



Operation and Maintenance Manual

320, 323 Excavator

HEX 1-UP (320)

KFE 1-UP (320)

MYK 1-UP (320)

YCP 1-UP (320)

HDT 1-UP (323)

LTN 1-UP (323)

NDL 1-UP (323)

RAZ 1-UP (323)

Language: Original Instructions

Important Safety Information

Most accidents that involve product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards, including human factors that can affect safety. This person should also have the necessary training, skills and tools to perform these functions properly.

Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair on this product, until you verify that you are authorized to perform this work, and have read and understood the operation, lubrication, maintenance and repair information.

Safety precautions and warnings are provided in this manual and on the product. If these hazard warnings are not heeded, bodily injury or death could occur to you or to other persons.

The hazards are identified by the "Safety Alert Symbol" and followed by a "Signal Word" such as "DANGER", "WARNING" or "CAUTION". The Safety Alert "WARNING" label is shown below.



The meaning of this safety alert symbol is as follows:

Attention! Become Alert! Your Safety is Involved.

The message that appears under the warning explains the hazard and can be either written or pictorially presented.

A non-exhaustive list of operations that may cause product damage are identified by "NOTICE" labels on the product and in this publication.

Caterpillar cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are, therefore, not all inclusive. You must not use this product in any manner different from that considered by this manual without first satisfying yourself that you have considered all safety rules and precautions applicable to the operation of the product in the location of use, including site-specific rules and precautions applicable to the worksite. If a tool, procedure, work method or operating technique that is not specifically recommended by Caterpillar is used, you must satisfy yourself that it is safe for you and for others. You should also ensure that you are authorized to perform this work, and that the product will not be damaged or become unsafe by the operation, lubrication, maintenance or repair procedures that you intend to use.

The information, specifications, and illustrations in this publication are on the basis of information that was available at the time that the publication was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service that is given to the product. Obtain the complete and most current information before you start any job. Cat dealers have the most current information available.

NOTICE

When replacement parts are required for this product Caterpillar recommends using original Caterpillar® replacement parts.

Other parts may not meet certain original equipment specifications.

When replacement parts are installed, the machine owner/user should ensure that the machine remains in compliance with all applicable requirements.

In the United States, the maintenance, replacement, or repair of the emission control devices and systems may be performed by any repair establishment or individual of the owner's choosing.

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Foreword

Foreword

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.



WARNING – This product can expose you to chemicals including ethylene glycol, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to:

www.P65Warnings.ca.gov

Do not ingest this chemical. Wash hands after handling to avoid incidental ingestion.



WARNING - This product can expose you to chemicals including lead and lead

compounds, which are known to the State of California to cause cancer, birth defects, or other reproductive harm. For more information go to:

www.P65Warnings.ca.gov

Wash hands after handling components that may contain lead.

Literature Information

This manual should be stored in the operator's compartment in the literature holder or seat back literature storage area.

This manual contains safety information, operation instructions, transportation information, lubrication information, and maintenance information.

Some photographs or illustrations in this publication show details or attachments that can be different from your machine. Guards and covers might have been removed for illustrative purposes.

Continuing improvement and advancement of product design might have caused changes to your machine which are not included in this publication. Read, study, and keep this manual with the machine.

Whenever a question arises regarding your machine, or this publication, please consult your Cat dealer for the latest available information.

Safety

The safety section lists basic safety precautions. In addition, this section identifies the text and locations of warning signs and labels used on the machine.

Read and understand the basic precautions listed in the safety section before operating or performing lubrication, maintenance, and repair on this machine.

Operation

The operation section is a reference for the new operator and a refresher for the experienced operator. This section includes a discussion of gauges, switches, machine controls, attachment controls, transportation, and towing information.

Photographs and illustrations guide the operator through correct procedures of checking, starting, operating, and stopping the machine.

Operating techniques outlined in this publication are basic. Skill and techniques develop as the operator gains knowledge of the machine and its capabilities.

Maintenance

The maintenance section is a guide to equipment care. The Maintenance Interval Schedule (MIS) lists the items to be maintained at a specific service interval. Items without specific intervals are listed under the "When Required" service interval. The Maintenance Interval Schedule lists the page number for the step-by-step instructions required to accomplish the scheduled maintenance. Use the Maintenance Interval Schedule as an index or "one safe source" for all maintenance procedures.

Maintenance Intervals

Use the service hour meter to determine servicing intervals. Calendar intervals shown (daily, weekly, monthly, etc.) can be used instead of service hour meter intervals if the calendar intervals provide more convenient servicing schedules and approximate the indicated service hour meter reading. Perform the recommended service at the interval that occurs first.

Under severe, dusty, or wet operating conditions, more frequent lubrication than is specified in the maintenance intervals chart might be necessary.

Perform service on items at multiples of the original requirement. For example, at every 500 service hours or 3 months, also service those items listed under every 250 service hours or monthly and every 10 service hours or daily.

Certified Engine Maintenance

Proper maintenance and repair are essential to keep the engine and machine systems operating correctly. As the heavy-duty off-road diesel engine owner, you are responsible for the performance of the required maintenance listed in the Owner Manual, Operation and Maintenance Manual, and Service Manual.

It is prohibited for any person engaged in the business of repairing, servicing, selling, leasing, or trading engines or machines to remove, alter, or to render inoperative, any emission-related device or element of design installed on or in an engine or machine that is in compliance with all applicable regulations of the intended country to which it has been shipped. Certain elements of the machine and engine such as the exhaust system, fuel system, electrical system, intake air system, and cooling system may be emission-related and should not be altered unless approved by Caterpillar.

Machine Capacity

Additional attachments or modifications may exceed machine design capacity which can adversely affect performance characteristics. Included would be stability and system certifications such as brakes steering, and rollover protective structures (ROPS). Contact your Cat dealer for further information.

Product Identification Number

Effective First Quarter 2001 the Product Identification Number (PIN) has changed from 8 to 17 characters. To provide uniform equipment identification, construction equipment manufacturers are moving to comply with the latest version of the product identification numbering standard. Non-road machine PINs are defined by ISO 10261. The new PIN format will apply to all machines and generator sets. The PIN plates and frame marking will display the 17 character PIN. The new format will look like the following:

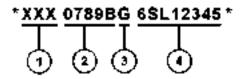


Illustration 1 g03891925

Where:

1. World Manufacturing Code (characters 1-3)

- Machine Descriptor (characters 4-8)
- Check Character (character 9)
- 4. Machine Indicator Section (MIS) or Product Sequence Number (characters 10-17). These were previously referred to as the Serial Number.

Machines and generator sets produced before First Quarter 2001 will maintain their 8 character PIN

Components such as engines, transmissions, axles, and work tools will continue to use an 8 character Serial Number (S/N).

Safety Section

i07503031

Safety Messages

SMCS Code: 7000; 7405

There are several specific safety messages on this machine. The exact location of the hazards and the description of the hazards are reviewed in this section. Please become familiarized with all safety messages.

Make sure that all the safety messages are legible. Clean the safety messages or replace the safety messages if you cannot read the words. Replace the illustrations if the illustrations are not visible. When you clean the safety messages, use a cloth, water, and soap. Do not use solvent, gasoline, or other harsh chemicals to clean the safety messages. Solvents, gasoline, or harsh chemicals could loosen the adhesive that secures the safety message. Loose adhesive will allow the safety message to fall.

Replace any safety message that is damaged, or missing. If a safety message is attached to a part that is replaced, install a safety message on the replacement part. Any Cat dealer can provide new safety messages.

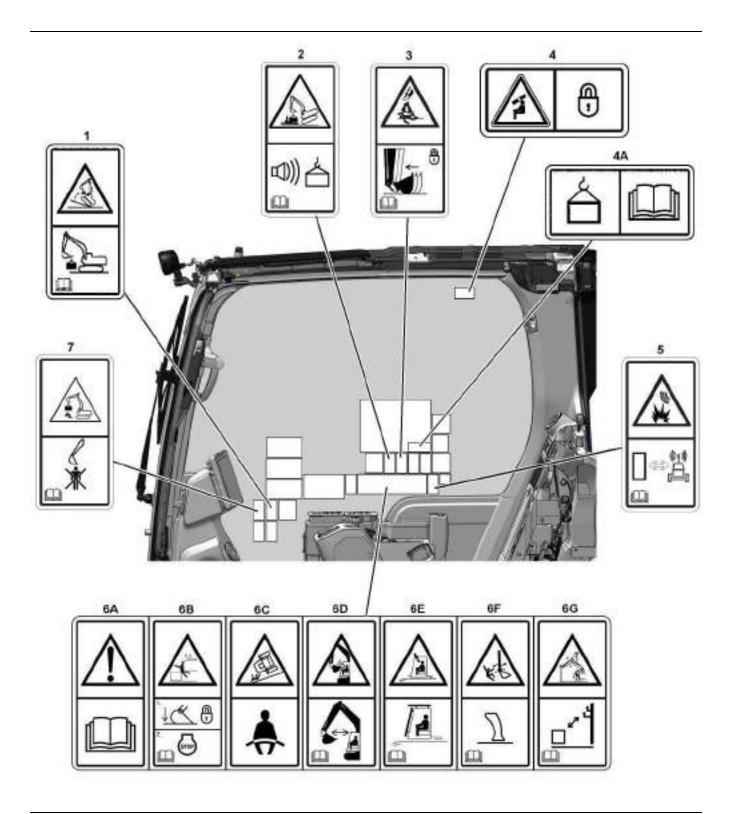


Illustration 2 g06289476

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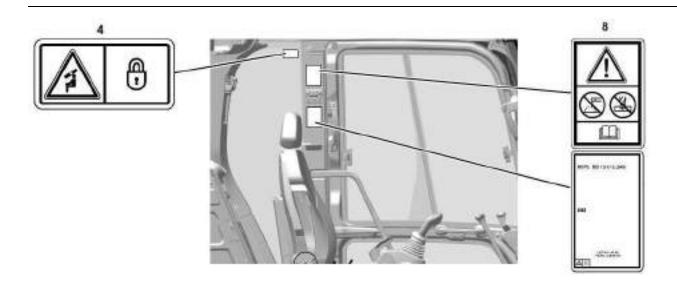


Illustration 3 g06188729

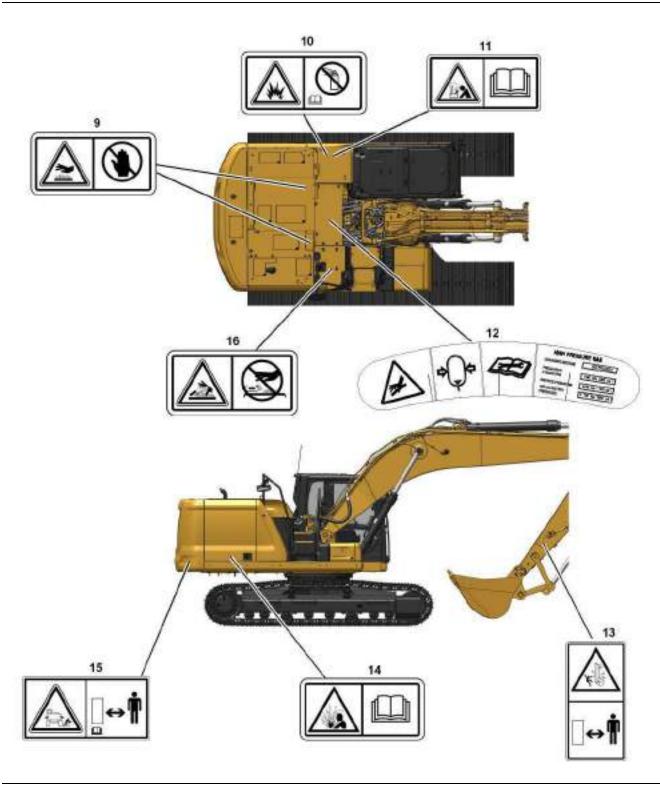


Illustration 4 g06180922

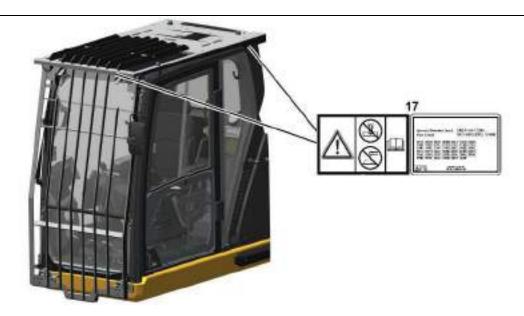


Illustration 5 g06184325

Lifting Level Warning (1)



Illustration 6 g06188532

Overload Warning Device (2)

If equipped, this safety message is located in the cab on the right side window.



Illustration 7 g06224998

WARNING

Overloading the machine could impact the machine's stability which could result in a tipover hazard. A tipover hazard could result in serious injury or death. Always activate the overload warning device before you handle or lift objects.

Refer to Operation and Maintenance Manual, "Operator Controls" for further information.

Crushing Injury (3)

If equipped, this safety message is located in the cab on the right side window.



Illustration 8

g06188540

A WARNING

Crush injury. Could cause serious injury or death. Always confirm that the quick coupler is engaged onto the pins. Read the Operator's Manual.

Refer to Operation and Maintenance Manual, "Quick Coupler Operation" for further information.

Crushing Hazard (4)

These safety messages are on the left and right side cab windows.



Illustration 9

g02061339

MARNING

Personal injury can result if the window is not latched in the overhead position; ensure the auto lock is engaged.

Refer to Operation and Maintenance Manual, "Window (Front)" for further information.

Lifting Notice (4A)

If equipped, this safety message is located in the cab on the right side window.

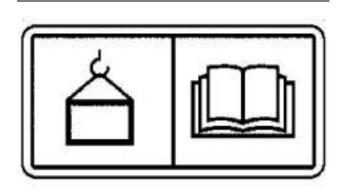


Illustration 10

g06289554

MARNING

When operating the machine's lift tool, read Operation and Maintenance Manual first for lifting capabilities.

Product Link (5)

If equipped, this safety message is located in the cab on the right side window.







This machine is equipped with a Caterpillar Product Link communication device. When electric detonators are used, this communication device should be deactivated within 12 m (40 ft) of a blast site for satellite-based systems and within 3 m (10 ft) of a blast site for cellular based systems, or within the distance mandated under applicable legal requirements. Failure to do so could cause interference with blasting operations and result in serious injury or death.

In cases where the type of Product Link module cannot be identified, Caterpillar recommends that the device be disabled no less than 12 m (40 ft) from the blast perimeter.

Refer to Operation and Maintenance Manual, "Product Link" for further information.

Do Not Operate (6A)

This safety message is located in the cab on the right side window.



Illustration 12 g06188661

WARNING

Do not operate or work on this machine unless you have read and understand the instructions and warnings in the Operation and Maintenance Manual. Failure to follow the instructions or heed the warnings could result in injury or death. Contact any Caterpillar dealer for replacement manuals. Proper care is your responsibility.

Crushing Hazard (6B)

If equipped, this safety message is located in the cab on the right side window.







Crush Hazard! A machine may move unexpectedly and without warning resulting in personal injury or death.

Before leaving the machine lower the work tool to the ground, lock operator controls, shut off the engine and remove the key.

Seat Belt (6C)

This safety message is located in the cab on the right side window.



Illustration 14 g06188642

WARNING

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

Crushing Hazard (6D)

This safety message is located in the cab on the right side window.



Illustration 15

g06188644

A WARNING

Crushing Hazard! Certain machine front linkage combinations (boom, stick, quick coupler, work tool) may require keeping the work tool away from the cab during operation. Personal injury or death may result if the work tool contacts the cab during operation.

Crushing Hazard (6E)

This safety message is located in the cab on the right side window.



Illustration 16

g06188652

A WARNING

The impact from objects that strike the front of the cab or the top of the cab could result in a crushing hazard with the potential for personal injury or death.

The front guard and the top guard should be installed on the cab for applications where the hazard of falling objects exist. Read the Operation and Maintenance Manual.

Refer to Operation and Maintenance Manual, "Guards" for further information.

Joystick Controls Alternate Patterns (6F)

If equipped, this safety message is located in the cab on the right side window.



Illustration 17

g06188665

Safety Messages

MARNING

Crush Hazard. Improper joystick setting could cause possible unexpected movement of the boom, stick, or worktool which could result in serious injury or death. Confirm that the joystick settings are properly configured before you operate the machine. Read the Operation and Maintenance Manual.

Refer to Operation and Maintenance Manual, "Joystick Controls Alternate Patterns" for further information.

Electrical Power Lines (6G)

This safety message is located in the cab.



Illustration 18 g06188667

A DANGER

Electrocution Hazard! Keep the machine and attachments a safe distance from electrical power. Stay clear 3 m (10 ft) plus twice the line insulator length. Read and understand the instructions and warnings in the Operation and Maintenance Manual. Failure to follow the instructions and warnings will cause serious injury or death

Refer to Operation and Maintenance Manual, "Specifications" for further information.

Do Not Lift Over Personnel (7)

This safety message is located in the cab on the right side window.



Illustration 19 g06188697

Do not lift

Do Not Weld or Drill on ROPS (8)

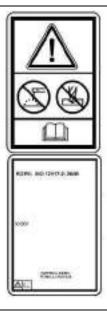


Illustration 20 g06207749

If equipped, this safety message is on the left side pillar in the cab.



Structural damage, an overturn, modification, alteration, or improper repair, can impair this structure's protective capability thereby voiding this certification. Do not weld on or drill holes in the structure. Consult a Caterpillar dealer to determine this structure's limitations without voiding its certification.

This machine has been certified to the standards that are listed on the certification plate. The maximum mass of the machine, which includes the operator and the attachments without a payload, should not exceed the mass on the certification plate.

Refer to Operation and Maintenance Manual, "Guards (Operator Protection)" for more information.

Hot Surface (9)

This message is on the outside of the engine hood and on the inside of the engine hood.



Illustration 21 g01372256

A WARNING

Engine hood and engine hood parts can be hot while engine is running or immediately after engine shutdown. Hot parts or hot components can cause burns or personal injury. Do not allow these parts to contact your skin, when engine is running or immediately after engine shutdown. Use protective clothing or protective equipment to protect your skin.

Aerosol Starting Aid (10)

This safety message is located near the precleaner. The following information is not applicable to machines that are equipped with an ether starting aid



Illustration 22 g01372254

WARNING

Explosion hazard! Do not use ether! This machine is equipped with an air inlet heater. Using ether can create explosions or fires that can cause personal injury or death. Read and follow the starting procedure in the Operation and Maintenance Manual.

Refer to Operation and Maintenance Manual, "Engine Starting" for the proper starting procedure.

Jump-Start Cables (11)

This safety message is positioned on the circuit breaker panel.

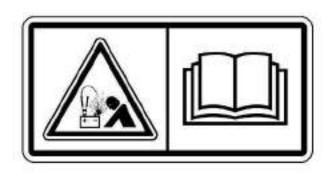


Illustration 23 g01370909

⚠ WARNING

Explosion Hazard! Improper jumper cable connections can cause an explosion resulting in serious injury or death. Batteries may be located in separate compartments. Refer to the Operation and Maintenance Manual for the correct jump starting procedure.

Safety Section Safety Messages

Refer to Operation and Maintenance Manual, "Engine Starting with Jump-Start Cables" for further information.

High-Pressure Gas (12)

This safety message is positioned on the accumulator.



Illustration 24 g06188756



Pressurized System!

Hydraulic accumulators contain gas and oil under high pressure. DO NOT disconnect lines or disassemble any component of a pressurized accumulator. All gas pre-charge must be removed from the accumulator as instructed by the service manual before servicing or disposing of the accumulator or any accumulator component.

Failure to follow the instructions and warnings could result in personal injury or death.

Only use dry nitrogen gas to recharge accumulators. See your Cat dealer for special equipment and detailed information for accumulator service and charging.

Refer to Operation and Maintenance Manual, "Equipment Lowering with Engine Stopped" for further information.

Crushing Hazard (13)

This safety message is on both sides of the stick.



Illustration 25 g01385579

A WARNING

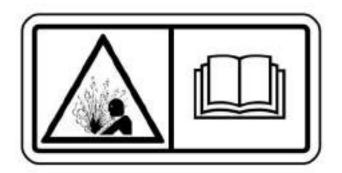
A crushing hazard exists when the stick and boom are in motion and when the machine is being used in object handling applications. Failure to stay clear of the stick and boom when the machine is in operation can result in personal injury or death. Stay clear of the stick and boom when the machine is in operation.

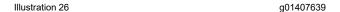
Vapor Explosion (14)

If equipped, this safety message is on the storage compartment for the fuel transfer pump.

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Explosion hazard! Fuel vapors can accumulate in the refueling pump compartment and can be ignited by improper operation of the refueling pump. Failure to follow the operating instructions for the refueling pump could result in personal injury or death. Read and follow the operating instructions for the refueling pump in the Operation and Maintenance Manual.

Refer to Operation and Maintenance Manual, "Fuel Transfer Pump (Refueling)" for further information.

Crushing Hazard (15)

This safety message is on the rear of each side of the machine.

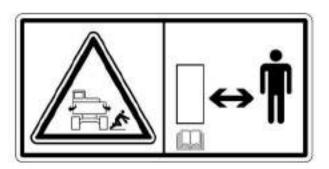


Illustration 27 g06219420

WARNING

Machine swings. Stay back. Crushing hazard could cause serious injury or death.

Relieve Hydraulic Tank Pressure (16)

This safety message is on top of the hydraulic tank.



Illustration 28 g01371640



Hot Fluid Under Pressure!

Do NOT remove pressure cap when hot. Hot oil could cause serious injury or death.

Falling Object Guard Structure (17)

If equipped, this safety message is on top of the front falling object guard structure. This safety message is also on the left side of the falling object guard structure on the top of the cab.

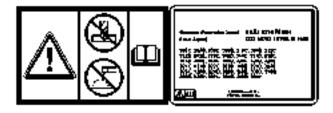


Illustration 29 g02428757

WARNING

Structural damage, an overturn, modification, alteration, or improper repair can impair this structure's protection capability thereby voiding this certification. Do not weld on or drill holes in the structure. Consult a Caterpillar dealer to determine this structure's limitations without voiding its certification.

i07945148

Additional Messages

SMCS Code: 7000; 7405

There are several specific messages on this machine. The exact location of the messages and the description of the information are reviewed in this section. Become familiar with all messages.

Make sure that all the messages are legible. Clean the messages or replace the messages if you cannot read the words. Replace the illustrations if the illustrations are not legible. When you clean the messages, use a cloth, water, and soap. Do not use solvent, gasoline, or other harsh chemicals to clean the messages. Solvents, gasoline, or harsh chemicals could loosen the adhesive that secures the messages. Loose adhesive will allow the messages to fall.

Replace any message that is damaged, or missing. If a message is attached to a part that is replaced, install a message on the replacement part. Any Cat dealer can provide new messages.

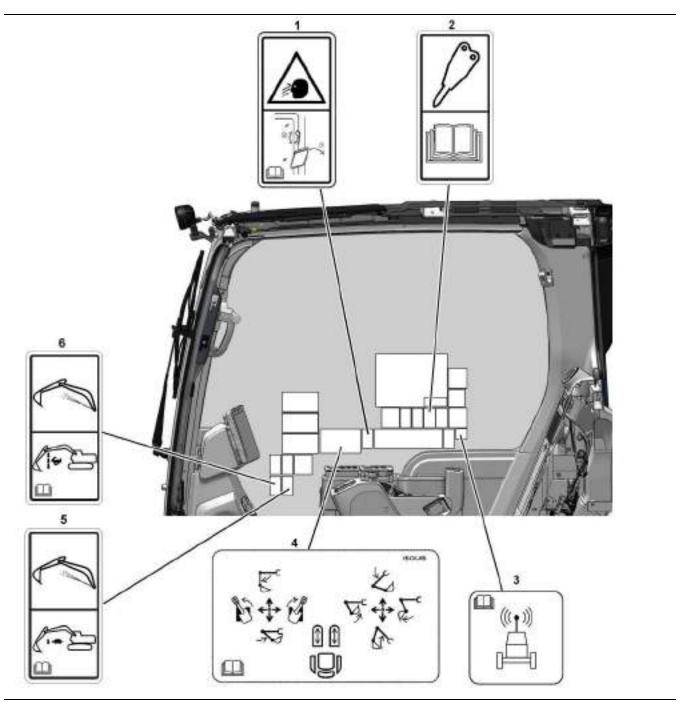


Illustration 30 g06187617

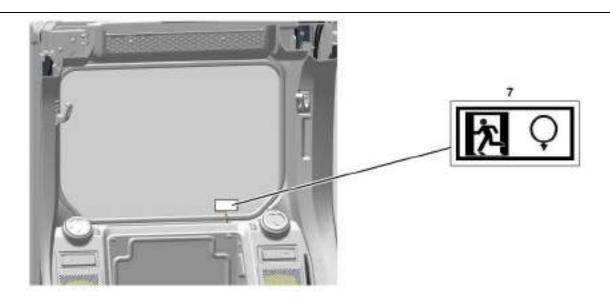


Illustration 31 g06189121

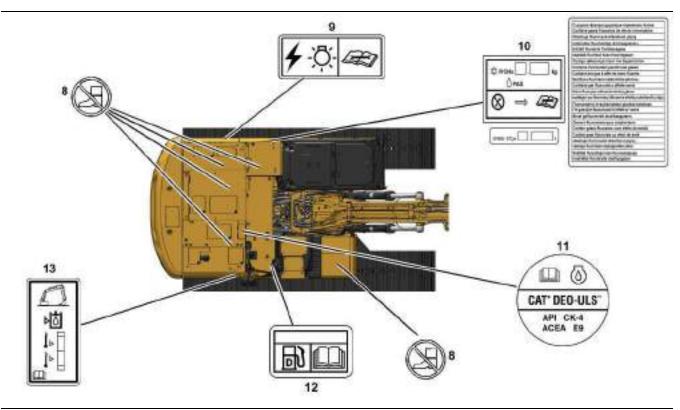


Illustration 32 g06214499

Front Window Usage (1)

For machines equipped with the Cat Grade Control monitor, the monitor must be moved downward before lifting or lowering the front window. The monitor is in the path of the window track in its normal position.



Illustration 33 g06214810

Hammer Operation(2)

This message is on the window on the right side of the cab.

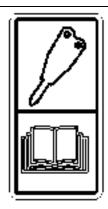


Illustration 34 g06189240

See Operation and Maintenance Manual, "Hammer Operation" within Operation and Maintenance Manual, "Work Tool Control (One-Way Flow)" for instructions on hammer operation.

Also, see Operation and Maintenance Manual, "Hydraulic Hammer Control (Foot Switch)" within Operation and Maintenance Manual, "Work Tool Control (One-Way Flow)" for instructions on hammer operation.

Data Privacy (3)



Illustration 35 g01418953

The Product Link System is a satellite communication device that transmits information regarding the machine back to Caterpillar and Cat dealers and customers. All logged events and diagnostic codes that are available to the Cat Electronic Technician (ET) on the Cat data link can be sent to the satellite. Information can also be sent to the Product Link System. The information is used to improve Cat products and Cat services.

Refer to Operation and Maintenance Manual, "Product Link" for more information.

Joystick Controls Alternate Patterns (4)

If equipped, this message is on the right side window of the cab.

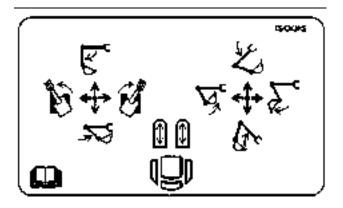


Illustration 36

g06214805

Refer to Operation and Maintenance Manual, "Joystick Controls Alternate Patterns" for further information.

Hose Burst (5)



Illustration 37 g06189238

Hose Burst (6)

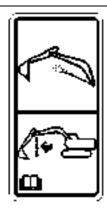


Illustration 38 g06189239

Alternate Exit (7)

If equipped, this message is on the rear window of the cab in the lower left-hand corner.

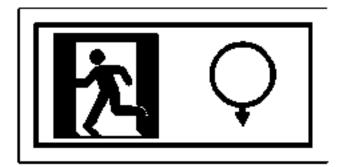


Illustration 39 g06189112

Pull the ring to pull out the seal. Push the window out of the cab and exit through the opening.

Refer to Operation and Maintenance Manual, "Alternate Exit" for further information.

No Step (8)

This message is on various places on the upper structure and covers. It is also on the engine valve cover.

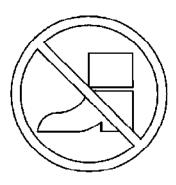


Illustration 40 g00911158

Do not step in this area.

DEF Purge Indicator Lamp (9)

This message is located behind the cab near the disconnect switch and pertains to the Diesel Exhaust Fluid (DEF) system.

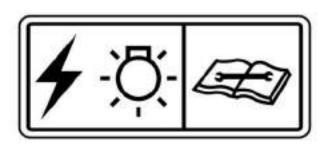


Illustration 41 g03796564

For machines equipped with a circuit that stays activated for DEF purge with the disconnect switch off.

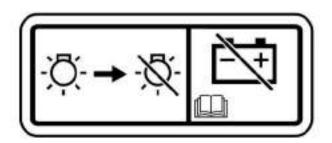


Illustration 42 g03408962

For machines not equipped with a circuit that stays activated for DEF purge with the disconnect switch off

NOTICE

After the engine is shutdown apply the battery disconnect switch. Applying the battery disconnect too soon will prevent the DEF system from being purged and could cause DEF to freeze in the lines.

Air Conditioner (10)

These messages are positioned on the left door behind the cab.

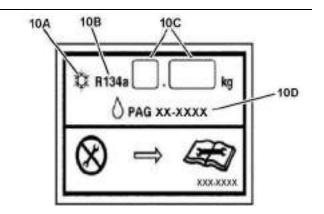


Illustration 43 g06214936

(10A) Air conditioning symbol

(10B) R134a (Refrigerant type common name)

(10C) Refrigerant quantity

(10D) PAG (polyalkylene glycol) lubricating oil part number

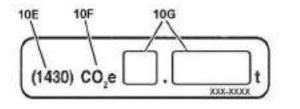


Illustration 44 g06214938

If equipped, this plate provides the below additional European Union required greenhouse gas information.

(10E) (1430) - This is the Global Warming Potential of R134a (10F) $\text{CO}_{\scriptscriptstyle 2}$ equivalent

(10G) The system contains 1.430 metric tonne of CO₂ equivalent



Illustration 45 g06214940

(10H) If equipped, this film provides the required language translations of the text "Contains fluorinated greenhouse gases" for the European Union greenhouse gas regulation.

These messages for the air conditioner system have the appropriate information for the following services: the air conditioner lubricant, the refrigerant charge, and the refrigerant capacity.

Engine Oil Requirements (11)

This message is on top of the engine.

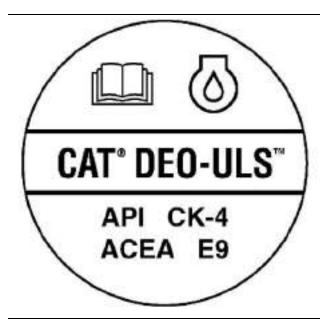


Illustration 46 g06208149

Refer to Operation and Maintenance Manual, "Lubricant Viscosities".

Diesel Fuel Requirements (12)

This message is located by the fuel tank.

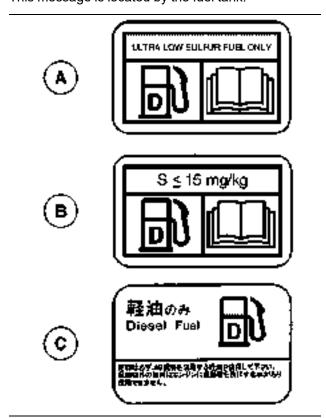


Illustration 47 g03218956

- (A) North America film
- (B) Europe, Africa, Middle East film
- (C) Japan film

Hydraulic Oil Level Check (13)

This message is located in the right access compartment next to the sight gauge for the hydraulic oil .

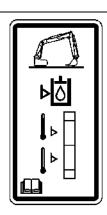


Illustration 48 g01069075

Check hydraulic oil level daily. See Operation and Maintenance Manual, "Hydraulic System Oil Level - Check" for details.

i07746355

General Hazard Information

SMCS Code: 7000

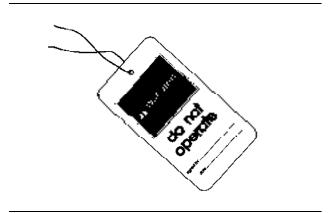


Illustration 49
Typical example

g00104545

Attach a "Do Not Operate" warning tag or a similar warning tag to the start switch or to the controls. Attach the warning tag before you service the equipment or before you repair the equipment. Warning tag SEHS7332 is available from your Cat dealer.

A WARNING

M0068104-12

Operating the machine while distracted can result in the loss of machine control. Use extreme caution when using any device while operating the machine. Operating the machine while distracted can result in personal injury or death.

Know the width of your equipment to maintain proper clearance when you operate the equipment near fences or near boundary obstacles.

Be aware of high-voltage power lines and power cables that are buried. If the machine comes in contact with these hazards, serious injury or death may occur from electrocution.

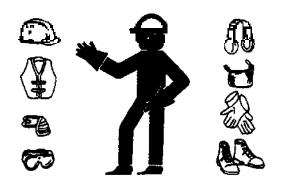


Illustration 50 g00702020

Wear a hard hat, protective glasses, and other protective equipment, as required.

Do not wear loose clothing or jewelry that can snag on controls or on other parts of the equipment.

Make sure that all protective guards and all covers are secured in place on the equipment.

Keep the equipment free from foreign material. Remove debris, oil, tools, and other items from the deck, from walkways, and from steps.

Secure all loose items such as lunch boxes, tools, and other items that are not a part of the equipment.

Know the appropriate work site hand signals and the personnel that are authorized to give the hand signals. Accept hand signals from one person only.

Do not smoke when you service an air conditioner. Also, do not smoke if refrigerant gas may be present. Inhaling the fumes that are released from a flame that contacts air conditioner refrigerant can cause bodily harm or death. Inhaling gas from air conditioner refrigerant through a lighted cigarette can cause bodily harm or death.

Never put maintenance fluids into glass containers. Drain all liquids into a suitable container.

Obey all local regulations for the disposal of liquids.

General Hazard Information

Use all cleaning solutions with care. Report all necessary repairs.

Do not allow unauthorized personnel on the equipment.

Unless you are instructed otherwise, perform maintenance with the equipment in the servicing position. Refer to Operation and Maintenance Manual for the procedure for placing the equipment in the servicing position.

When you perform maintenance above ground level, use appropriate devices such as ladders or man lift machines. If equipped, use the machine anchorage points and use approved fall arrest harnesses and lanyards.

Pressurized Air and Water

Pressurized air and/or water can cause debris and/or hot water to be blown out. The debris and/or hot water could result in personal injury.

When pressurized air and/or pressurized water is used for cleaning, wear protective clothing, protective shoes, and eye protection. Eye protection includes goggles or a protective face shield.

The maximum air pressure for cleaning purposes must be reduced to 205 kPa (30 psi) when the nozzle is deadheaded and the nozzle is used with an effective chip deflector and personal protective equipment. The maximum water pressure for cleaning purposes must be below 275 kPa (40 psi).

Avoid direct spraying of water on electrical connectors, connections, and components. When using air for cleaning, allow the machine to cool to reduce the possibility of fine debris igniting when redeposited on hot surfaces.

Trapped Pressure

Pressure can be trapped in a hydraulic system. Releasing trapped pressure can cause sudden machine movement or attachment movement. Use caution if you disconnect hydraulic lines or fittings. High-pressure oil that is released can cause a hose to whip. High-pressure oil that is released can cause oil to spray. Fluid penetration can cause serious injury and possible death.

Fluid Penetration

Pressure can be trapped in the hydraulic circuit long after the machine has been stopped. The pressure can cause hydraulic fluid or items such as pipe plugs to escape rapidly if the pressure is not relieved correctly.

Do not remove any hydraulic components or parts until pressure has been relieved or personal injury may occur. Do not disassemble any hydraulic components or parts until pressure has been relieved or personal injury may occur. Refer to the Service Manual for any procedures that are required to relieve the hydraulic pressure.

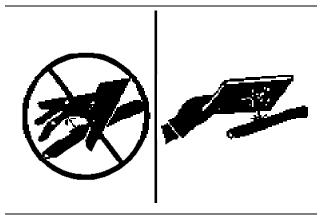


Illustration 51 g00687600

Always use a board or cardboard when you check for a leak. Leaking fluid that is under pressure can penetrate body tissue. Fluid penetration can cause serious injury and possible death. A pin hole leak can cause severe injury. If fluid is injected into your skin, you must get treatment immediately. Seek treatment from a doctor that is familiar with this type of injury.

Containing Fluid Spillage

Care must be taken in order to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the equipment. Prepare to collect the fluid with suitable containers before opening any compartment or disassembling any component that contains fluids.

Refer to Special Publication, NENG2500, "Cat dealer Service Tool Catalog" for the following items:

- Tools that are suitable for collecting fluids and equipment that is suitable for collecting fluids
- Tools that are suitable for containing fluids and equipment that is suitable for containing fluids

Obey all local regulations for the disposal of liquids.

Inhalation

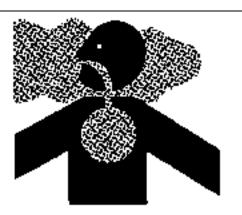


Illustration 52 g02159053

Exhaust

Use caution. Exhaust fumes can be hazardous to your health. If you operate the machine in an enclosed area, adequate ventilation is necessary.

Asbestos Information

Cat equipment and replacement parts that are shipped from Caterpillar are asbestos free. Caterpillar recommends the use of only genuine Cat replacement parts. Use the following guidelines when you handle any replacement parts that contain asbestos or when you handle asbestos debris.

Use caution. Avoid inhaling dust that might be generated when you handle components that contain asbestos fibers. Inhaling this dust can be hazardous to your health. The components that may contain asbestos fibers are brake pads, brake bands, lining material, clutch plates, and some gaskets. The asbestos that is used in these components is bound in a resin or sealed in some way. Normal handling is not hazardous unless airborne dust that contains asbestos is generated.

If dust that may contain asbestos is present, there are several guidelines that should be followed:

- Never use compressed air for cleaning.
- Avoid brushing materials that contain asbestos.
- Avoid grinding materials that contain asbestos.
- Use a wet method in order to clean up asbestos materials.
- A vacuum cleaner that is equipped with a high efficiency particulate air filter (HEPA) can also be used.

- Use exhaust ventilation on permanent machining jobs.
- Wear an approved respirator if there is no other way to control the dust.
- Comply with applicable rules and regulations for the work place. In the United States, use Occupational Safety and Health Administration (OSHA) requirements. These OSHA requirements can be found in "29 CFR 1910.1001". In Japan, use the requirements found in the "Ordinance on Prevention of Health Impairment due to Asbestos" in addition to the requirements of the Industrial Safety and Health Act.
- Obey environmental regulations for the disposal of asbestos.
- Stay away from areas that might have asbestos particles in the air.

Dispose of Waste Properly

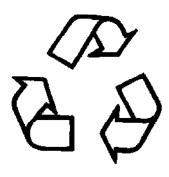


Illustration 53 g00706404

Improperly disposing of waste can threaten the environment. Potentially harmful fluids should be disposed of according to local regulations.

Always use leakproof containers when you drain fluids. Do not pour waste onto the ground, down a drain, or into any source of water.

i01359664

Crushing Prevention and Cutting Prevention

SMCS Code: 7000

Support the equipment properly before you perform any work or maintenance beneath that equipment. Do not depend on the hydraulic cylinders to hold up the equipment. Equipment can fall if a control is moved, or if a hydraulic line breaks.

Do not work beneath the cab of the machine unless the cab is properly supported.

Unless you are instructed otherwise, never attempt adjustments while the machine is moving or while the engine is running.

Never jump across the starter solenoid terminals in order to start the engine. Unexpected machine movement could result.

Whenever there are equipment control linkages the clearance in the linkage area will change with the movement of the equipment or the machine. Stay clear of areas that may have a sudden change in clearance with machine movement or equipment movement.

Stay clear of all rotating and moving parts.

If it is necessary to remove guards in order to perform maintenance, always install the guards after the maintenance is performed.

Keep objects away from moving fan blades. The fan blade will throw objects or cut objects.

Do not use a kinked wire cable or a frayed wire cable. Wear gloves when you handle wire cable.

When you strike a retainer pin with force, the retainer pin can fly out. The loose retainer pin can injure personnel. Make sure that the area is clear of people when you strike a retainer pin. To avoid injury to your eyes, wear protective glasses when you strike a retainer pin.

Chips or other debris can fly off an object when you strike the object. Make sure that no one can be injured by flying debris before striking any object.

i07746334

Burn Prevention

SMCS Code: 7000

Do not touch any part of an operating engine. Allow the engine to cool before any maintenance is performed on the engine. Relieve all pressure in the air system, in the oil system, in the lubrication system, in the fuel system, or in the cooling system before any lines, fittings, or related items are disconnected.

Coolant

When the engine is at operating temperature, the engine coolant is hot. The coolant is also under pressure. The radiator and all lines to the heaters or to the engine contain hot coolant.

Any contact with hot coolant or with steam can cause severe burns. Allow cooling system components to cool before the cooling system is drained.

Check the coolant level only after the engine has been stopped.

Ensure that the filler cap is cool before removing the filler cap. The filler cap must be cool enough to touch with a bare hand. Remove the filler cap slowly to relieve pressure.

Cooling system conditioner contains alkali. Alkali can cause personal injury. Do not allow alkali to contact the skin, the eyes, or the mouth.

Oils

30

Hot oil and hot components can cause personal injury. Do not allow hot oil to contact the skin. Also, do not allow hot components to contact the skin.

Remove the hydraulic tank filler cap only after the engine has been stopped. The filler cap must be cool enough to touch with a bare hand. Follow the standard procedure in this manual to remove the hydraulic tank filler cap.

Batteries

The liquid in a battery is an electrolyte. Electrolyte is an acid that can cause personal injury. Do not allow electrolyte to contact the skin or the eyes.

Do not smoke while checking the battery electrolyte levels. Batteries give off flammable fumes which can explode.

Always wear protective glasses when you work with batteries. Wash hands after touching batteries. The use of gloves is recommended.

i06179517

Fire Prevention and Explosion Prevention

SMCS Code: 7000



Illustration 54 g00704000

Regeneration

The exhaust gas temperatures during regeneration will be elevated. Follow proper fire prevention instructions and use the disable regeneration function (if equipped) when appropriate.

General

All fuels, most lubricants, and some coolant mixtures are flammable.

To minimize the risk of fire or explosion, Caterpillar recommends the following actions.

Always perform a Walk-Around Inspection, which may help you identify a fire hazard. Do not operate a machine when a fire hazard exists. Contact your Cat dealer for service.

Understand the use of the primary exit and alternative exit on the machine. Refer to Operation and Maintenance Manual, "Alternative Exit".

Do not operate a machine with a fluid leak. Repair leaks and clean up fluids before resuming machine operation. Fluids that are leaking or spilled onto hot surfaces or onto electrical components can cause a fire. A fire may cause personal injury or death.

Remove flammable material such as leaves, twigs, papers, trash, and so on. These items may accumulate in the engine compartment or around other hot areas and hot parts on the machine.

Keep the access doors to major machine compartments closed and access doors in working condition in order to permit the use of fire suppression equipment, in case a fire should occur.

Clean all accumulations of flammable materials such as fuel, oil, and debris from the machine.

Do not operate the machine near any flame.

Keep shields in place. Exhaust shields (if equipped) protect hot exhaust components from oil spray or fuel spray in a break in a line, in a hose, or in a seal. Exhaust shields must be installed correctly.

Do not weld or flame cut on tanks or lines that contain flammable fluids or flammable material. Empty and purge the lines and tanks. Then clean the lines and tanks with a nonflammable solvent prior to welding or flame cutting. Ensure that the components are properly grounded in order to avoid unwanted arcs.

Dust that is generated from repairing nonmetallic hoods or fenders may be flammable and/or explosive. Repair such components in a ventilated area away from open flames or sparks. Use suitable Personal Protection Equipment (PPE).

Inspect all lines and hoses for wear or deterioration. Replace damaged lines and hoses. The lines and the hoses should have adequate support and secure clamps. Tighten all connections to the recommended torque. Damage to the protective cover or insulation may provide fuel for fires.

Store fuels and lubricants in properly marked containers away from unauthorized personnel. Store oily rags and flammable materials in protective containers. Do not smoke in areas that are used for storing flammable materials.



Illustration 55

g03839130

Use caution when you are fueling a machine. Do not smoke while you are fueling a machine. Do not fuel a machine near open flames or sparks. Do not use cell phones or other electronic devices while you are refueling. Always stop the engine before fueling. Fill the fuel tank outdoors. Properly clean areas of spillage.

Avoid static electricity risk when fueling. Ultra low sulfur diesel (ULSD) poses a greater static ignition hazard than earlier diesel formulations with a higher sulfur content. Avoid death or serious injury from fire or explosion. Consult with your fuel or fuel system supplier to ensure that the delivery system is in compliance with fueling standards for proper grounding and bonding practices.

Never store flammable fluids in the operator

Battery and Battery Cables

compartment of the machine.



Illustration 56 g03839133

Caterpillar recommends the following in order to minimize the risk of fire or an explosion related to the battery.

Do not operate a machine if battery cables or related parts show signs of wear or damage. Contact your Cat dealer for service.

Follow safe procedures for engine starting with jumpstart cables. Improper jumper cable connections can cause an explosion that may result in injury. Refer to Operation and Maintenance Manual, "Engine Starting with Jump Start Cables" for specific instructions.

Do not charge a frozen battery. This may cause an explosion.

Gases from a battery can explode. Keep any open flames or sparks away from the top of a battery. Do not smoke in battery charging areas. Do not use cell phones or other electronic devices in battery charging areas.

Never check the battery charge by placing a metal object across the terminal posts. Use a voltmeter in order to check the battery charge.

Daily inspect battery cables that are in areas that are visible. Inspect cables, clips, straps, and other restraints for damage. Replace any damaged parts. Check for signs of the following, which can occur over time due to use and environmental factors:

Fraying

- Abrasion
- Cracking
- Discoloration
- · Cuts on the insulation of the cable
- Fouling
- Corroded terminals, damaged terminals, and loose terminals

Replace damaged battery cable(s) and replace any related parts. Eliminate any fouling, which may have caused insulation failure or related component damage or wear. Ensure that all components are reinstalled correctly.

An exposed wire on the battery cable may cause a short to ground if the exposed area comes into contact with a grounded surface. A battery cable short produces heat from the battery current, which may be a fire hazard.

An exposed wire on the ground cable between the battery and the disconnect switch may cause the disconnect switch to be bypassed if the exposed area comes into contact with a grounded surface. This may result in an unsafe condition for servicing the machine. Repair components or replace components before servicing the machine.

WARNING

Fire on a machine can result in personal injury or death. Exposed battery cables that come into contact with a grounded connection can result in fires. Replace cables and related parts that show signs of wear or damage. Contact your Cat dealer.

Wiring

Check electrical wires daily. If any of the following conditions exist, replace parts before you operate the machine.

- Fraying
- Signs of abrasion or wear
- Cracking
- Discoloration
- · Cuts on insulation
- Other damage

Make sure that all clamps, guards, clips, and straps are reinstalled correctly. This will help to prevent vibration, rubbing against other parts, and excessive heat during machine operation.

Attaching electrical wiring to hoses and tubes that contain flammable fluids or combustible fluids should be avoided.

Consult your Cat dealer for repair or for replacement parts.

Keep wiring and electrical connections free of debris.

Lines, Tubes, and Hoses

Do not bend high-pressure lines. Do not strike highpressure lines. Do not install any lines that are bent or damaged. Use the appropriate backup wrenches in order to tighten all connections to the recommended torque.

