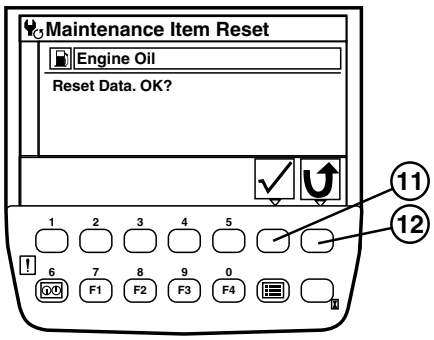
DW90712,0000039 –19–24JAN07–4/5

1. If data is to be reset, push button (5) on the interval ON/OFF settings screen. The message “Reset Data. OK?” displays.

NOTE: To return to the previous screen without resetting the data, use the back button (12).

2. Push the select button (11) to confirm resetting the data.

   The value of the remaining hours is reset to that of the change interval. Previous change date/hour is updated with current date and time.



TX1001286 –19–15DEC05

DW90712,0000039 –19–24JAN07–5/5

Screen Display When Scheduled Maintenance is Due

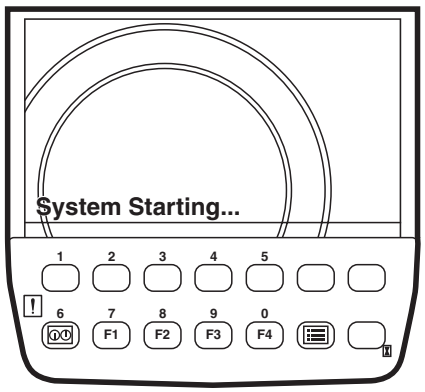
NOTE: The scheduled maintenance screen will only be displayed if the Maintenance Information Display is set to ON. (See Maintenance Settings in this section)

One Maintenance Item Due

Continued on next page

VD76477,00003B7 –19–18JAN07–1/5

1. Turn the key to the ON position, the system starting screen will appear.



TX1000374 –UN–29NOV05

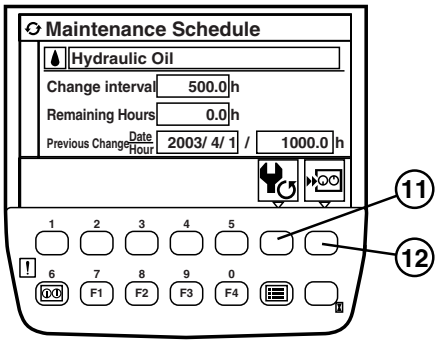
System Starting Screen

VD76477,00003B7 –19–18JAN07–2/5

2. When a change interval has expired for a maintenance item, the maintenance information screen will display for 3 to 10 seconds. While the maintenance information screen is displayed, press the select button (11) to reset the maintenance item.

NOTE: If the maintenance item is not reset or the back button (12), the default screen will appear after 3 to 10 seconds.

1—Button 1
2—Button 2
11—Select Button
12—Back Button



TX1001364 –19–15DEC05

Maintenance Information Screen

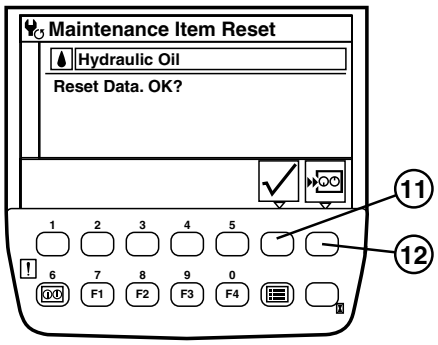
Continued on next page

VD76477,00003B7 –19–18JAN07–3/5

3. The maintenance item reset screen will display with the message “Reset Data. OK?”. Push the select button (11) to confirm reset or the back button (12) to return to the previous screen without resetting. When data is reset, the value of the remaining hours is reset to that of the Change interval. Previous change date/hour is updated with the current date and time.

Two or More Maintenance Items Due

1. Turn the key to the ON position, the system starting screen will appear.



TX1001363 –19–15DEC05

Maintenance Item Reset Screen

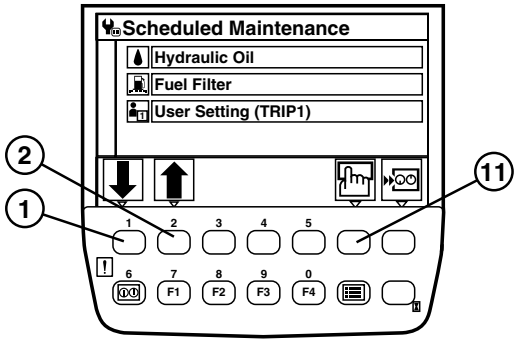
VD76477,00003B7 –19–18JAN07–4/5

2. When the change intervals have expired for two or more maintenance items, the scheduled maintenance screen will display for 3 to 10 seconds. While the scheduled maintenance screen is displayed, use button (1) or (2) to navigate to the maintenance item that is to be reset. Then press the select button (11) to view the maintenance information screen.

NOTE: If the maintenance item is not reset or the back button (12) pressed, the default screen will appear after 3 to 10 seconds.

3. While the maintenance information screen is displayed, press the select button (11) to reset the maintenance item.

4. The maintenance item reset screen will displays with the message “Reset Data. OK?”. Push the select button (11) to confirm reset or the back button (12) to return to the previous screen without resetting. When data is reset, the value of the remaining hours is reset to that of the Change interval. Previous change date/hour is updated with the current date and time.



TX1001362 –19–15DEC05

Scheduled Maintenance Screen

VD76477,00003B7 –19–18JAN07–5/5

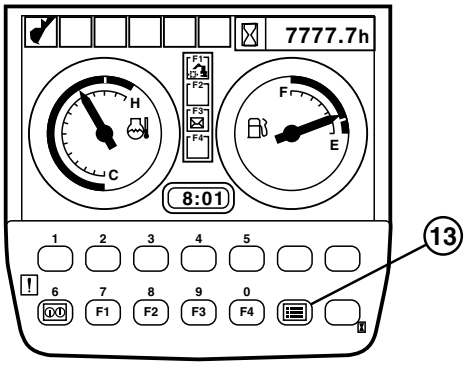
Fuel Rate Display/No Display

1. From the default screen, push the menu button (13) to display the main menu.
2. Select Fuel Rate Display/No Display from the main menu using buttons (1) or (2).
3. Push the select button (11) to display the fuel rate display/no display screen.
4. Push the select button to toggle between Fuel Rate Display ON and OFF.

NOTE: If Fuel Rate Display ON is selected, the fuel rate will display on the default screen under the fuel gauge needle.

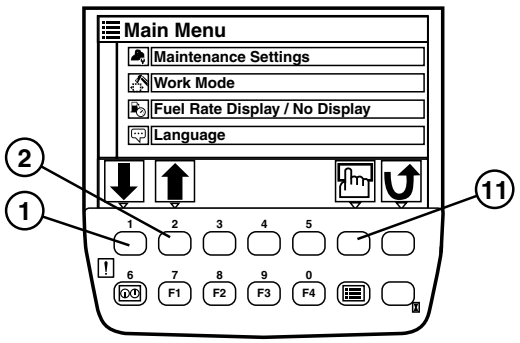
5. Push the back button (12) to apply desired setting and return to the default screen.

1—Button 1
2—Button 2
11—Select Button
12—Back Button
13—Menu Button



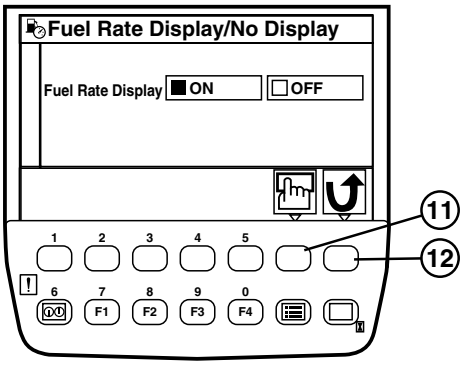
TX1001142 –UN–12DEC05

Default Screen



TX1001275 –19–15DEC05

Main Menu Screen



TX1000975 –19–14DEC05

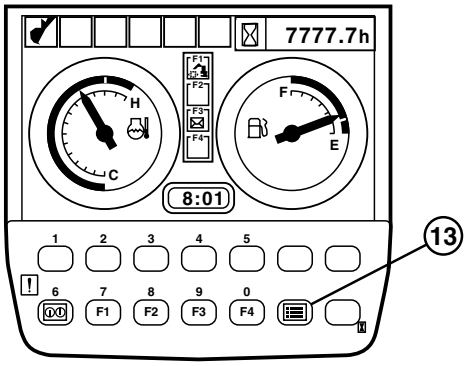
Fuel Rate Display/No Display Screen

VD76477,0000314 –19–31OCT06–1/1

Language Settings

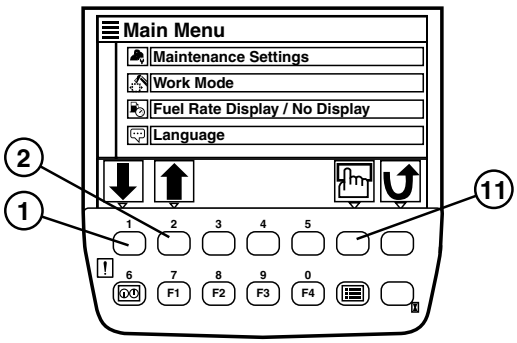
1. When the default screen appears, press the menu button (13) to display the main menu.
2. Select Language from the main menu by using buttons (1) or (2), then push the select button (11) to display the language settings screen.
3. Choose the desired language by using buttons (1) or (2), then push the select button to apply.
4. Push the return to default screen button (6) to display the default screen, or push the back button (12) to display the previous screen.

1—Button 1
2—Button 2
6—Return to Default Screen Button
11—Select Button
12—Back Button
13—Menu Button



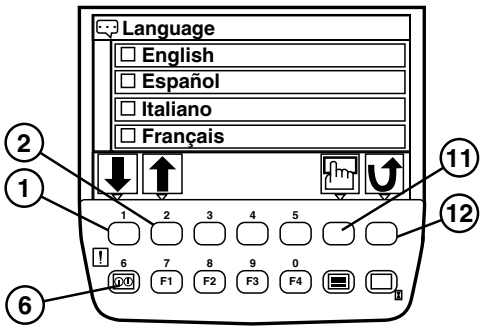
TX1001142 –UN–12DEC05

Default Screen



TX1001275 –19–15DEC05

Main Menu Screen



TX1001289 –UN–07JAN06

Language Settings Screen

Continued on next page

Language	Screen Display
English	English
Spanish	Español
Italian	Italiano
French	Français
German	Deutsch
Dutch	Nederlands
Russian	Русск
Portuguese	Português
Finnish	Suomi
Norwegian	Norsk
Danish	Dansk

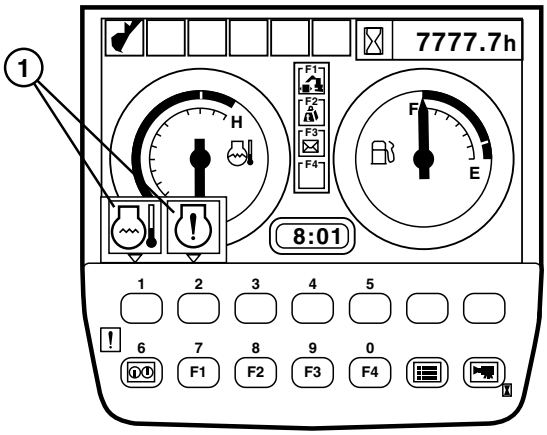
VD76477,0000315 –19–12APR07–2/2

Alarm Occurrence Screen

In case any abnormality occurs, the alarm indicators (1) are displayed on the default screen.

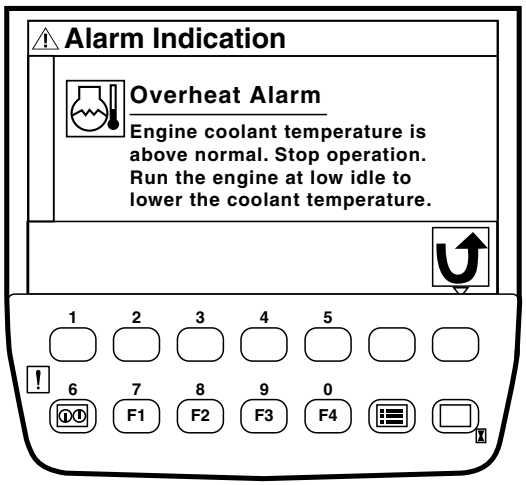
Push the button on the monitor located under an alarm indicator to view the alarm indication screen and the corrective action necessary.

1—Alarm Indicators



TX1000871 –UN–01DEC05

Default Screen



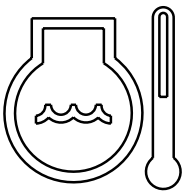
TX1000878 –19–01DEC05

Alarm Indication Screen

Continued on next page

Engine Overheat Alarm

Engine coolant temperature has abnormally increased. Stop operation. Run the engine at slow idle speed or lower the coolant temperature.



Engine Overheat Alarm

VD76477,0000387 –19–31OCT06–2/11

Engine Warning Alarm

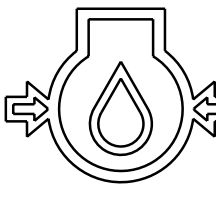
Engine or engine related parts are abnormal. Consult your authorized dealer.

Engine Warning Alarm

VD76477,0000387 –19–31OCT06–3/11

Engine Oil Pressure Alarm

Engine oil pressure has decreased. Immediately stop engine. Check engine oil system and oil level.

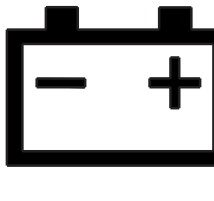


Engine Oil Pressure Alarm

VD76477,0000387 –19–31OCT06–4/11

Alternator Alarm

Electrical system is abnormal. Consult your authorized dealer.



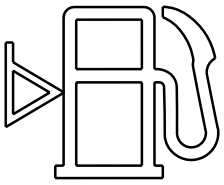
Alternator Alarm

Continued on next page

VD76477,0000387 –19–31OCT06–5/11

Remaining Fuel Alarm

Fuel level is low. Refill fuel tank as soon as possible.



Remaining Fuel Alarm

VD76477,0000387 –19–31OCT06–6/11

Hydraulic Oil Filter Alarm—If Equipped

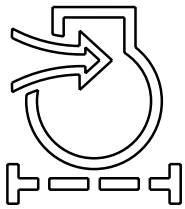
Hydraulic oil filter is clogged. Replace filter.

Hydraulic Oil Filter Alarm

VD76477,0000387 –19–31OCT06–7/11

Air Filter Clogged Alarm

Air filter elements are clogged. Clean or replace air filter elements.

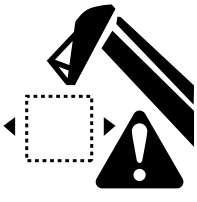


Air Filter Clogged Alarm

VD76477,0000387 –19–31OCT06–8/11

Work Mode Alarm

Work Mode system is abnormal. Consult your authorized dealer.



Work Mode Alarm

Continued on next page

VD76477,0000387 –19–31OCT06–9/11

Pilot Shutoff Lever Alarm

Pilot shutoff lever system is abnormal. Consult your authorized dealer.

TX1000890 –UN–01DEC05

Pilot Shutoff Lever Alarm

VD76477,0000387 –19–31OCT06–10/11

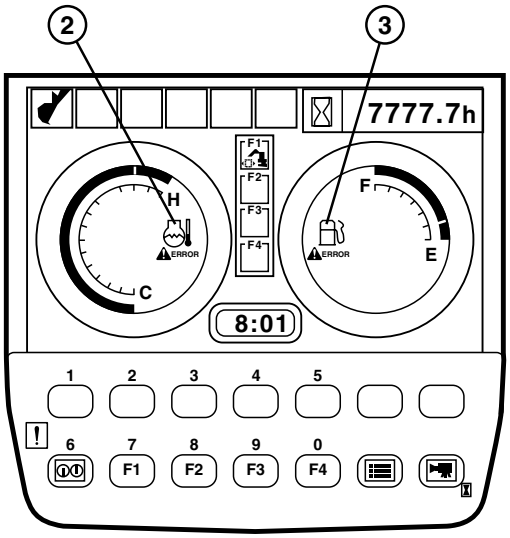
Coolant Temperature Sensor Error Display

When the coolant temperature sensor is faulty or if the harness between the coolant temperature sensor and monitor unit is broken, the coolant temperature sensor error display (2) is displayed on the coolant temperature gauge.

Fuel Sensor Error Display

When the fuel sensor is faulty or if the harness between the fuel sensor and monitor unit is broken, the fuel sensor error display (3) is displayed on the fuel gauge.

2—Coolant Temperature Sensor Error Display
3—Fuel Sensor Error Display



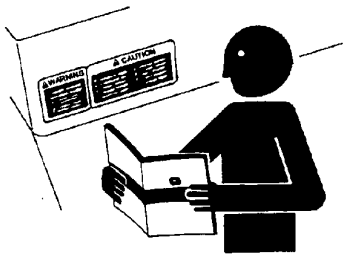
TX1000877 –UN–01DEC05

VD76477,0000387 –19–31OCT06–11/11

Before Starting Work

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

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



T133556 –UN–24AUG00

TX03679,0001780 –19–03JAN07–1/1

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.

Clear all steps and walking surfaces.

Check condition of guards, shields, and covers.

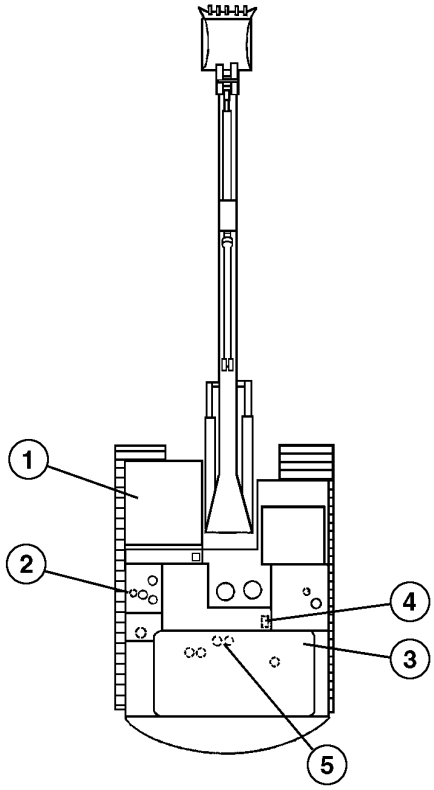
Overall Machine Checks

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

Inspect machine for bent, broken, or loose 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.



TX1001785 –UN–03JAN06

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

DW90712,000003A –19–11MAY06–1/1

Starting Engine

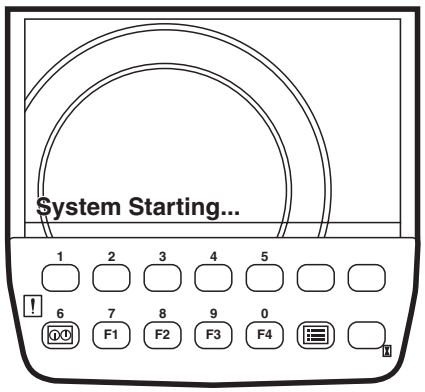
Before Starting the Engine

Turn key switch to ON position. Wait for “System Starting” screen to disappear before starting machine.

IMPORTANT: Wait for Engine Preheat Indicator to go out before starting the engine.

NOTE: The pilot shutoff lever must be in the locked (UP) position to start machine.

Starting the Engine



TX1000374 –UN–29NOV05

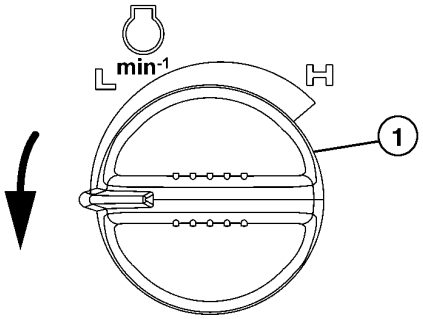
System Starting Screen

VD76477,00001F0 –19–02JUL07–1/3

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. Release key; switch will return to ON position.



T214920 –UN–29NOV05

1—Engine Speed Dial

After Starting Check

Continued on next page

VD76477,00001F0 –19–02JUL07–2/3

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

After the engine is started, check that the alarm indicators no longer display.

Check that the alternator alarm indicator (1) is no longer displayed.

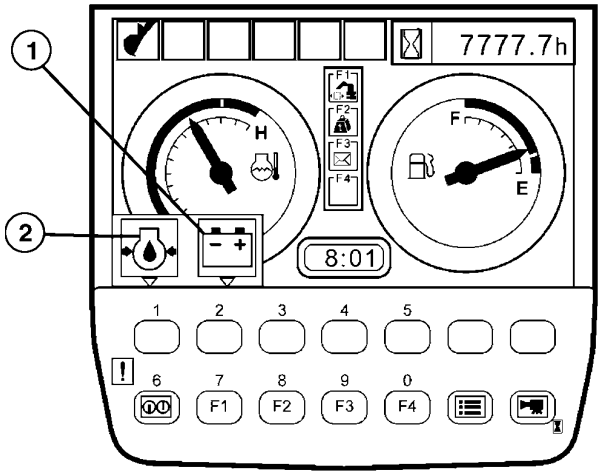
Check that the engine oil pressure alarm indicator (2) is no longer displayed.

If the alarm indicators continue to be displayed, stop the engine immediately. Find and correct the problem.

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.



TX1000875 –UN–01DEC05

1—Alternator Alarm Indicator
2—Engine Oil Pressure Alarm Indicator

VD76477,00001F0 –19–02JUL07–3/3

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.

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

1. If temperature is below 0° Celsius, engine will start at 1400 rpm. Engine will maintain 1400 rpm until hydraulic temperature reaches 2° Celsius or 15 minutes, whichever comes first.
2. 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.

3. Actuate travel and swing functions slowly, initially moving only short distances.
4. Operate boom, arm, and bucket functions by moving cylinders a short distance each direction for the first time.
5. Continue cycling cylinders by increasing the travel each cycle until full stroke is obtained.
6. Swing upperstructure so boom is perpendicular to tracks.

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

7. 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.

8. 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.
9. Repeat procedure with track rotating in reverse direction.
10. Lower machine to ground.
11. Repeat steps 6—10 on opposite track.
12. Operate all hydraulic functions to distribute warm oil in all cylinders, motors, and lines.
13. If hydraulic functions still move slowly, repeat steps 7 and 8.

DW90712,000003B –19–20JAN06–1/1

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.

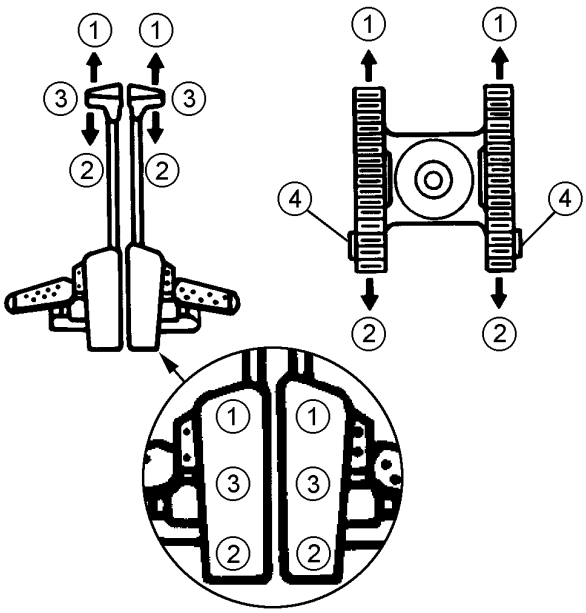
LEFT TURN: Push down on front of right pedal or push right lever forward.

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.

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 shutoff lever in locked position.



T137492 –UN–25JAN01

1—Forward Travel
2—Reverse Travel
3—Neutral Position
4—Travel Motors

VD76477,00001F2 –19–31JAN06–1/1

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.

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

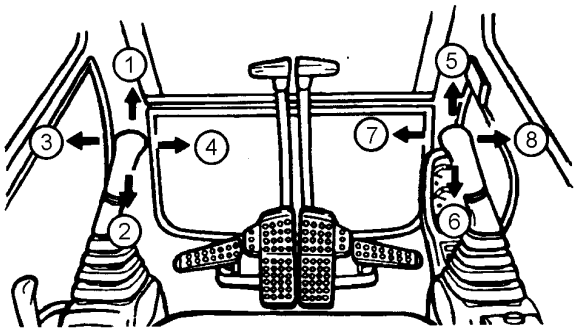
NOTE: There is a Control Pattern Changer field option available that allows the excavator or backhoe control pattern to be selected. Contact your dealer for an alternate method to change the control lever pattern if the field option is not used. Additional parts are required for the alternate method.

The machine comes equipped from the factory with the excavator control lever pattern. A label with the excavator control lever pattern comes installed on the right cab window.

Check the pattern on the label, and then carefully operate the machine to verify the pattern.

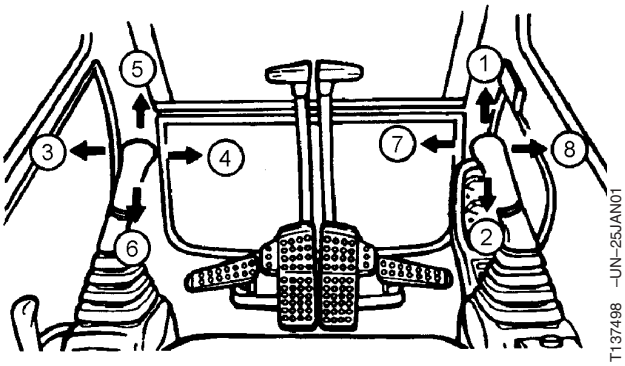
Control levers return to neutral when released. Functions will stop and remain positioned, and the parking brake for swing and travel will engage.

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



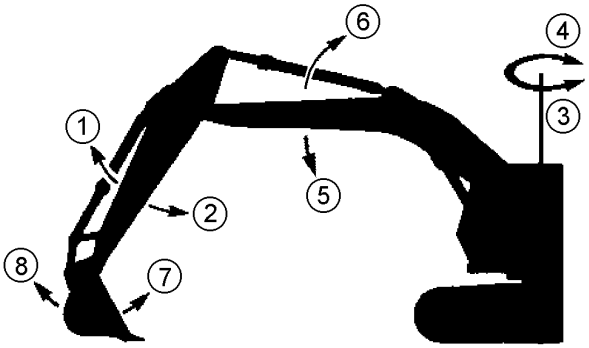
T137500 –UN–25JAN01

Excavator Control Lever Pattern



T137498 –UN–25JAN01

Backhoe Control Lever Pattern



T137499 –UN–25JAN01

Boom, Arm, Bucket Movement

DW90712,000003C –19–18JAN07–1/1

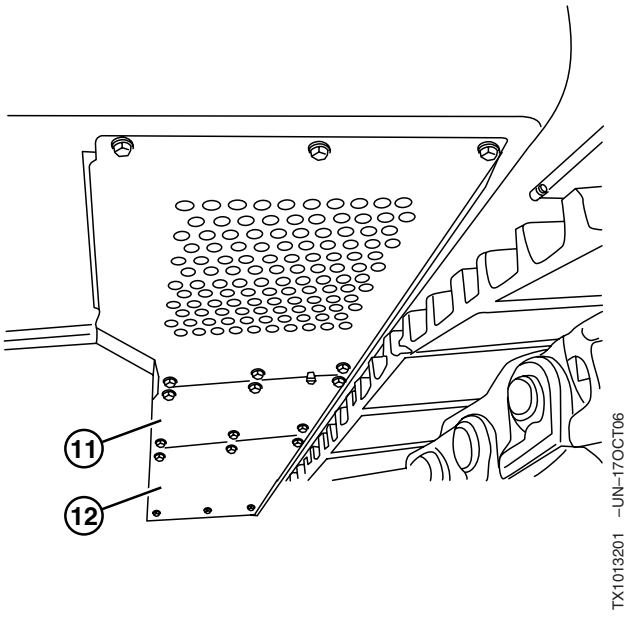
Control Lever Pattern Conversion

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

DW90712,000039F –19–17NOV06–1/6

3. Remove covers (11 and 12) from main frame under cab.

11—Cover
12—Cover



Covers

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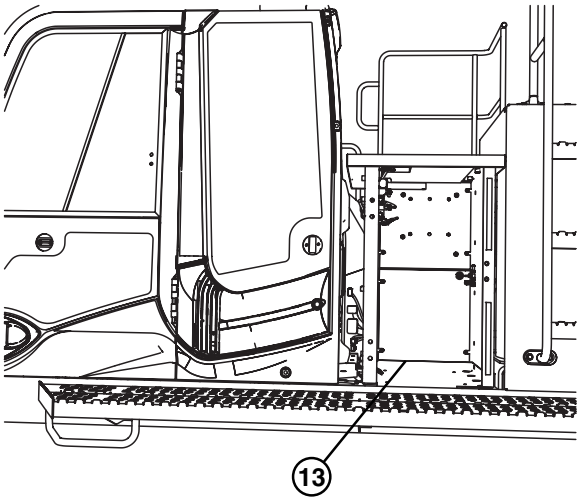
DW90712,000039F –19–17NOV06–2/6

4. Remove cover (13).

13—Cover



TX1013437 –UN–24OCT06

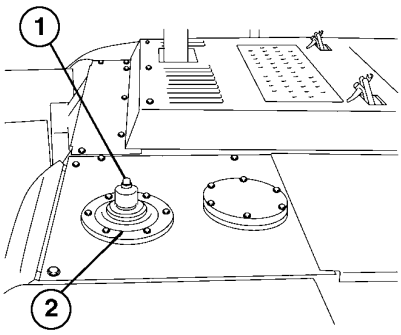
Digging Sensor Manifold Cover

DW90712,000039F –19–17NOV06–3/6

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button.

5. Push pressure release button (1).

1—Pressure Release Button
2—Hydraulic Oil Tank Cover



T214924 –UN–17NOV05

Hydraulic Oil Tank

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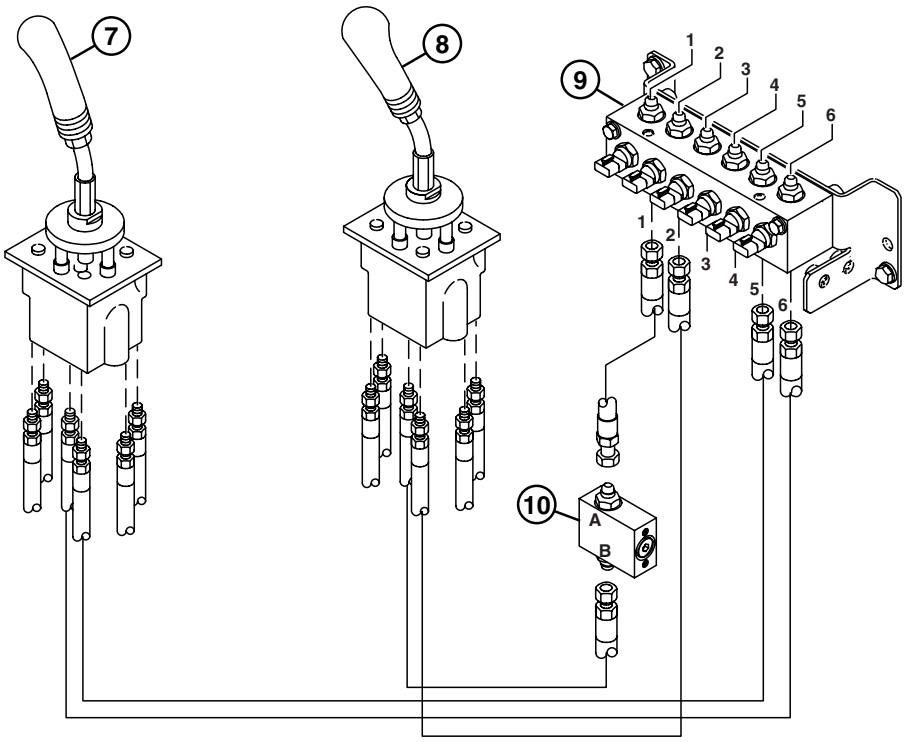
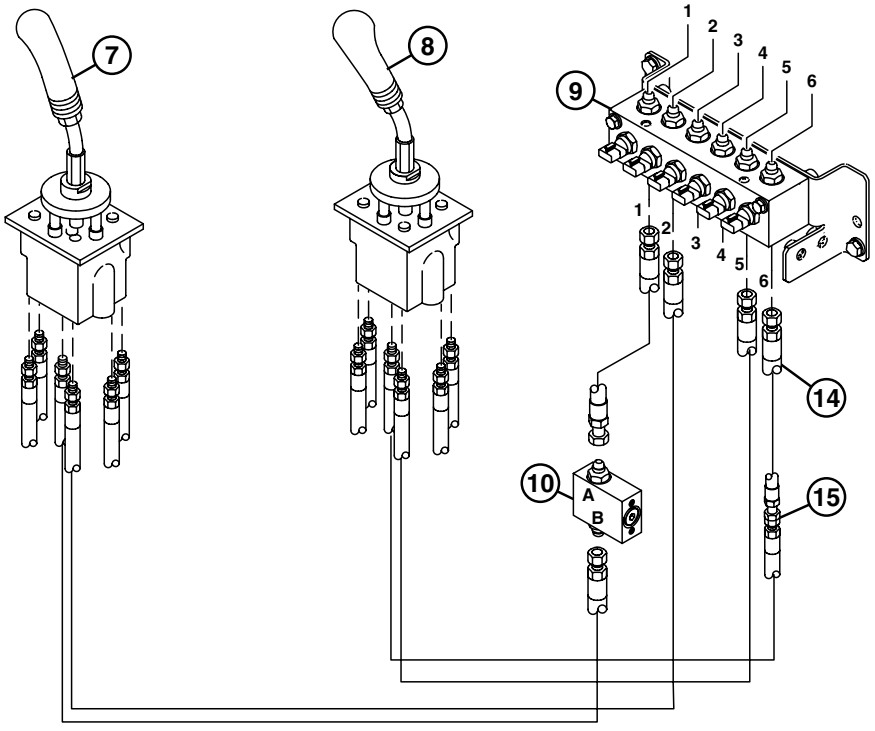
DW90712,000039F –19–17NOV06–4/6



TX1013016 –UN–13OCT06

TX1013016

Excavator Pattern



TX1013015 –UN–26OCT06

TX1013015

Backhoe Pattern

7—Left Control Lever
8—Right Control Lever
9—Digging Sensor Manifold
10—Boom Up Shockless Valve
14—Fabricated Hose
15— -6 M 37° x -6 M 37° Union

Continued on next page

DW90712,000039F –19–17NOV06–5/6

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 digging sensor manifold that is connected to the pilot control valves.

Port numbers on digging sensor manifold are given from front to rear of machine and are not marked on manifold.

6. Switch pilot lines connected to port 2 and 5 at digging sensor manifold (9).
7. Disconnect pilot line from port B of the boom shockless valve (10).
8. Use the following table to fabricate the hydraulic hose needed.

Part Number	Description	Assembly Quantity
X10643-6-6	Fittings	2
X421-6	Hydraulic Hose, No Skive	1905 mm (75 in.)
Left Fitting: X10643-6-6 (Parker No. 10643-6-6) Right Fitting: X10643-6-6 (Parker No. 10643-6-6) Hydraulic Hose: X421-6 (Parker No. 421-6) Cut Length: 1885.4 mm (74.23 in.) Crimp Dies: 43-6 (YEL) Die Ring: Silver Length: 1949.9 mm (76.77 in.)		

9. Install a -6 M 37° x -6 M 37° union to fabricated hose. Connect union to pilot line disconnected from the shockless valve
10. Route fabricated hose to digging sensor manifold.
11. Disconnect pilot line from port 6.
12. Connect fabricated hose to port 6.
13. Route pilot line disconnected from port 6 to the shockless valve. Connect line to port B.
14. Install covers.

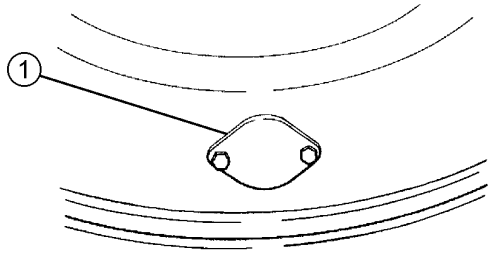
DW90712,000039F –19–17NOV06–6/6

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. (See Section 3-7.)



T136459 –UN–18DEC00

1—Drain Plug

TX14740,0001CAF –19–09AUG06–1/1

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.

VD76477,00001F4 –19–31JAN06–1/1

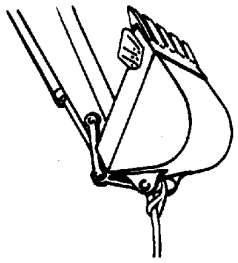
Lifting

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**

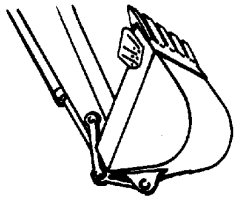
1. Use proper rigging to attach and stabilize loads.
2. Without bucket loop: Curl bucket and retract arm. Fasten sling or chain to bucket pivot pin.

   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



T133649 –UN–02NOV00

Without Bucket Loop



T135070 –UN–02NOV00

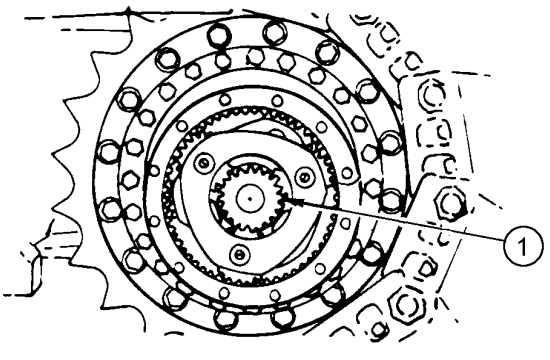
With Bucket Loop

TX03679,0001781 –19–15MAR07–1/1

Towing Machine

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

VD76477,00001F5 –19–31OCT06–1/1

Lower Boom With Engine Stopped

To lower the boom with the engine stopped, move the left pilot control lever forward.

DW90712,000003E –19–03FEB06–1/1

Parking the Machine

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.

1. Park machine on a solid level surface.

   During freezing weather, clean mud and dirt from tracks, rollers, and track frames. Clean the steps and walkways after parking the machine.

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

2. Lower equipment to the ground.

3. Turn auto-idle switch OFF.

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

4. Run engine with engine rpm dial at 1/3 position without load for 2 minutes.

5. Turn engine rpm dial to slow idle position.

6. Turn key switch to OFF. Remove key from switch.

7. Pull pilot 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.

8. Close windows, roof vent, and cab door.

9. Lock all access doors and compartments.

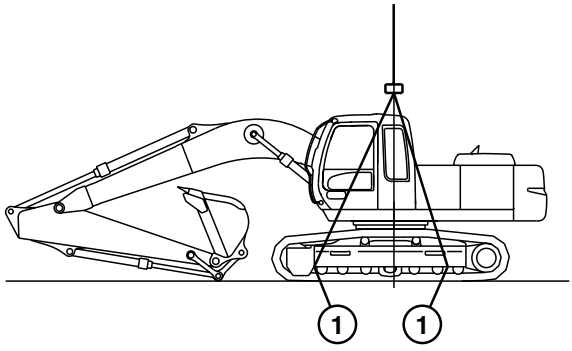
DW90712,000003F –19–31OCT06–1/1

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



TX1002686 –UN–13JAN06

1—Lifting Points

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Specification	
450DLC—Approximate Weight	48 163 kg 106 180 lb

Specification	
650DLC—Approximate Weight	69 032 kg 152 190 lb

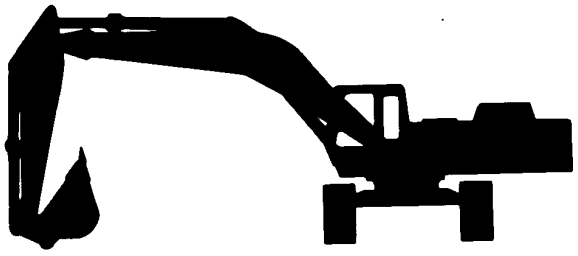
Specification	
850DLC—Approximate Weight	84 152 kg 185 520 lb

VD76477,0000425 –19–12JAN06–1/1

Counterweight Removal With Hydraulic Removal Option

IMPORTANT: This procedure must be performed with machine located on a level surface.

1. Park machine on a level surface.
2. Rotate upperstructure 90° and lower front attachment to the ground.
3. Stop engine.



T7708AA

T7708AA –UN–24FEB92

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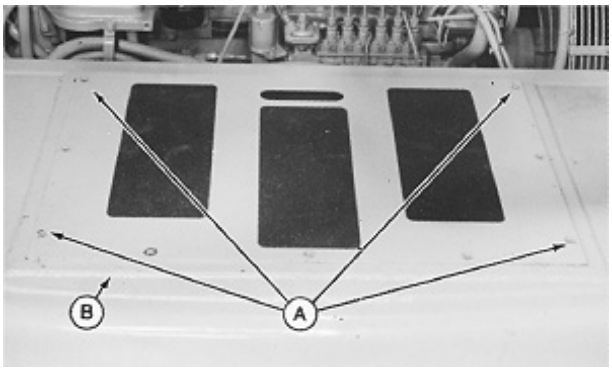
DW90712,00001F0 –19–12SEP08–1/12

CAUTION: Avoid personal injury from unexpected counterweight movement. DO NOT go directly under machine counterweight to remove or install counterweight covers or hardware. Enter the work area only from either SIDE of counterweight.

IMPORTANT: Do not attempt to remove or install counterweight with the track gauge in the narrow (transport) position. Before removing or installing the counterweight, the track gauge must be widened to the work position. To change the track gauge, see procedure in this section.

4. Remove cap screws (A) to remove counterweight top cover plate (B).



T8172AE –UN–20FEB94

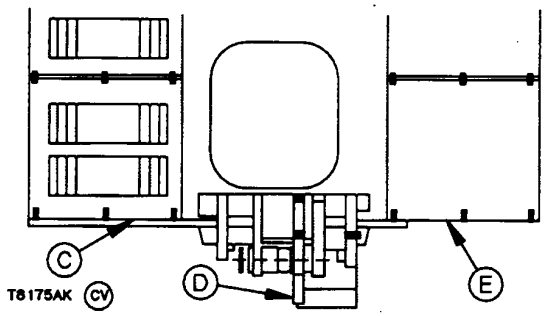
A—Cap Screw
B—Cover Plate

DW90712,00001F0 –19–12SEP08–2/12

5. Remove bottom covers (C and E).

6. Remove counterweight lift cylinder lower guard.

C—Bottom Cover
D—Lifting Device
E—Bottom Cover



T8175AK –UN–20FEB94

View looking up from below machine

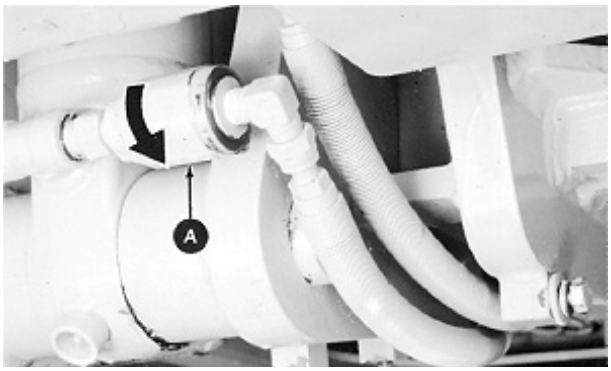
Continued on next page

DW90712,00001F0 –19–12SEP08–3/12

7. Set variable orifice (A) by turning in direction of arrow until closed. Then open orifice two turns. Adjust as required to achieve desired counterweight lowering speed. Every 1/8 turn of variable orifice changes lowering cycle time approximately 6 seconds.

IMPORTANT: Linkage pivot areas may bind if not properly lubricated resulting in failure of the counterweight lift cylinder to raise counterweight to full height.

8. Grease all pivot areas of counterweight lift linkage the **FIRST TIME** and every third time the counterweight device is operated.

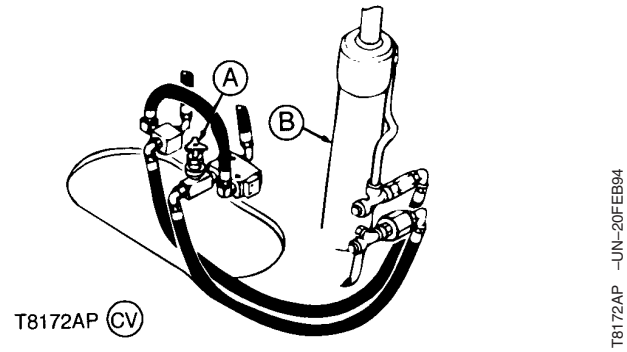


A—Variable Orifice

DW90712,00001F0 –19–12SEP08–4/12

9. Loosen jam nut and turn handle of shutoff valve (A) (located through opening under the engine) counterclockwise to open hydraulic pressure to counterweight lift cylinder (B).

A—Shutoff Valve
B—Lift Cylinder



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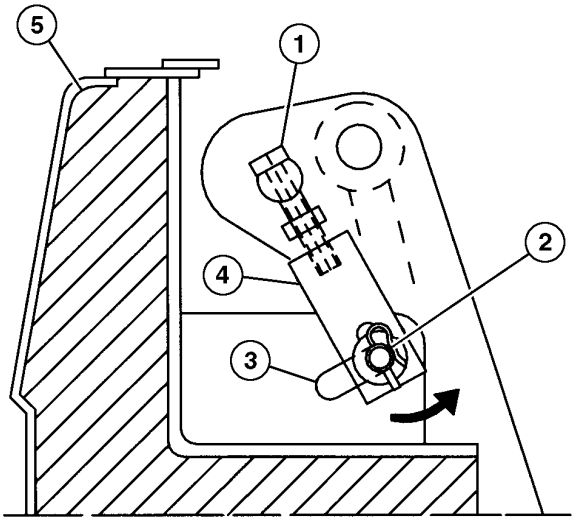
DW90712,00001F0 –19–12SEP08–5/12

10. Loosen jam nuts and adjusting cap screws (1) to loosen lifting yokes (4) from counterweight pin brackets.

11. Slide the lifting yokes forward to the upward position of slot (3) away from the rear of counterweight (5).

1—Adjusting Nut (2 used)
2—Yoke-To-Counterweight Pin (2 used)
3—Slot
4—Yoke (2 used)
5—Counterweight



TX1011165 –UN–16AUG06

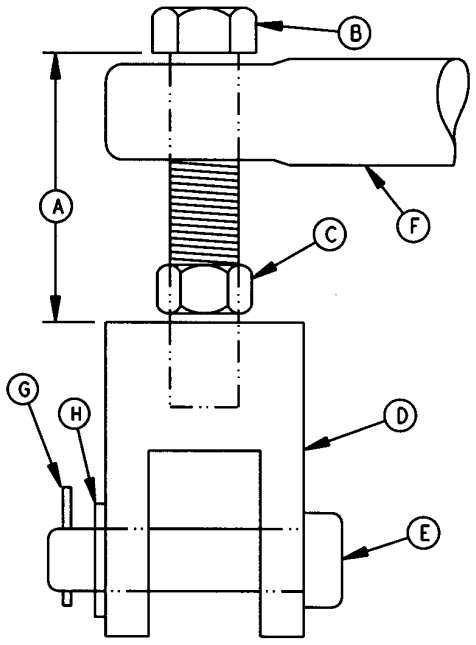
TX1011165

DW90712,00001F0 –19–12SEP08–6/12

IMPORTANT: To ensure full thread engagement of cap screw (B) in yoke (D), length (A) must not exceed 110 mm (4.33 in.)

12. Tighten adjusting cap screws (B) enough to hold both lifting yokes in the forward position. Tighten jam nuts (C).

A—105 mm (4.13 in.) Approximate
B—Adjusting Cap Screw (2 used)
C—Nut (2 used)
D—Yoke (2 used)
E—Yoke-To-Counterweight Pin (2 used)
F—Washer (2 used)
G—Lock Pin (2 used)
H—Flat Washer (2 used)



T8174AL –UN–23SEP94

T8174AL CV

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DW90712,00001F0 –19–12SEP08–7/12

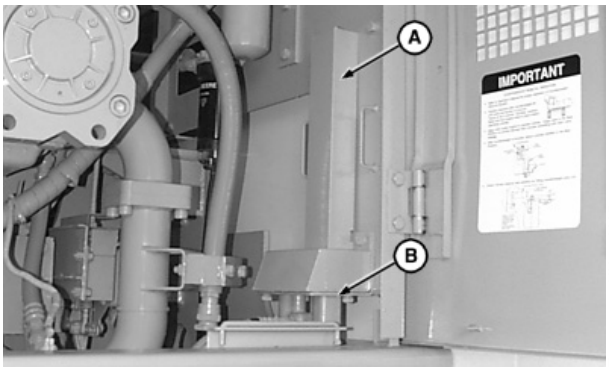
13. Open left rear access door and pull off lever cover (A) of counterweight pilot control valve (B).

14. Start engine. Run machine at slow idle.

15. Leave pilot shutoff lever in locked (UP) position.

CAUTION: To ensure good footing and visibility always stand on the machine service walk when operating counterweight pilot control valve.

16. Slowly move counterweight pilot control valve lever UP and DOWN several times to check response of cylinder control.



A—Cover
B—Control Valve

DW90712,00001F0 –19–12SEP08–8/12

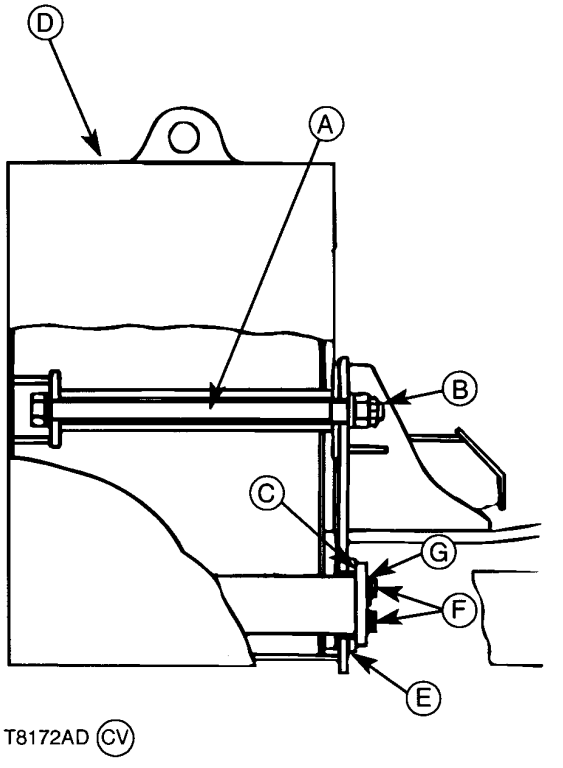
17. Remove both lock pins from slotted nuts (B) on counterweight tie bolts (A).

18. Alternately loosen each counterweight tie bolt two or three turns.

19. Using a standard screwdriver, pry corner of lock plate (G) away from head of each of the lower counterweight boss cap screws (F).

20. Loosen each cap screw 5 mm (0.20 in.)

A—Tie Bolt (2 used)
B—Slotted Nut (2 used)
C—Boss Plate (2 used)
D—Counterweight
E—Shim (as required)
F—Cap Screws (4 used)
G—Lock Plate (2 used)



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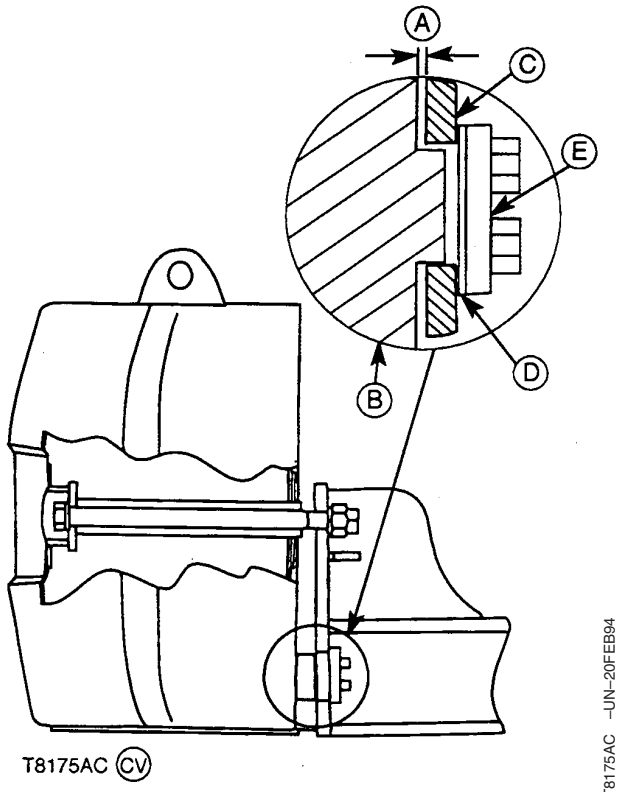
DW90712,00001F0 –19–12SEP08–9/12

NOTE: Lifting yokes must be in the forward position or highest point of slot.

21. Slowly move the counterweight pilot valve lever UP until counterweight bottom bosses (B) move away from machine mainframe (C) approximately 5 mm (0.20 in.) (A). This will ensure that the weight of the counterweight is on the counterweight cylinder.

A—5 mm (0.20 in.)
B—Counterweight Boss
C—Mainframe
D—Shim
E—Boss Plate



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DW90712,00001F0 –19–12SEP08–10/12

CAUTION: When threads of counterweight-to-mainframe tie bolt (A) disengage from slotted nut (B), the slotted nut and slotted nut spacer may drop to the ground. Stay clear from under machine when removing tie bolts.

CAUTION: Clear everyone from the area before removing or installing the counterweight.

Specification	
450DLC Counterweight—Approximate Weight	9150 kg (20,172 lb)

Specification	
650DLC Counterweight—Approximate Weight	11,000 kg (24,471 lb)

Specification	
850DLC Counterweight—Approximate Weight	13,300 kg (29,321 lb)

22. To avoid binding, remove large counterweight-to-mainframe tie bolts (A) by alternately turning each bolt one turn at a time.

NOTE: To avoid binding, alternately loosen left hand and right hand counterweight boss cap screws two or three turns at a time.

23. Remove cap screws (F), plates (G), spacers and shims (E) from each counterweight boss.

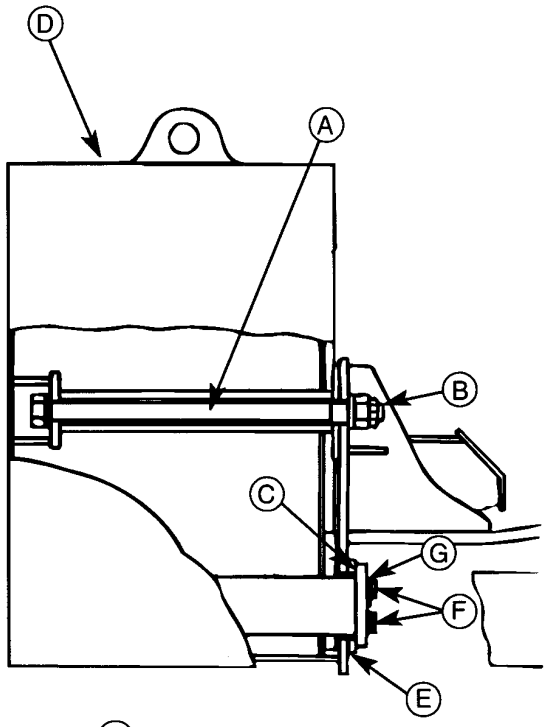
24. Slowly lower counterweight to the ground until all weight is removed from linkage and yokes move freely in their slots.

25. Remove counterweight yoke-to-link pins.

26. Raise counterweight cylinder to end of its stroke.

27. Store yoke-to-link pins by attaching pins to counterweight lift brackets.

28. Close hydraulic counterweight shutoff valve by turning valve handle clockwise and tighten jam nut.



A—Tie Bolt (2 used)
B—Slotted Nut (2 used)
C—Boss Plate (2 used)
D—Counterweight
E—Shim (as required)
F—Cap Screw (4 used)
G—Lock Strap (2 used)

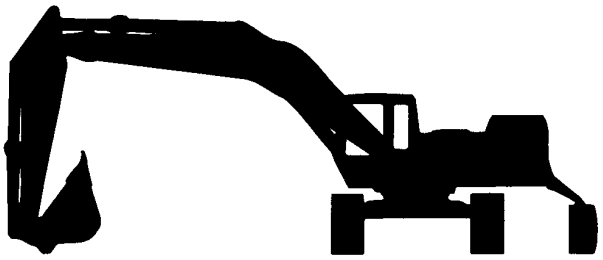
Continued on next page

29. Install top cover to counterweight and two bottom covers to machine mainframe.
30. Install counterweight lift cylinder lower guard.
31. Install lever cover over counterweight pilot valve.
32. Close left rear access door.

DW90712,00001F0 –19–12SEP08–12/12

Counterweight Installation With Hydraulic Removal Option

1. Park machine on a level surface.
2. Lower bucket to ground.
3. Stop engine.
4. Remove both machine mainframe bottom access covers, counterweight lift cylinder lower guard, and counterweight top cover.



T8186AC (CV)

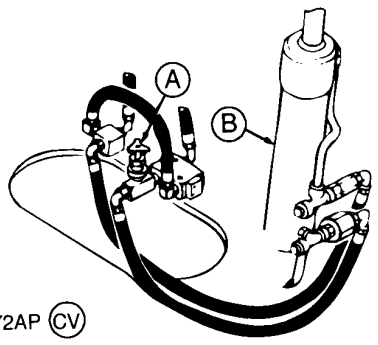
T8186AC –UN–07MAR94

MD04263,0000095 –19–09DEC08–1/7

5. Loosen jam nut and open shutoff valve (A).
6. Start engine. Run machine at slow idle.
7. Leave pilot shutoff lever in locked (UP) position.

CAUTION: To ensure good footing and visibility always stand on the machine service walk when operating counterweight pilot control valve.

8. Lower counterweight cylinder.



T8172AP (CV)

T8172AP –UN–20FEB94

A—Shutoff Valve
B—Lift Cylinder

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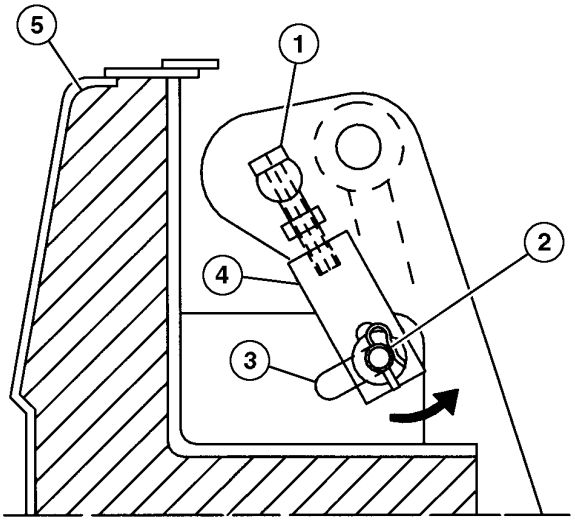
MD04263,0000095 –19–09DEC08–2/7

9. Install counterweight lifting yoke link pins (2) to counterweight pin brackets. Slide yokes (4) forward to top position of slot in counterweight pin brackets.

1—Adjusting Nut (2 used)
2—Yoke-To-Counterweight Pin (2 used)
3—Slot
4—Yoke (2 used)
5—Counterweight



TX1011165 –UN–16AUG06

TX1011165

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MD04263,0000095 –19–09DEC08–3/7

IMPORTANT: To ensure full thread engagement of cap screw (B) in yoke (D), length (A) must not exceed 110 mm (4.33 in.)

NOTE: In order to achieve proper alignment of tie bolts and counterweight bosses to machine mainframe, length (A) of each adjusting cap screw (B) may vary from side to side of counterweight.

10. Adjust cap screw (B) on each yoke (D) to length (A). Tighten nut (C).

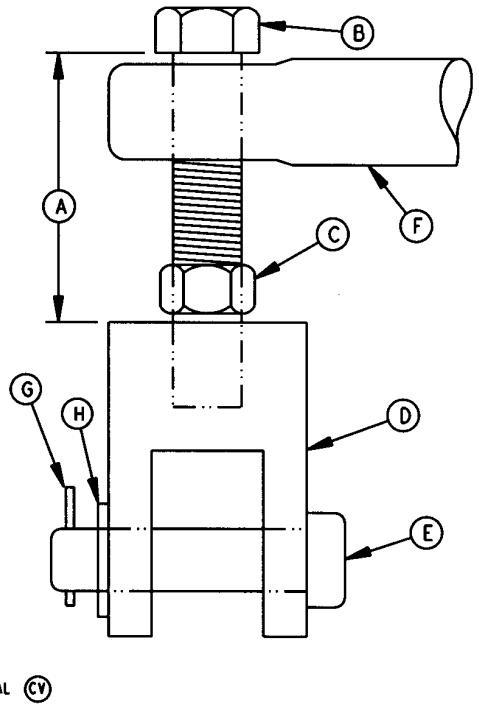
Counterweight—Specification

Head of Cap Screw to Yoke—Length	105 mm (4.13 in.) approximate

11. Slowly raise counterweight to full height.

12. Check counterweight boss and tie bolt alignment.

13. As necessary, lower counterweight and adjust length (A). To raise counterweight, decrease length. To lower counterweight, increase length.



T8174AL –UN–23SEP94

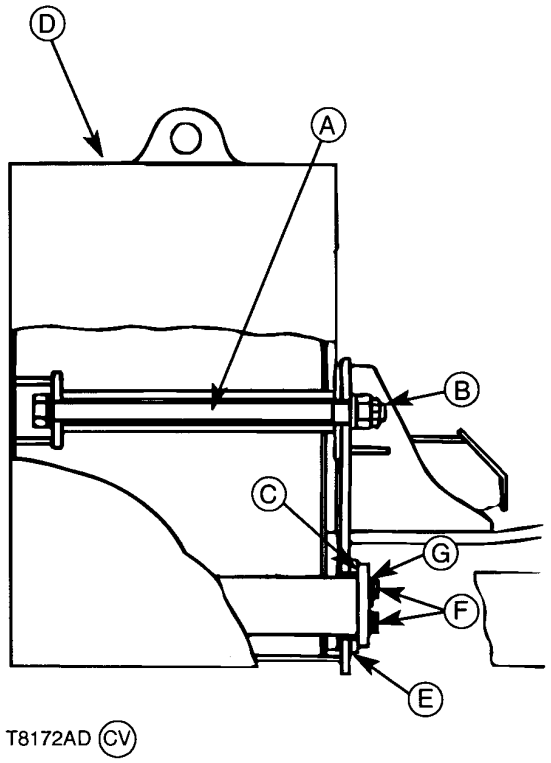
A—105 mm (4.13 in.) Approximate
B—Adjusting Cap Screw (2 used)
C—Nut (2 used)
D—Yoke (2 used)
E—Yoke-To-Counterweight Pin (2 used)
F—Washer (2 used)
G—Lock Pin (2 used)
H—Flat Washer (2 used)

Continued on next page

14. Install washers on tie bolts (A). Install tie bolt through counterweight and frame.

15. Install spacers and nuts (B). One flat of nut must be against tab. Turn cap screws (A) into nuts until end of tie bolts are even with slotted end of nuts.

A—Tie Bolt (2 used)
B—Nut (2 used)
C—Boss Plate
D—Counterweight
E—Shim (as required)
F—Cap Screws (4 used)
G—Lock Strap (2 used)



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MD04263,0000095 –19–09DEC08–5/7

NOTE: Replace lock plate if damaged.

16. Install shims (E), plates (C), lock plates (G), and cap screws (F) to counterweight bosses. Tighten cap screws (F) to specification.

Specification	
Plate And Lock Plate Cap Screw—450DLC—Torque	450 N•m (325 lb-ft)
Plate And Lock Plate Cap Screw—650DLC—Torque	700 N•m (510 lb-ft)
Plate And Lock Plate Cap Screw—850DLC—Torque	700 N•m (510 lb-ft)

17. Bend one top and one bottom corner of lock plates (G) against heads of cap screws (F).

18. Tighten counterweight-to-frame tie bolts (A).

Counterweight—Specification	
450DLC Counterweight-To-Frame Tie Bolt—Torque	2400 N•m (1735 lb ft)

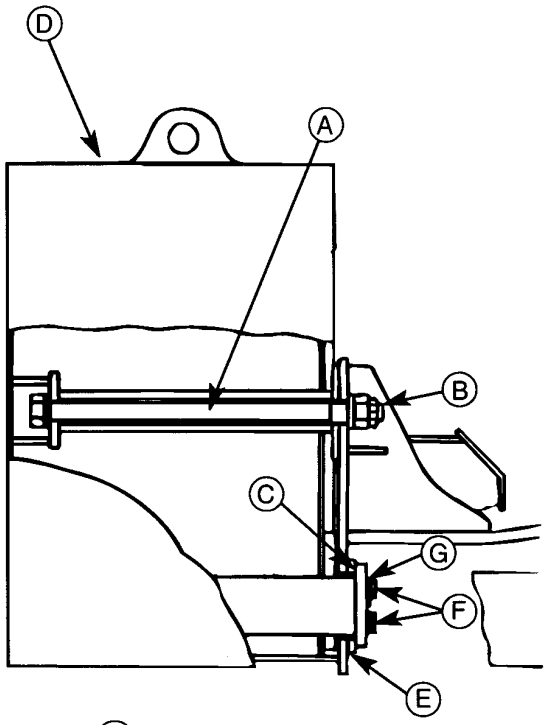
Counterweight—Specification	
650DLC Counterweight-To-Frame Tie Bolt—Torque	2800 N•m (2065 lb ft)

Counterweight—Specification	
850DLC Counterweight-To-Frame Tie Bolt—Torque	2800 N•m (2065 lb ft)

19. Tighten or loosen cap screws (A) if necessary to install quick lock pins to nut (B).

IMPORTANT: Lower counterweight cylinder slightly to slide yokes (J) to back of slots (K). Lift arms must be below top surface of counterweight to prevent interference with counterweight top cover.

20. Close shutoff valve and tighten jam nut.



T8172AD CV

T8172AD –UN–20FEB94

Counterweight Hardware

A—Counterweight-To-Frame Cap Screw
B—Nut
C—Plate
D—Counterweight
E—Shim
F—Cap Screw
G—Lock Plate

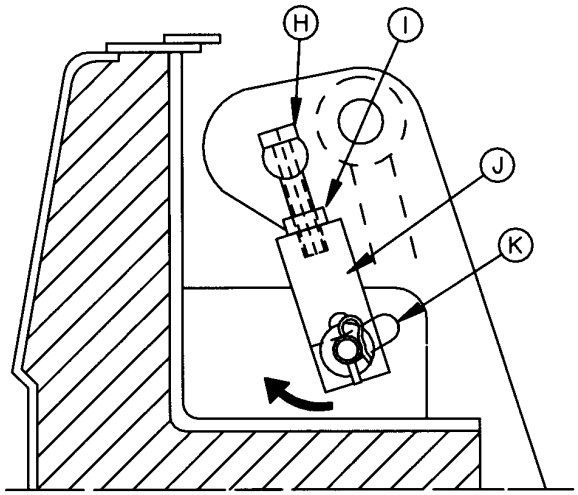
Continued on next page

MD04263,0000095 –19–09DEC08–6/7

21. Install machine mainframe bottom access covers and counterweight top cover.

22. Install counterweight lift cylinder lower guard.

H—Adjusting Cap Screw (2 used)
I—Nut (2 used)
J—Yoke
K—Slot



T8175AB CV

T8175AB –UN–20FEB94

Counterweight Lift Cylinder Storage Position

MD04263,0000095 –19–09DEC08–7/7

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.

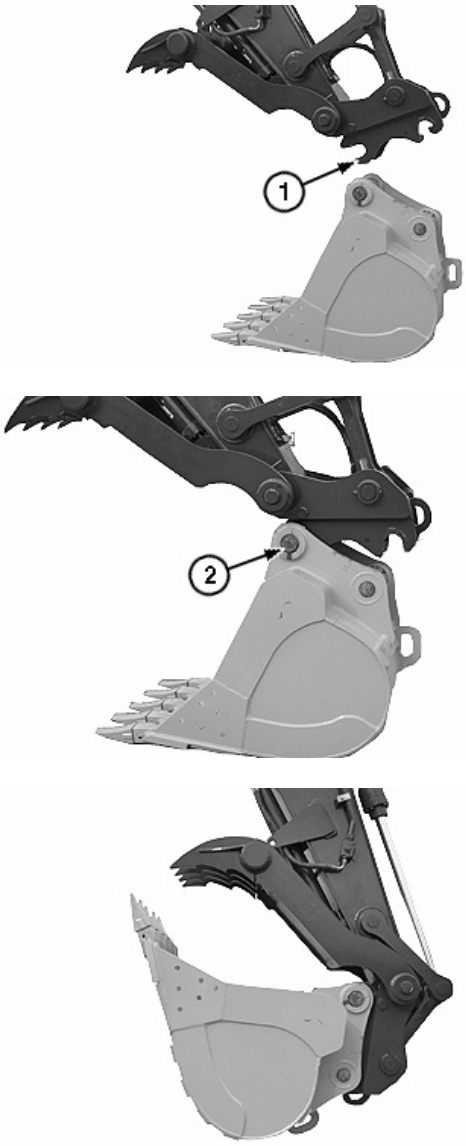
NOTE: A safety buzzer will sound to alert personnel the lock/unlock function has been activated.

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.



TX1017664A –UN–17JAN07
TX1017662A –UN–17JAN07
TX1017663A –UN–17JAN07

Bucket Rotated to Full-Curl Position

1—Front Hook
2—Pin

Continued on next page

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.

DW90712,0000450 –19–27JUN07–2/2

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.

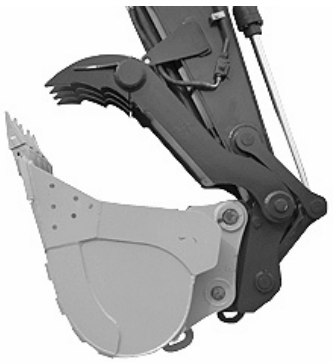
2. Rotate hydraulic coupler to full-curl position to release supplemental lock. Toggle switch should be in LOCK position.

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.