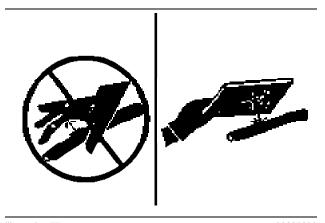


Illustration 57 g00687600

Check lines, tubes, and hoses carefully. Wear Personal Protection Equipment (PPE) in order to check for leaks. Always use a board or cardboard when you check for a leak. Leaking fluid that is under pressure can penetrate body tissue. Fluid penetration can cause serious injury and possible death. A pin hole leak can cause severe injury. If fluid is injected into your skin, you must get treatment immediately. Seek treatment from a doctor that is familiar with this type of injury.

Replace the affected parts if any of the following conditions are present:

- End fittings are damaged or leaking.
- · Outer coverings are chafed or cut.
- Wires are exposed.
- Outer coverings are swelling or ballooning.
- · Flexible parts of the hoses are kinked.
- Outer covers have exposed embedded armoring.
- · End fittings are displaced.

Make sure that all clamps, guards, and heat shields are installed correctly. During machine operation, this will help to prevent vibration, rubbing against other parts, excessive heat, and failure of lines, tubes, and hoses.

Do not operate a machine when a fire hazard exists. Repair any lines that are corroded, loose, or damaged. Leaks may provide fuel for fires. Consult your Cat dealer for repair or for replacement parts. Use genuine Cat parts or the equivalent, for capabilities of both the pressure limit and temperature limit.

Ether

Ether (if equipped) is commonly used in cold-weather applications. Ether is flammable and poisonous.

Only use approved Ether canisters for the Ether dispensing system fitted to your machine, do not spray Ether manually into an engine, follow the correct cold engine starting procedures. Refer to the section in the Operation and Maintenance Manual with the label "Engine Starting".

A WARNING

Manually spraying Ether into an engine with a Diesel Particulate Filter (DPF) may result in the accumulation of Ether in the DPF and an explosion. This in conjunction with other factors may result in an injury or death.

Use ether in ventilated areas. Do not smoke while you are replacing an ether cylinder.

Do not store ether cylinders in living areas or in the operator compartment of a machine. Do not store ether cylinders in direct sunlight or in temperatures above 49° C (120.2° F). Keep ether cylinders away from open flames or sparks.

Dispose of used ether cylinders properly. Do not puncture an ether cylinder. Keep ether cylinders away from unauthorized personnel.

Fire Extinguisher

As an additional safety measure, keep a fire extinguisher on the machine.

Be familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher regularly. Follow the recommendations on the instruction plate.

Safety Section Fire Safety

Consider installation of an aftermarket Fire Suppression System, if the application and working conditions warrant the installation.

i07041871

Fire Safety

SMCS Code: 7000

Note: Locate secondary exits and how to use the secondary exits before you operate the machine.

Note: Locate fire extinguishers and how to use a fire extinguisher before you operate the machine.

If you find that you are involved in a machine fire, your safety and that of others on site are the top priority. The following actions should only be performed if the actions do not present a danger or risk to you and any nearby people. Assess the risk of personal injury and move away to a safe distance as soon as you feel unsafe.

Move the machine away from nearby combustible material such as fuel/oil stations, structures, trash, mulch, and timber.

Lower any implements and turn off the engine as soon as possible. If you leave the engine running, the engine will continue to feed a fire. The fire will be fed from any damaged hoses that are attached to the engine or pumps.

If possible, turn the battery disconnect switch to the OFF position. Disconnecting the battery will remove the ignition source in the event of an electrical short. Disconnecting the battery will eliminate a second ignition source if electrical wiring is damaged by the fire, resulting in a short circuit.

Notify emergency personnel of the fire and your location.

If your machine is equipped with a fire suppression system, follow the manufacturers procedure for activating the system.

Note: Fire suppression systems need to be regularly inspected by qualified personnel. You must be trained to operate the fire suppression system.

If you are unable to do anything else, shut off the machine before exiting. By shutting off the machine, fuels will not continue to be pumped into the fire.

If the fire grows out of control, be aware of the following risks:

- Tires on wheeled machines pose a risk of explosion as tires burn. Hot shrapnel and debris can be thrown great distances in an explosion.
- Tanks, accumulators, hoses, and fittings can rupture in a fire, spraying fuels and shrapnel over a large area.

 Remember that nearly all the fluids on the machine are flammable, including coolant and oils. Additionally, plastics, rubbers, fabrics, and resins in fiberglass panels are also flammable.

i06952417

Fire Extinguisher Location

SMCS Code: 7000; 7419



Illustration 58

g06188176

Installation of a fire extinguisher is recommended. Be familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher regularly. Obey the recommendations on the instruction plate.

The recommended location for mounting the fire extinguisher is on the upper handrail on the right side of the machine.

i01329108

Track Information

SMCS Code: 4170; 7000

Track adjusting systems use either grease or oil under high pressure to keep the track under tension.

Grease or oil under high pressure coming out of the relief valve can penetrate the body causing injury or death. Do not watch the relief valve to see if grease or oil is escaping. Watch the track or track adjustment cylinder to see if the track is being loosened.

The pins and bushings in a dry track pin joint can become very hot. It is possible to burn the fingers if there is more than brief contact with these components.

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Safety Section

High Pressure Fuel Lines

i02546320

High Pressure Fuel Lines

SMCS Code: 1000; 1274; 7000

⚠ WARNING

Contact with high pressure fuel may cause fluid penetration and burn hazards. High pressure fuel spray may cause a fire hazard. Failure to follow these inspection, maintenance and service instructions may cause personal injury or death.

The high pressure fuel lines are the fuel lines that are between the high pressure fuel pump and the high pressure fuel manifold and the fuel lines that are between the fuel manifold and cylinder head. These fuel lines are different from fuel lines on other fuel systems.

This is because of the following differences:

- The high pressure fuel lines are constantly charged with high pressure.
- The internal pressures of the high pressure fuel lines are higher than other types of fuel system.
- The high pressure fuel lines are formed to shape and then strengthened by a special process.

Do not step on the high pressure fuel lines. Do not deflect the high pressure fuel lines. Do not bend or strike the high pressure fuel lines. Deformation or damage of the high pressure fuel lines may cause a point of weakness and potential failure.

Do not check the high pressure fuel lines with the engine or the starting motor in operation. After the engine has stopped allow 10 minutes to pass in order to allow the pressure to be purged before any service or repair is performed on the engine fuel lines.

Do not loosen the high pressure fuel lines in order to remove air from the fuel system. This procedure is not required.

Visually inspect the high pressure fuel lines before the engine is started. This inspection should be each day.

If you inspect the engine in operation, always use the proper inspection procedure in order to avoid a fluid penetration hazard. Refer to Operation and Maintenance Manual, "General hazard Information".

- Inspect the high pressure fuel lines for damage, deformation, a nick, a cut, a crease, or a dent.
- Do not operate the engine with a fuel leak. If there
 is a leak do not tighten the connection in order to
 stop the leak. The connection must only be
 tightened to the recommended torque. Refer to
 Disassembly and Assembly for your engine.

- If the high pressure fuel lines are torqued correctly and the high pressure fuel lines are leaking the high pressure fuel lines must be replaced.
- Ensure that all clips on the high pressure fuel lines are in place. Do not operate the engine with clips that are damaged, missing or loose.
- Do not attach any other item to the high pressure fuel lines.
- Loosened high pressure fuel lines must be replaced. Also removed high pressure fuel lines must be replaced. Refer to Disassembly and Assembly for your engine.

i01122596

Electrical Storm Injury Prevention

SMCS Code: 7000

When lightning is striking in the vicinity of the machine, the operator should never attempt the following procedures:

- Mount the machine.
- · Dismount the machine.

If you are in the operator's station during an electrical storm, stay in the operator's station. If you are on the ground during an electrical storm, stay away from the vicinity of the machine.

i00771840

Before Starting Engine

SMCS Code: 1000; 7000

Start the engine only from the operator compartment. Never short across the starter terminals or across the batteries. Shorting could damage the electrical system by bypassing the engine neutral start system.

Inspect the condition of the seat belt and of the mounting hardware. Replace any parts that are worn or damaged. Regardless of appearance, replace the seat belt after three years of use. Do not use a seat belt extension on a retractable seat belt.

Adjust the seat so that full pedal travel can be achieved with the operator's back against the back of the seat.

Make sure that the machine is equipped with a lighting system that is adequate for the job conditions. Make sure that all machine lights are working properly.

Before you start the engine and before you move the machine, make sure that no one is underneath the machine, around the machine, or on the machine. Make sure that the area is free of personnel.

i07746368

Visibility Information

SMCS Code: 7000

Before you start the machine, perform a walk-around inspection in order to ensure that there are no hazards around the machine.

While the machine is in operation, constantly survey the area around the machine in order to identify potential hazards as hazards become visible around the machine.

Your machine may be equipped with visual aids. Some examples of visual aids are Closed Circuit Television (CCTV) and mirrors. Before operating the machine, ensure that the visual aids are in proper working condition and that the visual aids are clean. Adjust the visual aids using the procedures that are located in this Operation and Maintenance Manual. If equipped, the Work Area Vision System shall be adjusted according to Operation and Maintenance Manual, SEBU8157, "Work Area Vision System". If equipped, the Cat Detect Object Detection shall be adjusted according to the Operation and Maintenance Manual, "Cat Detect Object Detection" for your machine.

It may not be possible to provide direct visibility on large machines to all areas around the machine. Appropriate job site organization is required in order to minimize hazards that are caused by restricted visibility. Job site organization is a collection of rules and procedures that coordinates machines and people that work together in the same area. Examples of job site organization include the following:

- Safety instructions
- Controlled patterns of machine movement and vehicle movement
- Workers that direct safe movement of traffic
- Restricted areas
- Operator training
- Warning symbols or warning signs on machines or on vehicles
- A system of communication
- Communication between workers and operators prior to approaching the machine

Modifications of the machine configuration by the user that result in a restriction of visibility shall be evaluated.

i07575957

Restricted Visibility

SMCS Code: 7000

The size and the configuration of this machine may result in areas that cannot be seen when the operator is seated. For restricted visibility areas, an appropriate job site organization must be utilized to minimize hazards of this restricted visibility. For more information regarding job site organization refer to Operation and Maintenance Manual, "Visibility Information".

Illustrations59 - 62 provide an approximate visual indication of the areas at ground level inside a radius of 12 m (39 ft) from the operator of significant restricted visibility for various machine configurations. Refer to the correct illustration for your machine configuration. All restricted visibility areas less than 300 mm wide may not be shown. These illustrations do not indicate areas of restricted visibility for distances outside of the shown radius. The areas of restricted visibility shown in the illustrations are with the track and work tool of the machine in the Travel position. Illustration 63 shows the position of the work tool in the travel position. The Caterpillar authorized work tool that resulted in the largest visibility restriction was used.

Illustration 59 indicates restricted visibility areas at ground level inside the shown radius from the operator without the use of visual aids that may be optional for this product in some markets.

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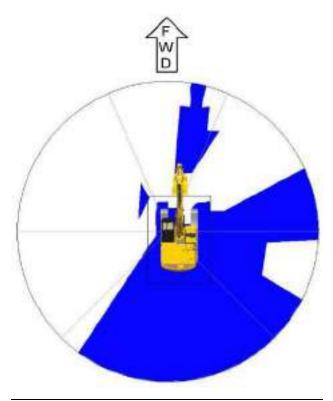


Illustration 59 g06366562

Top view of the machine, ground level visibility without use of optional visual aids
(A) 12 m (39 ft)

Note: The shaded areas indicate the approximate location of areas with significant restricted visibility.

Illustration 60 indicates restricted visibility areas at ground level inside the shown radius from the operator with the use of available rear camera, right side mirror, and left side mirror installed.

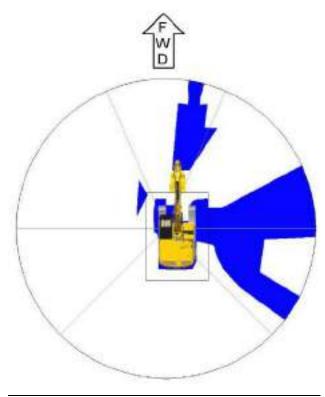


Illustration 60 g06366568

Top view of the machine, ground level visibility with rear camera, left side mirror, and right side mirror (A) 12 m (39 ft)

Note: The shaded areas indicate the approximate location of areas with significant restricted visibility.

Illustration 61 indicates restricted visibility areas at ground level inside the shown radius from the operator with the use of available rear camera, right side camera, left side mirrors, and left side second mirror.

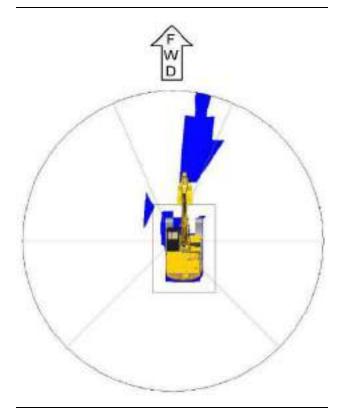


Illustration 61 g06356105

Top view of the machine, ground level visibility with rear camera, right side camera, left side mirror, and left side second mirror.

(A) 12 m (39 ft)

Note: The shaded areas indicate the approximate location of areas with significant restricted visibility.

Illustration 62 indicated restricted visibility areas at ground level inside the shown radius from the operator with the use of front camera, rear camera, right side camera, left side camera installed.

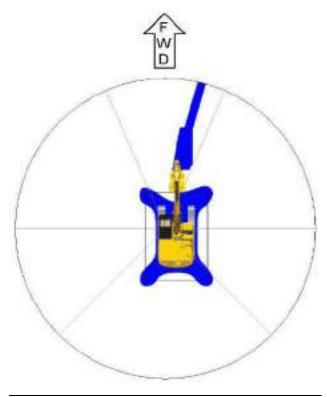


Illustration 62 g06356117

Top view of the machine, 360 visibility with front camera, rear camera, right side camera, and left side camera.

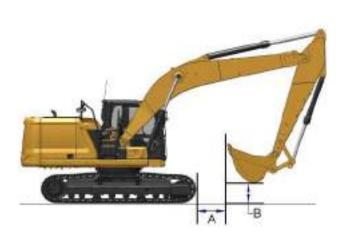
Note: The shaded areas indicate the approximate location of areas with significant restricted visibility.

Restricted visibility is measured when the front linkage of the machine is in the travel position. Illustration 63 shows the machine in the travel position.

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position.

Safety Section Engine Starting



horn, the travel alarm (if equipped), and all other warning devices are working properly.

Fasten the seat belt securely.

Warm up the engine and the hydraulic oil before operating the machine.

Before moving the machine, check the position of the undercarriage. The normal travel position is with the idler wheels to the front under the cab and the drive sprockets to the rear. When the undercarriage is in the reversed position, the directional controls must be operated in opposite directions.

Be sure that all windows are clean. Secure the doors and the windows in the open position or in the shut

Adjust the rearview mirrors (if equipped) for the best visibility close to the machine. Make sure that the

i04159629

Illustration 63

g06181081

(A) 1 m $\,$ (3.0 ft) from the front of the machine to the bucket (B) 0.5 m $\,$ (1.6 ft) from ground level

i03562260

Engine Starting

SMCS Code: 1000; 7000

If a warning tag is attached to the engine start switch or to the controls, do not start the engine. Also, do not move any controls.

Make sure that you are seated before you start the engine.

Move all hydraulic controls to the HOLD position before you start the engine. Move the hydraulic lockout control to the LOCKED position. For further details on this procedure, refer to Operation and Maintenance Manual, "Operator Controls".

Diesel engine exhaust contains products of combustion which can be harmful to your health. Always run the engine in a well ventilated area. If you are in an enclosed area, vent the exhaust to the outside.

Briefly sound the horn before you start the engine.

i01340061

Before Operation

SMCS Code: 7000

Clear all personnel from the machine and from the area.

Clear all obstacles from the machine's path. Beware of hazards (wires, ditches, etc).

Work Tools

SMCS Code: 6700

Only use work tools that are recommended by Caterpillar for use on Cat machines.

Use of work tools, including buckets, which are outside of Caterpillar's recommendations or specifications for weight, dimensions, flows, pressures, and so on, may result in less-than-optimal vehicle performance, including but not limited to reductions in production, stability, reliability, and component durability. Caterpillar recommends appropriate work tools for our machines to maximize the value our customers receive from our products. Caterpillar understands that special circumstances may lead a customer to use tools outside of our specifications. In these cases, customers must be aware that such choices can reduce vehicle performance and will affect their ability to claim warranty in the event of what a customer may perceive as a premature failure.

Work tools and work tool control systems, that are compatible with your Cat machine, are required for safe machine operation and/or reliable machine operation. If you are in doubt about the compatibility of a particular work tool with your machine, consult your Cat dealer.

Make sure that all necessary guarding is in place on the host machine and on the work tool.

Keep all windows and doors closed on the host machine. A polycarbonate shield must be used when the host machine is not equipped with windows and when a work tool could throw debris.

Do not exceed the maximum operating weight that is listed on the ROPS certification.

40

If your machine is equipped with an extendable stick,

install the transport pin when you are using the following work tools: hydraulic hammers, augers and compactors

Always wear protective glasses. Always wear the

Always wear protective glasses. Always wear the protective equipment that is recommended in the operation manual for the work tool. Wear any other protective equipment that is required for the operating environment.

To prevent personnel from being struck by flying objects, ensure that all personnel are out of the work area.

While you are performing any maintenance, any testing, or any adjustments to the work tool stay clear of the following areas: cutting edges, pinching surfaces and crushing surfaces.

Never use the work tool for a work platform.

i07199415

Assist and E-Fence

SMCS Code: 5050

⋒ WARNING

Personal Responsibility

When the Assist System is engaged, the Assist System will control various machine functions. The Assist System is not a substitute for the personal judgment of an operator for the present work site situation or work site conditions. Failure to pay attention to work site situations or work site conditions with the Assist System engaged could result in personal injury or death. Always be aware of the work site situation and work site conditions when operating the machine with the Assist System engaged.

MARNING

Be Alert

Due to system limitations with the Assist System, warnings from the Assist System may be issued late, improperly, or not at all. Failure to respond to warnings from the Assist System with appropriate action could result in personal injury or death. Always be alert when operating a machine with the Assist System engaged and be ready to intervene to prevent an accident.

Operation Guidance

- Ground personnel should maintain a safe distance from the machine. Remain out of the swing radius/ swing zone, and always check for ground personnel in the swing radius/swing zone. Do not operate with ground personnel in the swing radius/ swing zone.
- When setting height or load restrictions, make sure that any work tools that are attached are in the least favorable position.
- Check for the correct operation once the restriction has been set.
- Validate proper settings both initially and periodically during machine operation.
- Do not move the (machine) quickly when close to a restriction setting.
- Do not operate the machine in a reckless manner.
- · Do not travel with the restriction set.
- Reset the load restriction if the machine is moved to a different location.
- Always check settings or reestablish desired settings after leaving the machine for any period to ensure desired performance.
- If the proper setting procedure has been followed, but the system does not appear to be functioning properly, consult your Cat dealer.

Hazard recommendations:

- Return the joysticks to the neutral position once a limit has been reached
- Operate the machine at a slow speed
- · Do not travel

Lifting operations with the machine

- Ensure that Lift Mode is selected during lifting operations
- Operate the machine at a safe speed
- Take special care when traveling with a load attached

Do not operate the machine in a reckless manner

i07889511

Operation

SMCS Code: 7000

Machine Operating Temperature Range

The machine must function satisfactorily in the anticipated ambient temperature limits that are encountered during operation. The standard machine configuration is intended for use within an ambient temperature range of -18 °C (0 °F) to 43 °C (109 °F). Special configurations for different ambient temperatures may be available. Consult your Cat dealer for additional information on special configurations of your machine.

Limiting Conditions and Criteria

Limiting conditions are immediate issues with this machine that must be addressed prior to continuing operation.

The Operation and Maintenance Manual, Safety Section describes limiting condition criteria for replacing items such as safety messages, seat belt and mounting hardware, lines, tubes, hoses, battery cables and related parts, electrical wires, and repairing any fluid leak.

The Operation and Maintenance Manual, Maintenance Interval Schedule describes limiting condition criteria that require repair or replacement for items (if equipped) such as alarms, horns, braking system, steering system, and rollover protective structures.

The Operation and Maintenance Manual, Monitoring System (if equipped) provides information on limiting condition criteria, including a Warning Category 3 that requires immediate shutdown of the engine.

Critical Failures

The following table provides summary information on several limiting conditions found in this Operation and Maintenance Manual. The table provides criteria and required action for the limiting conditions listed. Each System or Component in this table, together with the respective limiting condition, describes a potential critical failure that must be addressed. Not addressing limiting conditions with required actions may, in conjunction with other factors or circumstances, result in a risk of personal injury or death. If an accident occurs, notify emergency personnel and provide location and description of accident.

Table 1

System or Component Name	Limiting Condition	Criteria for Action	Required Action
Line, tubes, and hoses	End fittings are damaged or leaking. Outer coverings are chafed or cut. Wires are exposed. Outer coverings are swelling or ballooning. Flexible parts of the hoses are kinked. Outer covers have exposed embedded armoring. End fittings are displaced.	Visible corrosion, loose, or damaged lines, tubes, or ho- ses. Visible fluid leaks.	Immediately repair any lines, tubes, or hoses that are corroded, loose, or damaged. Immediately repair any leaks as these may provide fuel for fires.
Electrical Wiring	Signs of fraying, abrasion, crack- ing, discoloration, cuts on the insulation	Visible damage to electrical wiring	Immediately replace damaged wiring
Battery cable(s)	Signs of fraying, abrasion, crack- ing, discoloration, cuts on the in- sulation of the cable, fouling, corroded terminals, damaged ter- minals, and loose terminals	Visible damage to battery ca- ble(s)	Immediately replace damaged battery cables
Operator Protective Structure	Structures that are bent, cracked, or loose. Loose, missing, or damaged bolts.	Visible damage to structure. Loose, missing, or damaged bolts.	Do not operate machine with damaged structure or loose, missing, or damaged bolts. Contact your Cat dealer for inspection and repair or replacement options.
Seat Belt	Worn or damaged seat belt or mounting hardware	Visible wear or damage	Immediately replace parts that are worn or damaged.
Seat Belt	Age of seat belt	Three years after date of installation	Replace seat belt three years after date of installation
Safety Messages	Appearance of safety message	Damage to safety messages making them illegible	Replace the illustrations if illegible.
Audible Warning Device(s) (if equipped)	Sound level of audible warning	Reduced or no audible warning present	Immediately repair or replace audible warning devices not working properly.
Camera(s) (if equipped)	Dirt or debris on camera lens	Dirt or debris obstructing camera view	Clean camera before operating machine.
Cab Windows (if equipped)	Dirt, debris, or damaged windows	Dirt or debris obstructing operator visibility. Any damaged windows.	Clean windows before operating machine. Repair or replace damaged windows before operating machine.
Mirrors (if equipped)	Dirt, debris, or damaged mirror	Dirt or debris obstructing operator visibility. Any damaged mirrors.	Clean mirrors before operating machine. Repair or replace damaged mirrors before operating machine.
Braking System	Inadequate braking performance	System does not pass Braking System - Test(s) included in Maintenance Section or in the Testing and Adjusting Manual	Contact your Cat dealer to inspect and, if necessary, repair the brake system.
Cooling System	The coolant temperature is too high.	Monitoring System displays Warning Category 3	Stop the engine immediately. Check the coolant level and check the radiator for debris. Refer to Operation and Maintenance Manual, Cooling System Coolant Level - Check. Check the fan drive belts for the water pump. Refer to Operation and Maintenance Manual, Belts - Inspect/Adjust/ Replace. Make any necessary repairs.
Engine Oil System	A problem has been detected with the engine oil pressure.	Monitoring System displays Warning Category 3	If the warning stays on during low idle, stop the engine and check the engine oil level. Perform any necessary repairs as soon as possible.
Engine system	An engine fault has been detected by the engine ECM.	Monitoring System displays Warning Category 3	Stop the engine immediately. Contact your Cat dealer for service.
Fuel System	A problem has been detected with the fuel system.	Monitoring System displays Warning Category 3	Stop the engine. Determine the cause of the fault and perform any necessary repairs.
Hydraulic Oil System	The hydraulic oil temperature is too high.	Monitoring System displays Warning Category 3	Stop the engine immediately. Check the hydraulic oil level and check the hydraulic oil cooler for debris. Perform any necessary repairs as soon as possible.

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System or Component Name	Limiting Condition	Criteria for Action	Required Action
	A problem has been detected with the steering system. (If equipped with steering system monitoring.)	Monitoring System displays Warning Category 3	Move machine to a safe location and stop the engine immediately. Contact your Cat dealer to inspect and, if necessary, repair the steering system.
Overall Machine	·	Monitoring System displays Warning Category 3	Stop the engine immediately. Contact your Cat dealer for service.

Machine Operation

Only operate the machine while you are in a seat. The seat belt must be fastened while you operate the machine. Only operate the controls while the engine is running.

Check for proper operation of all controls and of all protective devices while you operate the machine slowly in an open area.

When the machine is moving watch the clearance of the boom. Uneven ground can cause the boom to move in all directions.

Make sure that no personnel will be endangered before you move the machine. Do not allow riders on the machine unless the machine has an additional seat with a seat belt.

Report any machine damage that was noted during machine operation. Make any necessary repairs.

Never use the work tool for a work platform.

Hold attachments approximately 40 cm (15 inches) above ground level while you drive the machine. Do not drive the machine close to an overhang, to the edge of a cliff, or to the edge of an excavation.

If the machine begins to sideslip on a grade, immediately dump the load and turn the machine downhill.

Be careful to avoid any ground condition which could cause the machine to tip. Tipping can occur when you work on hills, on banks, or on slopes. Tipping can also occur when you cross ditches, ridges, or other unexpected obstructions.

When possible, operate the machine up slopes and down slopes with the final drive sprockets facing down the slope. Avoid operating the machine across the slope. Place the heaviest end of the machine uphill when you are working on an incline.

Keep the machine under control. Do not overload the machine beyond capacity.

Avoid changing the direction of travel on a slope. Changing the direction of travel on a slope could result in tipping or side slipping of the machine.

Bring the load close to the machine before traveling any distances.

Bring the load close to the machine before swinging the load.

Lifting capacity decreases as the load is moved further from the machine.

Make sure that the towing eyes and the towing devices are adequate for your needs.

Only connect trailing equipment to a drawbar or to a hitch.

Never straddle a wire cable. Never allow other personnel to straddle a wire cable.

When you maneuver in order to connect the equipment, make sure that no personnel are between the machine and trailing equipment. Block up the hitch of the trailing equipment in order to align the equipment with the drawbar.

Check the local regulations, state codes, and/or directives of the job site for a specific minimum distance from obstacles.

Before you operate the machine, check with local utilities for the locations of underground pipes and for the locations of buried cables.

Know the maximum dimensions of your machine.

Watch the load at all times.

Do not operate the machine without the counterweight. The machine can tip when the boom is over the side.

The clamshell, the grapple, or the magnet can swing in all directions. Move the joysticks in a continuous motion. Failure to move the joysticks in a continuous motion can cause the clamshell, the grapple, or the magnet to swing into the cab or into a person in the work area. This will result in personal injury.

Certain machine front linkage combinations (boom, stick, quick coupler, work tool) can allow the work tool to contact the machine undercarriage, swing frame, boom, boom hydraulic cylinder and or the cab. Be aware of the position of the work tool while you operate the machine.

Shut down the machine until damaged or nonfunctioning visibility aid(s) is repaired (if applicable) or until appropriate job site organization is used to minimize hazards that are caused by any resulting restricted visibility.

Machine Operation when the Machine is not Completely Assembled

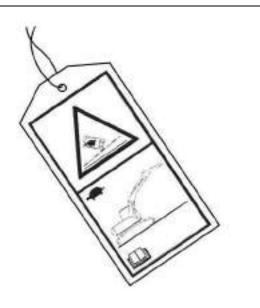


Illustration 64 g02202544

Attach the tag to the controls of the machine. When the tag is attached to the controls, operate the machine as described below.

If the machine needs to be operated without the boom, stick, and/or counterweight being installed, the machine should be operated slowly on flat, stable ground or pavement by qualified operators. Avoid any machine operations which could affect machine stability, including the swing function. The ROPS structural certification depends on the support of the boom, stick, and counterweight in the event of a machine tip over or a machine rollover incident.

i06299648

Engine Stopping

SMCS Code: 1000; 7000

Do not stop the engine immediately after the machine has been operated under load. Stopping the engine immediately can cause overheating and accelerated wear of engine components. After the machine is parked and the parking brake is engaged, allow the engine to run at low idle for 5 minutes before shutdown. Running the engine allows hot areas of the engine to cool gradually.

i06304391

Lifting Objects

SMCS Code: 7000

There may be local regulations and/or government regulations that govern the use of machines which lift heavy objects. Obey all local and government regulations.

If this machine is used to lift objects within an area that is controlled by the European Directive "2006/42/EC", the machine must be equipped with a boom lowering control valve, a stick lowering control valve, and an overload warning device.

If this machine is used to lift objects within Japan, Japanese regulations require the machine to be equipped with a shovel crane configuration.

Contact your Cat dealer for additional information

i07749631

Demolition

SMCS Code: 6700

There maybe local regulations and/or government regulations that govern the use of machines which are designed and used as demolition machinery.

Note: Obey all local and government regulations.

Demolition machinery is designed for demolishing by pushing or pulling, or fragmenting. Demolition is done by crushing or shearing, buildings and/or other civil engineering structures and component parts and/or separating the resultant debris.

If this machine is used for demolition within an area that is controlled by the European Directive 2006/42/EC, the machine must be equipped with:

- Rollover Protective Structure (ROPS, not required for demolition excavators)
- Boom Lowering Control Valve (BLCV) / Stick Lowering Control Valve (SLCV)
- · Top Guard / Front Guard
- Bottom / Motor / Swivel Guard
- · EN 356 class P5A front window glass
- If a roof window is used to provide visibility to the working area, then roof window shall be equipped with motorized windscreen wipers and washers.

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Demolition applications may generate flying debris. Ensure that there are no personnel in the area around the machine where flying debris may travel.

Demolition applications may generate airborne dust that can be hazardous to your health. If you operate the machine in a dust generating applications, use appropriate safeguarding or adequate ventilation to minimize risk.

i07946718

Parking

SMCS Code: 7000

The hydraulic system controls remain pressurized if the accumulator is charged. This condition is true even when the engine is not running. The hydraulic control system pressure should decrease in a short time (approximately 1 minute). While the hydraulic controls maintain a charge, the hydraulic work tools and machine controls remain functional.

There can be residual pressure within the hydraulic system even when the accumulator is empty. Refer to this Operation and Maintenance Manual, "System Pressure Release" before any service is performed to the hydraulic system.

Machine movement that is sudden and unexpected will occur if any of the controls are moved. Machine movement that is sudden and unexpected, can cause personal injury or death.

Always move the hydraulic lockout control to the LOCKED position before you shut off the engine or immediately after the engine stops running.

Park the machine on a hard, level surface. If you must park the machine on a grade, chock the tracks of the machine.



Illustration 65 g06181120

Place the machine in the servicing position.

Note: Make sure that all work tools are in the recommended servicing position before servicing the machine.

Stop the engine.

Turn the engine start switch to the OFF position.

Turn the battery disconnect switch to the OFF position, if you do not intend on operating the machine for an extended period. This will prevent drainage of the battery. A battery short circuit, any current draw from certain components, and vandalism can cause drainage of the battery.



Illustration 66 g06217247

Note: Do not turn off the battery disconnect switch until 5 seconds have elapsed after turning the engine start switch to the OFF position. Do not turn off the battery disconnect switch while the "Lock Security?" screen is displayed on the monitor. Both conditions would prevent the Diesel Exhaust Fluid (DEF) system from being purged and could cause the fluid to freeze in the lines.

Install barriers or lighting as required to prevent interference in road traffic.

Select places free of danger by flooding and other water damage.

i07746366

Parking

Slope Operation

SMCS Code: 7000

Machines that are operating safely in various applications depend on these criteria: the machine model, configuration, machine maintenance, operating speed of the machine, conditions of the terrain, fluid levels, and tire inflation pressures. The most important criteria are the skill and judgment of the operator.

A well trained operator that follows the instructions in the Operation and Maintenance Manual has the greatest impact on stability. Operator training provides a person with the following abilities: observation of working and environmental conditions, feel for the machine, identification of potential hazards and operating the machine safely by making appropriate decisions.

When you work on side hills and when you work on slopes, consider the following important points:

Speed of travel – At higher speeds, forces of inertia tend to make the machine less stable.

Roughness of terrain or surface – The machine may be less stable with uneven terrain.

Direction of travel – Avoid operating the machine across the slope. When possible, operate the machine up the slopes and operate the machine down the slopes. Place the heaviest end of the machine uphill when you are working on an incline.

Mounted equipment – Balance of the machine may be impeded by the following components: equipment that is mounted on the machine, machine configuration, weights, and counterweights.

Nature of surface – Ground that has been newly filled with earth may collapse from the weight of the machine.

Surface material – Rocks and moisture of the surface material may drastically affect the machine's traction and machine's stability. Rocky surfaces may promote side slipping of the machine.

Slippage due to excessive loads – This may cause downhill tracks or downhill tires to dig into the ground, which will increase the angle of the machine.

Width of tracks or tires – Narrower tracks or narrower tires further increase the digging into the ground which causes the machine to be less stable.

Implements attached to the drawbar – This may decrease the weight on the uphill tracks. This may also decrease the weight on the uphill tires. The decreased weight will cause the machine to be less stable.

Height of the working load of the machine – When the working loads are in higher positions, the stability of the machine is reduced.

Operated equipment – Be aware of performance features of the equipment in operation and the effects on machine stability.

Operating techniques – Keep all attachments or pulled loads low to the ground for optimum stability.

Machine systems have limitations on slopes – Slopes can affect the proper function and operation of the various machine systems. These machine systems are needed for machine control.

Note: Operators with lots of experience and proper equipment for specific applications are also required. Safe operation on steep slopes may also require special machine maintenance. Refer to Lubricant Viscosities and Refill Capacities in this manual for the proper fluid level requirements and intended machine use. Fluids must be at the correct levels to ensure that systems will operate properly on a slope.

i08229294

Equipment Lowering with Engine Stopped

SMCS Code: 7000-II

Before lowering any equipment with the engine stopped, clear the area around the equipment of all personnel. The procedure to use will vary with the type of equipment to be lowered. Keep in mind most systems use a high pressure fluid or air to raise or lower equipment. The procedure will cause high pressure air, hydraulic, or some other media to be released in order to lower the equipment. Wear appropriate personal protective equipment and follow the established procedure in the Operation and Maintenance Manual, "Equipment Lowering with Engine Stopped" in the Operation Section of the manual.

i07865151

Sound Information and Vibration Information

SMCS Code: 7000

Sound Level Information

The declared dynamic operator sound pressure level is 71 dB(A) when "ISO 6396: 2008" is used to measure the value for an enclosed cab. The measurement was conducted at 70% of the maximum engine cooling fan speed. The sound level may vary at different engine cooling fan speeds. The measurement was conducted with the cab doors and the cab windows closed. The cab was properly installed and maintained.

The declared exterior sound power level L_{WA} is 99 dB (A) for 320 and 100 dB(A) for 323 when the value is measured according to the dynamic test procedures and the conditions that are specified in "ISO 6395:2008". The measurement was conducted at 70 % of the maximum engine cooling fan speed. The sound level may vary at different engine cooling fan speeds.

The declared sound levels listed above include both measurement uncertainty and uncertainty due to production variation.

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Safety Section

Hearing protection may be needed when the machine is operated with an open operator station for extended periods or in a noisy environment. Hearing protection may be needed when the machine is operated with a cab that is not properly maintained, or when the doors and windows are open for extended periods or in a noisy environment.

Sound Level Information for Machines in European Union Countries and in Countries that Adopt the "EU Directives"

The declared dynamic operator sound pressure level is 71 dB(A) when "ISO 6396: 2008" is used to measure the value for an enclosed cab. The measurement was conducted at 70% of the maximum engine cooling fan speed. The sound level may vary at different engine cooling fan speeds. The measurement was conducted with the cab doors and the cab windows closed. The cab was properly installed and maintained.

The declared exterior sound power level (LWA) when the value is measured according to the dynamic test procedures and conditions that are specified in "ISO 6395:2008" are as follows:

- 320 99 dB(A)
- 323 100 dB(A)

The measurement was conducted at 70% of the maximum engine cooling fan speed. The sound level may vary at different engine cooling fan speeds.

The declared sound levels listed above include both measurement uncertainty and uncertainty due to production variation.

Sound Level Information for Machines in Eurasian Economic Union Countries

The declared dynamic operator sound pressure level is 71 dB(A) when "ISO 6396:2008" is used to measure the value for an enclosed cab. The measurement was conducted at 70 % of the maximum engine cooling fan speed. The sound level may vary at different engine cooling fan speeds. The measurement was conducted with the cab doors and the cab windows closed.

The declared exterior sound power level L_{WA} is 99 dB (A) for 320 and 100 dB(A) for 323 when the value is measured according to the dynamic test procedures and the conditions that are specified in "ISO 6395:2008". The measurement was conducted at 70 % of the maximum engine cooling fan speed. The sound level may vary at different engine cooling fan speeds.

The declared sound levels listed above include both measurement uncertainty and uncertainty due to production variation.

Sound Information and Vibration Information

"The European Union Physical Agents (Vibration) Directive 2002/ 44/EC"

Vibration Data for Track Type Excavator

Information Concerning Hand/Arm Vibration Level

When the machine is operated according to the intended use, the hand/arm vibration of this machine is below 2.5 meter per second squared.

Information Concerning Whole Body Vibration Level

This section provides vibration data and a method for estimating the vibration level for track type excavators.

Note: Vibration levels are influenced by many different parameters. Many items are listed below.

- Operator training, behavior, mode, and stress
- Job site organization, preparation, environment, weather, and material
- Machine type, quality of the seat, quality of the suspension system, attachments, and condition of the equipment

It is not possible to get precise vibration levels for this machine. The expected vibration levels can be estimated with the information in Table 2 to calculate the daily vibration exposure. A simple evaluation of the machine application can be used.

Estimate the vibration levels for the three vibration directions. For typical operating conditions, use the average vibration levels as the estimated level. With an experienced operator and smooth terrain, subtract the Scenario Factors from the average vibration level to obtain the estimated vibration level. For aggressive operations and severe terrain, add the Scenario Factors to the average vibration level to obtain the estimated vibration level.

Note: All vibration levels are in meter per second squared.

Table 2

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"ISO Reference Table A - Equivalent vibration levels of whole body vibration emission for earthmoving equipment."									
Machine Type	Typical Operating	Vi	bration Level	s	Scenario Factors				
	Activity	X axis	Y axis	Z axis	X axis	Y axis	Z axis		
	excavating	0,44	0,27	0,30	0,24	0,16	0,17		
Track Type	hydraulic breaker application	0,53	0,31	0,55	0,30	0,18	0,28		
Excavators	mining application	0,65	0,42	0,61	0,21	0,15	0,32		
	transfer	0,48	0,32	0,79	0,19	0,20	0,23		

Note: Refer to "ISO/TR 25398 Mechanical Vibration - Guideline for the assessment of exposure to whole body vibration of ride on operated earthmoving machines" for more information about vibration. This publication uses data that is measured by international institutes, organizations, and manufacturers. This document provides information about the whole body exposure of operators of earthmoving equipment. Refer to Operation and Maintenance Manual, SEBU8257, "The European Union Physical Agents (Vibration) Directive 2002/44/EC" for more information about machine vibration levels.

The Cat suspension seat meets the criteria of "ISO 7096". This standard represents vertical vibration level under severe operating conditions.

Guidelines for Reducing Vibration Levels on Earthmoving Equipment

Properly adjust machines. Properly maintain machines. Operate machines smoothly. Maintain the conditions of the terrain. The following guidelines can help reduce the whole body vibration level:

- **1.** Use the right type and size of machine, equipment, and attachments.
- **2.** Maintain machines according to the manufacturers recommendations.
 - a. Tire pressures
 - b. Brake and steering systems
 - c. Controls, hydraulic system, and linkages
- 3. Keep the terrain in good condition.
 - a. Remove any large rocks or obstacles.
 - b. Fill any ditches and holes.
 - c. Provide machines and schedule time to maintain the conditions of the terrain.
- **4.** Use a seat that meets "ISO 7096". Keep the seat maintained and adjusted.
 - Adjust the seat and suspension for the weight and the size of the operator.

- b. Inspect and maintain the seat suspension and adjustment mechanisms.
- **5.** Perform the following operations smoothly.
 - a. Steer
 - b. Brake
 - c. Accelerate.
 - d. Shift the gears.
- 6. Move the attachments smoothly.
- Adjust the machine speed and the route to minimize the vibration level.
 - a. Drive around obstacles and rough terrain.
 - b. Slow down when necessary to go over rough terrain.
- **8.** Minimize vibrations for a long work cycle or a long travel distance.
 - a. Use machines that are equipped with suspension systems.
 - b. Use the ride control system on track type excavators.
 - c. If no ride control system is available, reduce speed to prevent bounce.
 - d. Haul the machines between workplaces.
- **9.** Less operator comfort may be caused by other risk factors. The following guidelines can be effective to provide better operator comfort:
 - a. Adjust the seat and adjust the controls to achieve good posture.
 - b. Adjust the mirrors to minimize twisted posture.
 - c. Provide breaks to reduce long periods of sitting.
 - d. Avoid jumping from the cab.
 - e. Minimize repeated handling of loads and lifting of loads.

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Safety Section Operator Station

 f. Minimize any shocks and impacts during sports and leisure activities.

Sources

The vibration information and the calculation procedure are based on "ISO/TR 25398 Mechanical Vibration - Guideline for the assessment of exposure to whole body vibration of ride on operated earthmoving machines". Harmonized data is measured by international institutes, organizations, and manufacturers.

This literature provides information about assessing the whole body vibration exposure of operators of earthmoving equipment. The method is based on measured vibration emission under real working conditions for all machines.

Check the original directive. This document summarizes part of the content of the applicable law. This document is not meant to substitute the original sources. Other parts of these documents are based on information from the United Kingdom Health and Safety Executive.

Refer to Operation and Maintenance Manual, SEBU8257, "The European Union Physical Agents (Vibration) Directive 2002/44/EC" for more information about vibration.

Consult your local Cat dealer for more information about machine features that minimize vibration levels. Consult your local Cat dealer about safe machine operation.

Use the following web site to find your local dealer:

Caterpillar, Inc. www.cat.com

i07746362

Operator Station

SMCS Code: 7300; 7301; 7325

Any modifications to the inside of the operator station should not project into the operator space or into the space for the companion seat (if equipped). The addition of a radio, fire extinguisher, and other equipment must be installed so that the defined operator space and the space for the companion seat (if equipped) is maintained. Any item that is brought into the cab should not project into the defined operator space or the space for the companion seat (if equipped). A lunch box or other loose items must be secured. Objects must not pose an impact hazard in rough terrain or in the event of a rollover.

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Guards

(Operator Protection)

SMCS Code: 7000; 7150

There are different types of guards that are used to protect the operator. The machine and the machine application determine the type of guard that should be used.

A daily inspection of the guards is required in order to check for structures that are bent, cracked, or loose. Never operate a machine with a damaged structure.

The operator becomes exposed to a hazardous situation if the machine is used improperly or if poor operating techniques are used. This situation can occur even though a machine is equipped with an appropriate protective guard. Follow the established operating procedures that are recommended for your machine.

Rollover Protective Structure (ROPS), Falling Object Protective Structure (FOPS) or Tip Over Protection Structure (TOPS)

The ROPS/FOPS Structure (if equipped) on your machine is specifically designed, tested and certified for that machine. Any alteration or any modification to the ROPS/FOPS Structure could weaken the structure. This places the operator into an unprotected environment. Modifications or attachments that cause the machine to exceed the weight that is stamped on the certification plate also place the operator into an unprotected environment. Excessive weight may inhibit the brake performance, the steering performance and the ROPS. The protection that is offered by the ROPS/FOPS Structure will be impaired if the ROPS/FOPS Structure has structural damage. Damage to the structure can be caused by an overturn, a falling object, a collision, etc.

Do not mount items (fire extinguishers, first aid kits, work lights, etc) by welding brackets to the ROPS/FOPS Structure or by drilling holes in the ROPS/FOPS Structure. Welding brackets or drilling holes in the ROPS/FOPS Structures can weaken the structures. Consult your Cat dealer for mounting guidelines.

The Tip Over Protection Structure (TOPS) is another type of guard that is used on mini hydraulic excavators. This structure protects the operator in the event of a tipover. The same guidelines for the inspection, the maintenance and the modification of the ROPS/FOPS Structure are required for the Tip Over Protection Structure.

Other Guards (If Equipped)

Protection from flying objects and/or falling objects is required for special applications. Logging applications and demolition applications are two examples that require special protection.

A front guard needs to be installed when a work tool that creates flying objects is used. Mesh front guards that are approved by Caterpillar or polycarbonate front guards that are approved by Caterpillar are available for machines with a cab or an open canopy. On machines that are equipped with cabs, the windows should also be closed. Safety glasses are recommended when flying hazards exist for machines with cabs and machines with open canopies.

If the work material extends above the cab, top guards and front guards should be used. Typical examples of this type of application are listed below:

- · Demolition applications
- Rock quarries
- · Forestry products

Additional guards may be required for specific applications or work tools. The Operation and Maintenance Manual for your machine or your work tool will provide specific requirements for the guards. Refer to Operation Maintenance manual, "Demolition" for additional information. Consult your Cat dealer for additional information.

Product Information Section

General Information

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Regulatory Information (Japan)

SMCS Code: 7000

Qualifications for Machine Operation

The following qualifications are required for the operation of this machine:

Excavation and Loading

Completion of the construction machines (for land leveling, hauling, loading, and excavation) operation skill training course. (Qualification by the Industrial Safety and Health Act)

Demolition

Completion of the construction machines (for demolition) operation skill training course. (Qualification by the Industrial Safety and Health Act)

Mining Jobs

Certification by the Director General or Deputy Director General of Bureau of Mine Safety after completion of the safety training course. (Qualification by the Mine Safety Act)

Crane Slinging for the Bucket with a Hook

Completion of the special slinging training for the crane for loads weighing less than 1 ton. (Qualification by the Industrial Safety and Health Act)

Trailer Transportation

In principle, this machine should be transported by a trailer. Select the appropriate trailer regarding the machine weight and measurements shown in the major specifications in the specification part of this manual. Be aware machine weight and transportation measurements differ depending on the various types of attachments.

 In the event heavy items are to be transported, observe the related laws. These laws include Road Traffic Law, Road Laws, Road Transportation Vehicle Laws, and Vehicle Restriction Laws. Conduct prior investigation of the road width, ground clearance of road/railway bridges, weight restrictions etc. of the planned transportation route, to confirm the viability of the transportation execution.

Load

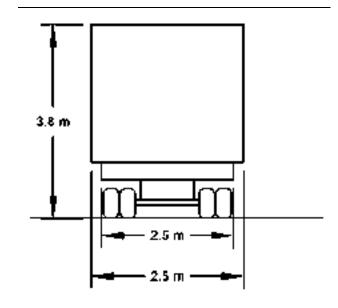


Illustration 67 g02698738

Not more than 3.8 m (12 ft 6 inch)

- Not more than 2.5 m (8 ft 2 inch)(Safety Standard)
- Not more than 2.5 m (8 ft 2 inch) (Vehicle Restriction Laws)
- Items that protrude out are not allowed.
 (Government ordinance for Road Traffic Laws)

Transportation weight and measurements are restricted by the Vehicle Restriction Laws. If the actual weight/measurements exceed the limitation figures, you must submit the restriction relaxation request to the pertinent governmental agencies. For details, consult your Cat dealer.

Table 3

101a. 201.g.i.	Not more than 12 m (39 ft 4 inch)
\ /	Not more than 2.5 m (8 ft 2 inch)

(continued)

Product Information Section Regulatory Information (Japan)

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	Not more than 3.8 m (12 ft 6 inch) when loaded on the trailer.
Total Weight	20 to 25 ton (depending on road, axle, and vehicle length)

Operation of Construction Equipment and the Governing Laws and Regulations

NOTICE

Various laws and regulations, including Industrial Safety and Health Act, are enforced to ensure prevention of injuries on and around construction equipment and safe and comfortable operation of equipment. Be sure to obey them.

NOTICE

The notices regarding machine operation, inspection, maintenance, and safety contained in this manual are applicable only to cases in which the machine is used for the specified jobs. It is impossible for this kind of manual to cover every kind of operation. Therefore, the content of this manual does not necessarily explain all possible cases. Be sure to pay careful attention also to the items not covered by this manual and confirm the safety before starting jobs to prevent human injury and machine damage accidents.

Qualification of Operators

Operation of construction equipment is limited to persons who have any of the following licenses by law.

Note: Employers will face imprisonment up to a maximum of 6 months or a fine of up to a maximum of five hundred thousand yen if they let unqualified personnel operate equipment. Unqualified operators will also be fined up to a maximum of five hundred thousand yen.

- One who completed an operating skill course for vehicle-type construction equipment at a registered training institution.
- One who passed the construction equipment and technologies license examination (Type 1-3) defined by the Construction Industry Law.
- One who completed an operating training course for construction equipment defined by the Vocational Training Law.

- One who took a special training (rules and skills) at a registered training institution to operate equipment weighing less than 3 tons.
- With an auto-drivers license, an operator does not need to complete an operating skill course for construction equipment to operate equipment on the roads that apply to the rules of the Road Traffic Act. However, the operator needs to complete the course to engage in snow clearing or excavating on the roads.
- The operator must be qualified under the Mine Safety Act to operate construction equipment in a mine.

Acquisition of the Qualifications

The company offers training courses for construction machine operation, in addition to other skills. For details, contact the company's dealer in your area.

Regarding machine operation qualifications, also refer to the laws related to the construction machines shown at the end of this manual.

Subsidy System

Small-to-medium-sized construction business companies are eligible to receive a subsidy for a part of training fees and wages when they have their employees attend a training course to improve skills.

Operation of Construction Equipment and the Governing Laws and Regulations

NOTICE

Information about operating skill course for vehicle-type construction equipment (for ground leveling, transporting, loading, excavating).

Industrial Safety and Health Act requires operators of construction equipment weight 3 tons and over to acquire a certificate of completion of an operating skill course. Registered with and authorized by the respective directors general of the regional labor bureaus, we offer operating skill courses for vehicle-type construction equipment and special trainings.

Request for Periodical Self-Inspection

Rules of Periodical Self-Inspection

The employer shall, as provided for by the Ordinance of the Ministry of Health, Labor and Welfare, conduct self-inspection periodically. The employer shall keep the records of the results in respect to construction equipment such as tractor shovels and power shovels, etc., specified by Cabinet Order. (from Article 45, Industrial Safe and Health Act)

Ordinance on Industrial Safety and Hygiene

Periodical self-inspections Article 167

- (1) The employer shall, as regards a vehicle type construction machine, carry out self-inspections for the following matters periodically once every period within a year. However, this shall not apply to the non-use period of a vehicle type construction machine, which is not used for a period exceeding 1 year.
- (2) The employer shall, as regards a vehicle type construction machine set forth in the proviso of the proceeding paragraph, carry out self-inspection for abnormalities in each part of a construction machine before resuming the operation.

Periodical self-inspections Article 168

- (1) The employer shall, as regards a vehicle type construction machine, carry out self-inspections for the following matters periodically once every period within a month. However, this shall not apply to the non-use period of a vehicle type construction machine, which is not used for a period exceeding one month:
- (i) Abnormalities in a brake, a clutch, a controlling device, and working devices.
- (ii) Damage in a wire, rope, and a chain
- (iii) Damage in a bucket, a dipper, etc.
- (2) The employer shall, as regards to the vehicle type construction machine set forth in the proviso of the preceding paragraph, carry out self-inspection for the matters listed in each item of the same paragraph before resuming the operation.

Record of Periodical Self-Inspections Article 169

The employer shall, when having carried out the self-inspections set forth in the preceding two Articles, record the results and retain the records for 3 years.

Specified Self-Inspection Article 169-2

The specified self-inspection pertaining to the vehicle type construction machine shall be the self-inspection (prescribed by Article 167) and carried out by qualified personnel. The employer shall, when having carried out the specified self-inspection pertaining to a vehicle type construction machine, affix an inspection sticker stating the month and year when the said specified self-inspection was carried out at a readily visible location of the said machine.

- Caterpillar Japan has a supporting program for self-inspection as a registered inspection agency. Qualified personnel and inspection equipment are available to help customers who do not conduct internal inspections or do not have time to conduct the specified self-inspections. Contact a Cat dealer near you for details.
- Maintenance and inspection record book for a record-saving purpose can be purchased at Caterpillar Japan.
- Penalty: Employer who fails to carry out selfinspections and to record the results will face a fine of up to five hundred thousand yen.

Checkup before Commencing the Work Article 170

The employer shall, when carrying out the work using a vehicle type construction machine, check functions of a brake and a clutch before commencing the work for the day.

Other Rules

Besides qualification for operating equipment and self inspections, the following obligations are set forth in the Industrial Safety and Health Act:

- To conduct health and safety training for new recruits and shop foremen.
- To appoint the operation leader or supervisor, and establish health and safety management system.
- To inform employees of a chain of command at the worksite, communication and signal rules, traveling route of equipment, speed limits, signs of restricted areas, etc. for securing safety in the workplace.

The Industrial Safety and Health Act further also set obligations related to mechanical structures and rental activities of equipment.

Safety comes before anything else. Establish a workplace where no injuries occur by observing the governing laws and by referring to this manual, specifically the descriptions on safety.

Product Information Section Regulatory Information (Japan)

Construction Equipment and Environmental Laws

Prohibition of Emissions and Obligations to Recover Fluorocarbons

Law Concerning the Recovery and Destruction of Fluorocarbons (Enforcement date: April 1, 2015)

Being emitted into the atmosphere, Fluorocarbons, used as refrigerants of air conditioning, destroy the ozone layer and accelerate the global warming as a cause of environmental destruction. Follow the instructions below required by law when handling air conditioners to protect the global environment.

- 1. 1. Do not arbitrarily emit the encapsulated refrigerant installed on the product into the atmosphere.
- **2.** 2. Recover the encapsulated refrigerant when disposing of the product.

Note: Violators of the law will face a maximum one-year imprisonment or a fine up to a maximum of five hundred thousand yen.

When you need to fill, recover a refrigerant or dispose of a product with an encapsulated refrigerant installed, please ask a filling-recovery operator registered with the government of the local prefecture as "class-1 filling-recovery operator." And carry out the simple inspection of air conditioner and keep the record.

Class-1 Specified products sold after October 1, 2015 shall have the label inside of the cab showing the type and quantity of refrigerant, GWP (Global Warming Potential), and precautions for use. (Refer to the fluorocarbon label in the OMM safety section)

Standard Certificate of Transfer

Dear Customers

Japan Construction Equipment Manufacturers Association

Standard Certificate of Transfer

Issued by the Japan Construction Equipment Manufacturers Association

Standard Certificate of Transfer issued by the Japan Construction Equipment Manufacturers Association proves the ownership of your equipment. Request us to issue the certificate as a proof of transfer of ownership.

Commercial transactions of construction equipment are generally made on a long-term installment plan basis with a special provision of reservation of ownership that the seller retains the ownership of the sold equipment until the buyer completely pays off the installments.

Ownership of some construction equipment can be proved with a vehicle inspection certificate, but the certificate is not issued for most of the equipment. Therefore, the buyer will need to present a third party with a proof of ownership of the sold equipment.

Japan Construction Equipment Manufacturers
Association launched a system of standard certificate
of transfer in 1971 to normalize trading in
construction equipment and establishes a business
practice relating to transfer of ownership. Customers
are kindly requested to understand the intent of the
system and request your seller to issue a certificate
of transfer.

- 1. About the standard certificate of transfer
 - a. Japan Construction Equipment Manufacturers Association (hereinafter referred to as CEMA) sets the rules and form of standard certificate of transfer (hereinafter referred to as certificate of transfer), and members of the CEMA issue the certificate of transfer. A certificate of transfer proves the ownership of equipment.

2. Purpose of issuance

 a. A certificate of transfer will be issued for the purpose of clarifying the ownership of equipment and preventing misconduct such as trades of stolen equipment or fraud.

3. Issuer

 a. A certificate of transfer will be issued by a distributor (Primary transferer) who sells new construction equipment and is authorized by the CEMA.

4. Eligibility

 a. A certificate of transfer will be issued for the equipment, which is sold by CEMA-member distributors and defined as construction equipment by the CEMA

5. Issuance

- a. A certificate of transfer will be issued and directly given to a buyer upon the buyer's request when he/she buys eligible equipment from an issuer.
- A certificate of transfer may not be issued for the equipment, which was sold as new merchandise more than 10 years ago.
- c. A certificate of transfer is not permitted to substitute a vehicle inspection certificate.

6. Prohibition of reissuance

 a. Certificate of transfer should be safely stored as it will not be reissued under any circumstances.

- 7. In case a certificate description runs out of space
 - Discretionary page/s to the certificate will be valid with a tally seal of the issuer at the joint of two pages.

Contact CEMA-member companies or distributors for more details of the system.

Industrial Safety and Health Act

Article 164 (Extracted) of Industrial Safety and Health Act (Restriction on use Other Than Main Application)

Article 164

Business Operator must not use construction machineries of vehicle type for applications other than main application of the applicable construction machineries of vehicle type such as: lifting cargos by hydraulic excavator or lifting/lowering workers using the clamshell.

- [2] The previous clause will not be applied for any of the following cases:
- **1.** In performing cargo lifting, any one of the following may be applicable.
 - Cannot be avoided due to the nature of the work or necessary in view of performing work in safe.
 - When working with attachments installed for metals of hook or shackle etc or other devices for lifting application applicable to any one of the following as implements for boom or bucket etc
 - Enough strength is retained bearable for loads to be applied.
 - Load lifted up is not feared to be dropped from the applicable instrument used, due to provided locking device is in use or etc.
 - Load not feared of disengaging from the implement.
- 2. In performing work other than cargo lifting, nothing is feared to do harm to the workers.
- [3] The business operator must take the following measures, in performing cargo lifting work applicable to Items 1a and 1b of Step 1 above. To prevent any danger of workers from contact with lifted cargo, drop of lifted cargo or turnover or falling down of construction machineries of vehicle type.

- Designate one person who issues a sign as well as setting up fixed signs related to cargo lifting work, and follow his signs.
- 2. Perform work on a flat ground.
- **3.** Keep any worker away from any place where is feared to cause any danger to worker due to contact with a cargo or drop of lifted cargo.
- [4] Do not perform any work applying load exceeding the allowed rated max load specified according to structure or materials of the applicable construction machineries of the vehicle type.
- [5] In using wire rope in slinging device, use wire rope applicable to every item of the followings.
- Safety coefficient is 6 or more. (The safety coefficient here must be the same as specified in Article 213 item 2 in Safety Rules on Crane Works (Article 34 in Ordinance of Ministry of Labor, 1972) etc. Hereinafter called as "Crane Rules")
- Among wire rope 1 strands, numbers of cut strands (other than filler) are less than 10%.
- Reduction of diameter is 7% or less than nominal diameter.
- Free from kinking.
- · Free from badly collapse and corrosion.
- [6] In using lifting chain as slinging device, the chain is applicable to every item of the followings.
- · Safety coefficient is 5 or more.
- Elongation is 5% or less than the length when the applicable lifting chain was fabricated.
- Reduction of diameter of the cross section of link is 10% or less than diameter of cross section of the applicable link when the applicable lifting chain was manufactured.
- · Free from cracks.

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[7] In using those other than wire rope and lifting chain as slinging device, they must be free from bad damage and corrosion.

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Specifications

SMCS Code: 7000

Intended Use

The intended use of this machine is for excavating with a bucket or working with approved work tools. The machine should be operated with the undercarriage in a stationary position since the upper structure is normally capable of 360 degree swing with mounted equipment. This machine can be used in object handling applications that are within the lift capacity of the machine. When this machine is used in object handling applications, ensure that the machine is properly configured and operated properly. Obey any local governmental regulations and regional governmental regulations. Only lift objects from approved lifting points and with approved lifting devices.

Expected Life

The expected life, defined as total machine hours, of this machine is dependent upon many factors including the machine owner's desire to rebuild the machine back to factory specifications. The expected life interval of this machine is 8,000 service hours. The expected life interval corresponds to the service hours to engine overhaul. Service hours to engine overhaul may vary based on overall machine duty cycle. At the expected life interval, remove the machine from operation and consult your Cat dealer for inspect, repair, rebuild, install remanufactured, install new components, or disposal options and to establish a new expected life interval. If a decision is made to remove this machine from service, refer to Operation and Maintenance Manual, "Decommissioning and Disposal".

The following items are required to obtain an economical expected life of this machine:

- Perform regular preventive maintenance procedures as described in the Operation and Maintenance Manual.
- Perform machine inspections as described in the Operation and Maintenance Manual and correct any problems discovered.
- Perform system testing as described in the Operation and Maintenance Manual and correct any problems discovered.
- Ensure that machine application conditions comply with Caterpillar's recommendations.

- Ensure that the operating weight does not exceed limits set by manufacturer.
- Ensure that all frame cracks are identified, inspected, and repaired to prevent further development.

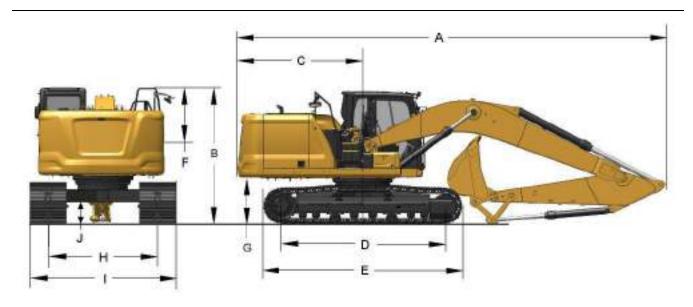
Application/Configuration Restrictions

The maximum travel operating slope for machine lubrication is 35 degrees.

The operator station is ROPS certified up to a mass of 27800 kg (61300 lb) per ISO 12117-2:2008.

Specification Data

Specifications



| Illustration 68 g06181548

Table 4

Model				320 ⁽¹⁾ 323 ⁽²⁾					
_		Reacl	n Boom	Variable Ang	Super Long Reach Boom				
Boom			7 m 8 inch)			3 m ! inch)	8. 8 m (29 ft)		
Stick	2.9 m (9 ft 6 inch)	2.5 m (8 ft 2 inch)	3.9 m (12 ft 10 inch)	3.7 m (12 ft 1 inch)	2.9 m (9 ft 6 inch)	2.5 m (8 ft 2 inch)	6.3 m (20 ft 7 inch)		
320 Approxi- mate Weight ⁽³⁾	18008 kg (39700 lb)	17962 kg (39600 lb)	18688 kg (41200 lb)	18688 kg (41200 lb)	18461 kg (40700 lb)	18416 kg (40600 lb)	19278 kg (42500 lb)		
323 Approximate Weight	19550 kg (43100 lb)	19731 kg (43500 lb)	1973 1kg (43500 lb)	1973 1kg (43500 lb)	20185 kg (44500 lb)	20003 kg (44100 lb)	21092 kg (46500 lb)		
Overall Length (A)		2 mm 4 inch)	3467 mm (11 ft 4 inch)	3467 mm (11 ft 4 inch)	3002 mm (9 ft 8 inch)	2907 mm (9 ft 5 inch)	3185 mm (10 ft 4 inch)		
Overall Height (B)			29	960 mm (9 ft 7 inc	h)				
Swing Radius (C)			28	333 mm (9 ft 3 inc	h)				
Length to Center of Rollers (D)		3650 mm (12 ft)							
Length of Track (E)	4450 mm (14 ft 6 inch)								
Handrail Height (F)			29	954 mm (9 ft 7 inc	h)				

(Table 4, contd)

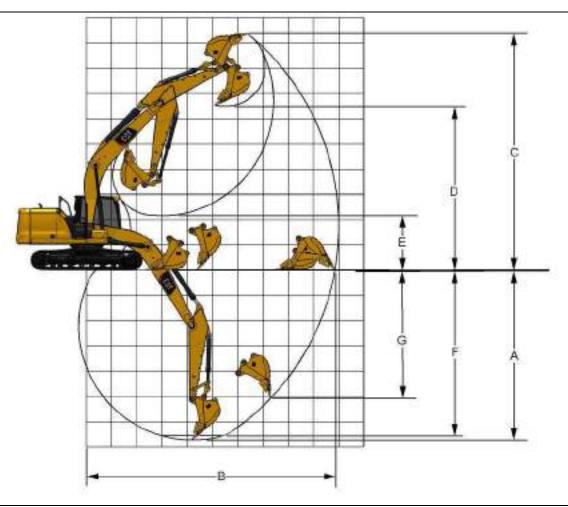
(Table 1, centa)	
Counterweight Clearance (G)	1048 mm (3 ft 4 inch)
Track Gauge (H)	2380 mm (7 ft 8 inch)
Overall Width (I) with 600 mm (24 inch) Shoe	2980 mm (9 ft 9 inch)
Overall Width (I) with 700 mm (28 inch) Shoe	3080 mm (10 ft 1 inch)
Overall Width (I) with 790 mm (31 inch) Shoe	3170 mm (10 ft 5 inch)
Overall Width (I) with 900 mm (36 inch) Shoe	3280 mm (10 ft 10 inch)
Ground Clear- ance (J)	450 mm (1 ft 6 inch)

 ⁽¹⁾ Approximate weight for machines equipped with 790 mm (31 inch) triple grouser track shoes, a 4700 kg (10400 lb) counterweight, and without a quick coupler.
 (2) Approximate weight for machines equipped with 790 mm (31 inch) triple grouser track shoes, a 5400 kg (11900 lb) counterweight, and without the provided respectively.

out a quick coupler.

(3) 10 percent full fuel tank.

Working Ranges and Forces



| Illustration 69 g06258435

Reach Boom

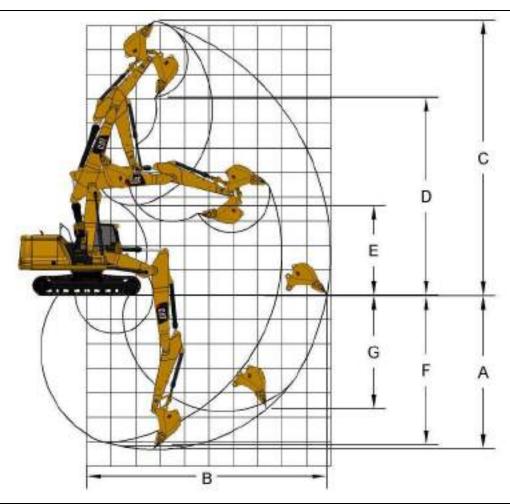


Illustration 70 g06257081

VA Boom

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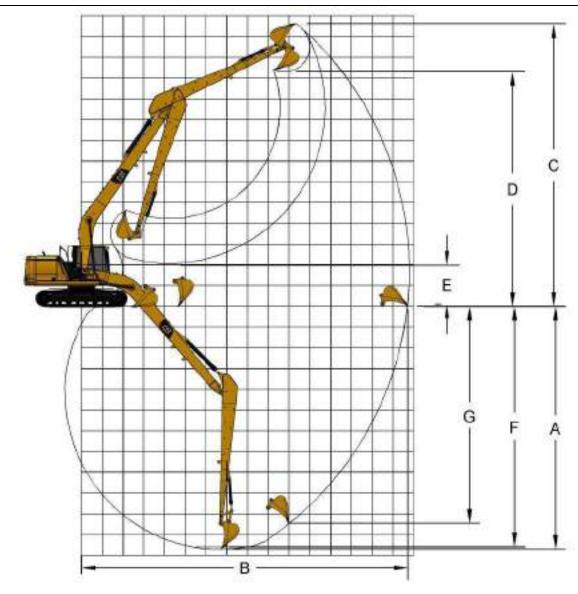


Illustration 71 g06256858

Super Long Reach (SLR)

320

Note: All dimensions are approximate and may vary depending on bucket selection.

Table 5

			32	20				
Boom Options		Reach Boom			VA B	Boom	Super Long Reach (SLR) Boom	
Boom Options		5.7m (19 ft)			ft) Stub 0 ft) Fore	8.85 m (29 ft)		
			Reach Stick		Reach	Stick	SLR	Stick
Stick Options		R2.9B1 (9 ft 6 in)	R2.9B1 (9 ft 6 in)	R2.5B1 (8 ft 2 in)	R2.9B1 (9 ft 6 in)	R2.5B1 (8 ft 2 in)	6.28A (20 ft 7 in)	6.28A (20 ft 7 in)
Maximum digging depth (A)	mm	6720	6620	6300	6700	6280	11540	11690
Maximum digging depth (A)	ft	22.0	21.7	20.7	22.0	20.6	37.9	38.4
Maximum Reach at Ground Line (B)	mm	9860	9760	9470	10210	9810	15570	15730
Maximum Reach at Ground Line (B)	ft	32.3	32.0	31.1	33.5	32.2	51.1	51.6
Maximum cutting height (C)	mm	9370	9430	9170	11520	11180	13540	13610
Maximum cutting height (C)	ft	30.7	30.9	30.1	37.8	36.7	44.4	44.7
Maximum Loading Height (D)	mm	6490	6590	6290	8410	8070	11440	11290
Maximum Loading Height (D)	ft	21.3	21.6	20.6	27.6	26.5	37.5	37.0
Minimum Loading height (E)	mm	2170	2270	2590	3260	3660	2240	2080
Minimum Loading height (E)	ft	7.1	7.4	8.5	10.7	12.0	7.3	6.8
Maximum Depth Cut for 2440 mm (8ft) Level Bottom (F)	mm	6550	6450	6110	6600	6180	11440	11590
Maximum Depth Cut for 2440 mm (8ft) Level Bottom (F)	ft	21.5	21.2	20.0	21.7	20.3	37.5	38.0
Maximum Vertical Wall Digging Depth (G)	mm	5190	5960	4800	5060	4680	11020	10560
Maximum Vertical Wall Digging Depth (G)	ft	17.0	19.6	15.7	16.6	15.4	36.2	34.6
Bucket Digging Force (SAE)	kN	134	133	134	134	134	62	54
Bucket Digging Force (SAE)	lbf	295	294	295	295	295	136	119
Bucket Digging Force (ISO)	kN	150	148	150	150	150	62	60
Bucket Digging Force (ISO)	lbf	332	326	332	332	332	136	133
Stick Digging Force (SAE)	kN	103	105	114	103	114	49	48
Stick Digging Force (SAE)	lbf	228	232	251	228	251	108	106
Stick Digging Force (ISO)	kN	106	108	118	106	118	49	49
Stick Digging Force (ISO)	lbf	235	238	260	235	260	108	107
			Bucke	t type				
Bucket Capacity	m³	1.19	0.80	1.19	1.19	1.19	0.57	0.53
Bucket Capacity	yd³	1.56	1.05	1.56	1.56	1.56	0.75	0.69
Bucket Tip Radius	mm	1570	1470	1570	1570	1570	1070	1230
Bucket Tip Radius	ft	5.2	4.8	5.2	5.2	5.2	3.5	4.0

323

Note: All dimensions are approximate and may vary depending on bucket selection.

Table 6

				323					
		Reach Boom			VA E	Boom	Super Long Reach (SLR) Boom		
Boom Options			5.7 m (19 ft)			ft) Stub 0 ft) Fore	8.85 m (29 ft)		
			Reach Stick		Reach	n Stick	SLR	Stick	
Maximum digging depth (A)	mm	6730	6310	7670	6700	6290	11540	11690	
Maximum digging depth (A)	ft	22.1	20.7	25.2	22.0	20.6	37.9	38.4	
Maximum Reach at Ground Line (B)	mm	9870	9470	10770	10220	9820	15570	15730	
Maximum Reach at Ground Line (B)	ft	32.4	31.1	35.3	33.5	32.2	51.1	51.6	
Maximum cutting height (C)	mm	9450	9250	9910	11540	11200	13540	13610	
Maximum cutting height (C)	ft	31.0	30.3	32.5	37.9	36.7	44.4	44.7	
Maximum Loading Height (D)	mm	6480	6280	6930	8380	8040	11440	11290	
Maximum Loading Height (D)	ft	21.3	20.6	22.7	27.5	26.4	37.5	37.0	
Minimum Loading height (E)	mm	2160	2580	1220	3250	3650	2240	2080	
Minimum Loading height (E)	ft	7.1	8.5	4.0	10.7	12.0	7.3	6.8	
Maximum Depth Cut for 2440 mm (8ft) Lev- el Bottom (F)	mm	6560	6120	7530	6610	6190	11440	11590	
Maximum Depth Cut for 2440 mm (8ft) Lev- el Bottom (F)	ft	21.5	20.1	24.7	21.7	20.3	37.5	38.0	
Maximum Vertical Wall Digging Depth (G)	mm	5740	5340	6640	5380	4980	11020	10560	
Maximum Vertical Wall Digging Depth (G)	ft	18.8	17.5	21.8	17.7	16.3	36.2	34.6	
Bucket Digging Force (SAE)	kN	124	124	124	124	124	62	54	
Bucket Digging Force (SAE)	lbf	274	274	274	274	274	136	119	
Bucket Digging Force (ISO)	kN	140	140	140	140	140	62	60	

(Table 6, contd)

				323				
			Reach Boom	ı	VA E	Boom	Super Long Reach (SLR) Boom	
Boom Options		5.7 m (19 ft)				ft) Stub 0 ft) Fore	8.85 m (29 ft)	
			Reach Stick		Reach	n Stick	SLR	Stick
Bucket Digging Force (ISO)	lbf	309	309	309	309	309	136	133
Stick Digging Force (SAE)	kN	104	114	85	104	114	49	48
Stick Digging Force (SAE)	lbf	228	252	188	228	252	108	106
Stick Digging Force (ISO)	kN	107	118	87	107	118	49	49
Stick Digging Force (ISO)	lbf	235	260	193	235	260	108	107
	-		Bucket type	•	•	•		
Bucket Capacity	m³	1.30	1.30	1.30	1.30	1.30	0.57	0.53
Bucket Capacity	yd³	1.70	1.70	1.70	1.70	1.70	0.75	0.69
Bucket Tip Radius	mm	1580	1580	1580	1580	1580	1070	1230
Bucket Tip Radius	ft	5.2	5.2	5.2	5.2	5.2	3.5	4.0

i08271900

Specifications

(Shovel Crane Specifications)

SMCS Code: 7000

S/N: HEX1-Up

WARNING

Failure to comply to the rated load can cause possible personal injury or property damage. This includes the risk of unintended boom lowering. Review the rated load of a particular work tool before performing any operation. Make adjustments to the rated load as necessary for non-standard configurations.

Japan regulations require a shovel crane configuration to lift certain objects. A shovel crane configuration uses a rated load capacity. Refer to the Rated Load specifications below.

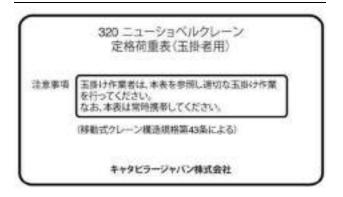
Refer to this Operation and Maintenance Manual, "Shovel Crane Control" for additional information.

Refer to this Operation and Maintenance Manual, "Shovel Crane Operation" for additional information.

Consult your Cat [®] dealer for additional information.

Rated Load Specification

320



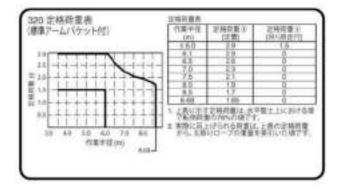


Illustration 72 g06310968

i07174905

Boom/Stick/Bucket Combinations

(323)

SMCS Code: 6000; 6700

S/N: NDL1-Up S/N: LTN1-Up S/N: HDT1-Up S/N: RAZ1-Up

This machine can be equipped with a large variety of boom-stick-bucket combinations to meet the needs of various applications.

Buckets are grouped into different families by capacity. As a rule, use a bucket with a smaller capacity when you are using a longer stick and/or a longer boom. Conversely, use a bucket with a larger capacity when you are using a shorter stick and/or a shorter boom. This rule ensures better machine stability and protection against structural machine damage.

A stick is designed to match only one specific family of buckets.

Note: The selection of a compatible boom-stick-bucket combination is a guide. Work tools, uneven ground conditions, soft ground conditions, or poor ground conditions have effects on machine performance. The operator is responsible for being aware of these effects.

Consult your Cat dealer for information on selecting the correct boom-stick-bucket combination.

The following tables show various compatible boomstick-bucket combinations. Select an optimum combination according to the working conditions and according to the type of work that is being done.

Table 7

				Exca	vato	r witho	ut a Qı	iick Co	upler (North A	America	1)				
											323					
		Width of	Capacı-				4200	kg (92	60 lb)			54	00 kg	(11905 lb)		
Buck- et	Link-			Weight of	Fill	Rea	ach Bo	om	HD Reach Boom		Reach Boom			HD Reach Boom		
Type	age	Buck- et	Bucket	Bucket	(%)		2.9 m (9 ft 6 inch) Stick	3.9 m (12 ft 8 inch) Stick	(8 ft 2	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	3.9 m (12 ft 8 inch) Stick	2.9 m (9 ft 6 inch) TRS Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		600 mm (24 inch)	0.55 m³ (0.72 yd³)	619 kg (1365 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		750 mm (30 inch)	0.75 m³ (0.98 yd³)	710 kg (1565 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Gener-		900 mm (36 inch)	0.95 m³ (1.24 yd³)	787 kg (1735 lb)	400	(1)	(1)	(2)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
- Ca- pacity (GDC)		1050 mm (42 inch)	1.16 m³ (1.52 yd³)	848 kg (1870 lb)	100	(1)	(1)	(3)	(1)	(2)	(1)	(1)	(1)	(1)	(1)	(1)
		1200 mm (48 inch)	1.38 m³ (1.80 yd³)	926 kg (2041 lb)		(2)	(3)	(4)	(3)	(3)	(1)	(1)	(3)	(2)	(1)	(2)
		1350 mm (54 inch)	1.59 m³ (2.08 yd³)	1004 kg (2213 lb)		(3)	(5)	(5)	(4)	(4)	(2)	(5)	(5)	(3)	(2)	(3)
		600 mm (24 inch)	0.55 m³ (0.72 yd³)	633 kg (1395 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Gener- al Duty - Ca-		750 mm (30 inch)	0.75 m³ (0.98 yd³)	731 kg (1612 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
pacity (GDC) - Wide Tip	В	900 mm (36 inch)	0.95 m³ (1.24 yd³)	813 kg (1793 lb)	100	(1)	(1)	(2)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		1050 mm (42 inch)	1.16 m³ (1.52 yd³)	895 kg (1973 lb)		(1)	(2)	(4)	(1)	(2)	(1)	(1)	(2)	(1)	(1)	(1)

(Table 7, contd)

				Exca	vato	r witho	ut a Qu	iick Co	upler (North A	America	1)				
											323					
							4200	kg (92	60 lb)			54	00 kg ((11905 lb)		
Buck- et	Link-	Width of	Capaci- ty of	Weight of	Fill	Rea	ach Bo	om	HD Reach Boom		Reach Boom			HD Reach Boom		
Type	age	Buck- et	Bucket	Bucket	(%)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	3.9 m (12 ft 8 inch) Stick	(8 ft 2	inch)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	3.9 m (12 ft 8 inch) Stick	2.9 m (9 ft 6 inch) TRS Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		1200 mm (48 inch)	1.38 m³ (1.80 yd³)	979 kg (2158 lb)		(2)	(3)	(6)	(3)	(3)	(1)	(1)	(3)	(2)	(1)	(2)
		1350 mm (54 inch)	1.59 m³ (2.08 yd³)	1063 kg (2343 lb)		(3)	(5)	(5)	(4)	(4)	(2)	(5)	(5)	(3)	(2)	(3)
	В	600 mm (24 inch)	0.46 m³ (0.61 yd³)	649 kg (1431 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		750 mm (30 inch)	0.64 m³ (0.84 yd³)	748 kg (1649 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Heavy		900 mm (36 inch)	0.81 m³ (1.06 yd³)	826 kg (1821 lb)	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Duty (HD)		1050 mm (42 inch)	1.00 m³ (1.31 yd³)	880 kg (1940 lb)	100	(1)	(1)	(3)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	972 kg (2143 lb)		(1)	(2)	(5)	(2)	(2)	(1)	(1)	(5)	(1)	(1)	(1)
		1350 mm (53 inch)	1.38 m³ (1.81 yd³)	1054 kg (2324 lb)		(5)	(5)	(5)	(3)	(5)	(5)	(5)	(5)	(5)	(1)	(5)
Heavy Duty -		900 mm (36 inch)	0.79 m³ (1.03 yd³)	842 kg (1856 lb)	400	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Power (HDP)	В	1050 mm (41 inch)	0.96 m³ (1.26 yd³)	907 kg (2000 lb)	100	(1)	(1)	(3)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)

(Table 7, contd)

(Table 7,	conta)			Exca	vato	r witho	ut a Qı	ıick Co	upler (North A	America	a)				
											323	,				
		Width of					4200	kg (92	60 lb)		5400 kg (11905 lb)					
Buck- et	Link-		Capaci- ty of	Weight of	Fill	Rea	ach Bo	om	HD Reach Boom		Reach Boom			HD Reach Boom		
Type	age	Buck- et	Bucket		(%)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	3.9 m (12 ft 8 inch) Stick			2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	3.9 m (12 ft 8 inch) Stick	2.9 m (9 ft 6 inch) TRS Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		1200 mm (48 inch)	1.14 m³ (1.49 yd³)	993 kg (2189 lb)		(5)	(5)	(5)	(1)	(5)	(5)	(5)	(5)	(5)	(1)	(5)
		600 mm (24 inch)	0.46 m³ (0.61 yd³)	694 kg (1530 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
	В	750 mm (30 inch)	0.64 m³ (0.84 yd³)	802 kg (1768 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Severe Duty (SD)		900 mm (36 inch)	0.81 m³ (1.06 yd³)	889 kg (1960 lb)	90	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		1050 mm (42 inch)	1.00 m³ (1.31 yd³)	964 kg (2125 lb)		(1)	(1)	(2)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	1053 kg (2321 lb)		(1)	(1)	(5)	(1)	(2)	(1)	(1)	(5)	(1)	(1)	(1)
Severe Duty - Power (SDP)	В	900 mm (36 inch)	0.79 m³ (1.03 yd³)	908 kg (2002 lb)	90	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Mud / Clean- up (M/ CU)	В	1700 mm (67 inch)	1.60 m³ (2.09 yd³)	979 kg (2158 lb)	100	(3)	(4)	(1)	(3)	(4)	(2)	(2)	(1)	(3)	(2)	(3)
Ditch Clean-	_	1500 mm (59 inch)	1.01 m³ (1.32 yd³)	652 kg (1437 lb)	100	(1)	(1)	(2)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
	В	1800 mm (71 inch)	1.24 m³ (1.62 yd³)	740 kg (1631 lb)	100	(1)	(2)	(3)	(1)	(2)	(1)	(1)	(2)	(1)	(1)	(1)

(Table 7, contd)

				Exca	vato	r witho	ut a Qu	ick Co	upler (North A	America	a)				
											323					
	Link-	Width of	Capaci- ty of Bucket				4200	kg (92	60 lb)			54	00 kg	(11905 I	lb)	
Buck- et				of	(%)	Reach Boom		om	HD Reach Boom		Re	ach Bo	om	HD Reach B		oom
Type	age	Buck- et				2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	3.9 m (12 ft 8 inch) Stick	2.5 m (8 ft 2 inch) Stick	(9 ft 6 inch)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	3.9 m (12 ft 8 inch) Stick	2.9 m (9 ft 6 inch) TRS Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		1500 mm (59 inch)	0.90 m³ (1.18 yd³)	948 kg (2090 lb)		(1)	(1)	(2)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Ditch Clean-		1800 mm (71 inch) 1800 mm (71 inch)	1.11 m³ (1.45 yd³)	1063 kg (2343 lb)	400	(1)	(2)	(4)	(2)	(2)	(1)	(1)	(2)	(1)	(1)	(1)
ing - Tilt (DCT)	В		1.40 m³ (1.83 yd³)	1148 kg (2531 lb)	100	(3)	(3)	(1)	(3)	(4)	(1)	(2)	(4)	(2)	(2)	(2)
		2000 mm (79 inch)	1.23 m³ (1.61 yd³)	1132 kg (2496 lb)	,	(2)	(3)	(1)	(2)	(3)	(1)	(1)	(3)	(2)	(1)	(1)
Gener- al Duty (GD)	312	900 mm (35 inch)	0.53 m³ (0.69 yd³)	403 kg (888 lb)	100	-	-	-	-	-	-	-	-	-	-	-
Ditch Clean- ing (DC) Long Reach	312	1200 mm (48 inch)	0.57 m³ (0.74 yd³)	386 kg (851 lb)	100	-	-	-	-	-	-	-	-	-	-	-
ı	Maximu	m load p	in-on (pay	cket)	3330 kg (7341 lb)	3100 kg (6834 lb)	2445 kg (5390 lb)	3165 kg (6978 lb)	2935 kg (6471 lb)	3980 kg (8774 lb)	3710 kg (8179 lb)	2985 kg (6581 lb)	2840 kg (6261 lb)	3810 kg (8400 lb)	3545 kg (7815 lb)	

^{(1) 2100} kg/m³ (3500 lb/yd³) is the maximum density of material.
(2) 1800 kg/m³ (3000 lb/yd³) is the maximum density of material.
(3) 1500 kg/m³ (2500 lb/yd³) is the maximum density of material.
(4) 1200 kg/m³ (2000 lb/yd³) is the maximum density of material.
(5) Not Recommended
(6) 900 kg/m³ (1500 lb/yd³) is the maximum density of material.

Table 8

				Exca	vato	with P	in Gra	bber C	oupler	(North	Americ	a)					
											323						
		Width	Capaci- ty of				4200	kg (92	60 lb)		5400 kg (11905 lb)						
Buck- et	Link-			Weight of	Fill	Rea	ach Bo	om	HD Reach Boom		Reach Boom			HD Reach Boom			
Type	age	Buck- et	Bucket	-	(%)	(8 ft 2	2.9 m (9 ft 6 inch) Stick	3.9 m (12 ft 8 inch) Stick	2.5 m (8 ft 2 inch) Stick		2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	3.9 m (12 ft 8 inch) Stick	2.9 m (9 ft 6 inch) TRS Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	
		600 mm (24 inch)	0.55 m³ (0.72 yd³)	619 kg (1365 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
		750 mm (30 inch)	0.75 m ³ (0.98 yd ³)	710 kg (1565 lb)		(1)	(1)	(2)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
Gener-		900 mm (36 inch)	0.95 m³ (1.24 yd³)	787 kg (1735 lb)	100	(1)	(1)	(3)	(1)	(2)	(1)	(1)	(2)	(1)	(1)	(1)	
- Ca- pacity (GDC)		1050 mm (41 inch)	1.16 m³ (1.52 yd³)	848 kg (1869 lb)		(2)	(4)	(5)	(2)	(4)	(1)	(1)	(4)	(2)	(1)	(1)	
		1200 mm (48 inch)	1.38 m³ (1.80 yd³)	926 kg (2041 lb)		(4)	(3)	(5)	(3)	(3)	(1)	(2)	(3)	(4)	(2)	(4)	
		1350 mm (53 inch)	1.59 m³ (2.08 yd³)	1004 kg (2213 lb)		(3)	(5)	(6)	(3)	(5)	(4)	(4)	(5)	(3)	(4)	(3)	
		600 mm (24 inch)	0.55 m³ (0.72 yd³)	633 kg (1395 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
Gener- al Duty - Ca- pacity (GDC) - Wide Tip		750 mm (30 inch)	0.75 m³ (0.98 yd³)	731 kg (1611 lb)		(1)	(1)	(2)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
	В	900 mm (36 inch)	0.95 m³ (1.24 yd³)	813 kg (1792 lb)	100	(1)	(1)	(3)	(1)	(2)	(1)	(1)	(2)	(1)	(1)	(1)	
		1050 mm (41 inch)	1.16 m³ (1.52 yd³)	895 kg (1973 lb)		(2)	(4)	(5)	(4)	(4)	(1)	(1)	(4)	(2)	(1)	(1)	

(Table 8, contd)

				Exca	vatoı	with P	in Gra	bber C	oupler	(North	Americ	a)				
											323					
							4200	kg (92	60 lb)			lb)				
Buck- et	Link-	Width of	Capaci- ty of	Weight of	Fill	Rea	ach Bo	om	HD Reach Boom		Reach Boom			HD Reach Boom		
Type	age	Buck- et	Bucket		(%)		2.9 m (9 ft 6 inch) Stick	3.9 m (12 ft 8 inch) Stick	2.5 m (8 ft 2 inch) Stick			2.9 m (9 ft 6 inch) Stick	3.9 m (12 ft 8 inch) Stick		2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		1200 mm (48 inch)	1.38 m³ (1.80 yd³)	979 kg (2158 lb)		(4)	(3)	(6)	(3)	(3)	(2)	(2)	(3)	(4)	(2)	(4)
		1350 mm (53 inch)	1.59 m³ (2.08 yd³)	1063 kg (2343 lb)		(3)	(5)	(6)	(5)	(5)	(4)	(4)	(5)	(3)	(4)	(3)
		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	649 kg (1431 lb)	g lb)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		750 mm (30 inch)	0.64 m³ (0.84 yd³)	748 kg (1649 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Heavy		900 mm (36 inch)	0.81 m³ (1.06 yd³)	826 kg (1821 lb)		(1)	(1)	(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Duty (HD)	В	1050 mm (41 inch)	1.00 m³ (1.31 yd³)	880 kg (1940 lb)	100	(1)	(2)	(3)	(2)	(2)	(1)	(1)	(2)	(1)	(1)	(1)
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	972 kg (2143 lb)		(2)	(4)	(5)	(4)	(3)	(1)	(1)	(3)	(2)	(1)	(2)
		1350 mm (53 inch)	1.38 m³ (1.81 yd³)	1054 kg (2324 lb)		(3)	(3)	(6)	(3)	(5)	(2)	(4)	(3)	(4)	(2)	(4)
Heavy Duty -	1	900 mm (36 inch)	0.79 m³ (1.03 yd³)	842 kg (1856 lb)	400	(1)	(1)	(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
	В		0.96 m ³ (1.26 yd ³)	907 kg (2000 lb)	100	(1)	(2)	(3)	(1)	(2)	(1)	(1)	(2)	(1)	(1)	(1)

(Table 8, contd)

				Exca	vato	r with P	in Gra	bber C	oupler	(North	Americ	:a)					
											323						
		Width of					4200	kg (92	60 lb)		5400 kg (11905 lb)						
Buck- et	Link-		Capaci- ty of	Weight of	Fill (%)	Re	ach Bo	om	HD Reach Boom		Reach Boom			HD Reach Boom			
Туре	age	Buck- et	Bucket		(/-,	2.5 m (8 ft 2 inch) Stick	(9 ft 6 inch)	3.9 m (12 ft 8 inch) Stick	2.5 m (8 ft 2 inch) Stick		2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	3.9 m (12 ft 8 inch) Stick	2.9 m (9 ft 6 inch) TRS Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	
		1200 mm (48 inch)	1.14 m³ (1.49 yd³)	993 kg (2189 lb)		(2)	(4)	(5)	(4)	(4)	(1)	(1)	(4)	(2)	(1)	(2)	
	В	600 mm (24 inch)	0.44 m³ (0.57 yd³)	676 kg (1490 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
		750 mm (30 inch)	0.60 m ³ (0.79 yd ³)	778 kg (1715 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
Heavy Duty - Pin Grab- ber		900 mm (36 inch)	0.76 m³ (1.00 yd³)	864 kg (1905 lb)	90	(1)	(1)	(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
Per- for- mance (HD - PGP)		1050 mm (42 inch)	0.93 m³ (1.22 yd³)	928 kg (2046 lb)		(1)	(2)	(3)	(1)	(2)	(1)	(1)	(2)	(1)	(1)	(1)	
1017		1200 mm (48 inch)	1.11 m³ (1.45 yd³)	1016 kg (2234 lb)		(2)	(4)	(5)	(4)	(4)	(1)	(1)	(4)	(2)	(1)	(1)	
		1350 mm (53 inch)	1.28 m³ (1.67 yd³)	1104 kg (2434 lb)		(4)	(3)	(6)	(3)	(3)	(1)	(2)	(3)	(4)	(2)	(4)	
Severe Duty (SD)		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	694 kg (1530 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
	В	750 mm (30 inch)	0.64 m³ (0.84 yd³)	802 kg (1768 lb)	90	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
		900 mm (36 inch)	0.81 m³ (1.06 yd³)	889 kg (1960 lb)		(1)	(1)	(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	

(Table 8, contd)

(Table 6,	,			Exca	vatoı	with P	in Gra	bber C	oupler	(North	Americ	a)				
											323					
							4200	kg (92	60 lb)			54	100 kg	(11905	lb)	
Buck- et	Link-	Width of	Capaci- ty of	Weight of		Re	ach Bo	om		leach om	Re	ach Bo	om	HD F	Reach B	oom
Туре	age	Buck- et	Bucket	Bucket	(%)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	3.9 m (12 ft 8 inch) Stick	2.5 m (8 ft 2 inch) Stick		2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	3.9 m (12 ft 8 inch) Stick	2.9 m (9 ft 6 inch) TRS Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		1050 mm (42 inch)	1.00 m³ (1.31 yd³)	964 kg (2125 lb)		(1)	(1)	(3)	(1)	(2)	(1)	(1)	(2)	(1)	(1)	(1)
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	1053 kg (2321 lb)		(2)	(4)	(5)	(4)	(4)	(1)	(1)	(4)	(2)	(1)	(1)
Severe Duty - Power (SDP)	В	900 mm (36 inch)	0.79 m³ (1.03 yd³)	908 kg (2002 lb)	90	(1)	(1)	(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Mud / Clean- up (M/ CU)	В	1700 mm (67 inch)	1.60 m³ (2.09 yd³)	979 kg (2158 lb)	100	(3)	(5)	(6)	(3)	(5)	(4)	(4)	(5)	(3)	(4)	(3)
Ditch Clean-	В	1500 mm (59 inch)	1.01 m³ (1.32 yd³)	652 kg (1437 lb)	100	(1)	(1)	(4)	(1)	(2)	(1)	(1)	(2)	(1)	(1)	(1)
ing (DC)	В	1800 mm (71 inch)	1.24 m³ (1.62 yd³)	740 kg (1631 lb)	100	(2)	(4)	(5)	(4)	(4)	(1)	(1)	(4)	(2)	(1)	(1)

(continued)

(Table 8, contd)