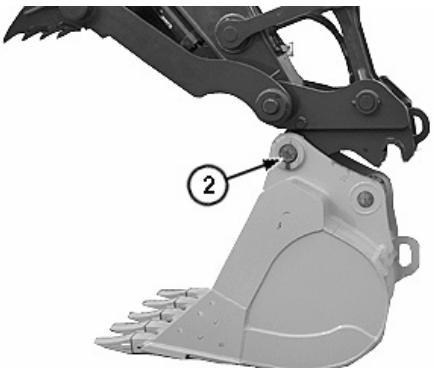
4. Slowly uncurl hydraulic coupler. Front hook (1) will release from pin (2). Toggle switch should be in UNLOCK position.

1—Front Hook
2—Pin



TX1017663A –UN–17JAN07

Bucket Rotated to Full-Curl Position



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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.

Required fuel properties

In all cases, the fuel shall meet the following properties:

Cetane number of 45 minimum. Cetane number greater than 50 is preferred, especially for temperatures below -20°C (-4°F) or elevations above 1500 m (5000 ft).

Cold Filter Plugging Point (CFPP) below the expected low temperature OR **Cloud Point** at least 5°C (9°F) below the expected low temperature.

Fuel lubricity should pass a minimum level of 3100 grams as measured by ASTM D6078 or maximum scar diameter of 0.45 mm as measured by ASTM D6079 or ISO 12156-1.

Sulfur content:

- Diesel fuel quality and fuel sulfur content must comply with all existing emissions regulations for the area in which the engine operates.
- Use of diesel fuel with sulfur content less than 0.10% (1000 ppm) is STRONGLY recommended.
- If diesel fuel with sulfur content greater than 0.2% (2000 ppm) is used, crankcase oil service intervals may be affected. (See recommendation for Diesel Engine Oil.)

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

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

VD76477,0000427 –19–13JAN06–1/1

Biodiesel Fuel

Biodiesel is a fuel 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.

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.bq-9000.org.

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

John Deere approved fuel conditioners containing detergent/dispersant additives are recommended when using lower biodiesel blends, but are required when using blends of B20 or greater.

John Deere engines can also operate on biodiesel blends above B20 (up to 100% biodiesel) ONLY if the biodiesel meets the EN 14214 specification (primarily available in Europe). Engines operating on biodiesel blends above B20 may not fully comply with all applicable emissions regulations. Expect up to a 12% reduction in power and an 18% reduction in fuel economy when using 100% biodiesel. John Deere approved fuel conditioners containing detergent/dispersant additives are required.

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

Biodiesel blends up to B20 must be used within 90 days of the date of biodiesel manufacture. Biodiesel blends from B21 to B100 must be used within 45 days of the date of biodiesel manufacture.

Request a certificate of analysis from your fuel distributor to ensure that the fuel is compliant with the above specifications.

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

When using biodiesel fuel, the engine oil level must be checked daily. If oil becomes diluted with fuel, shorten oil change intervals. Refer to Diesel Engine Oil and Filter Service Intervals for more details regarding biodiesel and engine oil change intervals.

The following must be considered when using biodiesel blends up to B20:

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

The following must also be considered when using biodiesel blends above B20.

- Possible coking and/or blocked injector nozzles, resulting in power loss and engine misfire if John Deere approved fuel conditioners containing detergent/dispersant additives are not used
- Possible crankcase oil dilution, requiring more frequent oil changes
- Possible corrosion of fuel injection equipment
- Possible lacquering and/or seizure of internal components
- Possible formation of sludge and sediments
- Possible thermal oxidation of fuel at elevated temperatures
- Possible elastomer seal and gasket material degradation (primarily an issue with older engines)

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- Possible compatibility issues with other materials (including copper, lead, zinc, tin, brass, and bronze) used in fuel systems and fuel handling equipment
- Possible reduction in water separator efficiency
- Potential high acid levels within fuel system
- Possible damage to paint if exposed to biodiesel

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

DX,FUEL7 –19–04OCT07–2/2

Low Sulfur Diesel Fuel Conditioner

When possible, use existing fuel formulations for engines used off-highway. This fuel will not require any additives to provide good performance and engine reliability. However, many local fuel distributors will not carry both low and regular sulfur diesel fuels.

If the local fuel distributor will supply only low sulfur fuel, order and use John Deere PREMIUM DIESEL FUEL CONDITIONER. It provides lubricating properties along with other useful benefits, such as cetane improver, anti-oxidant, fuel stabilizer, corrosion inhibitor and others. John Deere PREMIUM DIESEL FUEL CONDITIONER is specifically for use with low sulfur fuels. Nearly all other diesel fuel conditioners only improve cold weather flow and stabilize long-term fuel storage. They do not contain the lubrication additives needed by rotary fuel injection pumps.

CED,OUO1021,174 –19–17MAR98–1/1

Testing Diesel Fuel

DIESELSCAN™ is a John Deere fuel analysis program that can be used to monitor the quality of your fuel. The DIESELSCAN analysis verifies fuel type, cleanliness, water content, suitability for cold weather operation, and whether the fuel meets specifications.

Check with your John Deere dealer for availability of DIESELSCAN kits.

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DX,FUEL6 –19–14NOV05–1/1

Handling and Storing Diesel Fuel

CAUTION: 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.

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 for recommendations.

DW90712,0000086 –19–10FEB06–1/1

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.

NOTE: The following alternative oils could be used if factory fill has been completely flushed out. If using the following alternative oils, a reduced service interval of 1500 hours must be maintained.

Texaco Rando 46

Mobil DTE25-46

Shell Tellus T46

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 –19–28APR08–1/1

Diesel Engine Oil

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

John Deere PLUS-50™ oil is preferred.

Oils meeting one of the following specifications are also recommended:

- ACEA Oil Sequence E7
- ACEA Oil Sequence E6

Extended service intervals may apply when John Deere PLUS-50™, ACEA E7, or ACEA E6 engine oils are used. Consult your John Deere dealer for more information.

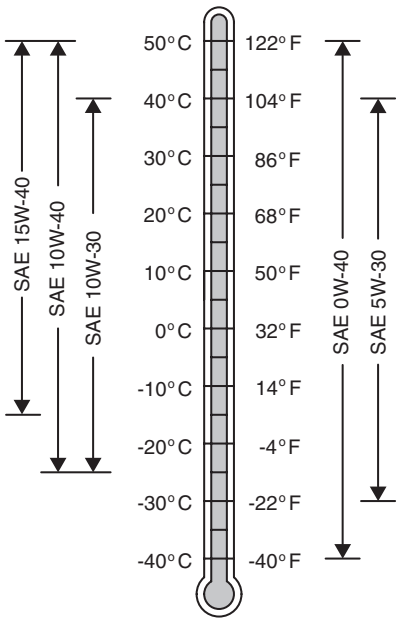
Other oils may be used if they meet one or more of the following:

- John Deere TORQ-GARD SUPREME™
- API Service Category CJ-4
- API Service Category CI-4 PLUS
- API Service Category CI-4
- 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 1.0% (10 000 ppm).



Oil Viscosities for Air Temperature Ranges

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DX,ENOIL11 –19–26JUL07–1/1

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.

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 0.10% (1000 ppm) is strongly recommended.
- Use of diesel fuel with sulfur content 0.10% (1000 ppm) to 0.50% (5000 ppm) 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 ppm), contact your John Deere dealer.
- DO NOT use diesel fuel with sulfur content greater than 1.00% (10 000 ppm).

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 (premium or standard) in the table include:

- “Premium Oils” include John Deere PLUS-50™, ACEA E7, or ACEA E6 oils.
- “Standard Oils” include John Deere TORQ-GARD SUPREME™, API CJ-4, API CI-4 PLUS, API CI-4, ACEA E5, or ACEA E4 oils.

Use of lower specification oils in Tier 3 engines may result in premature engine failure.

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Continued on next page

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

- *Engine equipped with an extended drain interval oil pan*
- *Use of diesel fuel with sulfur content less than 0.50% (5000 ppm)*
- *Use of premium oil: John Deere PLUS-50, ACEA E7, or ACEA E6*
- *Perform engine oil analysis to determine the actual extended service life of ACEA E7 and ACEA E6 oils*
- *Use of an approved John Deere oil filter*

	U.S. Tier 3 and EU Stage III A - PowerTechPlus™				**U.S. Tier 3 and EU Stage III A -** PowerTech™		
	Oil Pan Size (L/kW)				Oil Pan Size (L/kW)		
Oil pan capacity	Greater than or equal to 0.10	Greater than or equal to 0.12	Greater than or equal to 0.14	Greater than or equal to 0.22	Greater than or equal to 0.10	Greater than or equal to 0.12	Greater than or equal to 0.14
Fuel Sulfur	Less than 0.10% (1000 ppm)				Less than 0.10% (1000 ppm)		
Standard Oil	250 hours	250 hours	250 hours	250 hours	250 hours	250 hours	250 hours
Premium Oil	375 hours	500 hours	500 hours	500 hours	375 hours	500 hours	500 hours
Fuel Sulfur	0.10 to 0.20% (1000 to 2000 ppm)				0.10 to 0.20% (1000 to 2000 ppm)		
Standard Oil	200 hours	200 hours	250 hours	250 hours	200 hours	200 hours	250 hours
Premium Oil	300 hours	300 hours	500 hours	500 hours	300 hours	400 hours	500 hours
Fuel Sulfur	0.20 to 0.50% (2000 to 5000 ppm)				0.20 to 0.50% (2000 to 5000 ppm)		
Standard Oil	150 hours	150 hours	200 hours	250 hours	150 hours	175 hours	250 hours
Premium Oil	250 hours	250 hours	300 hours	500 hours	275 hours	350 hours	500 hours
Fuel Sulfur	0.50% to 1.00% (5000 ppm to 10 000 ppm)				0.50% to 1.00% (5000 ppm to 10 000 ppm)		
Standard Oil	Contact John Deere Dealer (dealer refers to DTAC solutions)				125 hours	125 hours	125 hours
Premium Oil	Contact John Deere Dealer (dealer refers to DTAC solutions)				187 hours	250 hours	250 hours
Engine oil analysis is required to determine the actual extended service life of premium oils ACEA E7 and ACEA E6.							

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PowerTech is a trademark of Deere & Company

DX,ENOIL13 –19–03NOV08–2/2

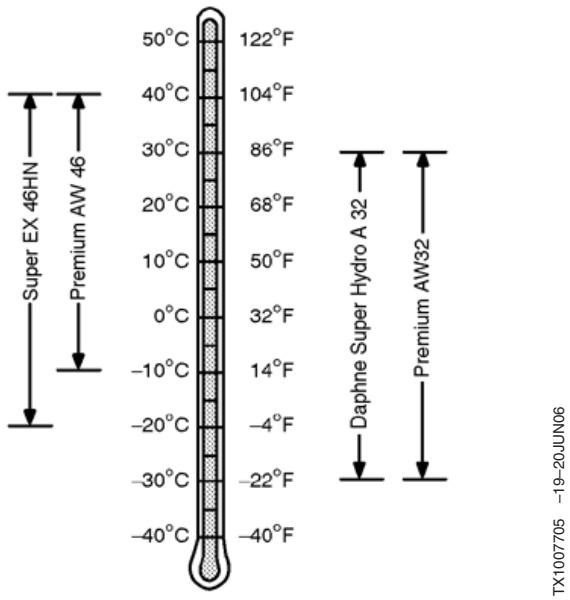
Hydraulic Oil

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.

Continued on next page

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:

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.)

DW90712,0000766 –19–07JUN07–2/2

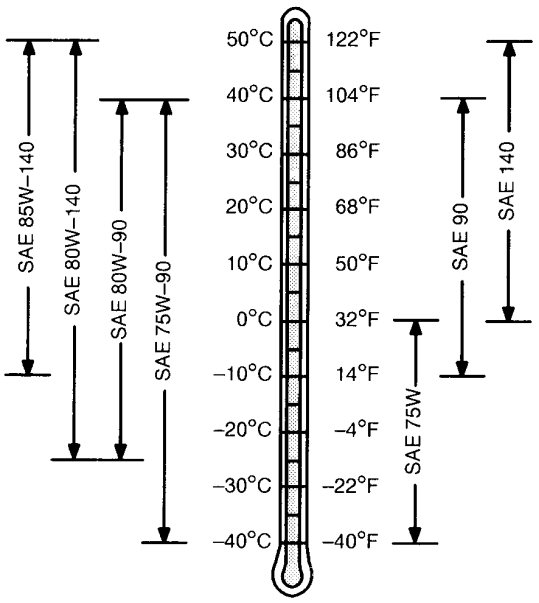
Swing Gearbox and Travel Gearbox Oils

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.



TS1653 –UN–14MAR96

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Pump Gearbox Oil

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

The following oil is preferred:

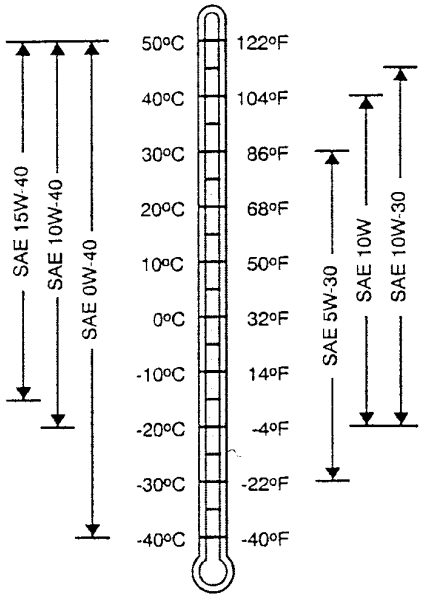
- John Deere PLUS-50™

The following oil is also recommended:

- John Deere TORQ-GARD SUPREME™

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

- API Service Category CI-4
- API Service Category CI-4
- API Service Category CG-4



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TORQ-GARD SUPREME is a trademark of Deere & Company

DW90712,00000E1 –19–14MAR06–1/1

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

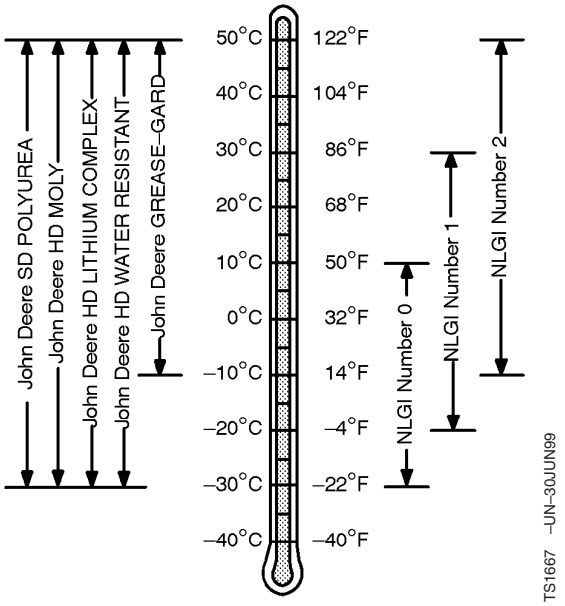
The following greases are also recommended:

- 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.



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Heavy Duty Diesel Engine Coolant

The engine cooling system is filled to provide year-round protection against corrosion and cylinder liner pitting, and winter freeze protection to -37°C (-34°F). If protection at lower temperatures is required, consult your John Deere dealer for recommendations.

John Deere COOL-GARD™ II Premix Coolant is preferred.

John Deere COOL-GARD II Premix is available in a concentration of 50% ethylene glycol.

Additional Recommended Coolants

The following engine coolants are also recommended:

- John Deere COOL-GARD II Concentrate in a 40% to 60% mixture of concentrate with quality water.
- John Deere COOL-GARD Premix (available in a concentration of 50% ethylene glycol).
- John Deere COOL-GARD Concentrate in a 40% to 60% mixture of concentrate with quality water.
- John Deere COOL-GARD PG Premix (available in a concentration of 55% propylene glycol).

John Deere COOL-GARD II Premix and COOL-GARD II Concentratecoolants do not require use of supplemental coolant additives.

John Deere COOL-GARD Premix, COOL-GARD Concentrate, and COOL-GARD PG Premix do not require use of supplemental coolant additives, except for periodic replenishment of additives during the drain interval.

Use John Deere COOL-GARD PG Premix when a non-toxic coolant formulation is required.

Other Coolants

It is possible that John Deere COOL-GARD II, COOL-GARD, and COOL-GARD PG coolants are unavailable in the geographical area where service is performed.

If these coolants are unavailable, use a coolant concentrate or prediluted coolant intended for use with heavy duty diesel engines and with a minimum of the following chemical and physical properties:

- Is formulated with a quality nitrite-free additive package.
- 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.
- Protects the cooling system metals (cast iron, aluminum alloys, and copper alloys such as brass) from corrosion.

The additive package must be part of one of the following coolant mixtures:

- ethylene glycol or propylene glycol base prediluted (40% to 60%) heavy duty coolant
- ethylene glycol or propylene glycol base heavy duty coolant concentrate in a 40% to 60% mixture of concentrate with quality water

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.

IMPORTANT: Do not use cooling system sealing additives or antifreeze that contains sealing additives.

Do not mix ethylene glycol and propylene glycol base coolants.

Do not use coolants that contain nitrites.

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DX,COOL3 –19–03NOV08–1/1

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 and COOL-GARD II Concentrate are maintenance free coolants for up to 6 years or 6000 hours of operation, provided that the cooling system is topped off using only John Deere COOL-GARD II 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.

When John Deere COOL-GARD Premix, COOL-GARD Concentrate or John Deere COOL-GARD PG Premix coolants are used, the drain interval may be extended to 5 years or 5000 hours of operation, provided that the coolant is tested annually AND additives are replenished, as needed, by adding a supplemental coolant additive.

If John Deere COOL-GARD II 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 4 years or 4000 hours of operation. This drain interval only applies to COOL-GARD II coolants that have been maintained within a 40% to 60% mixture of concentrate with quality water.

If John Deere COOL-GARD Premix, COOL-GARD Concentrate, or COOL-GARD PG Premix is used, but the coolant is not tested OR additives are not replenished by adding a supplemental coolant additive, the drain interval is 3 years or 3000 hours of operation. This drain interval only applies to COOL-GARD Premix, COOL-GARD Concentrate, and COOL-GARD PG Premix that have been maintained within a 40% to 60% mixture of concentrate with quality water.

If a coolant other than COOL-GARD II, COOL-GARD, or COOL-GARD PG is used, reduce the drain interval to 2 years or 2000 hours of operation.

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DX,COOL11 –19–03NOV08–1/1

John Deere COOL-GARD™ II COOLANT EXTENDER

Some coolant additives will gradually deplete during engine operation. For John Deere COOL-GARD™ II Premix and COOL-GARD II Concentrate, replenish coolant additives between drain intervals by adding John Deere COOL-GARD II COOLANT EXTENDER.

John Deere COOL-GARD II COOLANT EXTENDER should not be added unless indicated by coolant testing.

John Deere COOL-GARD II COOLANT EXTENDER is a chemically matched additive system approved for use with John Deere COOL-GARD II coolants in all John Deere engines.

John Deere COOL-GARD II COOLANT EXTENDER is not designed for use with John Deere COOL-GARD 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**
- **John Deere COOL-GARD PG**

The use of non-recommended supplemental coolant additives may result in additive drop-out, gelation of the coolant, or corrosion of cooling system components.

Add the recommended concentration of John Deere COOL-GARD II COOLANT EXTENDER. DO NOT add more than the recommended amount.

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DX,COOL16 –19–03NOV08–1/1

Supplemental Coolant Additives

Some coolant additives will gradually deplete during engine operation. For John Deere COOL-GARD™ Premix, COOL-GARD Concentrate, or John Deere COOL-GARD PG Premix, 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 John Deere COOL-GARD Premix, COOL-GARD Concentrate, and COOL-GARD PG Premix.

John Deere LIQUID COOLANT CONDITIONER is not designed for use with COOL-GARD II Premix or COOL-GARD II Concentrate.

IMPORTANT: Do not add a supplemental coolant additive when the cooling system is drained and refilled with any of the following:

- **John Deere COOL-GARD II**
- **John Deere COOL-GARD**
- **John Deere COOL-GARD PG**

If other coolants are used, consult the coolant supplier and follow the manufacturer's recommendation for use of supplemental coolant additives.

The use of non-recommended supplemental coolant additives may result in additive drop-out and gelation of the coolant.

Add the manufacturer's recommended concentration of supplemental coolant additive. DO NOT add more than the recommended amount.

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DX,COOL4 –19–03NOV08–1/1

Operating in Warm Temperature Climates

John Deere engines are designed to operate using glycol base engine coolants.

Always use a recommended glycol base engine coolant, even when operating in geographical areas where freeze protection is not required.

John Deere COOL-GARD™ II Premix is available in a concentration of 50% ethylene glycol. However, there are situations in warm temperature climates where a coolant with lower glycol concentration (approximately 20% ethylene glycol) has been approved. In these cases, the low glycol formulation has been modified to provide the same level of corrosion inhibitor as John Deere COOL-GARD II Premix (50/50).

IMPORTANT: Water may be used as coolant *in emergency situations only.*

Foaming, hot surface aluminum and iron corrosion, scaling, and cavitation will occur when water is used as the coolant, even when coolant conditioners are added.

Drain cooling system and refill with recommended glycol base engine coolant as soon as possible.

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DX,COOL6 –19–03NOV08–1/1

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 or propylene glycol antifreeze, inhibiting coolant additives, and quality water.

Coolant Specifications

John Deere COOL-GARD™ II Premix is a fully formulated coolant that contains 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 6 years or 6000 hours of operation.

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.

Continued on next page

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 –19–03NOV08–2/2

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 and COOL-GARD II Concentrate are maintenance free coolants for up to 6 years or 6000 hours of operation, provided that the cooling system is topped off using only John Deere COOL-GARD II Premix coolant. 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.

Add only the recommended concentration of John Deere COOL-GARD II COOLANT EXTENDER. DO NOT add more than the recommended amount.

When Using John Deere COOL-GARD

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.

CoolScan and CoolScan PLUS

For a more thorough evaluation of your coolant, perform a CoolScan™ or CoolScan PLUS™ analysis, where available. See your John Deere dealer for information.

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CoolScan is a trademark of Deere & Company
CoolScan PLUS is a trademark of Deere & Company

DX,COOL9 –19–03NOV08–1/1

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.

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Check the Hour Meter Regularly

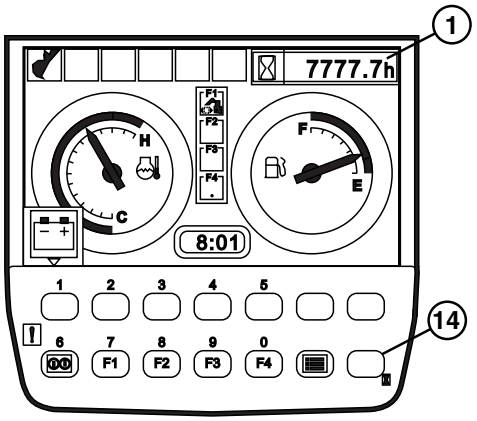
Check the hour meter (1) to determine when your machine needs periodic maintenance.

There are two ways to check the hour meter:

- Without key inserted or with the key at the OFF position, press and hold the Hour Meter Button (14) until the default screen appears.
- Turn key to the ON position to view the default screen and the hour meter.

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
14—Hour Meter Button



TX1000548 –UN–21DEC05

VD76477,00001DA –19–31OCT06–1/1

Prepare Machine for Maintenance

1. Park machine on a level surface as shown.

2. Stop engine.

T6811AI –UN–18OCT88

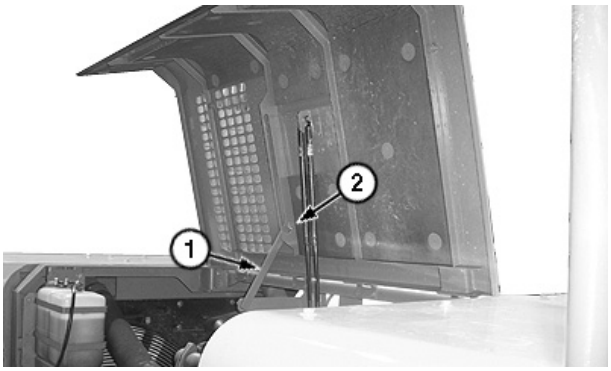
TX14740,0001C3D –19–06MAY08–1/1

Open Engine Cover for Service (450DLC and 650DLC Only)

CAUTION: Prevent possible injury. Unlock latches. Pull open latches to unlock cover. Raise the cover until lock stay completely engages with lock groove inside the cover.

Raise cover using handle on cover until lock stay (1) completely engages lock groove (2) inside the cover.

1—Lock Stay
2—Lock Groove



650DLC Shown

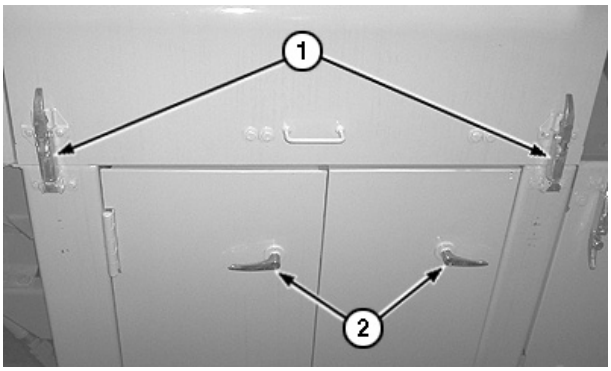
DW90712,000005E –19–07FEB06–1/1

Open Engine Cover for Service (850DLC)

CAUTION: Prevent possible injury. Unlock latches. Pull open latches to unlock cover. Raise the cover until lock stay completely engages with lock groove inside the cover.

To open the engine cover:

1. Unlatch engine cover latches (1).
2. Turn engine door handles (2) inwards and pull door backward.
3. Swing engine door to the left.
4. Raise engine cover using handle on cover until lock stay completely engages lock groove inside the cover.



1—Engine Cover Latches
2—Engine Door Handles

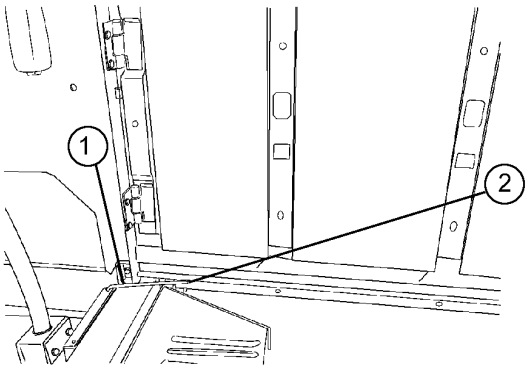
DW90712,0000065 –19–09FEB06–1/1

Open Access Doors for Service

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



T140176 –UN–27MAR01

DW90712,0000040 –19–03FEB06–1/1

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.

450DLC—Specification

Fuel Tank—Capacity ..... 725 L
191.5 gal

650DLC—Specification

Fuel Tank—Capacity ..... 900 L
238.0 gal

850DLC—Specification

Fuel Tank—Capacity ..... 1120 L
296 gal

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

If fuel tank is empty, bleed system. (See Bleed Fuel System in Section 3-3.)

VD76477,00003BC –19–12DEC05–1/1

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 frequently 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.

NOTE: John Deere recommends the addition of the hydraulic filter restriction indicator kit with the attachment.

Percentage of Operating Time	Hydraulic Return Filter	Hydraulic Oil Change
Ordinary Bucket Used	**Change Interval (hours)**	**Interval (hours)**
100	**500**	**4000**
Breaker or Crusher Used	**Change Interval (hours)**	**Interval (hours)**
100	100	500

DW90712,000005F –19–03JUL07–1/1

Maintenance and Repair Record Keeping System

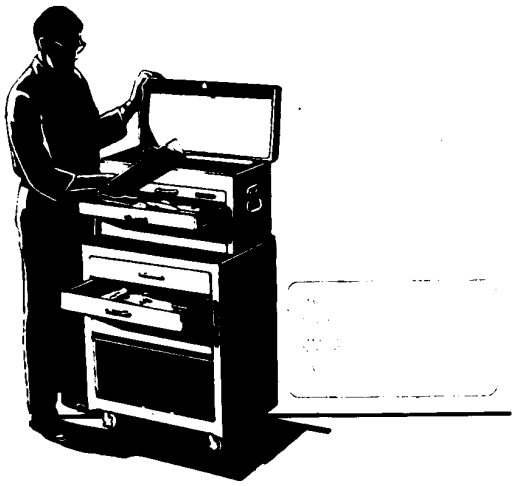
The checklist in this section summarizes scheduled maintenance, and parts and oil required at each maintenance interval.

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.



T7511CO –UN–27JUN91

TX,50,FF2898 –19–28JUN06–1/1

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.

TX1003513A –UN–20FEB06

AM40430,00002FE –19–12DEC08–1/1

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, 50 hours, and 10 hours or daily.

As Required

- ❒ Drain fuel tank sump
- ❒ Clean fuel tank inlet screen
- ❒ Clean radiator inlet screen
- ❒ Inspect belt, adjust tension
- ❒ Check air intake hose
- ❒ Drain water separator
- ❒ Check primary air cleaner element
- ❒ Check windshield washer fluid
- ❒ Check and adjust track sag
- ❒ Add coolant extender as indicated by COOL-GARD™ II test strips

Every 10 Hours or Daily

- ❒ Check radiator coolant level at tank
- ❒ Check engine oil level
- ❒ Grease hydraulic coupler (450DLC only—if equipped)
- ❒ Check hydraulic tank oil level
- ❒ Grease working tool pivots and links

Every 50 Hours

- ❒ Grease front end pin joints

OIL SAMPLING

Oil samples should be taken from each system prior to its recommended drain/change interval indicated on this form: 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

- ❒ Check battery electrolyte level and terminals
- ❒ Check swing gearbox oil level
- ❒ Check radiator coolant level
- ❒ Check travel gearbox oil level
- ❒ Take engine oil sample
- ❒ Clean primary air cleaner element
- ❒ Check pump drive gearbox oil level
- ❒ Drain hydraulic tank sump
- ❒ Take hydraulic tank oil sample

* For applications with high sulfur fuel see operator's manual for recommended engine oil drain intervals (Section 3-1)

Every 500 Hours

- ❒ Grease swing bearing gear and replace gasket
- ❒ Drain and refill engine oil and replace filters
- ❒ Replace fuel filter/water separator
- ❒ Check air intake hose
- ❒ Replace pump case drain filter
- ❒ Take swing gearbox oil sample
- ❒ Take diesel fuel sample
- ❒ Clean cab recirculating air filter (replace every 6th cleaning)
- ❒ Clean fresh air filter (replace every 6th cleaning)
- ❒ Grease swing bearing
- ❒ Take engine coolant sample
- ❒ Take travel gearbox oil sample
- ❒ Take pump drive oil sample

Every 1000 Hours

- ❒ Drain and refill swing gearbox oil
- ❒ Clean engine crankcase vent tube and hose
- ❒ Replace hydraulic oil filter
- ❒ Replace air cleaner elements
- ❒ Replace A/C V-Belt
- ❒ Drain and refill pump drive gearbox oil (650DLC and 850DLC only)
- ❒ Replace pilot oil filter
- ❒ Replace hydraulic tank cap breather element
- ❒ Adjust engine valve lash
- ❒ Check coolant

Every 2000 Hours

- ❒ Drain and refill travel gearbox oil

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Continued on next page

Every 4000 Hours

❒ Drain and refill hydraulic oil, clean suction screen

Every 6000 Hours

❒ Drain, flush and refill coolant system

Continued on next page

DW90712,00000A0 –19–29DEC08–2/5

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.							
Item	**Part Number**	**Every 250 Hours**	**Every 500 Hours**	**Every 1000 Hours**	**Every 2000 Hours**	**Every 4000 Hours**	**Every 6000 Hours**
Engine Oil Filter	1132402322		2	2	2	2	2
Fuel Filter	8980088400		2	2	2	2	2
Water Separator	4649267		1	1	1	1	1
Hydraulic Tank Oil Filter (450DLC)	4654745			1	1	1	1
Hydraulic Tank Oil Filter (650DLC and 850DLC)	4654745			2	2	2	2
Pump Case Drain Filter (Hydraulic Return Filter)	4363399		1	1	1	1	1
Swing Bearing Gear Access Cover Gasket (450DLC)	4602624		1	1	1	1	1
Swing Bearing Gear Access Cover Gasket (650DLC)	4292765		1	1	1	1	1
Swing Bearing Gear Access Cover Gasket (850DLC)	4261283		1	1	1	1	1
Pilot Oil Filter	4630525			1	1	1	1
Air Filter Primary (450DLC and 650DLC)	AT179371			1	1	1	1
Air Filter Primary (850DLC)	AT175223			1	1	1	1
Air Filter Secondary (450DLC and 650DLC)	AT179370			1	1	1	1
Air Filter Secondary (850DLC)	AT175224			1	1	1	1
Cab Recirculating Air Filter	4643580	As Needed					
Cab Fresh Air Filter	4632689	As Needed					
Engine Rocker Arm Cover Gasket - Upper	1111731191			1	1	1	1
Hydraulic Tank Cap Breather Element	4437838			1	1	1	1
Engine A/C V-Belt	4612763			1	1	1	1
PLUS-50™ Oil							
450DLC	TY6389*		55.8 L (14.75 gal)	55.8 L (14.75 gal)	55.8 L (14.75 gal)	55.8 L (14.75 gal)	55.8 L (14.75 gal)

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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.							
Item	**Part Number**	**Every 250 Hours**	**Every 500 Hours**	**Every 1000 Hours**	**Every 2000 Hours**	**Every 4000 Hours**	**Every 6000 Hours**
650DLC (Includes engine and pump gearbox)	TY6389*		51.6 L (13.6 gal)	55.4 L (14.6 gal)	55.4 L (14.6 gal)	55.4 L (14.6 gal)	55.4 L (14.6 gal)
850DLC (Includes engine and pump gearbox)	TY6389*		52.5 L (13.9 gal)	56.3 L (14.9 gal)	56.3 L (14.9 gal)	56.3 L (14.9 gal)	56.3 L (14.9 gal)
API GL-5 Gear Oil							
450DLC	TY6296*			13 L (3.4 gal)	35 L (9.2 gal)	35 L (9.2 gal)	35 L (9.2 gal)
650DLC	TY6296*			21 L (5.5 gal)	53 L (14 gal)	53 L (14 gal)	53 L (14 gal)
850DLC	TY6296*			30 L (7.9 gal)	68 L (18 gal)	68 L (18 gal)	68 L (18 gal)
COOL-GARD™ II Pre-mix							
450DLC	TY26575						48.0 L (12.0 gal)
650DLC	TY26575						55.8 L (14.7 gal)
850DLC	TY26575						81.4 L (21.5 gal)
Hitachi SUPER EX 46HN Hydraulic Oil							
450DLC	2908-050*					330 L (87.2 gal)	
650DLC	2908-050*					380 L (100.4 gal)	
850DLC	2908-050*					500 L (132.1 gal)	
Coolant Extender	TY26603	As Needed					
Fluid Analysis Kits							
❒Diesel Engine	AT317904	1	1	1	1	1	1
❒Hydraulic Oil	AT303189	1	1	1	1	1	1
❒Pump Drive Gearbox Oil	AT303189		1	1	1	1	1
❒Swing Gearbox Oil	AT303189		1	1	1	1	1
❒Travel Gearbox Oil	AT303189		2	2	2	2	2
DieselScan™	AT180344		1	1	1	1	1
COOL-GARD™II Test Strips	TY26605			1	1	1	1

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DieselScan is a trademark of Deere & Company

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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.

Item	Part Number	Every 250 Hours	Every 500 Hours	Every 1000 Hours	Every 2000 Hours	Every 4000 Hours	Every 6000 Hours
COOLSCAN PLUS™ Kit	AT183016		1	1	1	1	1

IMPORTANT: If fuel sulfur content exceeds 0.2 percent change the engine oil at 1/2 the normal interval. If engine has not run 250 hours before the season changes, change oil.

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

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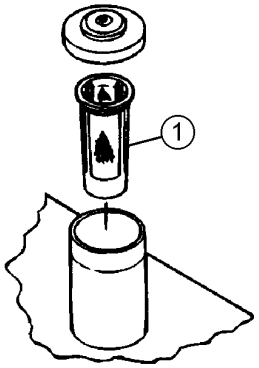
DW90712,00000A0 –19–29DEC08–5/5

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 –UN–06NOV00

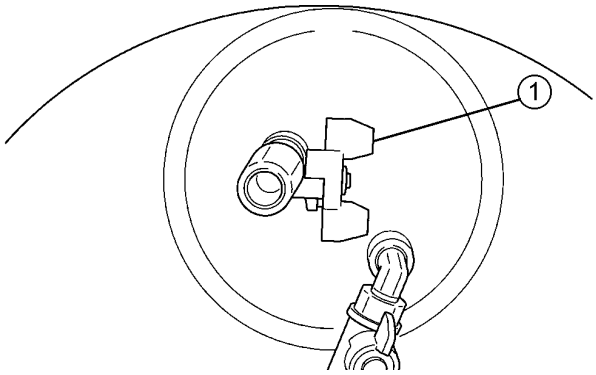
TX14740,0001C80 –19–03JAN07–1/1

Drain 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 –UN–18OCT88



T136406 –UN–18DEC00

TX14740,0001CF1 –19–20MAR01–1/1

Check Air Cleaner Element — 450DLC and 650DLC

1. Unscrew wing nut (1), and remove outer cover.
2. Unscrew wing nut (2) to remove primary element.
3. Pull primary element (3) straight back to remove.
4. Tap primary element with the palm of your hand, NOT ON A HARD SURFACE.

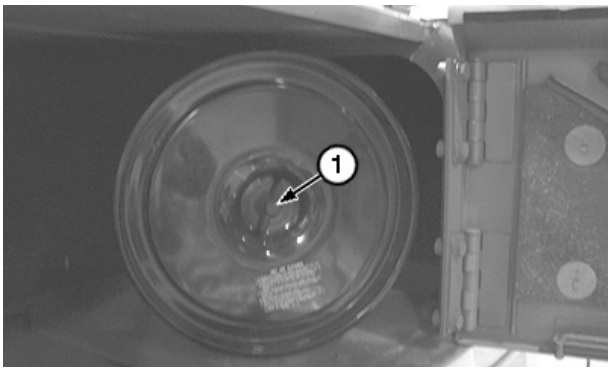
CAUTION: Prevent possible injury from flying chips if compressed air is more than 210 kPa (2.1 bar) (30 psi). Reduce compressed air to less than 210 kPa (2.1 bar) (30 psi) when using for cleaning purposes. Clear area of bystanders, guard against flying chips, and wear personal protection equipment including eye protection.

5. If this does not remove dust, use compressed air under 210 kPa (2.1 bar) (30 psi).

Specification

Compressed Air—Pressure..... Under 210 kPa (2.1 bar) (30 psi)

6. Direct air up and down from inside to outside. Be careful not to make a break in the element.
7. Install primary element (3), and securely screw on wing nut (2).
8. Install outer cover, and securely screw on wing nut (1).



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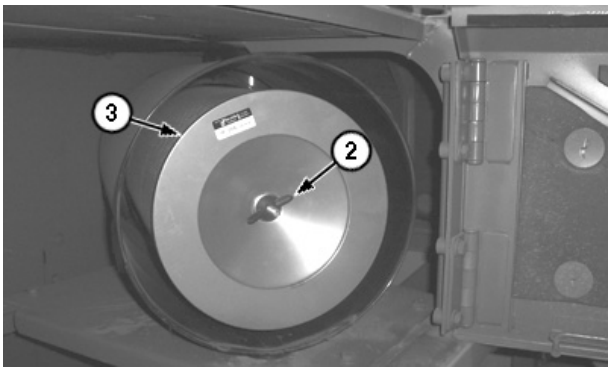


TX1001781A –UN–03JAN06

1—Outer Cover Wing Nut
2—Primary Element Wing Nut
3—Primary Element

DW90712,000000F –19–31OCT06–1/1

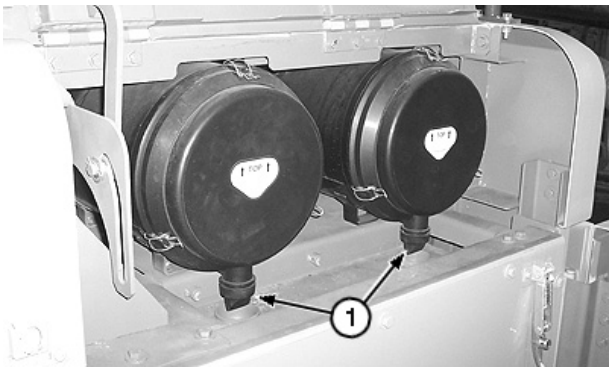
Check Air Cleaner Elements — 850DLC

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.

Dust Unloader Valve

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

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



1—Dust Unloader Valve

DW90712,0000041 –19–31OCT06–1/3

Primary Element

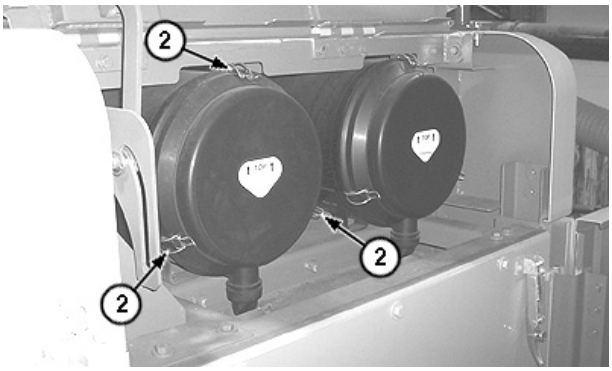
1. Unlock clamps (2), and pull air cleaner cover outward to remove.
2. Pull primary element (3) straight out to remove.
3. Tap primary element with the palm of your hand, NOT ON A HARD SURFACE.

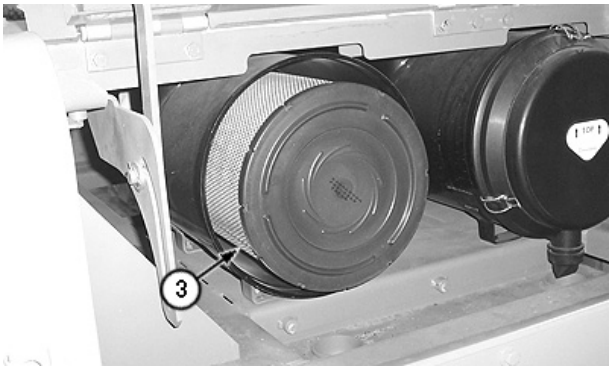
CAUTION: Prevent possible injury from flying chips if compressed air is more than 210 kPa (2.1 bar) (30 psi). Reduce compressed air to less than 210 kPa (2.1 bar) (30 psi) when using for cleaning purposes. Clear area of bystanders, guard against flying chips, and wear personal protection equipment including eye protection.

4. If this does not remove dust, use compressed air under 210 kPa (2.1 bar) (30 psi).

Specification	
Compressed Air—Pressure	Under 210 kPa (2.1 bar) (30 psi)

5. Direct air up and down from inside to outside. Be careful not to make a break in the element.





2—Clamps (3 used on each Air Cleaner)
3—Primary Element

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DW90712,0000041 –19–31OCT06–2/3

IMPORTANT: A damaged or dirty element may cause engine damage.

Install a new primary element:

1. **If the element shows damage.**
2. **If element will not clean.**
3. **After 1000 hours service or annually.**

Install a new secondary element:

1. **If the primary element is damaged and needs to be replaced.**
2. **If the element is visibly dirty.**
3. **After 1000 hours service or annually.**

DO NOT clean a secondary element. Install a new element carefully centering it in the canister.

6. Inspect element and gasket for damage. If element is damaged, install a new element (See Section 3-8).

7. Install primary element.

8. Install outer cover, and lock clamps.

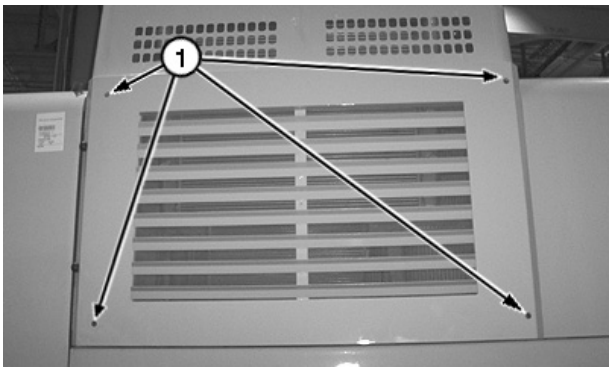
DW90712,0000041 –19–31OCT06–3/3

Clean Radiator Inlet Screen

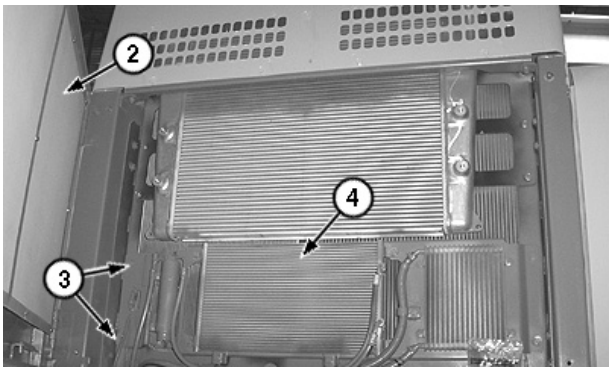
1. Turn machine off.
2. Remove cap screws from cooling package door to open (1).

CAUTION: Prevent possible injury from flying chips if compressed air is more than 210 kPa (2.1 bar) (30 psi). Reduce compressed air to less than 210 kPa (2.1 bar) (30 psi) when using for cleaning purposes. Clear area of bystanders, guard against flying chips, and wear personal protection equipment including eye protection.

3. Attach an air wand to an air compressor, and blow out dirt and debris from the door screen (2).
4. Remove cap screws (3) (2 used) on fuel cooler/A/C condenser panel.
5. Use air compressor, and blow out dirt and debris from inside of panel (4) and door screen (2).
6. Close panel, and install cap screws on fuel cooler/A/C condenser panel.
7. Close cooling package door, and install necessary cap screws.



450DLC Shown



450DLC Shown

1—Cooling Package Door Cap Screws (4 Used)
2—Cooling Packing Door Screen
3—Cap Screws (2 Used)
4—Fuel Cooler/A/C Condenser Panel

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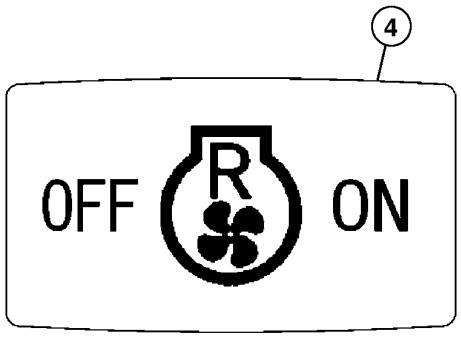
DW90712,0000026 –19–31OCT06–1/2

IMPORTANT: In case the pilot control shutoff lever is not in the LOCK position, the fan rotating direction switch device deactivates. Air conditioner may be damaged if the fan rotating direction switch (4) is pressed with using air conditioner.

When fan rotating direction switch (4) is turned ON, the fan rotates in reverse, and the radiator, the oil cooler, and the inter cooler core can be cleaned.

1. Turn all control levers to neutral with engine running. Pull the pilot control shutoff lever up to the LOCK position.
2. Turn off the air conditioner switch.
3. Raise the armrest, press fan rotating direction switch to down the engine speed. After approx. 20 seconds, the fan rotates in reverse for approx. 60 seconds.
4. After approx. 20 seconds, the fan rotating direction returns to normal.



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4—Fan Rotating Direction Switch

DW90712,0000026 –19–31OCT06–2/2

Check and Adjust A/C V-Belt

Visually check the belt for wear. Replace if necessary.

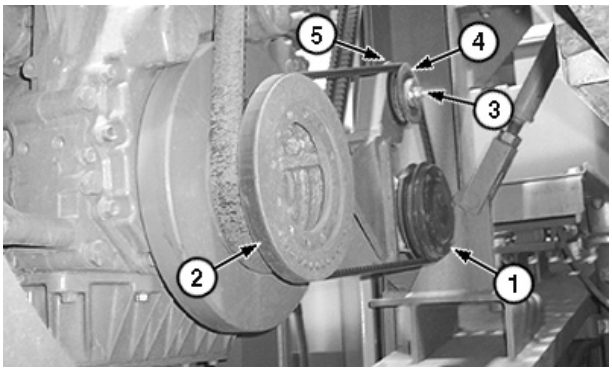
NOTE: When a new belt is installed, be sure to readjust the tension after operating the engine for 3 to 5 minutes at slow idle speed to be sure that the new belt is seated correctly.

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 10 kgf 22 lbf

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



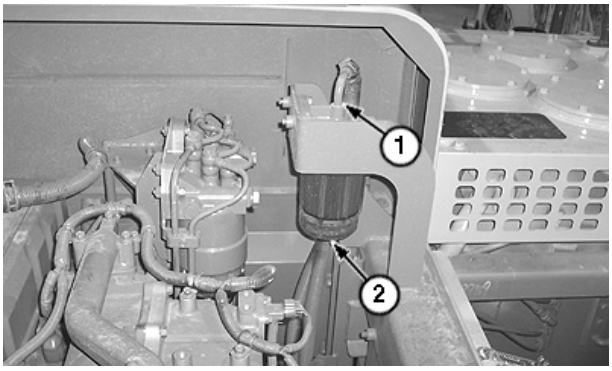
TX1002128A –UN–03JAN06

1—Compressor Pulley
2—Crank Pulley
3—Cap Screw
4—Tension Pulley
5—Cap Screw

DW90712,000037C –19–31OCT06–1/1

Drain Water Separator

1. Open front engine cover to access water separator.
2. Loosen plug (1) on the top of the water separator.
3. Open drain valve (2) to extract water or debris from fuel system. Collect waste in a container, and dispose of it properly.
4. Close drain valve.
5. Tighten plug.
6. Bleed fuel system. (See Bleed Fuel System in this Section.)



TX1002093A –UN–03JAN06

650DLC Shown

1—Plug
2—Drain Valve

DW90712,000001B –19–20JAN06–1/1

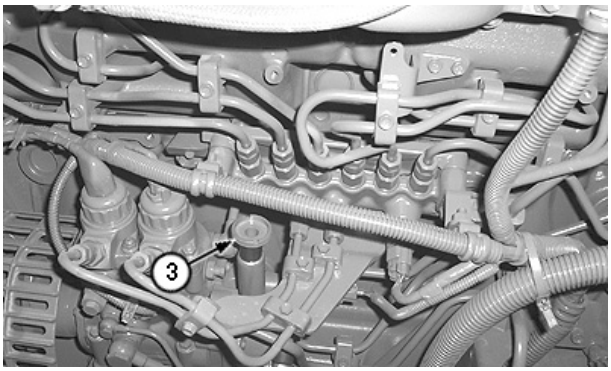
Bleed Fuel System

IMPORTANT: Over tightening the air bleed plugs can cause damage.

NOTE: Fuel filter air bleeding should be done one side at a time. Start with air bleed plug (1) and when finished, repeat procedure for air bleed plug (2).

1. Turn the manual prime pump knob (3) counterclockwise until plunger pops up.
2. Loosen the fuel filter air bleed plug (1).
3. Move the priming pump until air bubbles stop coming out.
4. Tighten bleed plug (1).
5. Loosen the fuel filter air bleed plug (2).
6. Move the priming pump until air bubbles stop coming out.
7. Tighten bleed plug (2).
8. After tightening all of the plugs, move the priming pump until it becomes heavy.
   - The priming pump needs to be moved a total of more than 150 times.
9. Tighten the manual priming pump knob to its previous position, and start the engine. If the engine doesn't start, repeat once again from step 5.

650DLC Shown



1—Bleed Plug
2—Bleed Plug
3—Manual Priming Pump Knob

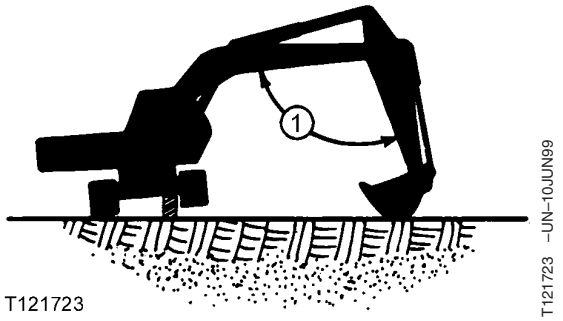
DW90712,000001A –19–03JAN06–1/1

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.



1—Boom-To-Arm Angle

DW90712,0000042 –19–23OCT08–1/3

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

450DLC—Specification

Track—Sag..... 390—440 mm (15.3—17.3 in.)

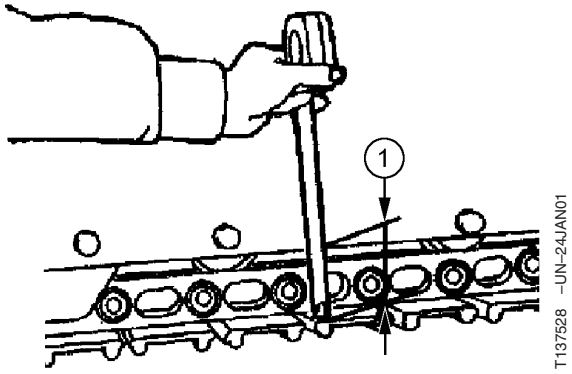
650DLC—Specification

Track—Sag..... 450—500 mm (17.7—19.7 in.)

850DLC—Specification

Track—Sag..... 460—510 mm (18.1—20.0 in.)

1—Distance



Continued on next page

DW90712,0000042 –19–23OCT08–2/3

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.

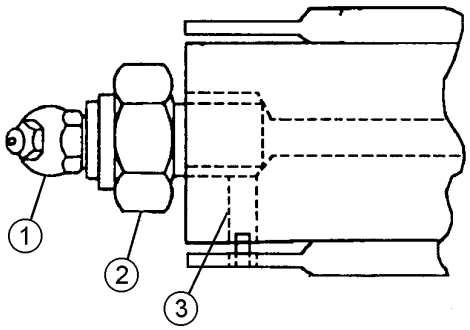
CAUTION: Prevent possible injury from high pressure grease. DO NOT remove grease fitting (1) from nut (2).

2. To loosen, slowly turn nut (2) counterclockwise; grease will escape through the bleed hole (3).

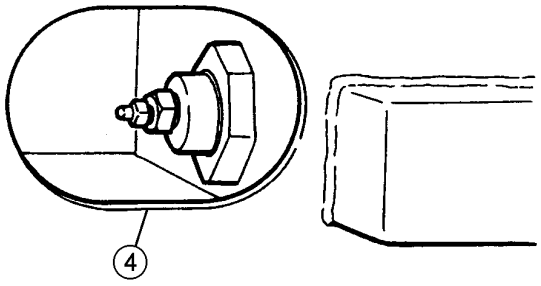
3. When amount of track sag is satisfactory, turn nut clockwise to tighten.

Specification

Nut—Torque ..... 147 N•m (108 lb-ft)



T135187 –UN–06NOV00



T135188 –UN–06NOV00

1—Grease Fitting
2—Nut
3—Bleed Hole
4—Access Hole

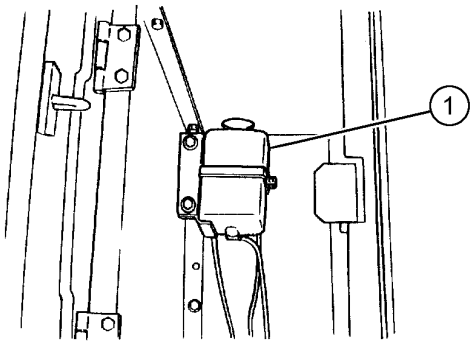
DW90712,0000042 –19–23OCT08–3/3

Check Windshield Washer Fluid Level

Open left front access door.

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.



T140231 –UN–21MAR01

1—Windshield Washer Tank

DW90712,0000010 –19–21DEC05–1/1

Check Overflow Tank Coolant Level

With the engine cold, coolant level must be between the FULL and LOW marks on the overflow tanks (1) located under the engine cover.

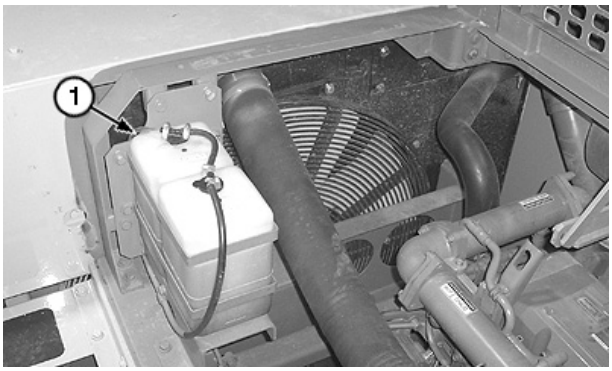
If coolant is below the LOW mark, add coolant to the overflow tanks.

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 overflow tanks are empty, check for leaks. Repair as required. Add coolant to the radiator and the overflow tanks.

NOTE: If overflow tanks are full and radiator is low, check for leaks in radiator cap and hose connections between radiator and coolant overflow tanks.



TX1001844A –UN–28DEC05

T6642EK –UN–01NOV88

1—Overflow Tanks

DW90712,0000016 –19–22DEC05–1/1

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.

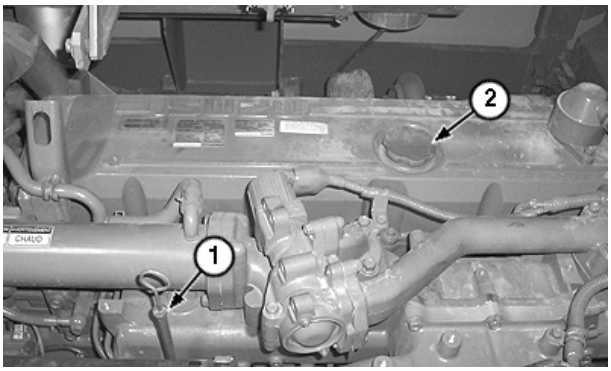
There are two ways to check the engine oil level:

Using the dipstick:

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

   BEFORE THE ENGINE IS STARTED: The engine is full when oil level is between the circle marks.

   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 between the circle marks.
3. If necessary, remove filler cap (2) to add oil. (See Engine Oil in Section 3-1.)



1—Dipstick
2—Filler Cap

Continued on next page

DW90712,000000E –19–20JAN06–1/2

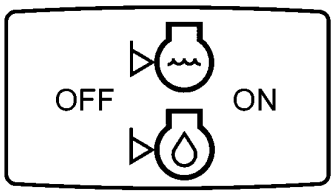
Using the Engine Oil Level/Coolant Level Switch:

1. Turn the key switch to the ON position.
2. Press and hold the engine oil level/coolant level switch.

NOTE: If the engine oil level indicator is red, the oil level is low. If the engine oil level indicator is green, the oil level is normal.

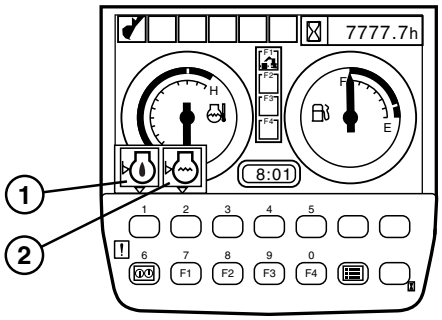
3. Check the engine oil level indicator (1) on the default screen of the monitor.
4. If necessary, remove filler cap to add oil. (See Engine Oil in Section 3-1.)

1—Engine Oil Level Indicator
2—Coolant Level Indicator



TX1001993 –UN–04JAN06

Engine Oil Level/Coolant Level Switch



TX1001986 –UN–05JAN06

Default Screen

DW90712,000000E –19–20JAN06–2/2

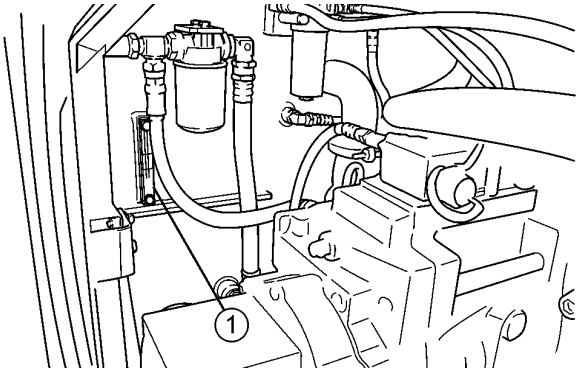
Check Hydraulic Oil Level

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

Avoid mixing different brands or types of oil. 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.

T6811AI –UN–18OCT88



T147455 –UN–01NOV01

650DLC Shown

1—Hydraulic Oil Level Window

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 hydraulic oil level window (1). Oil must be between marks on window.

   If necessary, add oil.

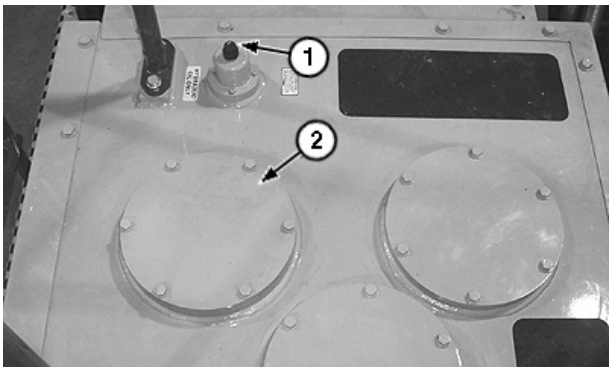
   To add oil:

Continued on next page

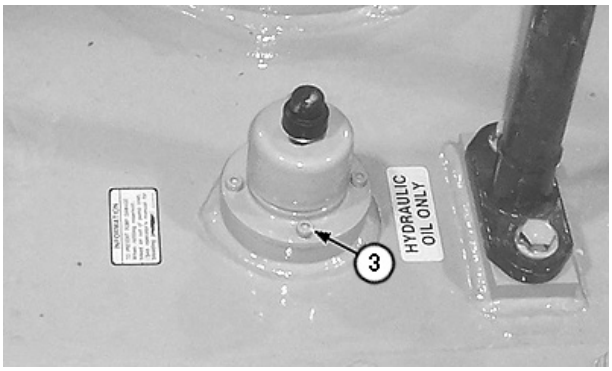
CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

4. Push pressure release button.
5. Insert 5 mm hex wrench to remove cap screws (3).
6. Remove cap.
7. Add oil. (See Hydraulic Oil in Section 3-1.)
8. Install cap and cap screws.

1—Pressure Release Button
2—Hydraulic Tank Cover
3—Cap Screws (4 used)



TX1001796A –UN–12JAN06

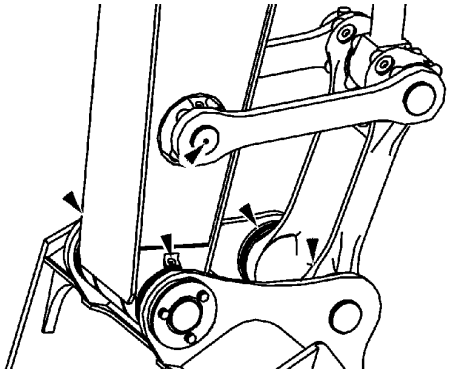


TX1001798A –UN–21DEC05

DW90712,0000011 –19–07JUN07–2/2

Grease Working Tool Pivots and Links

Grease working tool pivots and links (5 points) until grease escapes from joints. Grease every 4 hours for first 20 hours. Grease every 10 hours thereafter.



Ten Points: Right Side Shown

TX1001846 –UN–03JAN06

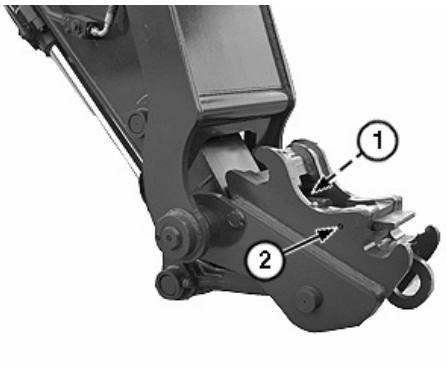
DW90712,0000017 –19–07FEB06–1/1

Grease Hydraulic Coupler (If Equipped)

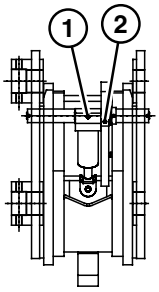
NOTE: Cylinders that are supplied without grease zerks do NOT need to be greased.

To keep hydraulic coupler in proper working condition it must be greased on a daily basis. Most hydraulic couplers are supplied with a grease zerk located on the head end of the cylinder or the cylinder barrel, the lock arm and on each side of the hydraulic coupler for the locking wedge. Apply grease to lubrication fittings until it escapes from joints. See Grease. (Section 3-1.)

1—Hydraulic Cylinder Grease Zerk
2—Lock Arm Grease Zerk



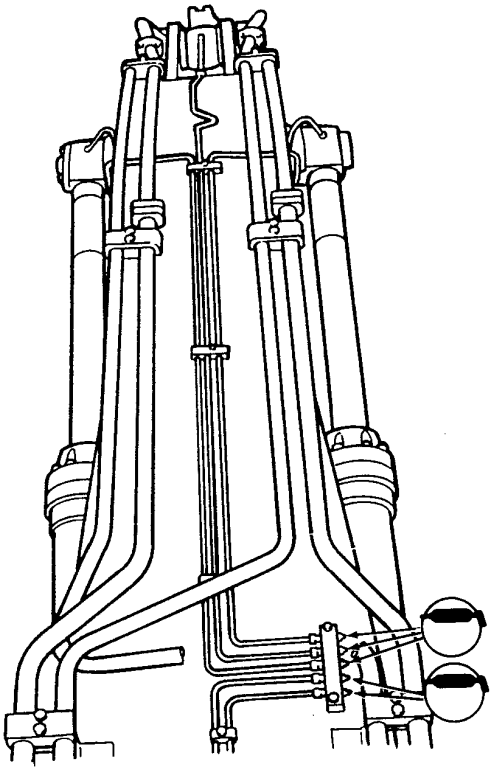
TX1017854A –UN–22JAN07



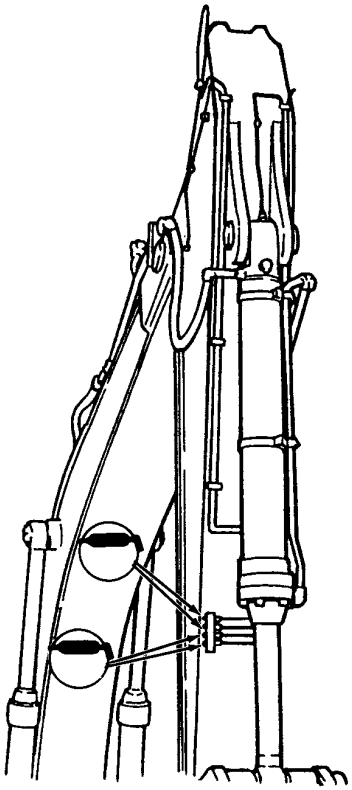
TX1017855 –UN–25JAN07

VD76477,0001376 –19–27JUN07–1/1

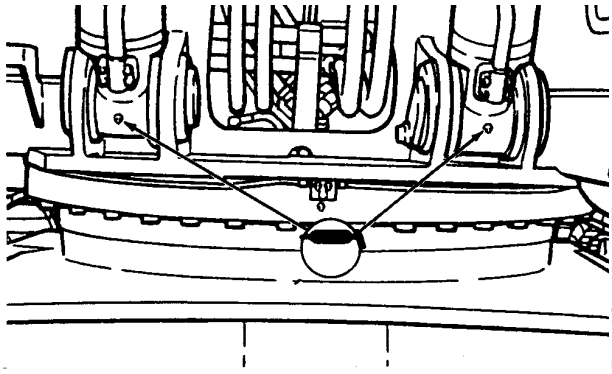
Grease Front End Pin Joints



Five Points



Four Points



Two Points

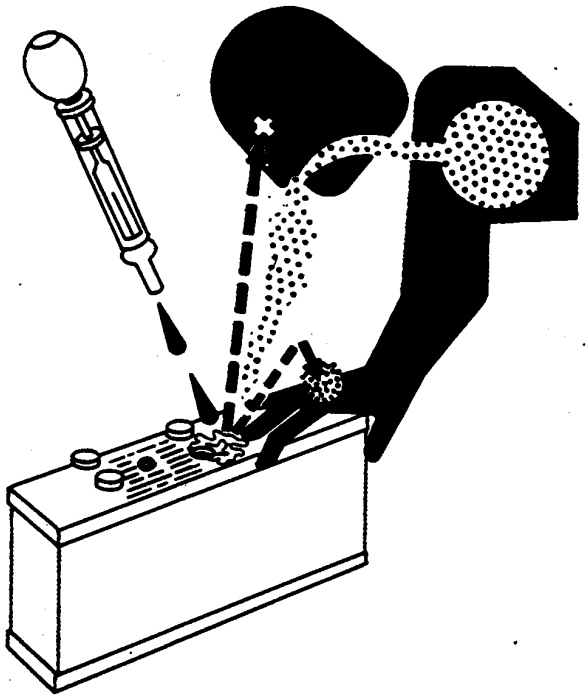
Grease these areas until grease escapes at joints. (See Section 3-1.)

Grease every four hours during the first 20 hours of operation.

Grease daily during the first 30—100 hours of operation and when working in mud and water.

TX14740,0001DA7 –19–01NOV01–1/1

Check Battery Electrolyte Level and Terminals



TS203 –UN–23AUG88

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

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

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

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

Avoid the hazard by:

1. **Filling batteries in a well-ventilated area.**
2. **Wearing eye protection and rubber gloves.**
3. **Avoiding breathing fumes when electrolyte is added.**
4. **Avoiding spilling or dripping electrolyte.**
5. **Use proper jump start procedure.**

If you spill acid on yourself:

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

If acid is swallowed:

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

1. Remove battery box cover.

Continued on next page

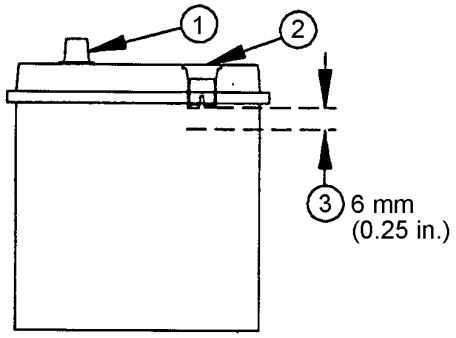
IMPORTANT: If water is added to batteries during freezing weather, batteries must be charged after water is added to prevent batteries from freezing. Charge battery using a battery charger or by running the engine.