				Exca	vatoı	r with P	in Gra	bber C	oupler	(North	Americ	a)				
											323					
							4200	kg (92	60 lb)			54	100 kg	(11905	lb)	
Buck- et	Link-	Width of	Capaci- ty of	Weight of	Fill	Re	ach Bo	om		leach om	Re	ach Bo	om	HD F	Reach B	oom
Туре	age	Buck- et	Bucket		(%)		(9 ft 6 inch)	3.9 m (12 ft 8 inch) Stick		2.9 m (9 ft 6 inch) Stick		2.9 m (9 ft 6 inch) Stick	3.9 m (12 ft 8 inch) Stick	2.9 m (9 ft 6 inch) TRS Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		1500 mm (59 inch)	0.90 m³ (1.18 yd³)	948 kg (2090 lb)		(1)	(1)	(3)	(1)	(2)	(1)	(1)	(2)	(1)	(1)	(1)
Ditch Clean-		1800 mm (71 inch)	1.11 m³ (1.45 yd³)	1063 kg (2343 lb)	400	(2)	(4)	(5)	(4)	(3)	(1)	(1)	(4)	(2)	(1)	(2)
ing - Tilt (DCT)	В	1800 mm (71 inch)	1.40 m³ (1.83 yd³)	1148 kg (2531 lb)	100	(3)	(3)	(6)	(3)	(5)	(2)	(4)	(5)	(3)	(4)	(4)
		2000 mm (79 inch)	1.23 m³ (1.61 yd³)	1132 kg (2496 lb)		(4)	(3)	(6)	(3)	(3)	(1)	(2)	(3)	(4)	(2)	(4)
ı	Maximur	n load p	in-on (pay	icket)	6920 kg (1525- 5 lb)	6413 kg (1413- 8 lb)	4969 kg (1095- 4 lb)	6556 kg (1445- 3 lb)	6049 kg (1333- 6 lb)	8353 kg (18415 lb)	7758 kg (17102 lb)	6159 kg (13579 lb)	5839 kg (12874 lb)	7978 kg (17588 lb)	7394 kg (16300 lb)	

^{(1) 2100} kg/m³ (3500 lb/yd³) is the maximum density of material.
(2) 1800 kg/m³ (3000 lb/yd³) is the maximum density of material.
(3) 1200 kg/m³ (2000 lb/yd³) is the maximum density of material.
(4) 1500 kg/m³ (2500 lb/yd³) is the maximum density of material.
(5) 900 kg/m³ (1500 lb/yd³) is the maximum density of material.
(6) Not Recommended

Table 9

Table 9															
				Exc	cavate	or witho	ut a Qu	ick Cou	ıpler (Eı	urope)					
										32	:3				
							42	200 kg	(9260 lb)		54	100 kg (11905 I	b)
Buck- et	Link- age	Width of Buck-	Capaci- ty of	Weight	Fill (%)	Reach	Boom		leach om	VA B	oom	Reach	Boom	HD R Bo	
Type		et	Bucket	Bucket	,	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
Gener- al Duty (GD)	В	600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	551 kg (1215 lb)	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)

(Table 9, contd)

				Exc	cavat	or witho	ut a Qu	ick Cou	ıpler (Eı	urope)					
										32	23				
							42	200 kg	(9260 lb)		54	400 kg	(11905	lb)
Buck- et	Link- age	Width of Buck-	Capaci- ty of	Weight of	Fill (%)	Reach	Boom	HD R Bo	Reach om	VA E	Soom	Reach	Boom		Reach om
Type	· ·	et	Bucket	Bucket	, ,	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		750 mm (30 inch)	0.64 m ³ (0.84 yd ³)	622 kg (1371 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		900 mm (36 inch)	0.81 m ³ (1.06 yd ³)	668 kg (1473 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	803 kg (1770 lb)		(1)	(1)	(1)	(2)	(2)	(3)	(1)	(1)	(1)	(1)
		1300 mm (51 inch)	1.30 m³ (1.71 yd³)	835 kg (1841 lb)		(1)	(2)	(2)	(3)	(3)	(3)	(1)	(1)	(1)	(1)
		1400 mm (55 inch)	1.43 m³ (1.87 yd³)	870 kg (1918 lb)		(4)	(4)	(3)	(4)	(4)	(4)	(4)	(4)	(1)	(4)
		1050 mm (42 inch)	1.00 m³ (1.31 yd³)	Yet to Verify		(1)	(1)	(1)	(1)	(1)	(2)	(1)	(1)	(1)	(1)
Heavy		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	907 kg (1999 lb)		(1)	(2)	(2)	(2)	(3)	(3)	(1)	(1)	(1)	(1)
Duty (HD)	В	1200 mm (48 inch)	1.19 m³ (1.56 yd³)	918 kg (2024 lb)	100	(1)	(2)	(2)	(2)	(3)	(3)	(1)	(1)	(1)	(1)
		1300 mm (52 inch)	1.30 m³ (1.71 yd³)	962 kg (2120 lb)		(2)	(2)	(2)	(3)	(3)	(5)	(1)	(1)	(1)	(1)
Severe Duty (SD)	В	600 mm (24 inch)	0.46 m³ (0.61 yd³)	694 kg (1530 lb)	90	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)

(Table 9, contd)

(Table 9,	oonta)			Exc	cavat	or witho	ut a Qu	ick Cou	ıpler (Eı	urope)					
										32	23				
							42	200 kg	(9260 lk)		54	400 kg	(11905 I	b)
Buck- et	Link- age	Width of Buck-	Capaci- ty of	Weight of	Fill (%)	Reach	Boom		leach om	VA E	Soom	Reach	Boom		leach om
Туре	90	et	Bucket	Bucket	(70)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		750 mm (30 inch)	0.64 m ³ (0.84 yd ³)	802 kg (1768 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		900 mm (36 inch)	0.81 m ³ (1.06 yd ³)	889 kg (1960 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		1050 mm (42 inch)	1.00 m ³ (1.31 yd ³)	964 kg (2125 lb)		(1)	(1)	(1)	(1)	(1)	(2)	(1)	(1)	(1)	(1)
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	1053 kg (2321 lb)		(1)	(1)	(1)	(2)	(2)	(3)	(1)	(1)	(1)	(1)
Severe Duty (SDV)	В	1200 mm (48 inch)	1.20 m³ (1.57 yd³)	1001 kg (2207 lb)	90	(1)	(1)	(1)	(2)	(2)	(3)	(1)	(1)	(1)	(1)
Ditch Clean- ing (DC)	В	2000 mm (78 inch)	1.22 m³ (1.60 yd³)	869 kg (1916 lb)	100	(1)	(2)	(2)	(2)	(3)	(3)	(1)	(1)	(1)	(1)
Ditch Clean- ing - Tilt (DCT)	В	2000 mm (78 inch)	1.23 m ³ (1.61 yd ³)	1096 kg (2416 lb)	100	(2)	(2)	(2)	(3)	(3)	(5)	(1)	(1)	(1)	(1)
Gener- al Duty (GD)	312	900 mm (35 inch)	0.53 m ³ (0.69 yd ³)	403 kg (888 lb)	100	-	-	-	-	-	-	-	-	-	-
Ditch Clean- ing (DC) Long Reach	312	1200 mm (48 inch)	0.57 m³ (0.74 yd³)	386 kg (851 lb)	100	-	-	-	-	-	-	-	-	-	-
	Maxim	um load	pin-on (pa	yload + bı	ıcket)	3330 kg (7341 lb)	3100 kg (6834 lb)	3165 kg (6978 lb)	2935 kg (6471 lb)	2790 kg (6151 lb)	2600 kg (5732 lb)	3980 kg (8774 lb)	3710 kg (8179 lb)	3810 kg (8400 lb)	3545 kg (7815 lb)

(Table 9, contd)

- 2100 kg/m³ (3500 lb/yd³) is the maximum density of material.
 1800 kg/m³ (3000 lb/yd³) is the maximum density of material.
 1500 kg/m³ (2500 lb/yd³) is the maximum density of material.
 Not Recommended
 1200 kg/m³ (2000 lb/yd³) is the maximum density of material.

Table 10

				Exc	avat	or with I	Pin Gral	ber Co	upler (E	urope)					
										32	3				
							4:	200 kg ((9260 lb)		54	400 kg (11905 I	b)
Buck- et	Link- age	Width of Buck-	Capaci- ty of	Weight	Fill (%)	Reach	Boom	HD R Bo		VA B	oom	Reach	Boom		leach om
Type	J	et	Bucket	Bucket	, ,	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		600 mm (24 inch)	0.46 m³ (0.61 yd³)	564 kg (1243 lb)	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Utility Duty (UD) (No Adjust- er)	В	1000 mm (39 inch)	0.93 m³ (1.22 yd³)	735 kg (1620 lb)	100	(1)	(1)	(1)	(1)	(2)	(3)	(1)	(1)	(1)	(1)
Adjust-		1400 mm (55 inch)	1.43 m³ (1.87 yd³)	914 kg (2015 lb)	100	(3)	(4)	(4)	(4)	(5)	(5)	(2)	(2)	(2)	(3)
		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	551 kg (1215 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		750 mm (30 inch)	0.64 m ³ (0.84 yd ³)	622 kg (1371 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Gener- al Duty (GD) - EU	В	900 mm (36 inch)	0.81 m ³ (1.06 yd ³)	668 kg (1473 lb)	100	(1)	(1)	(1)	(1)	(1)	(2)	(1)	(1)	(1)	(1)
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	803 kg (1770 lb)		(2)	(3)	(2)	(3)	(4)	(4)	(1)	(1)	(1)	(1)
		1300 mm (51 inch)	1.30 m³ (1.71 yd³)	835 kg (1841 lb)		(3)	(3)	(3)	(4)	(4)	(5)	(1)	(2)	(1)	(2)

(Table 10, contd)

				Exc	cavat	or with I	Pin Gral	bber Co	upler (E	urope)					
										32	:3				
							4:	200 kg ((9260 lb)		54	400 kg ((119 <mark>05 I</mark>	b)
Buck- et	Link- age	Width of Buck-	Capaci- ty of	Weight	Fill (%)	Reach	Boom	HD R Bo		VA E	Boom	Reach	Boom		Reach om
Type		et	Bucket	Bucket	(75)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		1400 mm (55 inch)	1.43 m³ (1.87 yd³)	870 kg (1918 lb)		(3)	(4)	(4)	(4)	(5)	(5)	(2)	(2)	(2)	(3)
		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	546 kg (1204 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		750 mm (30 inch)	0.64 m³ (0.84 yd³)	617 kg (1361 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Gener- al Duty (GD)		1000 mm (39 inch)	0.93 m³ (1.22 yd³)	710 kg (1565 lb)		(1)	(1)	(1)	(1)	(2)	(3)	(1)	(1)	(1)	(1)
(No Adjust- er)	В	1200 mm (48 inch)	1.19 m³ (1.56 yd³)	799 kg (1761 lb)	100	(2)	(3)	(2)	(3)	(4)	(4)	(1)	(1)	(1)	(1)
		1400 mm (55 inch)	1.43 m³ (1.87 yd³)	866 kg (1909 lb)		(3)	(4)	(4)	(4)	(5)	(5)	(2)	(2)	(2)	(3)
		1500 mm (60 inch)	1.58 m³ (2.06 yd³)	906 kg (1997 lb)		(4)	(4)	(4)	(5)	(5)	(5)	(2)	(3)	(3)	(3)
		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	649 kg (1431 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Heavy Duty (HD)	В	750 mm (30 inch)	0.64 m³ (0.84 yd³)	748 kg (1649 lb)	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		900 mm (36 inch)	0.81 m ³ (1.06 yd ³)	826 kg (1821 lb)		(1)	(1)	(1)	(1)	(1)	(2)	(1)	(1)	(1)	(1)

(Table 10, contd)

				Exc	avat	or with I	Pin Gral	bber Co	upler (E	urope)					
										32	:3	1			
							4	200 kg((9260 lb)		54	400 kg ((11905 I	b)
Buck- et	Link- age	Width of Buck-	Capaci- ty of	Weight	Fill (%)	Reach	Boom	HD R Bo		VA E	Boom	Reach	Boom		Reach om
Type		et	Bucket	Bucket	, ,	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		1050 mm (42 inch)	1.00 m ³ (1.31 yd ³)	880 kg (1940 lb)		(1)	(2)	(2)	(2)	(3)	(4)	(1)	(1)	(1)	(1)
		1050 mm (42 inch)	1.00 m ³ (1.31 yd ³)	880 kg (1940 lb)		(1)	(2)	(2)	(2)	(3)	(4)	(1)	(1)	(1)	(1)
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	907 kg (1999 lb)		(2)	(3)	(3)	(3)	(4)	(4)	(1)	(1)	(1)	(2)
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	918 kg (2024 lb)		(2)	(3)	(3)	(4)	(4)	(5)	(1)	(1)	(1)	(2)
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	972 kg (2141 lb)		(2)	(3)	(3)	(4)	(4)	(5)	(1)	(1)	(1)	(2)
		1300 mm (52 inch)	1.30 m ³ (1.71 yd ³)	962 kg (2120 lb)		(3)	(4)	(3)	(4)	(4)	(5)	(1)	(2)	(2)	(2)
		1350 mm (54 inch)	1.38 m³ (1.81 yd³)	1054 kg (2322 lb)		(4)	(4)	(4)	(5)	(5)	(5)	(2)	(3)	(2)	(3)
Severe Duty (SD)	В	1050 mm (42 inch)	1.00 m ³ (1.31 yd ³)	964 kg (2125 lb)	90	(1)	(1)	(1)	(2)	(3)	(3)	(1)	(1)	(1)	(1)
Severe Duty (SDV)	В	1200 mm (48 inch)	1.20 m ³ (1.57 yd ³)	1001 kg (2207 lb)	90	(2)	(3)	(3)	(3)	(4)	(4)	(1)	(1)	(1)	(1)
Ditch Clean- ing (DC)	В	2000 mm (78 inch)	1.22 m³ (1.60 yd³)	869 kg (1916 lb)	100	(2)	(3)	(3)	(3)	(4)	(4)	(1)	(1)	(1)	(2)

(Table 10, contd)

				Exc	avat	or with F	Pin Gra	bber Co	upler (E	urope)					
										32	:3				
							4	200 kg (9260 lb)		54	400 kg (11905 I	b)
Buck- et	Link-	Width of Buck-	Capaci- ty of	of	Fill (%)	Reach	Boom	HD R Bo		VA E	Soom	Reach	Boom		leach om
Type	et Bucke	Bucket	Bucket	(73)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	
Ditch Clean- ing - Tilt (DCT)	В	2000 mm (78 inch)	1.23 m³ (1.61 yd³)	1096 kg (2416 lb)	100	(3)	(4)	(4)	(4)	(5)	(5)	(1)	(2)	(2)	(2)
	Maximu	ım load ı	pin-on (pa	yload + bu	cket)	6920 kg (15255 lb)	6413 kg (14138 lb)	6556 kg (14453 lb)	6049 kg (13336 lb)	5729 kg (12631 lb)	5310 kg (11707 lb)	8353 kg (18415 lb)	7758 kg (17102 lb)	7978 kg (17588 lb)	7394 kg (16300 lb)

Table 11

Table 11				Exc	cavat	or with	CW-40 (Quick Co	oupler (Europe)				
										32	23				
							4	200 kg	(9260 lb)		54	400 kg (11905 I	b)
Buck- et	Link- age	Width of Buck-	Capaci- ty of	of	Fill (%)	Reach	Boom	HD R Bo		VA B	oom	Reach	Boom		Reach om
Type	330	et	Bucket	Bucket	(/)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		900 mm (36 inch)	0.81 m ³ (1.06 yd ³)	658 kg (1450 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Gener- al Duty (GD) - CW40	В	1050 mm (42 inch)	1.00 m³ (1.31 yd³)	704 kg (1551 lb)	100	(1)	(1)	(1)	(1)	(2)	(2)	(1)	(1)	(1)	(1)
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	764 kg (1683 lb)		(1)	(2)	(2)	(3)	(3)	(4)	(1)	(1)	(1)	(1)

^{(1) 2100} kg/m³ (3500 lb/yd³) is the maximum density of material.
(2) 1800 kg/m³ (3000 lb/yd³) is the maximum density of material.
(3) 1500 kg/m³ (2500 lb/yd³) is the maximum density of material.
(4) 1200 kg/m³ (2000 lb/yd³) is the maximum density of material.
(5) 900 kg/m³ (1500 lb/yd³) is the maximum density of material.

(Table 11, contd)

	I	I	T	EXC	cavat	or with	CVV-4U (Quick Co	oupier (-				
										32	23	I			
		1000					4	200 kg	(9260 lb)		54	400 kg((11905 I	b)
Buck- et	Link- age	Width of Buck-	Capaci- ty of	Weight	Fill (%)	Reach	Boom		each om	VA B	oom	Reach	Boom		Reach oom
Type		et	Bucket	Bucket	, ,	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		1300 mm (51 inch)	1.30 m³ (1.71 yd³)	804 kg (1772 lb)		(2)	(3)	(3)	(3)	(4)	(4)	(1)	(1)	(1)	(2)
		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	611 kg (1348 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Heavy Duty (HD) - CW40	В	1200 mm (48 inch)	1.19 m³ (1.56 yd³)	877 kg (1933 lb)	100	(2)	(2)	(2)	(3)	(3)	(4)	(1)	(1)	(1)	(1)
		1300 mm (52 inch)	1.30 m³ (1.71 yd³)	931 kg (2052 lb)		(5)	(5)	(3)	(5)	(5)	(5)	(5)	(5)	(1)	(5)
Sever Duty (SD)- CW40	В	1200 mm (48 inch)	1.20 m³ (1.57 yd³)	985 kg (2171 lb)	90	(1)	(2)	(2)	(3)	(3)	(4)	(1)	(1)	(1)	(1)
		2100 mm (83 inch)	1.29 m³ (1.69 yd³)	793 kg (1748 lb)		(2)	(3)	(2)	(3)	(3)	(4)	(1)	(1)	(1)	(1)
		2100 mm (83 inch)	1.46 m³ (1.91 yd³)	812 kg (1790 lb)		(3)	(3)	(3)	(4)	(4)	(6)	(1)	(2)	(2)	(2)
Ditch Clean- ing (DC) CW40	В	1800 mm (72 inch)	1.50 m ³ (1.96 yd ³)	777 kg (1713 lb)	100	(3)	(3)	(3)	(4)	(4)	(6)	(1)	(2)	(2)	(2)
2.170		1800 mm (72 inch)	1.50 m³ (1.96 yd³)	826 kg (1821 lb)		(3)	(4)	(3)	(4)	(4)	(6)	(1)	(2)	(2)	(2)
		2100 mm (83 inch)	1.76 m³ (2.31 yd³)	867 kg (1911 lb)		(4)	(4)	(4)	(6)	(6)	(6)	(3)	(3)	(3)	(3)

(Table 11, contd)

				Exc	cavat	or with	CW-40 (Quick Co	oupler (Europe)				
										32	23				
							4	200 kg ((9260 lb)		54	400 kg (11905 I	b)
Buck- et	Link-	Width of Buck-	Capaci- ty of	of	Fill (%)	Reach	Boom	HD R Boo		VA B	oom	Reach	Boom		Reach oom
Type	e age Buck- et B	Bucket	Bucket	(70)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	
Ditch Clean- ing-Tilt (DCT)- CW40	В	2000 mm (79 inch)	1.23 m³ (1.61 yd³)	1161 kg (2560 lb)	100	(3)	(3)	(3)	(4)	(4)	(6)	(1)	(2)	(1)	(2)
	Maximu	m load p	oin-on (pay	/load + bu	cket)	3188 kg (7028 lb)	2951 kg (6506 lb)	3019 kg (6656 lb)	2784 kg (6138 lb)	2642 kg (5825 lb)	2445 kg (5390 lb)	3849 kg (8486 lb)	3573 kg (7877 lb)	3680 kg (8113 lb)	3406 kg (7509 lb)

^{(1) 2100} kg/m³ (3500 lb/yd³) is the maximum density of material.
(2) 1800 kg/m³ (3000 lb/yd³) is the maximum density of material.
(3) 1500 kg/m³ (2500 lb/yd³) is the maximum density of material.
(4) 1200 kg/m³ (2000 lb/yd³) is the maximum density of material.
(5) Not Recommended
(6) 900 kg/m³ (1500 lb/yd³) is the maximum density of material.

Table 12

Table 12															
				Exc	avato	or with C	:W-40S	Quick C	oupler	(Europ	e)				
											23	_			
							4:	200 kg((9260 lb)		54	400 kg(11905 I	D)
Buck- et	Link- age	Width of Buck-	Capaci- ty of	of	Fill (%)	Reach	Boom	HD R Bo		VA E	Boom	Reach	Boom		Reach om
Type	330	et	Bucket	Bucket	(1.5)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		600 mm (24 inch)	0.46 m³ (0.61 yd³)	503 kg (1109 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Gener- al Duty (GD) - CW40S	В	750 mm (30 inch)	0.64 m³ (0.84 yd³)	588 kg (1297 lb)	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		900 mm (36 inch)	0.81 m³ (1.06 yd³)	655 kg (1444 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)

(Table 12, contd)

				Exc	avato	or with C	W-40S	Quick C	oupler	(Europ	e)				
										32	23				
							4:	200 kg ((9260 lb)		5-	400 kg(11905 I	b)
Buck- et	Link- age	Width of Buck-	Capaci- ty of	of	Fill (%)	Reach	Boom	HD R Bo		VA E	Boom	Reach	Boom		Reach oom
Type		et	Bucket	Bucket	(**)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	770 kg (1697 lb)		(2)	(2)	(2)	(3)	(3)	(4)	(1)	(1)	(1)	(1)
		1300 mm (51 inch)	1.30 m³ (1.71 yd³)	801 kg (1765 lb)		(2)	(3)	(3)	(3)	(4)	(4)	(1)	(1)	(1)	(2)
		1400 mm (55 inch)	1.43 m³ (1.87 yd³)	837 kg (1845 lb)		(3)	(4)	(3)	(4)	(4)	(5)	(1)	(2)	(2)	(2)
		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	584 kg (1288 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Heavy Duty (HD) - CW40S	В	1200 mm (48 inch)	1.19 m³ (1.56 yd³)	874 kg (1927 lb)	100	(2)	(3)	(2)	(3)	(4)	(4)	(1)	(1)	(1)	(1)
		1300 mm (52 inch)	1.30 m³ (1.71 yd³)	929 kg (2048 lb)		(6)	(6)	(3)	(6)	(6)	(6)	(6)	(6)	(1)	(6)
Ditch Clean-	Б	2000 mm (78 inch)	1.22 m³ (1.60 yd³)	715 kg (1576 lb)	100	(2)	(2)	(2)	(3)	(3)	(4)	(1)	(1)	(1)	(1)
ing (DC) CW40S	В	2200 mm (87 inch)	1.36 m ³ (1.78 yd ³)	769 kg (1695 lb)	100	(2)	(3)	(3)	(4)	(4)	(4)	(1)	(2)	(1)	(2)

(continued)

(Table 12, contd)

				Exc	avato	or with C	W-40S	Quick C	oupler	(Europ	e)				
										32	23				
							4	200 kg (9260 lb)		54	400 kg(11905 I	b)
Buck- et	Link-	Width of Buck-	Capaci- ty of	of	Fill (%)	Reach	Boom	HD R Boo		VA E	Boom	Reach	Boom		Reach om
Type	pe age Bucke et Bucke	Bucket	Bucket	(70)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	
Ditch Clean- ing-Tilt (DCT)- CW40S	В	2000 mm (79 inch)	1.23 m³ (1.61 yd³)	1142 kg (2518 lb)	100	(3)	(4)	(3)	(4)	(4)	(5)	(1)	(2)	(2)	(2)
	(79 (1.61 yd²) (2518 lb) inch)					3099 kg (6832 lb)	2869 kg (6325 lb)	2934 kg (6468 lb)	2704 kg (5961 lb)	2559 kg (5642 lb)	2369 kg (5223 lb)	3749 kg (8265 lb)	3749 kg (7670 lb)	3579 kg (7890 lb)	3314 kg (7306 lb)

^{(1) 2100} kg/m³ (3500 lb/yd³) is the maximum density of material.
(2) 1800 kg/m³ (3000 lb/yd³) is the maximum density of material.
(3) 1500 kg/m³ (2500 lb/yd³) is the maximum density of material.
(4) 1200 kg/m³ (2000 lb/yd³) is the maximum density of material.
(5) 900 kg/m³ (1500 lb/yd³) is the maximum density of material.
(6) Net Recommended.

Table 13

			E	xcavator	with F	Pin-ON (N	lo Quick	Coupler	(Japan)				
									32	23			
							4200 kg	(9260 lb)			5400 kg(11905 lb)
Bucket Type	Link- age	Width of	Capacity of	Weight of	Fill (%)	Reach	Boom	HD R Boo		Reach	Boom		Reach om
Typo	ugo	Bucket	Bucket	Bucket	(70)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		950 mm (37 inch)	0.80 m ³ (1.04 yd ³)	688 kg (1517 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
General Duty-Ex- cavation (GDX)	В	1050 mm (41 inch)	0.90 m³ (1.17 yd³)	721 kg (1590 lb)	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		1150 mm (45 inch)	1.00 m³ (1.31 yd³)	753 kg (1660 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)

⁽⁶⁾ Not Recommended

(Table 13, contd)

			E	Excavator	with I	Pin-ON (N	lo Quick	Coupler	(Japan)	1			
									32	23			
							4200 kg	(9260 lb)		ŧ	5400 kg(11905 lb)
Bucket Type	Link- age	Width of	Capacity of	Weight of	Fill (%)	Reach	Boom	HD R Boo		Reach	Boom		Reach om
3,60	90	Bucket	Bucket	Bucket	(70)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
General Duty-Ex-	В	1000 mm (40 inch)	0.80 m ³ (1.04 yd ³)	715 kg (1575 lb)	400	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
cavation (GDX)- ESCO	В	1100 mm (44 inch)	0.90 m ³ (1.17 yd ³)	749 kg (1650 lb)	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Heavy Duty-Ex-		950 mm (37 inch)	0.80 m ³ (1.04 yd ³)	798 kg (1760 lb)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
cavation (HDX)	В	1050 mm (41 inch)	0.90 m ³ (1.17 yd ³)	837 kg (1846 lb)	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
	Мах	ximum loa	nd pin-on (p	ayload + bı	ucket)	3330 kg (7341 lb)	3100 kg (6834 lb)	3165 kg (6978 lb)	2935 kg (6471 lb)	3980 kg (8774 lb)	3710 kg (8179 lb)	3810 kg (8400 lb)	3545 kg (7815 lb)

^{(1) 2100} kg/m³ (3500 lb/yd³) is the maximum density of material.

Table 14

Table 14													
				Excava	tor wi	th Pin Gr	abber C	oupler (Ja	apan)				
									32	23			
							4200 kg	(9260 lb)		ţ	5400 kg(11905 lb)
Bucket Type	Link- age	Width of	Capacity of	Weight of	Fill (%)	Reach	Boom	HD R Boo		Reach	Boom		leach om
Туре		Bucket	Bucket	Bucket	(75)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
General Duty-Ex-	x- R	950 mm (37 inch)	0.80 m ³ (1.04 yd ³)	688 kg (1517 lb)	100	(1)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
	R	1050 mm (41 inch)	0.90 m³ (1.17 yd³)	721 kg (1590 lb)	100	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)

(Table 14, contd)

				Excava	tor wi	th Pin Gr	abber Co	oupler (Ja	apan)				
									32				
						•	4200 kg	(9260 lb)			5400 kg(11905 lb)
Bucket Type	Link- age	Width of	Capacity of	Weight of	Fill (%)	Reach	Boom	HD R Boo		Reach	Boom		Reach om
.,,,,	u go	Bucket	Bucket	Bucket	(70)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick
		1150 mm (45 inch)	1.00 m³ (1.31 yd³)	753 kg (1660 lb)		(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
General Duty-Ex-		1000 mm (40 inch)	0.80 m ³ (1.04 yd ³)	715 kg (1575 lb)	400	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
cavation (GDX)- ESCO	tion B	1100 mm (44 inch)	0.90 m ³ (1.17 yd ³)	749 kg (1650 lb)	100	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Heavy Duty-Ex-		950 mm (37 inch)	0.80 m ³ (1.04 yd ³)	798 kg (1760 lb)		(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
cavation (HDX)	В	1050 mm (41 inch)	0.90 m³ (1.17 yd³)	837 kg (1846 lb)	100	(2)	(2)	(2)	(3)	(2)	(2)	(2)	(2)
'	Ma	ximum loa	ad pin-on (p	ayload + bı	ucket)	6920 kg (15255 lb)	6413 kg (14138 lb)	6556 kg (14453 lb)	6049 kg (13336 lb)	8353 kg (18415 lb)	7758 kg (17102 lb)	7978 kg (17588 lb)	7394 kg (16300 lb)

^{(1) 2100} kg/m³ (3500 lb/yd³) is the maximum density of material.

i07865211

Boom/Stick/Bucket Combinations

SMCS Code: 6000; 6700

S/N: KFE1–Up **S/N**: MYK1–Up **S/N**: YCP1–Up **S/N**: HEX1–Up

This machine can be equipped with a large variety of boom-stick-bucket combinations to meet the needs of various applications. Buckets are grouped into different families by capacity. As a rule, use a bucket with a smaller capacity when you are using a longer stick and/or a longer boom. Conversely, use a bucket with a larger capacity when you are using a shorter stick and/or a shorter boom. This rule ensures better machine stability and protection against structural machine damage.

A stick is designed to match only one specific family of buckets.

Note: The selection of a compatible boom-stick-bucket combination is a guide. Work tools, uneven ground conditions, soft ground conditions, or poor ground conditions have effects on machine performance. The operator is responsible for being aware of these effects.

Consult your Cat dealer for information on selecting the correct boom-stick-bucket combination.

^{(2) 1800} kg/m³ (3000 lb/yd³) is the maximum density of material.

The following tables show various compatible boomstick-bucket combinations. Select an optimum combination according to the working conditions and according to the type of work that is being done.

320

Table 15

			LACAVAIO	without Quic	r coubi	c. (North A	anenca)	000		
							4200 kg	320 (9260 lb)		4700 kg (10362 lb)
Bucket Type	Linkage	Width of Bucket	Capacity of Bucket	Weight of Bucket	Fill (%)	Reach	Boom	VA I	Boom	
.,,,,,		Bucket	Bucket	Bucket	(70)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	SLR
		600 mm (24 inch)	0.55 m ³ (0.72 yd ³)	619 kg (1365 lb)		(1)	(1)	(1)	(1)	-
		750 mm (30 inch)	0.75 m ³ (0.98 yd ³)	710 kg (1565 lb)		(1)	(1)	(1)	(1)	-
General Duty - Ca-		900 mm (36 inch)	0.95 m ³ (1.24 yd ³)	787 kg (1735 lb)	400	(1)	(1)	(1)	(2)	-
pacity (GDC)	В	1050 mm (41 inch)	1.16 m³ (1.52 yd³)	848 kg (1869 lb)	100	(1)	(2)	(3)	(3)	-
		1200 mm (48 inch)	1.38 m³ (1.80 yd³)	926 kg (2041 lb)		(2)	(3)	(4)	(4)	-
		1350 mm (53 inch)	1.59 m³ (2.08 yd³)	1004 kg (2213 lb)		(3)	(5)	(6)	(5)	-
		600 mm (24 inch)	0.55 m ³ (0.72 yd ³)	633 kg (1395 lb)		(1)	(1)	(1)	(1)	-
		750 mm (30 inch)	0.75 m ³ (0.98 yd ³)	731 kg (1611 lb)		(1)	(1)	(1)	(1)	-
General Duty - Ca-		900 mm (36 inch)	0.95 m ³ (1.24 yd ³)	813 kg (1792 lb)	400	(1)	(1)	(1)	(2)	-
pacity (GDC) - Wide Tip	В	1050 mm (41 inch)	1.16 m³ (1.52 yd³)	895 kg (1973 lb)	100	(1)	(2)	(3)	(3)	-
		1200 mm (48 inch)	1.38 m³ (1.80 yd³)	979 kg (2158 lb)		(3)	(3)	(4)	(4)	-
		1350 mm (53 inch)	1.59 m³ (2.08 yd³)	1063 kg (2343 lb)		(4)	(5)	(6)	(5)	-
		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	649 kg (1431 lb)		(1)	(1)	(1)	(1)	-
Heavy Du-	_	750 mm (30 inch)	0.64 m ³ (0.84 yd ³)	748 kg (1649 lb)	466	(1)	(1)	(1)	(1)	-
ty (HD)	В	900 mm (36 inch)	0.81 m ³ (1.06 yd ³)	826 kg (1821 lb)	100	(1)	(1)	(1)	(1)	-
		1050 mm (41 inch)	1.00 m ³ (1.31 yd ³)	880 kg (1940 lb)		(1)	(1)	(2)	(4)	-

(Table 15, contd)

			Excavator	without Quic	k Coupl	er (North A	merica)			
								320		
							4200 kg	(9260 lb)		4700 kg (10362 lb)
Bucket Type	Linkage	Width of Bucket	Capacity of Bucket	Weight of Bucket	Fill (%)	Reach	Boom	VA	Boom	
.,,,,,		Bucket	Bucket	Bucket	(70)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	SLR
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	972 kg (2143 lb)		(1)	(1)	(2)	(4)	-
		1350 mm (53 inch)	1.38 m³ (1.81 yd³)	1054 kg (2324 lb)		(5)	(5)	(5)	(5)	-
		900 mm (36 inch)	0.79 m³ (1.03 yd³)	842 kg (1856 lb)		(1)	(1)	(1)	(1)	-
Heavy Du- ty - Power (HDP)	В	1050 mm (41 inch)	0.96 m ³ (1.26 yd ³)	907 kg (2000 lb)	100	(1)	(1)	(2)	(2)	-
(,		1200 mm (48 inch)	1.14 m³ (1.49 yd³)	993 kg (2189 lb)		(5)	(5)	(5)	(5)	-
		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	694 kg (1530 lb)		(1)	(1)	(1)	(1)	-
		750 mm (30 inch)	0.64 m ³ (0.84 yd ³)	802 kg (1768 lb)		(1)	(1)	(1)	(1)	-
Severe Du- ty (SD)	В	900 mm (36 inch)	0.81 m ³ (1.06 yd ³)	889 kg (1960 lb)	90	(1)	(1)	(1)	(1)	-
		1050 mm (42 inch)	1.00 m ³ (1.31 yd ³)	964 kg (2125 lb)		(1)	(1)	(2)	(2)	-
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	1053 kg (2321 lb)		(1)	(2)	(3)	(4)	-
Severe Du- ty - Power (SDP)	В	900 mm (36 inch)	0.79 m³ (1.03 yd³)	908 kg (2002 lb)	90	(1)	(1)	(1)	(1)	-
Mud / Cleanup (M/CU)	В	1700 mm (67 inch)	1.60 m³ (2.09 yd³)	979 kg (2158 lb)	100	(3)	(4)	(6)	(6)	-
Ditch	_	1500 mm (59 inch)	1.01 m ³ (1.32 yd ³)	652 kg (1437 lb)		(1)	(1)	(1)	(2)	-
Cleaning (DC)	В	1800 mm (71 inch)	1.24 m ³ (1.62 yd ³)	740 kg (1631 lb)	100	(1)	(2)	(3)	(3)	-
		1500 mm (59 inch)	0.90 m ³ (1.18 yd ³)	948 kg (2090 lb)		(1)	(1)	(1)	(2)	-
Ditch	_	1800 mm (71 inch)	1.11 m³ (1.45 yd³)	1063 kg (2343 lb)	465	(1)	(2)	(3)	(4)	-
Cleaning - Tilt (DCT)	В	1800 mm (71 inch)	1.40 m ³ (1.83 yd ³)	1148 kg (2531 lb)	100	(3)	(4)	(4)	(6)	-
		2000 mm (79 inch)	1.23 m³ (1.61 yd³)	1132 kg (2496 lb)		(2)	(3)	(4)	(4)	-

(Table 15, contd)

			Excavator	without Quic	k Coupl	er (North A	merica)			
								320		
							4200 kg	(9260 lb)		4700 kg (10362 lb)
Bucket Type	Linkage	Width of Bucket	Capacity of Bucket	Weight of Bucket	Fill (%)	Reach	Boom	VA I	Boom	
Турс		Bucket	Bucket	Bucket	(70)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	SLR
General Duty (GD)	312	900 mm (35 inch)	0.53 m³ (0.69 yd³)	403 kg (888 lb)	100	-	-	-	-	(6)
Ditch Cleaning (DC) Long Reach	312	1200 mm (48 inch)	0.57 m ³ (0.74 yd ³)	386 kg (851 lb)	100	-	-	-	-	(6)
		Max	imum load pin-	on (payload +	bucket)	3235 kg (7132 lb)	3010 kg (6636 lb)	2705 kg (5963 lb)	2520 kg (5556 lb)	800 kg (1764 lb)

Table 16

Table 16			Excavator w	ith Din Grahl	hor Cou	nlor (North	Amorica)			
			LACAVAIOI W	itti Fili Grabi	Jei Cou	piei (Noitii	America	320		
Bucket		Midth of	Considerat	Mainbe of	Fill		4200 kg	(9260 lb)		4700 kg (10362 lb)
Type	Linkage	Width of Bucket	Capacity of Bucket	Weight of Bucket	(%)	Reach	Boom	VA E	Boom	
						2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	SLR
		600 mm (24 inch)	0.55 m ³ (0.72 yd ³)	619 kg (1365 lb)		(1)	(1)	(1)	(1)	-
		750 mm (30 inch)	0.75 m ³ (0.98 yd ³)	710 kg (1565 lb)		(1)	(1)	(1)	(2)	-
General Duty - Ca-	Б	900 mm (36 inch)	0.95 m³ (1.24 yd³)	787 kg (1735 lb)	400	(1)	(2)	(3)	(4)	-
pacity (GDC)	В	1050 mm (41 inch)	1.16 m³ (1.52 yd³)	848 kg (1869 lb)	100	(2)	(3)	(4)	(5)	-
(GDC)		1200 mm (48 inch)	1.38 m³ (1.80 yd³)	926 kg (2041 lb)		(4)	(4)	(5)	(5)	-
		1350 mm (53 inch)	1.59 m³ (2.08 yd³)	1004 kg (2213 lb)		(4)	(5)	(6)	(6)	-

^{(1) 2100} kg/m³ (3500 lb/yd³) is the maximum density of material. (2) 1800 kg/m³ (3000 lb/yd³) is the maximum density of material. (3) 1500 kg/m³ (2500 lb/yd³) is the maximum density of material. (4) 1200 kg/m³ (2000 lb/yd³) is the maximum density of material. (5) Net Programment of the companied of the companie

⁽⁵⁾ Not Recommended

^{(6) 900} kg/m³ (1500 lb/yd³) is the maximum density of material.

(Table 16, contd)

			Excavator w	ith Pin Grabi	oer Cou	pier (North	America)			
.							4200 kg	320 (9260 lb)		4700 kg (10362 lb)
Bucket Type	Linkage	Width of Bucket	Capacity of Bucket	Weight of Bucket	Fill (%)	Reach	Boom	VA E	Soom	
						2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	SLR
		600 mm (24 inch)	0.55 m³ (0.72 yd³)	633 kg (1395 lb)		(1)	(1)	(1)	(1)	-
		750 mm (30 inch)	0.75 m ³ (0.98 yd ³)	731 kg (1611 lb)		(1)	(1)	(1)	(2)	-
General Duty - Ca-		900 mm (36 inch)	0.95 m³ (1.24 yd³)	813 kg (1792 lb)	400	(1)	(2)	(3)	(4)	-
pacity (GDC) - Wide Tip	В	1050 mm (41 inch)	1.16 m³ (1.52 yd³)	895 kg (1973 lb)	100	(3)	(3)	(4)	(5)	-
		1200 mm (48 inch)	1.38 m³ (1.80 yd³)	979 kg (2158 lb)		(4)	(4)	(5)	(6)	-
		1350 mm (53 inch)	1.59 m³ (2.08 yd³)	1063 kg (2343 lb)		(5)	(5)	(6)	(6)	-
		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	649 kg (1431 lb)		(1)	(1)	(1)	(1)	-
		750 mm (30 inch)	0.64 m ³ (0.84 yd ³)	748 kg (1649 lb)		(1)	(1)	(1)	(1)	-
Heavy Du-	_	900 mm (36 inch)	0.81 m ³ (1.06 yd ³)	826 kg (1821 lb)		(1)	(1)	(2)	(3)	-
ty (HD)	В	1050 mm (41 inch)	1.00 m ³ (1.31 yd ³)	880 kg (1940 lb)	100	(1)	(1)	(3)	(4)	-
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	972 kg (2143 lb)		(3)	(4)	(5)	(5)	-
		1350 mm (53 inch)	1.38 m³ (1.81 yd³)	1054 kg (2324 lb)		(4)	(4)	(5)	(6)	-
		900 mm (36 inch)	0.79 m ³ (1.03 yd ³)	842 kg (1856 lb)		(1)	(1)	(2)	(3)	-
Heavy Du- ty - Power (HDP)	В	1050 mm (41 inch)	0.96 m ³ (1.26 yd ³)	907 kg (2000 lb)	100	(1)	(2)	(3)	(4)	-
()		1200 mm (48 inch)	1.14 m³ (1.49 yd³)	993 kg (2189 lb)		(3)	(3)	(4)	(5)	-
Heavy Du-		600 mm (24 inch)	0.44 m ³ (0.57 yd ³)	676 kg (1490 lb)		(1)	(1)	(1)	(1)	-
ty - Pin Grabber Perform-	В	750 mm (30 inch)	0.60 m ³ (0.79 yd ³)	778 kg (1715 lb)	90	(1)	(1)	(1)	(1)	-
PGP)		900 mm (36 inch)	0.76 m ³ (1.00 yd ³)	864 kg (1905 lb)		(1)	(1)	(2)	(3)	-

(Table 16, contd)

								320		
Bucket		Width of	Capacity of	Weight of	Fill		4200 kg	(9260 lb)		4700 kg (10362 lb)
Type	Linkage	Bucket	Bucket	Bucket	(%)	Reach	Reach Boom		VA Boom	
						2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	SLR
		1050 mm (42 inch)	0.93 m³ (1.22 yd³)	928 kg (2046 lb)		(1)	(2)	(3)	(4)	-
		1200 mm (48 inch)	1.11 m³ (1.45 yd³)	1016 kg (2234 lb)		(3)	(3)	(4)	(5)	-
		1350 mm (53 inch)	1.28 m³ (1.67 yd³)	1104 kg (2434 lb)		(4)	(4)	(5)	(6)	-
		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	694 kg (1530 lb)		(1)	(1)	(1)	(1)	-
		750 mm (30 inch)	0.64 m ³ (0.84 yd ³)	802 kg (1768 lb)		(1)	(1)	(1)	(1)	-
Severe Du- ty (SD)	В	900 mm (36 inch)	0.81 m ³ (1.06 yd ³)	889 kg (1960 lb)	90	(1)	(1)	(2)	(3)	-
		1050 mm (42 inch)	1.00 m ³ (1.31 yd ³)	964 kg (2125 lb)		(1)	(2)	(3)	(4)	-
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	1053 kg (2321 lb)		(3)	(3)	(4)	(5)	-
Severe Du- ty - Power (SDP)	В	900 mm (36 inch)	0.79 m³ (1.03 yd³)	908 kg (2002 lb)	90	(1)	(1)	(1)	(2)	-
Mud / Cleanup (M/CU)	В	1700 mm (67 inch)	1.60 m³ (2.09 yd³)	979 kg (2158 lb)	100	(4)	(5)	(6)	(6)	-
Ditch		1500 mm (59 inch)	1.01 m ³ (1.32 yd ³)	652 kg (1437 lb)	100	(1)	(2)	(3)	(3)	-
Cleaning (DC)	В	1800 mm (71 inch)	1.24 m³ (1.62 yd³)	740 kg (1631 lb)	100	(2)	(3)	(4)	(5)	-
		1500 mm (59 inch)	0.90 m ³ (1.18 yd ³)	948 kg (2090 lb)		(1)	(2)	(3)	(4)	-
Ditch	_	1800 mm (71 inch)	1.11 m³ (1.45 yd³)	1063 kg (2343 lb)		(3)	(4)	(5)	(5)	-
Cleaning - Tilt (DCT)	В	1800 mm (71 inch)	1.40 m³ (1.83 yd³)	1148 kg (2531 lb)	100	(4)	(5)	(6)	(6)	-
		2000 mm (79 inch)	1.23 m³ (1.61 yd³)	1132 kg (2496 lb)		(4)	(4)	(5)	(6)	-
		Max	imum load pin-	on (payload +	bucket)	6710 kg (14793 lb)	6214 kg (13700 lb)	5542 kg (12218 lb)	5134 kg (11319 lb)	1342 kg (2959 lb)

^{(1) 2100} kg/m³ (3500 lb/yd³) is the maximum density of material.

(Table 16, contd)

- (2) 1800 kg/m³ (3000 lb/yd³) is the maximum density of material.
 (3) 1500 kg/m³ (2500 lb/yd³) is the maximum density of material.
 (4) 1200 kg/m³ (2000 lb/yd³) is the maximum density of material.
 (5) 900 kg/m³ (1500 lb/yd³) is the maximum density of material.
 (6) Not Recommended

Table 17

			Excava	tor without Q	uick Co	oupler (Eur	ope)			
								320		
Puokot		Milala - f	0	Weight of Bucket	Fill (%)			4700 kg (10362 lb)		
Bucket Type	Linkage	Width of Bucket	Capacity of Bucket			Reach	Boom	VA E	Boom	
						2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	SLR
		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	551 kg (1215 lb)		(1)	(1)	(1)	(1)	-
		750 mm (30 inch)	0.64 m ³ (0.84 yd ³)	622 kg (1371 lb)		(1)	(1)	(1)	(1)	-
General		900 mm (36 inch)	0.81 m ³ (1.06 yd ³)	668 kg (1473 lb)	400	(1)	(1)	(1)	(1)	-
Duty (GD)	В	1200 mm (48 inch)	1.19 m³ (1.56 yd³)	803 kg (1770 lb)	100	(1)	(2)	(3)	(3)	-
		1300 mm (51 inch)	1.30 m ³ (1.71 yd ³)	835 kg (1841 lb)		(2)	(3)	(3)	(4)	-
		1400 mm (55 inch)	1.43 m³ (1.87 yd³)	870 kg (1918 lb)		(5)	(5)	(5)	(5)	-
		1050 mm (42 inch)	1.00 m ³ (1.31 yd ³)	27 kg (59 lb)		(1)	(1)	(2)	(3)	-
Heavy Du-		1200 mm (48 inch)	1.19 m ³ (1.56 yd ³)	907 kg (1999 lb)	100	(1)	(2)	(3)	(4)	-
ty (HD)	В	1200 mm (48 inch)	1.19 m ³ (1.56 yd ³)	918 kg (2024 lb)	100	(2)	(2)	(3)	(4)	-
		1300 mm (52 inch)	1.30 m ³ (1.71 yd ³)	962 kg (2120 lb)		(2)	(3)	(4)	(4)	-
		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	694 kg (1530 lb)		(1)	(1)	(1)	(1)	-
		750 mm (30 inch)	0.64 m ³ (0.84 yd ³)	802 kg (1768 lb)		(1)	(1)	(1)	(1)	-
Severe Du- ty (SD)	В	900 mm (36 inch)	0.81 m ³ (1.06 yd ³)	889 kg (1960 lb)	90	(1)	(1)	(1)	(1)	-
		1050 mm (42 inch)	1.00 m ³ (1.31 yd ³)	964 kg (2125 lb)		(1)	(1)	(2)	(2)	-
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	1053 kg (2321 lb)		(1)	(2)	(3)	(4)	-

(Table 17, contd)

			Excava	tor without C	uick Co	upler (Euro	ope)				
						320					
Dualent		W 11 . 6	Capacity of Bucket	Weight of Bucket	Fill (%)			4700 kg (10362 lb)			
Bucket Type	Linkage	Width of Bucket				Reach	Boom	VA B	oom		
						2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	SLR	
Severe Du- ty (SDV)	В	1200 mm (48 inch)	1.20 m³ (1.57 yd³)	1001 kg (2207 lb)	90	(1)	(2)	(3)	(3)	-	
Ditch Cleaning (DC)	В	2000 mm (78 inch)	1.22 m³ (1.60 yd³)	869 kg (1916 lb)	100	(2)	(2)	(3)	(4)	-	
Ditch Cleaning - Tilt (DCT)	В	2000 mm (78 inch)	1.23 m³ (1.61 yd³)	1096 kg (2416 lb)	100	(2)	(3)	(4)	(4)	-	
General Duty (GD)	312	900 mm (35 inch)	0.53 m ³ (0.69 yd ³)	403 kg (888 lb)	100	-	-	-	-	757	
Ditch Cleaning (DC) Long Reach	312	1200 mm (48 inch)	0.57 m³ (0.74 yd³)	386 kg (851 lb)	100	-	-	-	-	733	
		Max	kimum load pin-	on (payload +	bucket)	3235 kg (7132 lb)	3010 kg (6636 lb)	2705 kg (5963 lb)	2520 kg (5556 lb)	800 kg (1764 lb)	

^{(1) 2100} kg/m³ (3500 lb/yd³) is the maximum density of material. (2) 1800 kg/m³ (3000 lb/yd³) is the maximum density of material. (3) 1500 kg/m³ (2500 lb/yd³) is the maximum density of material. (4) 1200 kg/m³ (2000 lb/yd³) is the maximum density of material.

Table 18

			Excavato	or with Pin G	rabber (Coupler (Eu	rope)			
								320		
	Bucket Linkage					4200 kg (9260 lb)				4700 kg (10362 lb)
	Linkage	Width of Bucket	Capacity of Bucket	Weight of Bucket	Fill (%)	Reach	Boom	VA E	Boom	
Type		Bucket	Ducket	Buokot	(79)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	SLR
		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	564 kg (1243 lb)		(1)	(1)	(1)	(1)	-
Utility Duty (UD) (No Adjuster)	В	1000 mm (39 inch)	0.93 m ³ (1.22 yd ³)	735 kg (1620 lb)	100	(1)	(1)	(2)	(3)	-
,,		1400 mm (55 inch)	1.43 m³ (1.87 yd³)	914 kg (2015 lb)		(4)	(4)	(5)	(5)	-

⁽⁵⁾ Not Recommended

(Table 18, contd)

			Excavato	or with Pin G	rabber (Coupler (Eu	rope)			
								320		
								4700 kg (10362 lb)		
Bucket Type	Linkage	Width of Bucket	Capacity of Bucket	Weight of Bucket	Fill (%)	Reach Boom		VA Boom		
1,700		Ducket			(70)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	SLR
		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	551 kg (1215 lb)		(1)	(1)	(1)	(1)	-
		750 mm (30 inch)	0.64 m ³ (0.84 yd ³)	622 kg (1371 lb)		(1)	(1)	(1)	(1)	-
General		900 mm (36 inch)	0.81 m ³ (1.06 yd ³)	668 kg (1473 lb)	400	(1)	(1)	(1)	(2)	-
Duty (GD) - EU	В	1200 mm (48 inch)	1.19 m³ (1.56 yd³)	803 kg (1770 lb)	100	(2)	(3)	(4)	(5)	-
		1300 mm (51 inch)	1.30 m ³ (1.71 yd ³)	835 kg (1841 lb)		(3)	(4)	(4)	(5)	-
		1400 mm (55 inch)	1.43 m³ (1.87 yd³)	870 kg (1918 lb)		(4)	(4)	(5)	(5)	-
		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	546 kg (1204 lb)		(1)	(1)	(1)	(1)	-
		750 mm (30 inch)	0.64 m ³ (0.84 yd ³)	617 kg (1360 lb)		(1)	(1)	(1)	(1)	-
General Duty (GD)	_	1000 mm (39 inch)	0.93 m ³ (1.22 yd ³)	710 kg (1565 lb)		(1)	(1)	(2)	(3)	-
(No Adjuster)	В	1200 mm (48 inch)	1.19 m³ (1.56 yd³)	799 kg (1761 lb)	100	(2)	(3)	(4)	(5)	-
		1400 mm (55 inch)	1.43 m³ (1.87 yd³)	866 kg (1909 lb)		(4)	(4)	(5)	(5)	-
		1500 mm (59 inch)	1.58 m ³ (2.06 yd ³)	906 kg (1997 lb)		(4)	(5)	(5)	(6)	-
		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	649 kg (1431 lb)		(1)	(1)	(1)	(1)	-
		750 mm (30 inch)	0.64 m ³ (0.84 yd ³)	748 kg (1649 lb)		(1)	(1)	(1)	(1)	-
Heavy Du-	_	900 mm (36 inch)	0.81 m ³ (1.06 yd ³)	826 kg (1821 lb)	46-	(1)	(1)	(2)	(3)	-
ty (HD)	В	1050 mm (42 inch)	1.00 m ³ (1.31 yd ³)	880 kg (1940 lb)	100	(2)	(2)	(3)	(4)	-
		1050 mm (42 inch)	1.00 m ³ (1.31 yd ³)	880 kg (1940 lb)		(2)	(2)	(3)	(4)	-
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	907 kg (1999 lb)		(3)	(3)	(4)	(5)	-

(Table 18, contd)

			Excavato	or with Pin G	rabber (Coupler (Eu	rope)			
								320		
				Weight of Bucket	Fill (%)			4700 kg (10362 lb)		
Bucket Type	Linkage	Width of Bucket	Capacity of Bucket			Reach Boom		VA E	Boom	
турс		Bucket		Bucket		2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	SLR
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	918 kg (2024 lb)		(3)	(3)	(4)	(5)	-
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	972 kg (2143 lb)		(3)	(4)	(5)	(5)	-
		1300 mm (51 inch)	1.30 m³ (1.71 yd³)	962 kg (2121 lb)		(3)	(4)	(5)	(5)	-
		1350 mm (53 inch)	1.38 m³ (1.81 yd³)	1054 kg (2324 lb)		(4)	(4)	(5)	(6)	-
Severe Du- ty (SD)	В	1050 mm (41 inch)	1.00 m ³ (1.31 yd ³)	964 kg (2125 lb)	90	(1)	(2)	(3)	(4)	-
Severe Du- ty (SDV)	В	1200 mm (48 inch)	1.20 m³ (1.57 yd³)	1001 kg (2207 lb)	90	(2)	(3)	(4)	(5)	-
Ditch Cleaning (DC)	В	2000 mm (78 inch)	1.22 m³ (1.60 yd³)	869 kg (1916 lb)	100	(3)	(3)	(4)	(5)	-
Ditch Cleaning - Tilt (DCT)	В	2000 mm (78 inch)	1.23 m³ (1.61 yd³)	1096 kg (2416 lb)	100	(3)	(4)	(5)	(6)	-
		Max	kimum load pin-	on (payload +	bucket)	6710 kg (14793 lb)	6214 kg (13700 lb)	5542 kg (12218 lb)	5134 kg (11319 lb)	1342 kg (2959 lb)

Table 19

			Excavato	r with CW-40	Quick (Coupler (E	urope)			
					Fill (%)			320		
							4200 kg	(9260 lb)		4700 kg (10362 lb)
Bucket Type	Linkage	Width of Bucket		Weight of Bucket		Reach Boom		VA Boom		
.ypc		Bucket	Bucket			2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	SLR
General Duty (GD) - CW40	В	900 mm (36 inch)	0.81 m³ (1.06 yd³)	658 kg (1451 lb)	100	(1)	(1)	(1)	(1)	-

^{(1) 2100} kg/m³ (3500 lb/yd³) is the maximum density of material.
(2) 1800 kg/m³ (3000 lb/yd³) is the maximum density of material.
(3) 1500 kg/m³ (2500 lb/yd³) is the maximum density of material.
(4) 1200 kg/m³ (2000 lb/yd³) is the maximum density of material.
(5) 900 kg/m³ (1500 lb/yd³) is the maximum density of material.
(6) Not Recommended

(Table 19, contd)

			Excavato	r with CW-40	Quick	Coupler (E	urope)			
								320		
				Weight of Bucket		4200 kg (9260 lb)				4700 kg (10362 lb)
Bucket Type	Linkage	Width of Bucket	Capacity of Bucket		Fill (%)	Reach	Reach Boom		VA Boom	
Турс		Bucket			(70)	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	SLR
		1050 mm (42 inch)	1.00 m ³ (1.31 yd ³)	704 kg (1552 lb)		(1)	(1)	(2)	(3)	-
		1200 mm (48 inch)	1.19 m³ (1.56 yd³)	764 kg (1684 lb)		(2)	(2)	(3)	(4)	-
		1300 mm (51 inch)	1.30 m³ (1.71 yd³)	804 kg (1772 lb)		(3)	(3)	(4)	(4)	-
		600 mm (24 inch)	0.46 m³ (0.31 yd³)	611 kg (1347 lb)		(1)	(1)	(1)	(1)	-
Heavy Du- ty (HD) - CW40	В	1200 mm (48 inch)	1.19 m³ (1.56 yd³)	877 kg (1933 lb)	100	(2)	(3)	(4)	(4)	-
		1300 mm (52 inch)	1.30 m³ (1.71 yd³)	931 kg (2052 lb)		(5)	(5)	(5)	(5)	-
Severe Du- ty (SD) CW40	В	1200 mm (48 inch)	1.20 m³ (1.57 yd³)	985 kg (2171 lb)	90	(2)	(3)	(4)	(4)	-
		2100 mm (83 inch)	1.29 m³ (1.69 yd³)	793 kg (1748 lb)		(2)	(3)	(4)	(4)	-
		2100 mm (83 inch)	1.46 m³ (1.91 yd³)	812 kg (1790 lb)		(2)	(3)	(4)	(6)	-
Ditch Cleaning (DC) CW40	В	2100 mm (83 inch)	1.76 m³ (2.31 yd³)	867 kg (1911 4 lb)	100	(4)	(6)	(6)	(5)	-
` ,		1800 mm (71 inch)	1.50 m³ (1.96 yd³)	777 kg (1713 lb)		(2)	(4)	(4)	(6)	-
		1800 mm (71 inch)	1.50 m³ (1.96 yd³)	826 kg (1821 lb)		(2)	(4)	(6)	(6)	-
Ditch Cleaning - Tilt (DCT) CW40	В	2000 mm (78 inch)	1.23 m³ (1.61 yd³)	1161 kg (2560 lb)	100	(2)	(4)	(6)	(6)	-
		Мах	kimum load pin-	on (payload +	bucket)	3034 kg (6689 lb)	2808 kg (6191 lb)	2499 kg (5509 lb)	2311 kg (5095 lb)	554 kg (1221 lb)

^{(1) 2100} kg/m³ (3500 lb/yd³) is the maximum density of material. (2) 1500 kg/m³ (2500 lb/yd³) is the maximum density of material. (3) 1800 kg/m³ (3000 lb/yd³) is the maximum density of material. (4) 1200 kg/m³ (2000 lb/yd³) is the maximum density of material. (5) Next Parameter of the density of material.

⁽⁵⁾ Not Recommended

^{(6) 900} kg/m³ (1500 lb/yd³) is the maximum density of material.

Table 20

								320 Long		
						4200 kg (9260 lb)				4700 kg (10362 lb)
Bucket Type	Linkage	Width of Bucket	Capacity of Bucket		Fill (%)	Reach	Boom	VA Boom		
,						2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	SLR
		600 mm (24 inch)	0.46 m ³ (0.61 yd ³)	503 kg (1109 lb)		(1)	(1)	(1)	(1)	-
		750 mm (29 inch)	0.64 m ³ (0.84 yd ³)	588 kg (1296 lb)		(1)	(1)	(1)	(1)	-
General		900 mm (35 inch)	0.81 m ³ (1.06 yd ³)	655 kg (1444 lb)		(1)	(1)	(1)	(1)	-
Duty (GD) - CW40S	В	1200 mm (48 inch)	1.19 m³ (1.56 yd³)	770 kg (1697 lb)	100	(2)	(3)	(3)	(4)	-
		1300 mm (51 inch)	1.30 m ³ (1.71 yd ³)	801 kg (1766 lb)		(3)	(3)	(4)	(4)	-
		1400 mm (55 inch)	1.43 m³ (1.87 yd³)	837 kg (1845 lb)		(3)	(4)	(4)	(5)	-
		600 mm (24 inch)	0.46 m ³ (0.31 yd ³)	611 kg (1347 lb)		(1)	(1)	(1)	(1)	-
Heavy Du- ty (HD) - CW40S	В	1200 mm (48 inch)	1.19 m³ (1.56 yd³)	877 kg (1933 lb)	100	(2)	(3)	(4)	(4)	-
011400		1300 mm (52 inch)	1.30 m ³ (1.71 yd ³)	931 kg (2052 lb)		(6)	(6)	(6)	(6)	-
Ditch Cleaning		2000 mm (79 inch)	1.22 m³ (1.60 yd³)	715 kg (1576 lb)	400	(2)	(3)	(3)	(4)	-
(DC) CW40S	В	2200 mm (87 inch)	1.36 m³ (1.78 yd³)	769 kg (1695 lb)	100	(3)	(3)	(4)	(5)	-
Ditch Cleaning - Tilt (DCT) CW40S	В	2000 mm (78 inch)	1.23 m³ (1.61 yd³)	1142 kg (2518 lb)	100	(3)	(4)	(5)	(5)	-
		Max	imum load pin-	on (payload +	bucket)	3004 kg (6623 lb)	2779 kg (6127 lb)	2474 kg (5454 lb)	2289 kg (5046 lb)	-

 ²¹⁰⁰ kg/m³ (3500 lb/yd³) is the maximum density of material.
 1800 kg/m³ (3000 lb/yd³) is the maximum density of material.
 1500 kg/m³ (2500 lb/yd³) is the maximum density of material.
 1200 kg/m³ (2000 lb/yd³) is the maximum density of material.
 900 kg/m³ (1500 lb/yd³) is the maximum density of material.
 Not Recommended

Table 21

			Excavator	without Quick	(Couple	(Japan)						
						320						
			Capacity of Bucket			3700 kg (8157 lb)						
Bucket	Linkage	Width of		Weight of	Fill (%)	Reach I	Boom	Reach E	Boom HD			
Туре	J	Bucket		Bucket		2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) HD Stick	2.9 m (9 ft 6 inch) HD Stick			
		950 mm (37 inch)	0.80 m ³ (1.04 yd ³)	688 kg (1517 lb)		(1)	(1)	(1)	(1)			
General Du- ty - Excava- tion (GDX)	В	1050 mm (41 inch)	0.90 m³ (1.17 yd³)	721 kg (1589 lb)	100	(1)	(1)	(1)	(2)			
,		1150 mm (45 inch)	1.00 m ³ (1.31 yd ³)	753 kg (1660 lb)		(2)	(2)	(2)	(3)			
General Du- ty - Excava-	В	1000 mm (40 inch)	0.80 m ³ (1.04 yd ³)	715 kg (1576 lb)	100	(1)	(1)	(1)	(1)			
tion (GDX) - ESCO	В	1100 mm (44 inch)	0.90 m³ (1.17 yd³)	749 kg (1651 lb)	100	(1)	(2)	(2)	(2)			
Heavy Duty	В	950 mm (37 inch)	0.80 m ³ (1.04 yd ³)	798 kg (1759 lb)	100	(1)	(1)	(1)	(2)			
(HDX)	В	1050 mm (41 inch)	0.90 m³ (1.17 yd³)	837 kg (1845 lb)	100	(1)	(2)	(2)	(3)			
			Maximum load p	in-on (payload	+ bucket)	2695 kg (5941 lb)	2505 kg (5523 lb)	2525 kg (5567 lb)	2335 kg (5148 lb)			

 ²¹⁰⁰ kg/m³ (3500 lb/yd³) is the maximum density of material.
 1800 kg/m³ (3000 lb/yd³) is the maximum density of material.
 1500 kg/m³ (2500 lb/yd³) is the maximum density of material.

Table 22

			Excavator wi	ith Pin Grabb	er Count	er (Janan)			
			Excavator w		er Goupi	er (dapari)	3	320	
							3700 kg	(8157 lb)	
Bucket	Linkage	Width of	Capacity of	Weight of	Fill (%)	Reach I	Boom	Reach E	Boom HD
Туре		Bucket	Bucket	Bucket	(///	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) HD Stick	2.9 m (9 ft 6 inch) HD Stick
		950 mm (37 inch)	0.80 m ³ (1.04 yd ³)	688 kg (1517 lb)		(1)	(2)	(2)	(3)
General Du- ty - Excava- tion (GDX)	В	1050 mm (41 inch)	0.90 m ³ (1.17 yd ³)	721 kg (1589 lb)	100	(2)	(3)	(3)	(4)
(027.)		1150 mm (45 inch)	1.00 m³ (1.31 yd³)	753 kg (1660 lb)		(3)	(4)	(4)	(4)
General Du- ty - Excava- tion (GDX) - ESCO	В	1000 mm (40 inch)	0.80 m ³ (1.04 yd ³)	715 kg (1576 lb)	100	(2)	(2)	(2)	(3)

(Tab	le 22,	contd)
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			Excavator w	ith Pin Grabb	er Coupl	er (Japan)								
						320								
						3700 kg (8157 lb)								
Bucket	Linkage	Width of	Capacity of	Weight of	Fill (%)	Reach	Boom	Reach E	Boom HD					
Туре		Bucket	Bucket	Bucket	(///	2.5 m (8 ft 2 inch) Stick	2.9 m (9 ft 6 inch) Stick	2.5 m (8 ft 2 inch) HD Stick	2.9 m (9 ft 6 inch) HD Stick					
		1100 mm (44 inch)	0.90 m³ (1.17 yd³)	749 kg (1651 lb)		(2)	(3)	(3)	(4)					
Heavy Duty	_	950 mm (37 inch)	0.80 m ³ (1.04 yd ³)	798 kg (1759 lb)	100	(2)	(3)	(3)	(4)					
- Excavation (HDX)	В	1050 mm (41 inch)	0.90 m³ (1.17 yd³)	837 kg (1845 lb)	100	(3)	(4)	(4)	(4)					
			Maximum load p	in-on (payload	+ bucket)	5520 kg (12169 lb)	5101 kg (11246 lb)	5145 kg (11343 lb)	4726 kg (10419 lb)					

- (1) 2100 kg/m³ (3500 lb/yd³) is the maximum density of material.
- (2) 1800 kg/m³ (3000 lb/yd³) is the maximum density of material.
 (3) 1500 kg/m³ (2500 lb/yd³) is the maximum density of material.
- (4) 1200 kg/m³ (2000 lb/yd³) is the maximum density of material.

i08287322

Lifting Capacities

(323 Reach Boom/Variable Angle Boom/Super Long Reach Boom)

SMCS Code: 7000

S/N: NDL1-Up S/N: LTN1-Up S/N: HDT1-Up S/N: RAZ1-Up

A WARNING

Failure to comply to the rated load can cause possible personal injury or property damage. This includes the risk of unintended boom lowering. Review the rated load of a particular work tool before performing any operation. Make adjustments to the rated load as necessary for nonstandard configurations.

There may be local regulations and/or government regulations that govern the use of excavators which lift heavy objects. Obey all local and government regulations.

Lifting capacities should be used as a guide. Work tools, uneven ground conditions, soft ground conditions, or poor ground conditions have effects on lifting capacities. The operator is responsible for being aware of these effects.

Lifting Capacities

The lifting capacities are defined by "ISO 10567 2007". The lifting capacities are defined as the lower value of 75% of the static tipping capacity or 87% of the hydraulic lift capacity.

Note: Lifting capacities are based on a standard machine with the following conditions:

- Lift point: Stick nose without bucket
- Lubricants full
- Fuel tank full
- Steel track
- Complete cab with a 75 kg (165 lb) operator

Lifting capacities will vary with different work tools and attachments. The weight of a work tool attachment must be subtracted from the lift capacity. Consult your Cat dealer regarding the lifting capacities for specific work tools and attachments.

This machine may be equipped with various sticks. Lifting capacities may vary between the different sticks. Measure the distance on the stick between the boom hinge pin and the work tool hinge pin. This distance will inform you of the size of the stick that is equipped on the machine.

Product Information Section

Use the lifting eye that is provided on the linkage to lift objects. When the lifting eye is used, the connection must be made with a sling or shackle.

Note: Japan regulations require a shovel crane configuration to lift certain objects. A shovel crane has a rated load capacity, therefore, the lift capacities discussed below do not apply to a shovel crane configuration. Contact your Cat dealer for additional information.

Note: In European countries, regulations require an overload warning device and a boom and stick lowering control valve if more than 1000 kg (2200 lb) is lifted during object handling applications. Regulations also require an overload warning device and a boom lowering control valve if a force that is greater than 40000 N·m (29500 lb ft) is created during object handling applications. If the machine is not equipped with these devices, even if the hydraulic lift capacity is capable, do not exceed a load of 1000 kg (2200 lb). Do not exceed a force of 40000 N·m (29500 lb ft) in European object handling applications.

Configuration Identification

Note: Each component has a stamp to identify the configuration affecting lifting capacity.

The owner will need to check the machine configuration to identify the correct lifting capacity.

The configuration identifier will be located with the part number stamped on the component. Refer to the following table for the abbreviation of the configuration.

Table 23

	Configuration Identification	
Compo- nent	Configuration	Ab- brevi- ation
	Reach Boom	R
	Mass Boom	М
	Variable Angle Boom	VA
	Super Long Reach Boom	SLR
	Standard	STD
Front	Short Reach Stick	SR
	Severe Duty Bucket	SD
	Heavy Duty	HD
	Semi-Heavy Duty	S-HD
	Extreme Special	ES

(Table 23, contd)

	Configuration Identification	
Compo- nent	Configuration	Ab- brevi- ation
	Thumb Ready Stick	TR
	Short Undercarriage (Crawler)	STD
Undercar- riage	Long Undercarriage (Crawler)	LC
	Long Narrow Undercarriage (Crawler)	LN
Cylinder	Standard	-
Cyllildel	Heavy Lift	HL
Counter- weight	Metric Ton (tonne)	t (1)

⁽¹⁾ Counterweight stamp indicates metric ton. (example 1.0t = 1000 kg)

Symbols Found in the Lifting Capacity Charts

Below are symbols that are commonly found on lifting capacity charts for track excavators.

Note: Depending on the machine configuration, some symbols may not be used.

(mm) (inch) Measurements are provided in millimeters and inches



Lift Capacities are provided in kilograms and pounds



Load is limited by hydraulic lifting capacity rather than by a tipping load



Lift point radius



Lift point height



Lifting capacity over the front of the machine



Lifting capacity over the side of the machine



Heavy Lift ON

Reach Boom with a 2.5 m (8 ft 2 inch) Stick and 4200 kg (9260 lb) Counterweight

102

600 mm (24 inch) Single Grouser Shoe (14 mm (0.6 inch) thickness)

lineki (ineki		60		120 120		100	75	8000 TEGS 340 300			Je		
À É	1	σ	4	dip	4	中	14	dia	4	ď	14	dip	(Inel (Inek)
7500			100				2.32		1210.0		4750	4750	5600
300			J				450145	a satisfication			. 40000	10000	224
6000							+ 5390	1 5350			4350	* 4350	6830
240					2000	J195507	1 3700	11700			1 3600	- 9600	270
4900					4100	1700	1790	5350	- 4800	3900	4230	3190	7570
100				-	* 14500	9/500	1 6550	1650	2000	72/9	9400	8380	300
3000					8450	1750	1 6900	5160	* :9650	3700	4350	3480	7960
120					10'80	18700	* W150	TIDEO	12300	8000	5600	7500	325
1900					9960	1900	1900	4900	5600	9600	4880	3390	9082
600					2950	8750	* 8790	10600	12700	7900	* TD250	7290	320
0					10050	7100	7650	4000	5558	3550	5260	3350	7060
.0					7. 23000	16250	19450	10000	71956	7950	39450	7350	370
-1900			+ 9050	1050	- 10500	1050	7600	4750			\$700	3650	7350
-60			+ 25800	* 25600	22700	16200	16350	10296			12800	8090	290
-3000			13750	13/80	3550	750	11.7090	4800			5300	4490	8470
-t20			+ 29800	29500	20960	16400	15100	10400			13900	9790	380
-4900		- 1			760	+ 750					, 6500	6290	4580
-100					14550	+ 9350					* 13550	13530	200

Illustration 73 g06224929

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift OFF

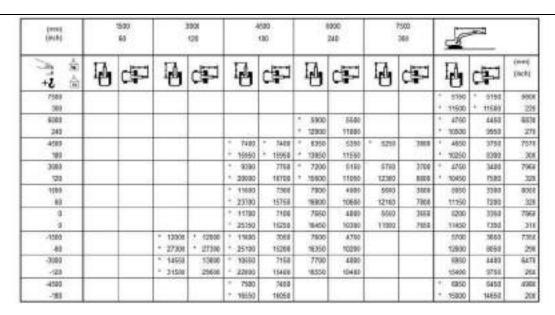


Illustration 74 g06224933

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift ON

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Product Information Section

600 mm (24 inch) Double Grouser Shoe (13 mm (0.5 inch) thickness)

(mm) (msh)		60 60		120		180		6800 240		1500 300	4		
→ \$	16	æ	1	æ	12	æ	14	ď	16	Œ	4	ď₽	(Inch)
7108							-				+ 4750	+ 4750	550
366											+ 10550	10088	23
500							* 5350	+ 6360			+ 4350	+ 4351	683
248							+ 11700	* 11785	V. Carry S. S.		* 1600	+ 9688	21
4508					6190	· 6706	\$ \$750	5380	* 4800	3806	+ 4250	3758	757
193					* \$4500	* 14500	* 12550	11583	1-762	-15.73	+ 5400	8394	30
366					* 8450	7758	* 6500	5150	+ 5990	3700	+ 4950	3466	:799
29					10100	110700	1 14150	11060	12300	8800	1800	75.00	37
1000					* 9950	1306	+ 7300	4060	1990	3606	* 4650	3394	800
63					4 2'H50	15700	1 16750	10000	12100	7100	+ 10250	7288	32
					* 18650	7100	7950	4860	556ft	3668	5290	3364	796
187					- 23000	15258	16450	50300	11900	768	71450	1364	38
-1000			+ +000	+ 11360	19190	7000	7900	6765			1700	3666	735
-60			* 25800	* 25000	* 22190	15158	16350	10255			12900	8098	29
3100			+ 13150	+ 19190	9550	7158	+ 7850	1800			+ 6300	4460	547
-188			* 28500	- 20500	- 39660	15400	- 15100	10060			13900	9794	26
4509				70000	7190	· 2168		10000			* 4300	* 6288	490
-101					14100	* 1686				111	7 13550	7 13880	20

Illustration 75 g06224922

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift OFF

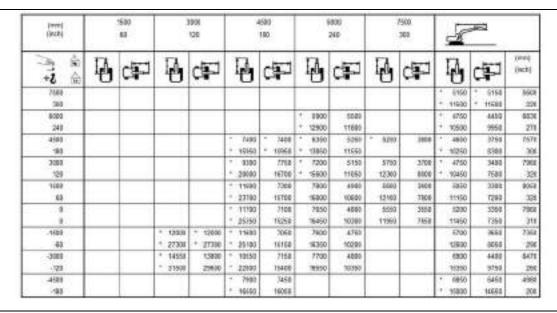


Illustration 76 g06224926

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift ON

104Product Information Section323 Reach Boom/Variable Angle Boom/Super Long Reach Boom

600 mm (24 inch) Triple Grouser Shoe

(inth)		1500 3000 60 100			180	6900 240			1500 269	8			
- <u>}</u>	1	æ	1	æ	4	æ	14	æ	4	æ	1	ď	(moti)
7588											+ 4750	* 6750	590
369											+ 10950	+ 10568	201
6000							* \$360	* 1360			1 4350	4360	6831
240						contract to	* 11700	* 11706			1 1000	+ 3690	211
4500					* 0190	. tida	* 5750	5380	* 4903	.7800	+ 4250	3750	7571
188					* 14900	* 14508	+ 12550	11580	100	- 7.00	+ 5400	8250	30
3000					* 8450	7758	4 6500	6190	* 9600	3700	+ 4950	3490	796
120					1 18150	1000	* 14150	11050	12300	8100	1 1800	7520	321
1000					* 9180	7300	+ 7300	4980	5500	3800	+ 4850	5380	900
- 60					11450	15700	* 16750	10680	12100	7806	+ 10250	7290	329
3					* 19650	7100	7950	4800	5590	-301	1200	3390	790
9					* 23000	15258	18450	10380	11990	7154	11850	7388	311
-1000			+ 1139	1 11360	19690	7018	7800	A710			1700	331	735
40			* 25800	* 25000	* 22100	15158	16350	10290			12990	8658	29
-3000			+ 13168	+ 13190	* 9660	2168	+ 7860	4800			+ 6300	4410	6471
-93			- 28500	1 20530	* 20050	15406	- 15100	10350			1 13900	9700	26
4500			11,000	1000	* 7150	7150			1		+ 6200	* 5200	420
-183					* 14950	* 14668				-	+ 19550	+ 13560	20

Illustration 77 g06224885

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

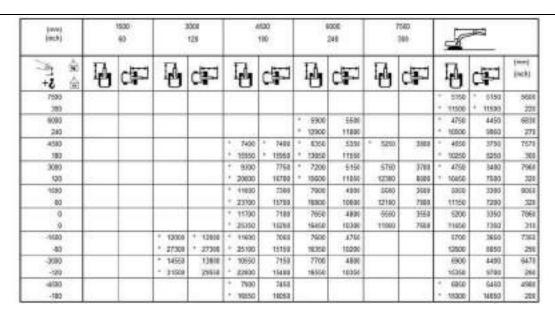


Illustration 78 g06224886

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

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Product Information Section

600 mm (24 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

(mm) (mth)		1506 50		3008 128		580 190	100000000000000000000000000000000000000		7580 300	-8			
è è	4	ď	4	ď	4	æ	4	ď₽	4	æ	10	æ	(week)
7508	,										+ 4000	4.797	Medical
306											* 10550	* 10650	22
8808							. 1350	* 5369			. 1000	4390	643
246						511153777	* 11790	11658	Second .	1,000	* 9000	* 5680	211
4500					* - 6190	. 1100	* 5750	5309	* 4806	3150	4250	3790	7577
165					* 1493	* 14500	* 12550	11368	7-285	-377	* 5400	8190	30
3804					* 8450	7668	+ 6900	5069	5468	3660	* 4360	2360	790
128					1 18150	19458	1 14150	10000	12100	7050	1 9500	7350	301
1500					9060	7200	+ 7300	4883	5508	2050	* 4550	3050	9000
88					* 21450	15458	* 16750	10450	11900	7650	* 16250	7130	329
- 1					* 19650	1958	7900	4709	5458	3990	£100	3340	796
					* 23000	15000	16/150	10109	51738	7100	11250	7250	311
1609			* 11369	+ +1310	1 10190	6000	7860	6550			8500	2630	730
60			* 25000	* 25800	* 22190	14908	16850	10058	1		10356	7990	290
-3406			+ 13153	+ 19190	+ 9650	.7058	+ 7950	4753			+ 6300	4390	647
-1/3			* 29500	* 26600	- 20160	19166	* 16100	10200			- 19900	9690	200
4500			700	1997	7 7190	* 71GB	-	1941100			* 4200	+ 6290	4900
-100					14150	* 1000					* 13550	* 138.60	200

Illustration 79 g06224934

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

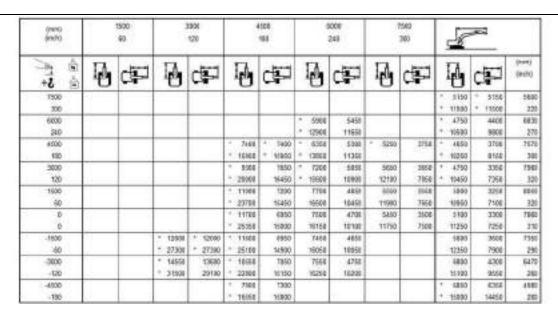


Illustration 80 g06224936

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

Product Information Section
323 Reach Boom/Variable Angle Boom/Super Long Reach Boom

106

700 mm (28 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

(mm) (insh)		588 68	12	120		190		899 240	1.0	1500 300	8	5		
- A	14	æ	1	æ	14	æ	1	æ	1	æ	4	di	(mm) (inch)	
7006											+ 1080	. 10,00	160	
300											* 19880	* 19668	.20	
8308							5350	5358			. 4350	4368	683	
248						C-15571	+ 11780	* 11709			* 5688	9500	27	
4800					- 6150	- 6100	6790	6450	4808	3890	4290	2908	257	
198					* 14500	7 54500	* 12550	71700	10.17	- 2007	* 3430	9400	.30	
3606					1 8400	1850	* 8800	5200	* 5000	3800	1 (250	3452	730	
128					* 18/50	16950	+ 14150	11250	+ 1256	8100	+ 5600	7008	32	
1508					4 1961	1400	±	5009	8798	:3700	. 4600	3366	885	
68					* 2451	16000	+ 16750	10009	12300	7900	11250	7368	. 32	
					1,1000	1200	7800	6303	5010	- 3800	1200	3408	. 789	
					* 33900	16500	16750	10450	12160	7800	+ 11450	750E	27	
-1508			* 11960	* 11390	5 1010E	1200	1750	4900			1883	3708	736	
48			+ 25800	* 25800	1 22100	15450	16600	19358			12000	8200	29	
-3000			1 13153	* 13150	1 5688	7300	* T050	4900			* 6300	6652	647	
-128			* 28800	7 28500	1 2000	79500	* 19100	19559			* 13590	9300	29	
4908				1000	* 7158	T 1150		-			1 1000	* 6266	459	
-166		1 1		100	* 14958	+ 14950			1 7		+ 17550	* 19568	20	

Illustration 81 g06224887

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift OFF

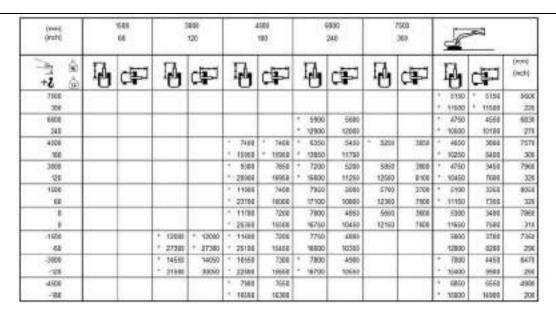


Illustration 82 g06224889

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift ON

M0068104-12 107

790 mm (31 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

(with)		1589 48	1.5	120	1.0	1500	1 100	1000 240	1 22	7508 308	-8	5	
÷ €	10	Œ,	10	æ	10	æ	14	æ	14	æ	4	ď₽	(red)
7590											* 400	4 4750	5600
300											* 1833	* 19550	201
(8080							* 5350	+ 5350			* 4368	4350	8830
240					19/14/1905		+ 11700	* 11780	San San		* 1600	* 9600	27
4560					+ 6706	6799	* 6760	. 6540	4900	3700	4 4958	3050	7679
100					* 14800	* 14600	* 12550	11060	- 1	177.57	* 1400	8900	36
3000					1 8450	7950	* 8500	5300	* 5500	3050	1 6368	3500	77067
120					+ 18150	17150	* 14150	11480	+ 12368	8050	* 1688	7700	301
1683					. 6650	7589	* 7300	. 0000	5908	3150	* 4000	3490	9081
- 60					+ 21450	16200	+ 16750	10960	12460	8650	* 11258	7450	301
0					* 10650	7300	+ 7900	4560	5700	3650	1200	3450	706
0					* 23100	10700	* 16850	10680	12300	7900	* 1955	7800	311
-1093			+ 11300	11300	+ 10806	7250	* 7900	4500			1908	1750	7361
-60			* ,25800	* 25800	+ 22700	15683	16850	10580			12564	8300	250
-3000			* 13150	* 13160	+ 9660	7360	* 7050	4550			* 1000	4500	6471
-100			Y 20600	- 2850	* 20650	16869	- 15100	10700			* 13900	10800	260
-9590				-	+ 7500	+ 7160	-				+ 4200	4 6000	490)
-100					14550	16550					* 13568	1 10550	200

Illustration 83 g06224891

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift OFF

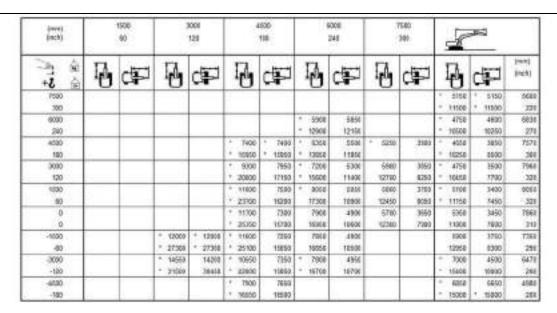


Illustration 84 g06224893

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift ON

108

900 mm (35 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

(ant)		1630 68		1006 120		1580 180	9890 240			1500 300	8		
-3 k	14	œ	1	œ	12	æ	14	Œ₽	120	æ	4	d I	(mm) (mm)
7100											+ 4/50	+ 4710	550
300											+ 10850	4 90000	231
5000							* 5350	* 5360			+ 4950	+ 4356	683
249					Linear State		* 11700	* 11780	Language Control		* 1900	+ 9684	271
4500					- 6190	* 6708	* . \$750	5680	* 4001	3512	+ 4250	3990	7511
188					* 14190	* 1600	* 12550	12500		- 577	+ 5400	9650	30
3000					* 8450	8068	+ 6500	5350	- 5660	2800	+ 4350	3560	790
120					+ 19150	17400	* 14100	11550	1 12360	6369	9600	7660	325
1000					9960	7000	1 7300	5190	\$200	3800	4650	2466	900
60					* 25650	16400	15750	11000	12000	2102	1 10250	1980	30
					* 10650	7466	7 7800	5000	5800	3706	+ 6200	3584	796
9					* 23000	1968	4 19850	10789	12660	8000	+ 11450	1790	311
490			* 1000	+ #1360	1 19090	7800	* 7900	4560			- 8800	3696	739
40			* 25808	+ 25800	* 22100	19058	1 16850	10660			11000	0480	29
-3000			+ 13153	+ 13150	9150	.7508	* 7950	5860			+ 6300	4680	5477
128		-	- 58500	* 28900	- 20160	16100	* 16:100	10657			1,900	10199	204
4500					7190	* 715E					* 6200	* 6298	490
-193					14150	1 1861					1 13550	* 13000	200

Illustration 85 g06224895

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift OFF

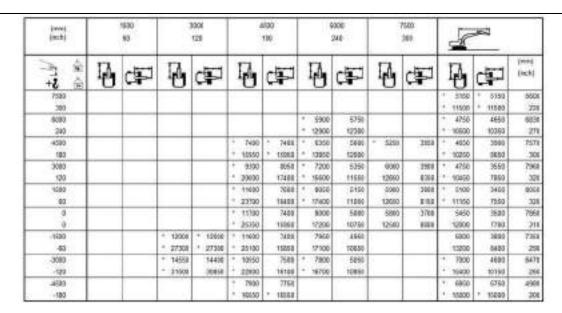


Illustration 86 g06224896

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift ON

Reach Boom with a 2.9 m (9 ft 6 inch) Stick and 4200 kg (9260 lb) Counterweight

600 mm (24 inch) Single Grouser Shoe (14 mm (0.6 inch) thickness)

Smell Sinchil		500 66	5.00	120	1 3	7500 100			000 140		1900 300	4	لحق	
) A	14	di	4	d	4	田	Ę	à	d	4	æ	4	æ	(sea) linch)
7500							1. 1	4550	4550			3990	1990	46
300												6750	* 1750	240
5000	-						1 4	4550	4990			3650	3650	7250
240							1 1	0850	10850	1		9050	* 8090	290
4500							11.3	5450	5450	5100	3850	2600	3500	7500
100				51 3	Orac System	G 1016-2	. 1	1000	11700	* 11200	8250	1 7900	7700	320
3000					+ 7900	7900	7 8	8258	5200	* 9450	3750	3850	1200	8380
120					17050	17050	. 4	3500	11200	* 11000	9000	1 0050	1000	330
1500					1 9000	7400	* 1	1050	4950	5050	3950	2000	3100	0400
60					* 20650	T5850		5300	10700	12150	2850	8990	1750	340
0			1 6250	1 6290	10590	7900	1 7	7650	4900	9990	3950	4300	3150	8290
a			1 14350	* 'H380	+ 22100	6380	1	6500	10350	11250	7650	5450	1900	330
-1500	5700	5700	* 10600	10000	10000	7050	-	7500	4750	9990	3990	+ 5890	3400	7790
-60	* 14900	* 14900	1 24450	24450	22990	550	1	6300	10200	11900	7600	1100	1450	310
-3000	19450	* 19450	1 14050	13790	9150	7100	1 1	7400	4750	(000000)	1	6050		6550
-000	* 25650	* 25650	* 30450	25050	* 21450	15300	+ 8	5850	10250	Ø		* 13300	8750	280
-4500	2000		* T200	* TI250	1 8050	7300	-	102		7 7	10	6100	5490	5800
-100			1 24000	1 24000	1 1750	42600						* 10400	12250	226

Illustration 87

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift OFF

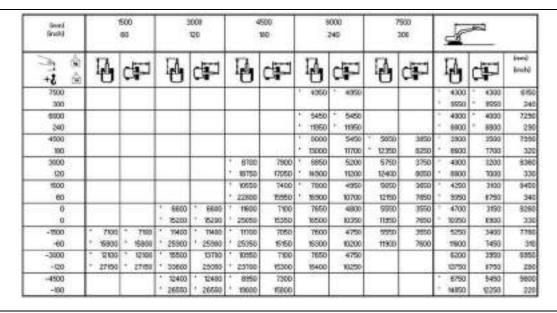


Illustration 88 g06224822

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift ON

600 mm (24 inch) Double Grouser Shoe (13 mm (0.5 inch) thickness)

loved Snothl		500 60		120	9	1900 190			900	100	500 308		F	362	
<u>}</u>	16	æ	1	æ	4	æ	1	0	ď	1	æ		4	dD	Snohl
1500							-	4550	4558			7	3950	1 3550	6150
500									10000			+	8750	* 6750	24
6000	11						7	4950	4968	9 7	100	1	3850	1 3650	729
240							+	0050	, X0625	Se our	100	*	1050	* 8050	290
4500							-	5450	5458	. 2500	360	-	3600	3500	733
790	10 1						-	18800	71700	. 40300	8250	-	7900	T700	328
3000					7300	7900	7	6250	5200	1 5450	3750	7	3990	3500	8390
200	1.1				+ 17050	11000	-	10500	TODS	* 11050	8850	-	8050	1000	330
1500					+ 9600	3400	-	7050	4950	5650	9890	-	0900	3/00	0400
60					1 20880	15990	+	15300	10708	1250	7850	٠	8990	6750	34
. 0			6250	6290	1 10500	7100		7850	4808	5950	3950	T	4300	3/50	8290
0			* 14350	* 14350	+ 22700	15300		H500	10058	11950	2650	ŀ	5450	6300	33
-7500	* 6T00	6700	* 10800	10000	10000	1050		7900	4758	9500	3550	-	5050	3400	7700
-60	+ 14800	14900	* 24450	* 24450	+ 22950	16150		8300	10200	11900	7500	÷	1100	7450	31
-3000	1 19450	1 11450	* 14050	19790	9950	7100		7400	4750	7 7 7		т	1050	3950	6990
-120	* 25650	. 52620	- 30450	25390	- 2950	15300	-	5850	10058	B		-	12300	8750	28
-4500	-		* 11000	* 1000	. 9020	7300	Т					-	£100	5450	5900
-190		6. 6	- 24000	* 24000	1750	15750	1			J			13400	12200	22

Illustration 89 a0622481

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift OFF

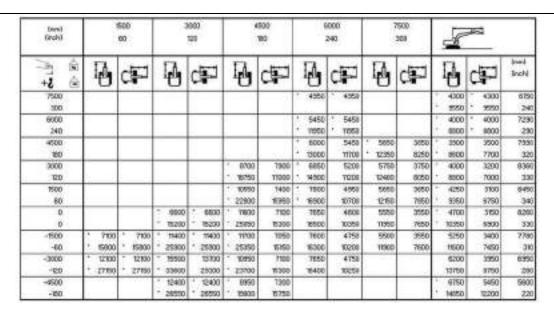


Illustration 90 g06224818

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift ON

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600 mm (24 inch) Triple Grouser Shoe

inelt tinchil		500 60		1000 120	1 3	1900			000 240		1500 300	8	-	
è e	14	ď	0	æ	4	æ	1	4	ďP	1	di	P	di)	(me) (inch)
7500							-	4550	4553			3950	1 3850	678
300												" BISE	* 6750	240
9080	ii 0						4	4990	4960			3650	1 5650	729
240							+	10050	1 10053	3		9050	. 8050	290
4500							-	5450	* 5450	5 5900	3650	3000	3500	7900
160						-00	-	11800	11700	· 1050	8250	7900	7700	325
3000					7300	2900	-	6250	5200	5450	3750	, 3665	3200	0300
120					17950	17000	-	19900	7000	1860	8090	8060	7000	33
1600 ·					- 9800	5400	+	7090	4963	6660	3660	3900	8100	8450
60					* 20650	6350	+	\$300	50700	6.40	7050	1 0500	6750	360
0			* 6250	* 6250	10500	-7100	*	7650	4800	5580	3550	4306	3750	8260
0			- 14300	14350	- EZ700	8300		16900	10050	1990	7650	9450	8800	33
-1500	6700	9 6700	1 10900	10800	10600	1090	П	7900	4750	5500	3690	9050	3400	7780
-60	14500	· M300	* 2960	- 2460	22950	15150		B300	10/50	7000	7900	1100	THEO	31
-3600	1 1450	11450	* 14050	19700	9990	7100	-	7400	4750			6050	5990	699
-100	+ 25650	* 36000	* 30400	29900	2960	16300		19850	10250			1 13300	1750	200
-4500			+ 11200	* 11200	9050	1300		100				* 6700	5450	5500
-80			* 24000	1 24000	1750	16750						· 13400	11200	225

g06224766

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

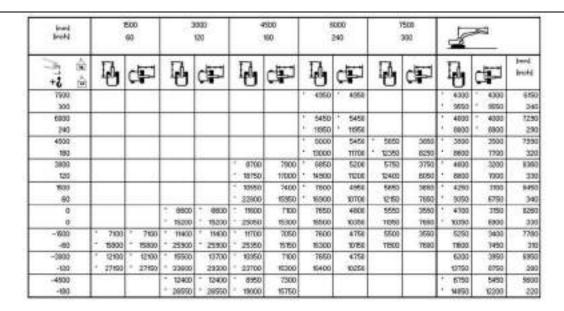


Illustration 92 g06224771

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

Product Information Section
323 Reach Boom/Variable Angle Boom/Super Long Reach Boom