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

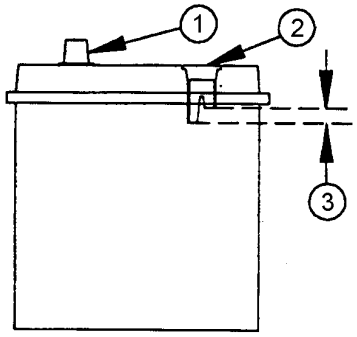
CAUTION: Prevent possible injury. ALWAYS remove grounded (-) battery clamp first and replace it last.

3. Disconnect battery clamps, grounded clamp first.

1—Battery Post
2—Fill Tube
3—Electrolyte Level Range



T137535 –UN–25JAN01



T137536 –UN–25JAN01

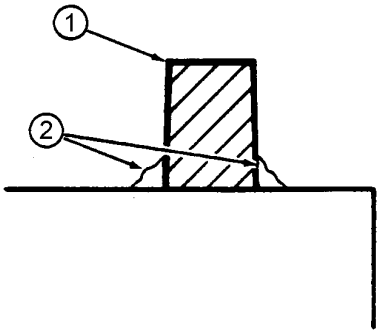
TX14740,0001CBE –19–22FEB07–2/3

4. Clean battery terminals (1) and clamps with a stiff brush.

5. Apply lubricating grease (2) around battery terminal base only.

6. Install and tighten clamps, grounded clamp last.

1—Battery Terminal
2—Lubricating Grease



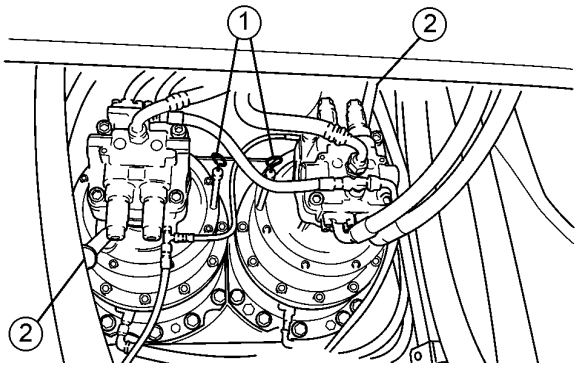
T137537 –UN–25JAN01

TX14740,0001CBE –19–22FEB07–3/3

Check Swing Gearbox Oil Level

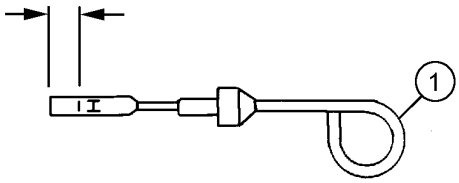
1. Park machine on a level surface.
2. Remove dipsticks (1). Oil must be between marks.
3. If oil is needed, remove filler caps (2), and add oil. (See Section 3-1.)
4. Install filler caps and dipsticks
5. Check oil level.

1—Dipsticks
2—Filler Caps



T147475 –UN–01NOV01

650DLC Shown



T145092 –UN–31AUG01

DW90712,0000012 –19–23JAN06–1/1

Check Radiator Coolant Level

T6642EK –UN–01NOV88

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.

There are two ways to check the coolant level:

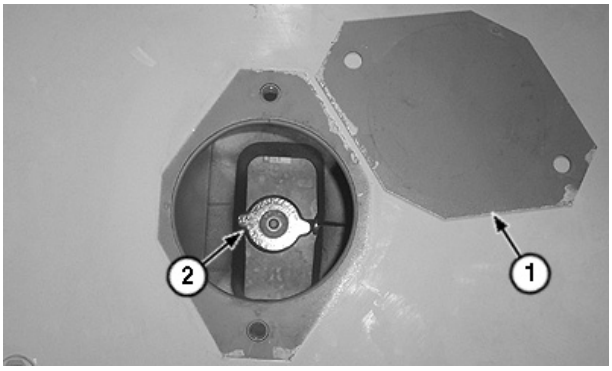
Visually checking coolant level:

1. To access radiator cap, remove cover plate (1).
2. Slowly remove cap (2). 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 overflow tanks.

3. Add coolant, if necessary.
4. Install radiator cap.

Using the Engine Oil Level/Coolant Level Switch:



TX1001810A –UN–21DEC05

650DLC Shown

1—Cover Plate
2—Radiator Cap

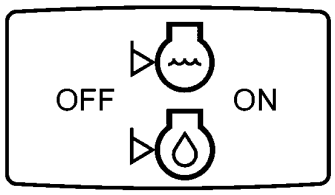
Continued on next page

DW90712,0000013 –19–05JAN06–1/2

1. Turn the key switch to the ON position.
2. Press and hold the engine oil level/coolant level switch.

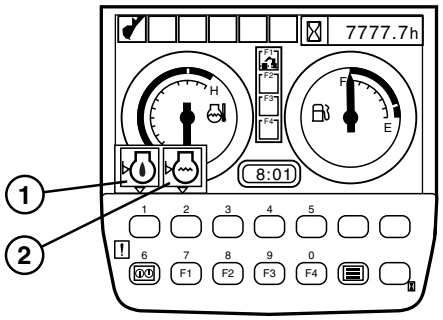
NOTE: If the coolant level indicator is red, the oil level is low. If the coolant level indicator is green, the oil level is normal.

3. Check the coolant level indicator (1) on the default screen of the monitor.
4. If it is necessary to add coolant, follow the above steps under “Visually checking coolant level”.



TX1001993 –UN–04JAN06

Engine Oil Level/Coolant Level Switch



TX1001986 –UN–05JAN06

1—Engine Oil Level Indicator
2—Coolant Level Indicator

Default Screen

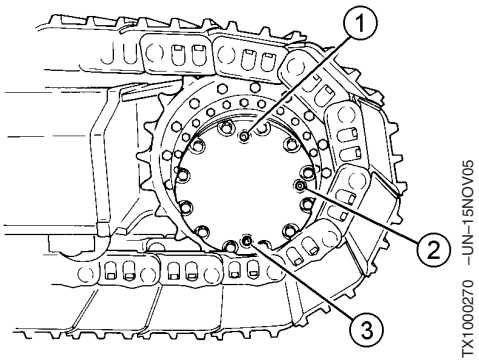
DW90712,0000013 –19–05JAN06–2/2

Check Travel Gearbox Oil Level

1. Park the machine on level ground rotating travel gearbox until positioned as shown.
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 (2) . Gradually loosen check plug to release air to relieve pressure.

3. After travel gearbox has cooled, slowly loosen check plug to release air to relieve pressure.
4. Remove check plug. Oil must be to bottom of hole.
5. If necessary, remove fill plug (1), and add oil until oil flows out of oil level check plug hole. (See Section 3-1.)
6. Wrap threads of plugs with sealing-type tape. Install plug. Tighten plugs to 70 N•m (51 lb-ft).
7. Check second travel gearbox oil level.



1—Fill Plug
2—Check Plug
3—Drain Plug

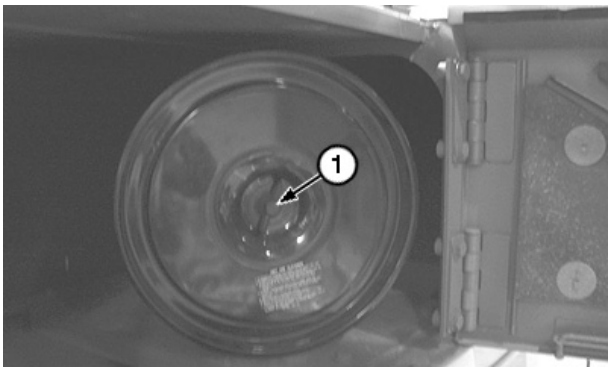
DW90712,0000044 –19–23JAN06–1/1

Clean Primary Air Cleaner Element - 450DLC and 650DLC

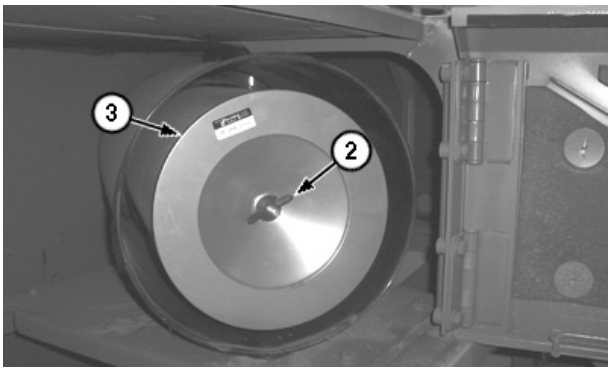
1. Unscrew wing nut (1), and remove outer cover.
2. Unscrew wing nut (2) to remove primary element
3. Pull primary element (3) straight back to remove.
4. Tap element with the palm of your hand, NOT ON A HARD SURFACE.

CAUTION: Prevent possible injury from flying chips if compressed air is more than 210 kPa (2.1 bar) (30 psi). Reduce compressed air to less than 210 kPa (2.1 bar) (30 psi) when using for cleaning purposes. Clear area of bystanders, guard against flying chips, and wear personal protection equipment including eye protection.

5. If this does not remove dust, use compressed air under 210 kPa (2.1 bar) (30 psi).
6. Direct air up and down the pleats from inside to outside. Be careful not to make a break in the element.



TX1001778A –UN–21DEC05



TX1001781A –UN–03JAN06

1—Outer Cover Wing Nut
2—Primary Element Wing Nut
3—Primary Element

Continued on next page

DW90712,0000014 –19–31OCT06–1/2

IMPORTANT: A damaged or dirty element may cause engine damage.

Install a new primary element:

1. **If the element shows damage.**
2. **If element will not clean.**
3. **After 1000 hours service or annually.**

Install a new secondary element:

1. **If the primary element is damaged and needs to be replaced.**
2. **If the element is visibly dirty.**
3. **After 1000 hours service or annually.**

DO NOT clean a secondary element. Install a new element carefully centering it in the canister.

7. Inspect element and gasket for damage. If element is damaged, install a new element (See Section 3-8).

8. Install primary element (3), and securely screw on wing nut (2).

9. Install outer cover, and securely screw on wing nut (1).

DW90712,0000014 –19–31OCT06–2/2

Clean Primary Air Cleaner Element - 850DLC

1. Unlock clamps (2), and pull air cleaner cover outward to remove.
2. Remove primary element (3).
3. Tap element with the palm of your hand, NOT ON A HARD SURFACE.

CAUTION: Prevent possible injury from flying chips if compressed air is more than 210 kPa (2.1 bar) (30 psi). Reduce compressed air to less than 210 kPa (2.1 bar) (30 psi) when using for cleaning purposes. Clear area of bystanders, guard against flying chips, and wear personal protection equipment including eye protection.

4. If this does not remove dust, use compressed air under 210 kPa (2.1 bar) (30 psi).
5. Direct air up and down the pleats from inside to outside. Be careful not to make a break in the element.

IMPORTANT: A damaged or dirty element may cause engine damage.

Install a new primary element:

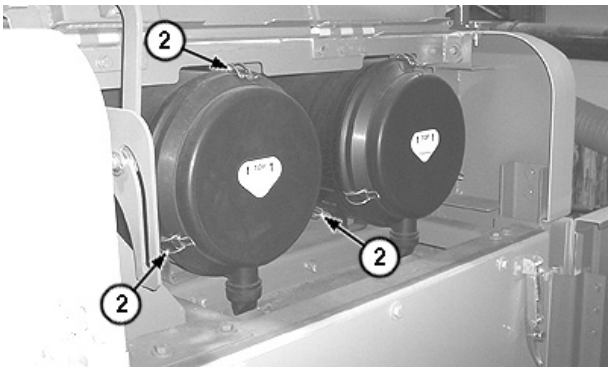
1. **If the element shows damage.**
2. **If element will not clean.**
3. **After 1000 hours service or annually.**

Install a new secondary element:

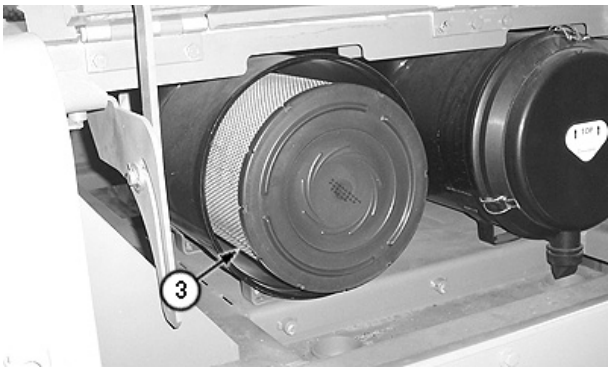
1. **If the primary element is damaged and needs to be replaced.**
2. **If the element is visibly dirty.**
3. **After 1000 hours service or annually.**

DO NOT clean a secondary element. Install a new element carefully centering it in the canister.

6. Inspect element and gasket for damage. If element is damaged, install a new element (See Section 3-8).



TX1002271A –UN–05JAN06



TX1002272A –UN–05JAN06

2—Clamps (3 used on each Air Cleaner)
3—Primary Air Cleaner Element

Continued on next page

7. Install primary element.
8. Install air cleaner cover and lock clamps.

DW90712,0000045 –19–31OCT06–2/2

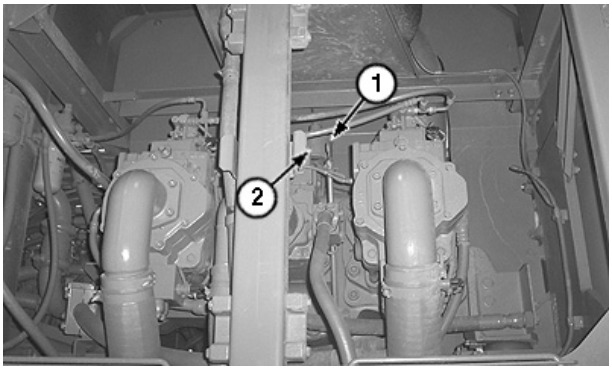
Check Pump Drive Gearbox Oil Level

1. Remove dipstick (1).
2. Wipe dipstick clean and insert completely into tube.
3. Remove dipstick.
4. Oil must be approximately halfway below the "H" (level) mark.

To add oil:

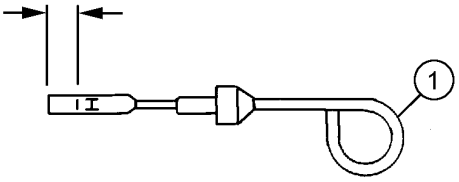
1. Remove filler cap (2).
2. Add oil.
3. Install filler cap.

1—Dipstick
2—Filler Cap



TX1001870A –UN–28DEC05

650DLC Shown



T145092 –UN–31AUG01

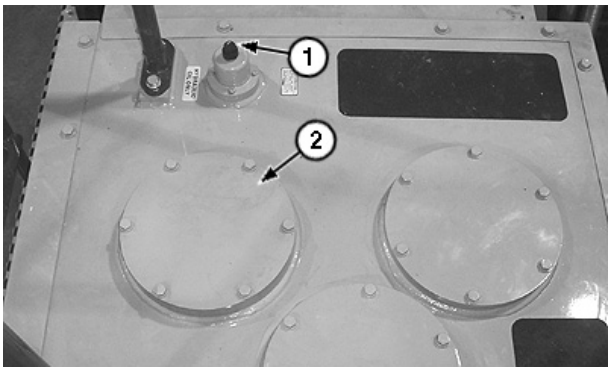
DW90712,0000018 –19–22DEC05–1/1

Drain Hydraulic Tank Sump

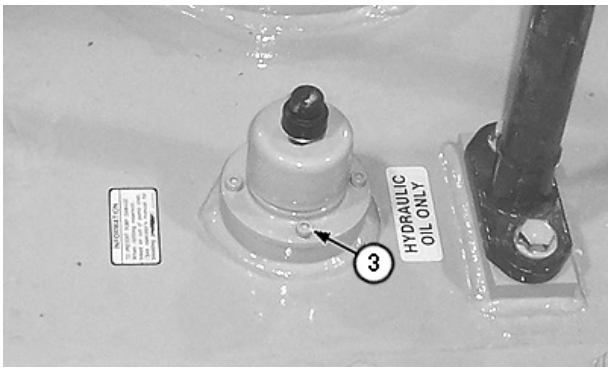
CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

1. To relieve pressure, push the pressure release button (1).
2. Insert a 5 mm hex wrench to remove cap screws (3).
3. Remove cover.

1—Pressure Release Button
2—Hydraulic Oil Tank Cover
3—Cap Screws (4 used)



TX1001796A –UN–12JAN06

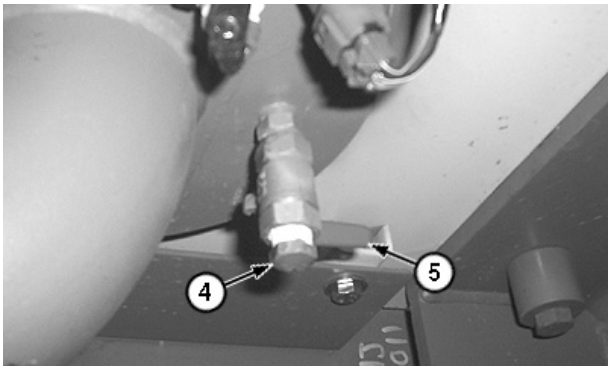


TX1001798A –UN–21DEC05

DW90712,0000015 –19–31OCT06–1/2

4. After oil is cool, loosen the drain valve plug (4), and open the ball valve (5) for several seconds to drain water and sediment into a container. Do not remove plug completely. Dispose of waste properly.
5. Close the ball valve (5), and tighten the drain valve plug (4).
6. Install hydraulic oil tank cover and cap screws.

4—Drain Valve Plug
5—Ball Valve



TX1001824A –UN–22DEC05

DW90712,0000015 –19–31OCT06–2/2

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). Discard gasket under access cover.
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.

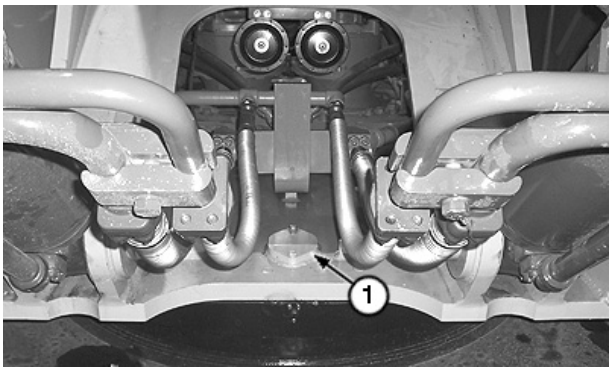
   If the grease is contaminated, remove grease and replace with clean grease.

IMPORTANT: If water or mud is found in swing gear area, see Operating in Water and Mud in Section 2-3.

3. Add grease as required.

IMPORTANT: Excessive grease can damage the swing gearbox seal.

4. Remove any excess grease from over the top of the swing drive pinion.
5. Clean surfaces, and install new gasket.
6. Install access cover.



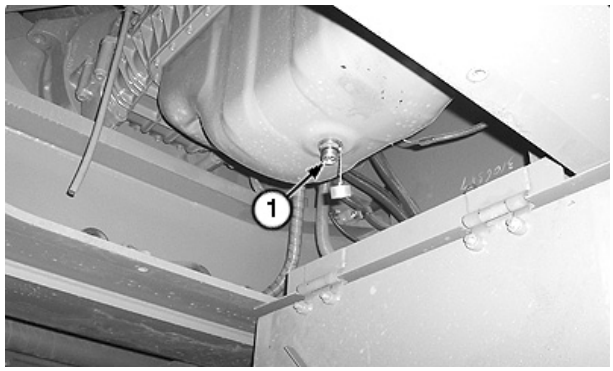
650DLC Shown

1—Access Cover

DW90712,0000019 –19–23JAN06–1/1

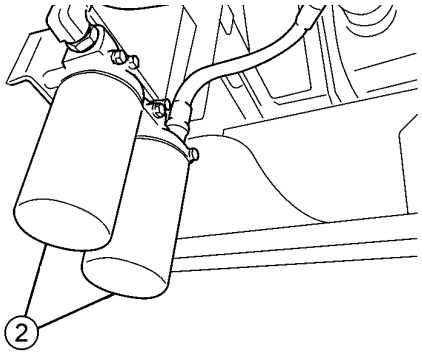
Change Engine Oil and Replace Filters

1. Run engine to warm oil.
2. Park machine on a level surface.
3. Stop engine.
4. Remove 4 cap screws on the engine pan access cover to access the filters and engine oil pan.
5. Unscrew environmental drain cap (1) from bottom of engine oil pan, and install the environmental drain hose to allow oil to drain into a container. Dispose of waste oil properly.
6. Turn filter(s) (2) counterclockwise to remove. Clean mounting surface on base.
7. Apply thin film of oil to rubber gasket of new filter.
8. Install new filter(s). Turn filter clockwise by hand until gasket touches mounting surface.
9. Tighten filter 1/2—3/4 turn more.
10. Remove environmental drain hose, and install environmental drain cap.



TX1002120A –UN–03JAN06

650DLC Shown



T147484 –UN–01NOV01

1—Environmental Drain Cap
2—Filters

Continued on next page

DW90712,000001C –19–31OCT06–1/2

11. Remove filler cap (3).

Specification

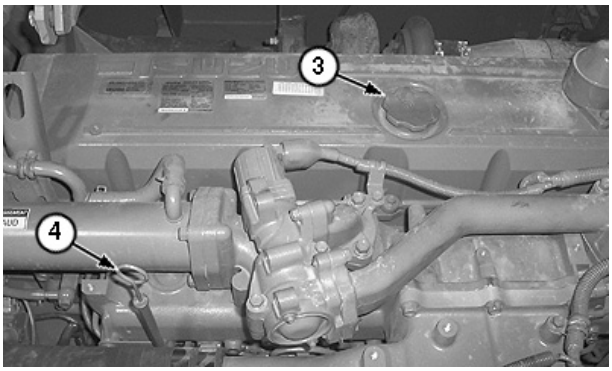
450DLC—Oil Capacity With Filter Change	55.8 L 14.75 gal
650DLC—Oil Capacity With Filter Change	57.0 L 15.1 gal
850DLC—Oil Capacity With Filter Change	57.0 L 15.1 gal

12. Add oil to specifications.

13. Install filler cap.

14. Start engine. Engine oil pressure indicator must go out within 15-20 seconds. If not, stop engine immediately, and find the cause.

15. Stop engine. Check oil level on dipstick (4). Check for any leakage at filter. Tighten filter just enough to stop leakage.



3—Filler Cap
4—Dipstick

DW90712,000001C –19–31OCT06–2/2

Replace Fuel Filters

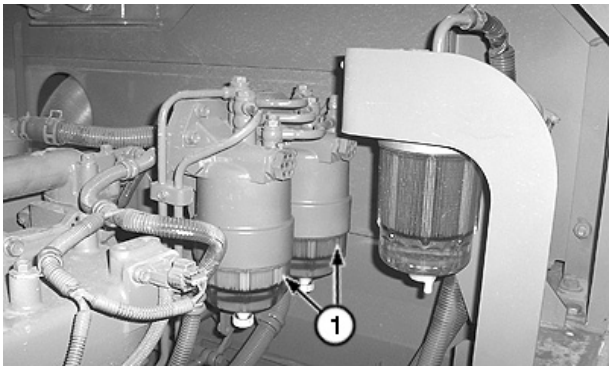
1. Turn canisters (1) counterclockwise to remove filters. Dispose of filters properly. Allow sediment to drain into a container. Dispose of waste properly.

2. Clean mounting surface on filter bases.

3. Clean sediment canisters.

4. Install O-rings. Install new filters. Install canisters.

5. Bleed fuel system. (See Bleed Fuel System in Section 3-3.)



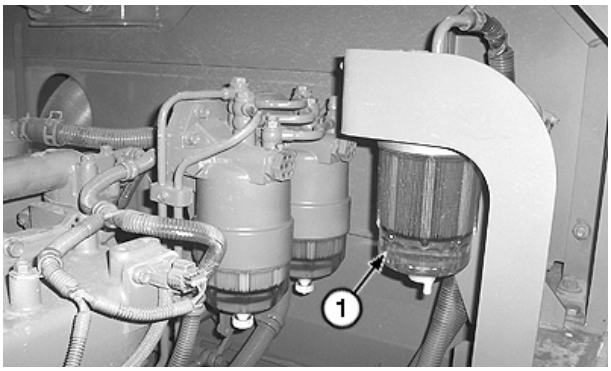
650DLC Shown

1—Fuel Filters

DW90712,000001D –19–10JAN06–1/1

Replace Water Separator

1. Turn canister (1) counterclockwise to remove filter. Allow sediment to drain into a container. Dispose of waste properly.
2. Clean bowl.
3. Install new filter. (Follow instructions on filter.)
4. Install new O-rings.
5. Install canister.
6. Bleed fuel system. (See Bleed Fuel System in Section 3-3.)



650DLC Shown

1—Canister

DW90712,0000027 –19–11JAN06–1/1

Check Air Intake Hose

Check air intake hoses for cracks. Replace as necessary.

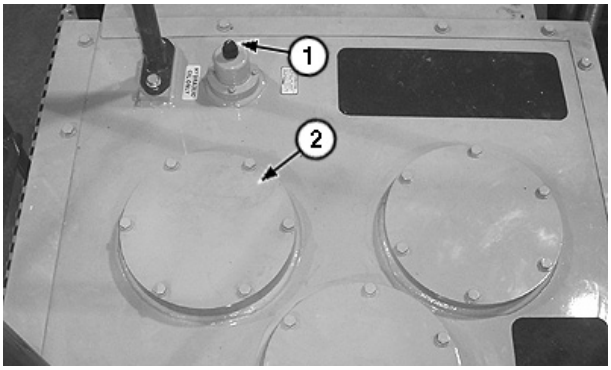
TX14740,0001C82 –19–04NOV00–1/1

Replace Pump Case Drain 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 pushing the pressure release button (1).

1. Push the pressure release button (1) to relieve pressure.

1—Pressure Release Button
2—Hydraulic Oil Tank Cover

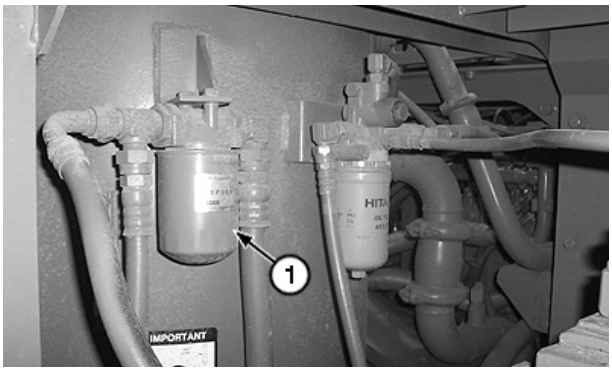


650DLC Shown

Continued on next page

DW90712,000001E –19–25MAY06–1/2

2. Turn filter canister (1) counterclockwise to remove.
3. Clean filter gasket contact area.
4. Apply a thin film of clean oil to the gasket of new filter.
5. Install new filter. Turn filter canister clockwise by hand until gasket touches contact area.
6. Tighten filter canister 1/2 turn more using wrench.
7. Bleed air from hydraulic system. (See next story.)
8. Check for any leakage.
9. Check oil level.



650DLC Shown

1—Filter Canister

DW90712,000001E –19–25MAY06–2/2

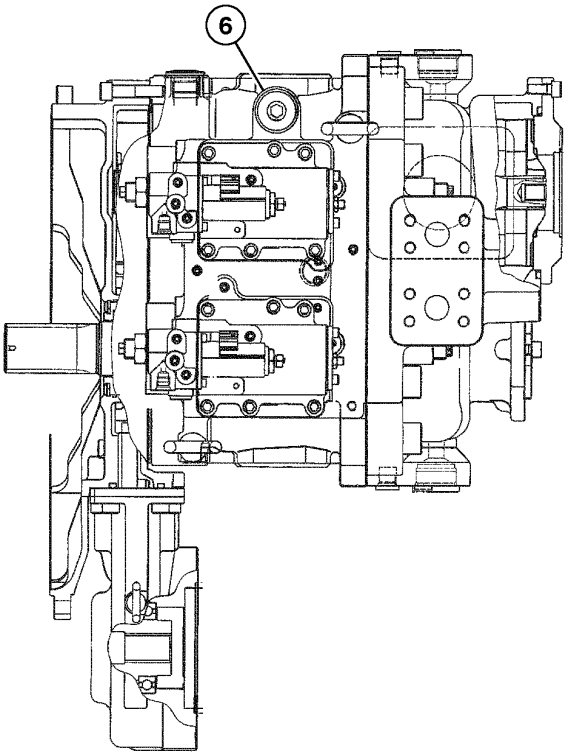
Bleed Air From Hydraulic System—450DLC

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

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.

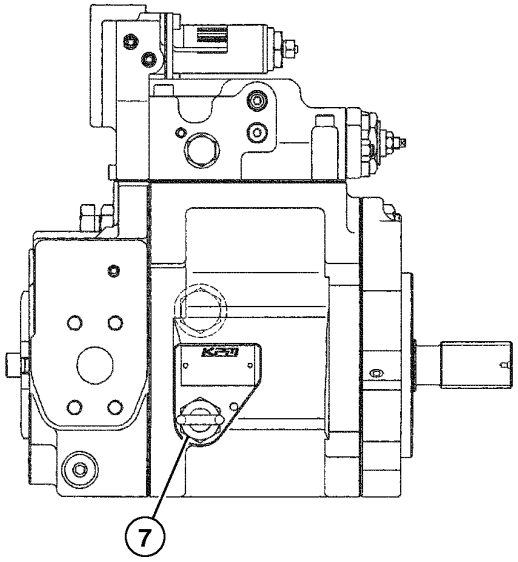
This excavator is factory filled with Super EX 46HN extended life zinc-free hydraulic oil. Avoid servicing this excavator with products that do not meet this specification. If oils have been mixed or if alternate service oils are desired, the complete hydraulic system needs to be totally flushed by an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

1. Loosen plugs (6 and 7).
2. Fill the pumps with oil through plug ports.
3. Tighten the plugs.
4. Start the engine and run at slow idle. Put a “Do Not Operate” tag on the pilot control shutoff lever. Make sure the pilot control shutoff lever is in the LOCK position.
5. Slowly loosen plugs (6 and 7) to release trapped air. Tighten the plug when air stops and oil flows.
6. Purge air from the hydraulic system by running the engine at slow idle and operating all control levers slowly and smoothly for 15 minutes.
7. Position the machine with the arm cylinder fully retracted and the bucket cylinder fully extended.
8. Lower the bucket to the ground.
9. Stop the engine. Remove the key from the key switch.



TX1009899 –UN–24JUL06

Pump 1 and 2



TX1009900 –UN–24JUL06

Fan Drive Pump

6—Plug
7—Plug

Continued on next page

10. Pull the pilot control shutoff lever to the LOCK position.

11. Check the oil level gauge. Remove cover to add oil, if necessary.

DW90712,0000190 –19–03JUL07–2/2

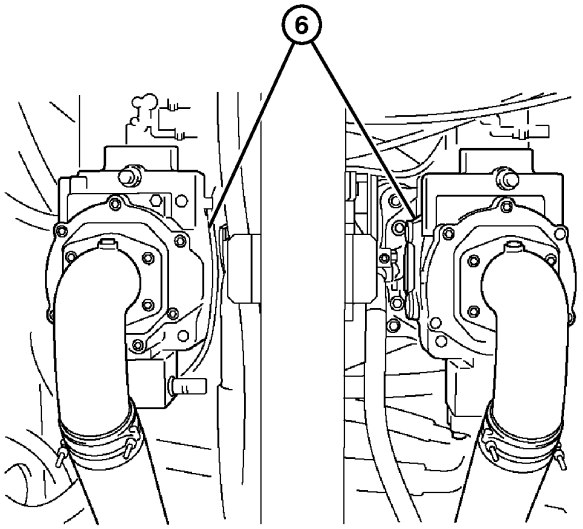
Bleed Air From Hydraulic System—650DLC and 850DLC

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

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.

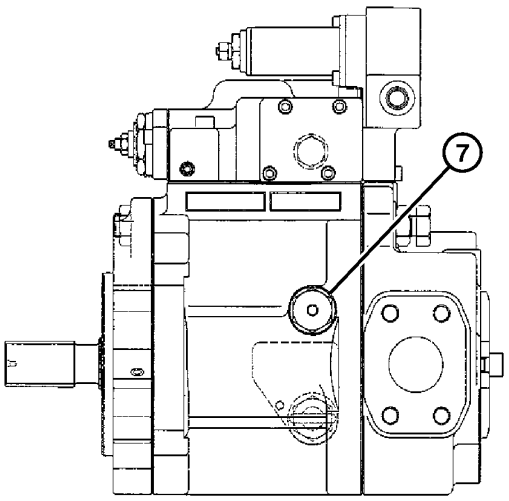
This excavator is factory filled with Super EX 46HN extended life zinc-free hydraulic oil. Avoid servicing this excavator with products that do not meet this specification. If oils have been mixed or if alternate service oils are desired, the complete hydraulic system needs to be totally flushed by an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

1. Loosen plugs (6 and 7).
2. Fill the pumps with oil through plug ports.
3. Tighten the plugs.
4. Start the engine and run at slow idle. Put a “Do Not Operate” tag on the pilot control shutoff lever. Make sure the pilot control shutoff lever is in the LOCK position.
5. Slowly loosen plugs (6 and 7) to release trapped air. Tighten the plug when air stops and oil flows.
6. Purge air from the hydraulic system by running the engine at slow idle and operating all control levers slowly and smoothly for 15 minutes.
7. Position the machine with the arm cylinder fully retracted and the bucket cylinder fully extended.
8. Lower the bucket to the ground.



TX1011082 –UN–10AUG06

850DLC Shown



TX1011083 –UN–10AUG06

6—Plug (2 used)
7—Plug

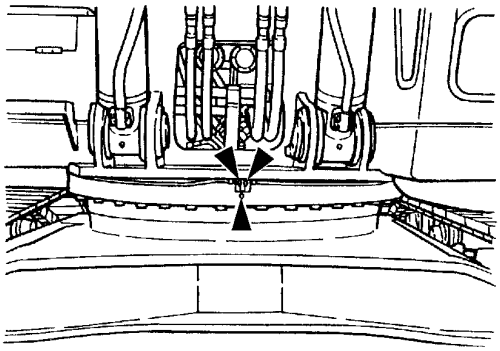
Continued on next page

9. Stop the engine. Remove the key from the key switch.
10. Pull the pilot control shutoff lever to the LOCK position.
11. Check the oil level gauge. Remove cover to add oil, if necessary.

DW90712,0000020 –19–03JUL07–2/2

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.



T140269 –UN–21MAR01

1. Park machine on a level surface.
2. Stop engine.
3. Lubricate swing bearing with 6 shots of grease at each of three 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.

DW90712,0000046 –19–23JAN06–1/1

Clean Cab Fresh Air and Recirculating Air Filters

IMPORTANT: Replace filters after the sixth cleaning.

Removing Cab Fresh Air Filter:

1. Unlock, and open left cab side cover (1) below cab door window.
2. Squeeze tab (2) on each side of the filter to remove.

Removing Cab Recirculating Air Filter:

1. Move operator's seat forward to access filter (3) located under the rear deck.
2. Squeeze tab (4) on right side of filter to remove.

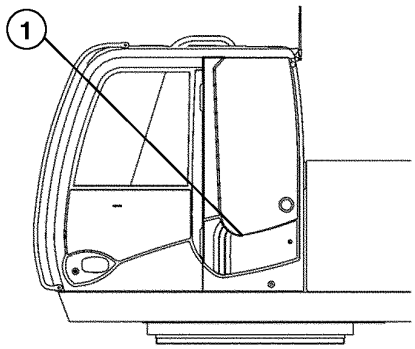
Cleaning Filters:

1. Clean filters in one of 2 ways.

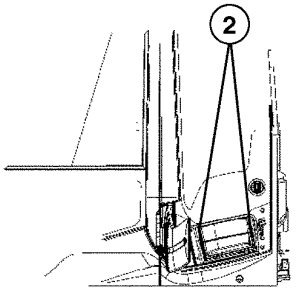
CAUTION: Reduce compressed air to less than 196 kPa (1.96 bar) (28.4 psi) when using for cleaning purposes. Clear area of bystanders, guard against flying chips, and wear personal protection equipment including eye protection.

- Use compressed air opposite to the normal air flow.
- Wash filters with water. Soak the filters in warm, soapy water for 5 minutes. Flush filter. Allow filter to dry before installing.

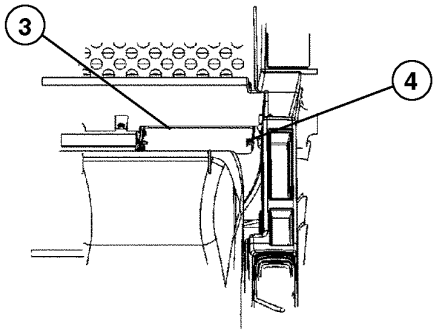
2. Install filter.



TX1000868 –UN–03DEC05



TX1000869 –UN–03DEC05



TX1000870 –UN–03DEC05

1—Side Cover
2—Fresh Air Filter Tab (2 used)
3—Recirculating Air Filter
4—Recirculating Air Filter Tab

VD76477,0000369 –19–31OCT06–1/1

Change Swing Gearbox Oil

1. Remove drain plugs (4) mounted at end of drain hoses.
2. Open drain valves (3) to drain oil. Allow oil to drain into a container. Dispose of waste oil properly.
3. Close drain valves.
4. Install drain plugs.
5. Remove filler caps (2) from fill tubes.
6. Add oil until oil is between marks on dipstick (1). (See Section 3-1.)

450DLC—Specification

Swing gearbox—Oil Capacity (each)..... 6.5 L / 1.7 gal

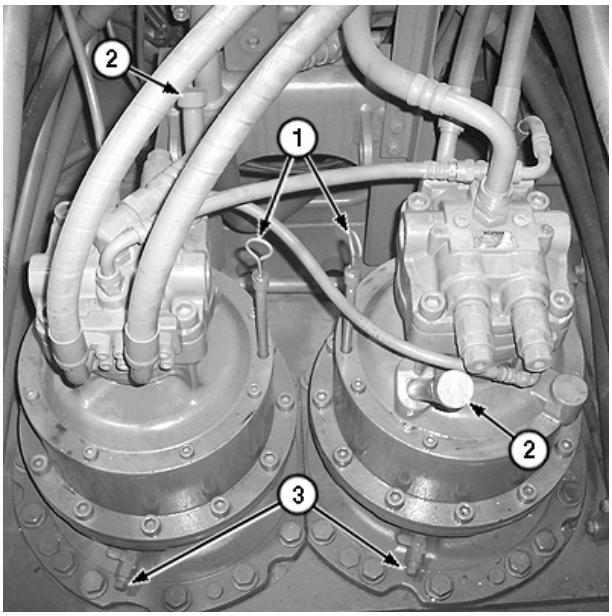
650DLC—Specification

Swing gearbox—Oil Capacity (each)..... 10.5 L / 2.8 gal

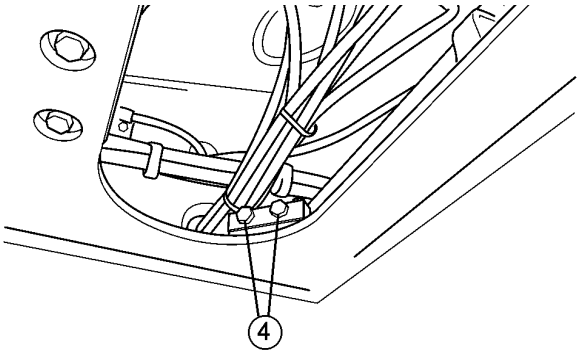
850DLC—Specification

Swing gearbox—Oil Capacity (each)..... 15 L / 4 gal

7. Install filler caps.



TX1002170A –UN–04JAN06



T147522 –UN–01NOV01

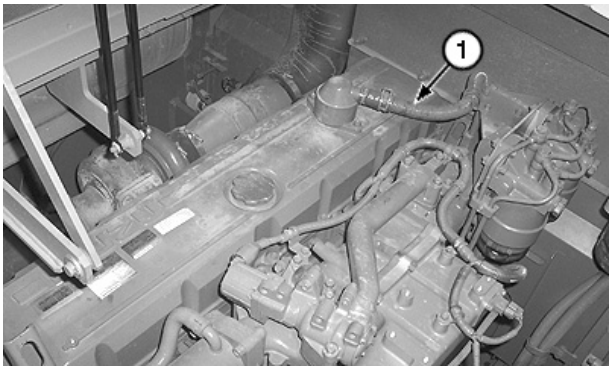
1—Dipstick
2—Filler Cap
3—Drain Valve
4—Drain Plug

VD76477,000040E –19–03JUL07–1/1

Remove and Clean Engine Crankcase Ventilation Tube

1. Remove and clean the engine crankcase vent tube (1).
2. Install tube.

1—Engine Crankcase Ventilation Tube



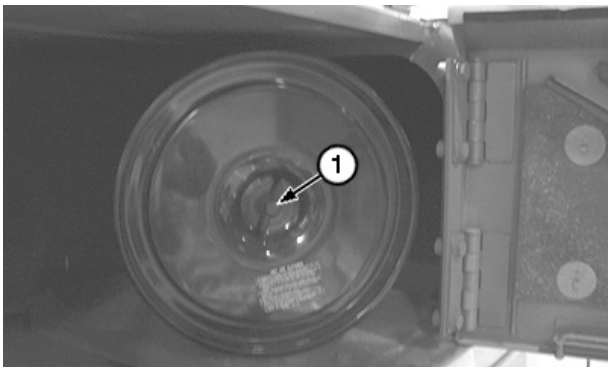
TX1001952A –UN–03JAN06

VD76477,00003FB –19–06FEB06–1/1

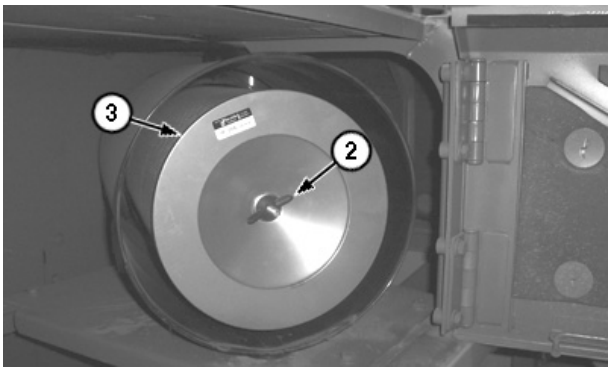
Replace Air Cleaner Elements — 450DLC and 650DLC

1. Unscrew wing nut (1), and remove outer cover.
2. Unscrew the primary element wing nut (2), and remove primary element (3).
3. Unscrew secondary element wing nut (4), and remove secondary element (5).
4. Clean the inside of the filter canister.
5. Install new secondary element, and securely screw on wing nut.
6. Install new primary element, and securely screw on wing nut.
7. Install outer cover, and securely screw on wing nut.

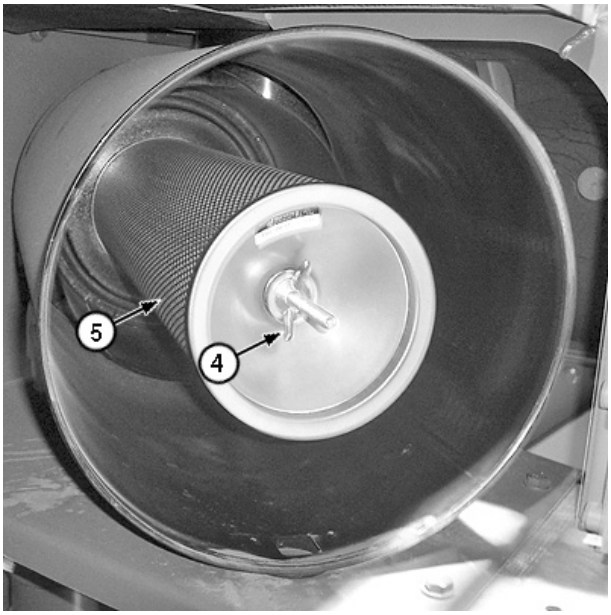
1—Outer Cover Wing Nut
2—Primary Element Wing Nut
3—Primary Element
4—Secondary Element Wing Nut
5—Secondary Element



TX1001778A –UN–21DEC05



TX1001781A –UN–03JAN06



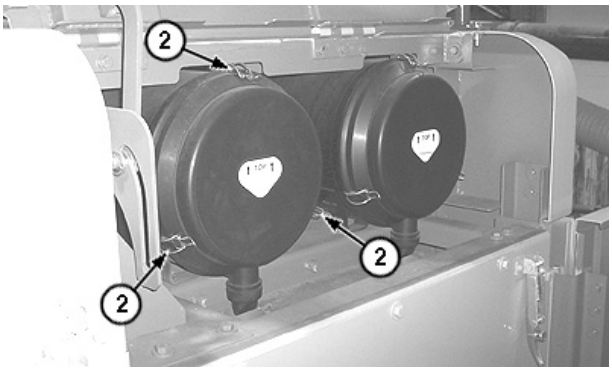
TX1001958A –UN–03JAN06

DW90712,0000047 –19–31OCT06–1/1

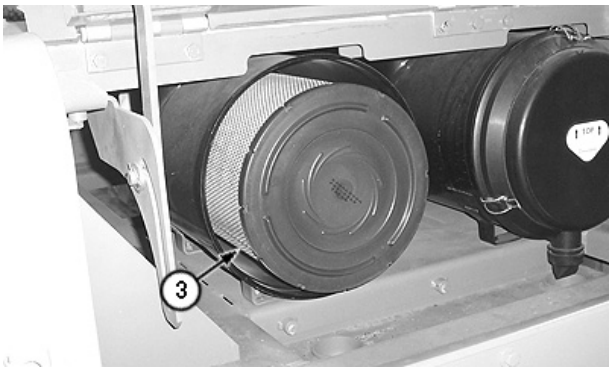
Replace Air Cleaner Elements — 850DLC

1. Unlock clamps (2), and pull air cleaner cover outward to remove.
2. Remove primary element (3).
3. Remove secondary element (4).
4. Clean the inside of the filter canister.
5. Install new elements, making sure the secondary element is centered in canister.
6. Install air cleaner cover, and lock clamps.

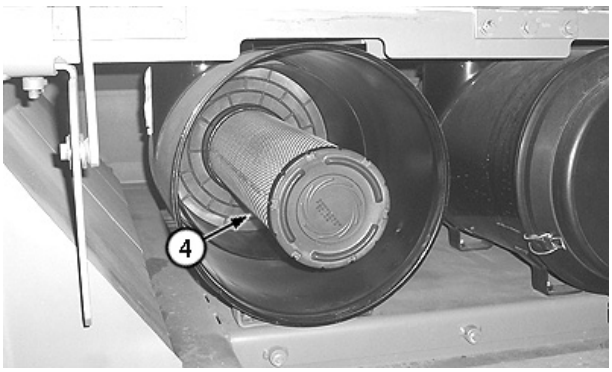
2—Clamps (3 used on each Air Cleaner)
3—Primary Element
4—Secondary Element



TX1002271A –UN–05JAN06



TX1002272A –UN–05JAN06



TX1002276A –UN–05JAN06

DW90712,0000048 –19–31OCT06–1/1

Change Pump Drive Gearbox Oil — 650DLC and 850DLC only

1. Remove drain plug (3). Open ball valve (4). Allow oil to drain into a container. Dispose of waste oil properly.
2. Close ball valve, and install drain plug.
3. Remove fill cap (2).
4.

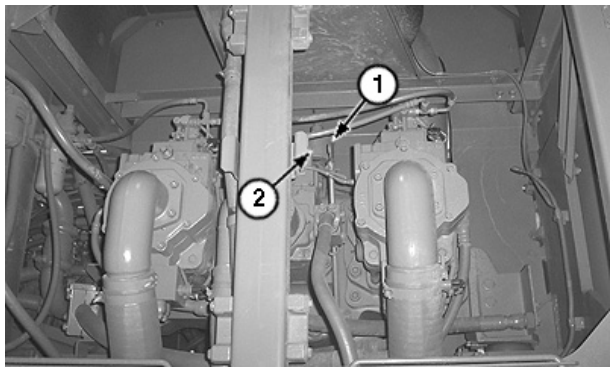
Specification

Pump Drive Gearbox—Oil Capacity	6.2 L 1.6 gal

Add oil per specifications. (See Section 3-1.)

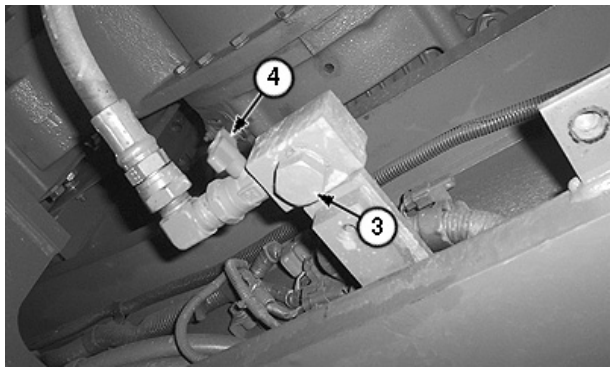
5. Remove dipstick (1), and check oil level. Oil level must be approximately halfway below "H" mark. Install dipstick.
6. Install fill cap.

1—Dipstick
2—Fill Cap
3—Drain Plug
4—Ball Valve



TX1001870A –UN–28DEC05

650DLC Shown



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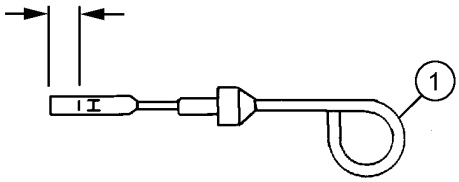


T145092 –UN–31AUG01

DW90712,0000022 –19–23JAN06–1/1

Replace Hydraulic Tank Oil Filter

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

2. Stop engine.

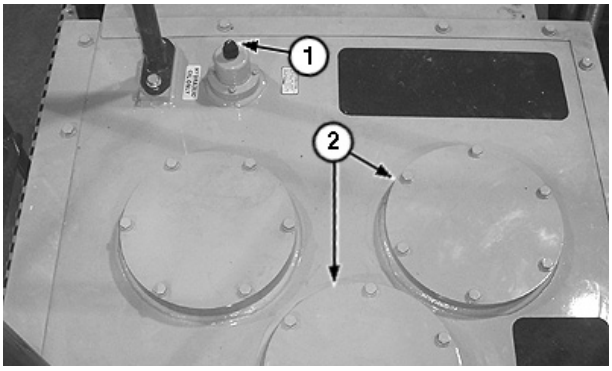
CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. Relieve pressure by pushing the pressure release button (1).

3. To relieve pressure, push the pressure release button (1).

4. Remove cap screws. Hold down filter cover (2) against light spring load when removing the last two cap screws.

1—Pressure Release Button
2—Hydraulic Tank Oil Filter Covers

T6811AI –UN–18OCT88



TX1003485A –UN–08FEB06

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DW90712,0000049 –19–07FEB06–1/2

5. Remove spring (3), valve (4), and filter element (5).

6. Discard filter element and O-ring (2).

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.

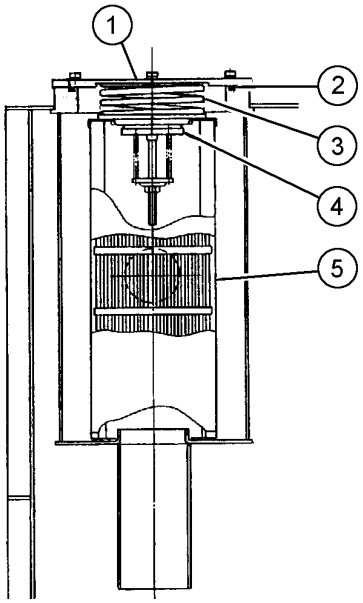
NOTE: 650DLC and 850DLC have two hydraulic oil tank filters.

8. Install filter element, valve, and spring.

9. Install cover (1), and tighten cap screws.

10. Tighten cap.

11. Bleed air from hydraulic system. (See procedure in this section.)



T140263 –UN–21MAR01

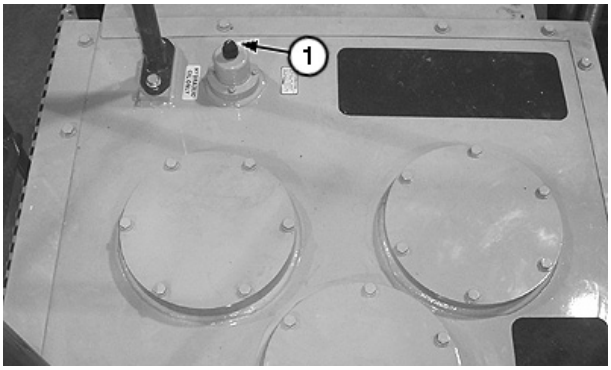
1—Cover
2—O-Ring
3—Spring
4—Valve
5—Filter Element

DW90712,0000049 –19–07FEB06–2/2

Replace Pilot Oil Filter

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. Relieve pressure by pushing the pressure release button (1).

1. Push the pressure release button (1) to relieve pressure.



TX1003486A –UN–08FEB06

650DLC Shown

1—Pressure Release Button

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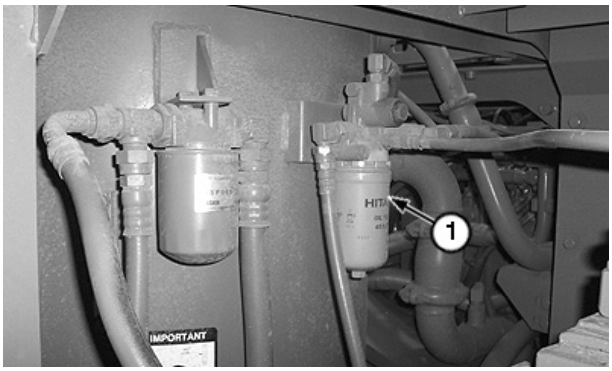
DW90712,0000021 –19–07FEB06–1/2

2. Remove filter (1).
3. Clean O-ring gasket contact area.
4. Apply a thin film of clean oil to the O-ring on the new filter.
5. Install filter.

Specification

Filter—Torque ..... 20-30 N•m (15-22 lb-ft)

6. Bleed air from hydraulic system. (See Bleed Air From Hydraulic System in Section 3-7.)
7. Check for any leakage.
8. Check oil level.



TX1002203A –UN–04JAN06

650DLC Shown

1—Filter

DW90712,0000021 –19–07FEB06–2/2

Replace Hydraulic Tank Cap Breather Element

CAUTION: To prevent possible burn injury from hot hydraulic oil, wait for hydraulic oil to cool before starting work.

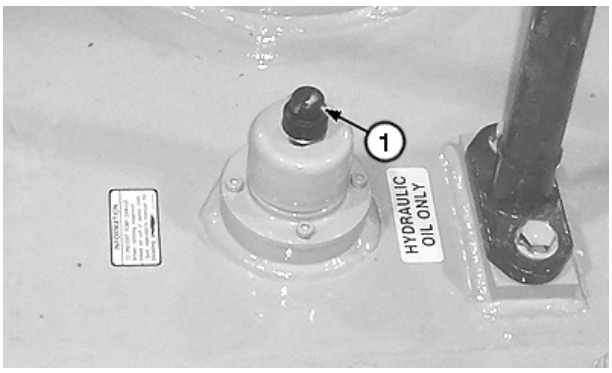
1. Park machine on solid level surface as shown at right. Stop engine.

T6811AI –UN–18OCT88

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve by pushing pressure release button (1).

2. Push the pressure release button (1).

1—Pressure Release Button



TX1002572A –UN–12JAN06

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DW90712,000004A –19–23JAN06–1/2

3. Remove rubber pressure release button.

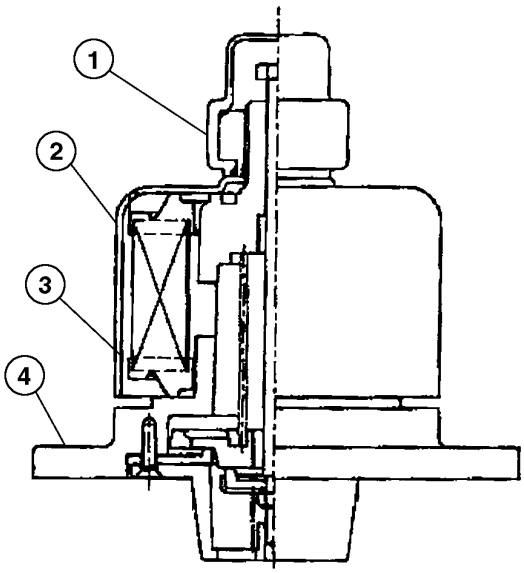
4. Remove cap screw under the pressure release button, and then remove hydraulic tank cap breather element cover (2) by turning counterclockwise.

5. Remove hydraulic tank cap breather element (3). Install new element.

IMPORTANT: Do not allow water and/or contaminants to stay between cover (2) and body (4).

6. Install element cover until it comes in contact with the breather element. Then, further tighten the cover 1/4 turn.

7. Install cap screw, and securely install rubber pressure release button.



TX1001448 –UN–16DEC05

1—Pressure Release Button
2—Hydraulic Tank Cap Breather Element Cover
3—Hydraulic Tank Cap Breather Element
4—Body

DW90712,000004A –19–23JAN06–2/2

Replace Engine A/C V-Belt

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.

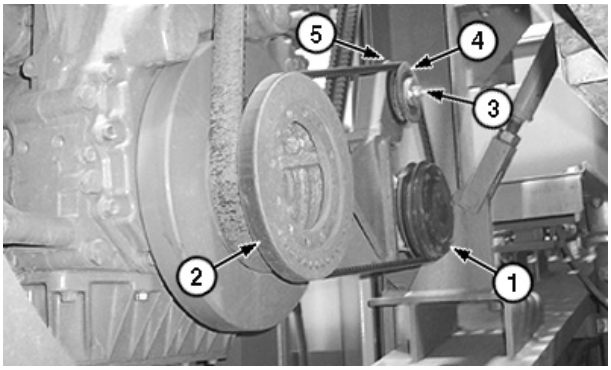
1. Loosen the tension pulley (4) by unscrewing cap screw (3).

2. Remove and discard belt.

3. Install new A/C belt.

4. Tighten cap screw (3) to specification.

Specification	
Compressor Belt—Deflection	9 mm to 12 mm 0.35 in. to 0.47 in.
—Depressing Force	98 N 10 kgf 22 lbf



TX1002128A –UN–03JAN06

1—Compressor Pulley
2—Crank Pulley
3—Cap Screw
4—Tension Pulley
5—Cap Screw

DW90712,000037D –19–31OCT06–1/1

Adjust Engine Valve Lash

See your authorized dealer for engine valve lash adjustment.

VD76477,00003E3 –19–20DEC05–1/1

Change Travel Gearbox Oil

1. Park the machine on level ground rotating travel gearbox until positioned as shown.

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 (2). Gradually loosen check plug to release pressure.

3. After travel gearbox has cooled, slowly loosen check plug (2) to release pressure.

450DLC—Specification

Travel Gearbox—Oil Capacity
(each)..... 11 L
2.9 gal

650DLC—Specification

Travel Gearbox—Oil Capacity
(each)..... 16 L
4.2 gal

850DLC—Specification

Travel Gearbox—Oil Capacity
(each)..... 19 L
5 gal

4. Remove drain plug (3). Allow oil to drain into a container. Dispose of waste oil properly.

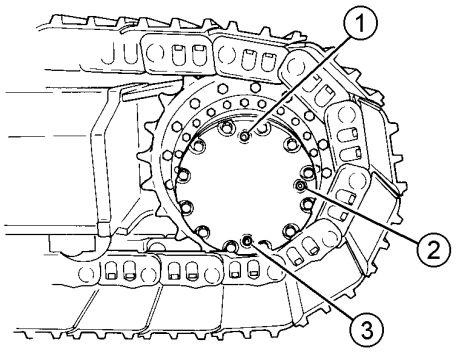
5. Wrap threads of drain plug with a sealing-type tape. Install plug. Tighten plug to 70 N•m (51 lb-ft).

6. Remove oil fill plug (1).

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 70 N•m (51 lb-ft).

9. Change oil of second travel gearbox.



1—Fill Plug
2—Check Plug
3—Drain Plug

DW90712,000004B –19–03JUL07–1/1

Drain Cooling System

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.

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. 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.

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

Specification	
450DLC—Refill Capacity	45.4 L 12.0 gal
650DLC—Refill Capacity	57.0 L 15.1 gal
850DLC—Refill Capacity	116 L 30.6 gal

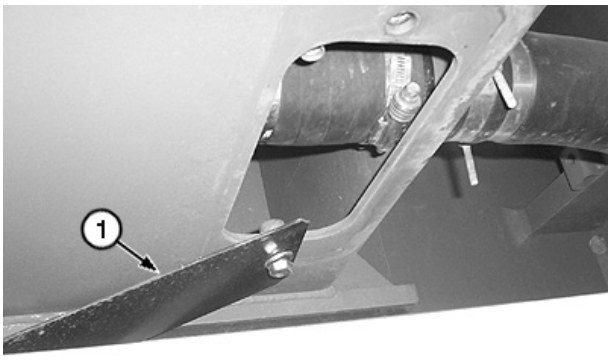
4. Remove access panel under radiator.

Continued on next page

5. Remove the radiator access panel (1). Open radiator drain valve (2). Allow coolant to drain into a container. Dispose of waste coolant properly. Close drain valve.

6. Open engine block drain valve (3). Drain coolant into a container. Dispose of waste properly. Close drain valve.

1—Radiator Access Panel
2—Radiator Drain Valve
3—Engine Block Drain Valve



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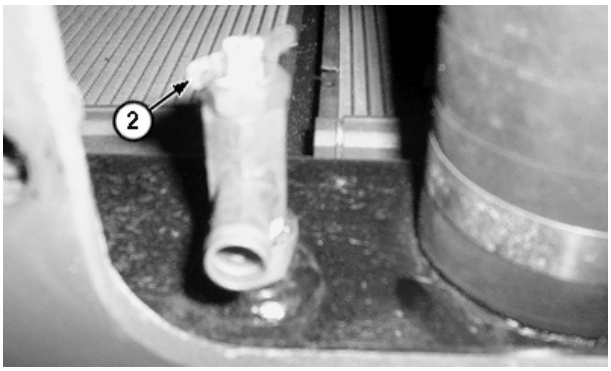

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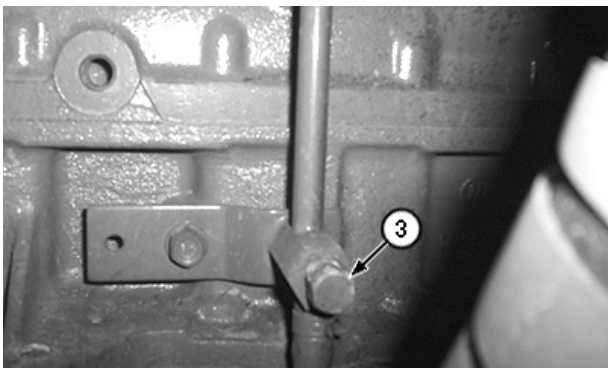


TX1002206A –UN–04JAN06

VD76477,00003F8 –19–04JAN06–2/2

Heavy Duty Diesel Engine Coolant

The engine cooling system is filled to provide year-round protection against corrosion and cylinder liner pitting, and winter freeze protection to -37°C (-34°F). If protection at lower temperatures is required, consult your John Deere dealer for recommendations.

John Deere COOL-GARD™ II Premix Coolant is preferred.

John Deere COOL-GARD II Premix is available in a concentration of 50% ethylene glycol.

Additional Recommended Coolants

The following engine coolants are also recommended:

- John Deere COOL-GARD II Concentrate in a 40% to 60% mixture of concentrate with quality water.
- John Deere COOL-GARD Premix (available in a concentration of 50% ethylene glycol).
- John Deere COOL-GARD Concentrate in a 40% to 60% mixture of concentrate with quality water.
- John Deere COOL-GARD PG Premix (available in a concentration of 55% propylene glycol).

John Deere COOL-GARD II Premix and COOL-GARD II Concentratecoolants do not require use of supplemental coolant additives.

John Deere COOL-GARD Premix, COOL-GARD Concentrate, and COOL-GARD PG Premix do not require use of supplemental coolant additives, except for periodic replenishment of additives during the drain interval.

Use John Deere COOL-GARD PG Premix when a non-toxic coolant formulation is required.

Other Coolants

It is possible that John Deere COOL-GARD II, COOL-GARD, and COOL-GARD PG coolants are unavailable in the geographical area where service is performed.

If these coolants are unavailable, use a coolant concentrate or prediluted coolant intended for use with heavy duty diesel engines and with a minimum of the following chemical and physical properties:

- Is formulated with a quality nitrite-free additive package.
- 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.
- Protects the cooling system metals (cast iron, aluminum alloys, and copper alloys such as brass) from corrosion.

The additive package must be part of one of the following coolant mixtures:

- ethylene glycol or propylene glycol base prediluted (40% to 60%) heavy duty coolant
- ethylene glycol or propylene glycol base heavy duty coolant concentrate in a 40% to 60% mixture of concentrate with quality water

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.

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.

COOL-GARD is a trademark of Deere & Company

DX,COOL3 –19–03NOV08–1/1

Cooling System Fill and Deaeration Procedure

Specification	
450DLC—Refill Capacity	48.0 L 12.7 gal
650DLC—Refill Capacity	56.0 L 14.8 gal
850DLC—Refill Capacity	81.4 L 21.5 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.

DW90712,00000EB –19–28MAR06–1/1

Change Hydraulic Tank Oil, Clean Suction Screen

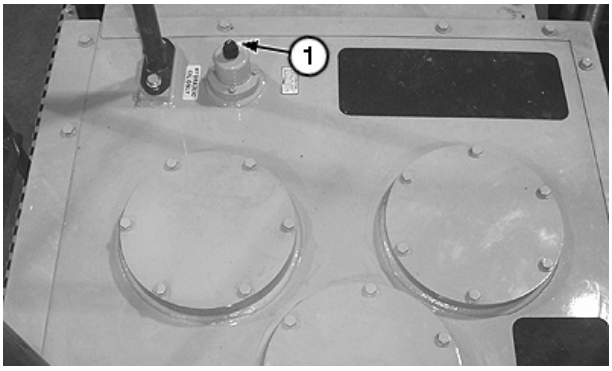
NOTE: Change original factory fill hydraulic oil after first 4000 hours. Change every 4000 hours thereafter if using Super EX 46HN, if using alternative oils see Hydraulic Oil. (Section 3-1.)

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.

T6811AJ –UN–18OCT88



TX1003486A –UN–08FEB06

650DLC Shown

1—Pressure Release Button

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.

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. Relieve pressure by pushing the pressure release button (1).

4. To relieve pressure, push the pressure release button (1).
5. Remove cap.

Continued on next page

450DLC—Specification

Hydraulic Tank—Oil Capacity ..... 330 L
87.2 gal

650DLC—Specification

Hydraulic Tank—Oil Capacity ..... 380 L
100.4 gal

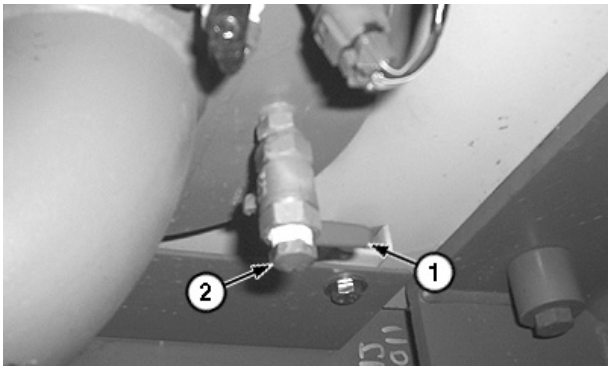
850DLC—Specification

Hydraulic Tank—Oil Capacity ..... 500 L
132.1 gal

DW90712,0000023 –19–03JUL07–2/5

6. Remove drain plug (2), and open ball valve (1) to allow oil to drain into container. Dispose of waste properly.

1—Ball Valve
2—Drain Valve Plug



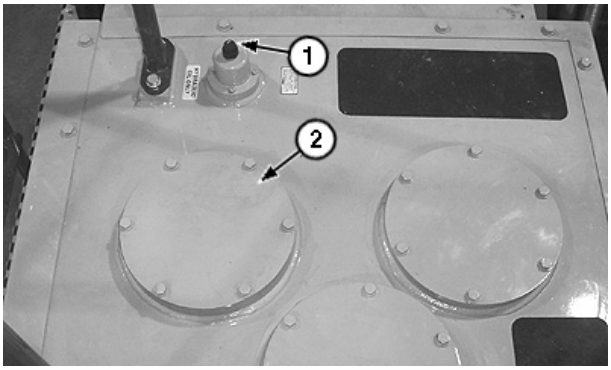
650DLC Shown

DW90712,0000023 –19–03JUL07–3/5

7. Remove cover (2) with suction screen.

8. Clean inside of tank and suction screen. If necessary, replace suction screen.

1—Pressure Release Button
2—Suction Screen Tank Cover



650DLC Shown

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DW90712,0000023 –19–03JUL07–4/5

NOTE: The hydraulic oil filter and the pilot oil filter can be changed at this point in the procedure (See Section 3-8).

9. 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.

10. Close the ball valve and tighten the drain valve plug. Install bottom guard.

11. Add oil until it is between marks on sight glass.

450DLC—Specification

Suction Screen Rod (1)—Length	945 mm +/- 1.5 mm 37.2 in.
Suction Screen Rod Nut—Torque	14.5—19.5 N•m 10.5—14.5 lb-ft
Hydraulic Cover Cap Screw—Torque	50 N•m 36.88 lb-ft

650DLC—Specification

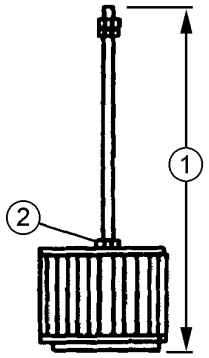
Suction Screen Rod (1)—Length	1120 mm +/- 1.5 mm 44.1 in.
Suction Screen Rod Nut—Torque	14.5—19.5 N•m 10.5—14.5 lb-ft
Hydraulic Cover Cap Screw—Torque	50 N•m 36.88 lb-ft

850DLC—Specification

Suction Screen Rod (1)—Length	1220 mm +/- 1.5 mm 48.03 in.
Suction Screen Rod Nut—Torque	14.5—19.5 N•m 10.5—14.5 lb-ft
Hydraulic Cover Cap Screw—Torque	50 N•m 36.88 lb-ft

12. Install tank cap.

13. Bleed air from hydraulic system. (See Bleed Air From Hydraulic System in Section 3-7.)



T135193 –UN–06NOV00

1—Suction Screen Rod
2—Suction Screen Rod Nut

DW90712,0000023 –19–03JUL07–5/5

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 high pressure fuel 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 a high pressure fuel pump that is not operating correctly. (See your authorized high pressure fuel pump service center.)