112

600 mm (24 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

Ined Inchi		1500 60		120	91	180 180			240 240			7580 300		4	-	
- A	1	æ	6	田	16	B		10	¢.	1	6	æ		4	ď	(inch)
7500							1	4550	455	0			T	3990	1950	6754
100							l.,			1			+	6750	1,6750	241
6000								4950	435	0			1	3650	1980	7290
240							*	10850	* 1085	0			+	8850	* 8050	250
4500							-	9490	.535	0 .	9490	3800	+	3600	3450	7996
190				-			-	11800	1199	0 '	11230	8:50	+	7900	1950	321
3630					7 7900	7800		6250	58	0 -	5450	3100		3650	160	6366
120					17050	16750	1.	19900	7105	0 .	11850	1990	+	8890	6800	336
1900					* 9600	1300	+	7090	490	0	8880	3600	+	3900	3086	2450
60					30650	15700	ŀ	\$300	1050	0	11860	7700	ř.	8990	6650	340
0	3		6250	+ 6250	10500	7000	Г	7550	470	0	5450	3500	+	4300	3100	8280
0			1 14350	14350	* 22100	19100	L	6200	1010	0	9050	7500	+	9490	6750	330
-1900	4 6700	° 6706	1 10900	1 10900	1 40600	6960	Т	7490	-995	0	9490	2450	3	5890	1000	1790
-80	* 14500	14000	1 24453	* 29450	+ 22550	14000	l.	16050	1000	10	10700	7500	÷	1100	7300	31
-3000	+ 19450	* 1458	1 14050	13450	+ 9950	7000		7400	470	0			+	6050	3900	6960
-120	1,25650	15868	1 30450	20050	* EH50	15050	-	5050	1010	0			ì,	10000	1600	200
-4500	-	-	* 46500	* H200	* 8050	7200	т	-	-	+			T	6100	\$350	5800
-180	0.00		24000	* 24000	1760	19500	Į.			П				13400	10050	221

Illustration 93 g06224830

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

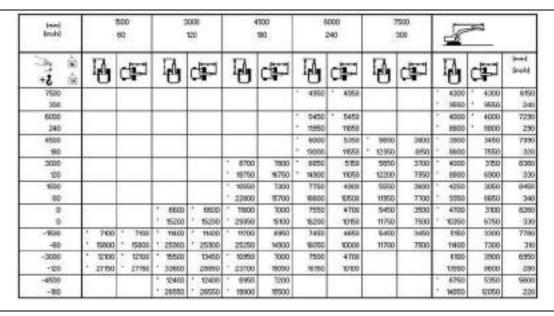


Illustration 94 g06224831

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

M0068104-12 113 **Product Information Section**

700 mm (28 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

Inini Brohil	12	500 60	1 33	120	50	1900 190			000 240	1.5	7500 300		8	302	
A) (8)	14	æ	4	æ	16	æ	1	4	æ	4	æ		0	ď₽	(me) (me)
7990			-					4590	4550		-	1	3950	1950	6750
300												+	artso	1 8750	240
6000	V						-	4950	4550	5		+	3650	+ 3650	725
240								0850	* 10853			11	8050	8050	290
4500								5450	5450	5100	3500	1	3000	3550	7990
180	de la				1077727		-	11500	* meco	. 10303	8400		7500	T800	320
3080					* 7900	* 3900	-	8250	5300	5490	3800	7	3650	1250	8390
120	H 5				17950	* 11050		10500	11400	1000	6200	1	6050	760	330
4000 ·					* 5900	7500	-	7050	5059	5750	5790	1	2000	3/50	0450
80					1 20650	8200		15300	10850	12350	7980	9	8550	8800	340
0			* 6250	* 6250	10900	1290		7990	4900	5680	3600	1	4300	3200	8260
			* 14350	* 14350	° 22700	75500	-	10000	10509	12750	7800	+	5450	1000	330
-800	6700	5700	* 10500	10800	10800	7150		7700	4500	5880	3600	+	5050	3450	7780
-60	1 14800	14900	* 24450	24450	22950	15400		9600	10350	12100	7750	1	1100	1550	310
-3000	* 1950	* TH50	* 14050	13300	3950	1290	-	7400	4850	7	1000	1	8050	4050	6950
-920	+ 25850	* 25650	* 30450	29800	* ZW50	4550	-	5000	10450	5		+	13300	8500	280
-4500	DICE AND	-	* 11200	* 11200	8390	1490		200			-	4.	6100	5500	5600
-100			* 24000	1 24000	17950	9050	1					1	13400	12400	220

g06224774

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift OFF

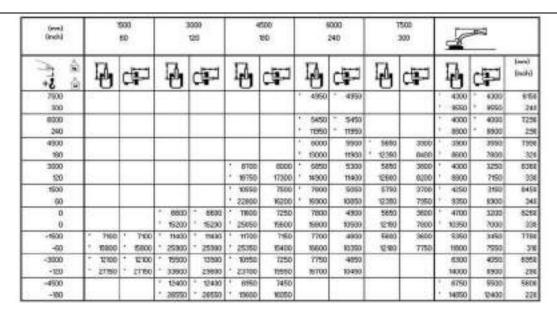


Illustration 96 g06224789

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift ON

790 mm (31 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

Iranò Enohè	1 2	500 60		120	5.	1900 190	10	240 8000	1 3	7502 300	A	J62	
3 6	4	æ	4	æ	10	æ	14	¢₽	4	æ	8	田	(mel)
7500							4990	+ 4550			3960	1960	619
300											8760	1 8750	240
6000	77						4350	4553			3650	3650	729
240							10850	1, 10853	S=3226		8050	8050	29
4500							5490	5450	5100	3350	2000	3600	7990
100	8				1000	-770-7	* 11000	1 1000	, 4500	8500	7900	1 7900	33
3000					* 7900	* 1900	* :6250	5350	1 5480	3850	3650	5300	8360
120	1				17050	17050	. ,0200	1000	1 1000	0000	8050	7250	330
1000					9900	1990	* 7050	5100	5860	9750	1 3300	1200	0450
80					20650	16400	* 18300	7000	12580	8080	8550	8950	340
0			+ 6250	+ 6250	10900	1390	1 7990	4959	5780	3660	4000	3250	8260
			14350	14250	22700	2200	- 19500	10653	12300	7900	3450	1100	330
-B00	* 6700	5700	* 10800	* 10800	10500	1250	7900	4850	5700	3650	5050	3500	7700
-60	14900	14900	* 24490	* 24450	22990	19900	19900	10500	12250	7650	1100	7660	31
-3000	* TM50	* TM50	* 14050	* 14050	3550	1300	7400	4300		1000	1 805D	4100	6350
-920	* 25650	15650	* 30450	3050	* 2W50	16750	* 16850	10880	S		13300	3050	200
-4500		-	11200	* 11200	3050	1990	177.00	1			, 6,00	5600	5600
-400			* 24000	1 24000	17950	96250					10400	12600	220

Illustration 97 g06224797

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift OFF

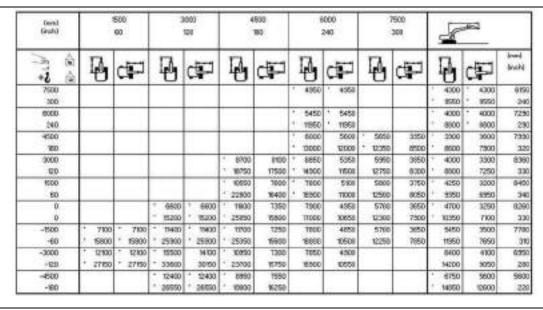


Illustration 98 g06226043

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift ON

900 mm (35 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

brand Brochil		500 60		120		180 180			000 240		7500 300		1	_	
3 6	4	œ.	4	æ	14	dia	1	4	di	4	œ		4	diam's	(moh)
7900							-	4990	4999			1	3990	1980	616
300												2	6790	* 6760	241
6000							1	4350	4350			大	3850	1 3650	729
243								10850	10890	B-00	0.00	1	8050	1 1050	29
4500							4	5450	5490	* 5mx	4030	1	3699	, 3600	1000
100								11000	* 11000	* 9000	9650	4	7900	1 7900	321
3032					7 7500	. 1900	7	6250	5400	5450	3850		3850	3350	8368
120		- 2			17050	10050	1	13500	11700	11990	8490		8050	1350	33
9000					9000	7700	1	7050	5000	9800	2000	Т	2900	1050	040
00					* 20650	16650		5300	11150	1 12700	6000	+	8850	7100	340
0			1 6250	6250	10500	7450	-	7650	9000	5800	3790	1	4300	3300	826
0			* M350	1 14050	* 22700	16000	-	10000	10000	12500	8000	1	3450	T200	300
-9500	4 6200	6706	1 10000	10000	, 40000	7350	-	7090	4950	5000	1700	T	1350	3550	7700
-00	* 14900	14500	* 24450	* 24480	* 22560	15050		16950	10050	12450	7990		1700	1800	51
-3000	1 19450	* 11458	1 14050	14050	9950	7450		7400	5000		0.00	1	6050	4150	6954
+620	25650	. 12888	1 30450	1 30450	* 2450	16000		5050	10750	0		1	12000	5/50	260
-4500	-		. A7500	* 11200	* aosa	7650	1	-				T	5300	5650	580
-190			+ 24000	T 24000	1250	16450						4	13400	12750	221

Illustration 99 g06224800

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift OFF

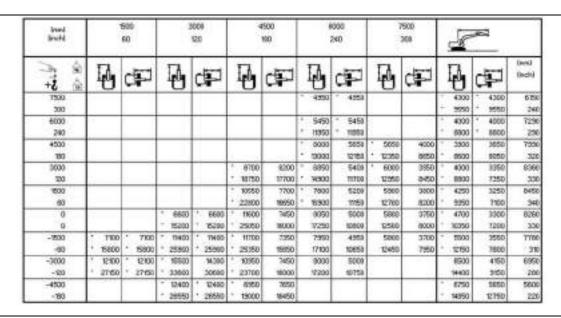


Illustration 100 g06224801

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift ON

Reach Boom with a 3.9 m (12 ft 8 inch) Stick and 4200 kg (9260 lb) Counterweight

600 mm (24 inch) Single Grouser Shoe (14 mm (0.6 inch) thickness)

(ma) (mak)	1.5	60 80		B0		160	3:2	240 240		100	1.2	183	F	2002	
7 8	4	dia	P	ď₽	14	æ	1	c#P	P	dip	4	æ	4	ď	Smell Smell
7500	1.00		1,000		7.5		****	-	7.0		7.10		* 2700	1700	110
300									واعتسمون	- 42			* 8000	* 8000	25
8000									4050	7500			2550	2550	630
240									1, 1750	9400			* 5500	1 5500	30
4500									1 4300	3050			2500	* 2500	. 850
180						-0.00	2006	0.000	1350	6250	00000		5500	5500	- 35
3000					9600	9400	* \$500	\$200	9 Y700	3700	7500	3750	2550	1 2550	525
120			Section 2	econor.	1 0000	* 10550	* 9450	7200	1 16250	1950	* 8500	5500	* 5500	5500	- 37
1600			1250	1250	£306	3450	1250	4900	\$250	2550	4050	-2700	- 2700	2550	233
60	- 4		1 22000	1 2200e	* 11900	9000	* 10500	9550	1 9350	7600	7. 7750	5750	* 5050	9550	30
-0			7 7600	1000	* 5050	1000	1 1050	4550	5400	3400	1 3000	2650	2500	2550	310
. 0	scany'i	ective to be	11400	11400	28500	8006	* R250	8000	1600	7306	6500	3050	6400	5500	28
-600	7 \$700	1 5700	9000	3000	10000	6750	3400	4500	5300	3350			2300	2700	877
-60	10700	12700	* 22250	1 22250	22250	YEST	15050	3700	1450	780			1 1500	5950	35
-3000	2500	8500	13650	10050	. MAD	(750)	1350	4500	5300	3350			4050	3050	800
-120	7 90000	9900	1. 36950	21900	7 25900	16000	15000	5050	9450	760			9 5000	8000	30
-4500	. E300	, 35300	" DED	. nee	* 3950	6050	1 6700	4550	-	1000			1 5450	3650	601
160	25050	* 35050	28300	28300	* 960e	14000	16250	9550					* \$200E	8500	21
-6000		-			1 6450	1 9450		75.00	- 1				1 5700	* 5700	- 40

Illustration 101

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift OFF

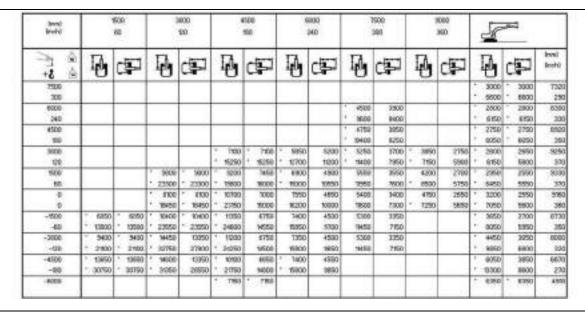


Illustration 102 g06224645

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift ON

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Product Information Section

600 mm (24 inch) Double Grouser Shoe (13 mm (0.5 inch) thickness)

Tend Srefd			60 60		100 120	0.0	100 100		240		100		1600 360	18	-	
	20	16	ø	4	æ	10	ďP	10	di	14	c F	4	ď₽	1	c₽	insi inshi
7500	7	-		-		-				1000		-		2700	2700	732
300	- 1				100					0.000			-	. 2000	9000	250
8000	Т									+050	3200			7550	2550	830
242	-1				-					9750	9400			1 5600	1 9000	330
4500	т									* 4300	3058			1 2500	* 2500	892
190	-1					1000		1000	1	9390	1250		- 1	5500	9500	.39
9000	т					6400	* 6400	* 5300	3200	4700	1700	* 3900	2790	2560	2950	329
100	-1	-		10000	9.50007	13990	1 10890	1 145	1000	- 10090	7956	* 4900	8900	5600	+ 9900	370
1900	7			3290	9250	6300	7450	1 6256	4900	\$250	3660	#050	2300	2700	2990	300
60	-1			* 22000	22000	T/900	16000	* 10500	10550	1050	7600	* 7750	5750	1 5880	9550	37
0	т			7500	1500	- 9950	7000	1050	4650	5400	3400	* 3800	2890	2500	2550	2150
0	-1	_		19400	19400	20900	15060	* BUSE	10000	7500	7300	+ 8800	5850	1 5400	5800	380
-6500	7	5700	5700	9800	1000	* 10000	:6750	3400	4500	1300	3068	-		1, 5300	2700	6730
-60	-1	12700	12200	22250	22250	* 22250	H550	8052	1700	1950	760			7,7300	1950	350
-3000	7	8500	- 0800	10050	10000	* 1050	6750	-1550	4500	5300	3350			1 4050	3050	6000
-90	1	10000	+ 19900	1 30160	27900	2900	16500	6751	5650	1990	760			9000	9900	300
-4900	7	12300	12990	1 10160	1 1760	9450	9990	470	4990		-			1 5488	3950	- 6670
-100	-1	29050	29850	18300	. 38300	19900	14000	1 1655	1950					1 :2000	9900	270
18000	7	-				* 6450	+ 8453	-						* 8700	+ 97000	137

Illustration 103

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift OFF

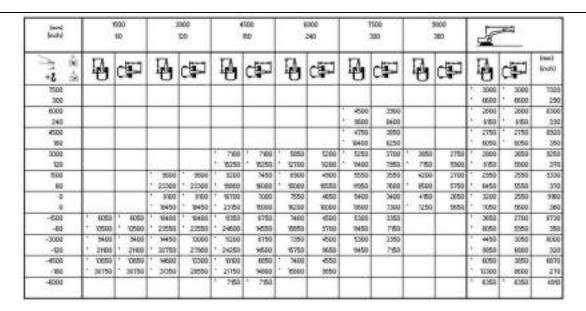


Illustration 104 g06224641

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe

118

lend Brohil	1.5	80 80	1.0	120 120	111	160	10.5	900 340		100		160	1	244	
A 84	1	ď	10	œ.	1	ď₽	10	æ	P	ď₽	14	di)	14	ď₽	(Inchi
7500	-				-		-		-				* 2700	- 2700	T12
300									DOMESTIC:	10.151			, 8000	- 8000	250
5900									+950	2500			2550	2550	530
240									8790	9400			* 5600	· 9900	23
4500									* 4300	2850			* 2500	* 2500	882
100					1000		22000	14,51	2390	5250			5500	- 5500	39
2000					7 9400	8400	* 8300	- 5200	4200	0790	1 3600	.7750	° 2960	* 2950	929
100			COLUMN COLUMN		10000	1 12050	9450	1900	* 10250	7950	1 4500	\$900	9600	- 9900	37
500			5290	1250	1 8300	3450	6250	4900	1 5250	3660	1 1000	2700	2700	2550	123
60			* 22900	* 21000	1 17900	9000	* 19900	10950	* 1090	7900	+ 7790	\$750	* 5950	9990	350
- 0			7900	1 7600	1 5650	1950	1050	4990	5400	3400	1 3800	2600	* 2900	2990	- 2100
			4 17400	10400	21900	15000	16250	10000	1600	7900	4600	1060	6400	9900	360
-7500	5700	5700	1 9800	5 5500	1 10300	1750	1350	:4900	:8300	3350			* 3300	2700	8730
-60	- 12700	* t2700	* 22290	1 22250	22250	M580	W850	1700	11490	7180			+ 5300	9950	750
-3900	- 8900	- 6900	* 13850	10000	1768	1750	1350	4900	5300	3390			4050	3050	9900
-00	19900	- 19900	- 30950	27500	* 21900	1600	8750	3650	TH50	780			* 9000	8800	150
>4500	* T2900	- 12900	11150	1, 10/80	7 5780	8850	1700	4950	-	-			1 5450	3850	8870
180	- 25050	- 23050	- 28300	28300	19600	14800	14250	9850					. 2000	8800	270
-6000	-	-	-		1 8450	7 8450	-						* 5700	7 5700	4910

Illustration 105 g06224603

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

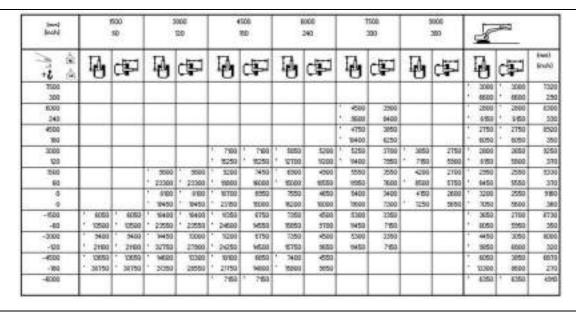


Illustration 106 g06224611

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

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Product Information Section

600 mm (24 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

(nerd (linch)		- 1	60 60	1000	100	100	110		9000 240	276	100	1.0	160	4	==	
-	4 6	4	di P	10	diam	4	ď₽	P	c₽	4	dip	10	dip.	1	ď₽	Danii Drafii
7590 300	T													+ 2190 + 6000	' 2700 ' 5000	750 25
6000	+	_		_			_		_	4050	3850			2550	11 0 3000	83
340	-									+ 9750	8250			* 5800	5600	- 3
4500	_									1 4300	3000			1 2500	1 2500	- 85
100	- 1					- 7000	2000			1 3350	PIDD	and part		5500	5500	1.3
3000	_					9400	7 (6400)	5300	9400	* x700	5950	3900	-2700	1 2990	1 2660	90
120	-			or other	and the	" t0950	1 10000	1 11450	1000	1 9050	7000	* 6900	0000	1 5800	1 5660	3
1000				1 2050	1 5250	8000	7300	1 6250	4000	1 5250	3500	4050	3690	2300	2500	-93
80				* \$3000	- 23000	*- 17900	15750	+ 10600	10350	7: 9358	1460	* 1790	5890	5890	\$450	- 3
0	1			9900	900	9880	6890	1 7090	4600	\$300	1350	, 3800	2900	1 5900	2500	- 31
0	_			19400	19100	. 50900	10790	15250	3050	9400	1200	* 6600	1990	+ 9400	9900	- 3
~1900.	١.	5100	. 5100	. 5500	5900	* 10300	8890	7250	4453	5200	3250			5300	1680	.07
-90		12700	, 25300	12250	* 22250	- 22250	14300	19550	9580	7250	7000		-0	1 7300	5860	- 2
-3000		8908	6900	19650	13900		.6900	7290	4400	5000	3250			4890	3000	80
-120		19900	19900	. 20950	27400	. 5900	14250	15500	3450	W250	1050			* 3000	6850	3
-4500		12900	. 5300	. Den	13100	- \$150	6750	5 6700	600					1 5450	3800	80
-190	_ !	29050	29050	, 18000	20100	19900	14850	* N250	3100				- 0	12000	8450	- 2
-6000						5450	1 6450							1 5700	5700	45

Illustration 107

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

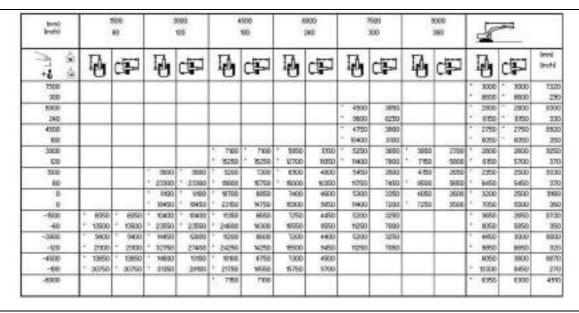


Illustration 108 g06226062

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

700 mm (28 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

Ored (inch)		100	100			900 90			600 800			900			586 200			900	18	8	*	3	
A1 08 00	120	1	孠	Ę	4	æ	1	ð	di P		4	dFJ		4	ďP	1	0	中		4	C	F	(moh) (moh)
7500	-	+			-			-		t			Н	-		t	-			2190	-	2700	732
300	1	4			_					L									4	5000	*	9000	25
6000		\top								Т			-	4050	1000	Г			+	,2550	*	2550	830
240	1							- 4		L	- 4	- 4		9750	9500				4.	5000	+	5000	33
4530		Т								Г			-	4300	2000	Г			+	2500	+	2500	193
100								-5-31		L	-33-0	1990	+	2090	9359			100	+	5580	*	\$500	35
9000		Т						6400	* 6430	1	1300	8300	-	4300	3750	*	7500	2900	*	2560	*	2950	: 825
100	1					CHILD		13950	+ 13890	ŀ	1960	1400	+	10090	8068	+	8900	4000	+	5600	+	9600	37
1900		т		" 9	1963	850	-	8900	7990	П	4250	5000		\$250	1600	F	4050	2790	1	5799		2600	880
50				1 22	5000	. 13000		11900	16250		12500	18700	-	1050	7750	٠	7750	5850		5880		9850	37
g		Т		* 1	900	1500	-	5550	7700	1	7052	4750		5500	7450	*	3800	2700	*	2500		2500	318
g.			-	+ 10	490	19400	. :	20900	15250	Ŀ	9250	16200		1850	1480		8800	5790		5400		9700	36
-Y500	579	00	5700	7 3	1000	1 5000	-	10300	.0900	1	7500	4500	Г	5400	3400	Г			*	5300		2750	973
-00	. MA	100	12700	1 22	250	22250		22250	14000	ŀ	950	2300		1850	7300			-	*	7300		6100	35
-3000	. 600	00	6900	. 10	1050	13250	-	REO.	0850	1	7450	4550	Г	5400	: 3400					4050	П	320	. 000
-90	1,100	100	19900	1 10	949	26068	5.	2900	10790	Ŀ	9068	9900		1990	7100	L			+	3000		4900	32
-4600	1.10%	00	15900	4 6	990	1 050		3450)	7000	1	4700	4990	Г			Г			1	9450	П	3300	.887
-90	2500	0	29850	1 28	1300	1.26000		19600	16060		1050	10050	ŀ						9	5000		9750	27
-9000	1	T					-	6450	* 8493	Г			Г						+	5780	+	1700	18

Illustration 109 g0622461:

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 4200 kg (9260 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift OFF

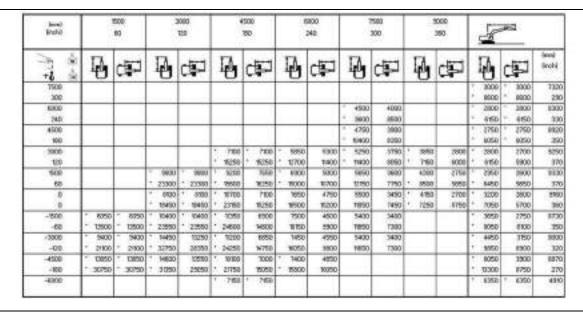


Illustration 110 g06224615

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 4200 kg (9260 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift ON

790 mm (31 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

(ratio			89				125				500				800 940	Ü			580 100			000 160	8	8	×	a ·	
79 6		4	¢	P		10	¢	ş.		1	di	p	1	4	d	p		4	æ		4	ď	5000	4	c	P	(lend (lend)
7500	t	-	Т	-	Г	7,777	Т		Г	-			Т	-				7 - 7 - 7 - 7		Т	1000		T	2700	Ŧ	2700	732
300	L		L		L		ŀ									- 1		ome						9000		8000	25
1000	т		Г		Г		Г		Г				Г					.4050	+650	Г				2550	-	2550	100
260	L				ŀ		Ŀ										4	4750	9600	l			15	9600	-	9900	30
4500	т		Г		Г		Г		Г				Г				15.	4300	3990				+	2500		2900	100
100	Ł						L	- 4		- 4						- 1	٠	1250	1450	l			-	9500	-	9900	2
3000	T		Г		Г		г		1	8400	7	6400	-	£300	-	5300	-	4200	3800		2500	:2050	۳	. 5550		2950	- 50
100	L					den	ŀ	704	+	13860	. 1	1950		1950	+	1450	-	10250	0150		4600	9100	+	9600	4	9900	10
1600	✝		т		-	3620	-	3250	T	8360		KAR	1	6250		9050	7	5250	3650	r	1050	2758	T	2700	$\overline{}$	2900	10
68	L				-	22500	+	22000	+	17900	7	1458		12500		MOSO	-	1050	1850	٠	1750	5550	+	5850		5750	3
. 0	T		Г		+	7900	+	7600	٠	5550		1200	+	1050		4800		5800	3500	٠	3600	1700	+	2900	г	3850	- 59
0	L		L		4	17400	+	17400		20900	- 1	5450	-	10250		10000		12900	1990	ŀ	5600	8800	+	9400		8800	36
-/500	TΞ	5700	F	5700	7	-9800	7	9500	•	30300		1000	-	7500		4850	_	1500	3450	r	-			3500	г	3800	873
60	-	12700	-	12700	-	22250	٠	22250	٠	22250	1	9000	-	10250		10000		1800	T400	ļ.		-	٠	7300		650	35
/3300	t٠	8900	-	8800	7	13650	-	10400	•	10150		1950	-	1450	$\overline{}$	4500	_	5800	3450	1				4050	г	3750	880
-00	-	1000	-	10900	+	30950		20750		27900	-	050		WEG.		9950		1800	7400				+	9000		1000	37
-4500	t٠	12900	-	12900	7	1150	7	1950	•	580		7100		1700		4700		-	-	Г				3450	г	1950	657
-100	1-	25050	-	25050	-	28300		28300		10000	7	1250	-	W250		6200				L			٠	2000		8850	27
-4000	1	-		-			-	-	1	9453	1113	6450		-						П			+	5700	=	\$700	43

Illustration 111

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 4200 kg (9260 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift OFF

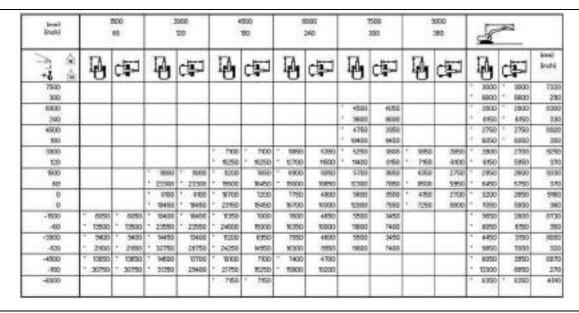


Illustration 112 g06224624

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 4200 kg (9260 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift ON

900 mm (35 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

lend Snoh)	1	60		120 120	1 7	1500 180	4.0	5800 240	1	300		9000 360	4	-FG2	
-3 A	P	di	14	æ	4	4	P	中	14	œ	4	æ	4	æ	tion) (mah)
7500		-	-		-		-			-	THE REAL PROPERTY.		1 2700	2790	.9300
300													. 6000	. 6000	290
6000									4050	* 4050			* 2980	* 2550	8300
240									0.750	0750			* 5800	* 5600	000
4500									* 4300	4000			2900	1 2500	8920
160									9350	8800			* 5800	* 5500	390
3000					6400	5400	5300	5300	4700	3850	3900	2500	2950	2550	5050
120					13990	13950	* 1450	1450	* 10250	8000	4 6900	6200	5600	* 6660	- 370
1500			* 5250	9250	6300	7750	- 8250	5700	* 5250	3700	4050	2800	* 2790	2650	9330
60			- 22000	* 22000	17900	16700	10500	11000	* 11950	7950	+ 1750	9050	. \$850	5850	300
			T 7800	+ 7600	9690	7105	* 7060	4900	9880	1950	1 3800	- 2760	2900	2790	9160
		AND SECTION	- TT400	+ 17400	20900	15700	15250	10500	12200	7700	. 9800	5900	5400	5500	300
-800	5700	* 5300	* /5000	* 5000	10100	7100	7500	+75D	9600	3500			2300	2650	8130
-60	+ 12700	12700	- 22210	* 25290	22290	19290	10210	10200	10000	7900	U.	. 3	* 1300	6250	390
-3000	+ 8900	+ 6500	+ TS850	13600	10150	7050	7450	+700	5600	3500			1 4050	3250	5000
-900	1 19900	+ 19900	* 30950	29'50	2800	15200	10'50	10100	93000	7900			* 9000	790	320
-4500	10900	, 55,000	13/60	1380	350	7390	9100	4600	17000				1 8490	4050	serio
-100	* 29050	* 25000	* 28000	* 20000	10000	15500	1 1050	10150					* 10000	9000	270
-6000		-			6490	9450							1 \$200	* 5790	4910

Illustration 113 q0622462

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift OFF

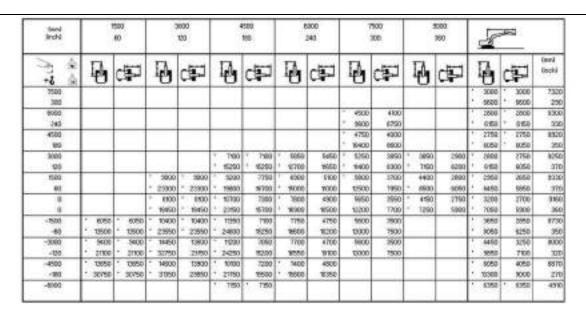


Illustration 114 g06224637

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift ON

Reach Boom with a 2.5 m (8 ft 2 inch) Stick and 5400 kg (11905 lb) Counterweight

M0068104-12 123

Product Information Section

600 mm (24 inch) Single Grouser Shoe (14 mm (0.6 inch) thickness)

Eninů Enchů		1500 160	100	120	50	1900 1910	0.0	8000 240	193	7500 300	F	<i>3</i> 63	
- A	4	d I	1	ď	10	ďP	4	di	4	æ	4	ď	(inch)
7990										-	4750	* 4750	560
300											10550	10550	22
6000							5350	10000			4350	4380	683
240					- 500		11200	, 2000	1	- 1000	9600	9600	27
4500					. 6500	1700	5750	5750	4600	++00	4250	+250	121
90	15				14500	. M200	* T2550	12553		9700	. 2400	9400	30
3080					8450	1450	8900	586)	, 2680	4390	4350	4000	798
100	1				. Mit20	. 8120	* MISS	12883	, £320	9350	, 3000	1750	329
1000					9950	1900	* 7300	\$753	. 8000	4250	1 4050	3650	005
80					* 21950	18300	* 15750	12350	* T3050	980	10250	3450	325
0					10650	8300	7800	9660	, 8583	4200	5300	3350	786
0					* 23000	11890	16850	12050	13450	5000	THE	5650	31
-800			* 1050	11250	10500	\$250	7,900	.5553			1 6750	4300	735
-60			* 25900	29800	22700	17790	1 19950	1960			13500	9450	29
-3000			* 1380	* 13150	19250	8390	* 7050	5850			6300	550	647
-920			* 20500	* 28500	* 20850	9000	- 15100	12/59	5		+ 13500	11400	26
-4500	-		72.50	4,000	- 2150	- 7190	-			-	· 6200	* 8200	498
-100					14950	* ×950					13550	10550	20

Illustration 115 q0622542

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift OFF

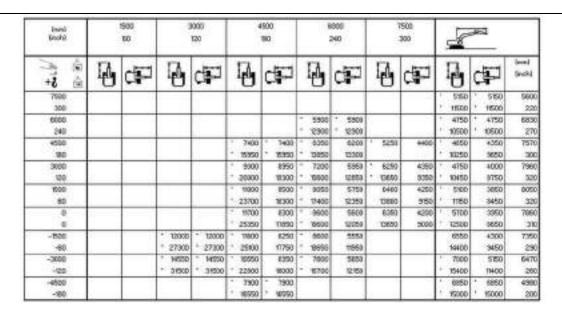


Illustration 116 g06225425

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift ON

600 mm (24 inch) Double Grouser Shoe (13 mm (0.5 inch) thickness)

(red (reh)		800 800	100	120		900 90	1.0	240 240	1 2	7500 300	1		
-) û	12	æ	4	æ	10	æ	1	Œ.	0	æ	10	æ	Inen) Inchi
2500	1										4790	1790	5600
900											40660	16890	236
6000							5350	5350			4350	4250	6630
240							* 11200	11200	S	11150	9800	5900	230
4900					* 6000	- E500	5790	5790	4800	4433	4230	4250	7510
100					1 19500	* M500	* 12990	1 12550			9400	1 8400	300
9900					9450	* 1450	* 8900	5950	* 9890	4390	4350	4000	7960
120					. 8820	- 8150	* M100	12050	12350	5390	3900	1750	38
1500					9950	#500	* 7300	5750	* 8000	4250	4950	1000	9050
60					21450	36300	15750	12350	13050	9'80	1 10250	1450	321
0					10650	1300	7900	5900	1 6290	4200	, 2500	1950	7960
0					* 22000	T1890	- 16850	12050	13450	5000	THOSE	8650	28
-1500			- 1050	+ 1050	10500	1250	* 7500	9950			+ 6750	4300	7380
-60			25800	25800	22700	17790	1 19950	11950	6		13900	9450	290
-3000			. 13150	, 1350	5990	8350	7050	5650			+ 6300	5150	6430
-120			- 28500	* 28500	* 20950	18000	- 15100	12150	S		+ 33900	1900	260
-4900	-		7000	10000	7750	* 7150	77.70				6200	* \$200	4980
-150					* 14950	* M990					10000	11550	200

Illustration 117 g06226077

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift OFF

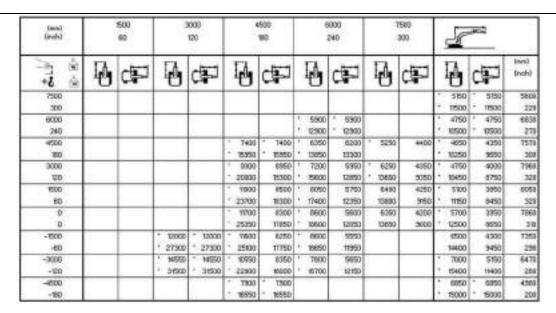


Illustration 118 g06225423

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe

look!		500 80	140	120	11 9	1900 180	1.00	1000 240		7500 300	4	1	
- A	10	ď	4	æ	100	æ	14	æ	10	æ	4	ďP	(mak)
7900	8										4250	4750	5600
300											1 90000	* 10550	228
5893	3						* 5350	5350			1 4350	4350	6630
240					ar was not		* 11700	* 11700	S		9600	1 1600	270
4500					6700	4 6700	5750	5750	* 4600	4450	1 4250	4250	7570
190	2 1				* 14500	* 1600	12550	* 12950	1 - 120	238	9400	5400	300
3000					* 8450	9450	- 8900	5990	* 9880	4390	4390	4000	1960
120	-				1 1050	1050	* NY50	12010	* 12350	9350	5600	8800	501
1000					* 9950	8500	* 7300	5750	* 9000	4250	1 4950	1000	0050
80					21450	18350	5750	12400	13050	950	10250	8500	321
0					1 10650	4300	7900	5900	* 6210	4200	5200	1950	7860
a					23000	17850	- (6880)	12100	13450	5000	THISO	8650	28
-7500			* T050	* 11350	* 10500	5250	* 7900	5950			+ 6350	4500	T350
-00			25800	25800	+ 22700	17800	16850	12000	8		13666	9450	290
-3830			12,000	1350	+ 3550	8350	* 7050				1 6300	5750	6470
-120			+ 28500	+ 28500	+ 20950	18000	- 65100	12150	S		1 13900	11400	260
-4500	·		735.10	37.00	780		-	1-925			6300	6200	4960
-190					1.14950	91950					10000	+ 10550	200

Illustration 119 g06225400

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

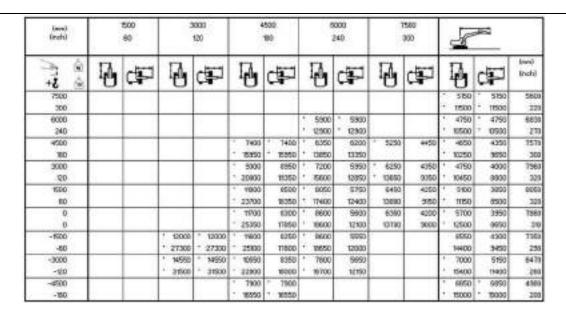


Illustration 120 g06225404

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

700 mm (28 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

Enoh)		1500 160		120 120	5.	1900 190		260 260	1.00	7500 300	8	JEST .	
A) 68	4	æ	0	æ	10	æ	4	æ	100	电	4	ď	(mail (mail)
7900			-							-	4050	4750	560
300											1 10550	1 10550	220
6000	V						5350	5353		-	4350	4350	683
240							° 11700	, 4000		2000	9600	9600	270
4500					6500	1700	3750	5750	4600	4500	4250	+250	120
180	VS 13				14500	* MS00	" 12550	* 12553	100	0.00	, 2400	9400	300
3080					9450	1450	8900	6050	1 5690	4400	4350	4050	7990
120	H 0			1	· 10150	. 8100	* MISS	13000	, £320	5450	. 3000	1000	320
Y000					1 5950	8600	* 7300	\$800	. 0000	4000	1 4050	3000	0050
80					* 21450	9550	* 15750	12583	* T3050	5250	10250	3800	320
0					10650	8400	7900	\$700	1 6283	4250	1 5200	4000	7960
				1	* 23000	100	16050	9250	13450	950	THE	5500	310
-800	7 - 7		* 1050	- 11350	10500	1400	7800	5853			1 6750	4350	7350
-60			* 25900	29800	22700	19000	19999	12:53			13500	9600	290
-3000			* 1380	* 1350	1 2000	2500	* 7050	5700			6300	5200	6470
120			* 20500	* 28500	* 20850	W250	- 15100	12300			+ 13500	1650	260
-4500			200000	- XXXXX	2750	7190	2000	-		-	. 62DD	* 8200	4980
-100					14950	* ×950					10550	1 10550	200

Illustration 121 g0622540

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift OFF

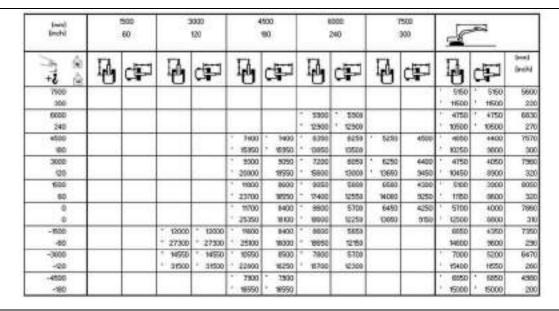


Illustration 122 g06225409

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift ON

790 mm (31 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

Smith!		500 60	1	120	100	1900 1900	1.00	240 240	11 70	7500 368	F	- C	
→ â	16	æ	1	æ	14	æ	10	dP	10	æ	4	œ	(ledt)
7500											4750	4750	560
300											- 99990	10550	729
8000	-						5390	* 5360		- 10	4350	4350	683
240					-		* 11700	* 11700	Y	2115.0	1000	1 3600	270
4500					6700	1 5700	5750	5750	1 4000	4250	4250	1 4250	757
193					+ 14500	* 14500	* 12550	12553		11.070	- 5400	4 3400	30
1600					* 8450	1 8450	9900	6100	1 5660	4450	4390	4100	.796
120					1550	* 19750	* W750	13/50	12350	3550	5000	5000	328
1600					+ 9950	6700	* 7000	5500	. 8000	4150	+990	3860	0058
80					+ 21450	19750	* 15750	12708	13050	9350	10250	8700	30
0					10650	#500	7900	5750	, 6500	4300	5800	4050	7866
0					* 23000	16300	- 8830	12350	13450	5250	1990	8900	23
-9500			* 11390	11380	, 10200	5450	7000	5700			* 6750	4400	7356
-90			* 25800	* 25880	* 22100	10200	16890	12300			13900	5700	29
-3000			13:50	13/50	9550	8550	7090	5758		177	6000	5250	647
-120			28500	1 28580	* 20050	10450	15100	10450	1		12000	1700	26
-4500				V.Doc.	780	* 780	-	1110000			* £200	4 8200	450
-180					14950	1 14950				100	13990	19880	20

Illustration 123 q0622541:

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift OFF

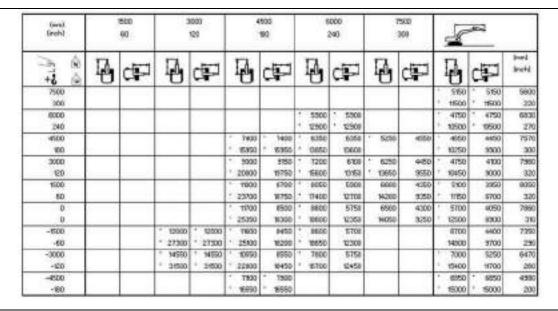


Illustration 124 g06225415

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift ON

Product Information Section 323 Reach Boom/Variable Angle Boom/Super Long Reach Boom

128

900 mm (35 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

(mm) (inch)		500 60	0.00	1000 120	- 3	1900 1900	1.00	240 240		1503 390	4	, ES	
- à	P	c#I	4	d	4	中	1	dip	10	dia	4	dip	(med) (moh)
7500											1 4750	4750	560
200											1 10550	1 0990	32
6000							5350	5350			4350	4350	683
240						NAME OF STREET	* 11700	11700	Parameter St.		9600	9900	21
4500					6700	6700	, 9120	5 9780	4800	.4600	1250	4290	757
180					1 14500	* M500	+ 12550	12990	2000	7777	9400	9400	30
3000					1 8450	1 8450	* 6500	6200	* 5830	4500	* 4050	4150	736
150					18190	1 18150	1 14150	13333	12390	9700	9600	9100	32
1600					. 8889	8600	7300	18890	* 6000	4400	1 4650	9000	906
60					2,8450	11000	1 15750	12850	* 13050	3500	10250	0900	32
.0					10650	0088	1 7000	-5800	* 6230	4350	5200	4100	186
0					22900	18550	16860	12950	13490	9350	1 11450	9000	31
-1900			1 11960	° #380	10600	8800	7000	9900	100		+ 650	4490	796
-60			. 52000	7 25800	1 22700	10450	1 9000	12450			10500	3050	29
-3000			· 1380	1350	5550	8700	* 7050	5350			* K300	5350	647
-1200			28800	* 25500	30690	18700	. 900	12900			10900	11890	25
-4500			121.00	-	1190	7150		7 1 1 1 1 1 1 1 1			* 6200	* 6200	438
-100					14950	1 MSSD					10550	19990	20

Illustration 125 g06225416

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift OFF

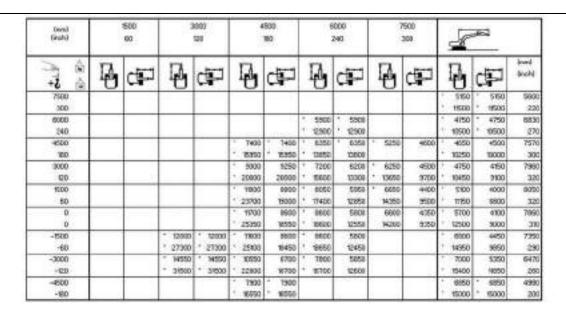


Illustration 126 g06225417

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift ON

Reach Boom with a 2.9 m (9 ft 5 inch) Stick and 5400 kg (11905 lb) Counterweight

600 mm (24 inch) Single Grouser Shoe (14 mm (0.6 inch) thickness)

lored Books		500 60		1000	1 3	180		240 240		7500 500	8	262	
-3 A	4	æ	4	di	4	di)	4	Œ	4	æ	4	di	(med (meh)
7500 300							4990	4568			9990	9750	919 34
8000					7		* 4350	4558			1 3050	4 3650	729
240							* 19850	10850	Same.		1,8050	+ 8050	29
4500							5490	5450	5100	4500	3900	, 3600	733
190	-						* 1900	* 1900	* 11200	9650	* 7900	1 7500	32
3000					7,7500	7900	1 5250	5050	5460	4400	* 3650	3550	830
100					17050	1000	10500	19000	11850	9450	6090	+ 8050	33
1600					9600	3600	* 7050	7000	9990	4100	2900	3650	945
- 60					. 50020	65250	. 2000	12508	12700	9200	* 8950	7950	34
0	2		6250	+ 6250	1 10500	8350	7 7650	5650	6750	4200	+ 4300	3700	826
0			* 14390	14360	22700	17990	19900	5:00	13300	9000	9490	8100	33
-1930	4 6700	6700	* 15800	1, 40660	1, 40600	8290	* 7950	6888	6100	4150	* 5090	4000	778
-90	* N300	1 14900	* 24450	* 24450	+ 22950	17750	* 8350	1055	13300	3000	* 9100	8750	31
-3000	* TH50	11450	14050	14050	* 9350	8300	* 2400	5800	Total Control	0.000	1 6050	4650	635
-100	* 25650	. 19690	* 30493	1 30450	* ZN50	17900	- 3650	12050			13330	10300	28
-4500	- X12120	-	* 11200	1 1530	+ 8050	, 9080	-				- 6100	4 6400	560
-90			* 24000	* 24000	7 1760	10100				111	10400	* T0400	22

Illustration 127 q0622538

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift OFF

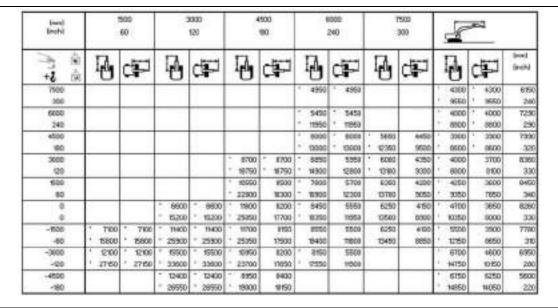


Illustration 128 g06225389

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift ON

Product Information Section
323 Reach Boom/Variable Angle Boom/Super Long Reach Boom