VD76477,0000366 –19–31OCT06–1/1

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

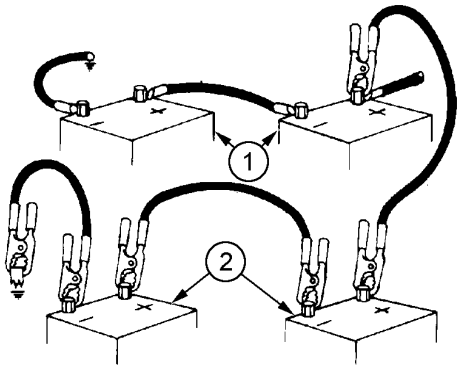
Using Booster Batteries—24 Volt System

Before boost starting, machine must be properly shut down 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 in series as shown for 24 volts.

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



T137512 –UN–25JAN01

Two Battery Application

1—Machine Batteries
2—Booster Batteries

CED,TX14740,6112 –19–24JAN07–1/1

Handling, Checking, and Servicing Batteries Carefully

TS204 –UN–23AUG88

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:

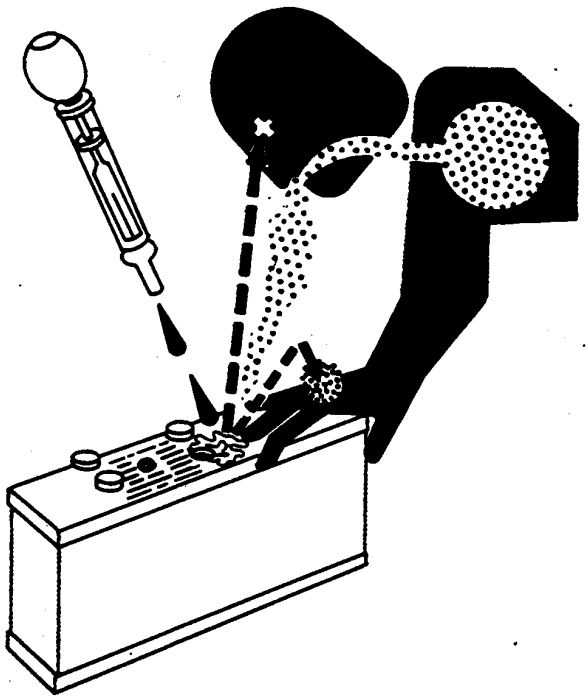
1. **Filling batteries in a well-ventilated area.**
2. **Wearing eye protection and rubber gloves.**
3. **Avoiding breathing fumes when electrolyte is added.**
4. **Avoiding spilling or dripping electrolyte.**
5. **Use proper jump start procedure.**

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.**



TS203 –UN–23AUG88

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.**

Continued on next page

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) housold ammonia in 4 L (1 gal) water.

IMPORTANT: Do not overfill the battery cells.

Check the specific gravity of electrolyte in each battery cell.

TX03679,0001788 –19–16DEC08–2/3

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

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

T85402 –UN–10NOV88

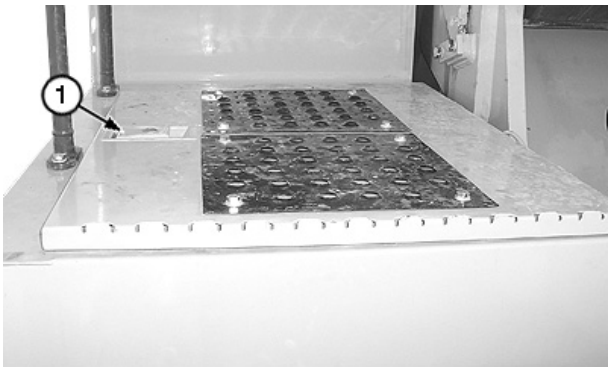
SERVICEGARD is a trademark of Deere & Company

TX03679,0001788 –19–16DEC08–3/3

Using Grease Gun — 850DLC Only

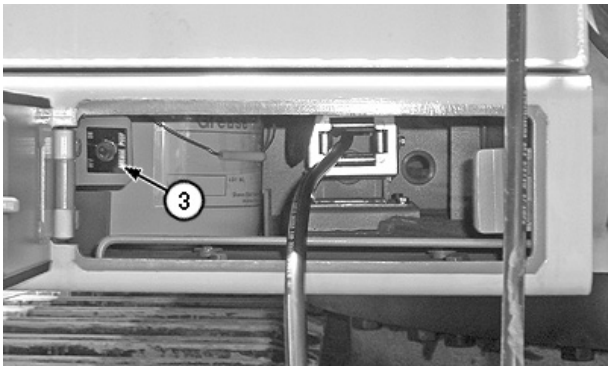
1. Turn the key switch to the ON position.
2. Open the grease gun compartment using latch (1).
3. Turn the grease gun switch (2) to the ON position.
4. Open the access door to the compartment located directly above the right track.
5. Turn the grease pump switch (3) to the ON position, and remove the grease gun.
6. Connect the grease gun to a grease fitting, and pull the trigger to lubricate.
7. When finished, pull on the hose to retract.
8. Turn off the grease pump switch and the grease gun switch.
9. Close all compartments.

1—Grease Gun Compartment Latch
2—Grease Gun Switch
3—Grease Pump Switch



TX1002599A –UN–12JAN06

TX1002602A –UN–12JAN06



TX1002605A –UN–12JAN06

DW90712,000004E –19–23JAN06–1/1

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.

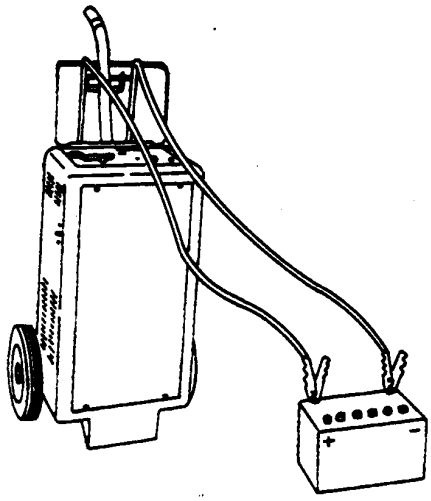
Disconnect battery ground (—) clamp before you charge batteries in the machine to prevent damage to electrical components.

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).

TS204 –UN–23AUG88



N36890 –UN–07OCT88

DW90712,0000456 –19–18JAN07–1/1

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.

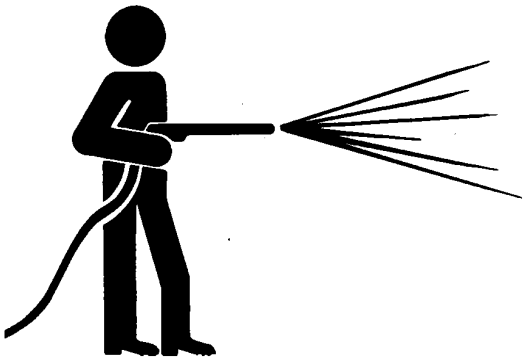
Connect welder ground clamp close to each weld area so electrical current does not arc inside any bearings.

TX,90,DH5140 –19–03JAN07–1/1

Clean the 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.



T6642EJ –UN–18OCT88

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.

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

TX03679,00017E0 –19–28JUN06–1/1

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.

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 –19–16NOV00–1/1

JDLink™ Machine Monitoring System (MMS)—If Equipped

JDLink™ is an equipment monitoring and information delivery system. JDLink™ automatically collects and manages information about where and how construction and forestry equipment is being used, as well as critical machine health data and service status.

For more information visit www.deere.com, browse to Construction, Services and Support, JD Link.

JDLink is a trademark of Deere & Company

VD76477,0001541 –19–22DEC08–1/1

JDLink™ Machine Monitoring System (MMS) Direct Laptop Connection—If Equipped

NOTE: (Location of control box behind the access door may vary depending on model.)

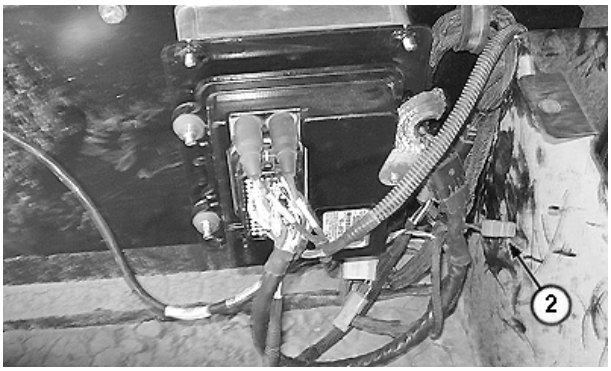
- Open left door (1) to access JDLink™ MMS.
- To download machine data using the JDLink™ MMS Direct:
  - Install the JDLink™ MMS Direct cable by inserting the Ethernet connector into the laptop.
  - Connect the JDLink™ MMS Direct cable to the vehicle 4-pin Deutsch connector (2).
  - Launch JDLink™ MMS Direct Software.
- Contact your authorized dealer to obtain the JDLink™ MMS Direct Kit (AT347680), which includes the JDLink™ MMS Direct cable (AT335476) and software.

NOTE: On equipment using the JDLink™ Direct system, there is no nightly upload to a remote server and thus, the information is only stored in one location—the controller. Without downloading the controller data on a regular basis, the data could be lost if the controller were to fail.

To obtain the most detailed machine data on your laptop, you must perform a machine data download every 1000 hrs or less.

TX1025143A –UN–19JUN07

350DLC shown



TX1025668A –UN–07MAR08

1—Left Access Door
2—4-pin Deutsch Connector

JDLink is a trademark of Deere & Company

OUT4001,00002F1 –19–26JUN07–1/1

Replacing Fuses

The fuse box is located behind the seat.

Remove cover.

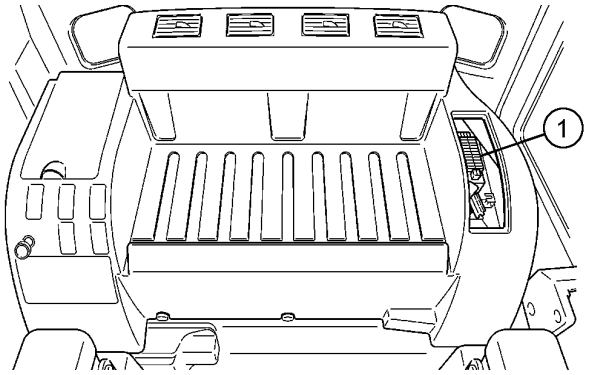
IMPORTANT: Install fuse with correct amperage rating to prevent electrical system damage from overload.

Fuse (Blade-Type) Color Codes

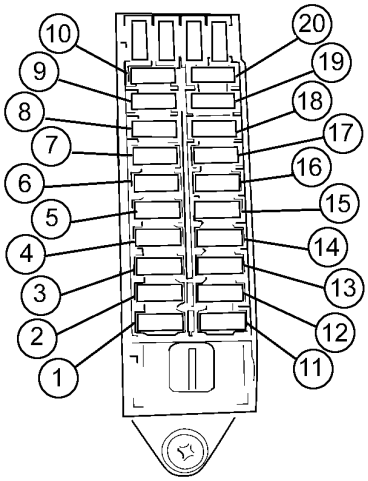
Amperage Rating	Color
1	Black
3	Violet
4	Pink
5	Tan
7-1/2	Brown
10	Red
15	Light Blue
20	Yellow
25	Natural (white)
30	Light Green

Continued on next page

1—Boom Lights 20 A Fuse (Marked LAMP)
2—Windshield Wiper and Washer 10 A Fuse (Marked WIPER)
3—Air Conditioner and Heater 20 A Fuse (Marked HEATER)
4—Solenoid 10 A Fuse (Marked SOLENOID)
5—Travel Alarm 5 A Fuse (Marked OPT. 1)
6—Optional Equipment 10 A Fuse (Marked OPT. 2)
7—Lubricator 10 A Fuse (Marked LUBRICATOR)
8—Engine Control Module (ECM) 30 A Fuse (Marked ECM)
9—Radio Backup 5 A Fuse (Marked BACK UP)
10—Machine Information Center and Main Controller Battery Power 5 A Fuse (Marked C/U)
11—Horn 10 A Fuse (Marked HORN)
12—Radio and Dome Light 5 A Fuse (Marked RADIO)
13—Lighter 10 A Fuse (Marked LIGHTER)
14—High Pressure Fuel Pump Control Valve 15 A Fuse (Marked PCV)
15—Cab Auxiliary Power Connector 1 10 A Fuse (Marked AUXILIARY)
16—Glow Plug Relay 5 A Fuse (Marked GLOW/RELAY)
17—Air Conditioner and Heater 5 A Fuse (Marked AIRCON)
18—Controller Key Switch Signal 5 A Fuse (Marked POW ON)
19—Controller 5 A Fuse (Marked SW. BOX)
20—Optional Equipment 10 A Fuse (Marked OPT. 3)



T140322 –UN–22MAR01



T140484 –UN–28MAR01

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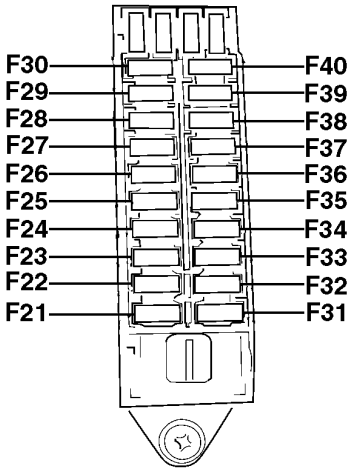
OUT4001,00002E1 –19–26JUN07–2/4

Fuse Block 2

F21—Heated Air Seat 10 A Fuse (Marked SEAT HEATER)
F22—Front Cab Light One 15 A Fuse (Marked CAB LAMP FRONT)
F23—Rear Cab Light 10 A Fuse (Marked CAB LAMP REAR)
F24—12 Volt Power Unit 30 A Fuse (Marked 12V UNIT)
F25—IMOBI 5 A Fuse (Marked IMOBI)
F26—Quick Hitch 5 A Fuse (Marked QUICK HITCH)
F27—Cab Auxiliary Power Connector Three 5 A Fuse (Marked AUX. 3)
F28—Not Used
F29—Drive Light 20 A Fuse (Marked LIGHT 1)
F30—Not Used
F31—Seat Compressor 10 A Fuse (Marked SEAT COMPR)
F32—Front Cab Light Two 10 A Fuse (Marked CAB LAMP FRONT +2)
F33—Warning Lamp 10 A Fuse (Marked WARNING LAMP)
F34—Cab Auxiliary Power Connector Two 10 A Fuse (Marked AUX. 2)
F35—Not Used
F36—Not Used
F37—Not Used
F38—Not Used
F39—Not Used
F40—Not Used



Fuse Block 2

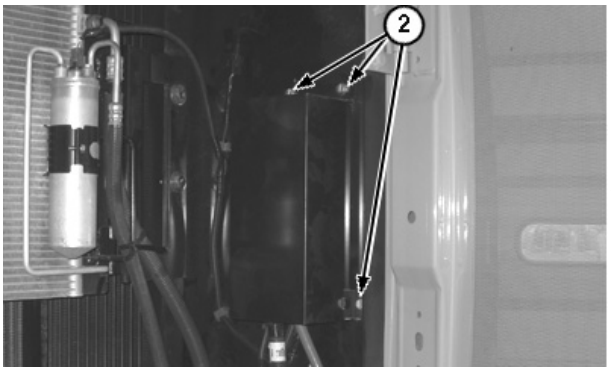
TX1000660 –UN–29NOV05

Continued on next page

OUT4001,00002E1 –19–26JUN07–3/4

JDLink™ In-Line Fuse (If Equipped)

1. Turn machine off.
2. Open battery compartment access door.
3. Remove cap screws (2) from cover to access the 7.5 Amp JDLink™ unswitched power n-line fuse (1) on the yellow wire.
4. To deactivate the JDLink™ Machine Monitoring System, remove the unswitched power in-line fuse.
5. Install cover and cap screws.
6. Close access door.



TX1014241A –UN–28OCT06

TX1024511A –UN–31MAY07

1—JDLink™ Unswitched Power In-Line Fuse
2—Cap Screws (3 used)

JDLink is a trademark of Deere & Company

OUT4001,00002E1 –19–26JUN07–4/4

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.

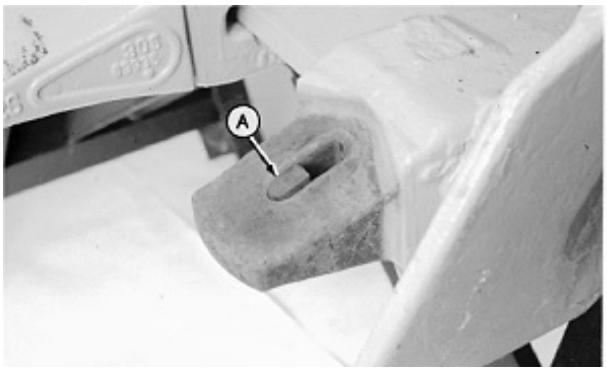
2. Remove tooth.


T95784 –UN–10NOV88

Continued on next page

04T,90,M16 –19–07SEP06–1/3

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.

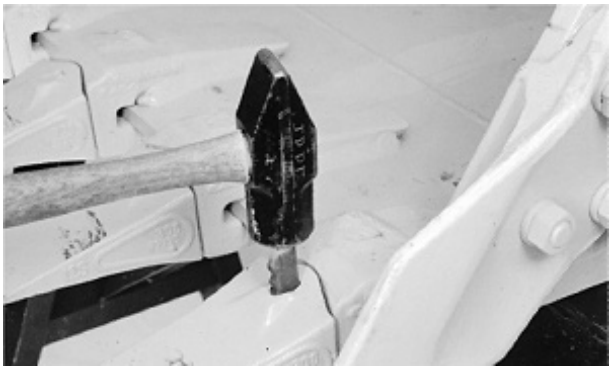


T95785 –UN–10NOV88

04T,90,M16 –19–07SEP06–2/3

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.



T95786 –UN–10NOV88

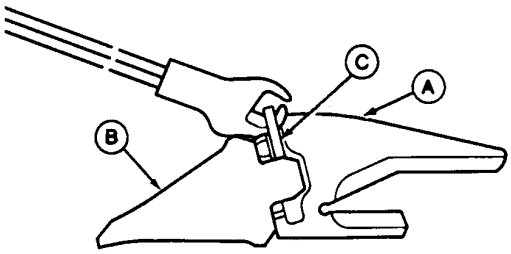
04T,90,M16 –19–07SEP06–3/3

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).

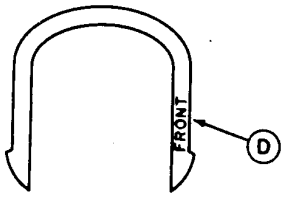
CAUTION: Avoid possible injury. Pin may fly after it is released from tooth tip. Keep a firm grip on pin to prevent injury.

3. Remove pin.
4. Turn tooth tip counterclockwise and pull it 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.



T6879EE

T6879EE –UN–06DEC88



T7527DO –UN–27JUN91

A—Tooth
B—Tooth Tip
C—Pin
D—"Front" Mark

04T,90,K273 –19–03JAN07–1/1

Removing the 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 and adjust bucket. See Adjust Bucket To Arm Joint in this section.

04T,90,M35 –19–24JAN07–1/1

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 travel drive system.

Machine productivity and fuel consumption are also adversely affected because increased horsepower is needed to move the machine.

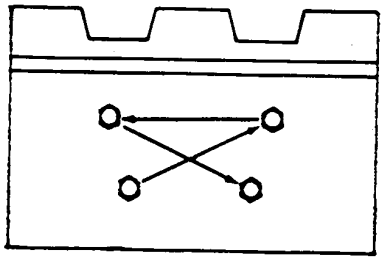
LOOSE TRACK: A loose track has more side to side motion, increasing side wear on the links, rollers, and front idler. An excessively loose track will slap at high ground speeds, resulting in high impact loads on the sprocket teeth, bushings, and carrier rollers.

VD76477,00001F7 –19–30JAN06–1/1

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.



T6352AH –UN–23FEB89

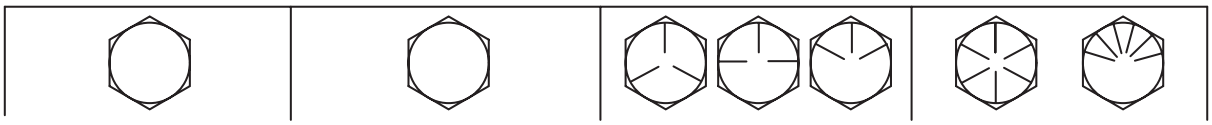
1. Clean the mating surface of shoe and links. Install shoes.
2. Apply a light coating of oil to cap screw threads before installing.
3. Install nuts with the rounded corners against milled surface of link and chamfered side is away from link.

   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.
4. Starting at any cap screw, tighten all cap screws in sequence shown to specification.

TX14740,0001CFC –19–20MAY08–1/1

Unified Inch Bolt and Screw Torque Values

TS1671 –UN–01MAY03



Bolt or	SAE Grade 1				SAE Grade 2[a]				SAE Grade 5, 5.1 or 5.2				SAE Grade 8 or 8.2			
Screw	Lubricated[b]		Dry[c]		Lubricated[b]		Dry[c]		Lubricated[b]		Dry[c]		Lubricated[b]		Dry[c]	
Size	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.

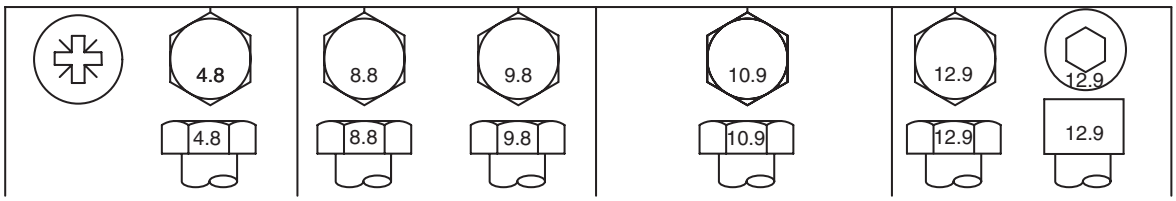
[a]Grade 2 applies for hex cap screws (not hex bolts) up to 6. in (152 mm) long. Grade 1 applies for hex cap screws over 6 in. (152 mm) long, and for all other types of bolts and screws of any length.

[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 zinc flake coating.

[c]"Dry" means plain or zinc plated without any lubrication, or 1/4 to 3/4 in. fasteners with JDM F13B zinc flake coating.

DX,TORQ1 –19–24APR03–1/1

Metric Bolt and Screw Torque Values



TS1670 –UN–01MAY03

Bolt or	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
Screw	Lubricated[a]		Dry[b]		Lubricated[a]		Dry[b]		Lubricated[a]		Dry[b]		Lubricated[a]		Dry[b]	
Size	N•m	lb-in	N•m	lb-in	N•m	lb-in	N•m	lb-in	N•m	lb-in	N•m	lb-in	N•m	lb-in	N•m	lb-in
M6	4.7	42	6	53	8.9	79	11.3	100	13	115	16.5	146	15.5	137	19.5	172
									N•m	lb-ft	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft
M8	11.5	102	14.5	128	22	194	27.5	243	32	23.5	40	29.5	37	27.5	47	35
			N•m	lb-ft	N•m	lb-ft	N•m	lb-ft								
M10	23	204	29	21	43	32	55	40	63	46	80	59	75	55	95	70
	N•m	lb-ft														
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 zinc flake coating.

[b] "Dry" means plain or zinc plated without any lubrication, or M6 to M18 fasteners with JDM F13B zinc flake coating.

DX,TORQ2 –19–24APR03–1/1

Transporting the Machine by Trailer

Understand and follow all local regulations when transporting the machine on public roads

1. For transporting using a trailer, check the width, height, length, and weight of the trailer when the machine is loaded.

2. In some cases, disassemble the machine to bring it within dimensional limits or weight limits of local regulations.

3. Retract the side frame before loading the machine onto trailer bed. (See “Retracting or Extending the Side Frame” in this chapter.)

T122568

T122568 –UN–05AUG99

Loading/Unloading On A Trailer

Always load and unload the machine on a solid, level surface.

Ramp/Loading Dock

CAUTION: Be sure to use a loading dock or a ramp for loading/unloading.

1. Before loading, thoroughly clean the ramp and flatbed.

2. Place chock blocks against the truck and trailer wheels while using a ramp or loading dock.

3. Ramps must be sufficient in width, length, and strength. Be sure that the incline of the ramp is less than 15 degrees.

4. Loading docks must be sufficient in width and strength to support the machine and have a gradient of less than 15 degrees.

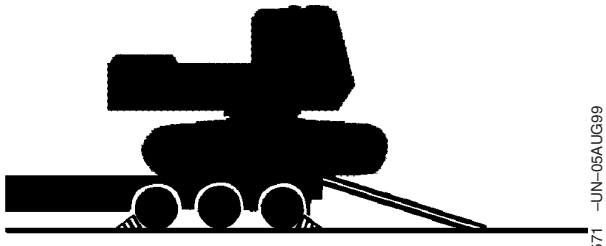
Continued on next page

Loading/Unloading

CAUTION: Always turn the auto-idle switch OFF when loading or unloading the machine to avoid an unexpected speed increase due to unintentional operation of a control lever.

Move travel speed switch to slow speed mode.

Do Not steer while driving up or down a ramp. If repositioning is necessary, move back to the ground or flatbed, correct travel direction, and drive again.



T122571

T122571 –UN–05AUG99

Loading:

1. The machine direction should be as follows:

   Without the front attachment: Travel in reverse.

2. The centerline of the machine should be over the centerline of the trailer.

3. Drive the machine onto the ramp slowly.

4. Stop the engine. Remove key from switch.

5. Move the control levers several times until hydraulic pressure in the lines is released.

6. Pull pilot control shutoff lever to locked position.

7. Close cab windows, roof vent, and door, and cover the exhaust opening, to prevent entry of wind and water.

IMPORTANT: Fasten chains or cables to the machine frame or track chain links. Do not place chains or cables over or against the hydraulic lines or hoses.

8. Place blocks in front of and behind the tracks.

Unloading:

Move the machine over end of the trailer onto the ramp slowly.

DW90712,0000081 –19–31OCT06–2/2

Types of Packings for Transportation

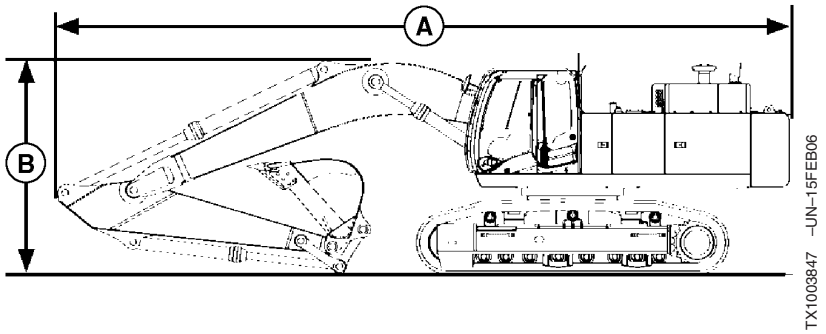
Type 1	Type 2	Type 3
Basic Machine with Boom, Arm, and Counterweight	**Basic Machine with Boom**	**Basic Machine without Front Attachment**
Two Side Steps	Counterweight	Counterweight
Ladder	Arm / Bucket	Boom
	Bucket	Arm
	Two Side Steps	Bucket
	Ladder	Two Boom Cylinders
		Four Hydraulic Hoses
		Two Side Steps
		Ladder

NOTE: The side frame mounting width can be adjusted. Retract the side frame for transportation.

When the 600 mm (24 in.) wide track shoes are used, the steps on the track frame and the hand rails on the cab will protrude outside the track shoe width. Remove the steps, hand rails, and ladder as necessary.

DW90712,000006F –19–08FEB06–1/1

Packing Dimensions and Weights for Transportation



A—Overall Length **B—Overall Height**

Type 1

Basic Machine

Model	Arm Length mm (ft-in.)	Shoe Width mm (ft-in.)	A mm (ft-in.)	B mm (ft-in.)	Overall Width mm (ft-in.)	Weight kg (lb)
450DLC	2900 (9’ 6")	600 (2’ 0")	12,000 (39’ 4")	3600 (11’ 10")	3490/3000 (11’ 5"/9’10") (Extended/Retracted)	46,600 (102,700)
		750 (2’ 6")	12,000 (39’ 4")	3600 (11’ 10")	3640/3140 (11’ 11"/10’ 4") (Extended/Retracted)	47,400 (104,500)
	3400 (11’ 2")	600 (2’ 0")	11,910 (39’ 1")	3480 (11’ 5")	3490/3000 (11’ 5"/9’10") (Extended/Retracted)	46,600 (102,700)
		750 (2’ 6")	11,980 (39’ 4")	3620 (11’ 11")	3640/3140 (11’ 11"/10’ 4") (Extended/Retracted)	47,400 (104,500)
	3900 (12’ 10")	600 (2’ 0")	11,910 (39’ 1")	3500 (11’ 6")	3490/3000 (11’ 5"/9’10") (Extended/Retracted)	46,600 (102,700)
		750 (2’ 6")	11,980 (39’ 4")	3500 (11’ 6")	3640/3140 (11’ 11"/10’ 4") (Extended/Retracted)	47,400 (104,500)
	4900 (16’ 1")	600 (2’ 0")	11,910 (39’ 1")	4500 (14’ 9")	3490/3000 (11’ 5"/9’10") (Extended/Retracted)	46,600 (102,700)
		750 (2’ 6")	11,910 (39’ 1")	4500 (14’ 9")	3640/3140 (11’ 11"/10’ 4") (Extended/Retracted)	47,400 (104,500)

Continued on next page

NOTE: When the 600 mm (24 in.) wide shoes are installed, steps on the track frame and hand rails on the cab must be removed to comply with the overall width dimensions above.

Bucket—Refer to Marketing Brochure

DW90712,0000071 –19–18JAN07–2/11

Side Step

Side Step (Front)

Weight: 44 kg (97 lb)

Maximum Height: 150 mm (6 in)

Side Step (Rear)

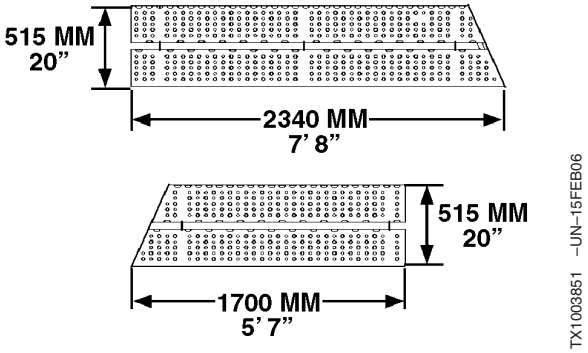
Weight: 30 kg (66 lb)

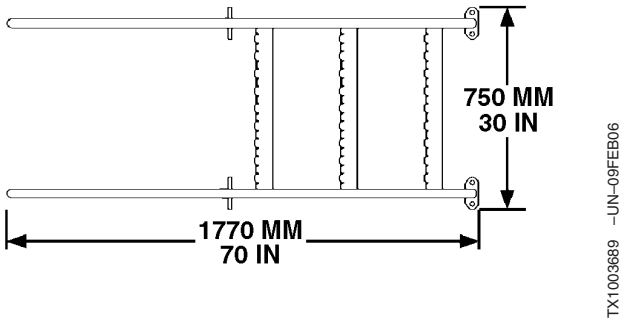
Maximum Height: 150 mm (6 in)

Ladder

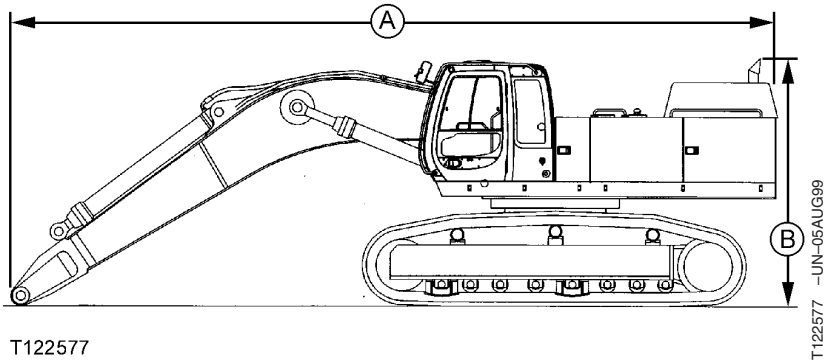
Weight: 23 kg (51 lb)

Maximum Height: 424 mm (17 in)





DW90712,0000071 –19–18JAN07–3/11



T122577

A—Overall Length **B—Overall Height**

Type 2

Basic Machine

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DW90712,0000071 –19–18JAN07–4/11

Model	Arm Length m (ft-in.)	Bucket Capacity (PCSA Heaped) m^3 (yd^3)	Shoe Width mm (ft-in.)	A mm (ft-in.)	B mm (ft-in.)	Overall Width mm (ft-in.)	Weight kg (lb)
450DLC	2900 (9’ 6")	2.1 2.7	600 (2’ 0")	6030 (19’ 9")	1340 (4’ 5")	3490/3000 (11’ 5"/9’ 10") Extended/Retracted	33,300 (73,400)
		2.1 2.7	750 (2’ 6")	6030 (19’ 9")	1340 (4’ 5")	3640/3140 (11’ 11"/10’ 4") Extended/Retracted	34,100 (75,200)
	3400 (11’ 2")	1.9 2.5	600 (2’ 0")	6430 (21’ 1")	1270 (4’ 2")	3490/3000 (11’ 5"/9’ 10") Extended/Retracted	33,300 (73,400)
		1.9 2.5	750 (2’ 6")	6430 (21’ 1")	1270 (4’ 2")	3640/3140 (11’ 11"/10’ 4") Extended/Retracted	34,100 (75,200)
	3900 (12’ 9")	1.6 2.1	600 (2’ 0")	6930 (22’ 9")	1270 (4’ 2")	3490/3000 (11’ 5"/9’ 10") Extended/Retracted	33,300 (73,400)
		1.6 2.1	750 (2’ 6")	6930 (22’ 9")	1270 (4’ 2")	3640/3140 (11’ 11"/10’ 4") Extended/Retracted	34,100 (75,200)
	4900 (16’ 1")	1.4 1.8	600 (2’ 0")	7760 (25’ 6")	1170 (3’ 10")	3490/3000 (11’ 5"/9’ 10") Extended/Retracted	33,300 (73,400)
		1.4 1.8	750 (2’ 6")	7760 (25’ 6")	1170 (3’ 10")	3640/3140 (11’ 11"/10’ 4") Extended/Retracted	34,100 (75,200)

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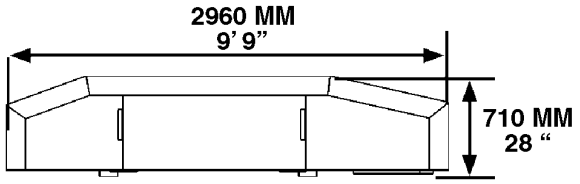
450DLC Counterweight

Weight: 9150 kg (20,200 lb)

Maximum Height: 1340 mm (4 ft 5 in)



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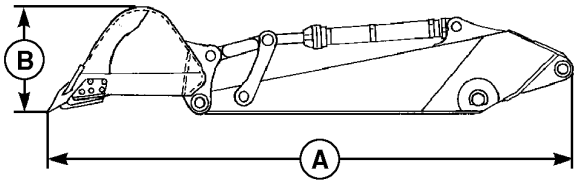
DW90712,0000071 –19–18JAN07–6/11

Arm

Arm Length m (ft-in.)	A mm (ft-in.)	B mm (ft-in.)	Overall Width mm (ft-in.)	Weight kg (lb)
2.9 (9’ 6") ME-Arm	4250 (13’ 11")	1250 (4’ 1")	740 (2’ 5")	2400 (5300)
3.4 (11’ 2")	4650 (17’ 7")	1100 (3’ 7")	740 (2’ 5")	2330 (5100)
3.9 (21’ 1")	5150 (16’ 11")	1100 (3’ 7")	740 (2’ 5")	2640 (5820)
4.9 (16’ 1")	6220 (20’ 5")	1150 (3’ 9")	650 (2’ 2")	2550 (5620)



TX1003849 –UN–15FEB06

A—Overall Length
B—Overall Height

Bucket—Refer to Marketing Brochure

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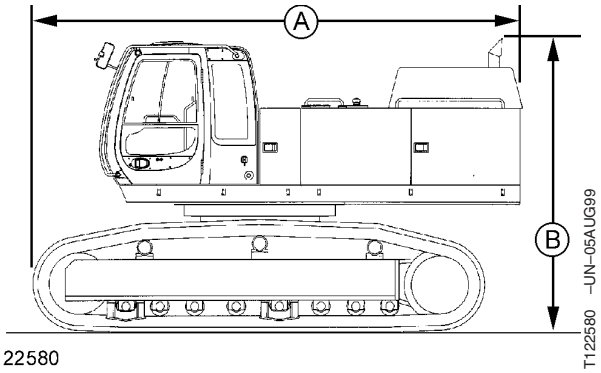
DW90712,0000071 –19–18JAN07–7/11

Type 3

Basic Machine



T122580

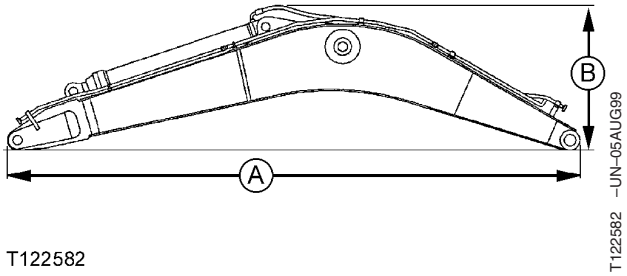
A—Overall Length
B—Overall Height

Model	Shoe Width mm (ft-in.)	A mm (ft-in.)	B mm (ft-in.)	Overall Width mm (ft-in.)	Weight kg (lb)
450DLC	600 (2’ 0")	7330 (24’ 1")	1820 (6’)	3490/3000 (11’5"/9’10") (Extended/Retracted)	28,500 (62,800)
	750 (2’ 6")	7330 (24’ 1")	1820 (6’)	3640/3140 (11’11"/10’4") (Extended/Retracted)	29300 (64,600)

DW90712,0000071 –19–18JAN07–8/11

Boom

Boom Length m (ft-in.)	A mm (ft-in.)	B mm (ft-in.)	Overall Width mm (ft-in.)	Weight kg (lb)
7.0 23’ 0"	7330 (24’ 1")	1820 6’ 0")	1110 (3’ 7")	3340 (7,363)



A—Overall Length
B—Overall Height

T122582

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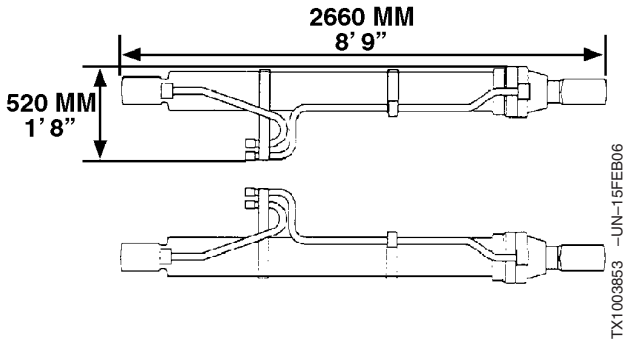
DW90712,0000071 –19–18JAN07–9/11

Boom Cylinder

Weight: 420 kg (926 lb) x 2

Maximum Height: 330 mm (1 ft 1 in)



DW90712,0000071 –19–18JAN07–10/11

Hose

Weight: 9 kg (20 lb) x 4

DW90712,0000071 –19–18JAN07–11/11

Retracting or Extending the Side Frame

IMPORTANT: Remove debris stuck to contact areas of the track frame and side frame or mounting cap screws may be loosened.

Extend the side frames when operating the machine at job sites. Retraction of the side frames is designed only for easy transportation of the machine by trailer. When the side frames are retracted overside balance of the machine will be reduced, potentially causing damage to the track frame, side frames, and cap screws.

AG,OUOE003,9835 –19–11AUG99–1/1

Retracting the Side Frame

IMPORTANT: Remove debris from contact areas of track frame (C) and side frame (D) or mounting cap screws may be loosened.

Required Tools:

- Power Boost Wrench (including accessories)
- Torque width (width across flats: 50 mm)
- Air Compressor (slide surface cleaning)

CAUTION: Do not loosen the mounting cap screws (B) of guide on the side frame.

1. Remove eighteen mounting cap screws (A) (9 used for each side) from the retracting side frames.

IMPORTANT: Maintain a 90 to 110° angle between the boom and the arm.

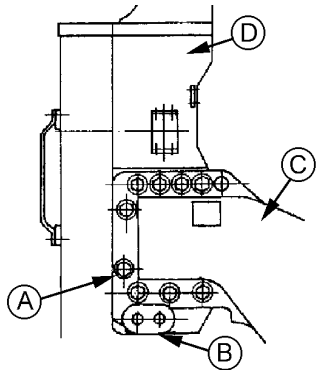
Do not raise the track too high or operate the arm control lever abruptly. Damage to the track frame may result.

2. Retracting Side Frame (Track Gauge)—Turn the boom mode switch OFF so that the machine can be raised off the ground with front attachment.

3. Raise the side track using the front attachments, as illustrated.

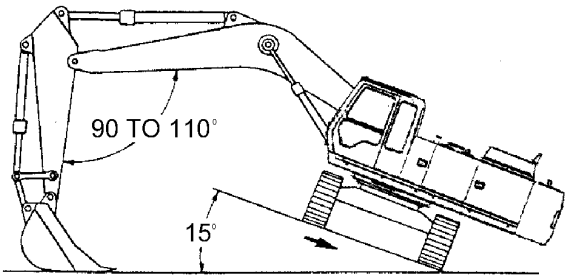
   Slowly rotate the raised track back and forth. The side frame will be retracted with its own weight and stop when it comes into contact with guide (B).

   If parts of the side frame do not retract lower the undercarriage and turn the upperstructure 180°. Raise the opposite side track about 15° from the ground using the front attachment. Slowly push the arm out to retract the side frame.



T122587

T122587 –UN–05AUG99



T122588

T122588 –UN–05AUG99

A—Mounting Cap Screws (18 used)
B—Guide
C—Track Frame
D—Side Frame

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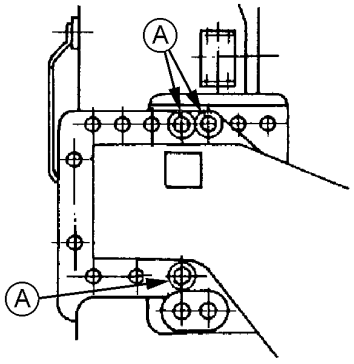
4. Slowly lower the track to the ground. Tighten six mounting cap screws (A) (3 used for each side) to specification.

Specification

450DLC Side Frame Mounting Cap Screw—Torque ..... 1750 N•m (1290 lb-ft)

5. Retract the opposite side, following steps 1 to 4 above.

A—Mounting Cap Screw (6 used)



T122589

T122589 –UN–05AUG99

DW90712,0000072 –19–18JAN07–2/2

Extending the Side Frame

Necessary Equipment

1. Slinging Rope (20 mm dia. x 8 m, 6 x 37 Ordinary Z lay Class A, Applicable Max. Load: 3 tons) (4 Used). Before Slinging, make sure no broken wire strands and/or kinks exist.
2. Lever Block (JIS B8819 equivalent to L3.2T) (2 Used). Check that there is no damage on the lever block.
3. Power Boost Wrench (including accessories), width across flats of the torque wrench: 50 mm
4. Air Compressor (slide surface cleaning)
5. Soft Protectors

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DW90712,0000073 –19–18JAN07–1/5

1. Before starting work, coordinate work procedures with co-workers.
2. When extending the side frame using the front attachment, do not allow any personnel to enter the vicinity of the machine.

CAUTION: Do not loosen side frame guide cap screws (D).

IMPORTANT: When the machine is shipped from the factory, not all side frame tightening cap screws are installed. Therefore, unbolted screw holes on the side frame are coated with rust-inhibitor and they may be clogged with dust or soil. Before installing the cap screws, clean the thread surface thoroughly. If the cap screws are difficult to tighten, tap the screw holes again.

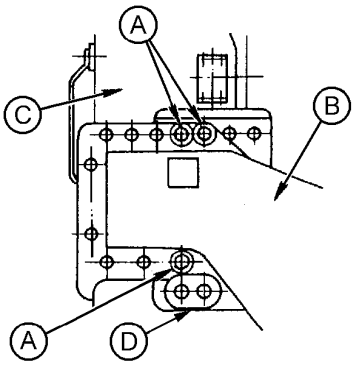
Tap: M 33, Pitch: 3 mm

Clean the side frame slide surfaces using compressed air. If debris is stuck on the contact areas of track frame (B) and side frame (C), loose mounting cap screws (A) may result.

1. Remove side frame mounting cap screws (A) (6 used, 3 cap screws in two places) from the extending side frame.

2. Rotate the upperstructure to the side of the extending side frame until the front attachment faces the side frame perpendicularly.

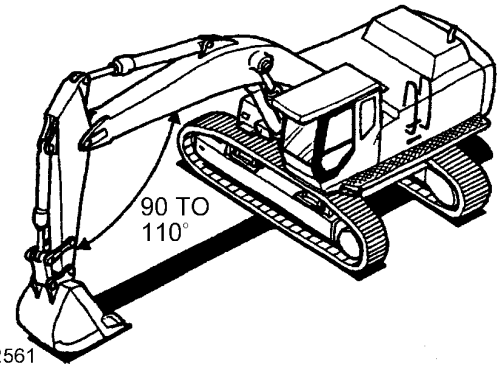
3. Position the arm and boom angle between 90° and 110°. Lower the bucket bottom to the ground.



T122560

T122560 –UN–05AUG99

A—Mounting Cap Screw
B—Track Frame
C—Side Frame
D—Guide Cap Screw



T122561

T122561 –UN–05AUG99

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DW90712,0000073 –19–18JAN07–2/5

4. Wind two cables or chains (B) around the front and rear sections (one cable or chain on each section) of the side frame. Connect lever block (C) to the ends of each cable or chain. Attach soft protectors (D) between the side frame (A) corners and cables or chains to prevent damage to side frame and cables or chains.

5. Wind two cables or chains (F) around the arm near the bracket of bucket (E). Connect each cable or chain end to lever blocks. Slowly extend the front attachment to remove sag on cables or chains. Attach soft protectors (D) between the bucket bracket corners and cable or chain to prevent damage to cables or chains.

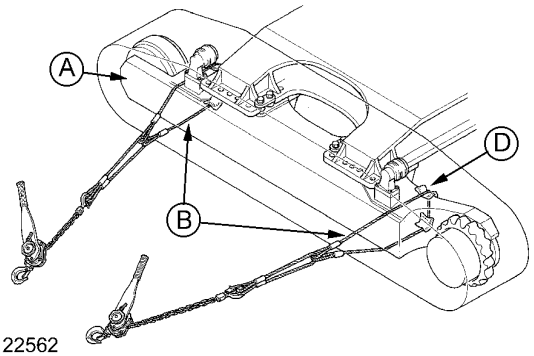
6. While lowering the boom, raise the extending side frame approx. 50 mm (2 in.) above the ground. If the side frame is raised too much, extending force increases.

CAUTION: When the lever block becomes inoperable, it is because too much resistance exists against the extending force.

Stop the work and check if the front and rear of the side frame are equally extended or if the side frame is raised to the proper height.

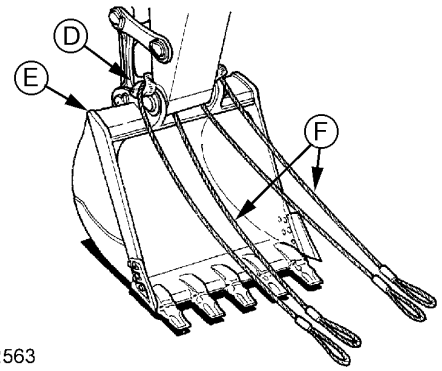
Take corrective measures as necessary.

7. Operate lever blocks so that the rear (travel device side) and front (front idler side) of the side frame is equally extended until side frame guide comes in contact with the track frame stopper.



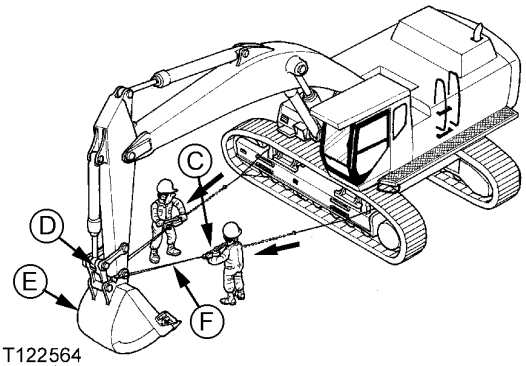
T122562

T122562 –UN–05AUG99



T122563

T122563 –UN–05AUG99



T122564

T122564 –UN–05AUG99

A—Side Frame
B—Cable Or Chain
C—Lever Block
D—Soft Protector
E—Bucket
F—Cable Or Chain

Continued on next page

CAUTION: After raising the side frame above the ground, do not operate the arm to extend the side frame. If the arm is operated, the cables or chains are pulled with excessive tension force. Damage to the lever block or cable or chain may result, possibly causing severe personal injury.

8. When side frame guide comes in contact with the track frame stopper, install side frame tightening cap screws (18 used) (9 used in two places) and tighten temporarily by hand. If it is difficult to tighten with hand, cap screw and screw hole centers may not be correctly aligned. Re-align cap screw and screw hole centers by operating the lever blocks.

Continued on next page

CAUTION: Slowly operate the boom, or the lever block and/or cable or chain may be damaged and may disengage, possibly causing severe personal injury. Stay away from the machine when operating the boom.

9. Slowly slacken cable or chain tension by operating lever blocks (E), and raise the boom to lower the track frame (B).

10. After lowering track frame, tighten cap screws (A) by hand.

11. Repeat steps (9) and (10) three to four times until the track frame is completely lowered to the ground.

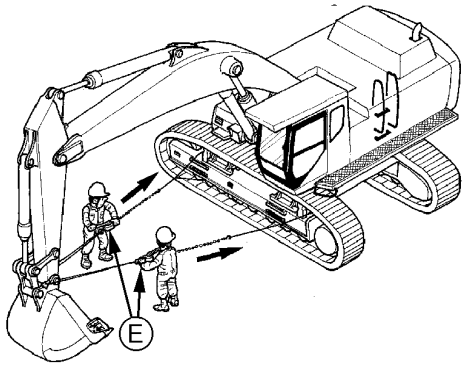
12. Slacken the lever blocks. Remove the lever blocks and cables or chains.

IMPORTANT: Be sure to apply a film of lubricant to the cap screw threads.

13. Tighten cap screws with the power boost wrench and torque wrench to specification.

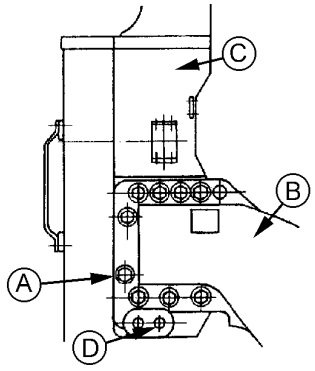
Specification

450DLC Side Frame Cap Screw—Torque ..... 1750 N•m
1290 lb-ft



T122566

T122566 –UN–05AUG99



T122567

T122567 –UN–05AUG99

A—Cap Screw
B—Track Frame
C—Side Frame
D—Guide Cap Screw
E—Lever Block

14. Extend the side frame (C) on the opposite side using the same procedure.

			Torque	
Model	Bolt Size	Width Across Flats (mm)	N•m	kgf-m
450DLC	M33-Pitch 3	50	1750	179

DW90712,0000073 –19–18JAN07–5/5

Transporting the Machine by Trailer

Understand and follow all local regulations when transporting the machine on public roads

1. For transporting using a trailer, check the width, height, length, and weight of the trailer when the machine is loaded.

2. In some cases, disassemble the machine to bring it within dimensional limits or weight limits of local regulations.

3. Retract the side frame before loading the machine onto trailer bed. (See “Retracting or Extending the Side Frame” in this chapter.)

T122568

T122568 –UN–05AUG99

Loading/Unloading On A Trailer

Always load and unload the machine on a solid, level surface.

Ramp/Loading Dock

CAUTION: Be sure to use a loading dock or a ramp for loading/unloading.

1. Before loading, thoroughly clean the ramp and flatbed.

2. Place chock blocks against the truck and trailer wheels while using a ramp or loading dock.

3. Ramps must be sufficient in width, length, and strength. Be sure that the incline of the ramp is less than 15 degrees.

4. Loading docks must be sufficient in width and strength to support the machine and have a gradient of less than 15 degrees.

Continued on next page

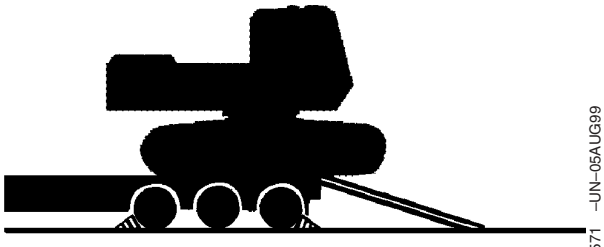
AM40430,00002FF –19–31OCT06–1/2

Loading/Unloading

CAUTION: Always turn the auto-idle switch OFF when loading or unloading the machine to avoid an unexpected speed increase due to unintentional operation of a control lever.

Move travel speed switch to slow speed mode.

Do Not steer while driving up or down a ramp. If repositioning is necessary, move back to the ground or flatbed, correct travel direction, and drive again.



T122571

T122571 –UN–05AUG99

Loading:

1. The machine direction should be as follows:

   Without the front attachment: Travel in reverse.

2. The centerline of the machine should be over the centerline of the trailer.

3. Drive the machine onto the ramp slowly.

4. Stop the engine. Remove key from switch.

5. Move the control levers several times until hydraulic pressure in the lines is released.

6. Pull pilot control shutoff lever to locked position.

7. Close cab windows, roof vent, and door, and cover the exhaust opening, to prevent entry of wind and water.

IMPORTANT: Fasten chains or cables to the machine frame or track chain links. Do not place chains or cables over or against the hydraulic lines or hoses.

8. Place blocks in front of and behind the tracks.

Unloading:

Move the machine over end of the trailer onto the ramp slowly.

AM40430,00002FF –19–31OCT06–2/2

Types of Packings for Transportation

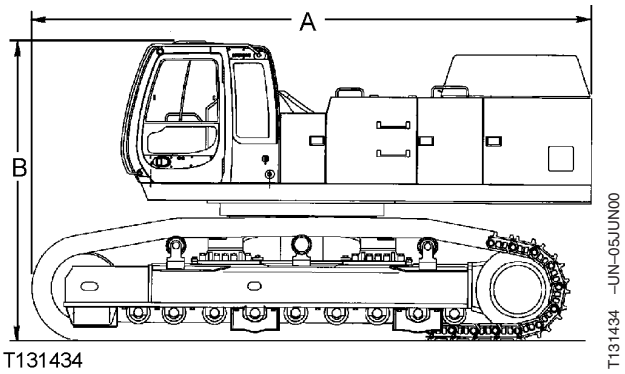
Type 1	Type 2
Basic Machine without Front Attachment and without Counterweight	**Basic Machine without Front Attachment, without Counterweight and without Side Frames**
Counterweight	Two Side Frames
Boom	Counterweight
Arm	Boom
Bucket	Arm
Two Boom Cylinders	Bucket
Four Hydraulic Hoses	Two Boom Cylinders
Two Side Steps	Four Hydraulic Hoses
	Two Side Steps

DW90712,000008C –19–23MAY06–1/1

Packing Dimensions and Weights for Transportation

Type 1

Basic Machine (Without Front Attachment)



T131434

A—Overall Length
B—Overall Height

Model	Shoe Width mm (ft-in.)	A mm (ft-in.)	B mm (ft-in.)	Overall Width mm (ft-in.)	Weight kg (lb)
650DLC	650 (2’ 2")	6100 (20’ 0")	3630 (11’ 3")	3480 (11’ 5")	40,500 (89,300)
	750 (2’ 6")	6100 (20’ 0")	3630 (11’ 3")	3580 (11’ 9")	41,100 (90,600)
	900 (3’ 0")	6100 (20’ 0")	3630 (11’ 3")	3730 (12’ 3")	42,100 (92,815)

Continued on next page

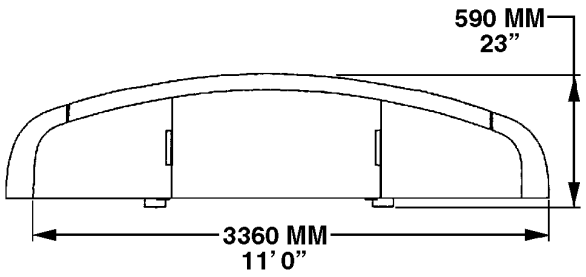
DW90712,000008D –19–18JAN07–1/13

NOTE: Steps on the track frame and the side hydraulic oil tank, hand rails on the upper battery box, upper fuel tank, and the side hydraulic oil tank must be removed to comply with the overall width dimensions above.

650DLC Counterweight

Weight: 11,100 kg (24,500 lb)

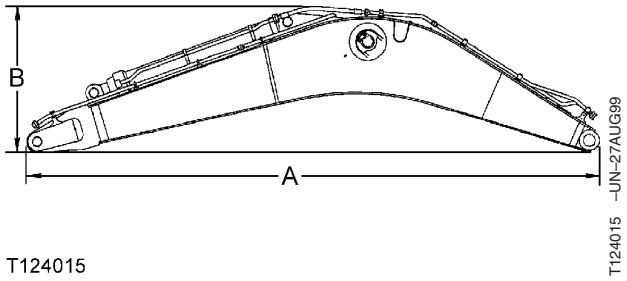
Maximum Height: 1550 mm (5 ft 1 in)



DW90712,000008D –19–18JAN07–2/13

Boom

Boom Length m (ft-in.)	A mm (ft-in.)	B mm (ft-in.)	Overall Width mm (ft-in.)	Weight kg (lb)
6.8 (23’ 4")	7140 (23’ 5")	2510 (8’ 3")	1390 (4’ 7")	6110 (13,470)
7.8 (27’ 1")	8130 (26’ 8")	2330 (7’ 8")	1390 (4’ 7")	6550 (14,450)



T124015

A—Overall Length
B—Overall Height

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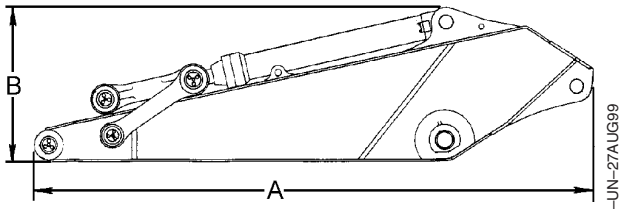
DW90712,000008D –19–18JAN07–3/13

Arm

Arm Length m (ft-in.)	A mm (ft-in.)	B mm (ft-in.)	Overall Width mm (ft-in.)	Weight kg (lb)
2.9 ME (9’ 8")	4370 (14’ 4")	1690 (5’ 7")	800 (3’ 1")	3820 (8,400)
3.6 (11’ 10")	5110 (16’ 9")	1440 (4’ 9")	800 (3’ 1")	3620 (8,000)
4.2 (13’ 9")	5710 (18’ 9")	1390 (4’ 7")	800 (3’ 1")	3930 (8,650)
5.3 (17’ 5")	6730 (22’ 1")	1260 (4’ 2")	800 (3’ 1")	3620 (8,000)



T124016

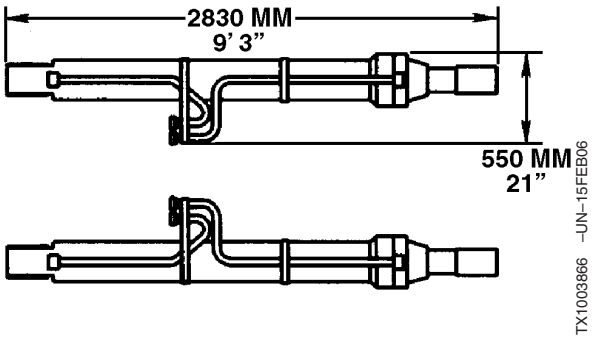
A—Overall Length
B—Overall Height

Bucket—Refer to Marketing Brochure

DW90712,000008D –19–18JAN07–4/13

Boom Cylinder

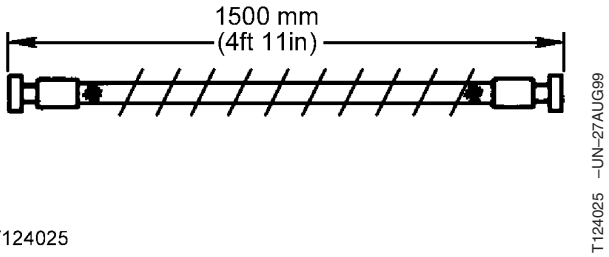
Weight: 700 kg (1,540 lb) x 2



DW90712,000008D –19–18JAN07–5/13

Hose

Weight: 8.56 kg (19 lb) x 4



T124025

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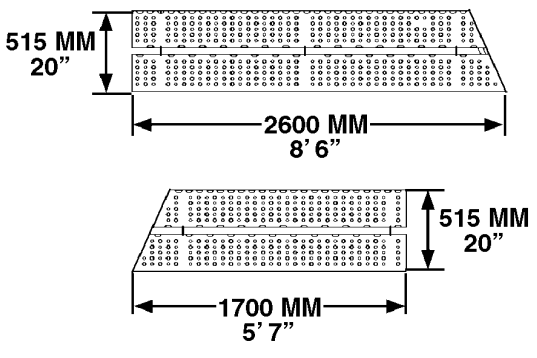
DW90712,000008D –19–18JAN07–6/13

Side Step

Weight: 40.9 kg (90 lb)



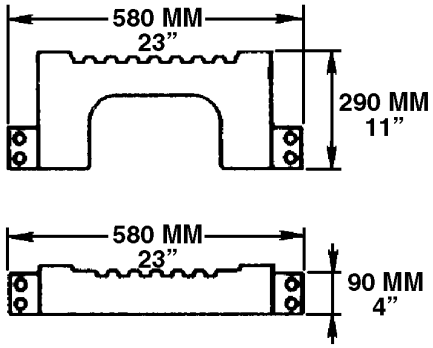
DW90712,000008D –19–18JAN07–7/13

Side Step on the Track Frame

Weight: 18.0 kg (40 lb) x 4

Weight: 12.7 kg (28 lb) x 4

Maximum Height: 125 mm (4.9 in)

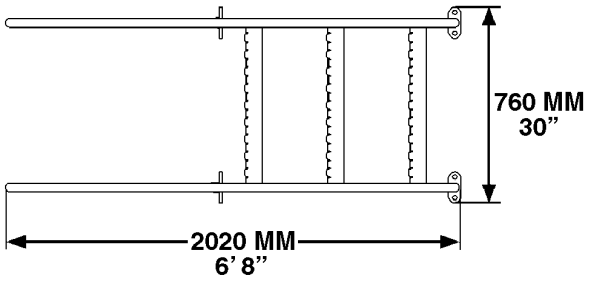


DW90712,000008D –19–18JAN07–8/13

Handrail on Side Hydraulic Oil Tank

Weight: 24.0 kg (53 lb)

Maximum Height: 400 mm (16 in)

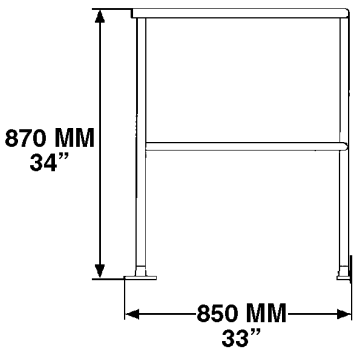


DW90712,000008D –19–18JAN07–9/13

Handrail on Fuel Tank

Weight: 19 kg (42 lb)

Maximum Height: 1040 mm (3 ft 5 in)



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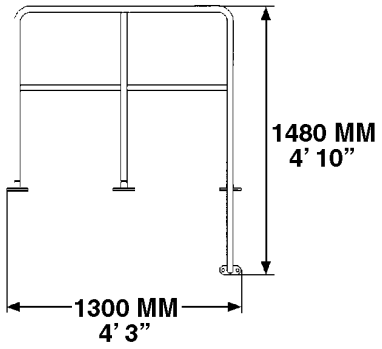
DW90712,000008D –19–18JAN07–10/13

Handrail on the Battery Box

Weight: 18 kg (40 lb)

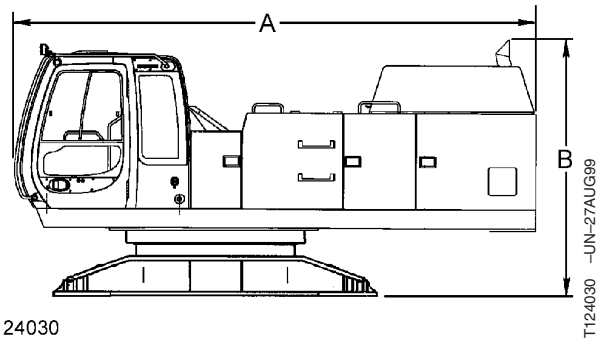
Maximum Height: 270 mm (11 ft)



DW90712,000008D –19–18JAN07–11/13

Type 2

Basic Machine



T124030

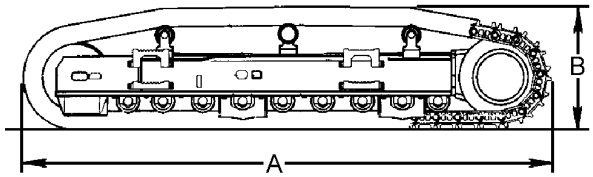
A—Overall Length
B—Overall Height

Model	A mm (ft-in.)	B mm (ft-in.)	Overall Width mm (ft-in.)	Weight kg (lb)
650DLC	5060 (16’ 7")	2720 (8’ 11")	3470 (11’ 5")	19,900 (43,900)

Continued on next page

DW90712,000008D –19–18JAN07–12/13

Side Frame



T124031 –UN–27AUG99

T124031

Model	Shoe Width mm (ft-in.)	A mm (ft-in.)	B mm (ft-in.)	Overall Width mm (ft-in.)	Weight kg (lb)
650DLC	650 (2’ 2")	5840 (19’ 2")	1450 (4’ 9")	1190 (3’ 1")	10,300 (22,700)
	750 (2’ 6")	5840 (19’ 2")	1450 (4’ 9")	1240 (4’ 1")	10,600 (23,600)
	900 (3’ 0")	5840 (19’ 2")	1450 (4’ 9")	1320 (4’ 4")	11,100 (24,470)

DW90712,000008D –19–18JAN07–13/13

Retracting or Extending the Side Frame

IMPORTANT: Remove debris stuck to contact areas of the track frame and side frame or mounting cap screws may be loosened.

Extend the side frames when operating the machine at job sites. Retraction of the side frames is designed only for easy transportation of the machine by trailer. When the side frames are retracted overside balance of the machine will be reduced, potentially causing damage to the track frame, side frames, and cap screws.

DW90712,0000124 –19–23MAY06–1/1

Retracting the Side Frame

IMPORTANT: Remove debris from contact areas of track frame (C) and side frame (D) or mounting cap screws may be loosened.

Required Tools:

- Power Boost Wrench (including accessories)
- Torque width (width across flats: 50 mm)
- Air Compressor (slide surface cleaning)

CAUTION: Do not loosen the mounting cap screws (B) of guide on the side frame.

1. Remove eighteen mounting cap screws (A) (9 used for each side) from the retracting side frames.

IMPORTANT: Maintain a 90 to 110° angle between the boom and the arm.

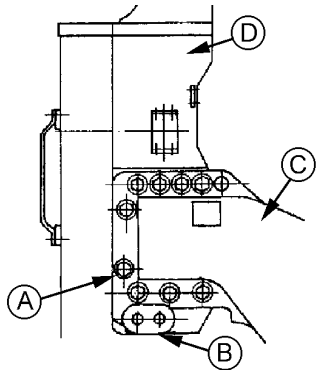
Do not raise the track too high or operate the arm control lever abruptly. Damage to the track frame may result.

2. Retracting Side Frame (Track Gauge)—Turn the boom mode switch OFF so that the machine can be raised off the ground with front attachment.

3. Raise the side track using the front attachments, as illustrated.

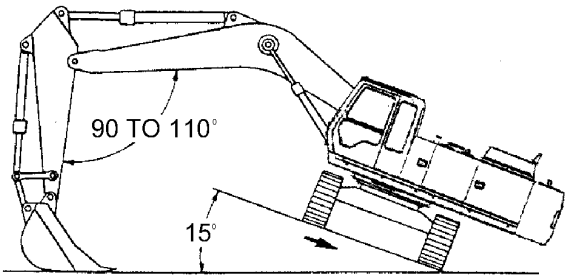
   Slowly rotate the raised track back and forth. The side frame will be retracted with its own weight and stop when it comes into contact with guide (B).

   If parts of the side frame do not retract lower the undercarriage and turn the upperstructure 180°. Raise the opposite side track about 15° from the ground using the front attachment. Slowly push the arm out to retract the side frame.



T122587

T122587 –UN–05AUG99



T122588

T122588 –UN–05AUG99

A—Mounting Cap Screws (18 used)
B—Guide
C—Track Frame
D—Side Frame

Continued on next page

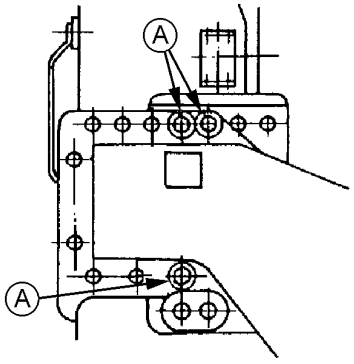
4. Slowly lower the track to the ground. Tighten six mounting cap screws (A) (3 used for each side) to specification.

Specification

650DLC Side Frame Mounting Cap Screw—Torque ..... 2160 N•m (1590 lb-ft)

5. Retract the opposite side, following steps 1 to 4 above.

A—Mounting Cap Screw (6 used)



T122589

T122589 –UN–05AUG99

AM40430,0000304 –19–18JAN07–2/2

Extending the Side Frame

Necessary Equipment

1. Slinging Rope (20 mm dia. x 8 m, 6 x 37 Ordinary Z lay Class A, Applicable Max. Load: 3 tons) (4 Used). Before Slinging, make sure no broken wire strands and/or kinks exist.
2. Lever Block (JIS B8819 equivalent to L3.2T) (2 Used). Check that there is no damage on the lever block.
3. Power Boost Wrench (including accessories), width across flats of the torque wrench: 50 mm
4. Air Compressor (slide surface cleaning)
5. Soft Protectors

Continued on next page

AM40430,0000305 –19–18JAN07–1/5

1. Before starting work, coordinate work procedures with co-workers.
2. When extending the side frame using the front attachment, do not allow any personnel to enter the vicinity of the machine.

CAUTION: Do not loosen side frame guide cap screws (D).

IMPORTANT: When the machine is shipped from the factory, not all side frame tightening cap screws are installed. Therefore, unbolted screw holes on the side frame are coated with rust-inhibitor and they may be clogged with dust or soil. Before installing the cap screws, clean the thread surface thoroughly. If the cap screws are difficult to tighten, tap the screw holes again.

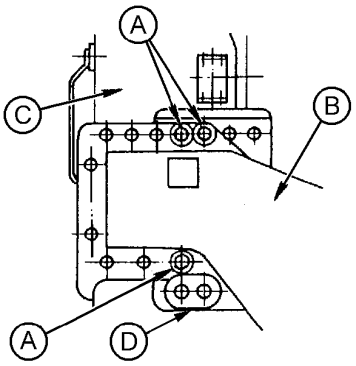
Tap: M 33, Pitch: 3 mm

Clean the side frame slide surfaces using compressed air. If debris is stuck on the contact areas of track frame (B) and side frame (C), loose mounting cap screws (A) may result.

1. Remove side frame mounting cap screws (A) (6 used, 3 cap screws in two places) from the extending side frame.

2. Rotate the upperstructure to the side of the extending side frame until the front attachment faces the side frame perpendicularly.

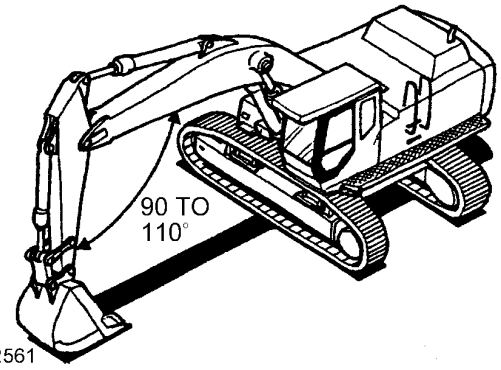
3. Position the arm and boom angle between 90° and 110°. Lower the bucket bottom to the ground.



T122560

T122560 –UN–05AUG99

A—Mounting Cap Screw
B—Track Frame
C—Side Frame
D—Guide Cap Screw



T122561

T122561 –UN–05AUG99

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AM40430,0000305 –19–18JAN07–2/5

4. Wind two cables or chains (B) around the front and rear sections (one cable or chain on each section) of the side frame. Connect lever block (C) to the ends of each cable or chain. Attach soft protectors (D) between the side frame (A) corners and cables or chains to prevent damage to side frame and cables or chains.

5. Wind two cables or chains (F) around the arm near the bracket of bucket (E). Connect each cable or chain end to lever blocks. Slowly extend the front attachment to remove sag on cables or chains. Attach soft protectors (D) between the bucket bracket corners and cable or chain to prevent damage to cables or chains.

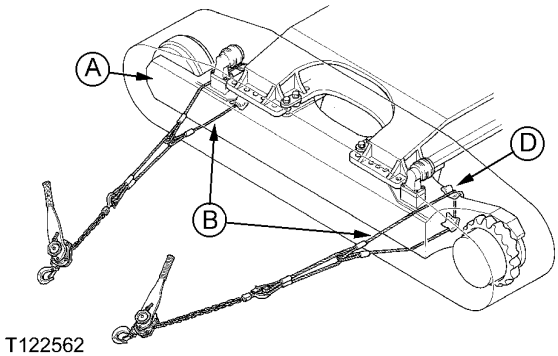
6. While lowering the boom, raise the extending side frame approx. 50 mm (2 in.) above the ground. If the side frame is raised too much, extending force increases.

CAUTION: When the lever block becomes inoperable, it is because too much resistance exists against the extending force.

Stop the work and check if the front and rear of the side frame are equally extended or if the side frame is raised to the proper height.

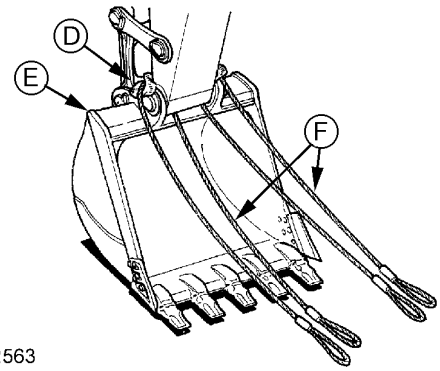
Take corrective measures as necessary.

7. Operate lever blocks so that the rear (travel device side) and front (front idler side) of the side frame is equally extended until side frame guide comes in contact with the track frame stopper.



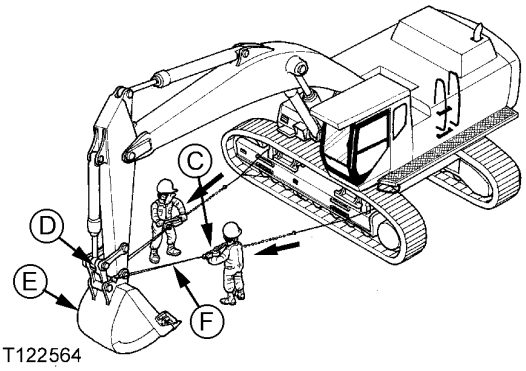
T122562

T122562 –UN–05AUG99



T122563

T122563 –UN–05AUG99



T122564

T122564 –UN–05AUG99

A—Side Frame
B—Cable Or Chain
C—Lever Block
D—Soft Protector
E—Bucket
F—Cable Or Chain

Continued on next page

CAUTION: After raising the side frame above the ground, do not operate the arm to extend the side frame. If the arm is operated, the cables or chains are pulled with excessive tension force. Damage to the lever block or cable or chain may result, possibly causing severe personal injury.

8. When side frame guide comes in contact with the track frame stopper, install side frame tightening cap screws (18 used) (9 used in two places) and tighten temporarily by hand. If it is difficult to tighten with hand, cap screw and screw hole centers may not be correctly aligned. Re-align cap screw and screw hole centers by operating the lever blocks.

Continued on next page

AM40430,0000305 –19–18JAN07–4/5

CAUTION: Slowly operate the boom, or the lever block and/or cable or chain may be damaged and may disengage, possibly causing severe personal injury. Stay away from the machine when operating the boom.

9. Slowly slacken cable or chain tension by operating lever blocks (E) and raise the boom to lower the track frame (B).
10. After lowering track frame, tighten cap screws (A) by hand.
11. Repeat steps (9) and (10) three to four times until the track frame is completely lowered to the ground.
12. Slacken the lever blocks. Remove the lever blocks and cables or chains.

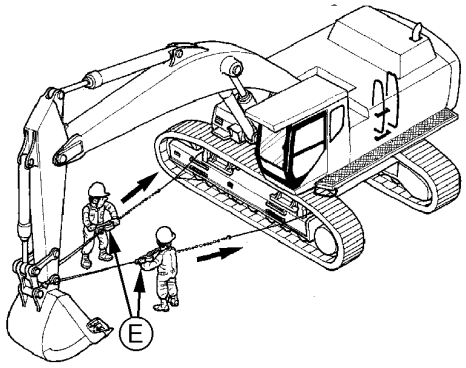
IMPORTANT: Be sure to apply a film of lubricant to the cap screw threads.

13. Tighten cap screws with the power boost wrench and torque wrench to specification.

Specification

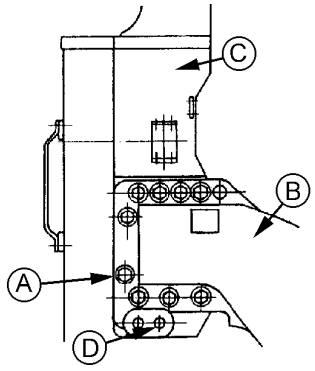
650DLC Side Frame Cap Screw—Torque..... 2800 N•m
2030 lb-ft

14. Extend the side frame (C) on the opposite side using the same procedure.



T122566

T122566 –UN–05AUG99



T122567

T122567 –UN–05AUG99

A—Cap Screw
B—Track Frame
C—Side Frame
D—Guide Cap Screw
E—Lever Block

			Torque	
Model	Bolt Size	Width Across Flats (mm)	N•m	kgf-m
650DLC	M33-Pitch 3	50	2800	286

AM40430,0000305 –19–18JAN07–5/5

Transporting the Machine by Trailer

Understand and follow all local regulations when transporting the machine on public roads

1. For transporting using a trailer, check the width, height, length, and weight of the trailer when the machine is loaded.

2. In some cases, disassemble the machine to bring it within dimensional limits or weight limits of local regulations.

3. Retract the side frame before loading the machine onto trailer bed. (See “Retracting or Extending the Side Frame” in this chapter.)

T122568

T122568 –UN–05AUG99

Loading/Unloading On A Trailer

Always load and unload the machine on a solid, level surface.

Ramp/Loading Dock

CAUTION: Be sure to use a loading dock or a ramp for loading/unloading.

1. Before loading, thoroughly clean the ramp and flatbed.

2. Place chock blocks against the truck and trailer wheels while using a ramp or loading dock.

3. Ramps must be sufficient in width, length, and strength. Be sure that the incline of the ramp is less than 15 degrees.

4. Loading docks must be sufficient in width and strength to support the machine and have a gradient of less than 15 degrees.

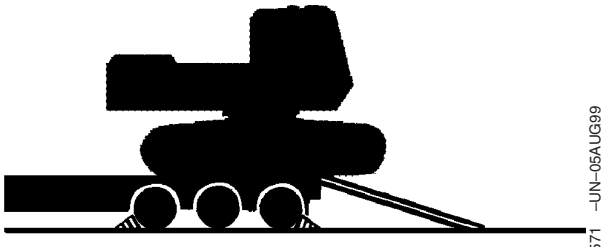
Continued on next page

Loading/Unloading

CAUTION: Always turn the auto-idle switch OFF when loading or unloading the machine to avoid an unexpected speed increase due to unintentional operation of a control lever.

Move travel speed switch to slow speed mode.

Do Not steer while driving up or down a ramp. If repositioning is necessary, move back to the ground or flatbed, correct travel direction, and drive again.



T122571

T122571 –UN–05AUG99

Loading:

1. The machine direction should be as follows:

   Without the front attachment: Travel in reverse.

2. The centerline of the machine should be over the centerline of the trailer.

3. Drive the machine onto the ramp slowly.

4. Stop the engine. Remove key from switch.

5. Move the control levers several times until hydraulic pressure in the lines is released.

6. Pull pilot control shutoff lever to locked position.

7. Close cab windows, roof vent, and door, and cover the exhaust opening, to prevent entry of wind and water.

IMPORTANT: Fasten chains or cables to the machine frame or track chain links. Do not place chains or cables over or against the hydraulic lines or hoses.

8. Place blocks in front of and behind the tracks.

Unloading:

Move the machine over end of the trailer onto the ramp slowly.

AM40430,0000306 –19–31OCT06–2/2

Types of Packings for Transportation

Type 1	Type 2
Basic Machine without Front Attachment and without Counterweight	**Basic Machine without Front Attachment, without Counterweight and without Side Frames**
Counterweight	Two Side Frames
Boom	Counterweight
Arm	Boom
Bucket	Arm
Two Boom Cylinders	Bucket
Four Hydraulic Hoses	Two Boom Cylinders
Two Side Steps	Four Hydraulic Hoses
	Two Side Steps

NOTE: The side frame mounting width can be adjusted. Retract the side frame for transportation.

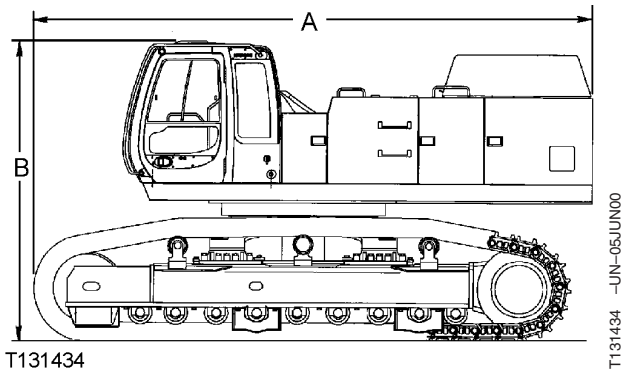
When the 650 mm (26 in.) wide track shoes are used, the steps on the track frame and the hand rails on the cab will protrude outside the track shoe width. Remove the steps, hand rails, and ladder as necessary.

DW90712,00000A1 –19–23MAY06–1/1

Packing Dimensions and Weights for Transportation

Type 1

Basic Machine (Without Front Attachment)



A—Overall Length
B—Overall Height

Model	Shoe Width mm (ft-in.)	A mm (ft-in.)	B mm (ft-in.)	Overall Width mm (ft-in.)	Weight kg (lb)
850DLC	650 (2' 2")	7020 (23' 0")	3660 (12' 0")	4100 (13' 5")	51,400 (113,300)
	750 (2' 6")	7020 (23' 0")	3660 (12' 0")	4200 (13' 9")	52,100 (114,900)
	900 (3' 0")	7020 (23' 0")	3660 (12' 0")	4343 (14' 3")	54,073 (119,212)

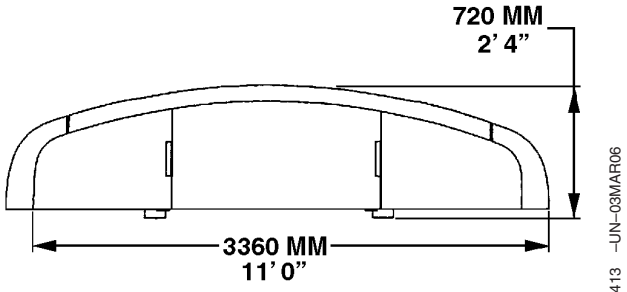
DW90712,000008E –19–18JAN07–1/12

NOTE: Steps on the track frame and the side hydraulic oil tank, hand rails on the upper battery box, upper fuel tank, and the side hydraulic oil tank must be removed to comply with the overall width dimensions above.

850DLC Counterweight

Weight: 13,300 kg (29,321 lb)

Maximum Height: 1620 mm (5 ft 4 in)



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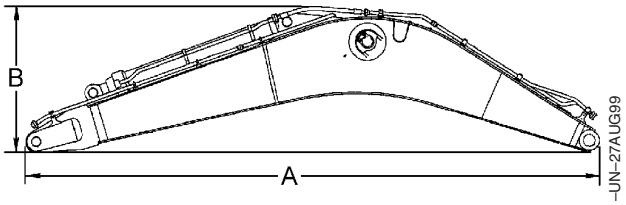
DW90712,000008E –19–18JAN07–2/12

Boom

Boom Length m (ft-in.)	A mm (ft-in.)	B mm (ft-in.)	Overall Width mm (ft-in.)	Weight kg (lb)
7.1 (23’ 4")	7490 (24’ 7")	2700 (8’ 10")	1450 (4’ 9")	7670 (16,900)
8.4 (27’ 7")	8780 (28’ 10")	2500 (8’ 2")	1450 (4’ 9")	8200 (18,100)



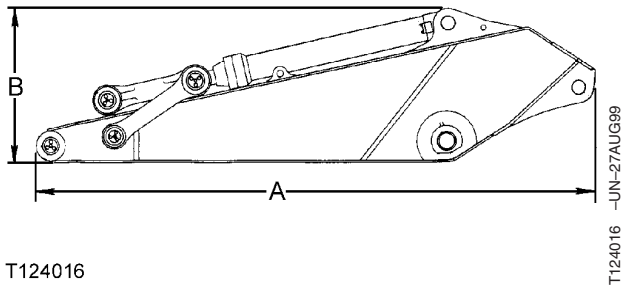
T124015

A—Overall Length
B—Overall Height

DW90712,000008E –19–18JAN07–3/12

Arm

Arm Length m (ft-in.)	A mm (ft-in.)	B mm (ft-in.)	Overall Width mm (ft-in.)	Weight kg (lb)
2.9 (9’ 8")	4460 (14’ 8")	1660 (5’ 5")	850 (2’ 10")	4650 (10,300)
3.7 (12’ 2")	5290 (17’ 4")	1420 (4’ 8")	820 (2’ 8")	4330 (9,500)
4.4 (14’ 5")	5880 (19’ 4")	1420 (4’ 8")	820 (2’ 8")	4660 (10,300)
5.4 (17’ 9")	6830 (22’ 5")	1480 (4’ 10")	820 (2’ 8")	4950 (10,913)



T124016

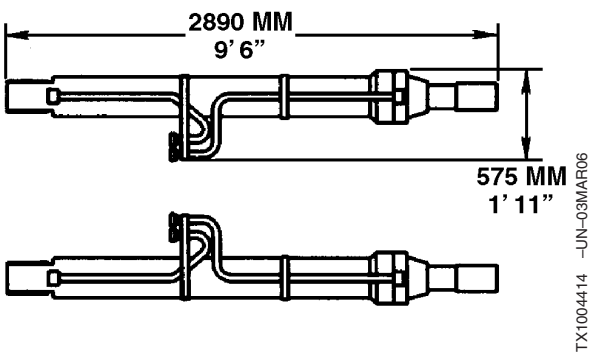
A—Overall Length
B—Overall Height

Bucket—Refer to Marketing Brochure

DW90712,000008E –19–18JAN07–4/12

Boom Cylinder

Weight: 850 kg (1,870 lb) x 2



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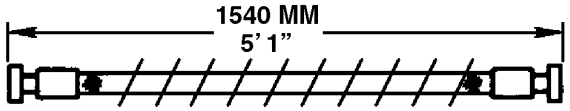
DW90712,000008E –19–18JAN07–5/12

Hose

Weight: 13.0 kg (29 lb) x 2

Weight: 9.0 kg (20 lb) x 2



TX1004415 –UN–03MAR06

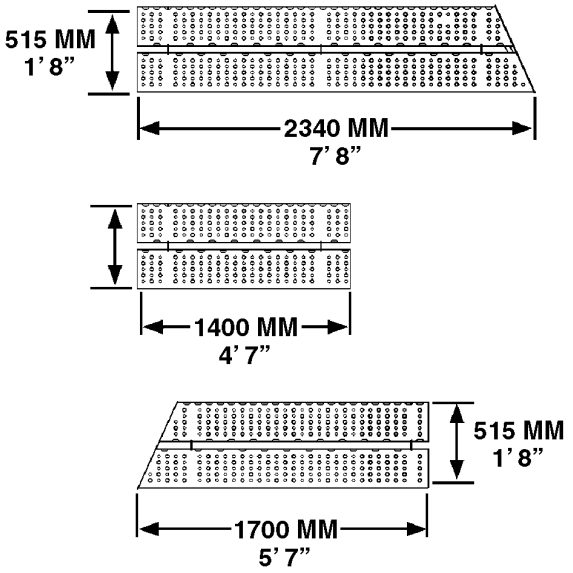
DW90712,000008E –19–18JAN07–6/12

Side Step

Weight (Front): 44 kg (97 lb)

Weight (Center): 26 kg (57 lb)

Weight (Rear): 30 kg (66 lb)



TX1004416 –UN–03MAR06

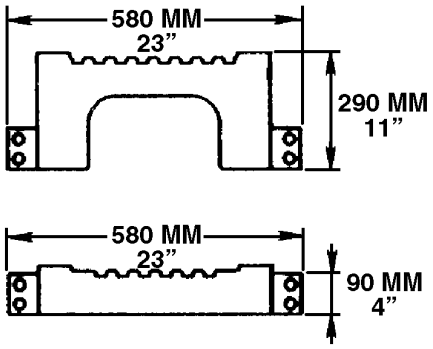
DW90712,000008E –19–18JAN07–7/12

Side Step on the Track Frame

Weight: 29 kg (64 lb) x 4

Weight: 13 kg (29 lb) x 4

Maximum Height: 125 mm (4.9 in)



TX1003868 –UN–15FEB06

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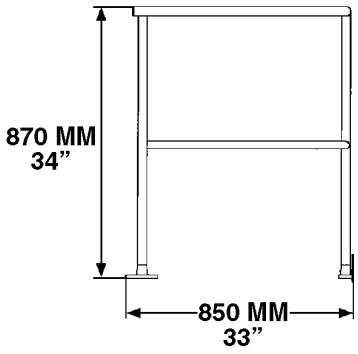
DW90712,000008E –19–18JAN07–8/12

Handrail on Fuel Tank

Weight: 19 kg (42 lb)

Maximum Height: 1040 mm (3 ft 5 in)



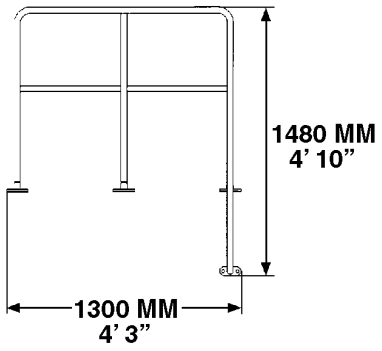
TX1003870 –UN–15FEB06

DW90712,000008E –19–18JAN07–9/12

Handrail on the Battery Box

Weight: 18 kg (40 lb)

Maximum Height: 270 mm (11 ft)

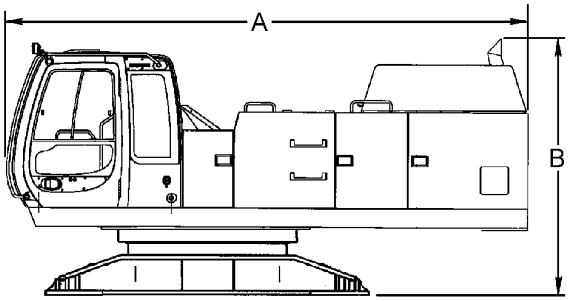


TX1003871 –UN–15FEB06

DW90712,000008E –19–18JAN07–10/12

Type 2

Basic Machine



T124030 –UN–27AUG99

T124030

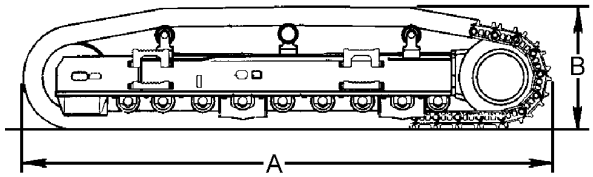
A—Overall Length
B—Overall Height

Model	A mm (ft-in.)	B mm (ft-in.)	Overall Width mm (ft-in.)	Weight kg (lb)
850DLC	6040 (19’ 10")	2960 (9’ 9")	3500 (11’ 6")	27,200 (60,000)

Continued on next page

DW90712,000008E –19–18JAN07–11/12

Side Frame



T124031 –UN–27AUG99

T124031

Model	Shoe Width mm (ft-in.)	A mm (ft-in.)	B mm (ft-in.)	Overall Width mm (ft-in.)	Weight kg (lb)
850DLC	650 (2’ 2")	6360 (20’ 10")	1500 (4’ 11")	1330 (4’ 4")	12,100 (26,700)
	750 (2’ 6")	6360 (20’ 10")	1500 (4’ 11")	1330 (4’ 4")	12,500 (27,600)
	900 (3’ 0")	6360 (20’ 10")	1500 (4’ 11")	1356 (4’ 5")	13,500 (29,762)

DW90712,000008E –19–18JAN07–12/12

Retracting or Extending the Side Frame

IMPORTANT: Remove debris stuck to contact areas of the track frame and side frame or mounting cap screws may be loosened.

Extend the side frames when operating the machine at job sites. Retraction of the side frames is designed only for easy transportation of the machine by trailer. When the side frames are retracted overside balance of the machine will be reduced, potentially causing damage to the track frame, side frames, and cap screws.

DW90712,0000125 –19–23MAY06–1/1

Retracting the Side Frame

IMPORTANT: Remove debris from contact areas of track frame (C) and side frame (D) or mounting cap screws may be loosened.

Required Tools:

- Power Boost Wrench (including accessories)
- Torque width (width across flats: 50 mm)
- Air Compressor (slide surface cleaning)

CAUTION: Do not loosen the mounting cap screws (B) of guide on the side frame.

1. Remove eighteen mounting cap screws (A) (9 used for each side) from the retracting side frames.

IMPORTANT: Maintain a 90 to 110° angle between the boom and the arm.

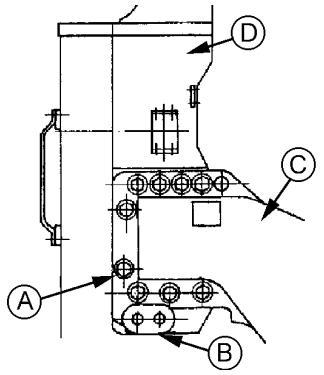
Do not raise the track too high or operate the arm control lever abruptly. Damage to the track frame may result.

2. Retracting Side Frame (Track Gauge)—Turn the boom mode switch OFF so that the machine can be raised off the ground with front attachment.

3. Raise the side track using the front attachments, as illustrated.

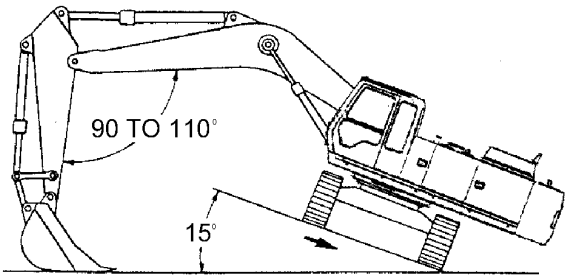
   Slowly rotate the raised track back and forth. The side frame will be retracted with its own weight and stop when it comes into contact with guide (B).

   If parts of the side frame do not retract lower the undercarriage and turn the upperstructure 180°. Raise the opposite side track about 15° from the ground using the front attachment. Slowly push the arm out to retract the side frame.



T122587

T122587 –UN–05AUG99



T122588

T122588 –UN–05AUG99

A—Mounting Cap Screws (18 used)
B—Guide
C—Track Frame
D—Side Frame

Continued on next page

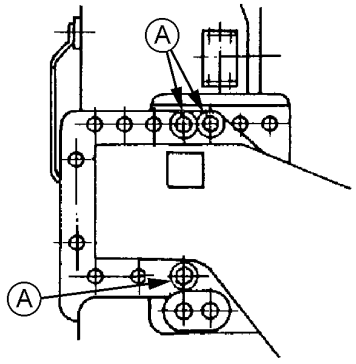
4. Slowly lower the track to the ground. Tighten six mounting cap screws (A) (3 used for each side) to specification.

Specification

850DLC Side Frame Mounting Cap Screw—Torque ..... 2800 N•m (2025 lb-ft)

5. Retract the opposite side, following steps 1 to 4 above.

A—Mounting Cap Screw (6 used)



T122589

T122589 –UN–05AUG99

DW90712,00000A2 –19–18JAN07–2/2

Extending the Side Frame

Necessary Equipment

1. Slinging Rope (20 mm dia. x 8 m, 6 x 37 Ordinary Z lay Class A, Applicable Max. Load: 3 tons) (4 Used). Before Slinging, make sure no broken wire strands and/or kinks exist.
2. Lever Block (JIS B8819 equivalent to L3.2T) (2 Used). Check that there is no damage on the lever block.
3. Power Boost Wrench (including accessories), width across flats of the torque wrench: 50 mm
4. Air Compressor (slide surface cleaning)
5. Soft Protectors

Continued on next page

DW90712,00000A3 –19–18JAN07–1/5

1. Before starting work, coordinate work procedures with co-workers.
2. When extending the side frame using the front attachment, do not allow any personnel to enter the vicinity of the machine.

CAUTION: Do not loosen side frame guide cap screws (D).

IMPORTANT: When the machine is shipped from the factory, not all side frame tightening cap screws are installed. Therefore, unbolted screw holes on the side frame are coated with rust-inhibitor and they may be clogged with dust or soil. Before installing the cap screws, clean the thread surface thoroughly. If the cap screws are difficult to tighten, tap the screw holes again.

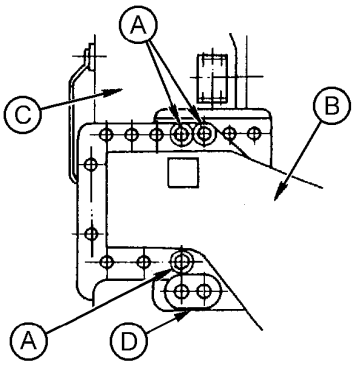
Tap: M 33, Pitch: 3 mm

Clean the side frame slide surfaces using compressed air. If debris is stuck on the contact areas of track frame (B) and side frame (C), loose mounting cap screws (A) may result.

1. Remove side frame mounting cap screws (A) (6 used, 3 cap screws in two places) from the extending side frame.

2. Rotate the upperstructure to the side of the extending side frame until the front attachment faces the side frame perpendicularly.

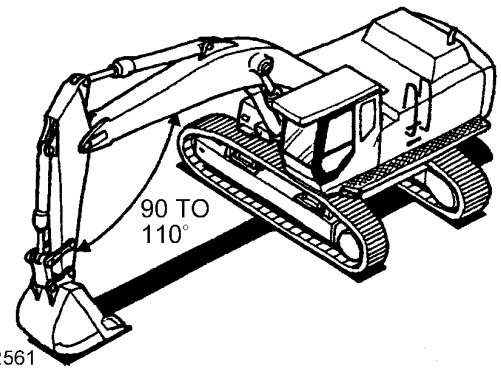
3. Position the arm and boom angle between 90° and 110°. Lower the bucket bottom to the ground.



T122560

T122560 –UN–05AUG99

A—Mounting Cap Screw
B—Track Frame
C—Side Frame
D—Guide Cap Screw



T122561

T122561 –UN–05AUG99

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DW90712,00000A3 –19–18JAN07–2/5

4. Wind two cables or chains (B) around the front and rear sections (one cable or chain on each section) of the side frame. Connect lever block (C) to the ends of each cable or chain. Attach soft protectors (D) between the side frame (A) corners and cables or chains to prevent damage to side frame and cables or chains.

5. Wind two cables or chains (F) around the arm near the bracket of bucket (E). Connect each cable or chain end to lever blocks. Slowly extend the front attachment to remove sag on cables or chains. Attach soft protectors (D) between the bucket bracket corners and cable or chain to prevent damage to cables or chains.

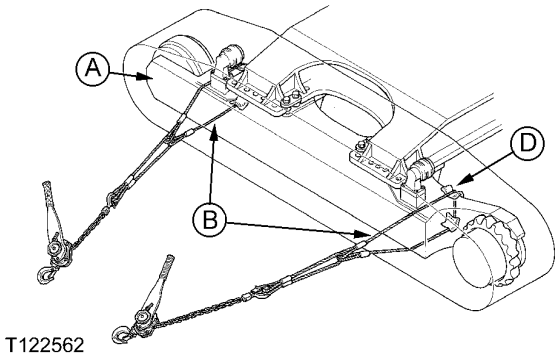
6. While lowering the boom, raise the extending side frame approx. 50 mm (2 in.) above the ground. If the side frame is raised too much, extending force increases.

CAUTION: When the lever block becomes inoperable, it is because too much resistance exists against the extending force.

Stop the work and check if the front and rear of the side frame are equally extended or if the side frame is raised to the proper height.

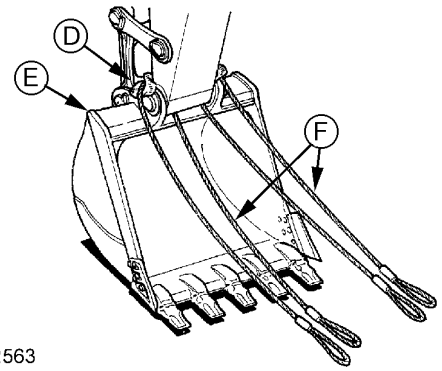
Take corrective measures as necessary.

7. Operate lever blocks so that the rear (travel device side) and front (front idler side) of the side frame is equally extended until side frame guide comes in contact with the track frame stopper.



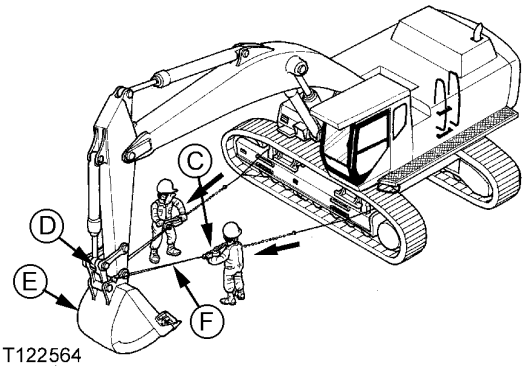
T122562

T122562 –UN–05AUG99



T122563

T122563 –UN–05AUG99



T122564

T122564 –UN–05AUG99

A—Side Frame
B—Cable Or Chain
C—Lever Block
D—Soft Protector
E—Bucket
F—Cable Or Chain

Continued on next page

CAUTION: After raising the side frame above the ground, do not operate the arm to extend the side frame. If the arm is operated, the cables or chains are pulled with excessive tension force. Damage to the lever block or cable or chain may result, possibly causing severe personal injury.

8. When side frame guide comes in contact with the track frame stopper, install side frame tightening cap screws (18 used) (9 used in two places) and tighten temporarily by hand. If it is difficult to tighten with hand, cap screw and screw hole centers may not be correctly aligned. Re-align cap screw and screw hole centers by operating the lever blocks.

Continued on next page

DW90712,00000A3 –19–18JAN07–4/5

CAUTION: Slowly operate the boom, or the lever block and/or cable or chain may be damaged and may disengage, possibly causing severe personal injury. Stay away from the machine when operating the boom.

9. Slowly slacken cable or chain tension by operating lever blocks (E) and raise the boom to lower the track frame (B).
10. After lowering track frame, tighten cap screws (A) by hand.
11. Repeat steps (9) and (10) three to four times until the track frame is completely lowered to the ground.
12. Slacken the lever blocks. Remove the lever blocks and cables or chains.

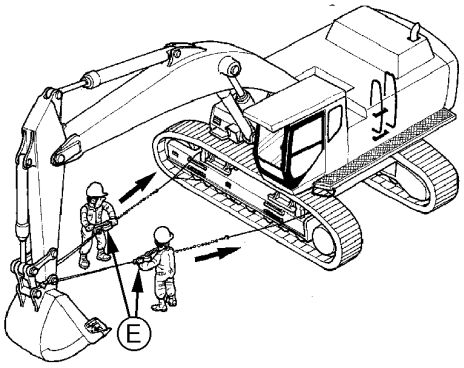
IMPORTANT: Be sure to apply a film of lubricant to the cap screw threads.

13. Tighten cap screws with the power boost wrench and torque wrench to specification.

Specification

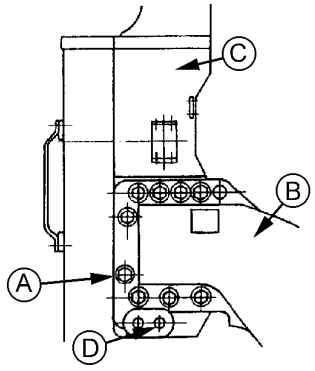
850DLC Side Frame Cap Screw—Torque ..... 2800 N•m (2025 lb-ft)

14. Extend the side frame (C) on the opposite side using the same procedure.



T122566

T122566 –UN–05AUG99



T122567

T122567 –UN–05AUG99

A—Cap Screw
B—Track Frame
C—Side Frame
D—Guide Cap Screw
E—Lever Block

			Torque	
Model	Bolt Size	Width Across Flats (mm)	N•m	kgf-m
850DLC	M33-Pitch 3	55	2800	286

DW90712,00000A3 –19–18JAN07–5/5

Precautions for Assembling

1. Worker's Clothing

   Wear clothing appropriate for the job.

   Wear safety equipment.

2. Conferring Work Process

   Discuss with all personnel, the work process, the role assigned to each, and precautions to ensure safety.

3. Coordinating Signal System, and Appointing Signal Person

   Before starting, be sure to coordinate the signal system to be used.

   Appoint one qualified signal person. All workers should obey the signals only from one signal person.

4. Secure a flat space big enough to assemble the machine.

5. Check that footing is strong enough to support the machine weight. If required, repair the footing sufficiently so that the machine can be kept in a horizontal position.

6. Before starting, make sure you have all necessary tools.

   Essential Equipment and Tools

   - A 25-ton class lifting capacity crane
   - Cables or chains to lift the machine
   - Shackles
   - Lifting protectors (Soft Pads)
   - 100 mm (4 in) square lumber
   - 10 pound hammer
   - Standard tools
   - Grease

7. Cap Screw Tightening Torque Specifications:

450DLC—Specification

Counterweight Mounting Cap Screw—Torque	2400 N•m 1735 lb-ft
Counterweight Lock Plate Securing Cap Screw—Torque	450 N•m 325 lb-ft
Pin Lock Securing Cap Screw—Torque	400 N•m 290 lb-ft

650DLC—Specification

Counterweight Mounting Cap Screw—Torque	2800 N•m 2065 lb-ft
Counterweight Lock Plate Securing Cap Screw—Torque	700 N•m 510 lb-ft
Boom Hose Connecting Cap Screw—Torque	180 N•m 130 lb-ft
Track Frame Support Cap Screw—Torque	2156 N•m 1590 lb-ft

850DLC—Specification

Counterweight Mounting Cap Screw—Torque	2800 N•m 2065 lb-ft
Counterweight Lock Plate Securing Cap Screw—Torque	700 N•m 510 lb-ft
Boom Hose Connecting Cap Screw—Torque	180 N•m 130 lb-ft
Side Frame Cap Screw—Torque	2 750 N•m 2030 lb-ft

8. Precautions for Tightening Cap Screws

   Use a torque wrench to tighten cap screws to specifications. After tightening cap screws to specifications, mark the tightened cap screw head to ensure that all the cap screws have been tightened.

Continued on next page

Be sure to use original size cap screws. If the cap screw length is too long or short, the cap screw will not be tightened correctly, possibly inducing an accident.

DW90712,000007C –19–15FEB06–2/2

Precautions for Lifting Work

1. Coordinating Signal System, and Appointing Signal Person

   Before starting, be sure to coordinate signal system to be used. Appoint one qualified signal person only. All workers should obey signals only from one signal person.

2. When attaching a cable or chain to the lifting parts/components, always use lifting protectors between the cable or chain and the lifting parts/components.

3. Precautions for Lifting

   - Always use a hook with a latch.
   - Use only lifting cables and chains that are strong enough.
   - Never allow the lifted load to pass over any persons.
   - Never allow anyone under the lifted load.

4. Fix Twisted Cable or Chain.

   Fix cables or chains after the job, if necessary. Store the cables or chains in a specified place.

CED,TX03679,5433 –19–24JAN07–1/1

Precautions for Operating Machine

1. General Precautions for Operating Machine

   - Always sit in operator's seat when operating the machine.
   - Before starting the engine, or driving or swinging the machine, check that there are no bystanders or obstructions around the machine. Use the horn or other signals to warn the bystanders.
   - If sight is obstructed, be sure to use a signal person. Always keep the signal person in view.
   - Thoroughly learn the meanings of all signs and signals. Appoint one qualified signal person.

2. Driving the Machine Safely

   - Always be alert for the safety of bystanders.
   - Before driving the machine, find out which way to move the travel levers for the direction you want to drive the machine.

3. Avoid injury from Backover and Swing Accidents

   During swing or backing up operation, operator's sight is obstructed, leading to a potential accident. If sight is obstructed, use a signal person.

   - Check that bystanders are away from the operating area of the machine before swinging or backing up the machine.

CED,OUOE003,9807 –19–24JAN07–1/1

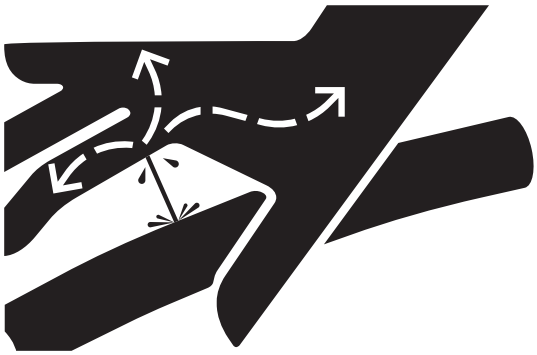
Avoid High-Pressure Fluids

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

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

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

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



X9811 –UN–08DEC08

DW90712,0000085 –19–23MAY06–1/1

Installation Sequence

NOTE: Assembly is a 2-person, 2-day job, and disassembly requires 2 people for 1 day. These times may vary for inexperienced crews.

1. Install boom cylinder.
2. Install boom.
3. Connect hoses between boom and machine.
4. Connect boom cylinder rod.
5. Install arm.
6. Connect arm cylinder rod.
7. Connect bucket cylinder hoses.
8. Adjust bucket linkage.
9. Extend side frame.
10. Check hydraulic oil level.
11. Lubricate working tool pivots.
12. Install counterweight.

DW90712,000007E –19–11MAY06–1/1

Installing Boom Cylinder

IMPORTANT: Take care not to mix up the right and left cylinders. Install the cylinder with the cylinder tubes facing toward each other.

1. Apply a film of grease to pin (B).

2. Lift up left side boom cylinder (C) with a crane.

450DLC—Specification

Boom Cylinder—Weight ..... 421 kg approximate
928 lb approximate

650DLC—Specification

Boom Cylinder—Weight ..... 515 kg approximate
1135 lb approximate

850DLC—Specification

Boom Cylinder—Weight ..... 850 kg approximate
1870 lb approximate

CAUTION: When aligning the centers of the pin and pin hole, Do Not put fingers into the pin hole.

When using a hammer, wear safety equipment such as safety glasses or a hard hat to protect against injury from flying pieces of metal.

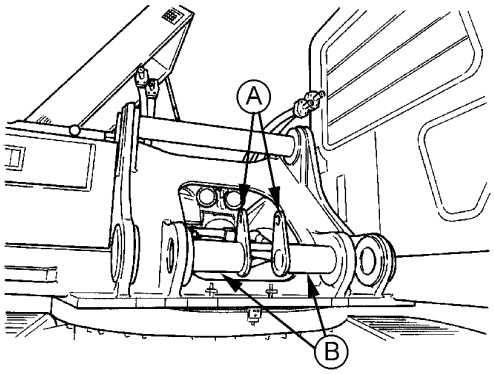
When inserting the pin, Do Not enter the area under the boom cylinder.

3. Align pin hole (D) on the bottom side of the boom cylinder with pin hole (E) on the main frame to install pin. Take care not to damage the seal at this time.

450DLC—Specification

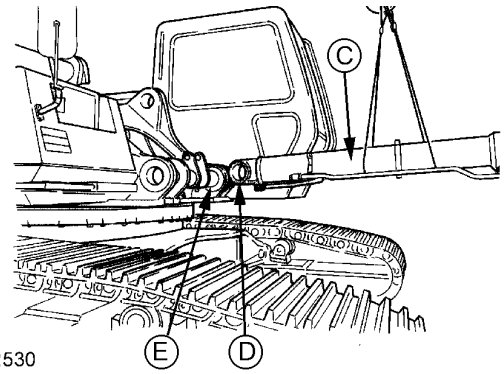
Boom Cylinder Head End Pin—
Weight..... 22.7 kg approximate
50 lb approximate

A—Pin Lock Plate
B—Pin
C—Left Side Boom Cylinder
D—Pin Hole
E—Pin Hole
F—Cap Screw
G—Supporting Stand



T122529

T122529 –UN–05AUG99



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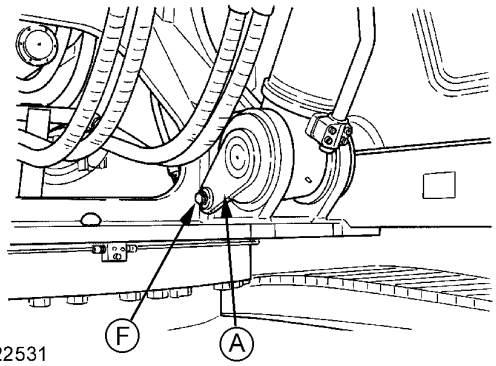

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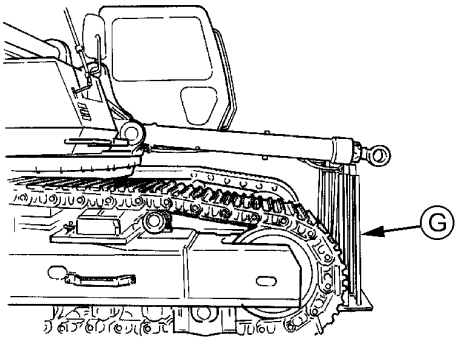

T122532

T122532 –UN–05AUG99

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650DLC—Specification

Boom Cylinder Head End Pin—	
Weight	38 kg approximate 83 lb approximate

850DLC—Specification

Boom Cylinder Head End Pin—	
Weight	43 kg approximate 95 lb approximate

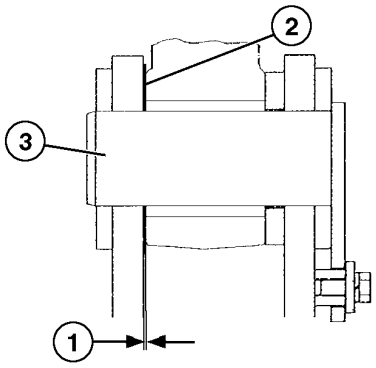
DW90712,0000076 –19–09FEB06–2/7

4. Align the boom cylinder bottom hole with the boss hole on the frame. Measure clearance (1). If clearance is 4 mm (0.16 in.) or more, remove the shim (2) on the pin (3) and install it, as illustrated.
5. Tighten cap screw (F) to secure pin lock plate (A).

Specification

Pin Lock Plate Cap Screw—	
Torque	400 N•m 290 lb-ft

6. After installing the left boom cylinder to the main frame, lay the rod of the boom cylinder onto a support stand (G).
7. Install the right side boom cylinder in the same procedure as taken in the steps 1 to 5 above.



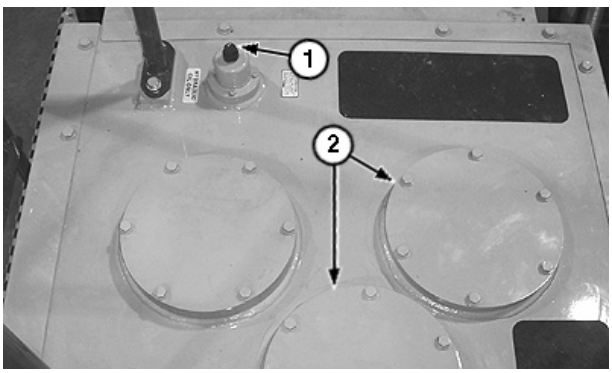
TX1003543 –UN–10FEB06

1—Clearance
2—Shim
3—Pin

DW90712,0000076 –19–09FEB06–3/7

8. To relieve pressure, push the pressure release button (1).

1—Pressure Release Button
2—Hydraulic Oil Tank Filter Cover



TX1003485A –UN–08FEB06

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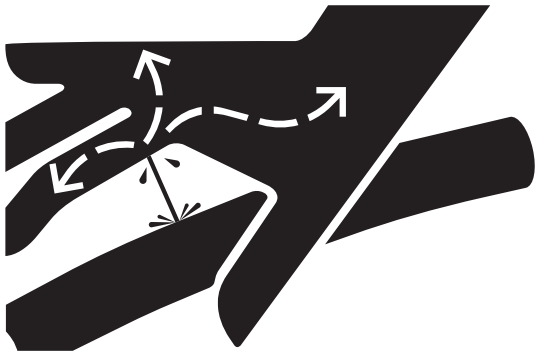
DW90712,0000076 –19–09FEB06–4/7

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. Relieve pressure by pushing the pressure release button (1).



X9811 –UN–08DEC08

DW90712,0000076 –19–09FEB06–5/7

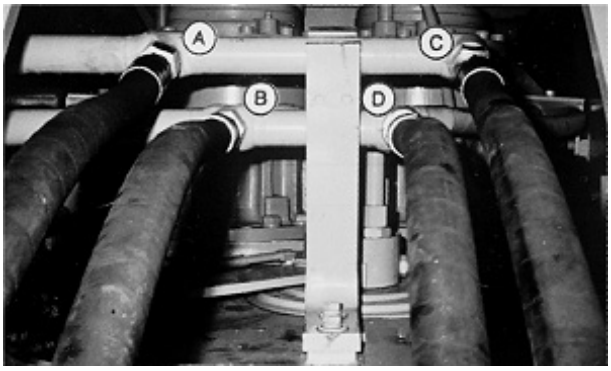
9. Slowly remove hydraulic tube caps and connect hoses (A—D).

10. Connect boom cylinder hoses.

Specification

650DLC and 850DLC Boom Hose
Flange Cap Screws—Torque ..... 180 N•m
130 lb-ft

A—Right Boom Cylinder Head End
B—Right Boom Cylinder Rod End
C—Left Boom Cylinder Head End
D—Left Boom Cylinder Rod End



T6912AC –UN–28OCT88

450DLC Shown

DW90712,0000076 –19–09FEB06–6/7

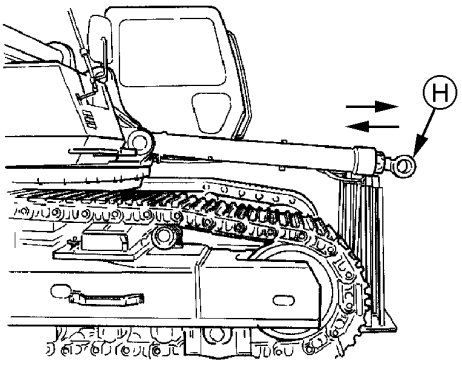
11. To prevent the seal from damage, bleed the air from the boom cylinders in the following procedures:

    a. Run the engine at slow idle.

    b. Slowly extend and retract boom cylinder rod (H).

    c. Repeat step (b) above until cylinder rod (H) moves smoothly.

H—Cylinder Rod



T122533

T122533 –UN–05AUG99

DW90712,0000076 –19–09FEB06–7/7

Installing Boom

CAUTION: Do Not allow anyone to enter the area under a lifted boom.

1. Attach cable or chain ends to the brackets, as illustrated. Lift the boom using a crane.

2. Pull out the boom to main frame pin (C) until the end of the pin is flush with the inside end of the right side bracket.

450DLC—Specification
Boom Pivot Pin—Weight ..... 116 kg approximate
257 lb approximate

650DLC—Specification
Boom Pivot Pin—Weight ..... 156 kg approximate
345 lb approximate

850DLC—Specification
Boom Pivot Pin—Weight ..... 193 kg approximate
425 lb approximate

3. Apply a film of grease to pin.

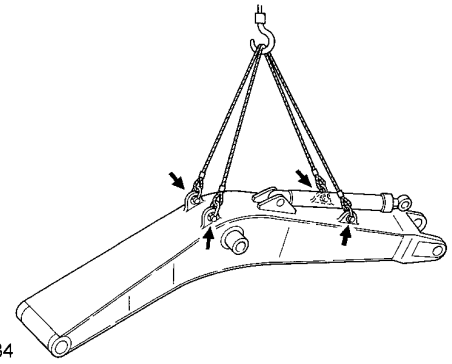
4. Lift up boom (A) with a crane.

450DLC—Specification
Boom And Arm Cylinder—Weight ..... 3370 kg approximate
7430 lb approximate

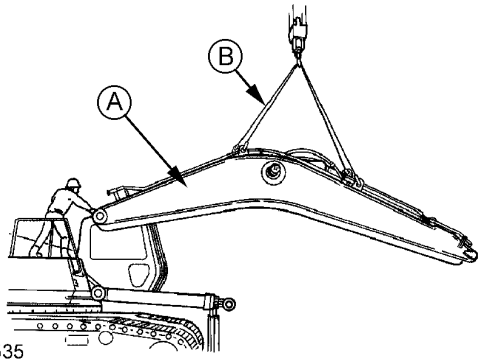
650DLC—Specification
Boom And Arm Cylinder—Weight ..... 5250 kg approximate
11,600 lb approximate

850DLC—Specification
Boom And Arm Cylinder—Weight ..... 8200 kg approximate
18,100 lb approximate

A—Boom
B—Cable Or Chain
C—Boom-To-Main Frame Pin


T122534

T122534 –UN–05AUG99



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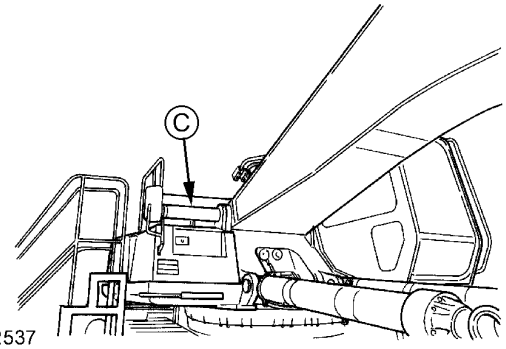

T122537

T122537 –UN–05AUG99

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DW90712,0000077 –19–03MAR06–1/3

CAUTION: When aligning the center of the pin and pin hole, Do Not put fingers into the pin hole.

When using a hammer, wear safety equipment such as safety glasses or a hard hat to protect against injury from flying pieces of metal.

When inserting the pin, Do Not enter the area under the boom.

5. Lower boom into place and install pin. Install shims as required between the boom and main frame.

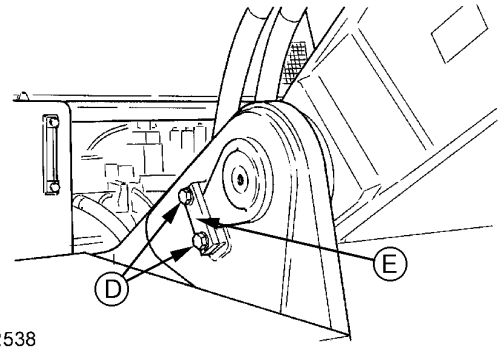
DW90712,0000077 –19–03MAR06–2/3

6. Install plate (E) and cap screws (D). Tighten to 390 N•m (288 lb-ft).

Specification	
Boom Plate Cap Screw—Torque	400 N•m 290 lb-ft

7. Lower the boom tip to the ground.

D—Cap Screw
E—Plate



T122538

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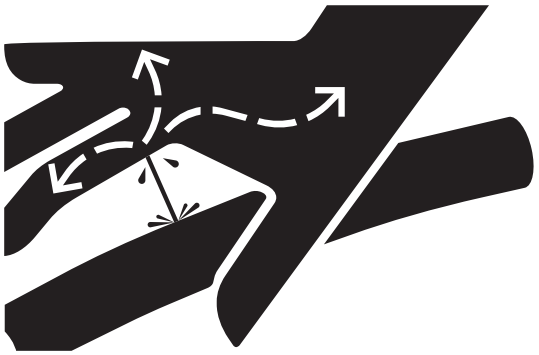
DW90712,0000077 –19–03MAR06–3/3

Connecting Hoses Between Boom and Machine



X9811 –UN–08DEC08

CAUTION: Escaping oil 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 oils.

1. Stop the engine. Place the pilot control lever in unlock position. Move the control levers back and forth, and right and left several times to release the remaining pressure in the hydraulic lines.
2. Before connecting hoses between the boom and the machine, gradually loosen cap screws securing the covers to the ends of the hydraulic lines on the machine to release the trapped oil pressure in the lines. Remove the covers.
3. Connect four hoses between both the right and left boom lines and the machine.

Continued on next page

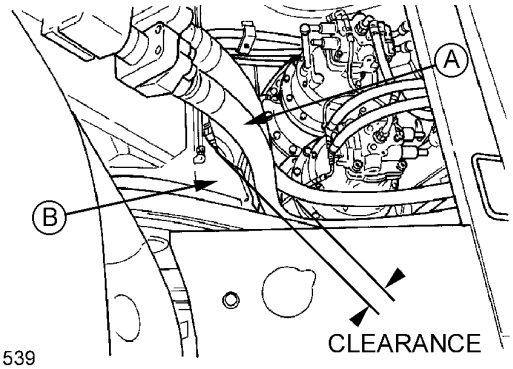
DW90712,0000083 –19–10FEB06–1/2

4. Check that hose (A) does not come into contact with frame (B). In cases where the gap between the hose and the frame is less than 5 mm (0.2 in), loosen the control valve side hose connector (C). Then, adjust the hose angle, so that the gap between the hose and the frame is increased.

NOTE: Check the gap between the hose and the frame with the front attachment positioned as illustrated to the right. (The gap between the hose and the frame is reduced to a minimum when the front attachment is positioned as illustrated.)

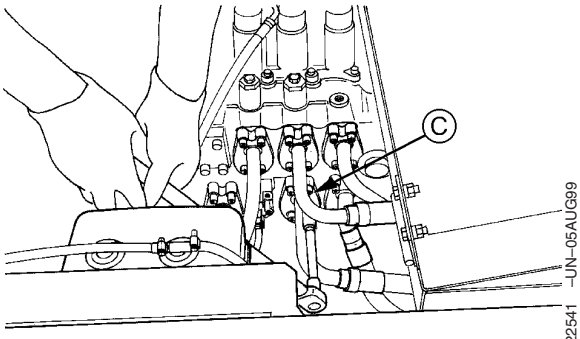
5. To adjust the hose angle, loosen three or four cap screws at hose connector (C). Then, twist hose adapter downward. (Hose angle is set to 10° before the machine is shipped from the factory. However, depending on the hose bending tendency or the direction of the boom side hose connector, the gap between the hose and the frame may vary. Therefore, be sure to check the gap and adjust as required.)

A—Hose
B—Frame
C—Connector



T122539

T122539 –UN–05AUG99



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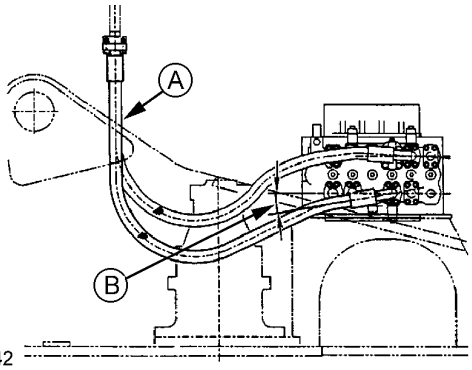


T122542

T122542 –UN–05AUG99

DW90712,0000083 –19–10FEB06–2/2

Connecting Boom Cylinder Rod

1. Lift right side boom cylinder (C) with a hoist.

2. Align the rod-pin bore of the boom cylinder with that of boom (B) by moving the boom cylinder up and down while extending or retracting cylinder rod (A).

CAUTION: When aligning the centers of the pin and pin hole, Do Not put fingers into the pin hole.

When using a hammer, wear safety equipment to protect against injury from flying pieces of metal.

When inserting the pin, Do Not enter the area under the boom cylinder rod.

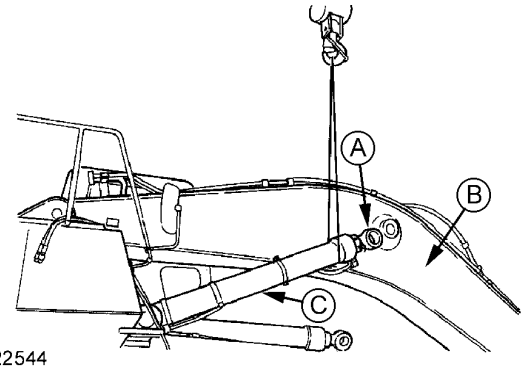
3. Install pin (D) into the pin bore, install pin retaining plate (E) cap screws (F). Tighten to 390 N•m (288 lb-ft).

Specification	
Pin Retaining Plate Cap Screw—Torque	400 N•m 290 lb-ft

4. Slide pin (D) to the right side (the side to which the cylinder rod has been installed) to allow the left side boom cylinder rod to be in the position ready for installation.

5. Install the left side boom cylinder rod in the same procedure used in steps 2 and 3.

6. Install fittings and connect grease lines to rod ends of boom cylinders.



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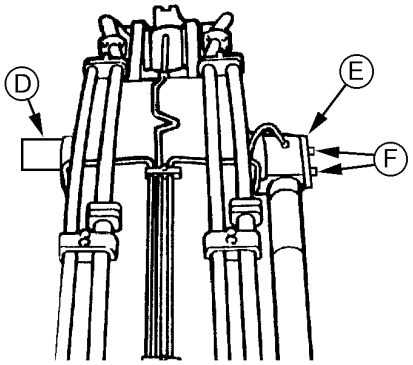

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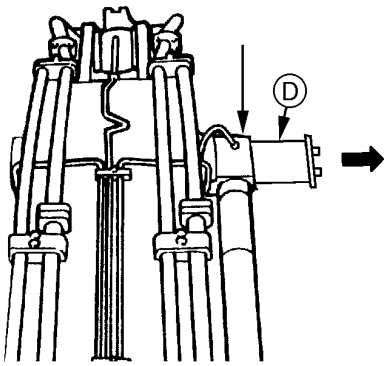


T122547

T122547 –UN–05AUG99

A—Cylinder Rod
B—Boom
C—Cylinder
D—Pin
E—Pin Retaining Plate
F—Cap Screw

DW90712,0000078 –19–08FEB06–1/1

Install Arm

CAUTION: Never allow anyone to enter into the area under the lifted arm (2).

1. Apply grease to boom (1), arm (2), and connecting pin (3).
2. While slinging arm with a crane, align pin hole (4) of arm with that of boom.

450DLC—Specification

Arm With Bucket Cylinder—Weight	2550 kg approximate 5620 lb approximate

650DLC—Specification

Arm With Bucket Cylinder—Weight	3930 kg approximate 8650 lb approximate

850DLC—Specification

Arm With Bucket Cylinder—Weight	4660 kg approximate 10300 lb approximate

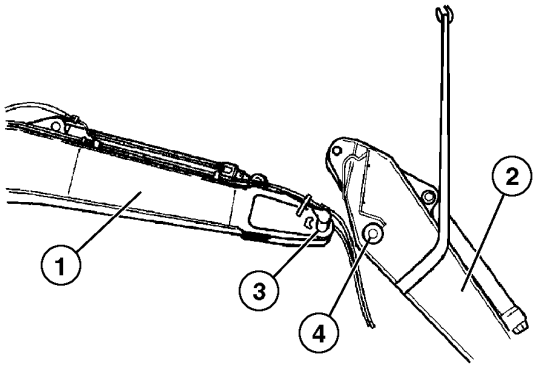
3. Install the plate between boom (5) and arm (6). Align the boom (1) bottom hole with the boss hole on the arm (2). Measure clearance (7). If clearance is 1 mm (0.04 in) or more, remove the shim (8) on the pin (9), and install it as illustrated.

CAUTION: When aligning the centers of the pin and pin hole, DO NOT put fingers into the pin hole. When using a hammer, wear safety equipment such as safety glasses or a hard hat to protect against injury from flying pieces of metal. When inserting the pin, DO NOT enter the area under the boom cylinder.

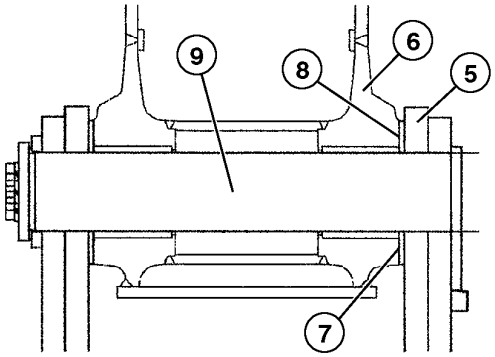
4. Drive the pin into the arm and boom holes.
5. Insert pin lock plate (10) with bolts (11).

Specification

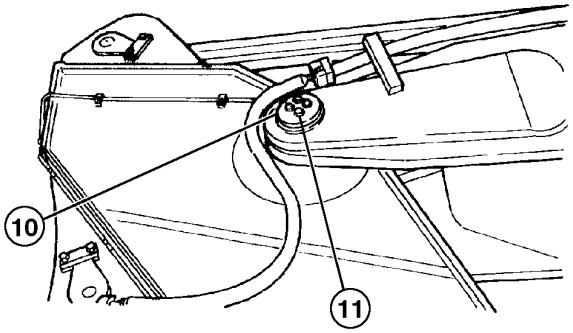
Pin Lock Plate With Bolts—Torque	400 N•m 290 lb-ft



TX1003500 –UN–10FEB06



TX1003502 –UN–10FEB06



TX1003501 –UN–10FEB06

1—Boom
2—Arm
3—Connecting Pin
4—Pin Hole
5—Boom
6—Arm
7—Clearance
8—Shim
9—Pin
10—Pin Lock Plate
11—Bolts

DW90712,000008B –19–03MAR06–1/1

Connecting Arm Cylinder Rod

1. To prevent seals from damage, bleed the air from the arm cylinder according to the following procedures.

   a. Start engine. Run engine at slow speed.

   b. Lift arm cylinder (B) with a crane. Slowly extend and retract rod (A).

   c. Repeat operation in step (b) until cylinder rod moves smoothly.

2. Align rod-pin bore (C) of the arm cylinder with pin (D) on the arm by moving the arm cylinder up and down while extending or retracting the cylinder rod.

450DLC—Specification

Arm Cylinder Rod End Pin—
Weight..... 25 kg approximate
54 lb approximate

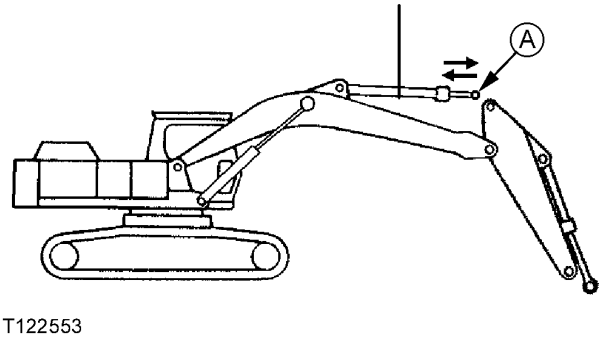
650DLC—Specification

Arm Cylinder Rod End Pin—
Weight..... 30 kg approximate
66 lb approximate

850DLC—Specification

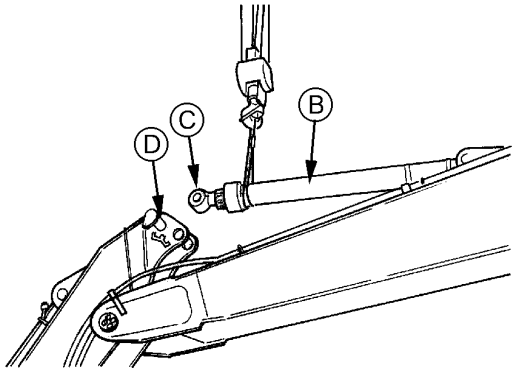
Arm Cylinder Rod End Pin—
Weight..... 38 kg approximate
85 lb approximate

A—Cylinder Rod
B—Arm Cylinder
C—Rod-Pin Bore
D—Pin
E—Pin Retaining Plate
F—Cap Screw
G—Adapter
H—10 to 30 Degree Angle



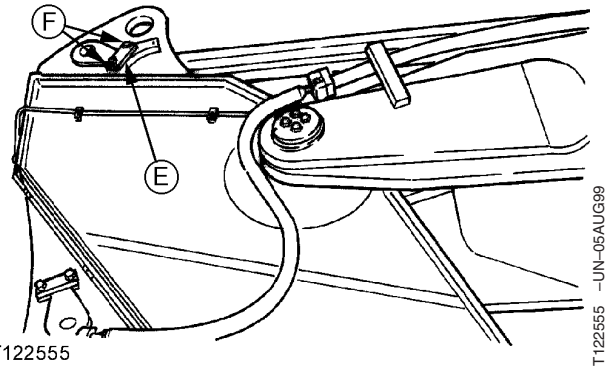
T122553 –UN–05AUG99

T122553



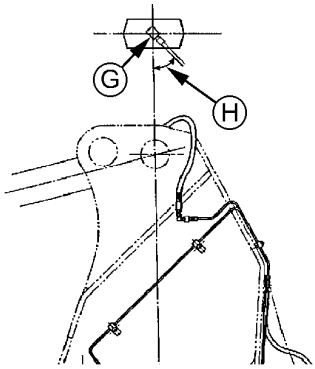
T122554 –UN–05AUG99

T122554



T122555 –UN–05AUG99

T122555



T122556 –UN–05AUG99

T122556

Continued on next page

CAUTION: When aligning the centers of the pin and pin hole, Do Not put fingers into the pin hole.

When using a hammer, wear safety equipment such as safety glasses or a hard hat to protect against injury from flying pieces of metal.

When inserting the pin, Do Not enter the area under the arm cylinder.

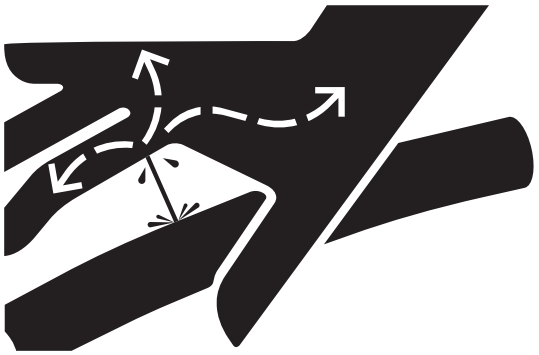
3. Install the pin into the pin bores, install pin retaining plate (E) with cap screws (F). Tighten to 400 N•m (290 lb-ft).

Specification	
Pin Retaining Plate Cap Screws—Torque	400 N•m 290 lb-ft

4. When connecting the arm-cylinder-rod grease hose to the arm cylinder rod, install adapter (G) with angle (H) of 10 to 30° so that the hose does not come into contact with the arm cylinder mounting bracket.

DW90712,000007A –19–09FEB06–2/2

Connecting Bucket Cylinder Hoses



X9811 –UN–08DEC08

CAUTION: Escaping oil under pressure can penetrate the skin causing serious injury.

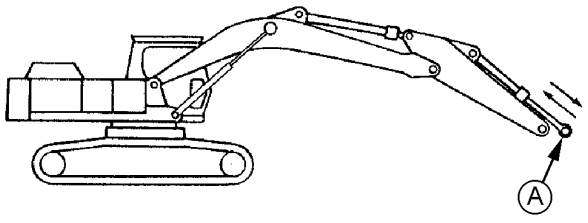
Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

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

1. Stop the engine. Place pilot control lever in unlock position. Move the control levers back and forth, and right and left several times to release the remaining pressure in the hydraulic line.
2. Before connecting the bucket cylinder and the lines on the boom with the hoses, gradually loosen cap screws securing the covers to the ends of the hydraulic lines on the boom to release the trapped oil pressure in the lines. Remove the covers.
3. Connect two hoses between the hydraulic lines on the boom and bucket cylinder.