130

600 mm (24 inch) Double Grouser Shoe (13 mm (0.5 inch) thickness)

inani Inchi		800 80	1 2 3	1000 1210		1900		6000 242		900	1	350	
À É	4	dP	4	ď	1	ďP	14	d	1	di	1	æ	(med (med)
7500							455	4550			1 1960	3960	819
200											* 8750	8750	24
6000							7 455	4350			* 3650	3650	729
240							1 1065	10880	C. Taranta		* 8050	9050	29
4500							1 545	5850	9100	4500	, 1600	3600	789
90	W						1 160	1 11800	× 11200	9650	* 7900	7900	33
3000					* 7500	7 7500	7 625	6050	* \$450	4400	1 3650	7 3650	830
120					17050	1/050	+ 1350	13000	* 11850	5450	+ 8050	. 8050	33
1900					. 3900	9600	+ T00	5000	- 5890	4300	* 3600	2650	049
90				11 3	20850	19990	1 1530	12500	12700	9000	* 8550	1950	34
0			1 6250	+ 6250	10500	1250	1 765	5650	* 450	4200	+ 4300	3700	829
			+ 14350	+ 14350	22/00	17990	1880	12100	* 10000	5000	+ 3450	8700	33
-1600	6700	- 6700	* 10600	* 30000	10800	1250	1 188	9980	- 6100	4190	. 6050	4000	778
-60	1 14900	14300	1 24490	1 24450	22950	17790	1 1686	11950	* 19200	8990	* 1100	8750	31
-3000	11450	11450	* 14050	* 14050	9950	1300	* 740	5600		1,000	* 8050	4650	635
-120	* 25650	75650	30450	1 30450	21450	17500	* 1585	12050			13300	10300	20
+4500	-		1 1080	1000	8050	* 8050					+ 8700	500	590
-190			1 24000	24000	1760	7190		1			7: 10400	13400	23

Illustration 129 q0622538

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift OFF

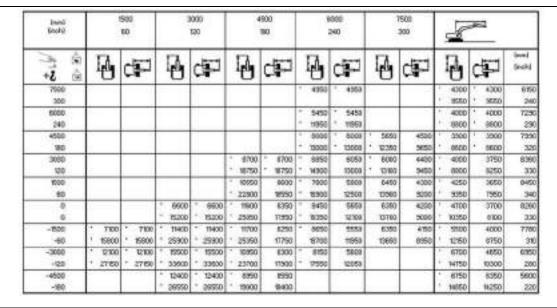


Illustration 130 g06225385

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe

(powl (inch)			1900 60			120		1500 150			240				7560 990		K	-	2	
7 6		4	dF		4	æ	B	di)		4	c	F	-	0	d		10	c	F	(nah)
2500	+			t					1	4550	-	4550	Т			7	1950	F	3350	65
300	Ш			1					ı.								8750	ŀ	6750	24
9000	Т			Т						4990	*	4990				+	3650	+	3990	7290
240										10050	*	10050	ß.				8050	١.	9050	290
4500	т			Т					1	5450	+	5430	+	5'00	4500	+	3500	T	3000	7500
100	1			1	_		1100			11800	-	11000		11230	3650		7500	٠	7300	321
3000	т			Т			. 7900	1900		6250	Г	8090	+	5450	4400		1650	1	3690	836
120	40					1	17050	11050		10500		13000		19850	9450	,	1050		9050	331
1500	т			т			1 5900	9600		7050	Г	2000	*	\$890	4050		3000	Г	3050	945
60	1						1 20050	16550	+	253000		12500		12790	9000		(550)	r.	7950	34
0	Т				6250	* 6250	10500	8350		7650		5890		6'80	4000	+	4300		3700	826
0	т.			1	W350	* 14350	22790	17960	1	16600		12100	4	10000	9000	1	3450		6100	33
-1500	T	6700	' 670	0	10900	* 10800	1 10000	9250	1	7990		(0990)	7	6/80	erfit	T	5090		9300	770
-60	1.	14300	* 1450	0	24450	* 24450	1 22350	11150		16350		11220	+	10293	8950		11100	Į.	8750	31
-3000	1	11450	* TH5	0	14090	* 14090	1 9950	8300		7400		9800		-117-7		+	6050		4990	695
-100	4	25650	1565	0 4	30450	* 30450	21150	11900	1	11050		12090				4	13300		10300	200
-4900	т	17	-	1	11200	* #200	1 8880	1 8050		-						*	6100		6100	5600
-100	-			1	24000	7 24000	17750	11150	1				ı				10400	+	10400	221

Illustration 131 q0622525

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

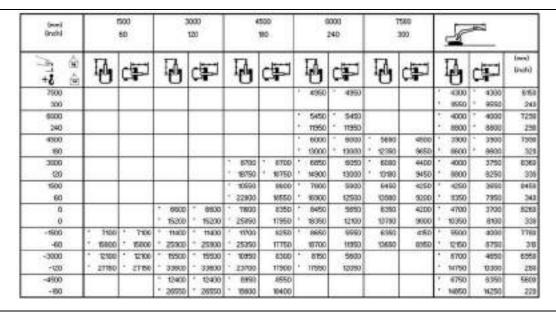


Illustration 132 g06225255

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

Inini (inchi)	197	500 60		120 120	50	1900 190			000 240		7500 300	4	M	
A 68	4	ďP	0	ď	10	ďP	1	d	ďP	Feb.	di di	13	œ	(mel) (mel)
7990								4590	4550			396	9950	6/60
300												1 000	1 1750	240
6000	V						-	4950	4550			365	9850	7250
240								10850	* 10853		0	906	9050	290
4500	-							5450	5450	51	00 4450	300	0 0000	7990
90	% o				127725			11500	* maca	· TU	9500	750	, Laco	320
3080					* 7900	3900		8250	595)	1 54	90 4390	365	9650	8390
100	H H				17950	* 17050		10500	12900	10	9300	006	1000	330
1000					9900	1900	*	7050	\$700	1 50	90 4200	1 200	0000	0450
80					1 20650	18300		15300	12368	. 151	9080	955	1650	. 340
0	i = i		* 6290	8250	10900	8200	*	7690	5553	. 60	90 4190	430	3650	8290
0			* 14350	14350	7 22700	11700		10000	1050	133	60 8500	545	5000	330
-B00	6700	5700	* 10500	- 10800	10800	1150	-	7850	5509	. 67	03 4190	505	2500	7700
-60	1 14800	14900	* 24450	24450	22950	17900		19990	1600	1 132	00 8850	1 110	0650	310
-3000	* TM50	* TH50	* 14050	* 14050	3950	8200	*	7400	2200	-	1000	605	4600	6350
-120	+ 25850	. 19650	* 30450	* 30450	* 2950	17050	+	5000	11000	0		+ 1330	10/50	200
-4500	OF COMMON		* 11200	* 11200	8390	8090		27.00			1	* 610	6700	5600
-90			* 24900	* 24000	17950	17150	1	_			1	1040	1 10400	220

Illustration 133 q0622538

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

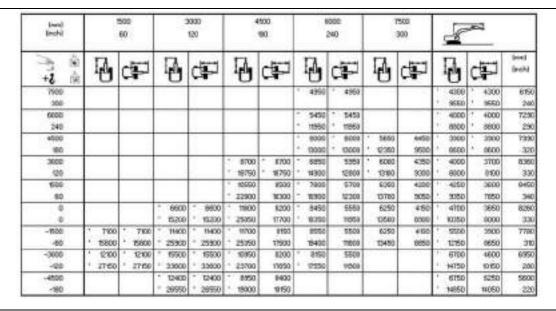


Illustration 134 g06225389

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

700 mm (28 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

ined inobi		60 500	3	120		190			240 240	3	7500 300	5		2	
* é	1	æ	1	æ	1	æ	1	4	ďP	4	æ	P	10	₽I	Ironi Snohi
7500	-							4990	4558			39	10	3960	619
300							L.					* 63	1 98	8750	24
6000	-						-	4350	1 4558			. 30	10 '	3650	723
240	4							10850	10853	diam'r.		809	50 .	8050	230
4500	7						-	5450	5450	5100	4550	- 38	10 '	3600	7330
90	-							1900	1 11606	° 11200	9750	* 79	10 4	7900	000
3000					7 7900	7500	-	\$250	6700	5450	4450	- 361	1 08	3650	8300
120					12050	1090		10500	13/61	* 11850	8990	80	1 08	8050	330
1600					9600	1750		7060	1908	* 9990	4390	. 29	00	37700	0490
90				:	20050	18900		2200	12650	* 12700	9090	- 89	10	0100	340
	7.		1 6250	+ 6250	10500	8450	+	7650	5700	* 6150	4250	+ 43	50	3750	8260
			1 14360	14350	22700	18200		6600	12300	13300	9150	94	50	8250	300
-450	* 670	6200	1 40800	* 10800	10600	1000	-	7950	5652	* 6100	4250	* 50	10	4050	7790
-60	1 1630	14900	1 24450	, 54420	- 22950	16050	-	16350	12:53	* 13200	9100	* 11	10	8300	310
-3000	1145	11450	14050	* 14050	* 5550	8450	-	2400	5658	12.20	1.33	- 60	50	4700	6950
-120	2565	9 - 19890	30450	30450	2850	19190	-	8880	10250			- 133	50	10450	200
-4500	-	1	* 9200	* 11200	9050	1050			-			+ 61	10 +	8100	9800
-80			* 24000	24000	17950	- 9750	1					* 104	70	13400	220

Illustration 135 q0622525

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift OFF

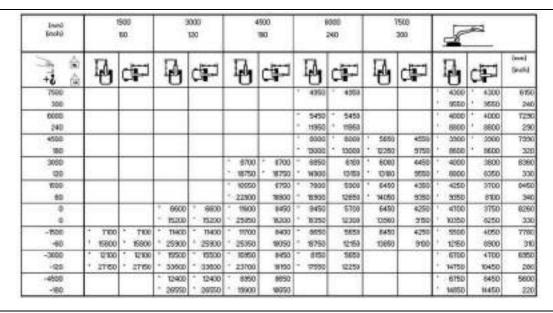


Illustration 136 g06225258

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift ON

134Product Information Section323 Reach Boom/Variable Angle Boom/Super Long Reach Boom

790 mm (31 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

(mm) (inah)		500 60		120		1500 180			000 940		1540 300	1	, FG	
3 6	4	œ	4	æ	14	æ	P	,	æ	4	æ	4	æ	Ired Ired
7500				-			45	60	4550			396	3990	8150
000												1 879	9790	340
6000							1 40	50	1 4350			7 3650	3650	7290
240							1 108	50	10890	Rosenski.		1 805	9050	290
4500							1 59	80	9450	5100	4600	, 360	3600	7990
190				-)			* 16	00	* 1900	* 11200	9890	* 790	7900	000
3000					* 7900	7 1500	. 65	50	6200	* 5450	4500	385	3650	\$360
120		- 2			1 17990	+ 17050	+ 135	00	13300	* 15850	5650	+ 806	9050	330
1000					1 0930	1900	+ 10	60	5350	1. 5550	4400	* 350	3790	8490
80					* 20690	19000	1 53	600	12900	12790	9490	1 858	6200	340
0			1 6250	* 6250	10500	6550	+ 16	50	5750	* 6150	4300	+ 400	3000	8260
0			+ 14350	+ 14350	* 22700	19400	+ 88	00	12450	- 13300	9250	+ 945	8350	300
-1600	5700	* 6701	10000	10800	10000	8450	* 10	50	5700	* 6100	4250	+ 5060	4100	2780
-60	1 14900	1 14500	1 24450	* 24450	1 22990	18200	1 168	60	12300	1 13200	9200	1 110	9000	310
-3000	* 19450	* 19450	* 14050	* 14050	. 5850	8550	+ 14	00	5750	27.000	-	+ 6060	4750	6350
- 100	* 25950	. 19896	30450	* 30450	27990	18350	* .68	60	12390			1130	10990	250
-₹500			* T000	* 11200	8090	1 8050						7 600	6100	5800
-180			24000	1 24900	17190	1 17190		_		5		1 1340	19400	220

Illustration 137 q0622525:

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift OFF

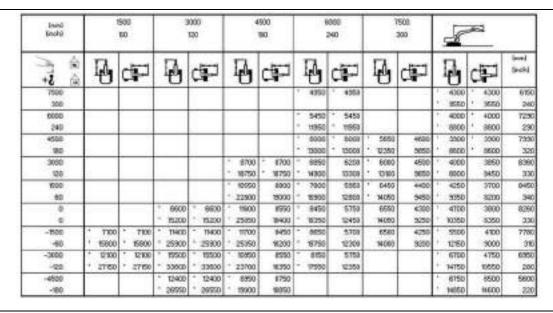


Illustration 138 g06225260

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift ON

900 mm (35 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

Inini Inchi	12	1500 160	1 33	120 120	50	1900 190			900 NKO	1.5	7500 300	8	363	
-3 6 6	4	æ	4	æ	10	di di	P	,	ď	4	æ	4	d=	(mel)
7990							45	90	4550			3960	1 3950	6/69
300												1 8750	1 1750	240
6000	/- I						42	50	4551	-	-	3650	+ 3850	7230
240							. 08	50	* 10850			9050	1 8050	290
4500							54	50	5450	5100	4650	3000	3600	7990
180	100				1077727		* 110	00	* 11800	. 10303	10000	7500	, Laco	320
3080					* 7900	* 3900	- 82	50	* 6250	5490	4550	3650	1 3650	8390
100	d 9				17950	* 17050	00	00	10450	1000	5000	0000	1000	330
4000 ·					* 5900	8990	* 70	50	6000	1 5860	4450	1 3900	3750	0450
80					20650	10250	* 163	00	12553	12760	9580	8550	8300	340
0			6290	6250	10900	8990	1 79	90	5850	, 6/80	4350	4300	3850	8290
0			* 14350	* 14350	7 22700	18990	100	00	10500	13360	3400	1 5450	5450	330
-800	6700	5700	* 10500	10800	10600	9900	- 72	50	5800	. 8,000	4350	5050	4750	7790
-60	14800	14900	* 24450	24450	22990	19490	189	98	12450	1 13200	9350	1100	9100	310
-3000	* 19450	* TH50	* 14050	* 14050	3950	8950	7.4	00	5000	17-3115		, 9020	4850	6950
-120	+ 25650	15650	* 30450	* 30450	* 2950	9600	- 53	00	12550	0		+ 13300	10700	200
-4500	ORGANIA.		* 11200	* 11200	8390	8090	122	~			-	6100	6700	5600
-100			* 24900	* 24000	17950	17150		-1				13400	10400	220

Illustration 139 q0622526

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift OFF

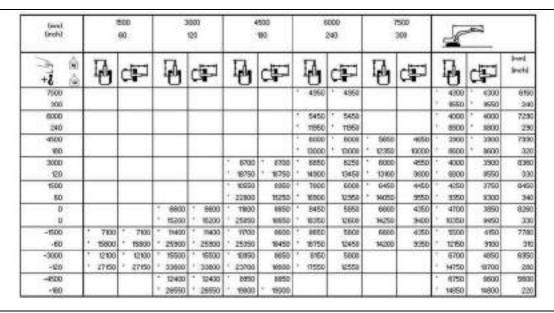


Illustration 140 g06225271

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift ON

Reach Boom with a 3.9 m (12 ft 8 inch) Stick and 5400 kg (11905 lb) Counterweight

600 mm (24 inch) Single Grouser Shoe (14 mm (0.6 inch) thickness)

	2	g#S	8	19	2	309				341				180				120			NO.				(mark)
(mm	P	¢	d	1	ş.	c	0	1	F	0	1		F	C	4	1000	ş.	c	4	P	d	4		8.4	3
.73	3700	4	2790			Т		г		T		Г		т	217	г		г			$\overline{}$		т		7908
	6000		8080		10000					L								L		_			ı.		306
12	2564	-	2940	-	3216	4	1090			Т		Г				Г		г					т		9000
	6600	+	5680		3758	+	1750	٠		L										- 1			ш		348
- 20	2508		2590	-	4300	+	4300	*	- 11	Т		Г		П		Г							Т	8	4976
. 33	2509	-	9180	9	9994	4	3299	+							VIIIC C	1							ш		100
- 90	3503	*	2580	7	4300		4700		.3300	1	1308	*	6480	9	8400	Ť.							Т	6	3006
- 1	6508		5680		9000		30209		11450	10	11400		13550	100	13850	+	-		020	- 1			ш		128
. 42	ZT08		2780		4158	П	5200		6790	Т	1258		4300		1300	6	984	100	5090		$\overline{}$		т		1006
- 1	6968	-	8660	0.3	0858	_	11068	+	12300	L	11606	3	17980		17900	+	2000	7	22000				ш		68
9	2908		2980	*	1968		5790	+	9690	Т	1968	+	8290		960	+	7908	+	1000				т		- 1
	6000	-	6410		9658		1000		11900	L	11268	+	1960		20900	+	17000	+	171.00	- 1			ш		
- 8	1214		3300	-	.7850		1993.		5350	Г	1100		.1990		10000	+	2006	7	5500	5700		5766	1	L.	1909
1	7100		7300	-	8800		12300		11500	L	16268	+	17150		22250		22256	7	22250	12708	+	12700	1		- 60
- 39	3550		4050		3956	П	1750	•	5300	Т	789	7	7250	Т	16150	*	1368	7	13680	8900		1990	Е		-3006
	8008		3000	9	8800		12000		11490	1	10100		17180		2:900		30004	4	30000	13006	1	10000			+628
- 61	4500		1450	7			-		5400	Г	6706	+	6090		3150	+	12958	+	10100	12906	1.	12300	7	1	-6106
- 1	10100		12090	-					11830	1	11258	=	11400		19000		21004	1	20300	29058		20000	1		198
- 11	4700	+	6780							T			44.60	+	6460	+			-	_			т		4008

Illustration 141 q0622524

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift OFF

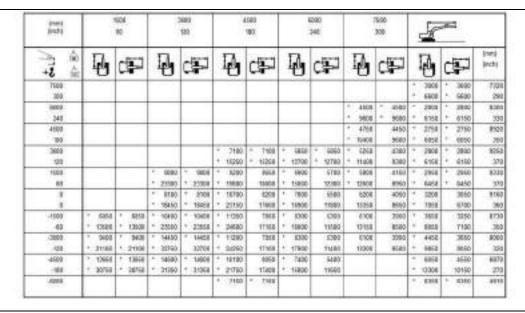


Illustration 142 g06225249

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift ON

600 mm (24 inch) Double Grouser Shoe (13 mm (0.5 inch) thickness)

	1	×	8	1		100			1		341				190	- 3			120		Ĺ		85				4	jours jirch
(ne)	P	c	4	1	P	d	b	1		dip	C	4		F	¢	0	7	P	C	4	1	P	C	6	20.00	金金	-	77
73	2700	4.	2763	$\overline{}$		$\overline{}$	-		t		t		Н		Н	-	_		г		$^{+}$		Н		1		6	7900
2	6800	4.	6000	4	netra				1.		L					_												300
81	3574	4	2502	-	4050	*	1200	4	T		Т		Г		Т						т		Т				g.	iteros
3	1600	+	9500	+	8750		eres.	4	ŀ		L					-					1						a.	341
. 89	2500	+	2500		4300	+	4308	*	Т		Г		Г				Т				Т				Г		ġ.	4600
3	5500	+	5500	+	9350		2006		ŀ							dv-											0	100
100	2558	4.	3560		£390		1706		r i	1700		4306		16489	÷.	6400	÷		г		т				т		0	3000
3	6606	4	9666		9390		8900	4	rl:	11480	+	11,658		13099		13650	+			-1111	-						0	100
82	2706	+	3760	-	4190		1268	4	1	1790	Т	1218		5700	+	1300	+	994	-	1010	+				1		0	1900
	tese	+	5890	-	8850		1968	,	d	12300	L	11508		17500		17900	,	72701		22000			-				ŧ.	- 60
- 11	2900	+	2900	Ψ,	4050		5708		1	5690		1968	+	1200		5950	+	7508	F	N00.					Г		11	- 1
3	6400	+	6400	*	3650		2306	+	d	11890	1	19258	+	11680		29900		1000	-	1/400	1						1	- 1
HT.	3010		3300	Y	3950		1992	1	d	1350	Г	1906	7	7000		11000		2601	4	3900		6708		6190	-		0	14500
- 3	7900		7300		8100		1906		4	11450	L	16258		17150		22250		22204	4	22050		12700	1	12790	1		0	-60
30	3656		4000		3950		1755	7	ď.	5390	Т	7452	7	7990		11150	+	1353		13050	,	3006	10	6190	+		0.	-3800
0	1862		9000	+	9680		2019	+	1	11480		10108	+	17180		21900	4.	30968	+	26100		10008	10	1000			b.	100
40	4650		5460	+					T	5490	Г	6706	+	8060	Г	1150	+	12168	+	13160	+	12908	+	10100	-		0	:490
- 2	10158		10000							19660		11268	+	11360		19600	+	20004		26100		25058	1	29960	9.		0	- 190
49	8206	+-	# POS						Т	-	Т		-	6460	+	1450	+				Т						8	,600

Illustration 143 q0622510.

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift OFF

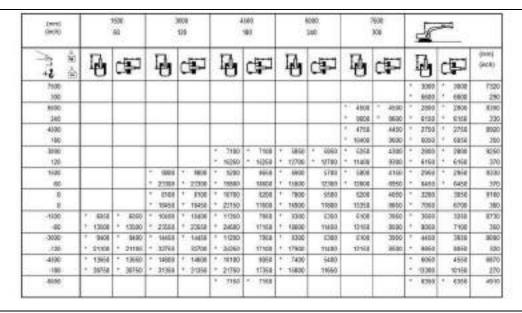


Illustration 144 g06225226

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe

138

(MID)			104			120			- 3	180				341				300		13	de	, See		
A 4	F	,	Œ		4	Ċ	P		4	C	F		4	C	F	1	4	C	P		4	C	P	(mm) (mm)
7908		7		t	777	т		Т		Ħ		t		Т		т		Т		*	2790	×	3700	732
300	1	- 1								L		L							and a	4	8080	-	6000	39
8008		\neg		Т		Т		Г		Т		Т		Г		-	4090	+	1210	-	2940	-	2564	830
348		- 1								L						٠	1750	+	8758		1690	+	6600	33
4976		П		Г		Г		Г		Г		Г		Г		-	4300	+	4300		2590	-	2501	787
166		- 1													See l	+	3299	4.	3056		2580	-	9509	26
3006		\neg		Г		Г		÷	- 6400	7	6480		1308	+	1300		4T00		4358		2680	*	2503	925
128		- 1						+	13850	þ	13050	-	11400	*	11450		90209		9300		5680		6508	31
1906		╗		1	5090	4	704	6	1300	1	4300	-	5218	Г	1750		5200	П	4158	-	2780	-	2700	.923
68					22000	4	2000	+	17900		17000	15	11606	L	12350	+	11068		0858	Ċ.	\$660	-	6968	. 17
		П		1	1680	+	7904	+	1650	Г	8290		1968	Г	6690	*	5700		1160	*	2990		2900	916
- 1		4		-	17110	+	17000	+	21900	l	17680	+	11268		11900		10,000		1662		6410	-	6000	34
1900	* 50	16	* 8700		5500	7	5604	+	10300	1	8080	-	1100	Г	1350		1993	Г	.7850	-			1218	-873
-66	* 120	90	1 12700	1	22250	4	22254		22250	Ŀ	11150	-	19258		11500		13300		8800	-	7300		7169	- 35
-3006	- 88	00	* 8900	1	13650	7	1,964		16150	Г	7550	7	149	Г	5300	7	1750	Г	3956		4050		3550	380
+600	1 100	00	1 19900	1	30000	4	30004		2:900	Ŀ	17180		1956		11450		1200		3800	¥	3000		8003	32
-6000	1 123	90	1 12908	1	10100	4	12958		3150	Г	8180		6706		1400				-,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,	5400		4500	687
108	1 200	22	* 29858		20100	1	21004	+	10000	1	11400	-	11258		11850						12090		10100	27
4000				Т				+	6460	10	6460			Г		Г				-	6790	+	6700°	491

Illustration 145 q0622508:

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

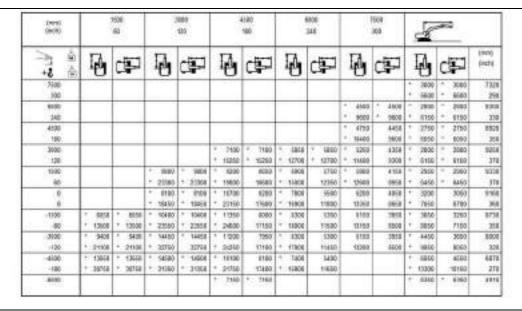


Illustration 146 g06225092

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

(MON)		46				179			1	100				160				906 908			8	2	2	
A 48	14		P	1	4	C	P		4	C	雪		4	c	F	1	1	C	P	77177	4	c	P	(mm) (inch)
7906		+		H		Н		Т		H		Н		Н		H		Н		-	2760	+	2708	730
100																L			and a	-	9000	4	6804	
8190		Т		Г		Г		Г		Г		Г		Г		-	4510	1	4990	-	2660	1	2914	210
340																4	6758	+	8150		9500	+	1800	30
4500		Т		Г		Г		Г		Г		Г		Г		+	4308	+	4300	-	2500	+	2508	810
180															sand.		3058	4	9350		5500	+	5500	- 28
3000		т		Г		г		7	6490	*	4408	Ŧ	5300		\$700		1708	Г	4250		3560	4	2918	925
120								+	53090		17850	+	11400	4	11400	4	10254		9100		9000	+	6809	- 3
1100		Т		-	550	4	1259		1390	-	4008	di.	4250	Г	. 9680		1208	Г	W100	-	\$1700	4	2700	. 830
60				-	22001	+	22904	+	17980	-	17908	+	19600		33150		11350		8600	-	5060	+	6850	90
100		Т		-	7501	+	7908		1650	Г	1058	+	7950	Г	5480		5708	Г	.3950	-	2909	+	2500	314
0.		-		-	17000	+	17900		2090		17968	+	19260		79680.	+	12308		9660	-	6400	+	5400	. 3
v1100	* 85	8	1100	-	2001	1	1006		90380	Г	7813	7	1900	Г	5250		198	Г	7990	-	3500		3000	1117
-00	1 127	œ.	12190	*	22294	*	20258	,	22250		10900	7	11250	L	1000		\$2800		3150	-	7360		7900	38
3000	* 500	q	1 8990	7	13584	+	13656		90150	Г	7908	7	1450	Г	5290	7	1758	Г	3980		4090	П	3800	808
1120	+ +900	6	18690		30968	+	30968	+	21980		10058	+	10150		91290		12313		0400	-	9000		1968	- 10
-4100	: 1200	6	13990	-	1766	+	12158	+	#150	Г	1968	+	6700	Г	6360	Г					-6490	Г	4500	467
-100	1:200	8	29050	4	20006	+	26006		19680		17108	+	11200		71450.					-	12000		10000	- 20
8100		T						+	6850		1018		-			Г					6700	+	6700	- 81

Illustration 147

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

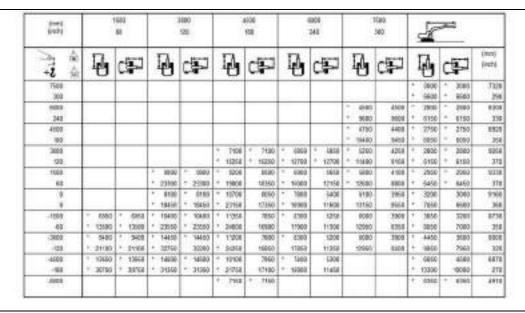


Illustration 148 g06225251

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

Product Information Section
323 Reach Boom/Variable Angle Boom/Super Long Reach Boom

140

700 mm (28 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

		je.	8	1		308				14E				100	- 12		12	120				80			12.50	presi presi
(ne)	P	C	6	-	P	c	è	1	-	c	0	1	Ţ	¢	4		P	c	4	1	S	0	4	· B · B		· Pa
73	2700	+	2700	7	_	\vdash	_	_	_	Н	-	Н		_	-			H		+		+			10	750
. 2	6800	4	6009		0.00					_		L		_				L				1		_		. 30
83	2948	+	2552	-	4800	+	4004	*		г		Г				$\overline{}$		г		\top		т			ia:	600
3	6800		6808	+	3750	+	1758	+										L				1		- 1	10	. 24
89	2500	+	2501		4300	+	4300	+				Г						г		Т		Т			10:	410
3	5800	+	5508	+	9350		7200	+							537.7			L		-				- 1		- 18
82	2656	+	2568		1400		1700		1780		\$300	٠	16489	*	\$406	÷		г		_		т		\neg		360
- 3	6600	+	9908	-	9400		10000	+	91480	4	11400	+	13000	+	13862	+		L		1		1		- 1	10	12
- 82	2700	+	2700	-	4250	П	5268	+	9000		4258	+	1700	+	1306	+	399	-	NW			\top		\neg	10	110
. 3	5850	+	5854		9100		11058	+	12680	_	19600	1	17000	+	17900		2000Y	1	22000			1		_	ia.	
- 11	2900	+	2900	Ψ,	4100		905è	=	9660		1956	+	8300		5658	+	7501	-	2680			Т			OC.	
- 3	6400	+	BHCS.	*	3800		12300		11950		15250		17890		2000	+	1000	-	17410			н		-	Ø.	- 9
III.	3300		3300	=	4800		1911		1400		7900	1	8100		11000	+	5000	1	8690		3708	0 '	· 8790		101	110
- 3	17050		7308		0000		12000		19080		11200	1	17400		22256	*	22204	-	22150	e -	12708	0 1	12190	- 1	ia.	- 4
30	1700		4003		4000		1792		1400	П	TAGE	7	9000		19158	7	13558	1	13680	9 7	9009	0 '	1000	- 1	102	-300
3	8000		9000	+	9600		6969	+	1980		11116	+	17068		2906	4.	30963	1-	30140		11000	0 .	- 10100	- 1	10.	10
40	4600		5460	+	-		-		5580		16700	+	16200		3168	+	1998	-	13190	6 -	12906	0 .	12190		10	-490
- 2	10300		10000	+					1990		11350	+	11662		19600	+	2004	-	20100	8 .	2960	0 .	1. 29960	- 1	10.	19
- 41	1700		1700	=								_	1000	-0	tass	+	-	г	-			1	-		10.	-000

Illustration 149 q0622509

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift OFF

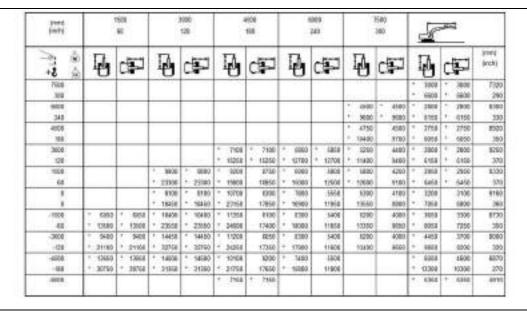


Illustration 150 g06225094

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift ON

790 mm (31 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

	2	æ	8	-		308				340				180				123				10				(MOV)
(inci	P	c	4	-	P	c	0	585	P	C	1	1	F	c	1	200	Ţ	C	4			c	4	1	8.4	à
7	2708	16	2780			T		г		Ť		Т		Т	7.72	$\overline{}$		т		т			1			7900
	6804	4	8000		oso se a	1				L								ш								.500
- 18	2914	-	2190	-	4860	1	4090	-		Г		Г				\Box		г		т				П		9000
103	5506	4	9580	+	8750	+	6756	+										L						L		248
. 2	2508	*	2580		4300	+	4308	+		Г		Г						Г		Т						4500
1.8%	5500	+	5580	+	9350		1208			ŀ					125410	-										100
0	2508	4	2560		4450		4700	-	1780		1306	*	6400	*	6400	Ŧ.		г		т				г		3000
1 3	8806	4	9680		9900	4	10203	4	55450	10	11468	+	17000		10050	+	-101.0			١.						129
- 7	2708	+	2180	-	4250	Т	5258		9990	T	1210		4369	-0	-6390	+	1254	100	5090	1		г		г	:	1000
	6868		5890		9800		11060	+	12660	L	11606	+	17900		12980	+	22906	2	20000	1						- 66
. 9	2900	-	2980	-	4150	Т	5708	+	9690	Т	1864	+	6400		9650		7908	+	Net-	F				П		- 1
	SHOT	+	6480		8800		12009		12190	1	15200	+	7060		2090	7	17000	+	170.00	1						- 1
- 0	3300	-	3300		4850	Т	1998		9590	Т	1100	1	4200		10300	+	1608	7	9990	1	5700		5700	,		1100
	7306	-	7300	8	8750	-	17800	-	1990	L	19250	,	11500		2250		20255	+	2220	1	12100	,	1270			- 66
- 3	1690		4050		4850	Т	1758		1450	Т	7456	7	-8150	г	16150		13958	10	13580	1	2500	,	8008	7		-3000
1 3	8306		9000		9750	1	10000		21790		12103	+	11000		2:990	+	30904	-	30960	10	19900	+	19906			120
- 6	4518		5480			т			9150	Т	4706	+	4200		.9150	+	13108	1-	12190	1	12900		12100	+		-4900
	10100		9090	+					1960	1	11208	+	11060.		19600	+	25004	9	20300	1	29650		2964			1100
- 4	6708	+	6700			Т				Т			4000		6450	+	-			T			-			2000

Illustration 151 q0622509

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift OFF

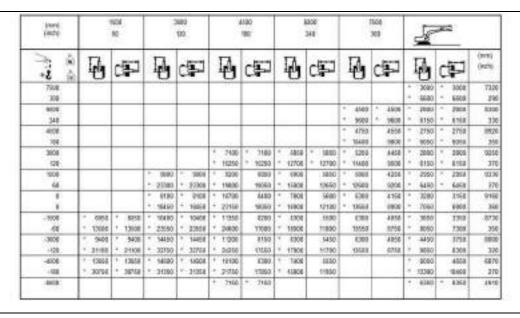


Illustration 152 g06225096

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift ON

900 mm (35 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

(most)			680 64				126				100				160				908 108			8	×	2	
- A	-	6	c	5	1	4	C	P		4	c	Ţ		4	c	ş		4	C	ĘIJ.		4	c	P	(med) (med)
1100			г		Г	1,000		7	Т	7.77			Г	1.1	Т		Т				-	2797	7	2700	712
300									Ь											Order		9060	1	680E	29
6000			Г		Г		Г		Г		Г		Г		Г		*	4999	+	1000	^	2099	+	2510	830
240									L								4	5708	+	9750	*	9580	+	5800	23
4500			г		Г		Г		Г		Г		Г		Г			4308	+	4300	*	2500	+	2506	292
180																4721		1008	+	3350	*	5580	+	5800	- 38
3190	Г		г		Г		г		F	6489	+	\$608	+	1300		6000	*	1706	Г	4690		3566	*	2968	923
120										11969	+	11868	+	11450	+	11400	4	10008		9600	٠	9000	4.	6608	37
1180			г		+	994	۳	5250		4300	+	1008	+	1250	Г	9990		1218	Г	4390		3799	+	2700	810
80.					+	22904	+	22000		11900	4	17908		19900	Н	12800		11250		9300		5050	+	1052	32
0			г		+	7508	,	2680	-	1660		1508	+	7850	Г	1700		5004	Г	4200	¥	Z900	+	2900	714
0					+	17408	*	12400		20900		1130K	٠	19250		12250	+	12308		3000	¥	5400	*	6400	34
1180		8790		0000	7	1806	7	1930	-	10300		\$304	1	7900	Г	1000	7	DRIZ	Г	8100	Y	3300	1	3000	873
60.	,	12700		12790		77258		22250	ŀ	21250		1783	1	19250	L	1990	4	17806		100		7300	+	1300	36
-3000		R900		8989	+	12656	,	10880	7	10199	Г	4258	7	7450	Г	5580	7	1758	Г	4100		4050	Т	3806	300
100	+	18900		1000		3960	+	26960	-	21900		17768	+	11150		11980.	+	12908		860	+	9000		8406	10
-4180	+	12100	+	12900	+	17168	+	10150	+	1162	Г	8408	+	6700	Г	9680	г		Г	-	+	5490	Г	4750	867
100	2	29050		20000	4	2000	+	26380	+	11680		11058	+	11250		10160						10000		10600	37
4180						-			8	4068	+	4058			Г		Г					6700	+	6706	100

Illustration 153 q0622509

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift OFF

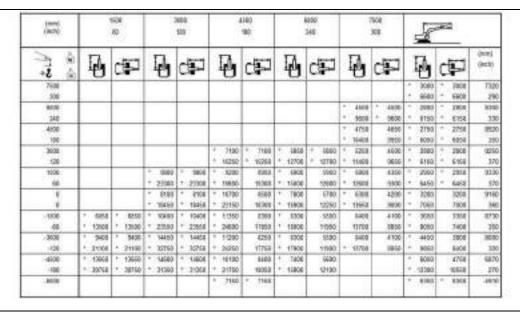


Illustration 154 g06225098

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift ON

HD Reach Boom with a 2.5 m (8 ft 2 inch) Stick and 4200 kg (9260 lb) Counterweight

M0068104-12 143

Product Information Section

600 mm (24 inch) Single Grouser Shoe (14 mm (0.6 inch) thickness)

(mohi) (mohi)	0.000	500 60		120	(C	90 90		240 240	100	900 900	8	,e3	
A) (8)	4	æ	0	Œ	100	æ	4	ďP	120	æ	4	di)	(invi) (inchi)
7500											4100	4700	5600
500											10400	* 10400	22
6000							. 2500	+ 1200			4100	+300	6630
240					one-way		11450	1 11450	Same		9450	9450	279
4500					6550	1550	, 2600	5300	4750	3700	4500	3650	5937
100					1 1450	* W150	* 10000	79400	1	100.74	9250	1050	300
3000					6250	1650	5250	5053	. 5500	3600	4300	3300	790
520					17790	9900	19790	10860	12000	7750	9450	7250	320
1900					9700	7190	* 7100	4000	2000	2500	4000	3460	9050
80					1 30950	15390	T 5350	10000	1850	7550	+ torbb	6350	321
0					10090	6900	7590	4660	5490	3450	9100	3200	789
0					22900	9000	16/50	3559	71790	7350	11200	1050	31
-900			* 11300	* 11300	10000	8890	7450	4800			5000	3500	7358
-60			* 25650	* 25650	22100	N750	16050	5653			12350	1750	29
-3000			* 12800	* 12900	9050	8990	9850	4653			6,000	4250	6470
-90			27700	27700	20000	W250	14600	10050			13450	5400	200
-4500				77.00	- 6850	- 6553			-		1 5950	* 5550	4300
-180					14400	* 14400					13000	+ 19000	200

Illustration 155 g06225072

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift OFF

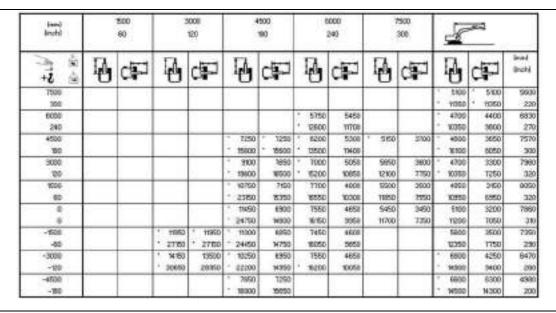


Illustration 156 g06225075

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift ON

Product Information Section
323 Reach Boom/Variable Angle Boom/Super Long Reach Boom

144

600 mm (24 inch) Double Grouser Shoe (13 mm (0.5 inch) thickness)

(end (roh)		500 60		100)	9	1600 180	10	8000 240	43	7500 308	8	3	
	4	ďP	4	ď	4	dD	4	ď₽	4	di	1	æ	hard linchl
7500											4700	4700	990
300											10400	* 10900	220
9000							* 5200	5200			4300	* 4300	6830
240					11 - 120-1	DI HSTAL S	1 11450	1 1450	2	2200.0	9450	9490	270
4500					1 6550	1550	5600	5300	1 4750	3700	4200	3050	7570
100					* 14150	* WISO	. 2300	TH00		200	+ 3250	9050	300
9000					6090	7650	1 6350	5050	9500	3600	4300	3300	7990
120					1, 17750	M200	1 10150	10050	, 15000	7750	9450	7250	330
1000					1 9700	7150	, 1400	4000	5500	2500	+ 4000	2900	0050
80					1 20050	15350	1 5350	10308	T1850	7500	10100	5990	320
0.					10090	6900	1500	4650	5450	3450	5100	3200	7890
0					22400	14500	8750	5958	11700	7350	11200	1050	310
-ts00			- 1000	* 11000	10000	6850	1450	4600			3600	2500	7390
-60			25650	25690	22100	14700	18058	9858			12300	7790	290
-3000			* 12800	1 12800	5250	1950	1 6050	4658			6100	4250	6470
-/20			* 27700	+ 27700	20000	14550	+ 34600	10051	(J		13450	9400	260
-4500	- 1		-000		* 8890	6850	7 7 7 7 7			100	9950	5950	4990
-180					1.14400	9400					10000	* 10000	200

Illustration 157 g06225066

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift OFF

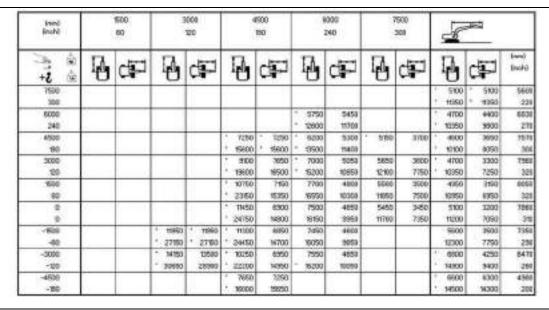


Illustration 158 g06225070

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe

(mah)		1900 60	100	126	1 6	9600 980		240 240		1900 100	5	M	
3 6	10	ď	4	æ	4	æ	4	(E)	4	Ð	1	d P	(end (insh)
7500											4700	4700	5600
300											10400	1 10400	330
6000		100					* 5200	5200		100	4500	4300	6630
240							* 19450	* 11450	Same		9450	9450	270
4500					6850	. 8520	* 5500	5300	4750	3700	4200	3650	1570
160					14150	1/150	* 2200	11390	100	100	* 3150	8050	300
3000					1 0050	7950	* 6350	9090	' 9900	.9900	-4100	1300	7960
100		- 10			17790	16500	19750	10850	12000	7750	9450	7250	320
1500					1 8700	7190	7100	4830	9900	3900	+ 4800	1750	6050
60					. 500.00	15390	* \$350	10000	11850	7500	- 10100	6950	320
D					10050	6900	7500	4850	5450	3400	5100	0200	7660
0					22490	94900	19150	1950	11700	7250	71200	1050	310
-600			, 41363	, 4000	, 40000	8090	7450	4900		- 0	5600	3500	7350
-60			+ 25880	* 25880	12100	14700	19050	3850	(12300	7750	290
-3000			, 45,000	15800	9090	1990	9850	4000	()		. 6100	(250)	6470
-100			7 27790	27700	20000	H990	* 14000	10000	ji		13450	9400	200
=4500			25,607	125000	6890	6890	10 (12)	110,00		- Y	5950	5950	4560
-180					1 14400	* 94400					10000	10000	200

Illustration 159 g06224991

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

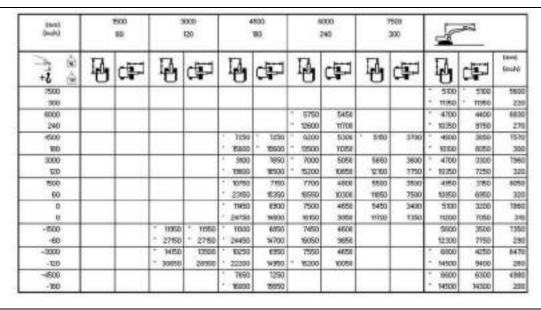


Illustration 160 g06224993

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

790 mm (31 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

Insoli Enobil		1900 60	100	120 120	5.	1900 180	0.0	540 900	12	500 300	4	æ	
3 A	4	dD	4	d P	1	d P	4	d	4	æ	4	ď	(mah)
7500											4700	* 4700	5600
300											1 10100	1 10400	220
6000	× .						5200	+ 5208	0.00		4300	4300	6830
240					1-0-0-0		* 11450	1 19450	Y		9450	9450	270
4500					6550	1550	5800	5458	4750	2000	4000	3750	7570
180	8 0				14850	. ME0	72200	11700	11.5	- 6193	3230	5300	300
3000					* 6250	1890	8390	5200	1 5580	3700	4300	3400	7960
100	1			1	17750	16950	* 19790	19953	, 15000	8000	3450	7450	320
1000					9700	1390	7100	4000	5780	3600	1 4000	0050	0050
60					1 20950	15800	* 18350	10650	12250	7750	10/00	750	320
0					10050	7100	* 7990	4350	5600	3590	5/50	3300	7860
					" Z2900	8290	8350	10250	9000	7600	11100	7200	310
-1600			* 11300	- 11300	10000	7050	7550	4700			5750	3650	7350
-60			* 29990	29950	22100	16200	18350	10150			12700	6000	290
-3000			* 1280D	12800	3050	7150	5050	4000			6100	4350	6470
-98			* 27700	- 27700	* 20000	19400	* H000	10050			13450	5700	260
-4500			1755		8850	. 8890	-0-00		1		5950	5950	4980
-90					* 16100	* W400					13000	* t0000	200

Illustration 161 g06224996

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift OFF

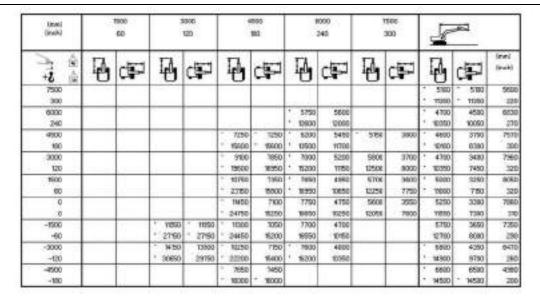


Illustration 162 g06224999

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift ON

900 mm (35 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

ined Inchi		80 80	-	120 120	100	800 180			000 240	V.	500 000		8	==	
-3 &	4	æ	1	æ	14	电	Ę	9	æ	1	æ	1	6	æ	Jeni Inchi
7900									100			T	4100	4700	990
990												1	40400	* 10900	22
6890							* 5	200	5200	11	1	*	4300	1 4300	500
243					2000	0.1953000	. 4	1450	11450	5-200		1	9450	9490	27
4500					9550	6550	. 3	000	5500	4750	3650	1	4000	3600	75
100					1450	1480	. 11	200	11050		0.00		5050	0450	30
3800					8250	7950	* 8	350	5250	+ 5500	3690		4300	. 3490	796
120					17750	17200	. 10	750	1000	. 5000	880		5450	7900	33
1500					. 8100	7450		100	5000	5800	3680		4000	3390	905
80					30950	16060	1 6	350	10800	12450	7980	10	10100	7000	3
0					10050	7200	* 7	550	4850	5700	3690	7.	5750	3400	700
0					22400	19500	+ 15	380	10450	12250	77700	÷:	T1500	1900	3
-100	4 1		* 11900	* #1300	10200	7150	1 7	550	4800			Н	5850	3200	736
-60			+ 25050	* 25000	- 22100	15400	+ 80	350	10000				12900	1100	25
-3893			12900	12800	9250	7250	-	850	4858			1	6100	4450	947
-100			- 27700	- 27700	- 20000	10050	1 H	600	10500			1	10450	3990	26
-4500				-	* 6850	* 1850						7	5850	* 5950	430
-190					14400	19400						1.	13000	13000	20

Illustration 163 g06225018

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift OFF

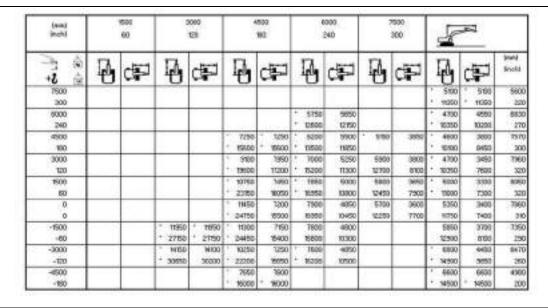


Illustration 164 g06225048

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift ON

HD Reach Boom with a 2.9 m (9 ft 6 inch) Stick and 4200 kg (9260 lb) Counterweight

600 mm (24 inch) Single Grouser Shoe (14 mm (0.6 inch) thickness)

(mul. (iroh)		60 60		120	- 0	190			000	12.	300	4	-	
3 6	4	æ	4	æ	4	中	F	4	æ	4	4	1	æ	bord Inchi
7500							4	900	4500			385	1850	8190
200												960	0000	340
8000							7 4	000	4800			360	9500	729
240							7 70	660	10680	S		790	7900	230
4500								300	5000	4050	3750	250	3400	7330
100	6 0						* 31	500	1 1600	10050	8050	* 770	7500	320
3000					7750	1 T750	7 8	080	5100	5250	3850	1 360	3700	8380
120				1	1 16990	1 16650	1 18	160	T1000	11500	7650	790	6790	900
1500					, 5620	1290		029	4050	6550	3950	200	2990	9490
80					1 20690	75500	+ 14	939	10400	11350	7500	. 835	1500	340
0			* 8200	1 8200	10050	6950	* 1	450	4651	5450	3450	420	3000	8290
0			* 14200	1 14200	1 22100	H500	* 16	1000	10008	11700	7350	930	9500	330
-800	. 6600	* 6600	* 10700	+ 10700	10000	6950	7	450	4558	5400	3400	400	3250	7790
-60	* 19750	* 14750	* 24300	* 24300	12290	14700	16	000	5658	11650	7500	1096	7150	310
-3000	* H350	11350	* 13650	13400	9990	6900	4 4	160	4600	3 777	1000	985	3800	6990
-60	1 25500	25500	23600	28650	20050	9050	. 4	350	5500			1 1205	9450	280
-6500	DITTE STORY		* 10850	10850	. 1800	7150	-					. 200	5300	5900
-180.			* 23200	1 23200	1.16800	16350		- 1			- 1	1290	11900	220

Illustration 165 g0622495

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift OFF

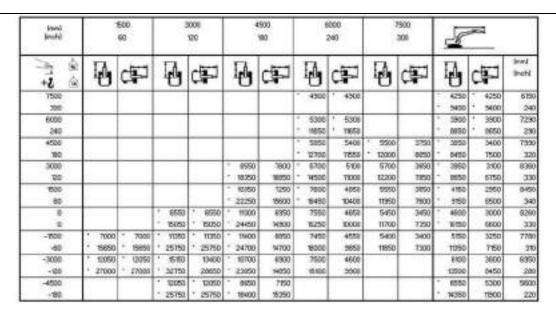


Illustration 166 g06224973

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe

(ren) (mehil		1500 80	- 3	120	1 3	190	1 1 1	5000 240	1 8	1580 300	8	361	
\$ 6	1	æ	4	æ	10	æ	1	ď	4	di	4	di)	Snoth
7500							4500	4500	1		3680	3850	619
200											+ 8600	* 8600	24
6000				-			4000	4800	1		1 3600	3600	729
240							1 10550	10550	Same of the second		1 7900	1900	290
4500							5300	5300	4950	3150	1 3500	3400	733
190	2					0.0000	1200	* TESOS	- 10050	8650	, 1100	7500	320
3000					7750	1750	* 8060	5100	* S250	3650	* 3600	3100	8390
'00	17				19950	- M050	10/60	11000	" 11000	7620	7900	6750	300
9006					9350	1200	. 6620	4000	2550	2680	1 3000	2950	940
80					* 2550	15500	* 14580	10400	11900	7550	+ 8350	6500	34
			1 8200	+ 8200	10250	1990	1 1450	4650	5490	3490	4 <500	3000	829
			. M500	1 MS00	22100	N300	10000	10000	11200	Y150	1 1300	6600	.000
-1500	1 8600	* 6900	1 10700	* 10700	10000	8990	7450	4990	5400	3400	1 4550	3250	779
-60	* 14750	1 14750	* 24300	* 24300	22350	19700	8000	3900	11050	7300	7 10550	TEU	310
<3000	1 11350	* 11390	13650	13350	9850	6900	1 7150	4600	1.00	10000	+ 5850	3600	699
-99	* #5500	29500	. 52600	20000	20050	14950	15050	3900	8 9		12850	8450	200
-4500	1000000	-	10050	1, 10850	7900	7100		-			* 5800	5800	5900
-80			* 23200	* 23300	18500	15350		1		1	* 12500	TECO	220

Illustration 167 q0622495.