DW90712,0000084 –19–10FEB06–1/2

4. To prevent seals from damage, bleed the air from the bucket cylinder according to the following procedure.
   a. Start engine. Run engine at slow idle speed.
   b. Slowly extend and retract cylinder rod (A).
   c. Repeat operation in step (b) until cylinder rod moves smoothly.



T122557 –UN–05AUG99

T122557

A—Cylinder Rod

DW90712,0000084 –19–10FEB06–2/2

Installing Bucket

1. Install the O-rings around the bucket bosses at the arm connecting section.
2. Start the engine. Raise the arm tip approximately 2.5 m (2.7 yd) above the ground.
3. Lift bucket (D) with a crane. Align pin (C) with pin hole (B) of the arm.

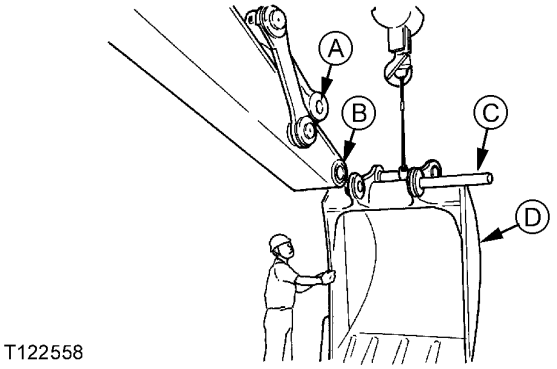
CAUTION: When aligning the centers of the pin and pin hole, Do Not put fingers into the pin hole.

When using a hammer, wear safety equipment to protect against injury from flying pieces of metal.

While installing the bucket pin, Do Not allow anyone to enter the area under the bucket.

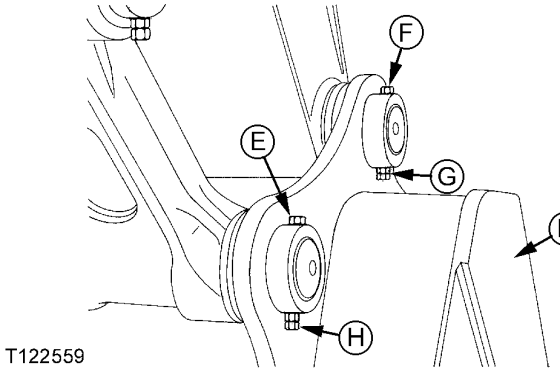
4. Install pin into the pin bosses. Secure pin with cap screw (F) and nuts (G).
5. While extending or retracting the bucket cylinder, align pin hole (A) of the link with that of bucket (D).
6. Install the pin into the bucket and link. Secure the pin with cap screw (E) and nuts (H). Install double nuts and tighten.

Specification	
Pin in Bucket and Link Cap Screws—Torque	400 N•m 290 lb-ft



T122558

T122558 –UN–05AUG99



T122559

T122559 –UN–05AUG99

A—Pin Hole
B—Pin Hole
C—Pin
D—Bucket
E—Cap Screw
F—Cap Screw
G—Nut
H—Nut

DW90712,000007B –19–08FEB06–1/1

Retracting the Side Frame

See Retracting the Side Frame. (Section 4-2.)

DW90712,000007D –19–08FEB06–1/1

Extending the Side Frame

See Extending the Side Frame. (Section 4-2.)

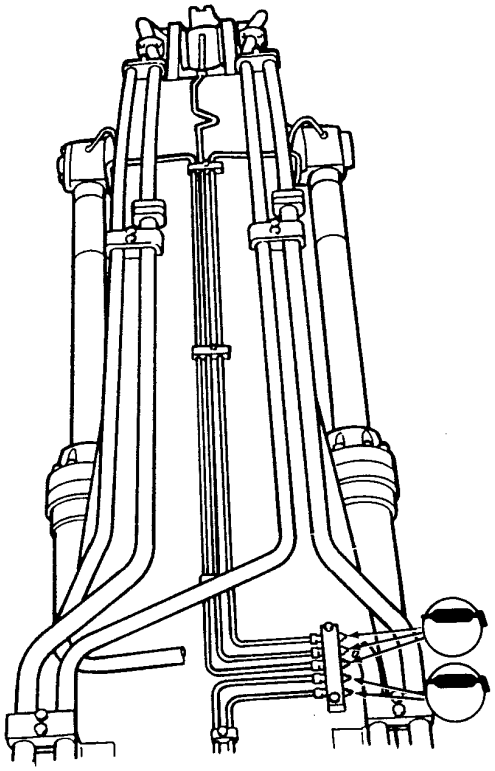
DW90712,000007F –19–08FEB06–1/1

Check Hydraulic Oil Level

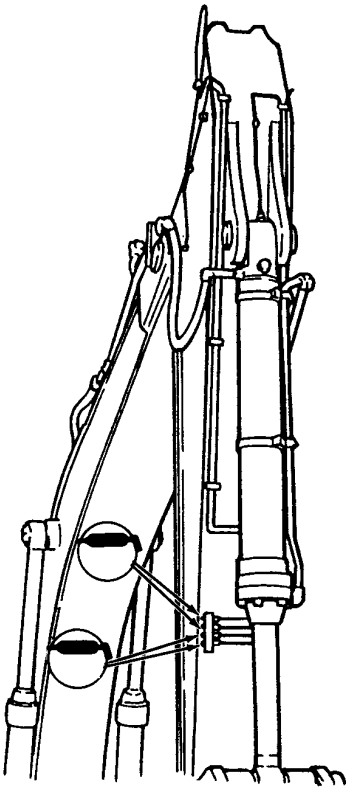
See Check Hydraulic Oil Level (See Section 3-4.)

VD76477,000011D –19–11MAY06–1/1

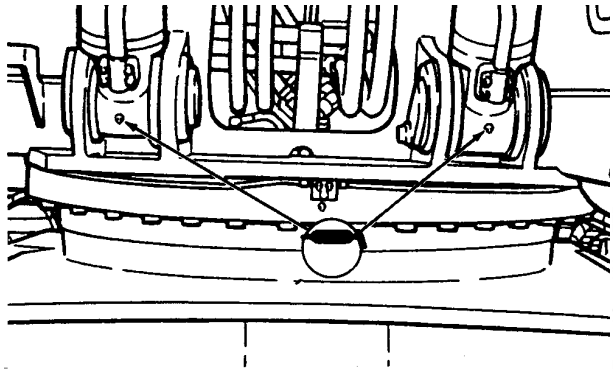
Lubricate Working Tool Pivots



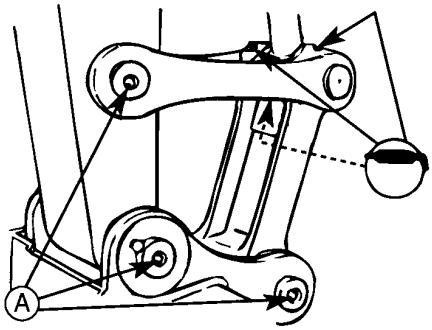
Five Points



Four Points



Two Points



Nine Points: A-Right Side Shown

Lubricate these areas until grease escapes at joints. (See Fuels and Lubricants chapter.)

Lubricate every four hours during the first 20 hours of operation.

Lubricate daily during the first 30—100 hours of operation and when working in mud and water.

TX,75,FF3833 –19–10MAR94–1/1

Install Counterweight (With Hydraulic Removal Option)

(See Section 2-3.)

DW90712,00001F3 –19–09AUG06–1/1

Installing Counterweight (Without Hydraulic Removal Option)

IMPORTANT: DO NOT attempt to remove or install counterweight with the track gauge in the narrow transport position. Before removing or installing the counterweight, the track gauge must be widened to the work position. To change track gauge, see story in this section.

NOTE: Counterweight installation procedure must be performed with the machine located on a level surface.

CAUTION: Never allow anyone to enter the area under the lifted counterweight.

1. Lift counterweight (A) using a crane.

Specification

Counterweight—450DLC—Weight ..... 9,150 kg Approximate
20,172 lb Approximate

Specification

Counterweight—650DLC—Weight ..... 11,100 kg Approximate
24,471 lb Approximate

Specification

Counterweight—850DLC—Weight ..... 13,300 kg Approximate
29,321 lb Approximate

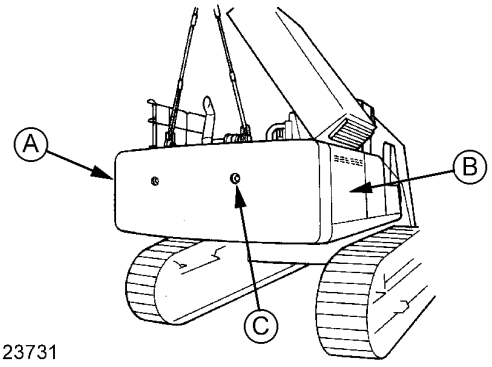
2. Insert the convex bosses of counterweight into holes on base machine (B). Install washers (D) (outer diameter: 80 mm) and counterweight mounting cap screws (C). Tighten cap screws. Do not overtighten.

Specification

Counterweight Mounting Cap Screws—450DLC—Torque ..... 2400 N•m
1735 lb-ft

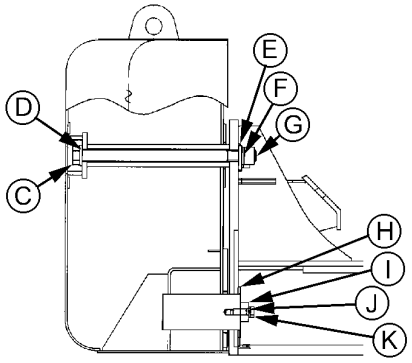
Specification

Counterweight Mounting Cap Screws—650DLC—Torque ..... 2800 N•m
2065 lb-ft



T123731

T123731 –UN–27AUG99



T123732

T123732 –UN–27AUG99

A—Counterweight
B—Base Machine
C—Cap Screw
D—Washer
E—Stopper
F—Washer
G—Nut
H—Spacer
I—Lock Plate
J—Washer
K—Cap Screw

Continued on next page

Specification	
Counterweight Mounting Cap Screws—850DLC—Torque	2800 N•m 2065 lb-ft

3. Install stoppers (E), washers (F), (outer diameter 70 mm), and nuts (G) on the end of counterweight mounting cap screws (C).

4. Install spacer (H), lock plates (I), and washer (J) onto the convex boss surfaces. Tighten cap screws (K).

Specification	
Plate And Lock Plate Cap Screw—450DLC—Torque	450 N•m 325 lb-ft
Plate And Lock Plate Cap Screw—650DLC—Torque	700 N•m 510 lb-ft
Plate And Lock Plate Cap Screw—850DLC—Torque	700 N•m 510 lb-ft

DW90712,000008F –19–15FEB06–2/2

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.

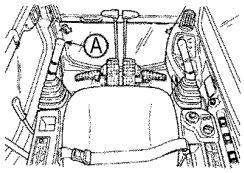
Complete the necessary visual checks (oil levels, oil condition, external leaks, loose hardware, linkage, wiring, etc.) prior to doing the checkout. The machine must be at operating temperature for many of the checks.

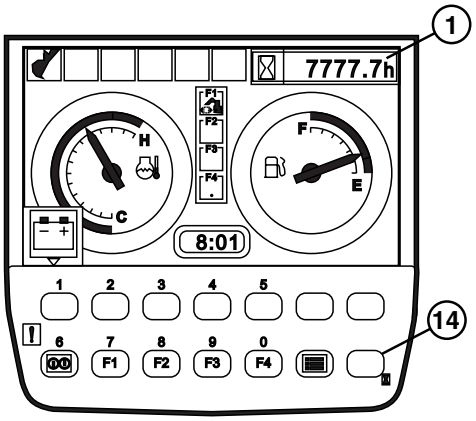
Start at the top of the left column and read completely down column before performing check. Follow this sequence from left to right. In the far right column, if no problem is found, you will be instructed to go to next check. If a problem is indicated, you will be referred to either a section in this manual or to your authorized dealer for repair.

VD76477,000042B –19–18JAN07–1/1

Operational Checks—Key Switch OFF, Engine OFF Checks

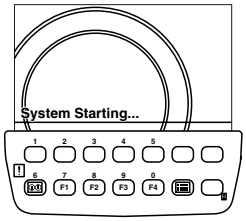
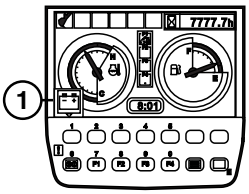
– – –1/1

Horn Circuit Check	 T102195 –UN–26JUL96	**A—Horn Switch** Key switch Off. Push horn button (A) on top of left pilot control lever. *LISTEN: Does horn sound?*	**YES:** Go to next check. **NO:** Check horn 10 A fuse (F17). **NO:** See your authorized dealer. – – –1/1

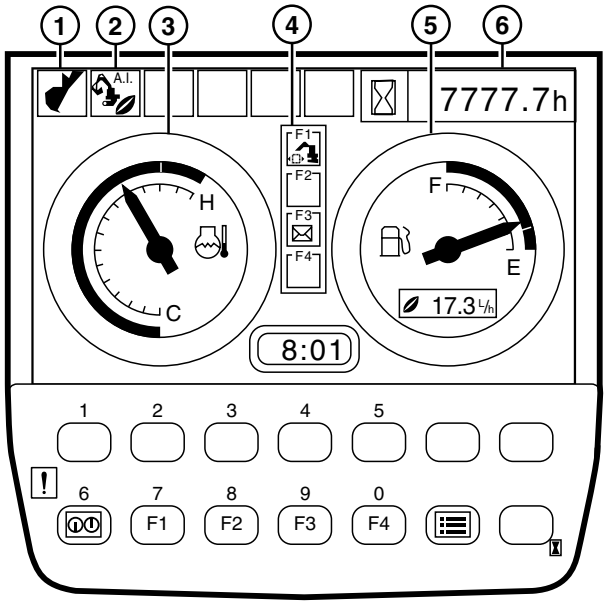
Hour Meter and Fuel Gauge Check	 TX1000548 –UN–21DEC05 **1—Hour Meter** **14—Hour Meter Button** Press and hold hour meter button (14) until default screen appears. *LOOK: Does hour meter (1) display machine hours?* *LOOK: Does fuel gauge display correct fuel level?*	**YES:** Go to next check. **NO:** Check controller 5 A fuse (F19). – – –1/1

Operational Checks—Key Switch ON, Engine OFF Checks

– – –1/1

Monitor Start Up Check	 TX1001153 –UN–07DEC05 *System Starting Screen*  TX1001157 –UN–07DEC05 *System Default Screen* **1—Alternator Alarm Indicator** Turn key switch to ON position. *LOOK: Does monitor display system starting screen?* *LOOK: Does default screen with hour meter appear?* *LOOK: Does alternator alarm indicator (1) appear on default screen?*	**YES:** Go to next check. **NO:** Check controller 5 A fuse (F19). – – –1/1

Monitor, Gauges and Battery Disconnect Relay Checks



TX1001140 –UN–04FEB06

1—Work Mode Indicator
2—Auto-Idle Indicator
3—Engine Coolant Temperature Gauge
4—F1 Function Button Indicator
5—Fuel Gauge
6—Hour Meter

NOTE: If engine coolant temperature is below 30°C (86°F) engine temperature gauge needle may not move.

Turn key switch to ON.

LISTEN: Does battery relay click?

LOOK: Does engine coolant temperature gauge (3) display correct engine coolant temperature?

LOOK: Does fuel gauge (5) display correct fuel level?

LOOK: Does hour meter (6) display machine hours?

LOOK: Do work mode indicator (1) and F1 function button indicator (4) display correct work mode (dig or attachment)?

YES: Go to next check.

NO: Battery relay does not click. See your authorized dealer.

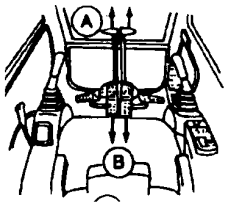
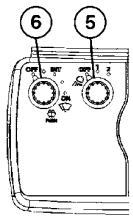
NO: Neither engine coolant temperature gauge or fuel gauge or moves. See your authorized dealer.

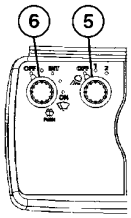
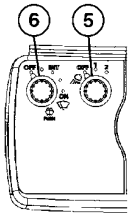
NO: Monitor indicator lights do not come ON. Check monitor controller 5 A fuse (F19).

Check wiring. See your authorized dealer.

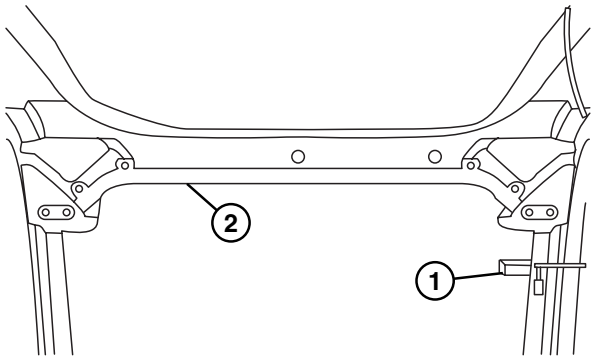
NO: Other than normal indicator lights remain On. See your authorized dealer.

– – –1/1

Travel Lever and Pedal Neutral Checks	 T7531AO –UN–07JUN91	**A—Travel Lever and Pedal Forward** **B—Travel Lever and Pedal Reverse** Push both travel levers and pedals forward (A), then release. Pull both travel levers and pedals rearward (B), then release. *FEEL: Do levers and pedals require equal effort to operate in forward and reverse?* *LOOK: Do levers and pedals return to neutral at the same time when released?*	**YES:** Go to next check. **NO:** See your authorized dealer. – – –1/1
Light Circuit Checks	 TX1000880 –UN–01DEC05	**5—Work Light Switch** **6—Windshield Wiper and Washer Switch** Turn work light switch (5) to 1st position. *LOOK: Are monitor panel back lights and drive lights on?* Turn light switch to 2nd position. *LOOK: Do monitor panel back lights and drive lights remain on and boom work lights come on?*	**YES:** Go to next check. **NO:** Check work and drive lights 20 A fuse (F1) and controller 5 A fuses (F19). **NO:** See your authorized dealer. – – –1/1

Windshield Wiper Controls Check	 TX1000880 –UN–01DEC05	**5—Work Light Switch** **6—Windshield Wiper and Washer Switch** *NOTE: Front window must be fully closed and latched for this check.* Turn wiper switch (6) to first INT position. *LOOK: Does wiper operate intermittently?* Turn wiper switch to second INT position. *LOOK: Does wiper operate intermittently, but faster than when in first position?* Turn wiper switch to third INT position. *LOOK: Does wiper operate intermittently, but faster than when in second position?* Turn wiper switch to ON position. *LOOK: Does wiper operate continuously?* Move wiper switch to OFF position. *LOOK: Does wiper arm stop in park position at left side of windshield?*	**YES:** Go to next check. **NO:** Check windshield wiper and washer 10 A fuse (F2). – – –1/1
Windshield Washer Circuit Check	 TX1000880 –UN–01DEC05	**IMPORTANT: Washer motor may be damaged if washer switch is held for more than 20 seconds, or continually operated with no fluid in the washer fluid tank.** **5—Work Light Switch** **6—Windshield Wiper and Washer Switch** *NOTE: Front window must be fully closed and latched for this check.* Push washer switch (6) *LOOK: Is washer fluid supplied to windshield?*	**YES:** Go to next check. **NO:** Check washer fluid level. See Windshield Washer Fluid Level. **NO:** Check windshield wiper and washer 10 A fuse (F2). **NO:** See your authorized dealer. – – –1/1

Windshield Wiper Circuit Check



TX1001270 –UN–14DEC05

1—Lock Pin
2—Lock Release Bar

NOTE: The wiper cannot operate with the upper front window open. The washer can operate with the upper front window open. When closing window, check that window upper left corner makes good contact with the cab.

Slide lock pin (1) inward, then down into notch.

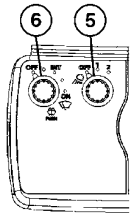
Pull lock release bar (2) toward operator.

While holding lower handle on window, pull window up and back as far as it can go.

CAUTION: Prevent possible injury from window closing. Always lock the pin in the cab frame boss hole.

Slide lock pin into cab frame boss hole and rotate downward into the lock position.

Turn windshield wiper (6) ON.



TX1000880 –UN–01DEC05

5—Work Light Switch
6—Windshield Wiper and Washer Switch

LISTEN: Does wiper circuit click?

LOOK: Does wiper remain stationary in park position?

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.

YES: Go to next check.

NO: Check windshield wiper and washer 10 A fuse (F2).

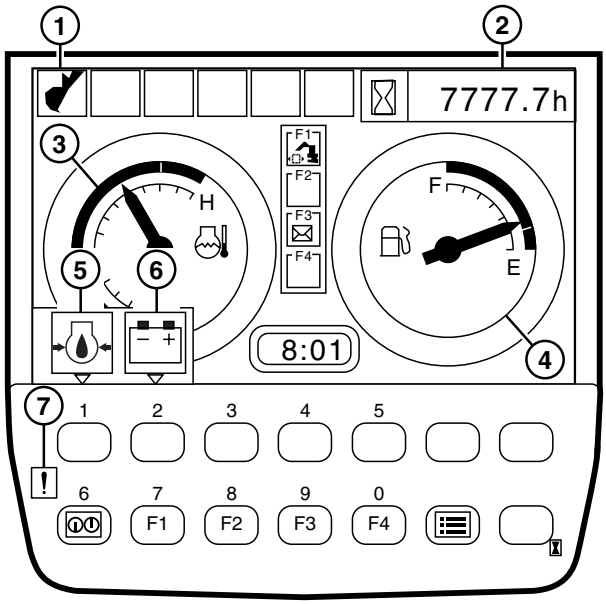
NO: See your authorized dealer.

– – –1/1

Operational Checks—Key Switch ON, Engine ON Checks

– – –1/1

Monitor and Gauge Circuit Checks



TX1001114 –UN–04FEB06

1—Work Mode Indicator
2—Hour Meter
3—Engine Coolant Temperature Gauge
4—Fuel Gauge
5—Engine Oil Pressure Alarm Indicator
6—Alternator Alarm Indicator
7—Alarm Light

IMPORTANT: Stop the engine immediately if alarm light (7) or engine oil pressure alarm indicator (5) comes on after engine starts.

Start engine.

LOOK: Does alternator alarm indicator (6) display then go off after engine starts?

LOOK: Do all alarm indicators remain off after engine starts?

LOOK: Does engine coolant temperature gauge (3) display correct engine coolant temperature?

LOOK: Does fuel gauge (4) display correct fuel level?

YES: Go to next check.

NO: Engine oil pressure alarm displayed. Immediately stop engine and check engine oil level. See Check Engine Oil Level.

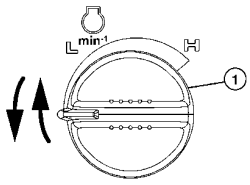
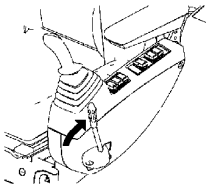
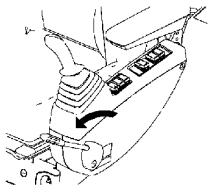
IF OK: See your authorized dealer.

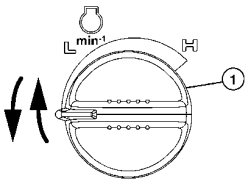
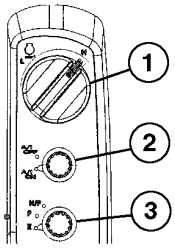
NO: Alternator alarm indicator displayed. Check alternator drive belt.

IF OK: Check alternator.

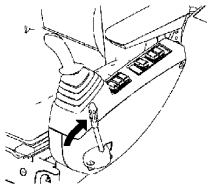
NO: Other alarm indicators display on monitor. See your authorized dealer.

– – –1/1

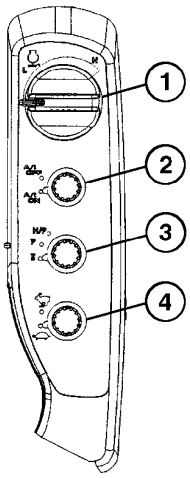
Pilot Shutoff Circuit Check	 TX1000874 –UN–01DEC05  TX1000749 –UN–29NOV05 **1—Engine Speed Dial** **CAUTION: Machine may move during this check. Make sure area is clear and large enough to operate all machine functions.** Turn engine speed dial (1) to slow idle (L) position. Place pilot shutoff lever in LOCKED (rearward) position. Slowly actuate dig and travel functions. *LOOK: Do dig and travel functions operate?*	**YES:** See your authorized dealer. **NO:** Continue check.
	 TX1000747 –UN–29NOV05 Place pilot shutoff lever in UNLOCKED (forward) position. Slowly actuate dig and travel functions. *LOOK: Do dig and travel functions operate?*	**YES:** Go to next check. **NO:** See your authorized dealer. – – –1/1

Engine Speed Dial Check	 TX1000874 –UN–01DEC05  TX1000170 –UN–10NOV05 **1—Engine Speed Dial** **2—Auto-Idle Switch** **3—Power Mode Switch** Turn auto-idle switch (2) to A/I OFF. Place pilot shutoff lever in LOCKED (rearward) position. Turn engine speed dial (1) clockwise. *LISTEN: Does engine speed increase?* Turn engine speed dial (1) counterclockwise. *LOOK/LISTEN: Does engine speed decrease?*	**YES:** Go to next check. **NO:** Check controller 5A fuse (F19). **NO:** See your authorized dealer. – – –1/1

P (Power) Mode Circuit Check



TX1000749 –UN–29NOV05



TX1000744 –UN–29NOV05

1—Engine Speed Dial
2—Auto-Idle Switch
3—Power Mode Switch
4—Travel Speed Switch

Turn engine speed dial (1) to fast idle (H) position.

Turn power mode switch (3) to P (power) mode.

Turn auto-idle switch (2) to A/I OFF.

Turn travel mode switch (4) to fast (rabbit) mode.

Place pilot shutoff lever in UNLOCKED (forward) position.

Slowly actuate any dig function.

LISTEN/LOOK: Does engine speed remain at fast idle?

Slowly actuate travel function.

LOOK/LISTEN: Does engine speed remain at fast idle?

Turn travel mode switch to slow (turtle) position.

Slowly actuate travel function.

LOOK/LISTEN: Does engine speed decrease when travel function is actuated?

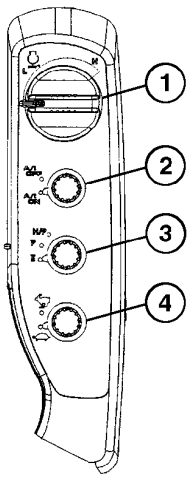
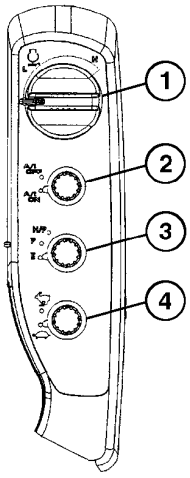
NOTE: Engine should return to fast idle after several seconds when travel pedals are returned to neutral.

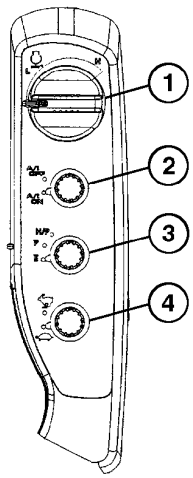
YES: Go to next check.

NO: Check controller 5 A fuse (F19).

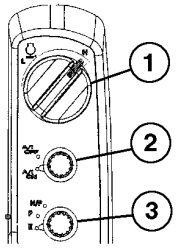
NO: See your authorized dealer.

– – –1/1

E (Economy) Mode Check	 TX1000744 –UN–29NOV05	**1—Engine Speed Dial** **2—Auto-Idle Switch** **3—Power Mode Switch** **4—Travel Speed Switch** Turn power mode switch (3) to P (power) mode. Turn auto-idle switch (2) A/I OFF. Turn engine speed dial (1) to fast idle (H) position. Turn power mode switch (3) to E (economy) mode. *LOOK/LISTEN: Does engine speed decrease?* Turn power mode switch (3) to P (power) mode. *LOOK/LISTEN: Does engine speed increase?*	**YES:** Go to next check. **NO:** See your authorized dealer. – – –1/1
P (Power) Mode Check	 TX1000744 –UN–29NOV05	**1—Engine Speed Dial** **2—Auto-Idle Switch** **3—Power Mode Switch** **4—Travel Speed Switch** Turn power mode switch (3) to P (power) mode. Turn auto-idle switch (2) to A/I OFF. Turn engine speed dial (1) to fast idle (H) position. Turn power mode switch (3) to E (economy) mode. *LOOK/LISTEN: Does engine speed decrease?* Turn power mode switch (3) to P (power) mode. *LOOK/LISTEN: Does engine speed increase?*	**YES:** Go to next check. **NO:** See your authorized dealer. – – –1/1

HP (High Power) Mode Check	 TX1000744 –UN–29NOV05	**1—Engine Speed Dial** **2—Auto-Idle Switch** **3—Power Mode Switch** **4—Travel Speed Switch** Turn power mode switch (3) to P (power) mode. Turn auto-idle switch (2) to A/I OFF. Turn engine speed dial (1) to fast idle (H) position. Turn power mode switch (3) to HP (high power) mode. Actuate arm in function over relief. *LOOK/LISTEN: Does engine speed increase as function goes over relief?*	**YES:** Go to next check. **NO:** Check controller 5 A fuse (F19). **NO:** See your authorized dealer. – – –1/1

Auto-Idle Circuit Check



TX1000170 –UN–10NOV05

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

Turn engine speed dial (1) to fast idle (H) position.

Turn power mode switch (3) to HP (high power) mode.

Turn auto-idle switch (2) to A/I OFF.

Place pilot shutoff lever to UNLOCKED position.

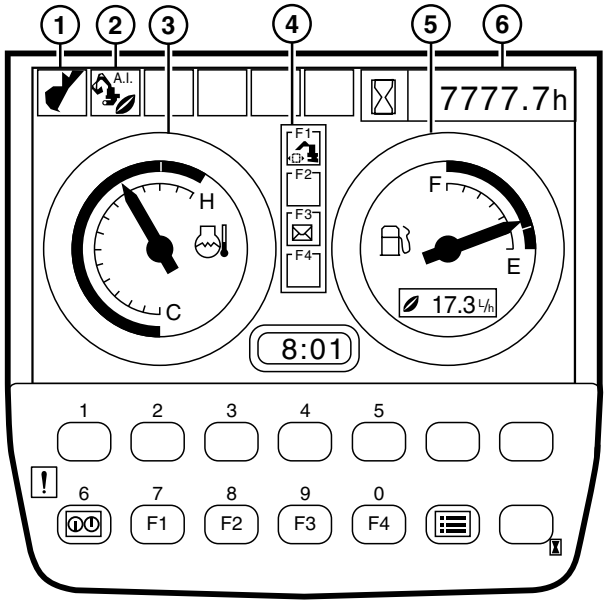
Turn auto-idle switch (2) to A/I ON.

LOOK/LISTEN: Does auto-idle indicator (2) illuminate?

Does engine speed decrease after 4—6 seconds?

Slowly actuate dig function.

LOOK/LISTEN: Does engine speed return to fast idle?



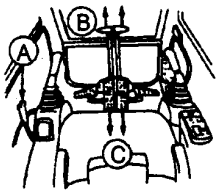
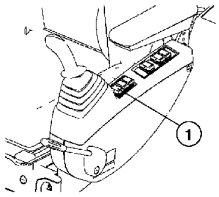
TX1001140 –UN–04FEB06

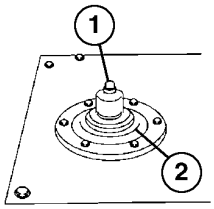
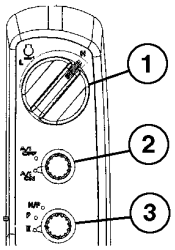
1—Work Mode Indicator
2—Auto-Idle Indicator
3—Engine Coolant Temperature Gauge
4—F1 Function Button Indicator
5—Fuel Gauge
6—Hour Meter

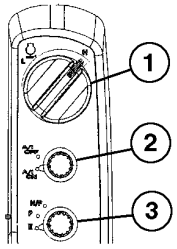
YES: Go to next check.

NO: Check solenoid 10 A fuse (F4).

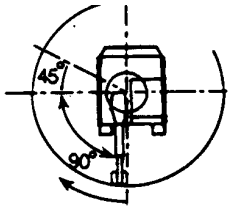
–––1/1

Travel Alarm Check	 T7850AF –UN–22OCT92	**A—Pilot Shutoff Lever** **B—Travel Lever and Pedal Forward** **C—Travel Lever and Pedal Rearward** **CAUTION: Machine will move during this check. Make sure area is clear and large enough to operate the machine.** Place pilot shutoff lever (A) to UNLOCKED position (forward). Push travel pedals or levers forward (B). *LISTEN: Does travel alarm sound?* Push travel pedals or pull levers rearward (C). *LISTEN: Does travel alarm sound?*	**YES:** Go to next check. **NO:** Check travel alarm 5 A fuse (F5). **NO:** See your authorized dealer. – – –1/1
Travel Alarm Cancel Switch Circuit Check	 TX1000876 –UN–03DEC05	**1—Travel Alarm Cancel Switch** **CAUTION: Machine will move during this check. Make sure area is clear, and large enough to operate the machine.** *NOTE: Travel alarm must operate for this check.* Place pilot shutoff lever (A) to UNLOCKED position (forward). Push travel pedals or levers and allow travel alarm to operate for a minimum of 12 seconds. *LISTEN: Does travel alarm sound?* While continuing travel, push travel alarm cancel switch (A). *LISTEN: Does travel alarm stop sounding?*	**YES:** Go to next check. **NO:** Check travel alarm 5 A fuse (F5). **NO:** See your authorized dealer. – – –1/1

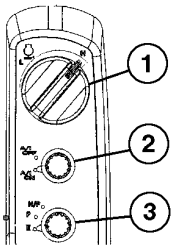
Hydraulic Oil Tank Pressurization Check	 TX1000859 –UN–01DEC05	**1—Hydraulic Oil Tank Pressure Release Button** **2—Hydraulic Oil Tank Cover** Raise boom to full height, then lower boom to ground. Slowly depress pressure release button on hydraulic oil tank cover. *LISTEN: Is air heard escaping from the pressure release button on hydraulic oil tank cover?* **IMPORTANT: The pressurized oil tank creates pressure at the inlet to the hydraulic pumps. If tank cover does not seal, hydraulic pumps could cavitate and be damaged.**	**YES:** Go to next check. **NO:** Replace hydraulic oil tank cover. – – –1/1
Control Lever Pattern Check—Backhoe Pattern	 TX1000170 –UN–10NOV05	**1—Engine Speed Dial** **2—Auto-Idle Switch** **3—Power Mode Switch** **CAUTION: Machine will move during this check. Make sure area is clear, and large enough to operate the machine.** Locate pilot control lever pattern decal on right window. Become familiar with excavator and backhoe pattern functions. Turn engine speed dial (1) to slow idle (L) position. Place pilot shutoff lever (A) to UNLOCKED position (forward). Slowly actuate pilot control levers to all positions shown on decal. *LOOK: Do functions operate as expected in backhoe pattern?*	**YES:** Go to next check. **NO:** See your authorized dealer. – – –1/1

Control Lever Pattern Check—Excavator Pattern	 TX1000170 –UN–10NOV05	**1—Engine Speed Dial** **2—Auto-Idle Switch** **3—Power Mode Switch** **CAUTION: Machine will move during this check. Make sure area is clear, and large enough to operate the machine.** Locate pilot control lever pattern decal on right window. Become familiar with excavator and backhoe pattern functions. Turn engine speed dial (1) to slow idle (L) position. Place pilot shutoff lever (A) to UNLOCKED position (forward). Slowly actuate pilot control levers to all positions shown on decal. *LOOK: Do functions operate as expected in excavator pattern?*	**YES:** Go to next check. **NO:** See your authorized dealer. – – –1/1

Swing Dynamic Braking Check



T6479AY –UN–19OCT88



TX1000170 –UN–10NOV05

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

CAUTION: Make sure area is clear and large enough to swing extended arm and bucket. Machine must be on level ground.

Position upperstructure with boom to the front.

Move arm to the extended position, bucket to the retracted position, and bucket-to-arm pivot pin at same level as boom-to-frame pivot pin.

Turn engine speed dial (1) to fast idle (H) position.

Turn power mode switch (3) to P (power) mode.

Fully actuate swing function. Swing clockwise 90 degrees and then release lever.

LOOK: Does upperstructure stop within 45 degrees (1/8 turn) or less after releasing lever?

Position upperstructure with boom to the front.

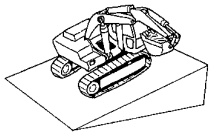
Fully actuate swing function. Swing counterclockwise 90 degrees and then release lever.

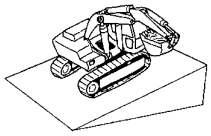
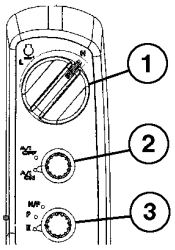
LOOK: Does upperstructure stop within 45 degrees (1/8 turn) or less after releasing lever?

YES: Go to next check.

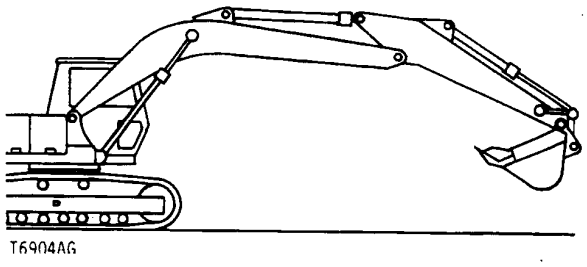
NO: See your authorized dealer.

– – –1/1

Swing Park Brake and Circuit Drift Check	 **T140540** T140540 –UN–17MAY01	Fill the bucket with dirt. Position machine on a side hill with a slope of approximately 25%. If a hill is not available, raise one side of machine approximately 300 mm (1 ft) with the boom and then put a block under the track. Move arm to the fully extended position. Raise boom so arm-to-bucket pivot pin are the same height as boom-to-frame pivot pin. Position upperstructure with cab over travel motors, perpendicular to tracks. Turn engine speed dial (1) to slow idle (L) position. Wait approximately 5 minutes with all functions in neutral. *NOTE: Function does not need to be fully actuated to disengage the swing park brake.* Slowly actuate bucket load function to disengage the swing park brake. Do not hold the function over relief for more than 10 seconds. *LOOK: Does upperstructure hold position when swing park brake is engaged?* *LOOK: Does upperstructure move only slightly when swing park brake is disengaged?* Swing upperstructure 180 degrees counterclockwise and repeat procedure. Turn engine speed dial (1) to slow idle (L) position. Wait approximately 5 minutes with all functions in neutral. Slowly actuate bucket load function to disengage the swing park brake. Do not hold the function over relief for more than 10 seconds. *LOOK: Does upperstructure hold position when swing park brake is engaged?* *LOOK: Does upperstructure move only slightly when swing park brake is disengaged?*	**YES:** Go to next check. **NO:** See your authorized dealer. – – –1/1

Swing Power Check	 **T140540** T140540 –UN–17MAY01  TX1000170 –UN–10NOV05 **1—Engine Speed Dial** **2—Auto-Idle Switch** **3—Power Mode Switch** Fill the bucket with dirt. Position machine on a hill side with a slope of approximately 25%. If a hill is not available, raise one side of machine approximately 300 mm (1 ft) with the boom and then put a block under the track. Move arm to the fully extended position. Raise boom so arm-to-bucket pivot pin are the same height as boom-to-frame pivot pin. Swing upperstructure clockwise so it's 90 degrees to the slope Turn engine speed dial (1) to fast idle (H) position. Turn power mode switch (3) to HP (high power) mode Actuate the swing function to swing up hill. *LOOK: Does upperstructure swing up hill?* Swing upperstructure 180 degrees counterclockwise and repeat procedure. Turn engine speed dial (1) to fast idle (H) position. Power mode switch (3) in HP (high power) mode Actuate the swing function to swing up hill. *LOOK: Does upperstructure swing up hill?*	**YES:** Go to next check. **NO:** See your authorized dealer. – – –1/1

Dig Function Drift Check



T6904AG –UN–06DEC88

Fill bucket with dirt.

Position bucket at maximum reach with bucket pivot pin the same height as boom pivot pin.

Retract arm cylinder, then extend about 2 inches

Extend bucket cylinder then retract about 2 inches.

Stop engine.

Measure amount cylinders extend or retract in 5 minutes.

Measure distance from bottom of bucket to ground.

Compare measurements to specifications.

450DLC—Specification

Boom Cylinder—Drift	15 mm 0..59 in.
Arm Cylinder—Drift	20 mm 0.78 in.
Bucket Cylinder—Drift	20 mm 0.78 in.
Bottom of Bucket-to-Ground—Drift	100 mm 3.9 in.

650DLC—Specification

Boom Cylinder—Drift	10 mm 0.39 in.
Arm Cylinder—Drift	10 mm 0.39 in.
Bucket Cylinder—Drift	16 mm 0.63 in.
Bottom of Bucket-to-Ground—Drift	100 mm 3.9 in.

850DLC—Specification

Boom Cylinder—Drift	5 mm 0.2 in.
Arm Cylinder—Drift	18 mm 0.71 in.
Bucket Cylinder—Drift	27 mm 1.1 in.
Bottom of Bucket-to-Ground—Drift	150 mm 6.0 in.

LOOK: Is cylinder drift within specification?

YES: Go to next check.

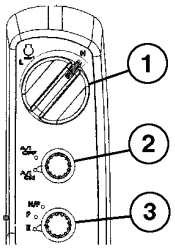
NO: See your authorized dealer.

– – –1/1

Swing Priority Circuit Check

CAUTION: Perform check in an open area away from other machinery or personnel.

T6290AF –UN–19OCT88



TX1000170 –UN–10NOV05

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

Position machine as shown.

Turn engine speed dial (1) to fast idle (H) position.

Turn power mode switch (3) to P (power) mode.

Operate swing function and record time required for three complete revolutions.

Divide that time by three to get an average time for one revolution.

450DLC—Specification
Swing Function—Time—
One Revolution ..... 6.17—7.17 seconds

650DLC—Specification
Swing Function—Time—
One Revolution ..... 5.8—6.8 seconds

850DLC—Specification
Swing Function—Time—
One Revolution ..... 7.93—8.6 seconds

IMPORTANT: Position machine as shown. Operate swing and arm in slowly a few times before attempting to perform check to ensure bucket does not contact machine or ground.

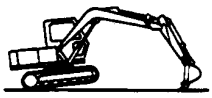
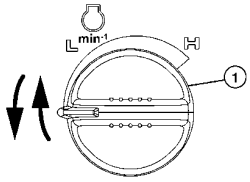
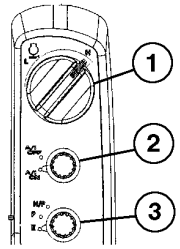
Position machine as shown, arm extended, bucket curled and upper structure 90 degrees to tracks.

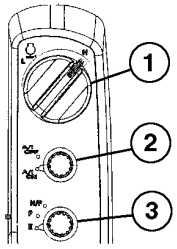
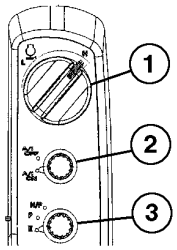
Turn engine speed dial (1) to fast idle (H) position.

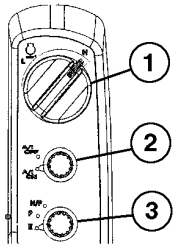
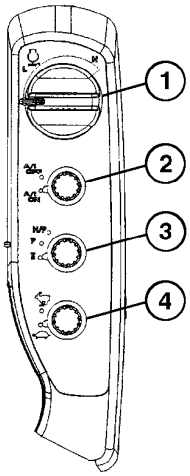
Turn power mode switch (3) to P (power) mode.

Raise boom high enough so bucket does not contact the machine or ground during arm in and swing combined operation.

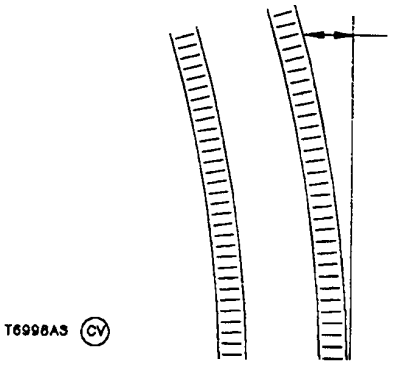
Operate swing function and slowly actuate arm in function when upperstructure is in line with tracks. Record time required for one complete revolution.

		NOTE: Swing speed should not slow when actuating arm in. *LOOK: Does swing speed remain unchanged when actuating arm in?*	**YES:** Go to next check. **NO:** See your authorized dealer. –19– –2/2
Control Valve Lift Check Test	 T6292AZ –UN–19OCT88  TX1000874 –UN–01DEC05	**1—Engine Speed Dial** Turn engine speed dial (1) to slow idle to (L) position. Position machine as shown. Slowly lower boom, extend arm (retract cylinder), and dump bucket (retract cylinder). *LOOK: Do functions move in opposite direction as pilot control levers are first moved, then change direction as levers are moved further?*	**YES:** See your authorized dealer. **NO:** Go to next check. – – –1/1
Boom Up, Arm In, and Bucket Combined Function Operation Check	 TX1000170 –UN–10NOV05	**1—Engine Speed Dial** **2—Auto-Idle Switch** **3—Power Mode Switch** Turn engine speed dial (1) to fast idle (H) position. Turn power mode switch (3) to P (power) mode. Actuate boom up function, arm in function and then bucket function in combination. *LOOK: Does boom continue to move at approximately the same speed after bucket function is actuated?*	**YES:** Go to next check. **NO:** See your authorized dealer. – – –1/1

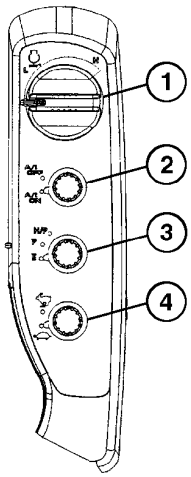
Boom Regenerative Valve Operation Check	 TX1000170 –UN–10NOV05	**1—Engine Speed Dial** **2—Auto-Idle Switch** **3—Power Mode Switch** Turn engine speed dial (1) to fast idle (H) position. Turn power mode switch (3) to P (power) mode. Raise boom and extend the arm to full extension. Actuate the boom down, then arm in and boom up functions in combined operation. *LOOK: Does the boom move smoothly through the complete cycle down and up and not hesitate when it goes past the vertical position?*	**YES:** Go to next check. **NO:** See your authorized dealer. – – –1/1
Arm Regenerative Valve Operation Check	 TX1000170 –UN–10NOV05	**1—Engine Speed Dial** **2—Auto-Idle Switch** **3—Power Mode Switch** Turn engine speed dial (1) to fast idle (H) position. Turn power mode switch (3) to P (power) mode. Extend the arm to full extension and then lower boom so bucket is on the ground. Actuate the boom up and arm in functions in combined operation. *LOOK: Does the arm move smoothly through the complete cycle and not hesitate when it goes through the vertical position?*	**YES:** Go to next check. **NO:** See your authorized dealer. – – –1/1

Bucket Regenerative Valve Operation Check	 TX1000170 –UN–10NOV05	**1—Engine Speed Dial** **2—Auto-Idle Switch** **3—Power Mode Switch** Turn engine speed dial (1) to fast idle (H) position. Turn power mode switch (3) to P (power) mode. Actuate boom up, arm out and bucket dump functions. Actuate boom down function, arm in function and then the bucket curl function. *LOOK: Does the bucket move smoothly through the complete cycle and not hesitate when it goes to the curl position?*	**YES:** Go to next check. **NO:** See your authorized dealer. – – –1/1
Travel Speed Selection Check	 TX1000744 –UN–29NOV05	**1—Engine Speed Dial** **2—Auto-Idle Switch** **3—Power Mode Switch** **4—Travel Speed Switch** Turn engine speed dial (1) to fast idle (H) position. Turn travel speed switch (4) to slow speed (turtle) mode. Actuate travel function to full speed. Turn travel speed switch (4) to fast speed (rabbit) mode. *LOOK: Does machine travel speed increase?* Actuate a dig function and then return to neutral. *LOOK: Does machine travel speed decrease and then increase as dig function is actuated and then released?* Turn travel speed switch (4) to slow speed (turtle) mode. *LOOK: Does machine travel speed decrease?*	**YES:** Go to next check. **NO:** See your authorized dealer. – – –1/1

Travel System Tracking Check



T6998AS –UN–23MAR89



TX1000744 –UN–29NOV05

1—Engine Speed Dial
2—Auto-Idle Switch
3—Power Mode Switch
4—Travel Speed Switch

Turn engine speed dial (1) to fast idle (H) position.

Turn power mode switch (3) to P (power) mode.

Turn travel speed switch (4) to fast speed (rabbit) mode.

Operate machine at full speed forward on a flat and level area about 20 m (65 ft.).

Repeat procedure in reverse travel.

Observe which direction and how much the machine mistracks from a straight line.

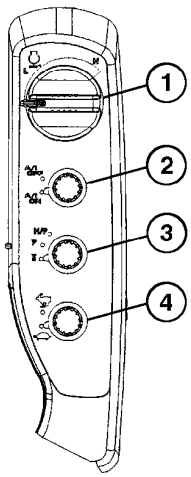
LOOK: Does machine mistrack less than 200 mm (7 7/8 in.)?

YES: Go to next check.

NO: See your authorized dealer.

– – –1/1

Travel System Tracking Checks While Operating a Dig Function



TX1000744 –UN–29NOV05

1—Engine Speed Dial
2—Auto-Idle Switch
3—Power Mode Switch
4—Travel Speed Switch

NOTE: Machine will slow down during this test.

Turn engine speed dial (1) to fast idle (H) position.

Turn travel speed switch (4) to fast speed (rabbit) mode.

Operate machine at full speed forward on a flat and level surface.

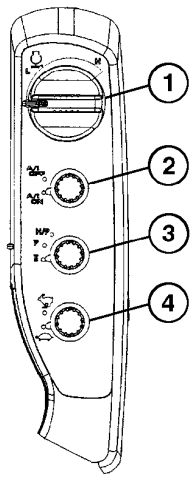
After machine is moving, actuate arm out from neutral to full actuation and extend the arm.

LOOK: Does machine mistrack excessively when the arm is extended?

YES: See your authorized dealer.

NO: Go to next check.

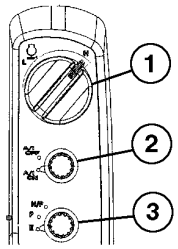
– – –1/1

Travel System Maneuverability Check	 TX1000744 –UN–29NOV05	**1—Engine Speed Dial** **2—Auto-Idle Switch** **3—Power Mode Switch** **4—Travel Speed Switch** Turn engine speed dial (1) to fast idle (H) position. Turn travel speed switch (4) to fast speed (rabbit) mode. Drive machine at full speed forward down a slope. Turn in each direction. *LOOK: Does each track slow down in response to pedal or lever movement in order to turn?* Repeat the procedure in reverse travel. Turn travel speed switch (4) in fast speed (rabbit) mode. Drive machine at full speed in reverse down a slope. Turn in each direction. *LOOK: Does each track slow down in response to pedal or lever movement in order to turn?*	**YES:** Go to next check. **NO:** See your authorized dealer. – – –1/1

Cycle Times Check—450DLC

CAUTION: Prevent possible injury from unexpected machine movement. Clear all persons from the area before operating machine.

NOTE: Warm hydraulic oil to operating temperature for this check.

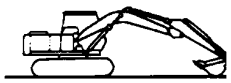


TX1000170 –UN–10NOV05

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

Turn engine speed dial (1) to fast idle (H) position.

Turn auto-idle switch (2) A/I OFF.



T6477AQ –UN–19OCT88

Boom

T7884AE –UN–10NOV92

Arm, Bucket, Swing

Move machine to position shown for each test.
Record cycle time for each function.

Specification	
Boom Raise (Cylinder Extend)—Cycle Time (Seconds)	3.3—3.9
Boom Lower (Cylinder Retract)—Cycle Time (Seconds)	2.2—2.8
Arm In (Cylinder Extend)—Cycle Time (Seconds)	4.2—4.8
Arm Out (Cylinder Retract)—Cycle Time (Seconds)	2.8—3.4
Bucket Load (Cylinder Extend)—Cycle Time (Seconds)	3.2—3.8
Bucket Dump (Cylinder Retract)—Cycle Time (Seconds)	2.6—3.2
Swing Left or Right, 3 Revolutions From a Running Start—Cycle Time (Seconds)	18.5—21.5
Drive 20 m (65 ft) From A Running Start (Check In Forward And Reverse With Travel Speed Switch In FAST Position)—Cycle Time (Seconds)	11.0—15.0
Drive 20 m (65 ft) From A Running Start (Check In Forward And Reverse With Travel Speed Switch In SLOW Position)—Cycle Time (Seconds)	18.0—22.0
Track Raised For 3 revolutions From A Running Start (Check In Forward And Reverse With Travel Mode Switch In FAST Position)—Cycle Time (Seconds)	20.0—24.0
Track Raised For 3 revolutions From A Running Start (Check In Forward And Reverse With Travel Mode Switch In SLOW Position)—Cycle Time (Seconds)	32.0—36.0

LOOK: Does machine perform within specifications?

YES: Go to next check.

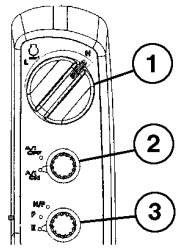
NO: See your authorized dealer.

– – –1/1

Cycle Times Check—650DLC

CAUTION: Prevent possible injury from unexpected machine movement. Clear all persons from the area before operating machine.

NOTE: Warm hydraulic oil to operating temperature for this check.

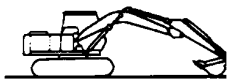


TX1000170 –UN–10NOV05

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

Turn engine speed dial (1) to fast idle (H) position.

Turn auto-idle switch (2) A/I OFF.



T6477AQ –UN–19OCT88
Boom

T7884AE –UN–10NOV92
Arm, Bucket, Swing

Move machine to position shown for each test.
Record cycle time for each function.

Specification	
Boom Raise (Cylinder Extend)—Cycle Time (Seconds)	3.9—4.5
Boom Lower (Cylinder Retract)—Cycle Time (Seconds)	2.6—3.2
Arm In (Cylinder Extend)—Cycle Time (Seconds)	3.9—4.5
Arm Out (Cylinder Retract)—Cycle Time (Seconds)	3.0—3.6
Bucket Load (Cylinder Extend)—Cycle Time (Seconds)	3.0—3.6
Bucket Dump (Cylinder Retract)—Cycle Time (Seconds)	2.5—3.1
Swing Left or Right, 3 Revolutions From a Running Start—Cycle Time (Seconds)	17.4—20.4
Drive 20 m (65 ft) From A Running Start (Check In Forward And Reverse With Travel Speed Switch In FAST Position)—Cycle Time (Seconds)	12.6—16.6
Drive 20 m (65 ft) From A Running Start (Check In Forward And Reverse With Travel Mode Switch In SLOW Position)—Cycle Time (Seconds)	19.3—23.3
Track Raised For 3 revolutions From A Running Start (Check In Forward And Reverse With Travel Mode Switch In FAST Position)—Cycle Time (Seconds)	24.8—28.8
Track Raised For 3 revolutions From A Running Start (Check In Forward And Reverse With Travel Mode Switch In SLOW Position)—Cycle Time (Seconds)	37.0—41.0

LOOK: Does machine perform within specifications?

YES: Go to next check.

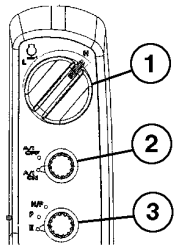
NO: See your authorized dealer.

– – –1/1

Cycle Times Check—850DLC

CAUTION: Prevent possible injury from unexpected machine movement. Clear all persons from the area before operating machine.

NOTE: Warm hydraulic oil to operating temperature for this check.

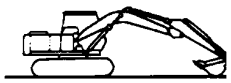


TX1000170 –UN–10NOV05

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

Turn engine speed dial (1) to fast idle (H) position.

Turn auto-idle switch (2) A/I OFF.



T6477AQ –UN–19OCT88

Boom

T7884AE –UN–10NOV92

Arm, Bucket, Swing

Move machine to position shown for each test.
Record cycle time for each function.

Specification	
Boom Raise (Cylinder Extend)—Cycle Time (Seconds)	4.3—5.1
Boom Lower (Cylinder Retract)—Cycle Time (Seconds)	2.5—3.3
Arm In (Cylinder Extend)—Cycle Time (Seconds)	4.1—4.9
Arm Out (Cylinder Retract)—Cycle Time (Seconds)	3.1—3.9
Bucket Load (Cylinder Extend)—Cycle Time (Seconds)	3.3—4.1
Bucket Dump (Cylinder Retract)—Cycle Time (Seconds)	2.9—3.7
Swing Left or Right, 3 Revolutions From a Running Start—Cycle Time (Seconds)	23.8—25.8
Drive 20 m (65 ft) From A Running Start (Check In Forward And Reverse With Travel Speed Switch In FAST Position)—Cycle Time (Seconds)	15.5—19.5
Drive 20 m (65 ft) From A Running Start (Check In Forward And Reverse With Travel Mode Switch In SLOW Position)—Cycle Time (Seconds)	21.2—25.2
Track Raised For 3 revolutions From A Running Start (Check In Forward And Reverse With Travel Mode Switch In FAST Position)—Cycle Time (Seconds)	30.1—34.1
Track Raised For 3 revolutions From A Running Start (Check In Forward And Reverse With Travel Mode Switch In SLOW Position)—Cycle Time (Seconds)	40.5—44.5

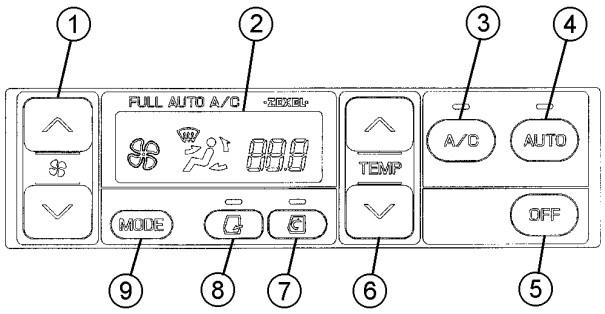
LOOK: Does machine perform within specifications?

YES: Go to next check.

NO: See your authorized dealer.

– – –1/1

Heater and Air Conditioning Circuit Check



T136242 –UN–18DEC00

1—Fan Speed Switches
2—Monitor Display
3—Air Conditioner ON and OFF switch (A/C)
4—Automatic Operation Switch (AUTO)
5—Heater and Air Conditioner OFF Switch (OFF)
6—Temperature Control Switches (TEMP)
7—Recirculating Air Switch
8—Fresh Air Switch
9—Front, Rear and Defroster Vent Control Switch (MODE)

Start engine and warm to normal operating temperature.

Press temperature control switch to maximum heat position.

FEEL: Does warm air come from the vents?

Press temperature control switch to maximum cold position.

LISTEN: Does air conditioner compressor clutch solenoid “click”?

FEEL: Does cool air come from the vents?

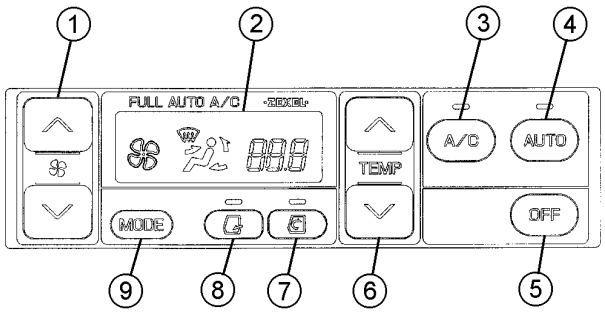
YES: Check complete.

NO: Heater does not operate. Check air conditioner and heater 20 A fuse (F3).

NO: See your authorized dealer.

– – –1/1

Heater And Air Conditioner Controls Check (Automatic Temperature Control)



T136242 –UN–18DEC00

1—Fan Speed Switches
2—Monitor Display
3—Air Conditioner ON and OFF switch (A/C)
4—Automatic Operation Switch (AUTO)
5—Heater and Air Conditioner OFF Switch (OFF)
6—Temperature Control Switches (TEMP)
7—Recirculating Air Switch
8—Fresh Air Switch
9—Front, Rear and Defroster Vent Control Switch (MODE)

Key ON, press OFF switch (5).

Start engine and warm to normal operating temperature.

Press AUTO switch (4).

LISTEN: Does air conditioner compressor clutch solenoid “click”?

LOOK: Does indicator light above A/C and AUTO switches illuminate?

LOOK: Does monitor display illuminate and display vent position, fan speed, and temperature setting?

Press temperature control switch to maximum heat position.

FEEL/LISTEN: Does vent position change?

LOOK: Does fan speed change to maximum and temperature setting increase?

LOOK: Does full heat (FH) appear in the temperature setting area?

FEEL: Does warm air come from the vents?

Press temperature control switch to maximum cold position?

FEEL/LISTEN: Does vent position change?

LOOK: Does fan speed change to maximum and temperature setting decrease?

LOOK: Does full cool (FC) appear in the temperature setting area?

FEEL: Does cool air come from the vents?

Press A/C switch.

LISTEN: Does air conditioner compressor clutch solenoid “click”? (Heater is ON in manual mode.)

LOOK: Do indicator lights above A/C and AUTO switches go OFF?

– – –1/2

	Press temperature control switch to maximum heat position. *FEEL/LISTEN: Does vent position change?* *LOOK: Does fan speed change to maximum and temperature setting increase?* *LOOK: Does full heat (FH) appear in the temperature setting area?* *FEEL: Does warm air come from the vents?* Press A/C switch. *LISTEN: Does air conditioner compressor clutch solenoid "click"? (Air conditioner and heater are ON in manual mode.)* Press temperature control switch to maximum cold position. *FEEL/LISTEN: Does vent position change?* *LOOK: Does fan speed change to maximum and temperature setting decrease?* *LOOK: Does full cool (FC) appear in the temperature setting area?* *FEEL: Does cool air come from the vents?* Press OFF switch. *LOOK: Is air conditioner and heater OFF? (Push AUTO to start A/C and heater).*	**YES:** Check complete. **NO:** Heater fan does not blow air. Check air conditioner and heater 20 A fuse (F3). **NO:** See your authorized dealer. –19– –2/2

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 –19–25JAN07–1/1

Engine

Symptom	Problem	Solution
Engine Cranks But Will Not Start Or Hard To Start	No fuel	Add fuel. Bleed air.
	Incorrect fuel	Use correct fuel.
	Fuel filter clogged	Replace filter. Bleed air. Clean fuel tank strainer.
	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.
	Incorrect engine oil	Use correct oil.
	Air filter clogged	Clean or replace elements.
	Starter	Replace starter.

Continued on next page

VD76477,000041B –19–10JAN06–1/4

Symptom	Problem	Solution
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 strainer.
	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 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.
	Incorrect fuel	Use correct fuel.
	Fuel line restricted	Repair or replace fuel line. Bleed air.
	Exhaust restriction	Install new muffler.
	Incorrect valve clearance	Check and adjust valves.
	Incorrect oil	Use correct oil.

Continued on next page

Symptom	Problem	Solution
Engine Overheats	Coolant level low	Add coolant to surge tank. Remove cap when cool.
	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.
	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.
	Incorrect oil	Use correct oil.
	Oil leaks	Go to your authorized dealer.
	Engine temperature too high	Check cooling system.
Engine Uses Too Much Oil	Incorrect 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.
	Incorrect fuel	Use correct fuel.
Excessive Black Or Gray Exhaust Smoke	Incorrect fuel	Use correct fuel.
	Clogged or dirty air intake or exhaust system	Clean air intake and exhaust system.

Continued on next page

Symptom	Problem	Solution
Exhaust Smoke Is White	Incorrect fuel	Use correct fuel.
	Cold engine	Run engine until warm.
Turbocharger Excessively Noisy Or Vibrates	Air leak in engine, intake, or exhaust manifold	Inspect, repair.
Oil Dripping From Turbocharger Adapter	Excessive crankcase pressure	Check vent tube to ensure tube is not clogged. Clean.
	Turbocharger oil return line carbon buildup	Remove line. Inspect, clean.

VD76477,000041B –19–10JAN06–4/4

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.
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.

Continued on next page

Symptom	Problem	Solution
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.
Starter Continues To Run After Engine Starts	Starter	Repair or replace starter.
	Key switch malfunction	Disconnect battery ground.
Charging Indicator Light On, Engine Running	Serpentine belt	Check belt. Replace if worn.
	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 belt. Turn pulley by hand. If any roughness is felt, repair alternator.
No Monitor Panel Indicators or Gauges Work	Fuse	Replace fuse.

Hydraulic System

Symptom	Problem	Solution
No Hydraulic Functions	Lack of hydraulic oil	Add oil.
	Clogged suction filter	Clean.
Hydraulic Functions Are Slow or Have Little or no Power	Low oil level	Fill hydraulic oil tank to full mark.
	Cold oil	Perform cold weather warm-up.
	Incorrect oil	Use correct oil.
	Suction screen clogged	Inspect and clean.
	Hydraulic tank cap/cover	Replace cap/cover.
Power Dig Does Not Work	Fuse	Check fuse.
Hydraulic Oil Overheats	Incorrect oil	Use correct oil.
	Clogged radiator or oil cooler	Clean and straighten fins.
	Radiator screen clogged	Clean screen.
	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.
	Incorrect 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 control valve hoses pinched or kinked	Inspect and correct.

Continued on next page

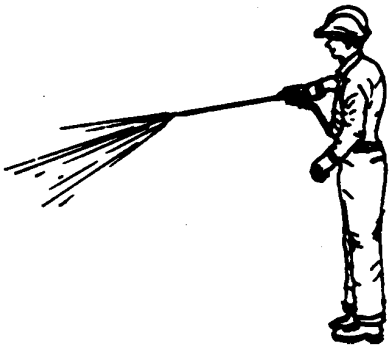
Symptom	Problem	Solution
Travel Is "Jerky"	Track sag adjustment	Adjust track sag.
	Rocks or mud jammed in track frame	Remove and repair.
Engine Stops When Travel Or Control Lever Actuated	Water separator clogged	Drain. Change element.

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

DW90712,000004F –19–23JAN06–2/2

Prepare Machine for Storage

T47764 –UN–09NOV88



T5813AM –UN–09FEB89

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. 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.

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.

LPS is a trademark of the Holt Lloyd Corporation.

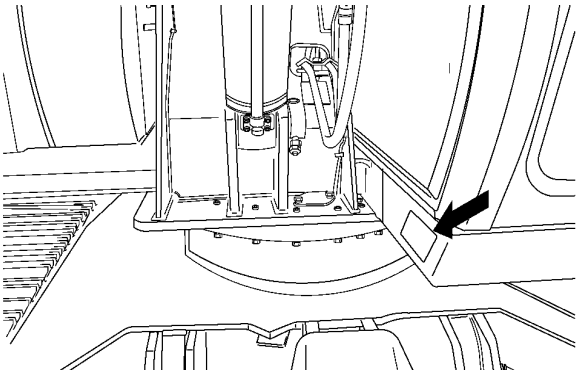
TX,105,FF2313 –19–29JUN06–1/1

Miscellaneous—Machine Numbers

Record Product Identification Number (PIN)

Purchase Date

NOTE: Record all 13 characters of the Product Identification Number.

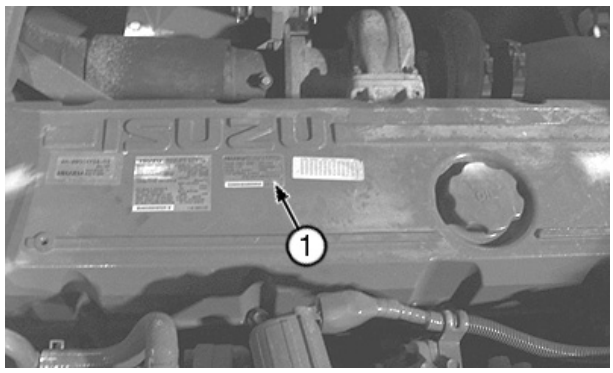


TX14740,0001E55 –19–22FEB02–1/1

Record Engine Serial Number

Engine Serial Number

1—Serial Number Plate

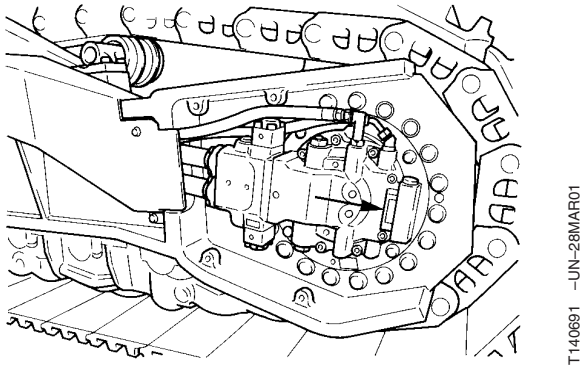


VD76477,0000403 –19–27JUN07–1/1

Record Travel Motor Serial Numbers

Travel Motor Serial Number
Travel Motor Serial Number

(Cover removed for clarity of photograph)

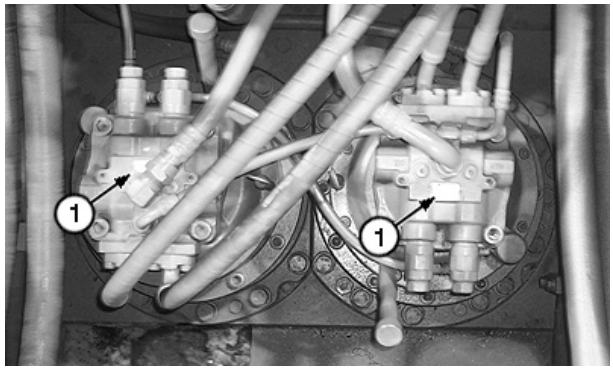


VD76477,00003BE –19–27JUN07–1/1

Record Swing Motor Serial Numbers

Swing Motor Serial Number
Swing Motor Serial Number

1—Serial Number Plates



VD76477,0000402 –19–27JUN07–1/1

Hydraulic Coupler Serial Number (If Equipped)

Hydraulic Coupler Serial Number

1—Hydraulic Coupler Serial Number Plate

TX1017852A –UN–22JAN07

TX1017853A –UN–22JAN07

VD76477,0001375 –19–27JUN07–1/1

Keep Proof of Ownership

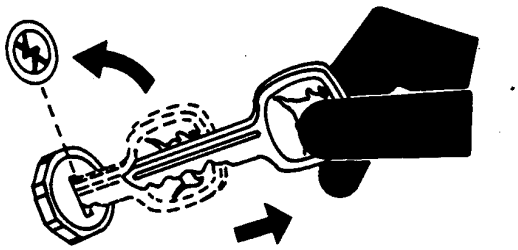
1. Maintain in a secure location an up-to-date inventory of all product and component serial numbers.
2. Regularly verify that identification plates have not been removed. Report any evidence of tampering to law enforcement agencies and order duplicate plates.
3. Other steps you can take:
   - Mark your 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

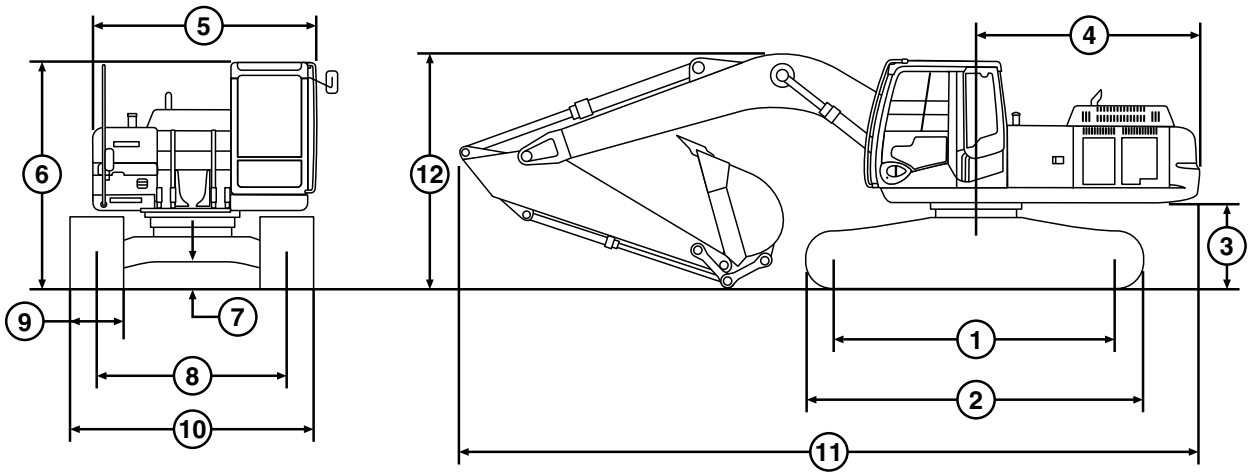
1. Install vandal-proof devices.
2. When machine is in storage:
   - Lower equipment to the ground
   - Set tracks to widest position to make loading more difficult
   - Remove any keys and batteries
3. When parking indoors, put large equipment in front of exits, and lock your storage buildings.
4. When 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 –UN–24MAY89

DW90712,0000050 –19–23JAN06–1/1

450DLC Machine Specifications



TX1001680 –UN–03JAN06

TX1001680

1—Sprocket Center To Idler Center
2—Undercarriage Length
3—Counterweight Clearance
4—Rear End Swing Radius
5—Overall Width
6—Cab Height
7—Minimum Ground Clearance
8—Center Of Sprocket To Center Of Sprocket
9—Track Shoe Width
10—Undercarriage Width
11—Overall Length
12—Transport Height

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 900 mm (36 in.) shoes, counterweight, 3.9 m (12 ft 10 in.) arm, 2031 kg (4478 lb) 2.34 m ^{3} (3.06 yd ^{3}) bucket, full fuel tank, 79 kg (175 lb) operator and standard equipment.

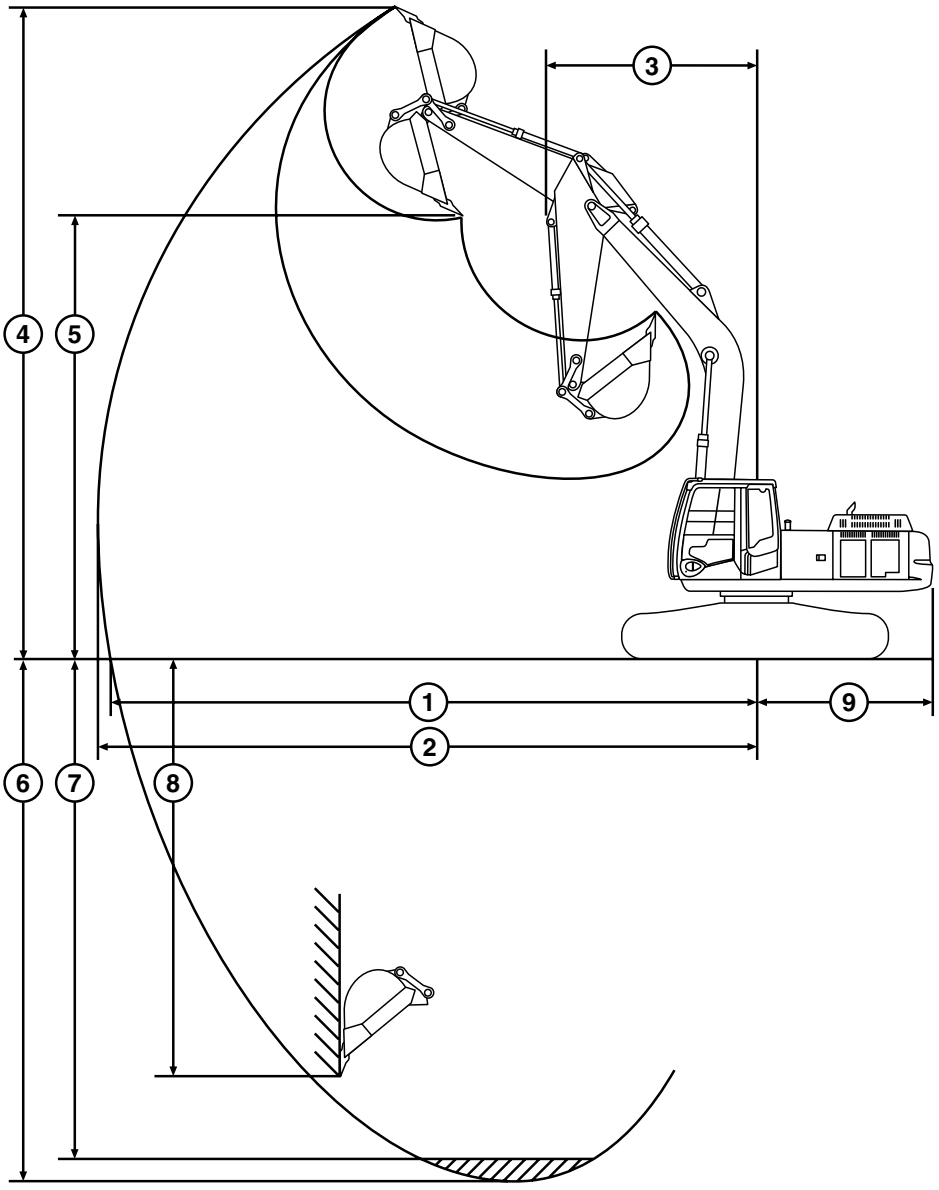
Item	Measurement	Specification
1—Sprocket Center To Idler Center	Distance	4470 mm 14 ft 8 in.
2—Undercarriage	Length	5470 mm 17 ft 11 in.
3—Counterweight Clearance	Distance	1360 mm 4 ft 6 in.

Continued on next page

Item	Measurement	Specification
4—Rear End Swing Radius	Distance	3645 mm 12 ft 0 in.
5—Overall Width (excluding back mirrors)	Distance	3530 mm 11 ft 7 in.
6—Cab	Height	3330 mm 10 ft 11 in.
7—Minimum Ground Clearance	Distance	723 mm 2 ft 4 in.
8—Center Of Sprocket To Center Of Sprocket	Distance	2890 mm 9 ft 6 in.
9—Track Shoe	Width	900 mm 36 in.
10—Undercarriage	Width	With 900 mm shoes: 3790 mm With 36 in. shoes: 12 ft 5 in.
11—Machine	Overall Length	With 3900 mm Arm: 11 920 mm With 12 ft 10 in. Arm: 39 ft 1 in.
12—Machine	Transport Height	With 3900 mm Arm: 3480 mm With 12 ft 10 in. Arm: 11 ft 5 in.
Machine	Operating Weight	48 163 kg 106 180 lb

VD76477,00003E6 –19–22MAY06–2/2

450DLC Working Ranges



TX1001681 –UN–03JAN06

TX1001681

1—Maximum Digging Reach
2—Maximum Digging Reach At Ground Level
3—Minimum Swing Radius
4—Maximum Cutting Height
5—Maximum Dumping Height
6—Maximum Digging Depth
7—Maximum Digging Depth (flat bottom)
8—Maximum Vertical Wall
9—Tail Swing Radius

Continued on next page

VD76477,00003E9 –19–22MAY06–1/2

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 900 mm (36 in.) shoes, counterweight and 3.9 m (12 ft 10 in.) arm.

Item	Measurement	Specification
1—Maximum Digging Reach	Distance	With 3900 mm Arm: 12 490 mm With 12 ft 10 in. Arm: 41 ft 0 in.
2—Maximum Digging Reach At Ground Level	Distance	With 3900 mm Arm: 12 280 mm With 12 ft 10 in. Arm: 40 ft 3 in.
3—Minimum Swing Radius	Radius	With 3900 mm Arm: 4810 mm With 12 ft 10 in. Arm: 15 ft 9 in.
4—Maximum Cutting Height	Height	With 3900 mm Arm: 11 160 mm With 12 ft 10 in. Arm: 36 ft 7 in.
5—Maximum Dumping Height	Height	With 3900 mm Arm: 7770 mm With 12 ft 10 in. Arm: 25 ft 6 in.
6—Maximum Digging Depth	Depth	With 3900 mm Arm: 8270 mm With 12 ft 10 in. Arm: 27 ft 2 in.
7—Maximum Digging Depth (flat bottom)	Depth	With 3900 mm Arm: 8140 mm With 12 ft 10 in. Arm: 26 ft 8 in.
8—Maximum Vertical Wall	Depth	With 3900 mm Arm: 6980 mm With 12 ft 10 in. Arm: 22 ft 11 in.
9—Tail Swing Radius	Radius	With 3900 mm Arm: 3645 mm With 12 ft 10 in. Arm: 12 ft 0 in.

VD76477,00003E9 –19–22MAY06–2/2

450DLC Engine Specifications

Item	Measurement	Specification
Isuzu 6WG1TC	Type	4-Cycle Water-Cooled, OHC, Vertical In-Line, Direct Injection, Turbocharged and with inter cooler
	Cylinders	6
	Displacement	15.7 L 957 cu in.
	Power At 2000 RPM	338 kW Net SAE 453 hp Net SAE
	Net Torque @ 2000 RPM	1960 N•m 1446 lb-ft

VD76477,0000321 –19–22MAY06–1/1

450DLC Drain and Refill Capacities

Item	Measurement	Specification
Fuel Tank	Capacity	725.0 L 191.5 gal
Cooling System	Capacity	48.0 L 12.7 gal
Engine	Oil Capacity, Including Filter Change	55.8 L 14.75 gal
Hydraulic Tank	Oil Capacity	330 L 87.2 gal
Hydraulic System	Oil Capacity	560 L 148 gal
Swing Gearbox (Each)	Oil Capacity	6.5 L 1.7 gal
Travel Gearbox (Each)	Oil Capacity	11 L 2.9 gal

DW90712,0000058 –19–03JUL07–1/1

450DLC Lift Capacity—KG (LB)

NOTE: Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface. Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures marked with an (a) are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

LIFTING OVER FRONT—Power Dig ON					
Boom: 7.0 m (23 ft 0 in.)		**Arm: 2.9 m (9 ft 6 in.)**		**Bucket: 2.3 m³ (3.0 yd³)**	**Shoe 750 mm (30 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
7.6 (25)				9752 (21500)[a]	
6.1 (20)				10251 (22600)[a]	
4.6 (15)		18098 (39900)[a]	13426 (29600)[a]	11204 (24700)[a]	9979 (22000)[a]
3.0 (10)			15785 (34800)[a]	12383 (27300)[a]	10478 (23100)[a]
1.5 (5)			17554 (38700)[a]	13381 (29500)[a]	10796 (23800)
Ground Line			18144 (40000)[a]	13971 (30800)[a]	10569 (23300)
-1.5 (-5)		22407 (49400)[a]	17690 (39000)[a]	13835 (30500)[a]	10478 (23100)
-3.0 (-10)	21727 (47900)[a]	20094 (44300)[a]	16284 (35900)[a]	12837 (28300)[a]	
-4.6 (-15)		16556 (36500)[a]	13562 (29900)[a]	10251 (22600)[a]	
LIFTING OVER SIDE—Power Dig ON					
Boom: 7.0 m (23 ft 0 in.)		**Arm: 2.9 m (9 ft 6 in.)**		**Bucket: 2.3 m³ (3.0 yd³)**	**Shoe 750 mm (30 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
7.6 (25)				9752 (21500)[a]	
6.1 (20)				9843 (21700)	
4.6 (15)		18098 (39900)[a]	13426 (29600)[a]	9435 (20800)	6804 (15000)
3.0 (10)			12701 (28000)	8981 (19800)	6577 (14500)
1.5 (5)			11929 (26300)	8528 (18800)	6350 (14000)
Ground Line			11567 (25500)	8255 (18200)	6169 (13600)
-1.5 (-5)		18370 (40500)	11431 (25200)	8119 (17900)	6078 (13400)
-3.0 (-10)	21727 (47900)[a]	18597 (41000)	11521 (25400)	8119 (17900)	
-4.6 (-15)		16556 (36500)[a]	11793 (26000)	8346 (18400)	
[a]Hydraulically-limited capacity					

Continued on next page

LIFTING OVER FRONT—Power Dig ON					
Boom: 7.0 m (23 ft 0 in.)		**Arm: 3.4 m (11 ft 2 in.)**		**Bucket: 2.1 m³ (2.7 yd³)**	**Shoe 750 mm (30 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
6.1 (20)				9752 (21500)[a]	8391 (18500)[a]
4.6 (15)			12701 (28000)[a]	10750 (23700)[a]	9662 (21300)[a]
3.0 (10)			15150 (33400)[a]	12020 (26500)[a]	10297 (22700)[a]
1.5 (5)			17191 (37900)[a]	13245 (29200)[a]	10932 (24100)[a]
Ground Line		11521 (25400)[a]	18234 (40200)[a]	13971 (30800)[a]	10750 (23700)
-1.5 (-5)		19595 (43200)[a]	18189 (40100)[a]	14107 (31100)[a]	10614 (23400)
-3.0 (-10)	17599 (38800)[a]	21863 (48200)[a]	17100 (37700)[a]	13426 (29600)[a]	10478 (23100)[a]
-4.6 (-15)	22362 (49300)[a]	18643 (41100)[a]	14878 (32800)[a]	11567 (25500)[a]	
-6.1 (-20)		13426 (29600)[a]	10614 (23400)[a]		
LIFTING OVER SIDE—Power Dig ON					
Boom: 7.0 m (23 ft 0 in.)		**Arm: 3.4 m (11 ft 2 in.)**		**Bucket: 2.1 m³ (2.7 yd³)**	**Shoe 750 mm (30 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
6.1 (20)				9752 (21500)[a]	7212 (15900)
4.6 (15)			12701 (28000)[a]	9706 (21400)	7031 (15500)
3.0 (10)			13154 (29000)	9253 (20400)	6804 (15000)
1.5 (5)			12338 (27200)	8800 (19400)	6532 (14400)
Ground Line		11521 (25400)[a]	11839 (26100)	8437 (18600)	6350 (14000)
-1.5 (-5)		18461 (40700)	11612 (25600)	8255 (18200)	6214 (13700)
-3.0 (-10)	17599 (38800)[a]	18643 (41100)	11612 (25600)	8210 (18100)	6214 (13700)
-4.6 (-15)	22362 (49300)[a]	18643 (41100)[a]	11839 (26100)	8391 (18500)	
-6.1 (-20)		13426 (29600)[a]	10614 (23400)[a]		

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON						
Boom: 7.0 m (23 ft 0 in.)		**Arm: 3.9 m (12 ft 10 in.)**		**Bucket: 1.9 m³ (2.5 yd³)**	**Shoe 750 mm (30 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
7.6 (25)					5080 (11200)[a]	
6.1 (20)					8119 (17900)[a]	
4.6 (15)				10024 (22100)[a]	9072 (20000)[a]	4536 (10000)[a]
3.0 (10)		19913 (43900)[a]	14107 (31100)[a]	11340 (25000)[a]	9752 (21500)[a]	6940 (15300)[a]
1.5 (5)		15921 (35100)[a]	16375 (36100)[a]	12655 (27900)[a]	10478 (23100)[a]	8165 (18000)[a]
Ground Line		14742 (32500)[a]	17781 (39200)[a]	13562 (29900)[a]	10659 (23500)	8119 (17900)[a]
-1.5 (-5)	8800 (19400)[a]	19958 (44000)[a]	18053 (39800)[a]	13925 (30700)[a]	10478 (23100)	
-3.0 (-10)	16647 (36700)[a]	22770 (50200)[a]	17373 (38300)[a]	13517 (29800)[a]	10433 (23000)	
-4.6 (-15)	25447 (56100)[a]	19913 (43900)[a]	15558 (34300)[a]	12156 (26800)[a]		
-6.1 (-20)		15377 (33900)[a]	12156 (26800)[a]	8709 (19200)[a]		
LIFTING OVER SIDE—Power Dig ON						
Boom: 7.0 m (23 ft 0 in.)		**Arm: 3.9 m (12 ft 10 in.)**		**Bucket: 1.9 m³ (2.5 yd³)**	**Shoe 750 mm (30 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
7.6 (25)					5080 (11200)[a]	
6.1 (20)					7257 (16000)	
4.6 (15)				9798 (21600)	7076 (15600)	4536 (10000)[a]
3.0 (10)		19913 (43900)[a]	13290 (29300)	9253 (20400)	6759 (14900)	5035 (11100)
1.5 (5)		15921 (35100)[a]	12383 (27300)	8754 (19300)	6486 (14300)	4899 (10800)
Ground Line		14742 (32500)[a]	11748 (25900)	8346 (18400)	6214 (13700)	4763 (10500)
-1.5 (-5)	8800 (19400)[a]	18144 (40000)	11431 (25200)	8119 (17900)	6078 (13400)	
-3.0 (-10)	16647 (36700)[a]	18234 (40200)	11385 (25100)	8029 (17700)	6033 (13300)	
-4.6 (-15)	25447 (56100)[a]	18507 (40800)	11521 (25400)	8119 (17900)		
-6.1 (-20)		15377 (33900)[a]	11884 (26200)	8482 (18700)		

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON							
Boom: 7.0 m (23 ft 0 in.)			**Arm: 4.9 m (16 ft 1 in.)**		**Bucket: 1.4 m³ (1.8 yd³)**	**Shoe 750 mm (30 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**1.5 (5)**	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
6.1 (20)							6078 (13400)[a]
4.6 (15)						8528 (18800)[a]	7303 (16100)[a]
3.0 (10)					10705 (23600)[a]	9480 (20900)[a]	8391 (18500)[a]
1.5 (5)			21818 (48100)[a]	15422 (34000)[a]	12247 (27000)[a]	10387 (22900)[a]	9072 (20000)
Ground Line			19459 (42900)[a]	17509 (38600)[a]	13562 (29900)[a]	11204 (24700)[a]	8890 (19600)
-1.5 (-5)		8664 (19100)[a]	19686 (43400)[a]	18552 (40900)[a]	14379 (31700)[a]	11113 (24500)	8754 (19300)
-3.0 (-10)	9843 (21700)[a]	13608 (30000)[a]	24449 (53900)[a]	18643 (41100)[a]	14515 (32000)	10932 (24100)	8664 (19100)
-4.6 (-15)	15014 (33100)[a]	19731 (43500)[a]	23224 (51200)[a]	17645 (38900)[a]	13880 (30600)[a]	10932 (24100)	
-6.1 (-20)		26671 (58800)[a]	19958 (44000)[a]	15468 (34100)[a]	12066 (26600)[a]	8845 (19500)[a]	
-7.6 (-25)			14470 (31900)[a]	11204 (24700)[a]			

LIFTING OVER SIDE—Power Dig ON							
Boom: 7.0 m (23 ft 0 in.)			**Arm: 4.9 m (16 ft 1 in.)**		**Bucket: 1.4 m³ (1.8 yd³)**	**Shoe 750 mm (30 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**1.5 (5)**	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
6.1 (20)							6033 (13300)
4.6 (15)						7847 (17300)	5942 (13100)
3.0 (10)					10206 (22500)	7575 (16700)	5761 (12700)
1.5 (5)			20865 (46000)	13517 (29800)	9616 (21200)	7212 (15900)	5579 (12300)
Ground Line			19459 (42900)[a]	12701 (28000)	9117 (20100)	6895 (15200)	5398 (11900)
-1.5 (-5)		8664 (19100)[a]	18869 (41600)	12202 (26900)	8800 (19400)	6668 (14700)	5262 (11600)
-3.0 (-10)	9843 (21700)[a]	13608 (30000)[a]	18688 (41200)	11975 (26400)	8573 (18900)	6577 (14500)	5216 (11500)
-4.6 (-15)	15014 (33100)[a]	19731 (43500)[a]	18824 (41500)	11929 (26300)	8573 (18900)	6532 (14400)	
-6.1 (-20)		26671 (58800)[a]	19142 (42200)	12111 (26700)	8709 (19200)	6713 (14800)	
-7.6 (-25)			14470 (31900)[a]	11204 (24700)[a]			

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON				
BE-Boom: 6.3 m (20 ft 8 in.)	**BE-Arm: 2.9 m (9 ft 6 in.)**		**Bucket: 2.5 m³ (3.3 yd³)**	**Shoe 750 mm (30 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**			
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
6.1 (20)		11521 (25400)[a]	10206 (22500)[a]	
4.6 (15)	16420 (36200)[a]	13109 (28900)[a]	11385 (25100)[a]	
3.0 (10)		15286 (33700)[a]	12383 (27300)[a]	8029 (17700)[a]
1.5 (5)		17191 (37900)[a]	13381 (29500)[a]	10297 (22700)[a]
Ground Line	24993 (55100)[a]	18098 (39900)[a]	13925 (30700)[a]	9072 (20000)[a]
-1.5 (-5)	23496 (51800)[a]	17781 (39200)[a]	13698 (30200)[a]	
-3.0 (-10)	20684 (45600)[a]	16057 (35400)[a]	12156 (26800)[a]	
-4.6 (-15)	15876 (35000)[a]	12247 (27000)[a]		
LIFTING OVER SIDE—Power Dig ON				
BE-Boom: 6.3 m (20 ft 8 in.)	**BE-Arm: 2.9 m (9 ft 6 in.)**		**Bucket: 2.5 m³ (3.3 yd³)**	**Shoe 750 mm (30 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**			
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
6.1 (20)		11521 (25400)[a]	9707 (21400)	
4.6 (15)	16420 (36200)[a]	13109 (28900)[a]	9435 (20800)	
3.0 (10)		13063 (28800)	9026 (19900)	6486 (14300)
1.5 (5)		12247 (27000)	8618 (19000)	6305 (13900)
Ground Line	18461 (40700)	11748 (25900)	8301 (18300)	6169 (13600)
-1.5 (-5)	18416 (40600)	11521 (25400)	8165 (18000)	
-3.0 (-10)	18643 (41100)	11612 (25600)	8210 (18100)	
-4.6 (-15)	15876 (35000)[a]	11975 (26400)		
[a]Hydraulically-limited capacity				

Continued on next page

LIFTING OVER FRONT—Power Dig ON					
Boom: 7.0 m (23 ft 0 in.)		**Arm: 2.9 m (9 ft 6 in.)**		**Bucket: 2.3 m³ (3.0 yd³)**	**Shoe 900 mm (35 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
7.6 (25)				9752 (21500)[a]	
6.1 (20)				10251 (22600)[a]	
4.6 (15)		18098 (39900)[a]	13426 (29600)[a]	11204 (24700)[a]	9979 (22000)[a]
3.0 (10)			15785 (34800)[a]	12383 (27300)[a]	10478 (23100)[a]
1.5 (5)			17554 (38700)[a]	13381 (29500)[a]	10932 (24100)
Ground Line			18144 (40000)[a]	13971 (30800)[a]	10750 (23700)
-1.5 (-5)		22407 (49400)[a]	17690 (39000)[a]	13835 (30500)[a]	10659 (23500)
-3.0 (-10)	21727 (47900)[a]	20094 (44300)[a]	16284 (35900)[a]	12837 (28300)[a]	
-4.6 (-15)		16556 (36500)[a]	13562 (29900)[a]	10251 (22600)[a]	
LIFTING OVER SIDE—Power Dig ON					
Boom: 7.0 m (23 ft 0 in.)		**Arm: 2.9 m (9 ft 6 in.)**		**Bucket: 2.3 m³ (3.0 yd³)**	**Shoe 900 mm (35 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
7.6 (25)				9752 (21500)[a]	
6.1 (20)				9934 (21900)	
4.6 (15)		18098 (39900)[a]	13426 (29600)[a]	9571 (21100)	6940 (15300)
3.0 (10)			12882 (28400)	9072 (20000)	6668 (14700)
1.5 (5)			12111 (26700)	8664 (19100)	6441 (14200)
Ground Line			11748 (25900)	8346 (18400)	6260 (13800)
-1.5 (-5)		18643 (41100)	11612 (25600)	8210 (18100)	6214 (13700)
-3.0 (-10)	21727 (47900)[a]	18824 (41500)	11703 (25800)	8255 (18200)	
-4.6 (-15)		16556 (36500)[a]	11975 (26400)	8482 (18700)	
[a]Hydraulically-limited capacity					

Continued on next page

LIFTING OVER FRONT—Power Dig ON					
Boom: 7.0 m (23 ft 0 in.)		**Arm: 3.4 m (11 ft 2 in.)**		**Bucket: 2.1 m³ (2.7 yd³)**	**Shoe 900 mm (35 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
6.1 (20)				9752 (21500)[a]	8391 (18500)[a]
4.6 (15)			12701 (28000)[a]	10750 (23700)[a]	9662 (21300)[a]
3.0 (10)			15150 (33400)[a]	12020 (26500)[a]	10297 (22700)[a]
1.5 (5)			17191 (37900)[a]	13245 (29200)[a]	10932 (24100)[a]
Ground Line		11521 (25400)[a]	18234 (40200)[a]	13971 (30800)[a]	10932 (24100)
-1.5 (-5)		19595 (43200)[a]	18189 (40100)[a]	14107 (31100)[a]	10796 (23800)
-3.0 (-10)	17599 (38800)[a]	21863 (48200)[a]	17100 (37700)[a]	13426 (29600)[a]	10478 (23100)[a]
-4.6 (-15)	22362 (49300)[a]	18643 (41100)[a]	14878 (32800)[a]	11567 (25500)[a]	
-6.1 (-20)		13426 (29600)[a]	10614 (23400)[a]		
LIFTING OVER SIDE—Power Dig ON					
Boom: 7.0 m (23 ft 0 in.)		**Arm: 3.4 m (11 ft 2 in.)**		**Bucket: 2.1 m³ (2.7 yd³)**	**Shoe 900 mm (35 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
6.1 (20)				9752 (21500)[a]	7303 (16100)
4.6 (15)			12701 (28000)[a]	9843 (21700)	7167 (15800)
3.0 (10)			13336 (29400)	9389 (20700)	6895 (15200)
1.5 (5)			12519 (27600)	8936 (19700)	6668 (14700)
Ground Line		11521 (25400)[a]	12020 (26500)	8573 (18900)	6441 (14200)
-1.5 (-5)		18733 (41300)	11793 (26000)	8391 (18500)	6305 (13900)
-3.0 (-10)	17599 (38800)[a]	18869 (41600)	11793 (26000)	8346 (18400)	6350 (14000)
-4.6 (-15)	22362 (49300)[a]	18643 (41100)[a]	11975 (26400)	8482 (18700)	
-6.1 (-20)		13426 (29600)[a]	10614 (23400)[a]		

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON						
Boom: 7.0 m (23 ft 0 in.)		**Arm: 3.9 m (12 ft 10 in.)**		**Bucket: 1.9 m³ (2.5 yd³)**	**Shoe 900 mm (35 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
7.6 (25)					5080 (11200)[a]	
6.1 (20)					8119 (17900)[a]	
4.6 (15)				10024 (22100)[a]	9072 (20000)[a]	4536 (10000)[a]
3.0 (10)		19913 (43900)[a]	14107 (31100)[a]	11340 (25000)[a]	9752 (21500)[a]	6940 (15300)[a]
1.5 (5)		15921 (35100)[a]	16375 (36100)[a]	12655 (27900)[a]	10478 (23100)[a]	8165 (18000)[a]
Ground Line		14742 (32500)[a]	17781 (39200)[a]	13562 (29900)[a]	10841 (23900)	8119 (17900)[a]
-1.5 (-5)	8800 (19400)[a]	19958 (44000)[a]	18053 (39800)[a]	13925 (30700)[a]	10659 (23500)	
-3.0 (-10)	16647 (36700)[a]	22770 (50200)[a]	17373 (38300)[a]	13517 (29800)[a]	10614 (23400)	
-4.6 (-15)	25447 (56100)[a]	19913 (43900)[a]	15558 (34300)[a]	12156 (26800)[a]		
-6.1 (-20)		15377 (33900)[a]	12156 (26800)[a]	8709 (19200)[a]		
LIFTING OVER SIDE—Power Dig ON						
Boom: 7.0 m (23 ft 0 in.)		**Arm: 3.9 m (12 ft 10 in.)**		**Bucket: 1.9 m³ (2.5 yd³)**	**Shoe 900 mm (35 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
7.6 (25)					5080 (11200)[a]	
6.1 (20)					7348 (16200)	
4.6 (15)				9934 (21900)	7176 (15800)	4536 (10000)[a]
3.0 (10)		19913 (43900)[a]	13472 (29700)	9389 (20700)	6895 (15200)	5126 (11300)
1.5 (5)		15921 (35100)[a]	12565 (27700)	8890 (19600)	6577 (14500)	4990 (11000)
Ground Line		14742 (32500)[a]	11929 (26300)	8482 (18700)	6350 (14000)	4853 (10700)
-1.5 (-5)	8800 (19400)[a]	18370 (40500)	11612 (25600)	8255 (18200)	6169 (13600)	
-3.0 (-10)	16647 (36700)[a]	18461 (40700)	11567 (25500)	8165 (18000)	6123 (13500)	
-4.6 (-15)	25447 (56100)[a]	18779 (41400)	11703 (25800)	8255 (18200)		
-6.1 (-20)		15377 (33900)[a]	12020 (26500)	8573 (18900)		

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON							
Boom: 7.0 m (23 ft 0 in.)			**Arm: 4.9 m (16 ft 1 in.)**		**Bucket: 1.4 m³ (1.8 yd³)**	**Shoe 900 mm (35 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**1.5 (5)**	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
6.1 (20)							6078 (13400)[a]
4.6 (15)						8528 (18800)[a]	7303 (16100)[a]
3.0 (10)					10705 (23600)[a]	9480 (20900)[a]	8391 (18500)[a]
1.5 (5)			21818 (48100)[a]	15422 (34000)[a]	12247 (27000)[a]	10387 (22900)[a]	9208 (20300)[a]
Ground Line			19459 (42900)[a]	17509 (38600)[a]	13562 (29900)[a]	11204 (24700)[a]	9026 (19900)
-1.5 (-5)		8664 (19100)[a]	19686 (43400)[a]	18552 (40900)[a]	14379 (31700)[a]	11249 (24800)	8890 (19600)
-3.0 (-10)	9843 (21700)[a]	13608 (30000)[a]	24449 (53900)[a]	18643 (41100)[a]	14515 (32000)[a]	11113 (24500)	8845 (19500)
-4.6 (-15)	15014 (33100)[a]	19731 (43500)[a]	23224 (51200)[a]	17645 (38900)[a]	13880 (30600)[a]	11022 (24300)[a]	
-6.1 (-20)		26671 (58800)[a]	19958 (44000)[a]	15468 (34100)[a]	12066 (26600)[a]	8845 (19500)[a]	
-7.6 (-25)			14470 (31900)[a]	11204 (24700)[a]			

LIFTING OVER SIDE—Power Dig ON							
Boom: 7.0 m (23 ft 0 in.)			**Arm: 4.9 m (16 ft 1 in.)**		**Bucket: 1.4 m³ (1.8 yd³)**	**Shoe 900 mm (35 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**1.5 (5)**	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
6.1 (20)							6078 (13400)[a]
4.6 (15)						7983 (17600)	6033 (13300)
3.0 (10)					10297 (22700)	7666 (16900)	5851 (12900)
1.5 (5)			21137 (46600)	13653 (30100)	9752 (21500)	7303 (16100)	5670 (12500)
Ground Line			19459 (42900)[a]	12882 (28400)	9253 (20400)	7031 (15500)	5488 (12100)
-1.5 (-5)		8664 (19100)[a]	19142 (42200)	12338 (27200)	8890 (19600)	6804 (15000)	5352 (11800)
-3.0 (-10)	9843 (21700)[a]	13608 (30000)[a]	18960 (41800)	12111 (26700)	8709 (19200)	6668 (14700)	5262 (11600)
-4.6 (-15)	15014 (33100)[a]	19731 (43500)[a]	19051 (42000)	12111 (26700)	8664 (19100)	6668 (14700)	
-6.1 (-20)		26671 (58800)[a]	19414 (42800)	12292 (27100)	8800 (19400)	6849 (15100)	
-7.6 (-25)			14470 (31900)[a]	11204 (24700)[a]			

[a]Hydraulically-limited capacity

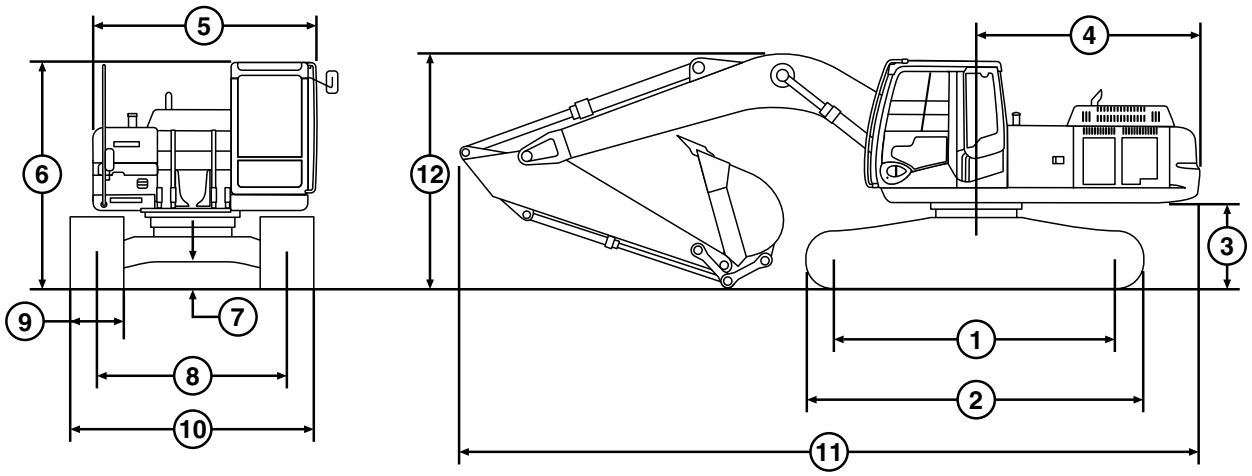
Continued on next page

LIFTING OVER FRONT—Power Dig ON				
BE-Boom: 6.3 m (20 ft 8 in.)	**BE-Arm: 2.9 m (9 ft 6 in.)**		**Bucket: 2.5 m³ (3.3 yd³)**	**Shoe 900 mm (35 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**			
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
6.1 (20)		11521 (25400)[a]	10206 (22500)[a]	
4.6 (15)	16420 (36200)[a]	13109 (28900)[a]	11385 (25100)[a]	
3.0 (10)		15286 (33700)[a]	12383 (27300)[a]	8029 (17700)[a]
1.5 (5)		17191 (37900)[a]	13381 (29500)[a]	10297 (22700)[a]
Ground Line	24993 (55100)[a]	18098 (39900)[a]	13925 (30700)[a]	9072 (20000)[a]
-1.5 (-5)	23496 (51800)[a]	17781 (39200)[a]	13698 (30200)[a]	
-3.0 (-10)	20684 (45600)[a]	16057 (35400)[a]	12156 (26800)[a]	
-4.6 (-15)	15876 (35000)[a]	12247 (27000)[a]		
LIFTING OVER SIDE—Power Dig ON				
BE-Boom: 6.3 m (20 ft 8 in.)	**BE-Arm: 2.9 m (9 ft 6 in.)**		**Bucket: 2.5 m³ (3.3 yd³)**	**Shoe 900 mm (35 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**			
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
6.1 (20)		11521 (25400)[a]	9843 (21700)	
4.6 (15)	16420 (36200)[a]	13109 (28900)[a]	9571 (21100)	
3.0 (10)		13200 (29100)	9163 (20200)	6622 (14600)
1.5 (5)		12428 (27400)	8709 (19200)	6396 (14100)
Ground Line	18688 (41200)	11884 (26200)	8437 (18600)	6260 (13800)
-1.5 (-5)	18688 (41200)	11703 (25800)	8255 (18200)	
-3.0 (-10)	18915 (41700)	11793 (26000)	8346 (18400)	
-4.6 (-15)	15876 (35000)[a]	12111 (26700)		

[a]Hydraulically-limited capacity

DW90712,0000103 –19–23OCT08–10/10

650DLC Machine Specifications



TX1001680 –UN–03JAN06

TX1001680

1—Sprocket Center To Idler Center
2—Undercarriage Length
3—Counterweight Clearance
4—Rear End Swing Radius
5—Overall Width
6—Cab Height
7—Minimum Ground Clearance
8—Center Of Sprocket To Center Of Sprocket
9—Track Shoe Width
10—Undercarriage Width
11—Overall Length
12—Transport Height

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 900 mm (36 in.) shoes, counterweight, 4.2 m (13 ft 9 in.) arm, 3126 kg (6892 lb) 3.09 m ^{3} (4.04 yd ^{3}) bucket, full fuel tank, 79 kg (175 lb) operator and standard equipment.

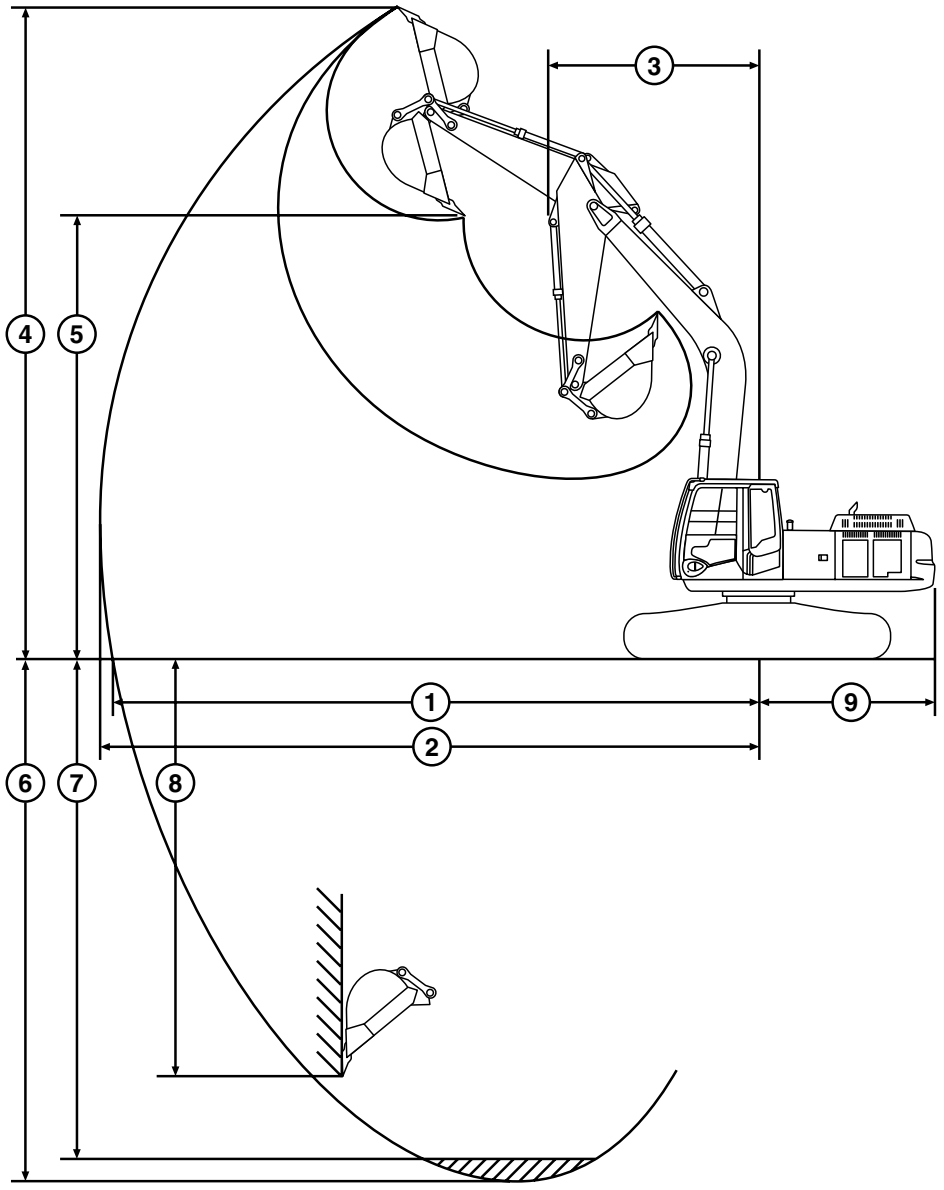
Item	Measurement	Specification
1—Sprocket Center To Idler Center	Distance	4590 mm 15 ft 1 in.
2—Undercarriage	Length	5840 mm 19 ft 2 in.
3—Counterweight Clearance	Distance	1530 mm 5 ft 0 in.

Continued on next page

Item	Measurement	Specification
4—Rear End Swing Radius	Distance	3850 mm 12 ft 8 in.
5—Overall Width (excluding back mirrors)	Distance	4100 mm 13 ft 5 in.
6—Cab	Height	3450 mm 11 ft 4 in.
7—Minimum Ground Clearance	Distance	860 mm 2 ft 10 in.
8—Center Of Sprocket To Center Of Sprocket	Distance	3300 mm 10 ft 10 in.
9—Track Shoe	Width	900 mm 36 in.
10—Undercarriage	Width	With 900 mm shoes: 4200 mm With 36 in. shoes: 13 ft 9 in.
11—Machine	Overall Length	With 4200 mm Arm: 13 200 mm With 13 ft 9 in. Arm: 43 ft 4 in.
12—Machine	Transport Height	With 4200 mm Arm: 4460 mm With 13 ft 9 in. Arm: 14 ft 8 in.
Machine	Operating Weight	69 032 kg 152 190 lb

VD76477,00003E7 –19–22MAY06–2/2

650DLC Working Ranges



TX1001681 –UN–03JAN06

TX1001681

1—Maximum Digging Reach
2—Maximum Digging Reach At Ground Level
3—Minimum Swing Radius
4—Maximum Cutting Height
5—Maximum Dumping Height
6—Maximum Digging Depth
7—Maximum Digging Depth (flat bottom)
8—Maximum Vertical Wall
9—Tail Swing Radius

Continued on next page

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 900 mm (36 in.) shoes, counterweight, and 4.2 m (13 ft 9 in.) arm.

Item	Measurement	Specification
1—Maximum Digging Reach	Distance	With 4200 mm Arm: 13 850 mm With 13 ft 9 in. Arm: 45 ft 5 in.
2—Maximum Digging Reach At Ground Level	Distance	With 4200 mm Arm: 13 610 mm With 13 ft 9 in. Arm: 44 ft 8 in.
3—Minimum Swing Radius	Radius	With 4200 mm Arm: 5760 mm With 13 ft 9 in. Arm: 18 ft 11 in.
4—Maximum Cutting Height	Height	With 4200 mm Arm: 12 240 mm With 13 ft 9 in. Arm: 40 ft 2 in.
5—Maximum Dumping Height	Height	With 4200 mm Arm: 8330 mm With 13 ft 9 in. Arm: 27 ft 4 in.
6—Maximum Digging Depth	Depth	With 4200 mm Arm: 9150 mm With 13 ft 9 in. Arm: 30 ft 0 in.
7—Maximum Digging Depth (flat bottom)	Depth	With 4200 mm Arm: 9030 mm With 13 ft 9 in. Arm: 29 ft 8 in.
8—Maximum Vertical Wall	Depth	With 4200 mm Arm: 9050 mm With 13 ft 9 in. Arm: 29 ft 8 in.
9—Tail Swing Radius	Radius	With 4200 mm Arm: 3850 mm With 13 ft 9 in. Arm: 12 ft 8 in.

650DLC Engine Specifications

Item	Measurement	Specification
Isuzu 6WG1TC	Type	4-Cycle Water-Cooled, OHC, Vertical In-Line, Direct Injection, Turbocharged and with inter cooler
	Cylinders	6
	Displacement	15.7 L 957 cu in.
	Power At 2000 RPM	338 kW Net SAE 453 hp Net SAE
	Net Torque @ 2000 RPM	1960 N•m 1446 lb-ft

VD76477,0000322 –19–22MAY06–1/1

650DLC Drain and Refill Capacities

Item	Measurement	Specification
Fuel Tank	Capacity	900.0 L 238.0 gal
Cooling System	Capacity	56.0 L 14.8 gal
Engine	Oil Capacity, Including Filter Change	51.6 L 13.6 gal
Hydraulic Tank	Oil Capacity	380 L 100.4 gal
Hydraulic System	Oil Capacity	680 L 179.7 gal
Swing Gearbox (Each)	Oil Capacity	10.5 L 2.8 gal
Travel Gearbox (Each)	Oil Capacity	16 L 4.2 gal
Pump Drive Gearbox	Oil Capacity	3.8 L 4 qt

DW90712,0000059 –19–03JUL07–1/1

650DLC Lift Capacity—KG (LB)

NOTE: Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface. Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures marked with an (a) are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

LIFTING OVER FRONT—Power Dig ON						
Boom: 7.8 m (25 ft 7 in.)		**Arm: 3.6 m (11 ft 10 in.)**		**Bucket: 2.9 m³ (3.8 yd³)**	**Shoe 650 mm (26 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
7.6 (25)					10297 (22700)[a]	
6.1 (20)					11385 (25100)[a]	7303 (16100)[a]
4.6 (15)			17554 (38700)[a]	14243 (31400)[a]	12383 (27300)[a]	10796 (23800)[a]
3.0 (10)			21319 (47000)[a]	16284 (35900)[a]	13517 (29800)[a]	11612 (25600)
1.5 (5)			24131 (53200)[a]	18053 (39800)[a]	14606 (32200)[a]	11294 (24900)
Ground Line			25310 (55800)[a]	19051 (42000)	14197 (31300)	11022 (24300)
-1.5 (-5)		15830 (34900)[a]	25174 (55500)[a]	18733 (41300)	13971 (30800)	10887 (24000)
-3.0 (-10)	16375 (36100)[a]	27079 (59700)[a]	24040 (53000)[a]	18643 (41100)	13880 (30600)	
-4.6 (-15)	28576 (63000)[a]	27216 (60000)[a]	21818 (48100)[a]	17418 (38400)[a]	13653 (30100)[a]	
-6.1 (-20)		22090 (48700)[a]	17962 (39600)[a]	13971 (30800)[a]		

LIFTING OVER SIDE—Power Dig ON						
Boom: 7.8 m (25 ft 7 in.)		**Arm: 3.6 m (11 ft 10 in.)**		**Bucket: 2.9 m³ (3.8 yd³)**	**Shoe 650 mm (26 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
7.6 (25)					10297 (22700)[a]	
6.1 (20)					11385 (25100)[a]	7303 (16100)[a]
4.6 (15)			17554 (38700)[a]	14243 (31400)[a]	10977 (24200)	8165 (18000)
3.0 (10)			20049 (44200)	14152 (31200)	10433 (23000)	7893 (17400)
1.5 (5)			18733 (41300)	13336 (29400)	9934 (21900)	7620 (16800)
Ground Line			18008 (39700)	12746 (28100)	9571 (21100)	7348 (16200)
-1.5 (-5)		15830 (34900)[a]	17781 (39200)	12474 (27500)	9344 (20600)	7257 (16000)
-3.0 (-10)	16375 (36100)[a]	27079 (59700)[a]	17781 (39200)	12383 (27300)	9253 (20400)	
-4.6 (-15)	28576 (63000)[a]	27216 (60000)[a]	18008 (39700)	12519 (27600)	9389 (20700)	
-6.1 (-20)		22090 (48700)[a]	17962 (39600)[a]	12927 (28500)		

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON							
Boom: 7.8 m (25 ft 7 in.)		**Arm: 4.2 m (13 ft 9 in.)**		**Bucket: 2.5 m³ (3.3 yd³)**	**Shoe 650 mm (26 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
7.6 (25)						5670 (12500)[a]	
6.1 (20)					10614 (23400)[a]	8709 (19200)[a]	
4.6 (15)				13245 (29200)[a]	11657 (25700)[a]	10614 (23400)[a]	
3.0 (10)			19822 (43700)[a]	15377 (33900)[a]	12927 (28500)[a]	11385 (25100)[a]	
1.5 (5)			23042 (50800)[a]	17373 (38300)[a]	14152 (31200)[a]	11431 (25200)	6350 (14000)[a]
Ground Line			24902 (54900)[a]	18779 (41400)[a]	14334 (31600)	11113 (24500)	
-1.5 (-5)		15740 (34700)[a]	25356 (55900)[a]	18824 (41500)	14016 (30900)	10932 (24100)	
-3.0 (-10)	14969 (33000)[a]	24131 (53200)[a]	24721 (54500)[a]	18643 (41100)	13880 (30600)	10841 (23900)	
-4.6 (-15)	23859 (52600)[a]	29529 (65100)[a]	22997 (50700)[a]	18189 (40100)[a]	13925 (30700)		
-6.1 (-20)		25038 (55200)[a]	19867 (43800)[a]	15694 (34600)[a]			
-7.6 (-25)			14243 (31400)[a]				
LIFTING OVER SIDE—Power Dig ON							
Boom: 7.8 m (25 ft 7 in.)		**Arm: 4.2 m (13 ft 9 in.)**		**Bucket: 2.5 m³ (3.3 yd³)**	**Shoe 650 mm (26 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
7.6 (25)						5670 (12500)[a]	
6.1 (20)					10614 (23400)[a]	8618 (19000)	
4.6 (15)				13245 (29200)[a]	11249 (24800)	8391 (18500)	
3.0 (10)			19822 (43700)[a]	14515 (32000)	10659 (23500)	8074 (17800)	
1.5 (5)			19187 (42300)	13608 (30000)	10115 (22300)	7711 (17000)	5987 (13200)
Ground Line			18234 (40200)	12927 (28500)	9662 (21300)	7439 (16400)	
-1.5 (-5)		15740 (34700)[a]	17826 (39300)	12519 (27600)	9389 (20700)	7257 (16000)	
-3.0 (-10)	14969 (33000)[a]	24131 (53200)[a]	17690 (39000)	12383 (27300)	9253 (20400)	7212 (15900)	
-4.6 (-15)	23859 (52600)[a]	29529 (65100)	17872 (39400)	12428 (27400)	9299 (20500)		
-6.1 (-20)		25038 (55200)[a]	18234 (40200)	12701 (28000)			
-7.6 (-25)			14243 (31400)[a]				
[a]Hydraulically-limited capacity							

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LIFTING OVER FRONT—Power Dig ON								
Boom: 7.8 m (25 ft 7 in.)			**Arm: 5.3 m (17 ft 5 in.)**		**Bucket: 2.0 m^3 (2.6 yd^3)**	**Shoe 650 mm (26 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**							
m (ft)	**1.5 (5)**	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.1 (40)**
9.1 (30)							4853 (10700)[a]	
7.6 (25)							6441 (14200)[a]	
6.1 (20)							7394 (16300)[a]	4944 (10900)[a]
4.6 (15)						9389 (20700)[a]	8528 (18800)[a]	6350 (14000)[a]
3.0 (10)				16828 (37100)[a]	13426 (29600)[a]	11476 (25300)[a]	10206 (22500)[a]	7439 (16400)[a]
1.5 (5)				20457 (45100)[a]	15604 (34400)[a]	12837 (28300)[a]	11068 (24400)[a]	8437 (18600)[a]
Ground Line			13381 (29500)[a]	23042 (50800)[a]	17373 (38300)[a]	14016 (30900)[a]	11022 (24300)	8709 (19200)
-1.5 (-5)		7575 (16700)[a]	15966 (35200)[a]	24358 (53700)[a]	18507 (40800)[a]	13835 (30500)	10705 (23600)	8573 (18900)
-3.0 (-10)	9253 (20400)[a]	12610 (27800)[a]	20956 (46200)[a]	24539 (54100)[a]	18189 (40100)	13517 (29800)	10523 (23200)	5761 (12700)[a]
-4.6 (-15)	14696 (32400)[a]	18507 (40800)[a]	28259 (62300)[a]	23678 (52200)[a]	18098 (39900)	13472 (29700)	10523 (23200)	
-6.1 (-20)		25991 (57300)[a]	28168 (62100)[a]	21591 (47600)[a]	16964 (37400)[a]	13381 (29500)[a]		
-7.6 (-25)			22861 (50400)[a]	17781 (39200)[a]	13744 (30300)[a]			
[a]Hydraulically-limited capacity								

Continued on next page

LIFTING OVER SIDE—Power Dig ON								
Boom: 7.8 m (25 ft 7 in.)			**Arm: 5.3 m (17 ft 5 in.)**		**Bucket: 2.0 m³ (2.6 yd³)**	**Shoe 650 mm (26 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**							
m (ft)	**1.5 (5)**	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.1 (40)**
9.1 (30)							4853 (10700)[a]	
7.6 (25)							6441 (14200)[a]	
6.1 (20)							7394 (16300)[a]	4944 (10900)[a]
4.6 (15)						9389 (20700)[a]	8528 (18800)[a]	6350 (14000)[a]
3.0 (10)				16828 (37100)[a]	13426 (29600)[a]	10841 (23900)	8119 (17900)	6169 (13600)
1.5 (5)				19641 (43300)	13789 (30400)	10160 (22400)	7711 (17000)	5897 (13000)
Ground Line			13381 (29500)[a]	18234 (40200)	12882 (28400)	9571 (21100)	7348 (16200)	5670 (12500)
-1.5 (-5)		7575 (16700)[a]	15966 (35200)[a]	17418 (38400)	12247 (27000)	9163 (20200)	7031 (15500)	5534 (12200)
-3.0 (-10)	9253 (20400)[a]	12610 (27800)[a]	20956 (46200)[a]	17055 (37600)	11929 (26300)	8890 (19600)	6849 (15100)	5443 (12000)
-4.6 (-15)	14696 (32400)[a]	18507 (40800)[a]	28077 (61900)	17010 (37500)	11839 (26100)	8800 (19400)	6849 (15100)	
-6.1 (-20)		25991 (57300)[a]	28168 (62100)[a]	17282 (38100)	11975 (26400)	8981 (19800)		
-7.6 (-25)			22861 (50400)[a]	17781 (39200)[a]	12474 (27500)			

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON					
BE-Boom: 6.8 m (22 ft 4 in.)		**BE-Arm: 2.9 m (9 ft 6 in.)**		**Bucket: 3.5 m³ (4.6 yd³)**	**Shoe 650 mm (26 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
7.6 (25)				13018 (28700)[a]	
6.1 (20)				13698 (30200)[a]	9163 (20200)[a]
4.6 (15)			18098 (39900)[a]	15105 (33300)[a]	13562 (29900)[a]
3.0 (10)			21636 (47700)[a]	16919 (37300)[a]	14379 (31700)[a]
1.5 (5)			24449 (53900)[a]	18552 (40900)[a]	14424 (31800)
Ground Line			25583 (56400)[a]	19096 (42100)	14107 (31100)
-1.5 (-5)			25129 (55400)[a]	18869 (41600)	13971 (30800)
-3.0 (-10)	27760 (61200)[a]	29574 (65200)[a]	23224 (51200)[a]	18008 (39700)[a]	
-4.6 (-15)		24131 (53200)[a]	19142 (42200)[a]	13653 (30100)[a]	
LIFTING OVER SIDE—Power Dig ON					
BE-Boom: 6.8 m (22 ft 4 in.)		**BE-Arm: 2.9 m (9 ft 6 in.)**		**Bucket: 3.5 m³ (4.6 yd³)**	**Shoe 650 mm (26 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
7.6 (25)				13018 (28700)[a]	
6.1 (20)				13698 (30200)[a]	9163 (20200)[a]
4.6 (15)			18098 (39900)[a]	14696 (32400)	10478 (23100)
3.0 (10)			20185 (44500)	13971 (30800)	10115 (22300)
1.5 (5)			18960 (41800)	13245 (29200)	9707 (21400)
Ground Line			18280 (40300)	12971 (28200)	9435 (20800)
-1.5 (-5)			18098 (39900)	12565 (27700)	9344 (20600)
-3.0 (-10)	27760 (61200)[a]	29574 (65200)[a]	18189 (40100)	12610 (27800)	
-4.6 (-15)		24131 (53200)[a]	18597 (41000)	13063 (28800)	

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON						
Boom: 7.8 m (25 ft 7 in.)		**Arm: 3.6 m (11 ft 10 in.)**		**Bucket: 2.9 m³ (3.8 yd³)**	**Shoe 750 mm (30 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
7.6 (25)					10297 (22700)[a]	
6.1 (20)					11385 (25100)[a]	7303 (16100)[a]
4.6 (15)			17554 (38700)[a]	14243 (31400)[a]	12383 (27300)[a]	10796 (23800)[a]
3.0 (10)			21319 (47000)[a]	16284 (35900)[a]	13517 (29800)[a]	11748 (25900)
1.5 (5)			24131 (53200)[a]	18053 (39800)[a]	14606 (32200)[a]	11431 (25200)
Ground Line			25310 (55800)[a]	19187 (42300)[a]	14379 (31700)	11158 (24600)
-1.5 (-5)		15830 (34900)[a]	25174 (55500)[a]	18915 (41700)	14107 (31100)	11022 (24300)
-3.0 (-10)	16375 (36100)[a]	27079 (59700)[a]	24040 (53000)[a]	18824 (41500)	14061 (31000)	
-4.6 (-15)	28576 (63000)[a]	27216 (60000)[a]	21818 (48100)[a]	17418 (38400)[a]	13653 (30100)[a]	
-6.1 (-20)		22090 (48700)[a]	17962 (39600)[a]	13971 (30800)[a]		
LIFTING OVER SIDE—Power Dig ON						
Boom: 7.8 m (25 ft 7 in.)		**Arm: 3.6 m (11 ft 10 in.)**		**Bucket: 2.9 m³ (3.8 yd³)**	**Shoe 750 mm (30 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
7.6 (25)					10297 (22700)[a]	
6.1 (20)					11385 (25100)[a]	7303 (16100)[a]
4.6 (15)			17554 (38700)[a]	14243 (31400)[a]	11068 (24400)	8255 (18200)
3.0 (10)			20276 (44700)	14288 (31500)	10569 (23300)	7983 (17600)
1.5 (5)			18915 (41700)	13472 (29700)	10070 (22200)	7711 (17000)
Ground Line			18189 (40100)	12927 (28500)	9662 (21300)	7484 (16500)
-1.5 (-5)		15830 (34900)[a]	17962 (39600)	12610 (27800)	9435 (20800)	7348 (16200)
-3.0 (-10)	16375 (36100)[a]	27079 (59700)[a]	17962 (39600)	12519 (27600)	9389 (20700)	
-4.6 (-15)	28576 (63000)[a]	27216 (60000)[a]	18189 (40100)	12655 (27900)	9525 (21000)	
-6.1 (-20)		22090 (48700)[a]	17962 (39600)[a]	13063 (28800)		

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON							
Boom: 7.8 m (25 ft 7 in.)		**Arm: 4.2 m (13 ft 9 in.)**		**Bucket: 2.5 m³ (3.3 yd³)**	**Shoe 750 mm (30 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
7.6 (25)						5670 (12500)[a]	
6.1 (20)					10614 (23400)[a]	8709 (19200)[a]	
4.6 (15)				13245 (29200)[a]	11657 (25700)[a]	10614 (23400)[a]	
3.0 (10)			19822 (43700)[a]	15377 (33900)[a]	12927 (28500)[a]	11385 (25100)[a]	
1.5 (5)			23042 (50800)[a]	17373 (38300)[a]	14152 (31200)[a]	11567 (25500)	6350 (14000)[a]
Ground Line			24902 (54900)[a]	18779 (41400)[a]	14515 (32000)	11249 (24800)	
-1.5 (-5)		15740 (34700)[a]	25356 (55900)[a]	19006 (41900)	14197 (31300)	11068 (24400)	
-3.0 (-10)	14969 (33000)[a]	24131 (53200)[a]	24721 (54500)[a]	18824 (41500)	14016 (30900)	10977 (24200)	
-4.6 (-15)	23859 (52600)[a]	29529 (65100)[a]	22997 (50700)[a]	18189 (40100)[a]	14061 (31000)		
-6.1 (-20)		25038 (55200)[a]	19867 (43800)[a]	15694 (34600)[a]			
-7.6 (-25)			14243 (31400)[a]				
LIFTING OVER SIDE—Power Dig ON							
Boom: 7.8 m (25 ft 7 in.)		**Arm: 4.2 m (13 ft 9 in.)**		**Bucket: 2.5 m³ (3.3 yd³)**	**Shoe 750 mm (30 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
7.6 (25)						5670 (12500)[a]	
6.1 (20)					10614 (23400)[a]	8709 (19200)[a]	
4.6 (15)				13245 (29200)[a]	11340 (25000)	8482 (18700)	
3.0 (10)			19822 (43700)[a]	14651 (32300)	10796 (23800)	8165 (18000)	
1.5 (5)			19368 (42700)	13744 (30300)	10251 (22600)	7847 (17300)	6033 (13300)
Ground Line			18461 (40700)	13063 (28800)	9798 (21600)	7530 (16600)	
-1.5 (-5)		15740 (34700)[a]	18008 (39700)	12655 (27900)	9480 (20900)	7348 (16200)	
-3.0 (-10)	14969 (33000)[a]	24131 (53200)[a]	17917 (39500)	12519 (27600)	9344 (20600)	7303 (16100)	
-4.6 (-15)	23859 (52600)[a]	29529 (65100)[a]	18053 (39800)	12565 (27700)	9389 (20700)		
-6.1 (-20)		25038 (55200)[a]	18416 (40600)	12837 (28300)			
-7.6 (-25)			14243 (31400)[a]				

[a]Hydraulically-limited capacity

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LIFTING OVER FRONT—Power Dig ON								
Boom: 7.8 m (25 ft 7 in.)			**Arm: 5.3 m (17 ft 5 in.)**		**Bucket: 2.0 m^3 (2.6 yd^3)**	**Shoe 750 mm (30 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**							
m (ft)	**1.5 (5)**	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.1 (40)**
9.1 (30)							4853 (10700)[a]	
7.6 (25)							6441 (14200)[a]	
6.1 (20)							7394 (16300)[a]	4944 (10900)[a]
4.6 (15)						9389 (20700)[a]	8528 (18800)[a]	6350 (14000)[a]
3.0 (10)				16828 (37100)[a]	13426 (29600)[a]	11476 (25300)[a]	10206 (22500)[a]	7439 (16400)[a]
1.5 (5)				20457 (45100)[a]	15604 (34400)[a]	12837 (28300)[a]	11068 (24400)[a]	8437 (18600)[a]
Ground Line			13381 (29500)[a]	23042 (50800)[a]	17373 (38300)[a]	14016 (30900)[a]	11158 (24600)	8845 (19500)
-1.5 (-5)		7575 (16700)[a]	15966 (35200)[a]	24358 (53700)[a]	18507 (40800)[a]	13971 (30800)	10841 (23900)	8618 (19000)[a]
-3.0 (-10)	9253 (20400)[a]	12610 (27800)[a]	20956 (46200)[a]	24539 (54100)[a]	18370 (40500)	13698 (30200)	10659 (23500)	5761 (12700)[a]
-4.6 (-15)	14696 (32400)[a]	18507 (40800)[a]	28259 (62300)[a]	23678 (52200)[a]	18280 (40300)	13608 (30000)	10659 (23500)	
-6.1 (-20)		25991 (57300)[a]	28168 (62100)[a]	21591 (47600)[a]	16964 (37400)[a]	13381 (29500)[a]		
-7.6 (-25)			22861 (50400)[a]	17781 (39200)[a]	13744 (30300)[a]			

[a]Hydraulically-limited capacity

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LIFTING OVER SIDE—Power Dig ON								
Boom: 7.8 m (25 ft 7 in.)			**Arm: 5.3 m (17 ft 5 in.)**		**Bucket: 2.0 m^3 (2.6 yd^3)**	**Shoe 750 mm (30 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**							
m (ft)	**1.5 (5)**	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.1 (40)**
9.1 (30)							4853 (10700)[a]	
7.6 (25)							6441 (14200)[a]	
6.1 (20)							7394 (16300)[a]	4944 (10900)[a]
4.6 (15)						9389 (20700)[a]	8528 (18800)[a]	6350 (14000)[a]
3.0 (10)				16828 (37100)[a]	13426 (29600)[a]	10977 (24200)	8210 (18100)	6260 (13800)
1.5 (5)				19822 (43700)	13925 (30700)	10297 (22700)	7802 (17200)	5987 (13200)
Ground Line			13381 (29500)[a]	18416 (40600)	13018 (28700)	9707 (21400)	7439 (16400)	5761 (12700)
-1.5 (-5)		7575 (16700)[a]	15966 (35200)[a]	17599 (38800)	12383 (27300)	9253 (20400)	7121 (15700)	5579 (12300)
-3.0 (-10)	9253 (20400)[a]	12610 (27800)[a]	20956 (46200)[a]	17237 (38000)	12066 (26600)	8981 (19800)	6985 (15400)	5534 (12200)
-4.6 (-15)	14696 (32400)[a]	18507 (40800)[a]	28259 (62300)[a]	17237 (38000)	11975 (26400)	8936 (19700)	6940 (15300)	
-6.1 (-20)		25991 (57300)[a]	28168 (62100)[a]	17463 (38500)	12111 (26700)	9072 (20000)		
-7.6 (-25)			22861 (50400)[a]	17781 (39200)[a]	12610 (27800)			

[a]Hydraulically-limited capacity

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LIFTING OVER FRONT—Power Dig ON					
BE-Boom: 6.8 m (22 ft 4 in.)		**BE-Arm: 2.9 m (9 ft 6 in.)**		**Bucket: 3.5 m³ (4.6 yd³)**	**Shoe 750 mm (30 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
7.6 (25)				13018 (28700)[a]	
6.1 (20)				13698 (30200)[a]	9163 (20200)[a]
4.6 (15)			18098 (39900)[a]	15105 (33300)[a]	13562 (29900)[a]
3.0 (10)			21636 (47700)[a]	16919 (37300)[a]	14379 (31700)[a]
1.5 (5)			24449 (53900)[a]	18552 (40900)[a]	14560 (32100)
Ground Line			25583 (56400)[a]	19323 (42600)	14243 (31400)
-1.5 (-5)			25129 (55400)[a]	19051 (42000)	14152 (31200)
-3.0 (-10)	27760 (61200)[a]	29574 (65200)[a]	23224 (51200)[a]	18008 (39700)[a]	
-4.6 (-15)		24131 (53200)[a]	19142 (42200)[a]	13653 (30100)[a]	
LIFTING OVER SIDE—Power Dig ON					
BE-Boom: 6.8 m (22 ft 4 in.)		**BE-Arm: 2.9 m (9 ft 6 in.)**		**Bucket: 3.5 m³ (4.6 yd³)**	**Shoe 750 mm (30 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
7.6 (25)				13018 (28700)[a]	
6.1 (20)				13698 (30200)[a]	9163 (20200)[a]
4.6 (15)			18098 (39900)[a]	14878 (32800)	10614 (23400)
3.0 (10)			20366 (44900)	14107 (31100)	10206 (22500)
1.5 (5)			19142 (42200)	13381 (29500)	9843 (21700)
Ground Line			18507 (40800)	12927 (28500)	9571 (21100)
-1.5 (-5)			18280 (40300)	12701 (28000)	9435 (20800)
-3.0 (-10)	27760 (61200)[a]	29574 (65200)[a]	18370 (40500)	12746 (28100)	
-4.6 (-15)		24131 (53200)[a]	18779 (41400)	13200 (29100)	

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON						
Boom: 7.8 m (25 ft 7 in.)		**Arm: 3.6 m (11 ft 10 in.)**		**Bucket: 2.9 m³ (3.79 yd³)**	**Shoe 900 mm (35 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
7.6 (25)					10297 (22700)[a]	
6.1 (20)					11385 (25100)[a]	7303 (16100)[a]
4.6 (15)			17554 (38700)[a]	14243 (31400)[a]	12383 (27300)[a]	10796 (23800)[a]
3.0 (10)			21319 (47000)[a]	16284 (35900)[a]	13517 (29800)[a]	11884 (26200)[a]
1.5 (5)			24131 (53200)[a]	18053 (39800)[a]	14606 (32200)[a]	11612 (25600)
Ground Line			25310 (55800)[a]	19187 (42300)[a]	14606 (32200)	11340 (25000)
-1.5 (-5)		15830 (34900)[a]	25174 (55500)[a]	19232 (42400)	14334 (31600)	11204 (24700)
-3.0 (-10)	16375 (36100)[a]	27079 (59700)[a]	24040 (53000)[a]	19006 (41900)[a]	14288 (31500)	
-4.6 (-15)	28576 (63000)[a]	27216 (60000)[a]	21818 (48100)[a]	17418 (38400)[a]	13653 (30100)[a]	
-6.1 (-20)		22090 (48700)[a]	17962 (39600)[a]	13971 (30800)[a]		
LIFTING OVER SIDE—Power Dig ON						
Boom: 7.8 m (25 ft 7 in.)		**Arm: 3.6 m (11 ft 10 in.)**		**Bucket: 2.9 m³ (3.79 yd³)**	**Shoe 900 mm (35 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
7.6 (25)					10297 (22700)[a]	
6.1 (20)					11385 (25100)[a]	7303 (16100)[a]
4.6 (15)			17554 (38700)[a]	14243 (31400)[a]	11249 (24800)	8391 (18500)
3.0 (10)			20548 (45300)	14515 (32000)	10705 (23600)	8119 (17900)
1.5 (5)			19187 (42300)	13698 (30200)	10206 (22500)	7847 (17300)
Ground Line			18507 (40800)	13109 (28900)	9843 (21700)	7620 (16800)
-1.5 (-5)		15830 (34900)[a]	18234 (40200)	12791 (28200)	9616 (21200)	7484 (16500)
-3.0 (-10)	16375 (36100)[a]	27079 (59700)[a]	18280 (40300)	12746 (28100)	9525 (21000)	
-4.6 (-15)	28576 (63000)[a]	27216 (60000)[a]	18507 (40800)	12882 (28400)	9662 (21300)	
-6.1 (-20)		22090 (48700)[a]	17962 (39600)[a]	13290 (29300)		

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON							
Boom: 7.8 m (25 ft 7 in.)		**Arm: 4.2 m (13 ft 9 in.)**		**Bucket: 2.5 m³ (3.27 yd³)**	**Shoe 900 mm (35 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
7.6 (25)						5670 (12500)[a]	
6.1 (20)					10614 (23400)[a]	8709 (19200)[a]	
4.6 (15)				13245 (29200)[a]	11657 (25700)[a]	10614 (23400)[a]	
3.0 (10)			19822 (43700)[a]	15377 (33900)[a]	12927 (28500)[a]	11385 (25100)[a]	
1.5 (5)			23042 (50800)[a]	17373 (38300)[a]	14152 (31200)[a]	11748 (25900)	6350 (14000)[a]
Ground Line			24902 (54900)[a]	18779 (41400)[a]	14742 (32500)	11431 (25200)	
-1.5 (-5)		15740 (34700)[a]	25356 (55900)[a]	19323 (42600)	14424 (31800)	11249 (24800)	
-3.0 (-10)	14969 (33000)[a]	24131 (53200)[a]	24721 (54500)[a]	19142 (42200)	14243 (31400)	11158 (24600)	
-4.6 (-15)	23859 (52600)[a]	29529 (65100)[a]	22997 (50700)[a]	18189 (40100)[a]	14288 (31500)		
-6.1 (-20)		25038 (55200)[a]	19867 (43800)[a]	15694 (34600)[a]			
-7.6 (-25)			14243 (31400)[a]				
LIFTING OVER SIDE—Power Dig ON							
Boom: 7.8 m (25 ft 7 in.)		**Arm: 4.2 m (13 ft 9 in.)**		**Bucket: 2.5 m³ (3.27 yd³)**	**Shoe 900 mm (35 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
7.6 (25)						5670 (12500)[a]	
6.1 (20)					10614 (23400)[a]	8709 (19200)[a]	
4.6 (15)				13245 (29200)[a]	11521 (25400)	8618 (19000)	
3.0 (10)			19822 (43700)[a]	14878 (32800)	10932 (24100)	8301 (18300)	
1.5 (5)			19686 (43400)	13971 (30800)	10387 (22900)	7983 (17600)	6169 (13600)
Ground Line			18733 (41300)	13290 (29300)	9979 (22000)	7666 (16900)	
-1.5 (-5)		15740 (34700)[a]	18280 (40300)	12882 (28400)	9662 (21300)	7484 (16500)	
-3.0 (-10)	14969 (33000)[a]	24131 (53200)[a]	18189 (40100)	12701 (28000)	9524 (21000)	7439 (16400)	
-4.6 (-15)	23859 (52600)[a]	29529 (65100)[a]	18325 (40400)	12746 (28100)	9571 (21100)		
-6.1 (-20)		25038 (55200)[a]	18733 (41300)	13063 (28800)			
-7.6 (-25)			14243 (31400)[a]				

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON								
Boom: 7.8 m (25 ft 7 in.)			**Arm: 5.3 m (17 ft 5 in.)**		**Bucket: 2.0 m^3 (2.6 yd^3)**	**Shoe 900 mm (35 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**							
m (ft)	**1.5 (5)**	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.1 (40)**
9.1 (30)							4853 (10700)[a]	
7.6 (25)							6441 (14200)[a]	
6.1 (20)							7394 (16300)[a]	4944 (10900)[a]
4.6 (15)						9389 (20700)[a]	8528 (18800)[a]	6350 (14000)[a]
3.0 (10)				16828 (37100)[a]	13426 (29600)[a]	11476 (25300)[a]	10206 (22500)[a]	7439 (16400)[a]
1.5 (5)				20457 (45100)[a]	15604 (34400)[a]	12837 (28300)[a]	11068 (24400)[a]	8437 (18600)[a]
Ground Line			13381 (29500)[a]	23042 (50800)[a]	17373 (38300)[a]	14016 (30900)[a]	11340 (25000)	8981 (19800)
-1.5 (-5)		7575 (16700)[a]	15966 (35200)[a]	24358 (53700)[a]	18507 (40800)[a]	14197 (31300)	11022 (24300)	8618 (19000)[a]
-3.0 (-10)	9253 (20400)[a]	12610 (27800)[a]	20956 (46200)[a]	24539 (54100)[a]	18688 (41200)	13925 (30700)	10841 (23900)	5761 (12700)[a]
-4.6 (-15)	14696 (32400)[a]	18507 (40800)[a]	28259 (62300)[a]	23678 (52200)[a]	18461 (40700)[a]	13835 (30500)	10841 (23900)	
-6.1 (-20)		25991 (57300)[a]	28168 (62100)[a]	21591 (47600)[a]	16964 (37400)[a]	13381 (29500)[a]		
-7.6 (-25)			22861 (50400)[a]	17781 (39200)[a]	13744 (30300)[a]			
[a]Hydraulically-limited capacity								

Continued on next page

LIFTING OVER SIDE—Power Dig ON								
Boom: 7.8 m (25 ft 7 in.)			**Arm: 5.3 m (17 ft 5 in.)**		**Bucket: 2.0 m³ (2.6 yd³)**	**Shoe 900 mm (35 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**							
m (ft)	**1.5 (5)**	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.1 (40)**
9.1 (30)							4853 (10700)[a]	
7.6 (25)							6441 (14200)[a]	
6.1 (20)							7394 (16300)[a]	4944 (10900)[a]
4.6 (15)						9389 (20700)[a]	8528 (18800)[a]	6350 (14000)[a]
3.0 (10)				16828 (37100)[a]	13426 (29600)[a]	11113 (24500)	8391 (18500)	6350 (14000)
1.5 (5)				20094 (44300)	14152 (31200)	10478 (23100)	7938 (17500)	6123 (13500)
Ground Line			13381 (29500)[a]	18688 (41200)	13245 (29200)	9888 (21800)	7575 (16700)	5897 (13000)
-1.5 (-5)		7575 (16700)[a]	15966 (35200)[a]	17872 (39400)	12610 (27800)	9435 (20800)	7257 (16000)	5715 (12600)
-3.0 (-10)	9253 (20400)[a]	12610 (27800)[a]	20956 (46200)[a]	17509 (38600)	12292 (27100)	9163 (20200)	7121 (15700)	5670 (12500)
-4.6 (-15)	14696 (32400)[a]	18507 (40800)[a]	28259 (62300)[a]	17509 (38600)	12202 (26900)	9117 (20100)	7076 (15600)	
-6.1 (-20)		25991 (57300)[a]	28168 (62100)[a]	17781 (39200)	12338 (27200)	9253 (20400)		
-7.6 (-25)			22861 (50400)[a]	17781 (39200)[a]	12791 (28200)			

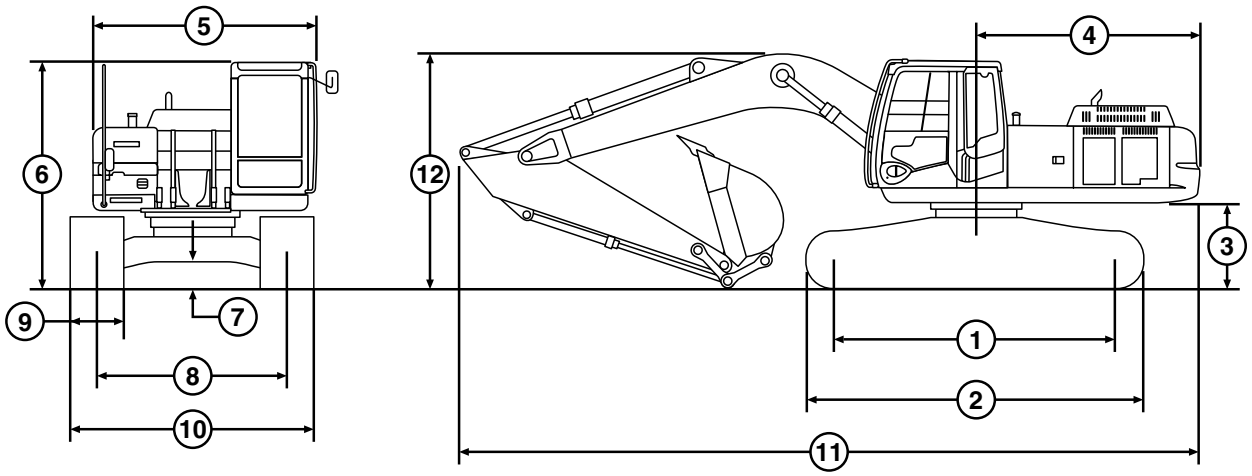
[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON					
BE-Boom: 6.8 m (22 ft 4 in.)		**BE-Arm: 2.9 m (9 ft 6 in.)**		**Bucket: 3.5 m³ (4.58 yd³)**	**Shoe 900 mm (35 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
7.6 (25)				13018 (28700)[a]	
6.1 (20)				13698 (30200)[a]	9163 (20200)[a]
4.6 (15)			18098 (39900)[a]	15105 (33300)[a]	13562 (29900)[a]
3.0 (10)			21636 (47700)[a]	16919 (37300)[a]	14379 (31700)[a]
1.5 (5)			24449 (53900)[a]	18552 (40900)[a]	14787 (32600)
Ground Line			25583 (56400)[a]	19459 (42900)[a]	14515 (32000)
-1.5 (-5)			25129 (55400)[a]	19368 (42700)	14379 (31700)
-3.0 (-10)	27760 (61200)[a]	29574 (65200)[a]	23224 (51200)[a]	18008 (39700)[a]	
-4.6 (-15)		24131 (53200)[a]	19142 (42200)[a]	13653 (30100)[a]	
LIFTING OVER SIDE—Power Dig ON					
BE-Boom: 6.8 m (22 ft 4 in.)		**BE-Arm: 2.9 m (9 ft 6 in.)**		**Bucket: 3.5 m³ (4.58 yd³)**	**Shoe 900 mm (35 in.)**
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**
7.6 (25)				13018 (28700)[a]	
6.1 (20)				13698 (30200)[a]	9163 (20200)[a]
4.6 (15)			18098 (39900)[a]	15059 (33200)	10750 (23700)
3.0 (10)			20638 (45500)	14288 (31500)	10387 (22900)[a]
1.5 (5)			19414 (42800)	13608 (30000)	10024 (22100)
Ground Line			18779 (41400)	13109 (28900)	9070 (21400)
-1.5 (-5)			18552 (40900)	12882 (28400)	9616 (21200)
-3.0 (-10)	27760 (61200)[a]	29574 (65200)[a]	18643 (41100)	12927 (28500)	
-4.6 (-15)		24131 (53200)[a]	19096 (42100)	13426 (29600)	
[a]Hydraulically-limited capacity					

DW90712,000000C –19–23OCT08–15/15

850DLC Machine Specifications



TX1001680 –UN–03JAN06

TX1001680

1—Sprocket Center To Idler Center
2—Undercarriage Length
3—Counterweight Clearance
4—Rear End Swing Radius
5—Overall Width
6—Cab Height
7—Minimum Ground Clearance
8—Center Of Sprocket To Center Of Sprocket
9—Track Shoe Width
10—Undercarriage Width
11—Overall Length
12—Transport Height

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 900 mm (36 in.) shoes, counterweight, 4.4 m (14 ft 5 in.) arm, 3391 kg (7491 lb) ??3.49 m ^{3} (4.57 yd ^{3}) bucket, full fuel tank, 79 kg (175 lb) operator and standard equipment.

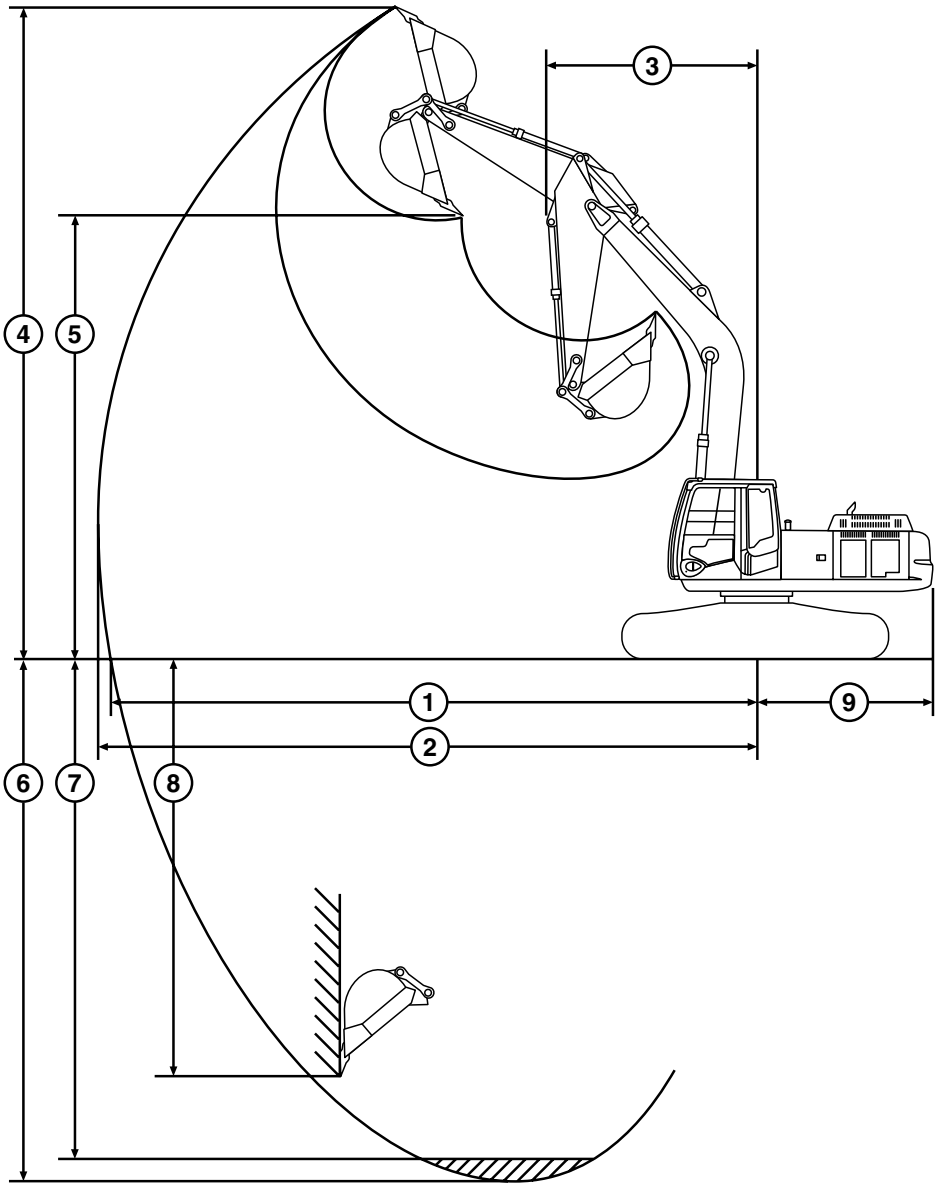
Item	Measurement	Specification
1—Sprocket Center To Idler Center	Distance	5110 mm 16 ft 9 in.
2—Undercarriage	Length	6360 mm 20 ft 10 in.
3—Counterweight Clearance	Distance	1680 mm 5 ft 6 in.

Continued on next page

Item	Measurement	Specification
4—Rear End Swing Radius	Distance	4600 mm 15 ft 1 in.
5—Overall Width (excluding back mirrors)	Distance	4120 mm 13 ft 6 in.
6—Cab	Height	3632 mm 11 ft 11 in.
7—Minimum Ground Clearance	Distance	890 mm 2 ft 11 in.
8—Center Of Sprocket To Center Of Sprocket	Distance	3450 mm 11 ft 4 in.
9—Track Shoe	Width	900 mm 36 in.
10—Undercarriage	Width	With 900 mm shoes: 4350 mm With 36 in. shoes: 14 ft 3 in.
11—Machine	Overall Length	With 4400 mm Arm: 14 840 mm With 14 ft 5 in. Arm: 48 ft 8 in.
12—Machine	Transport Height	With 3900 mm Arm: 4810 mm With 12 ft 10 in. Arm: 15 ft 9 in.
Machine	Operating Weight	84 152 kg 185 520 lb

DW90712,0000052 –19–22MAY06–2/2

850DLC Working Ranges



TX1001681 –UN–03JAN06

TX1001681

1—Maximum Digging Reach
2—Maximum Digging Reach At Ground Level
3—Minimum Swing Radius
4—Maximum Cutting Height
5—Maximum Dumping Height
6—Maximum Digging Depth
7—Maximum Digging Depth (flat bottom)
8—Maximum Vertical Wall
9—Tail Swing Radius

Continued on next page

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 900 mm (36 in.) shoes, counterweight and 4.4 m (14 ft 5 in.) arm.

Item	Measurement	Specification
1—Maximum Digging Reach	Distance	With 4400 mm Arm: 14 910 mm With 14 ft 5 in. Arm: 48 ft 11 in.
2—Maximum Digging Reach At Ground Level	Distance	With 4400 mm Arm: 14 640 mm With 14 ft 5 in. Arm: 48 ft 0 in.
3—Minimum Swing Radius	Radius	With 4400 mm Arm: 5950 mm With 14 ft 5 in. Arm: 19 ft 6 in.
4—Maximum Cutting Height	Height	With 4400 mm Arm: 13 820 mm With 14 ft 5 in. Arm: 45 ft 4 in.
5—Maximum Dumping Height	Height	With 4400 mm Arm: 9740 mm With 14 ft 5 in. Arm: 31 ft 11 in.
6—Maximum Digging Depth	Depth	With 4400 mm Arm: 9570 mm With 14 ft 5 in. Arm: 31 ft 5 in.
7—Maximum Digging Depth (flat bottom)	Depth	With 4400 mm Arm: 9460 mm With 14 ft 5 in. Arm: 31 ft 0 in.
8—Maximum Vertical Wall	Depth	With 4400 mm Arm: 8480 mm With 14 ft 5 in. Arm: 27 ft 10 in.
9—Tail Swing Radius	Radius	With 4400 mm Arm: 4600 mm With 14 ft 5 in. Arm: 15 ft 1 in.

DW90712,0000053 –19–22MAY06–2/2

850DLC Engine Specifications

Item	Measurement	Specification
Isuzu 6WG1TC	Type	4-Cycle Water-Cooled, OHC, Vertical In-Line, Direct Injection, Turbocharged and with inter cooler
	Cylinders	6
	Displacement	15.7 L 957 cu in.
	Power At 2000 RPM	338 kW Net SAE 453 hp Net SAE
	Net Torque @ 2000 RPM	1960 N•m 1446 lb-ft

VD76477,000031B –19–22MAY06–1/1

850DLC Drain and Refill Capacities

Item	Measurement	Specification
Fuel Tank	Capacity	1120.0 L 296.0 gal
Cooling System	Capacity	81.4 L 21.5 gal
Engine	Oil Capacity, Including Filter Change	52.5 L 13.9 gal
Hydraulic Tank	Oil Capacity	500 L 132.1 gal
Hydraulic System	Oil Capacity	790 L 208.7 gal
Swing Gearbox (Each)	Oil Capacity	15 L 4 gal
Travel Gearbox (Each)	Oil Capacity	19 L 5 gal
Pump Drive Gearbox	Oil Capacity	3.78 L 4 qt

DW90712,000005A –19–03JUL07–1/1

850DLC Lift Capacity—KG (LB)

NOTE: Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface. Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures marked with an (a) are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

LIFTING OVER FRONT—Power Dig ON						
Boom: 8.4 m (27 ft 7 in.)	**Arm: 3.7 m (12 ft 2 in.)**		**Bucket: 3.5 m³ (4.58 yd³)**	**Shoe 650 mm (25 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
7.6 (25)				13109 (28900)[a]	11068 (24400)[a]	
6.1 (20)				14243 (31400)[a]	13109 (28900)[a]	
4.6 (15)		24812 (54700)[a]	18915 (41700)[a]	15830 (34900)[a]	14016 (30900)[a]	9752 (21500)[a]
3.0 (10)			21818 (48100)[a]	17554 (38700)[a]	15014 (33100)[a]	12474 (27500)[a]
1.5 (5)			24086 (53100)[a]	19051 (42000)[a]	15921 (35100)[a]	13698 (30200)
Ground Line			25265 (55700)[a]	20003 (44100)[a]	16556 (36500)[a]	13472 (29700)
-1.5 (-5)		30708 (67700)[a]	25401 (56000)[a]	20321 (44800)[a]	16556 (36500)	
-3.0 (-10)	23950 (52800)[a]	30481 (67200)[a]	24539 (54100)[a]	19867 (43800)[a]	16193 (35700)[a]	
-4.6 (-15)	31933 (70400)[a]	27714 (61100)[a]	22634 (49900)[a]	18370 (40500)[a]		
-6.1 (-20)	27578 (60800)[a]	23405 (51600)[a]	19187 (42300)[a]	14923 (32900)[a]		
LIFTING OVER SIDE—Power Dig ON						
Boom: 8.4 m (27 ft 7 in.)	**Arm: 3.7 m (12 ft 2 in.)**		**Bucket: 3.5 m³ (4.58 yd³)**	**Shoe 650 mm (25 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
7.6 (25)				13109 (28900)[a]	11068 (24400)[a]	
6.1 (20)				14243 (31400)[a]	12202 (26900)	
4.6 (15)		24812 (54700)[a]	18915 (41700)[a]	15513 (34200)	11793 (26000)	9072 (20000)
3.0 (10)			19641 (43300)	14742 (32500)	11340 (25000)	8845 (19500)
1.5 (5)			18597 (41000)	14061 (31000)	10886 (24000)	8573 (18900)
Ground Line			17962 (39600)	13562 (29900)	10569 (23300)	8391 (18500)
-1.5 (-5)		25310 (55800)	17645 (38900)	13245 (29200)	10342 (22800)	
-3.0 (-10)	23950 (52800)[a]	25447 (56100)	17599 (38800)	13200 (29100)	10297 (22700)	
-4.6 (-15)	31933 (70400)[a]	25809 (56900)	17826 (39300)	13290 (29300)		
-6.1 (-20)	27578 (60800)[a]	23405 (51600)[a]	18234 (40200)	13744 (30300)		

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON							
Boom: 8.4 m (27 ft 7 in.)		**Arm: 4.4 m (14 ft 5 in.)**		**Bucket: 2.9 m³ (3.79 yd³)**	**Shoe 650 mm (25 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
9.1 (30)						8482 (18700)[a]	
7.6 (25)						10433 (23000)[a]	
6.1 (20)					12701 (28000)[a]	11929 (26300)[a]	8936 (19700)[a]
4.6 (15)			21999 (48500)[a]	17418 (38400)[a]	14832 (32700)[a]	13200 (29100)[a]	10932 (24100)[a]
3.0 (10)			27624 (60900)[a]	20457 (45100)[a]	16647 (36700)[a]	14334 (31600)[a]	12791 (28200)[a]
1.5 (5)				23042 (50800)[a]	18325 (40400)[a]	15422 (34000)[a]	13472 (29700)[a]
Ground Line			21546 (47500)[a]	24721 (54500)[a]	19550 (43100)[a]	16239 (35800)[a]	13562 (29900)
-1.5 (-5)			27987 (61700)[a]	25310 (55800)[a]	20185 (44500)[a]	16601 (36600)	13381 (29500)
-3.0 (-10)	11748 (25900)[a]	20412 (45000)[a]	31706 (69900)[a]	24993 (55100)[a]	20094 (44300)[a]	16465 (36300)	11385 (25100)[a]
-4.6 (-15)	22362 (49300)[a]	32341 (71300)[a]	29484 (65000)[a]	23632 (52100)[a]	19142 (42200)[a]	15468 (34100)[a]	
-6.1 (-20)		31797 (70100)[a]	25900 (57100)[a]	21001 (46300)[a]	16828 (37100)[a]		
-7.6 (-25)			20230 (44600)[a]	16193 (35700)[a]			

LIFTING OVER SIDE—Power Dig ON							
Boom: 8.4 m (27 ft 7 in.)		**Arm: 4.4 m (14 ft 5 in.)**		**Bucket: 2.9 m³ (3.79 yd³)**	**Shoe 650 mm (25 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
9.1 (30)						8482 (18700)[a]	
7.6 (25)						10433 (23000)[a]	
6.1 (20)					12701 (28000)[a]	11929 (26300)[a]	8936 (19700)[a]
4.6 (15)			21999 (48500)[a]	17418 (38400)[a]	14832 (32700)[a]	12066 (26600)	9344 (20600)
3.0 (10)			27624 (60900)[a]	20185 (44500)	15059 (33200)	11567 (25500)	9026 (19900)
1.5 (5)				18960 (41800)	14288 (31500)	11068 (24400)	8709 (19200)
Ground Line			21546 (47500)[a]	18098 (39900)	13698 (30200)	10659 (23500)	8482 (18700)
-1.5 (-5)			25129 (55400)	17645 (38900)	13290 (29300)	10387 (22900)	8301 (18300)
-3.0 (-10)	11748 (25900)[a]	20412 (45000)[a]	25174 (55500)	17509 (38600)	13109 (28900)	10251 (22600)	8255 (18200)
-4.6 (-15)	22362 (49300)[a]	32341 (71300)[a]	25401 (56000)	17599 (38800)	13154 (29000)	10297 (22700)	
-6.1 (-20)		31797 (70100)[a]	25855 (57000)	17917 (39500)	13426 (29600)		
-7.6 (-25)			20230 (44600)[a]	16193 (35700)[a]			

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON								
Boom: 8.4 m (27 ft 7 in.)		**Arm: 5.40 m (17 ft 9 in.)**		**Bucket: 2.30 m^3 (3.01 yd^3)**	**Shoe 650 mm (25 in.)**			
Load Point Height	**Horizontal Distance from Centerline of Rotation**							
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**	**13.7 (45)**
9.1 (30)							5080 (11200)[a]	
7.6 (25)						8754 (19300)[a]	7348 (16200)[a]	
6.1 (20)						9616 (21200)[a]	8618 (19000)[a]	
4.6 (15)					11884 (26200)[a]	11204 (24700)[a]	9843 (21700)[a]	6078 (13400)[a]
3.0 (10)			23723 (52300)[a]	18280 (40300)[a]	15241 (33600)[a]	13290 (29300)[a]	11385 (25100)[a]	7348 (16200)[a]
1.5 (5)			28440 (62700)[a]	21183 (46700)[a]	17055 (37600)[a]	14515 (32000)[a]	12746 (28100)[a]	8074 (17800)[a]
Ground Line			29801 (65700)[a]	23360 (51500)[a]	18597 (41000)[a]	15513 (34200)[a]	13426 (29600)[a]	7983 (17600)[a]
-1.5 (-5)		11612 (25600)[a]	29665 (65400)[a]	24675 (54400)[a]	19595 (43200)[a]	16239 (35800)[a]	13290 (29300)	6169 (13600)[a]
-3.0 (-10)	10977 (24200)[a]	17826 (39300)[a]	32477 (71600)[a]	24993 (55100)[a]	20003 (44100)[a]	16329 (36000)	13154 (29000)	
-4.6 (-15)	17781 (39200)[a]	25855 (57000)[a]	31162 (68700)[a]	24403 (53800)[a]	19595 (43200)[a]	16012 (35300)[a]	11340 (25000)[a]	
-6.1 (-20)	25991 (57300)[a]	36832 (81200)[a]	28622 (63100)[a]	22680 (50000)[a]	18234 (40200)[a]	14515 (32000)[a]		
-7.6 (-25)		30980 (68300)[a]	24403 (53800)[a]	19414 (42800)[a]	15105 (33300)[a]			
[a]Hydraulically-limited capacity								

Continued on next page

LIFTING OVER SIDE—Power Dig ON								
Boom: 8.4 m (27 ft 7 in.)		**Arm: 5.40 m (17 ft 9 in.)**		**Bucket: 2.30 m³ (3.01 yd³)**	**Shoe 650 mm (25 in.)**			
Load Point Height	**Horizontal Distance from Centerline of Rotation**							
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**	**13.7 (45)**
9.1 (30)							5080 (11200)[a]	
7.6 (25)						8754 (19300)[a]	7348 (16200)[a]	
6.1 (20)						9616 (21200)[a]	8618 (19000)[a]	
4.6 (15)					11884 (26200)[a]	11204 (24700)[a]	9480 (20900)	6078 (13400)[a]
3.0 (10)			23723 (52300)[a]	18280 (40300)[a]	15241 (33600)[a]	11748 (25900)	9117 (20100)	7121 (15700)
1.5 (5)			27397 (60400)	19414 (42800)	14515 (32000)	11204 (24700)	8800 (19400)	6940 (15300)
Ground Line			25809 (56900)	18370 (40500)	13789 (30400)	10705 (23600)	8437 (18600)	6759 (14900)
-1.5 (-5)		11612 (25600)[a]	25038 (55200)	17645 (38900)	13290 (29300)	10342 (22800)	8210 (18100)	6169 (13600)[a]
-3.0 (-10)	10977 (24200)[a]	17826 (39300)[a]	24721 (54500)	17282 (38100)	12973 (28600)	10115 (22300)	8074 (17800)	
-4.6 (-15)	17781 (39200)[a]	25855 (57000)[a]	24766 (54600)	17191 (37900)	12882 (28400)	10024 (22100)	8119 (17900)	
-6.1 (-20)	25991 (57300)[a]	36832 (81200)[a]	25038 (55200)	17373 (38300)	12973 (28600)	10206 (22500)		
-7.6 (-25)		30980 (68300)[a]	24403 (53800)[a]	17826 (39300)	13381 (29500)			
[a]Hydraulically-limited capacity								

Continued on next page

LIFTING OVER FRONT—Power Dig ON					
BE-Boom: 7.10 m (23 ft 4 in.)	**BE-Arm: 2.95 m (9 ft 8 in.)**		**Bucket: 4.5 m³ (5.89 yd³)**	**Shoe 650 mm (25 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
9.1 (30)			15785 (34800)[a]		
7.6 (25)			16556 (36500)[a]	11204 (24700)[a]	
6.1 (20)			17735 (39100)[a]	16375 (36100)[a]	
4.6 (15)		24721 (54500)[a]	19913 (43900)[a]	17327 (38200)[a]	
3.0 (10)			22498 (49600)[a]	18643 (41100)[a]	13018 (28700)[a]
1.5 (5)			24585 (54200)[a]	19777 (43600)[a]	14923 (32900)[a]
Ground Line			25628 (56500)[a]	20412 (45000)[a]	
-1.5 (-5)		32477 (71600)[a]	25310 (55800)[a]	20049 (44200)[a]	
-3.0 (-10)	36560 (80600)[a]	29665 (65400)[a]	23451 (51700)[a]	18053 (39800)[a]	
-4.6 (-15)	29620 (65300)[a]	24630 (54300)[a]	19096 (42100)[a]		
LIFTING OVER SIDE—Power Dig ON					
BE-Boom: 7.10 m (23 ft 4 in.)	**BE-Arm: 2.95 m (9 ft 8 in.)**		**Bucket: 4.5 m³ (5.89 yd³)**	**Shoe 650 mm (25 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
9.1 (30)			15785 (34800)[a]		
7.6 (25)			16556 (36500)[a]	11204 (24700)[a]	
6.1 (20)			17735 (39100)[a]	15785 (34800)	
4.6 (15)		24721 (54500)[a]	19913 (43900)[a]	15331 (33800)	
3.0 (10)			20049 (44200)	14696 (32400)	10977 (24200)
1.5 (5)			19006 (41900)	14061 (31000)	10660 (23500)
Ground Line			18325 (40400)	13608 (30000)	
-1.5 (-5)		25900 (57100)	17962 (39600)	13336 (29400)	
-3.0 (-10)	36560 (80600)[a]	25945 (57200)	17917 (39500)	13336 (29400)	
-4.6 (-15)	29620 (65300)[a]	24630 (54300)	18234 (40200)		

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON						
Boom: 8.4 m (27 ft 7 in.)	**Arm: 3.7 m (12 ft 2 in.)**		**Bucket: 3.5 m³ (4.58 yd³)**		**Shoe 750 mm (30 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
7.6 (25)				13109 (28900)[a]	11068 (24400)[a]	
6.1 (20)				14243 (31400)[a]	13109 (28900)[a]	
4.6 (15)		24812 (54700)[a]	18915 (41700)[a]	15830 (34900)[a]	14016 (30900)[a]	9752 (21500)[a]
3.0 (10)			21818 (48100)[a]	17554 (38700)[a]	15014 (33100)[a]	12474 (27500)[a]
1.5 (5)			24086 (53100)[a]	19051 (42000)[a]	15921 (35100)[a]	13835 (30500)
Ground Line			25265 (55700)[a]	20003 (44100)[a]	16556 (36500)[a]	13608 (30000)
-1.5 (-5)		30708 (67700)[a]	25401 (56000)[a]	20321 (44800)[a]	16738 (36900)	
-3.0 (-10)	23950 (52800)[a]	30481 (67200)[a]	24539 (54100)[a]	19867 (43800)[a]	16193 (35700)[a]	
-4.6 (-15)	31933 (70400)[a]	27714 (61100)[a]	22634 (49900)[a]	18370 (40500)[a]		
-6.1 (-20)	27578 (60800)[a]	23405 (51600)[a]	19187 (42300)[a]	14923 (32900)[a]		
LIFTING OVER SIDE—Power Dig ON						
Boom: 8.4 m (27 ft 7 in.)	**Arm: 3.7 m (12 ft 2 in.)**		**Bucket: 3.5 m³ (4.58 yd³)**		**Shoe 750 mm (30 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
7.6 (25)				13109 (28900)[a]	11068 (24400)[a]	
6.1 (20)				14243 (31400)[a]	12338 (27200)	
4.6 (15)		24812 (54700)[a]	18915 (41700)[a]	15649 (34500)	11929 (26300)	9163 (20200)
3.0 (10)			19822 (43700)	16239 (32800)	11431 (25200)	8936 (19700)
1.5 (5)			18779 (41400)	14197 (31300)	11022 (24300)	8664 (19100)
Ground Line			18098 (39900)	13698 (30200)	10659 (23500)	8482 (18700)
-1.5 (-5)		25537 (56300)	17826 (39300)	13381 (29500)	10478 (23100)	
-3.0 (-10)	23950 (52800)[a]	25673 (56600)	17781 (39200)	13336 (29400)	10433 (23000)	
-4.6 (-15)	31933 (70400)[a]	26036 (57400)	17962 (39600)	13426 (29600)		
-6.1 (-20)	27578 (60800)[a]	23405 (51600)[a]	18416 (40600)	13880 (30600)		

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON							
Boom: 8.4 m (27 ft 7 in.)		**Arm: 4.4 m (14 ft 5 in.)**		**Bucket: 2.9 m³ (3.79 yd³)**		**Shoe 750 mm (30 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
9.1 (30)						8482 (18700)[a]	
7.6 (25)						10433 (23000)[a]	
6.1 (20)					12701 (28000)[a]	11929 (26300)[a]	8936 (19700)[a]
4.6 (15)			21999 (48500)[a]	17418 (38400)[a]	14832 (32700)[a]	13200 (29100)[a]	10932 (24100)[a]
3.0 (10)			27624 (60900)[a]	20457 (45100)[a]	16647 (36700)[a]	14334 (31600)[a]	12791 (28200)[a]
1.5 (5)				23042 (50800)[a]	18325 (40400)[a]	15422 (34000)[a]	13472 (29700)[a]
Ground Line			21546 (47500)[a]	24721 (54500)[a]	19550 (43100)[a]	16239 (35800)[a]	13698 (30200)
-1.5 (-5)			27987 (61700)[a]	25310 (55800)[a]	20185 (44500)[a]	16692 (36800)[a]	13517 (29800)
-3.0 (-10)	11748 (25900)[a]	20412 (45000)[a]	31706 (69900)[a]	24993 (55100)[a]	20094 (44300)[a]	16511 (36400)[a]	11385 (25100)[a]
-4.6 (-15)	22362 (49300)[a]	32341 (71300)[a]	29484 (65000)[a]	23632 (52100)[a]	19142 (42200)[a]	15468 (34100)[a]	
-6.1 (-20)		31797 (70100)[a]	25900 (57100)[a]	21001 (46300)[a]	16828 (37100)[a]		
-7.6 (-25)			20230 (44600)[a]	16193 (35700)[a]			

LIFTING OVER SIDE—Power Dig ON							
Boom: 8.4 m (27 ft 7 in.)		**Arm: 4.4 m (14 ft 5 in.)**		**Bucket: 2.9 m³ (3.79 yd³)**		**Shoe 750 mm (30 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
9.1 (30)						8482 (18700)[a]	
7.6 (25)						10433 (23000)[a]	
6.1 (20)					12701 (28000)[a]	11929 (26300)[a]	8936 (19700)[a]
4.6 (15)			21999 (48500)[a]	17418 (38400)[a]	14832 (32700)[a]	12202 (26900)	9435 (20800)
3.0 (10)			27624 (60900)[a]	20321 (44800)	15195 (33500)	11657 (25700)	9117 (20100)
1.5 (5)				19096 (42100)	14424 (31800)	11204 (24700)	8800 (19400)
Ground Line			21546 (47500)[a]	18280 (40300)	13835 (30500)	10796 (23800)	8573 (18900)
-1.5 (-5)			25401 (56000)	17826 (39300)	13426 (29600)	10478 (23100)	8391 (18500)
-3.0 (-10)	11748 (25900)[a]	20412 (45000)[a]	25401 (56000)	17690 (39000)	13245 (29200)	10387 (22900)	8346 (18400)
-4.6 (-15)	22362 (49300)[a]	32341 (71300)[a]	25628 (56500)	17781 (39200)	13290 (29300)	10433 (23000)	
-6.1 (-20)		31797 (70100)[a]	25900 (57100)[a]	18098 (39900)	13562 (29900)		
-7.6 (-25)			20230 (44600)[a]	16193 (35700)[a]			

[a]Hydraulically-limited capacity

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LIFTING OVER FRONT—Power Dig ON								
Boom: 8.4 m (27 ft 7 in.)		**Arm: 5.40 m (17 ft 9 in.)**		**Bucket: 2.30 m³ (3.01 yd³)**	**Shoe 750 mm (30 in.)**			
Load Point Height	**Horizontal Distance from Centerline of Rotation**							
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**	**13.7 (45)**
9.1 (30)							5080 (11200)[a]	
7.6 (25)						8754 (19300)[a]	7348 (16200)[a]	
6.1 (20)						9616 (21200)[a]	8618 (19000)[a]	
4.6 (15)					11884 (26200)[a]	11204 (24700)[a]	9843 (21700)[a]	6078 (13400)[a]
3.0 (10)			23723 (52300)[a]	18280 (40300)[a]	15241 (33600)[a]	13290 (29300)[a]	11385 (25100)[a]	7348 (16200)[a]
1.5 (5)			28440 (62700)[a]	21183 (46700)[a]	17055 (37600)[a]	14515 (32000)[a]	12746 (28100)[a]	8074 (17800)[a]
Ground Line			29801 (65700)[a]	23360 (51500)[a]	18597 (41000)[a]	15513 (34200)[a]	13426 (29600)[a]	7983 (17600)[a]
-1.5 (-5)		11612 (25600)[a]	29665 (65400)[a]	24675 (54400)[a]	19595 (43200)[a]	16239 (35800)[a]	13426 (29600)	6169 (13600)[a]
-3.0 (-10)	10977 (24200)[a]	17826 (39300)[a]	32477 (71600)[a]	24993 (55100)[a]	20003 (44100)[a]	16465 (36300)[a]	13290 (29300)	
-4.6 (-15)	17781 (39200)[a]	25855 (57000)[a]	31162 (68700)[a]	24403 (53800)[a]	19595 (43200)[a]	16012 (35300)[a]	11340 (25000)[a]	
-6.1 (-20)	25991 (57300)[a]	36832 (81200)[a]	28622 (63100)[a]	22680 (50000)[a]	18234 (40200)[a]	14515 (32000)[a]		
-7.6 (-25)		30980 (68300)[a]	24403 (53800)[a]	19414 (42800)[a]	15105 (33300)[a]			
[a]Hydraulically-limited capacity								

Continued on next page

LIFTING OVER SIDE—Power Dig ON								
Boom: 8.4 m (27 ft 7 in.)		**Arm: 5.40 m (17 ft 9 in.)**		**Bucket: 2.30 m^3 (3.01 yd^3)**	**Shoe 750 mm (30 in.)**			
Load Point Height	**Horizontal Distance from Centerline of Rotation**							
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**	**13.7 (45)**
9.1 (30)							5080 (11200)[a]	
7.6 (25)						8754 (19300)[a]	7348 (16200)[a]	
6.1 (20)						9616 (21200)[a]	8618 (19000)[a]	
4.6 (15)					11884 (26200)[a]	11204 (24700)[a]	9571 (21100)	6078 (13400)[a]
3.0 (10)			23723 (52300)[a]	18280 (40300)[a]	15241 (33600)[a]	11884 (26200)	9253 (20400)	7212 (15900)
1.5 (5)			27624 (60900)	19595 (43200)	14651 (32300)	11294 (24900)	8890 (19600)	7031 (15500)
Ground Line			26036 (57400)	18552 (40900)	13925 (30700)	10840 (23900)	8573 (18900)	6849 (15100)
-1.5 (-5)		11612 (25600)[a]	25265 (55700)	17826 (39300)	13426 (29600)	10433 (23000)	8301 (18300)	6169 (13600)[a]
-3.0 (-10)	10977 (24200)[a]	17826 (39300)[a]	24948 (55000)	17463 (38500)	13109 (28900)	10206 (22500)	8165 (18000)	
-4.6 (-15)	17781 (39200)[a]	25855 (57000)[a]	24993 (55100)	17373 (38300)	13018 (28700)	10160 (22400)	8210 (18100)	
-6.1 (-20)	25991 (57300)[a]	36832 (81200)[a]	25310 (55800)	17554 (38700)	13109 (28900)	10297 (22700)		
-7.6 (-25)		30980 (68300)[a]	24403 (53800)[a]	17962 (39600)	13517 (29800)			

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON					
BE-Boom: 7.10 m (23 ft 4 in.)	**BE-Arm: 2.95 m (9 ft 8 in.)**		**Bucket: 4.5 m³ (5.89 yd³)**	**Shoe 750 mm (30 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
9.1 (30)			15785 (34800)[a]		
7.6 (25)			16556 (36500)[a]	11204 (24700)[a]	
6.1 (20)			17735 (39100)[a]	16375 (36100)[a]	
4.6 (15)		24721 (54500)[a]	19913 (43900)[a]	17327 (38200)[a]	
3.0 (10)			22498 (49600)[a]	18643 (41100)[a]	13018 (28700)[a]
1.5 (5)			24585 (54200)[a]	19777 (43600)[a]	14923 (32900)[a]
Ground Line			25628 (56500)[a]	20412 (45000)[a]	
-1.5 (-5)		32477 (71600)[a]	25310 (55800)[a]	20049 (44200)[a]	
-3.0 (-10)	36560 (80600)[a]	29665 (65400)[a]	23451 (51700)[a]	18053 (39800)[a]	
-4.6 (-15)	29620 (65300)[a]	24630 (54300)[a]	19096 (42100)[a]		
LIFTING OVER SIDE—Power Dig ON					
BE-Boom: 7.10 m (23 ft 4 in.)	**BE-Arm: 2.95 m (9 ft 8 in.)**		**Bucket: 4.5 m³ (5.89 yd³)**	**Shoe 750 mm (30 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
9.1 (30)			15785 (34800)[a]		
7.6 (25)			16556 (36500)[a]	11204 (24700)[a]	
6.1 (20)			17735 (39100)[a]	15921 (35100)	
4.6 (15)		24721 (54500)[a]	19913 (43900)[a]	15468 (34100)	
3.0 (10)			20230 (44600)	14832 (32700)	11068 (24400)
1.5 (5)			19187 (42300)	14197 (31300)	10750 (23700)
Ground Line			18507 (40800)	13744 (30300)	
-1.5 (-5)		26127 (57600)	18144 (40000)	13472 (29700)	
-3.0 (-10)	36560 (80600)[a]	26172 (57700)	18098 (39900)	13472 (29700)	
-4.6 (-15)	29620 (65300)[a]	24630 (54300)[a]	18416 (40600)		
[a]Hydraulically-limited capacity					

DW90712,000000D –19–23OCT08–10/10

850DLC Lift Capacity—KG (LB) (Cont'd)

NOTE: Ratings are at bucket lift hook, using standard counterweight, situated on firm, level, uniform supporting surface. Figures do not exceed 87 percent of hydraulic capacity or 75 percent of weight needed to tip machine. Figures marked with an (a) are hydraulically-limited capacities. Remaining figures are stability-limited capacities.

LIFTING OVER FRONT—Power Dig ON						
Boom: 8.4 m (27 ft 7 in.)	**Arm: 3.7 m (12 ft 2 in.)**		**Bucket: 3.5 m³ (4.58 yd³)**	**Shoe 900 mm (35 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
7.6 (25)				13109 (28900)[a]	11068 (24400)[a]	
6.1 (20)				14243 (31400)[a]	13109 (28900)[a]	
4.6 (15)		24812 (54700)[a]	18915 (41700)[a]	15830 (34900)[a]	14016 (30900)[a]	9752 (21500)[a]
3.0 (10)			21818 (48100)[a]	17554 (38700)[a]	15014 (33100)[a]	12474 (27500)[a]
1.5 (5)			24086 (53100)[a]	19051 (42000)[a]	15921 (35100)[a]	13880 (30600)[a]
Ground Line			25265 (55700)[a]	20003 (44100)[a]	16556 (36500)[a]	13789 (30400)
-1.5 (-5)		30708 (67700)[a]	25401 (56000)[a]	20321 (44800)[a]	16738 (36900)[a]	
-3.0 (-10)	23950 (52800)[a]	30481 (67200)[a]	24539 (54100)[a]	19867 (43800)[a]	16193 (35700)[a]	
-4.6 (-15)	31933 (70400)[a]	27714 (61100)[a]	22634 (49900)[a]	18370 (40500)[a]		
-6.1 (-20)	27578 (60800)[a]	23405 (51600)[a]	19187 (42300)[a]	14923 (32900)[a]		
LIFTING OVER SIDE—Power Dig ON						
Boom: 8.4 m (27 ft 7 in.)	**Arm: 3.7 m (12 ft 2 in.)**		**Bucket: 3.5 m³ (4.58 yd³)**	**Shoe 900 mm (35 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
7.6 (25)				13109 (28900)[a]	11068 (24400)[a]	
6.1 (20)				14243 (31400)[a]	12474 (27500)	
4.6 (15)		24812 (54700)[a]	18915 (41700)[a]	15830 (34900)	12066 (26600)	9299 (20500)
3.0 (10)			20049 (44200)	15059 (33200)	11612 (25600)	9072 (20000)
1.5 (5)			19006 (41900)	14379 (31700)	11158 (24600)	8800 (19400)
Ground Line			18325 (40400)	13880 (30600)	10841 (23900)	8618 (19000)
-1.5 (-5)		25855 (57000)	18053 (39800)	13562 (29900)	10614 (23400)	
-3.0 (-10)	23950 (52800)[a]	25991 (57300)	18008 (39700)	13472 (29700)	10569 (23300)	
-4.6 (-15)	31933 (70400)[a]	26308 (58000)	18189 (40100)	13608 (30000)		
-6.1 (-20)	27578 (60800)[a]	23405 (51600)[a]	18463 (41100)[a]	14061 (31000)		

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON							
Boom: 8.4 m (27 ft 7 in.)		**Arm: 4.4 m (14 ft 5 in.)**		**Bucket: 2.9 m³ (3.79 yd³)**	**Shoe 900 mm (35 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
9.1 (30)						8482 (18700)[a]	
7.6 (25)						10433 (23000)[a]	
6.1 (20)					12701 (28000)[a]	11929 (26300)[a]	8936 (19700)[a]
4.6 (15)			21999 (48500)[a]	17418 (38400)[a]	14832 (32700)[a]	13200 (29100)[a]	10932 (24100)[a]
3.0 (10)			27624 (60900)[a]	20457 (45100)[a]	16647 (36700)[a]	14334 (31600)[a]	12792 (28200)[a]
1.5 (5)				23042 (50800)[a]	18325 (40400)[a]	15422 (34000)[a]	13472 (29700)[a]
Ground Line			21546 (47500)[a]	24721 (54500)[a]	19550 (43100)[a]	16239 (35800)[a]	13880 (30600)
-1.5 (-5)			27987 (61700)[a]	25310 (55800)[a]	20185 (44500)[a]	16692 (36800)[a]	13698 (30200)
-3.0 (-10)	11748 (25900)[a]	20412 (45000)[a]	31706 (69900)[a]	24993 (55100)[a]	20094 (44300)[a]	16511 (36400)[a]	11385 (25100)[a]
-4.6 (-15)	22362 (49300)[a]	32341 (71300)[a]	29484 (65000)[a]	23632 (52100)[a]	19142 (42200)[a]	15468 (34100)[a]	
-6.1 (-20)		31797 (70100)[a]	25900 (57100)[a]	21001 (46300)[a]	16828 (37100)[a]		
-7.6 (-25)			20230 (44600)[a]	16193 (35700)[a]			

LIFTING OVER SIDE—Power Dig ON							
Boom: 8.4 m (27 ft 7 in.)		**Arm: 4.4 m (14 ft 5 in.)**		**Bucket: 2.9 m³ (3.79 yd³)**	**Shoe 900 mm (35 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
9.1 (30)						8482 (18700)[a]	
7.6 (25)						10433 (23000)[a]	
6.1 (20)					12701 (28000)[a]	11929 (26300)[a]	8936 (19700)[a]
4.6 (15)			21999 (48500)[a]	17418 (38400)[a]	14832 (32700)[a]	12338 (27200)	9571 (21100)
3.0 (10)			27624 (60900)[a]	20457 (45100)[a]	15377 (33900)	11839 (26100)	9253 (20400)
1.5 (5)				19323 (42600)	14606 (32200)	11340 (25000)	8936 (19700)
Ground Line			21546 (47500)[a]	18507 (40800)	14016 (30900)	10932 (24100)	8664 (19100)
-1.5 (-5)			25673 (56600)	18053 (39800)	13608 (30000)	10659 (23500)	8528 (18800)
-3.0 (-10)	11748 (25900)[a]	20412 (45000)[a]	25719 (56700)	17917 (39500)	13426 (29600)	10523 (23200)	8482 (18700)
-4.6 (-15)	22362 (49300)[a]	32341 (71300)[a]	25945 (57200)	17962 (39600)	13472 (29700)	10569 (23300)	
-6.1 (-20)		31797 (70100)[a]	25900 (57100)[a]	18280 (40300)	13744 (30300)		
-7.6 (-25)			20230 (44600)[a]	16193 (35700)[a]			

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON								
Boom: 8.4 m (27 ft 7 in.)		**Arm: 5.40 m (17 ft 9 in.)**		**Bucket: 2.30 m³ (3.01 yd³)**	**Shoe 900 mm (35 in.)**			
Load Point Height	**Horizontal Distance from Centerline of Rotation**							
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**	**13.7 (45)**
9.1 (30)							5080 (11200)[a]	
7.6 (25)						8754 (19300)[a]	7348 (16200)[a]	
6.1 (20)						9616 (21200)[a]	8618 (19000)[a]	
4.6 (15)					11884 (26200)[a]	11204 (24700)[a]	9843 (21700)[a]	6078 (13400)[a]
3.0 (10)			23723 (52300)[a]	18280 (40300)[a]	15241 (33600)[a]	13290 (29300)[a]	11385 (25100)[a]	7348 (16200)[a]
1.5 (5)			28440 (62700)[a]	21183 (46700)[a]	17055 (37600)[a]	14515 (32000)[a]	12746 (28100)[a]	8074 (17800)[a]
Ground Line			29801 (65700)[a]	23360 (51500)[a]	18597 (41000)[a]	15513 (34200)[a]	13426 (29600)[a]	7983 (17600)[a]
-1.5 (-5)		11612 (25600)[a]	29665 (65400)[a]	24675 (54400)[a]	19595 (43200)[a]	16239 (35800)[a]	13653 (30100)	6169 (13600)[a]
-3.0 (-10)	10977 (24200)[a]	17826 (39300)[a]	32477 (71600)[a]	24993 (55100)[a]	20003 (44100)[a]	16465 (36300)[a]	13472 (29700)	
-4.6 (-15)	17781 (39200)[a]	25855 (57000)[a]	31162 (68700)[a]	24403 (53800)[a]	19595 (43200)[a]	16012 (35300)[a]	11340 (25000)[a]	
-6.1 (-20)	25991 (57300)[a]	36832 (81200)[a]	28622 (63100)[a]	22680 (50000)[a]	18234 (40200)[a]	14515 (32000)[a]		
-7.6 (-25)		30980 (68300)[a]	24403 (53800)[a]	19414 (42800)[a]	15105 (33300)[a]			

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER SIDE—Power Dig ON								
Boom: 8.4 m (27 ft 7 in.)		**Arm: 5.40 m (17 ft 9 in.)**		**Bucket: 2.30 m^3 (3.01 yd^3)**	**Shoe 900 mm (35 in.)**			
Load Point Height	**Horizontal Distance from Centerline of Rotation**							
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**	**13.7 (45)**
9.1 (30)							5080 (11200)[a]	
7.6 (25)						8754 (19300)[a]	7348 (16200)[a]	
6.1 (20)						9616 (21200)[a]	8618 (19000)[a]	
4.6 (15)					11884 (26200)[a]	11204 (24700)[a]	9707 (21400)	6078 (13400)[a]
3.0 (10)			23723 (52300)[a]	18280 (40300)[a]	15241 (33600)[a]	12020 (26500)	9344 (20600)	7348 (16200)
1.5 (5)			27941 (61600)	19822 (43700)	14832 (32700)	11476 (25300)	8981 (19800)	7121 (15700)
Ground Line			26354 (58100)	18733 (41300)	14107 (31100)	10977 (24200)	8664 (19100)	6940 (15300)
-1.5 (-5)		11612 (25600)[a]	25583 (56400)	18053 (39800)	13608 (30000)	10614 (23400)	8437 (18600)	6169 (13600)[a]
-3.0 (-10)	10977 (24200)[a]	17826 (39300)[a]	25265 (55700)	17690 (39000)	13290 (29300)	10387 (22900)	8301 (18300)	
-4.6 (-15)	17781 (39200)[a]	25855 (57000)[a]	25265 (55700)	17599 (38800)	13200 (29100)	10297 (22700)	8346 (18400)	
-6.1 (-20)	25991 (57300)[a]	36832 (81200)[a]	25583 (56400)	17781 (39200)	13290 (29300)	10478 (23100)		
-7.6 (-25)		30980 (68300)[a]	24403 (53800)[a]	18189 (40100)	13698 (30200)			
[a]Hydraulically-limited capacity								

Continued on next page

LIFTING OVER FRONT—Power Dig ON					
BE-Boom: 7.10 m (23 ft 4 in.)	**BE-Arm: 2.95 m (9 ft 8 in.)**		**Bucket: 4.5 m³ (5.89 yd³)**	**Shoe 900 mm (35 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
9.1 (30)			15785 (34800)[a]		
7.6 (25)			16556 (36500)[a]	11204 (24700)[a]	
6.1 (20)			17735 (39100)[a]	16375 (36100)[a]	
4.6 (15)		24721 (54500)[a]	19913 (43900)[a]	17327 (38200)[a]	
3.0 (10)			22498 (49600)[a]	18643 (41100)[a]	13018 (28700)[a]
1.5 (5)			24585 (54200)[a]	19777 (43600)[a]	14923 (32900)[a]
Ground Line			25628 (56500)[a]	20412 (45000)[a]	
-1.5 (-5)		32477 (71600)[a]	25310 (55800)[a]	20049 (44200)[a]	
-3.0 (-10)	36560 (80600)[a]	29665 (65400)[a]	23451 (51700)[a]	18053 (39800)[a]	
-4.6 (-15)	29620 (65300)[a]	24630 (54300)[a]	19096 (42100)[a]		
LIFTING OVER SIDE—Power Dig ON					
BE-Boom: 7.10 m (23 ft 4 in.)	**BE-Arm: 2.95 m (9 ft 8 in.)**		**Bucket: 4.5 m³ (5.89 yd³)**	**Shoe 900 mm (35 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**				
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
9.1 (30)			15785 (34800)[a]		
7.6 (25)			16556 (36500)[a]	11204 (24700)[a]	
6.1 (20)			17735 (39100)[a]	16103 (35500)	
4.6 (15)		24721 (54500)[a]	19913 (43900)[a]	15604 (34400)	
3.0 (10)			20457 (45100)	15014 (33100)	11204 (24700)
1.5 (5)			19414 (42800)	14379 (31700)	10932 (24100)
Ground Line			18688 (41200)	13925 (30700)	
-1.5 (-5)		26444 (58300)	18325 (40400)	13653 (30100)	
-3.0 (-10)	36560 (80600)[a]	26490 (58400)	18280 (40300)	13653 (30100)	
-4.6 (-15)	29620 (65300)[a]	24630 (54300)[a]	18643 (41100)		

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON						
Boom: 8.4 m (27 ft 7 in.)	**Arm: 3.7 m (12 ft 2 in.)**		**Bucket: 3.50 m³ (4.58 yd³)**	**Shoe 1020 mm (40 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
7.6 (25)				13109 (28900)[a]	11068 (24400)[a]	
6.1 (20)				14243 (31400)[a]	13109 (28900)[a]	
4.6 (15)		24812 (54700)[a]	18915 (41700)[a]	15830 (34900)[a]	14016 (30900)[a]	9752 (21500)[a]
3.0 (10)			21818 (48100)[a]	17554 (38700)[a]	15014 (33100)[a]	12474 (27500)[a]
1.5 (5)			24086 (53100)[a]	19051 (42000)[a]	15921 (35100)[a]	13888 (30600)[a]
Ground Line			25265 (55700)[a]	20003 (44100)[a]	16556 (36500)[a]	13880 (30600)[a]
-1.5 (-5)		30708 (67700)[a]	25401 (56000)[a]	20321 (44800)[a]	16738 (36900)[a]	
-3.0 (-10)	23950 (52800)[a]	30481 (67200)[a]	24539 (54100)[a]	19867 (43800)[a]	16193 (35700)[a]	
-4.6 (-15)	31933 (70400)[a]	27714 (61100)[a]	22634 (49900)[a]	18370 (40500)[a]		
-6.1 (-20)	27578 (60800)[a]	23405 (51600)[a]	19187 (42300)[a]	14923 (32900)[a]		
LIFTING OVER SIDE—Power Dig ON						
Boom: 8.4 m (27 ft 7 in.)	**Arm: 3.7 m (12 ft 2 in.)**		**Bucket: 3.50 m³ (4.58 yd³)**	**Shoe 1020 mm (40 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
7.6 (25)				13109 (28900)[a]	11068 (24400)[a]	
6.1 (20)				14243 (31400)[a]	12610 (27800)	
4.6 (15)		24812 (54700)[a]	18915 (41700)[a]	15830 (34900)[a]	12202 (26900)	9389 (20700)
3.0 (10)			20230 (44600)	15195 (33500)	11703 (25800)	9163 (20200)
1.5 (5)			19187 (42300)	14515 (32000)	11294 (24900)	8936 (19700)
Ground Line			18552 (40900)	14016 (30900)	10932 (24100)	8709 (19200)
-1.5 (-5)		26127 (57600)	18234 (40200)	13744 (30300)	10750 (23700)	
-3.0 (-10)	23950 (52800)[a]	26263 (57900)	18234 (40200)	13653 (30100)	10705 (23600)	
-4.6 (-15)	31933 (70400)[a]	26581 (58600)	18416 (40600)	13789 (30400)		
-6.1 (-20)	27578 (60800)[a]	23405 (51600)[a]	18824 (41500)	14197 (31300)		

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON							
Boom: 8.4 m (27 ft 7 in.)	**Arm: 4.40 m (14 ft 5 in.)**			**Bucket: 2.90 m³ (3.79 yd³)**	**Shoe 1020 mm (40 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
9.1 (30)						8482 (18700)[a]	
7.6 (25)						10433 (23000)[a]	
6.1 (20)					12701 (28000)[a]	11929 (26300)[a]	8936 (19700)[a]
4.6 (15)			21999 (48500)[a]	17418 (38400)[a]	14832 (32700)[a]	13200 (29100)[a]	10932 (24100)[a]
3.0 (10)			27624 (60900)[a]	20457 (45100)[a]	16647 (36700)[a]	14334 (31600)[a]	12791 (28200)[a]
1.5 (5)				23042 (50800)[a]	18325 (40400)[a]	15422 (34000)[a]	13472 (29700)[a]
Ground Line			21546 (47500)[a]	24721 (54500)[a]	19550 (43100)[a]	16239 (35800)[a]	13925 (30700)[a]
-1.5 (-5)			27987 (61700)[a]	25310 (55800)[a]	20185 (44500)[a]	16692 (36800)[a]	13880 (30600)
-3.0 (-10)	11748 (25900)[a]	20412 (45000)[a]	31706 (69900)[a]	24993 (55100)[a]	20094 (44300)[a]	16511 (36400)[a]	11385 (25100)[a]
-4.6 (-15)	22362 (49300)[a]	32341 (71300)[a]	29484 (65000)[a]	23632 (52100)[a]	19142 (42200)[a]	15468 (34100)[a]	
-6.1 (-20)		31797 (70100)[a]	25900 (57100)[a]	21001 (46300)[a]	16828 (37100)[a]		
-7.6 (-25)			20230 (44600)[a]	16193 (35700)[a]			
LIFTING OVER SIDE—Power Dig ON							
Boom: 8.4 m (27 ft 7 in.)	**Arm: 4.40 m (14 ft 5 in.)**			**Bucket: 2.90 m³ (3.79 yd³)**	**Shoe 1020 mm (40 in.)**		
Load Point Height	**Horizontal Distance from Centerline of Rotation**						
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**
9.1 (30)						8482 (18700)[a]	
7.6 (25)						10433 (23000)[a]	
6.1 (20)					12701 (28000)[a]	11929 (26300)[a]	8936 (19700)[a]
4.6 (15)			21999 (48500)[a]	17418 (38400)[a]	14832 (32700)[a]	12565 (27700)	9752 (21500)
3.0 (10)			27624 (60900)[a]	20457 (45100)[a]	15649 (34500)	12066 (26600)	9435 (20800)
1.5 (5)				19686 (43400)	14878 (32800)	11567 (25500)	9117 (20100)
Ground Line			21546 (47500)[a]	18869 (41600)	14288 (31500)	11158 (24600)	8890 (19600)
-1.5 (-5)			26172 (57700)	18416 (40600)	13880 (30600)	10886 (24000)	8709 (19200)
-3.0 (-10)	11748 (25900)[a]	20412 (45000)[a]	26172 (57700)	18280 (40300)	13698 (30200)	10750 (23700)	8709 (19200)
-4.6 (-15)	22362 (49300)[a]	32341 (71300)[a]	26444 (58300)	18325 (40400)	13744 (30300)	10796 (23800)	
-6.1 (-20)		31797 (70100)[a]	25900 (57100)[a]	18643 (41100)	14016 (30900)		
-7.6 (-25)			20230 (44600)[a]	16193 (35700)[a]			

[a]Hydraulically-limited capacity

Continued on next page

LIFTING OVER FRONT—Power Dig ON								
Boom: 8.4 m (27 ft 7 in.)	**Arm: 5.40 m (17 ft 9 in.)**			**Bucket: 2.30 m^3 (3.01 yd^3)**	**Shoe 1020 mm (40 in.)**			
Load Point Height	**Horizontal Distance from Centerline of Rotation**							
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**	**13.7 (45)**
9.1 (30)							5080 (11200)[a]	
7.6 (25)						8754 (19300)[a]	7348 (16200)[a]	
6.1 (20)						9616 (21200)[a]	8618 (19000)[a]	
4.6 (15)					11884 (26200)[a]	11204 (24700)[a]	9843 (21700)[a]	6078 (13400)[a]
3.0 (10)			23723 (52300)[a]	18280 (40300)[a]	15241 (33600)[a]	13290 (29300)[a]	11385 (25100)[a]	7348 (16200)[a]
1.5 (5)			28440 (62700)[a]	21183 (46700)[a]	17055 (37600)[a]	14515 (32000)[a]	12746 (28100)[a]	8074 (17800)[a]
Ground Line			29801 (65700)[a]	23360 (51500)[a]	18597 (41000)[a]	15513 (34200)[a]	13426 (29600)[a]	7983 (17600)[a]
-1.5 (-5)		11612 (25600)[a]	29665 (65400)[a]	24675 (54400)[a]	19595 (43200)[a]	16239 (35800)[a]	13789 (30400)	6169 (13600)[a]
-3.0 (-10)	10977 (24200)[a]	17826 (39300)[a]	32477 (71600)[a]	24993 (55100)[a]	20003 (44100)[a]	16465 (36300)[a]	13653 (30100)	
-4.6 (-15)	17781 (39200)[a]	25855 (57000)[a]	31161 (68700)[a]	24403 (53800)[a]	19595 (43200)[a]	16012 (35300)[a]	11340 (25000)[a]	
-6.1 (-20)	25991 (57300)[a]	36832 (81200)[a]	28622 (63100)[a]	22680 (50000)[a]	18234 (40200)[a]	14515 (32000)[a]		
-7.6 (-25)		30980 (68300)[a]	24403 (53800)[a]	19414 (42800)[a]	15105 (33300)[a]			
[a]Hydraulically-limited capacity								

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LIFTING OVER SIDE—Power Dig ON								
Boom: 8.4 m (27 ft 7 in.)	**Arm: 5.40 m (17 ft 9 in.)**			**Bucket: 2.30 m^3 (3.01 yd^3)**	**Shoe 1020 mm (40 in.)**			
Load Point Height	**Horizontal Distance from Centerline of Rotation**							
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**	**12.2 (40)**	**13.7 (45)**
9.1 (30)							5080 (11200)[a]	
7.6 (25)						8754 (19300)[a]	7348 (16200)[a]	
6.1 (20)						9616 (21200)[a]	8618 (19000)[a]	
4.6 (15)					11884 (26200)[a]	11204 (24700)[a]	9843 (21700)	6078 (13400)[a]
3.0 (10)			23723 (52300)[a]	18280 (40300)[a]	15241 (33600)[a]	12156 (26800)	9480 (20900)	7348 (16200)[a]
1.5 (5)			28213 (62200)	20049 (44200)	15014 (33100)	11612 (25600)	9117 (20100)	7212 (15900)
Ground Line			26626 (58700)	18960 (41800)	14288 (31500)	11113 (24500)	8800 (19400)	7031 (15500)
-1.5 (-5)		11612 (25600)[a]	25809 (56900)	18234 (40200)	13744 (30300)	10705 (23600)	8528 (18800)	6169 (13600)[a]
-3.0 (-10)	10977 (24200)[a]	17826 (39300)[a]	25537 (56300)	17872 (39400)	13426 (29600)	10478 (23100)	8391 (18500)	
-4.6 (-15)	17781 (39200)[a]	25855 (57000)[a]	25537 (56300)	17781 (39200)	13336 (29400)	10433 (23000)	8437 (18600)	
-6.1 (-20)	25991 (57300)[a]	36832 (81200)[a]	25855 (57000)	17962 (39600)	13472 (29700)	10569 (23300)		
-7.6 (-25)		30980 (68300)[a]	24403 (53800)[a]	18416 (40600)	13880 (30600)			

[a]Hydraulically-limited capacity

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LIFTING OVER FRONT—Power Dig ON						
BE-Boom: 7.10 m (23 ft 4 in.)	**BE-Arm: 2.95 m (9 ft 8 in.)**			**Bucket: 4.50 m^3 (5.89 yd^3)**	**Shoe 1020 mm (40 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
9.1 (30)				15785 (34800)[a]		
7.6 (25)				16556 (36500)[a]	11204 (24700)[a]	
6.1 (20)				11735 (39100)[a]	16375 (36100)[a]	
4.6 (15)			24721 (54500)[a]	19913 (43900)[a]	17327 (38200)[a]	
3.0 (10)				22498 (49600)[a]	18643 (41100)[a]	13018 (28700)[a]
1.5 (5)				24585 (54200)[a]	19777 (43600)[a]	14923 (32900)[a]
Ground Line				25628 (56500)[a]	20412 (45000)[a]	
-1.5 (-5)			32477 (71600)[a]	25310 (55800)[a]	20049 (44200)[a]	
-3.0 (-10)		36560 (80600)[a]	29665 (65400)[a]	23451 (51700)[a]	18053 (39800)[a]	
-4.6 (-15)		29620 (65300)[a]	24630 (54300)[a]	19096 (42100)[a]		
LIFTING OVER SIDE—Power Dig ON						
BE-Boom: 7.10 m (23 ft 4 in.)	**BE-Arm: 2.95 m (9 ft 8 in.)**			**Bucket: 4.50 m^3 (5.89 yd^3)**	**Shoe 1020 mm (40 in.)**	
Load Point Height	**Horizontal Distance from Centerline of Rotation**					
m (ft)	**3.0 (10)**	**4.6 (15)**	**6.1 (20)**	**7.6 (25)**	**9.1 (30)**	**10.7 (35)**
9.1 (30)				15785 (34800)[a]		
7.6 (25)				16556 (36500)[a]	11204 (24700)[a]	
6.1 (20)				17735 (39100)[a]	16284 (35900)	
4.6 (15)			24721 (54500)[a]	19913 (43900)[a]	15785 (34800)	
3.0 (10)				20638 (45500)	15150 (33400)	11340 (25000)
1.5 (5)				19595 (43200)	14515 (32000)	11022 (24300)
Ground Line				18915 (41700)	14061 (31000)	
-1.5 (-5)			26717 (58900)	18552 (40900)	13789 (30400)	
-3.0 (-10)		36560 (80600)[a]	26762 (59000)	18507 (40800)	13835 (30500)	
-4.6 (-15)		29620 (65300)[a]	24630 (54300)[a]	18824 (41500)		

[a]Hydraulically-limited capacity

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