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

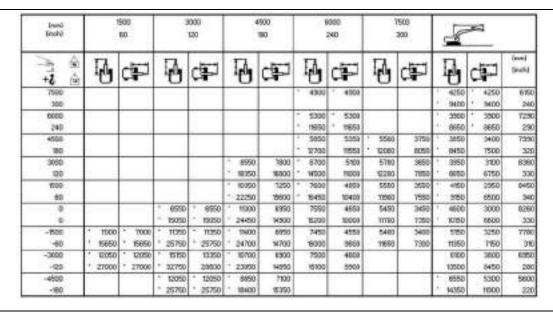


Illustration 168 g06224953

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

lmed linchi		500 60		1000		1500 1500	11.77	1000 240		1500 300	8	253	
) k	14	ďP	4	ď	4	ďП	14	ďΡ	4	d P	4	æ	(med) (brok)
7900	-						4900	4608			3990	3650	619
300											8900	9600	24
8000					11		4900	4800			* 3900	, 3600	729
240							* 10550	+ 10688		-500	7900	1900	29
4500	7	1					5300	5300	, 420	3700	3900	3350	733
190		1			-		* 19900	11400	10950	7950	* 7700	7350	33
3000					7150	7700	9050	.5050	5250	3600	* 3600	3050	0300
120					10050	16600	* 13150	10801	+ 11500	7700	1900	6650	33
7000					+ 9150	7100	- 6890	4758	9460	3490	* 3000	2900	8456
90					1 20150	15350	14990	10258	11700	1450	8390	6400	34
ů.			* 6200	1 5290	10250	6000	7400	4552	5350	3050	4200	2950	828
0			* 14200	14230	+ 2200	14650	16350	5652	11500	7250	5000	6500	33
-1600	. 6800	1 8800	+ 10700	* 10790	10300	.6700	7300	4500	5300	3090	* 4990	3200	770
-90	1 14750	14750	* 24300	1 24390	* 22350	19450	5750	9658	11450	7200	10950	7000	31
-3000	* T050	1050	13650	13750	* 3650	5500	7150	4500	-	-	5050	3750	695
=120	* 25500	. 12200	- 25600	26'80	20850	14600	8350	9158			10950	8300	28
-4500		-	* 10850	10850	* 7800	2000		-			5900	5200	560
-190			20200	23290	19600	15100			/		12990	11700	23

Illustration 169 g0622611:

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

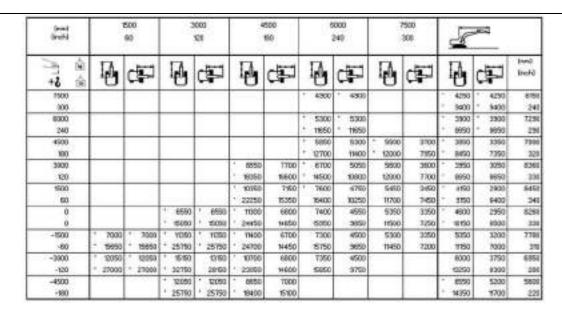


Illustration 170 g06224977

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

900 mm (35 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

Smeld Smeld		500 60		1003		1500 100			240			500 100		K		2	
-3 &	4	ďP	4	æ	4	æ	1	d	æ		4	æ		4	c	F	inel Inchi
7900							= 1	4506	4500	Г			7	3850	-	3850	6150
300										L			-	8600		8600	240
6000	10						*	4800	4800					3900		3600	7290
240							*	10590	, 10220	L	-0.00	22.55		7300		7900	280
4500								5300	5300		4350	3990		3500	*	3500	7330
190				1		SCHOOL	-	11500	1500		10250	9400		1700		TTOO	120
3000					7750	7750		9098	5960		5250	3900		1600		3200	8360
120	3 4				19550	* 16650		12750	11450		15500	6200		1900	1	7100	330
1990					. 3360	7550	-	6858	5050		5650	2700	-	1000		3100	8450
80					2050	16300	-	14860	10900		12300	7990	-	1350		6800	340
0			* 4200	' 6200	10350	7250		7450	4850	Г	5700	3900	7	4200		3/50	9290
0			* 14200	* W200	22'00	15600	-	10100	10500		UZZED	7750	1	1300		6300	330
-800	. 6800	- 6600	10700	* 10750	. 10300	780	-	7600	4000		5650	3550	F	4950		3400	7700
-60	14750	14750	* 24300	* 24300	22350	15400	-	16450	10300		12200	7950		10250		7500	310
-3000	1 11350	11350	* 13660	13650	9950	7200		7194	4800	1	1110	1000	Ψ.	5990		4000	6950
-120	25500	* 25500	23000	20000	20050	19990		15354	10400					10050		6050	200
-4500		-	* 10eto	, 30600	* 7500	7450			-				-	1100		5500	5600
×180			23200	* 23200	18800	18050				l				12500		12400	220

Illustration 171 q0622495:

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift OFF

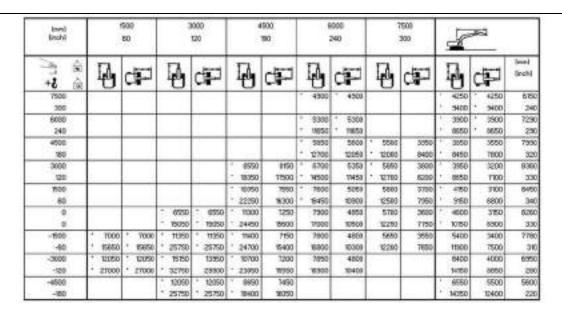


Illustration 172 g06224956

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift ON

HD Reach Boom with a 2.5 m (8 ft 2 inch) Normal Stick and 5400 kg (11905 lb) Counterweight

600 mm (24 inch) Single Grouser Shoe (14 mm (0.6 inch) thickness)

(irel) (irel)		500 60		150		100 100		24D	1 8	7900 300	4	, EQ	
-3 A	4	æ	4	田	19	æ	4	di	0	æ	1	æ	Smoth
7500											4750	4750	9900
300											9 10650	1 10990	220
8000							2300	5300			4350	4350	6830
240					the most	0.000	* 11700	* 11700	·		9800	9900	270
4500					9100	. 8700	5790	5750	4900	4450	4250	4550	7570
100					* 10450	* 19650	* 12500	* 12500	1	200	9400	* 9600	300
3000					8400	* 8400	8900	5990	* 9900	4350	- 4950	4000	7990
120					1 18050	16050	* 19050	120850	12250	9350	9500	8750	320
1000					* 9900	8500	* 7290	5750	* 5950	4250	4650	1050	9050
60					* 21300	18300	* 15650	12390	1 12950	9100	10150	8490	330
0.					1 10550	8250	* 7700	5900	6150	4150	5200	1900	7890
0					22800	17750	6700	12000	* 13300	6250	1950	8900	310
-1500	-		* 11350	* 11350	* 10400	6200	* 7700	9990			6050	4250	7.350
-60			* 25900	1 25800	22500	17650	16700	11900			13350	9400	290
-3000			* 13000	* 13000	+ 3450	8300	7000	5500			6250	5100	5470
120			* 28150	- 2860	7 20400	17900	* W350	12100			- 13150	11300	200
-4500	-			100000	* 7050	1050	11123	2000		1	6100	8100	4990
-100					* 14700	* 1VT00					* 12300	* 13300	200

Illustration 173 g0622562

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift OFF

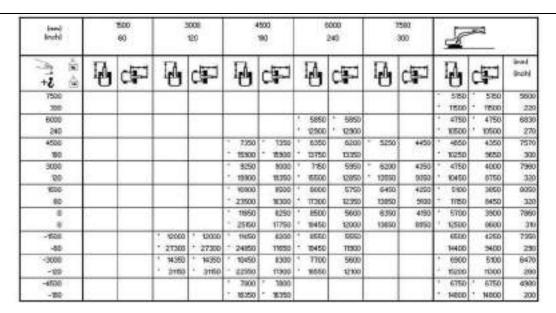


Illustration 174 g06225631

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift ON

600 mm (24 inch) Double Grouser Shoe (13 mm (0.5 inch) thickness)

Enotel Enotel		1500 100	133	120 120	50	1900 190	10.0	1000 240	193	7500 300	8	361	
À 60	4	d P	4	ď	10	ďP	4	ďP	4	dP)	10	æ	(mel) (mel)
7990											4750	* 4750	560
300											1 10550	10550	220
6000	/- I						- 5300	5308			4350	+ 4350	683
240							* 11200	* 1000			9600	9600	270
4500		1			6700	1 8700	- 3750	* 5750	4600	4450	4250	+250	757
180	de la				* 14450	* 1460	* T2500	. 03500		6724	. 2400	9400	300
3080					9400	* 9400	- 8900	5950	5800	4390	4350	3950	7960
100					10950	* W050	* W050	12883	1 12250	9350	. 3000	1750	520
1000					9900	1900	* 7250	5753	1 5950	42500	1 4050	3050	0050
80					* 21000	18300	* 16650	12350	12960	980	10250	8450	320
0					10990	6290	* 7700	9660	6/50	450	1 S200	3900	7860
				11 3	* Z2500	37790	8700	1000	13360	8950	THE	5500	31
-B00	7 7		* 1050	- 11250	10400	8200	7700	5883			+ 6050	4250	7350
-60			* 25900	29800	22500	19990	6700	11508			13350	9400	29
-3000			* 13000	* 13000	9450	E300	7000	2000			6250	5100	6470
-90			+ 28150	* 2850	20400	17500	* 14350	12053	5		+ 13150	11500	200
-4500	-		-	100000	7950	1090	10000			-	, eabb	6100	498
-100					* 19700	9700					13300	10000	200

Illustration 175 g06225620

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift OFF

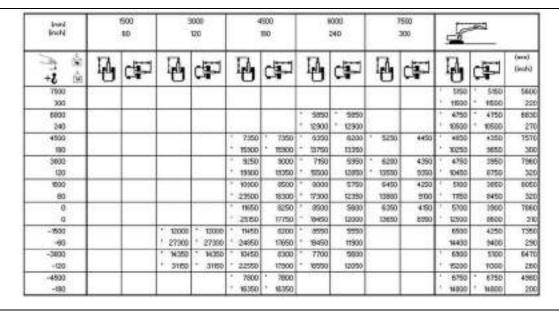


Illustration 176 g06225627

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe

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Enote Enote		1500 100	133	120 120	50	1900 190	0.00	1000 240	192	7500 300	6	262	
- A	16	æ	4	Œ	10	æ	14	ď	16	æ	4	dP	(mel)
7990											4750	4750	560
300											1 10550	10550	220
6000	Ÿ						- 5300	5308	1		4350	+ 4350	6830
240							* 11200	* 1000			9600	9600	270
4500		1			6700	1 8700	- 3750	* 5750	4600	4450	4250	+250	757
180	de la				14450	* 3450	* T2500	* 12500	3.33	6721	. 2400	9400	300
3080					* 8400	* 1400	- 8900	6000	5800	4390	4350	4000	7990
100	4				10950	· 10000	* W050	12500	1 12250	9350	. 3000	1750	520
1000					. 5900	1900	* 7250	5750	1 5950	42500	* 4050	3650	0050
80					* 21000	18300	* 16650	12468	12960	980	10250	3450	32
0					10990	6290	* 7700	9860	6/50	450	1 S200	3900	7860
				1 3	* Z2800	Tieou	8700	12050	13360	8950	THE	5600	310
-B00			* 1050	- 11250	10400	8200	7700	5553			+ 6050	4250	7350
-60			* 25900	29800	22500	17700	6700	11508			13350	9400	290
-3000			* 13000	* 13000	9450	8300	7000	2000			6250	5700	6470
-90			+ 28150	* 2850	20400	17500	* W350	12109	5		+ 13150	1050	200
-4500			-	1131.00	7050	- 1090	10,000			-	· 6100	6100	4980
-90					* 14700	9700					13300	10000	200

Illustration 177 g06225607

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

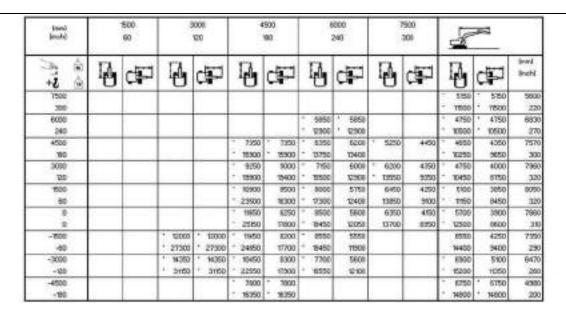


Illustration 178 g06225611

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

Inotic Inotic		500 60	100	120		1900 180	1.00	9000 240	100	900 308	8	J#2	
À 6	1	æ	4	æ	1	ďP	4	dF	0	æ	14	æ	lowl linchi
7500											4250	* 4750	550
300	,										10550	10880	22
6000	1	-					5300	5308	8 1		4380	4350	683
240							* 18700	11700	3	- Street	1,5600	* 3600	27
4500	1				6700	6700	5750	* 5758	4000	4250	4250	+ 4250	7570
190					14450	14450	12500	10500	- 37.5		1 5400	9400	300
3000					9400	9400	8900	5900	9800	4300	4350	3900	799
20					18050	- 3050	* 14050	12700	* 12250	5000	5000	5680	320
1800					9900	5350	* 7250	5650	. 5950	4200	4650	3000	8090
80					21000	18050	* 19860	12208	* 12950	9000	10250	8300	320
0					10950	8150	* 7700	5500	950	4100	* 5209	3650	7990
					22500	17500	" E300	19850	13300	8850	1950	6500	21
-7500			1050	* 11350	10400	(100	* 7700	.5458	3		6050	4200	739
-60			1 25800	* 25800	22500	19400	* 16700	1050			13350	9250	29
-3000			1 13000	13000	3450	8200	* 7000	5500			1, 1550	9050	8470
-126			1 20/50	2050	20400	10050	14550	11008			13250	1150	260
-4500			-		* 7950	* 3050					* £100	, 8300	430
-180				10	* 14700	* 14700			V		13300	+ 13300	200

Illustration 179 q0622563:

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

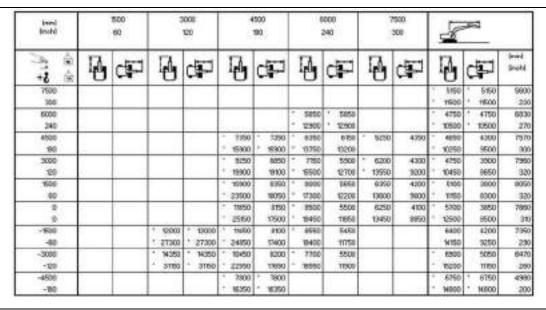


Illustration 180 g06225633

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

Product Information Section
323 Reach Boom/Variable Angle Boom/Super Long Reach Boom

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700 mm (28 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

(mrs). (iroh)		60 600	100	120	3	1500 180		440	800 840	100	300	1	200	
-3	1	ď	1	Œ	4	æ	****	d	ď₽	4	æ	1	di	hed Inchi
7500												4750	- 6790	590
300												10000	10990	23
8000							*	\$300	5308			4350	* 4050	653
240						JIDO S	4	11700	, 40,000	i and	-30	9600	9900	27
4500					. 6/00	1, 1900	4	\$750	5756	4000	4000	4250	4250	190
100	0 /				1 1450	* 1450		2500	1, 12500	0.000	1000	5 9400	9400	30
3000					. 8400	1 8400		6500	6050	5800	9400	4350	4050	738
120					16890	1 10050	1	14050	13058	12250	9450	9800	8900	33
1000					1 9900	9600	40	1250	T000	5960	4000	+ 4050	3900	909
80					1 2300	1650	+	5880	12552	· 12350	9250	* 10250	1550	35
0					10990	6350	+	1700	5650	6160	4200	5200	4000	789
0					22900	10000		W6700	10200	13300	3100	11450	8750	31
-4500			* 11350	* 11000	10400	8350	* 3	7700	1800			+ 0050	4350	739
-60			25800	* 25800	22500	11500	+ .	16700	12100	Ü		12350	9990	29
-3000			* 13000	, 43000	9450	8450	1	7000	5708	7	7.7	6250	\$200	647
-120			28150	1 2050	20400	8:50	1	H550	12258			1, 13750	19500	260
-4500	- 1		2000	111771	1950	1050			- Misson	1		. 8300	- 6100	433
-180					14700	14700						13300	* 10300	20

Illustration 181 g0622561:

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift OFF

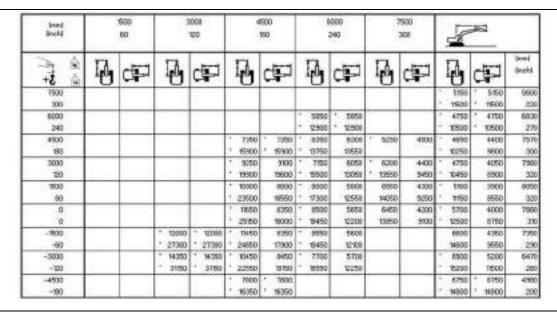


Illustration 182 g06225616

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift ON

900 mm (35 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

Ininò Bhohù		500 100		120	II 50	1900 1910		240	193	500 300	1	JES .	
73 6	4	d	0	æ	4	di	4	ďP	4	di	4	di	(inch)
7900	9									1-1	40150	4750	560
300											1 10550	1 10550	220
6000	V- 1						- 5300	5308			4350	4350	6830
240							° 11700	* 1000			9600	9600	270
4500					6700	1 8700	3750	5750	4600	4600	4250	+250	130
180					14450	* 9450	* T2500	. 02500	100	0.75	, 2400	9400	300
3080					6400	1 1400	- 8500	6200	· 5800	4800	4350	4150	7960
120					10950	* W050	* W050	10069	' W250	9700	. 3000	9100	320
Y000					. 8800	8000	* 7250	1963	1 5950	4400	1 4050	+000	0050
80					21000	9000	* 16650	12860	12960	9480	10250	8150	300
0					10990	1990	* 7700	5800	6/50	4350	S200	4100	7960
				1 3	· 22800	18450	8700	12500	13360	5300	THE	5550	310
-800			* 1050	- 11250	10400	F250	7700	5750			+ 6050	4450	7350
-60			* 25900	29800	22500	16350	6700	12409			13350	9750	290
-3000			* 13000	* 13000	9450	8950	7000	5800			6250	5300	6470
120			+ 28950	- 2850	20400	W990	· W350	12550	()		+ 13750	11750	260
-4500	-		-	70.00	7950	- 1090	50,000			-	, eabb	6100	4980
-90					10700	9700					12000	10000	200

Illustration 183

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift OFF

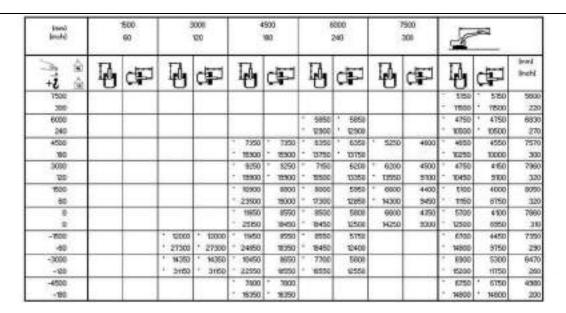


Illustration 184 g06225619

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift ON

HD Reach Boom with a 2.5 m (8 ft 2 inch) Extended Stick and 5400 kg (11905 lb) Counterweight

Product Information Section
323 Reach Boom/Variable Angle Boom/Super Long Reach Boom

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600 mm (24 inch) Single Grouser Shoe (14 mm (0.6 inch) thickness)

(med (insk)		600 60	100	5000 5000	E 5	1500 180		9000 246	1.0	500 300	F	===	
- h	4	d	4	d	4	dip	1	di	4	æ	4	ďP	Inch)
7500											4700	4790	560
000											* 10000	18400	220
5000							5200	+ 5200		- 10	1 4300	4330	6630
240					3777	201522523	11450	* 11450			9450	9450	230
4500					6550	6550	5600	5600	4750	4350	4200	4200	7571
150	n n			11 0	1 14050	11/50	* 12200	* 12200	1	200	- 5050	9250	300
3000					1 8250	* 8250	6350	5990	* 9900	4250	+ 4300	3890	7966
120	1				17750	1 1000	10750	12600	. 15000	2100	* 3450	8900	321
1500					9700	1050	* 7100	5600	. 2000	450	+000	3790	8050
60					1 20050	11950	5350	12100	12650	8850	- W100	8200	325
0.					10050	8100	7550	5450	9000	4050	° 9150	3600	7968
0					22400	17400	1 16350	11750	13000	-8700	* 1000	8350	38
-1500			7 75500	. 1000	10300	8050	7550	5400			5950	4150	7350
-60			1 25650	25650	2200	17300	1 16350	11600			13050	9190	290
+3000			1 12860	, £500	9250	8750	6850	5450			* 8100	5000	6470
420			+ 21780	+ 27700	20000	17550	+ 14600	11000			- 13450	9050	261
-4500			1000		6850	* 6850	1000	DAMES.			5990	5990	4580
-190				70	1 16400	* 1400		V			10000	* 0000	200

Illustration 185 q0622567

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift OFF

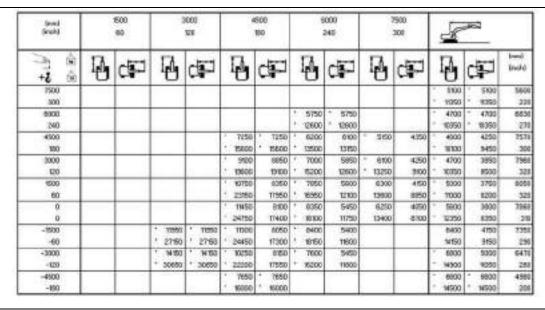


Illustration 186 g06225679

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift ON

600 mm (24 inch) Double Grouser Shoe (13 mm (0.5 inch) thickness)

(inch)		500 60	100	100)	3	1500 180			800 240	100	7500 300	8	263	
- A 60	4	dFI	4	ď₽	P	æ	F	4	dP	6	di	1	œ	brand bricht
7900												4700	4700	590
300												10400	* 10400	. 22
6000							* 5	200	5200	5	- 11	4300	* 4300	683
240					11 - Oe 1	STEELING SE	1 1	450	11450		11987	9450	1 1450	270
4500					6550	1550	. 5	000	5608	* #750	4300	4200	4200	757
100					* WISG	" WISO	. 4	200	. E300	11.5	500	9250	9250	30
3000					4 8850	* 6250	* 8	350	5851	. 5500	4250	4300	3850	799
20					1 17750	1 11750	. 13	OPT	12600	, 45000	300	1 3450	8500	320
1000					1 9700	6350	* 1	1900	\$600	' 5000	450	+ 4500	3750	000
60					1 20850	11950	* 8	380	12100	12850	8850	10100	1000	33
0.					10090	1100	. 1	550	5450	6000	4050	, 8,80	1900	789
0					22400	11400	* 16	350	11758	. 13000	8700	11300	\$350	310
-1500			11300	, 10300	10000	1050	+ 1	550	5400			+ 5350	4750	739
-60			* 25950	* 25690	22100	17300	1 16	350	TI608			13050	9150	29
-3000			12800	1 12800	5250	1150	' 6	850	5458			6100	5000	647
-03			- 27700	* 27700	20000	17550	+ 34	600	71600			13450	19050	200
-4500			-		* E890	6850	177		C-1110000			9950	5950	499
-160					1 14400	1400						10000	* 10000	200

Illustration 187 g06225674

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift OFF

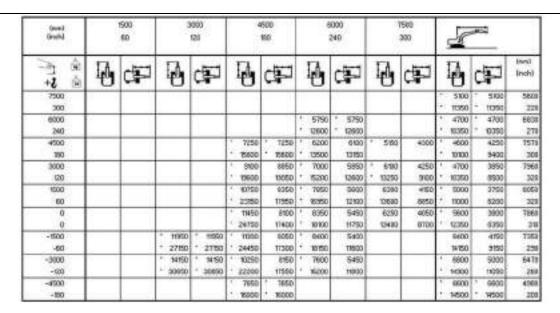


Illustration 188 g06225675

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe

160

(mul. (iroh)		60 60		120	- 69	600 180		240		12.0	7500 300	3	200	
<u>→</u> 6	4	ď	1	ď	4	æ	P	1 0	P	4	æ	1	di)	Inerd Inerd
7500												4700	1700	5900
900												1 10400	10000	220
8000							1 52	00 7	5208			+ 4300	+ 4300	6830
240						annessa s	114	50 .	T1458	Samuel		9450	9450	270
4100					. 6920	1550	100	00 ,	5000	4750	4050	4200	4500	7970
100	15 1				* WHOO	* N150	* 122	00 1	12208	in the contract of	1000	9250	1 1250	900
3000					. 8520	1 8250	1 635	50	5850	. 5500	4250	4300	3900	7980
120					1 17790	1 17750	1 137	50	12650	, 45000	3100	9450	8990	320
1600					9700	6300	1 79	00	1600	5000	450	+ 4000	3750	9050
80					1 20250	10000	+ 63	50	12100	. DAVO	8500	1000	8200	320
0					10090	8100	1 75	50	5450	6000	4050	950	3800	7890
0					22400	11450	* 1638	500	1010	13000	8700	11000	9400	310
-1500			* 11300	+ 11000	10000	1050	1 15	10	5400			1 - 5950	6850	7350
-60			* 25850	* 25690	22100	11350	* 163	50	1650			10050	9150	290
-0000			* 12800	1 12800	9250	8150	1 68	90	5500		177	T 6100	1000	6470
-120			22700	1 27700	20000	11550	1 1400	00	1000			1 13450	11100	260
-6500			11000		. 6850	6850	1010		777	1		1 1950	5350	4580
-180					14400	1400		-				1 10000	9 10000	200

Illustration 189 g0622565

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

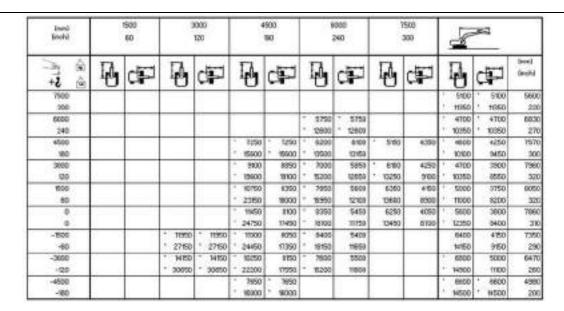


Illustration 190 g06225656

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

Enohil Enohil		1500 160	100	120	5.0	1900 190	2.5	9000 240	193	7500 300	\$	JRI .	
- A 60	4	æ	0	æ	14	ďP	4	di	4	di	1	æ	(invel (inch)
7500										-	4000	4700	560
300							-				1 10400	10400	22
6000	· ·						5200	5208			4300	4300	683
240							11450	19450	1	2293	9450	9450	27
4500					6550	£250	5800	5600	4750	4250	4200	+200	131
100	95 0				14850	" Wiso	2200	. 85500	7.5	0.00	9250	5250	30
3080					6520	1250	6350	5800	. 5880	4250	4300	3800	799
120	22 9				17750	17750	19750	10450	, 5000	0000	9450	1400	33
4000					9700	1200	* 7100	5550	1 5000	4050	1 4000	3700	005
80					20950	11700	* 16350	TREAT	12880	8750	10700	8100	325
0					10050	1990	7590	5350	, 6000	4000	5150	3750	789
0					* 22900	7750	8350	T553	. 0000	8800	1000	5050	31
-800			* 11300	- 11300	10000	1950	7550	5300			1 5950	4100	735
-60			* 25650	29650	22100	11090	8350	11450			19050	9000	29
-3000			+ \$200D	- 12800	1 5050	8050	6850	3400			, 6,000	4500	647
120			* 27700	* Z7700	* 20000	11300	* 14500	11650			13450	10500	26
-4500			0.55	7 7 7 7 8 1	8850	- 8890	-11-00			-	1 5950	* 5960	498
-90					14100	* W400					13000	1 10000	20

Illustration 101

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

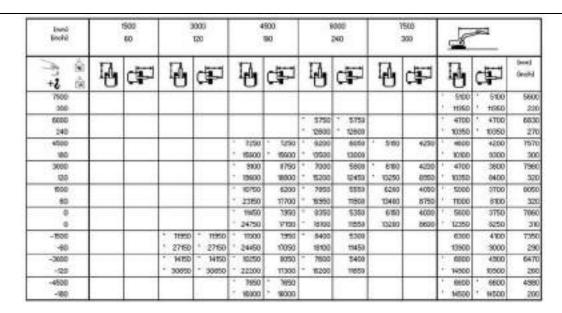


Illustration 192 g06225683

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

700 mm (28 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

Ininò (inch)	(Capacity)	500 60	100	120	5.	1900 190		1800 240	1.00	7500 300	8	JEST	
A) (8	4	田	0	æ	10	æ	4	æ	100	æ	4	ď	(mail (mail)
7990										-	4000	4700	560
300											1 30400	10400	23
8000	Y						5200	5208			4300	4300	683
240							* 11450	* 19450			9450	9450	270
4500					6550	1550	5800	5600	4750	+400	4200	+200	120
100	ve e				14850	" Willia	* 9200	. 8350	7.5	0.63	9250	9250	300
3080					6250	1250	6350	5950	1 5580	4300	4300	3950	7990
120	H 0				17750	17750	10700	12000	, 6000	5250	9450	1650	320
1000					* 5700	8490	* 7100	\$700	1 5000	4200	1 4000	3000	0050
80					20950	98200	* 16350	12253	12880	9000	10000	3350	325
0					10050	8200	* 7590	9553	6000	4100	5150	3850	7960
				11 3	° Z2900	170290	8350	T000	. 0000	8880	TUDO	5500	310
-800	7 - 7		* 11300	- 11300	- 10000	1150	7550	5500			+ 5950	4200	7350
-60			* 25650	29950	22100	17990	18358	1869			19050	9900	290
-3000			* 1200D	* 12000	1000	8290	- 6850	3558			, 6,000	5050	6470
120			* 27700	· 27700	* 20000	17800	* 14500	12000			+ 13450	1050	260
-4500			17.55	1200	8850	- 8890	121-00			-	1 9960	* 5950	4980
-90					14100	· W400					13000	1 10000	200

Illustration 193 g0622565

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift OFF

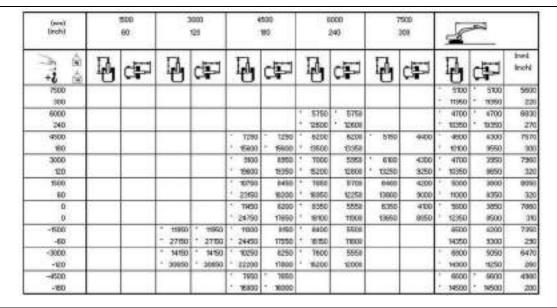


Illustration 194 g06225663

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift ON

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Product Information Section

790 mm (31 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

Ininò Enchi		1500 100		120	50	1900 180		1000 240	1.5	7500 300	1	æ1	
7 6	4	d	4	æ	4	di	4	ď	4	æ	4	dia	(ma)
7990											4700	4700	5600
300											1, 30400	10400	220
6000	//						5200	5208	-		4300	+ 4300	6830
240							* 11450	* 19450			9450	9450	270
4500					6550	£550	5800	5600	4758	4450	4200	4200	7570
90	15				14850	" Witto	72200	. (5500	7.00	97.09	. 3020	9250	300
3080					* 8250	* #250	6390	6000	· 5580	4390	4300	3950	7960
120	d 1				* 17750	17750	10700	12559	, 6000	9350	9450	1750	320
1000					9700	8520	7100	\$750	. 2000	4250	1 4000	3650	0050
80					20950	19400	* 19350	12468	12880	9100	10700	8400	320
0					10050	#300	7590	9860	, 6000	450	950	3900	7960
(0)					* 22900	11890	8350	12050	, ,0000	8950	TUDO	5500	310
-800	1		* 10300	- 11300	10000	8250	7550	.5553			1 5950	4250	7350
-60			* 29690	29650	22100	17790	18350	11560			13050	9400	290
-3000			* 1200D	* 12800	9050	8390	6850	2800			, 6,000	5700	6470
-120			* 27700	* Z7700	* 20000	9000	* 4500	12/09			13450	1050	260
-4500	~ ~		A77.55	100000	8850	- 6890	15-63			-	1 5960	* 5860	4980
-100				U	14400	* W400					1 13000	10000	200

Illustration 195 q0622566

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift OFF

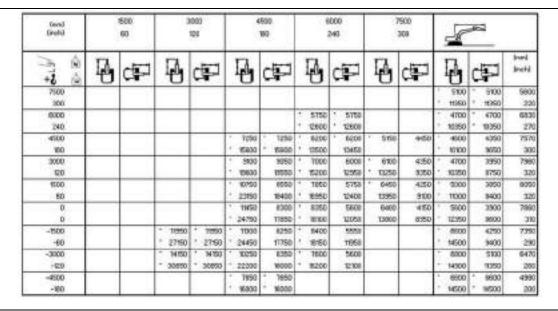


Illustration 196 g06225667

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift ON

900 mm (35 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

(red (reh)		600 60		ER .		100 100		9000 246	1.5	7500 300	1	3	
-3 é	4	ď₽	4	dip	4	中	1	di	4	æ	4	d	Inold Inold
7500											4700	4700	560 22
000											* 10000	19400	220
9000							52,00	+ 5200		- 40	1 4300	4333	6630
240						211102200	11450	* 11450			9450	9450	230
4500					6550	6550	5600	5600	* 4750	4500	4200	4200	757
100					* Witte	11/50	* 12200	* 12200	1.0	190	- 5050	9250	300
3000					. 8250	* 8250	6350	6100	5900	4400	+ 4300	4350	796
120					17750	1 11150	10750	13100	12000	9450	5450	8050	321
1500					9700	.0050	7100	5050	5000	4300	+000	3900	805
60					1 20050	18650	1 5350	12550	12650	9250	- MA30	1950	325
0					10050	8400	7550	5650	6000	4200	* F150	3950	796
0					22400	15100	16350	122000	13000	3050	* 1000	8790	31
-1500			* 9390	. 1000	10000	8350	1550	5600			- 5950	4300	735
-60			1 25650	25650	1 2266	18000	1 16350	12100			13050	9930	290
-3000			1 12860	, £500	1 5050	0450	6850	5700			* 8100	5200	647
-120			+ 21780	* 27700	20000	10250	+ 14600	12300			- 13450	9500	251
-4500					6850	* 6850		200000		177	5990	5990	4580
-100	r			70-	1 16400	1 1400		J			10000	* 0000	200

Illustration 197

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift OFF

(iroh)		500 60	- 3	100) 100	8	1500 180		000 240		7500 300	4	22	
4	4	d I	4	di	4	æ	4	d=	4	ď	4	di	brand brackl
7500											, 2,000	. 2100	5900
300											* #350	* 19390	220
8000							* 5750	5150	5-1		4700	4700	6830
240						211545.5	, 5800	, 45800	2	19-9-2	10350	10350	270
4500					1250	1250	6200	6208	5150	4500	4500	e450	7570
100					, \$2800	* 15500	13500	, 13208	2 - 8753	25.55	. 1000	9800	300
9000					4 9000	9100	* 1000	6:08	. 6400	9400	4700	4050	7990
80					. 10600	T 19000	* #500	13,000	10250	9450	10350	8650	320
1000					1 10750	0000	1 7000	5050	6450	4000	1 5000	2000	0050
60					1 23150	18850	1 16550	12588	14000	9250	11000	1850	320
0					1 11/50	. 6450	1 8360	5658	6500	4200	9800	1990	7890
0					24790	B100	* 16/00	12208	H000	9050	12350	5700	310
-1500			11990	11000	1 7000	8350	* 8400	5800			+ 6000	4000	7350
-60			* 27150	2750	24490	98000	1 6160	12108	2		14500	9500	290
-3000			* 14150	* N150	10250	0450	1 7500	5708			* 4000	5200	6470
-60			- 30550	* 30850	1 22200	16250	+ 8200	12308			14500	19500	260
-600			11111	-	1950	1650				-	. 8600	* 9600	4990
-160					1 96000	1 - 00000					1 14500	100	200

Illustration 198 g06225670

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift ON

HD Reach Boom with a 2.9 m (9 ft 6 inch) Normal Stick and 5400 kg (11905 lb) Counterweight

600 mm (24 inch) Single Grouser Shoe (14 mm (0.6 inch) thickness)

Ineni Inchi	I		500 80			120			1900 180			240	500			500 300		R	7	2	
3 6	Ī	4	ďP		4	d	1	1	ď		4	C	P	100.000	4	æ		4	c	F	(insh)
7900	T			Т			\neg			ŀ	4550	-	4550					3950	-	1950	9/60
300	L			L						l.		L		L			+	6750	*	9750	240
5000	Т			Г						1	4350	+	4250					3850	+	3650	1250
240	ш			L			_				10800		10900	8	- 20.0	1155	4	8850	+	8050	290
4500	т			Т			\neg			ŀ	.5400		5400	2	5100	4500	Т	5600	1	3600	7990
190	ŀ			L			-			-	11750	-	11750		11100	2620		T900		T900	325
3000	т			Т			\neg	7900	, 5900	-	6200	Г	9050		5480	4400	*	3890	+	1650	6360
120	L			L				16950	. 8950	ŀ	10400		13050		10750	5450		6050	7	8050	330
1500	т			Т			\neg	9500	8600	E	7000	Г	5000		9000	4290	Ŧ	3900		3600	0450
80	1							20550	10550	ŀ	5200		12500		12500	5000	+	8550		T950	340
0:	т			T	6250	* 6	250	10400	4300	1	7600	Г	5930	7	8400	490	7	4300	Т	1790	8290
a	П			+	14350	1.16	350	22500	17500	ŀ	39450	1	12100	7	13200	5000	+	5450		8300	330
-1500	1	6700	* STOR	+	10000	* 10	800	* 10500	8200	ŀ	7750	Г	9950		6050	4750	+	5950		1550	TIES
-00	1	14900	* 14906	1	24450	* 24	450	22750	17700	ŀ	19900		11900	4	13080	8900	1	1100		6700	310
-3600	t	7950	* 19458	1	13500	-	300	* 3100	6250	ŀ	7300		5550			7.7	T	6000		4650	6052
×120	1-	25050	* 15868	+	30100	+ 50	100	7 21200	17800	1-	5700		12000		Ш		+	13850		10250	280
-4500	1	-	-	1	TI050	- 11	080	* 7960	_	t	1000		175-7.				4	6000	4	8000	5800
-190	L			1	23650	1 23	70.85	1 10050	* 16950	ì							4	13000	+	11000	220

Illustration 199 q0622557/

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift OFF

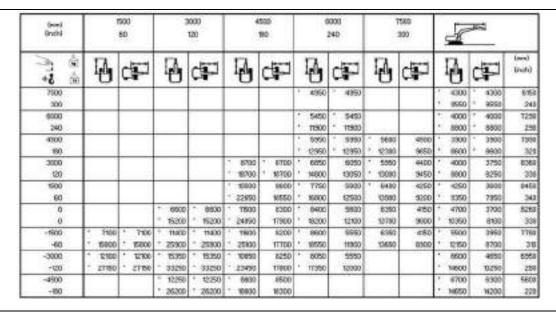


Illustration 200 g06225580

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift ON

600 mm (24 inch) Double Grouser Shoe (13 mm (0.5 inch) thickness)

Smokil Smokil		500 60	- 3	120		1900			240			900 900		8	×	ā	
À €	10	æ	10	æ	1	æ		4	ď	1000	0	æ		4	c	F	lowl lookl
7500							-	4550	1 4558				F	3850	-	3050	679
300	,						L						-	8750	+	6750	240
6000	1-							4958	4950					3650	*	3650	7290
240								10000	, 40000			1,500		8050	*	8050	290
4500								5400	5400		2100	4500	Г	3500	+	3600	7330
300					2000	COLE		11750	11150		11100	3650	-	7900	1	T900	320
3000					7900	1900	-	.6200	6050	*	5400	4400	-	3990		3650	8390
20					18350	* WESSO	-	13400	13050		11750	9450	-	8050		8050	330
1600					2500	8600	-	7000	5800		5800	4250	1	3800		3600	8/60
80					20550	16550	-	15250	12500	+	12800	5000		8950		1950	340
0.			1 6250	9250	10400	8300	-	7800	5600		6100	4193	7	4300		3700	9290
			* W353	* 14350	22500	17500	-	8450	12700		13200	2000	1	5450		6100	330
-7500	5700	6700	* 10800	, 10000	10500	1200	-	7750	5553		6050	4750	-	5050		3550	770X
-60	14900	* 14900	1 24450	* 24450	22750	17700	0	18800	T908		15050	8900	٠	T100		8700	310
-3000	11450	* 11450	13500	10900	3000	1290		7300	5550		- 7.0	177.57	-	6000		4600	6390
-126	25050	25050	30'00	5000	21200	10000	10	5700	\$2008					13150		10050	200
-4500			1, 1,020	* 11050	* 2550	* 1950			111111111111111111111111111111111111111				-	1000		5000	5500
-180			* 23650	* 23650	18950	18950	1				J.			13200	+	13200	220

Illustration 201 g0622557

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift OFF

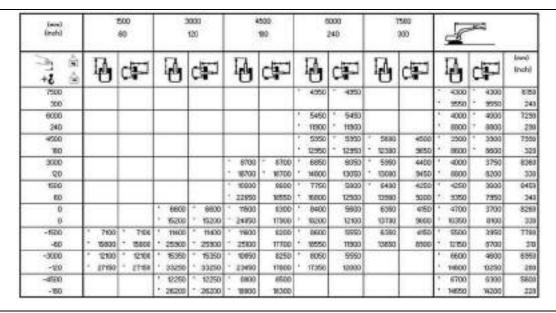


Illustration 202 g06225575

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe

(inch)		500 60	- 3	100)	3	1500 180	100	6000 240		7500 300	8	263	
-5 A	10	æ	1	Œ	14	B	P	æ	10	æ	4	dP	book books
7500							4560	4558	-		3950	3990	919
300											11750	1750	240
6000							4550	4550			3950	3650	7250
240							10600	, 10800	2000	12-02	8050	9090	290
4500	-						5400	5400	5100	4500	3500	9000	7330
700	10 10						1 11150	1030	. 11100	9650	7900	7900	320
9000					1 7900	1900	* 6200	6050	5400	4400	1650	* 3650	8360
80					, M950	T 1000	1, 10400	10050	11750	9450	0050	* 8050	330
1000					1 9900	. 6600	* T000	2000	5000	4250	2900	3000	9490
60					1 20550	18550	* 5200	12500	: 12800	5200	8580	7990	540
0			9 6250	1 8290	10400	8300	1 1806	5600	6900	450	4300	3700	8290
0			- 14350	* 14250	22500	17500	1 18450	12700	* TS200	9000	9450	9050	330
-500	6700	6700	- 10800	10800	10500	8200	1750	5550	. 8080	450	+ 3050	2950	7700
-60	14900	14900	24450	* 24450	1 22790	11950	1 16000	1908	13090	8900	1 1100	9700	310
-3000	* 1M50	* 11450	- 13900	10000	. 5900	8250	1 1300	5553	5 - 2 - 5		. 8000	4600	6990
-60	+ 25650	- 25650	* 30100	* 30'00	21000	11800	+ 5700	12000			+ 1050	19250	280
-4500	2 ell nie i		* 11050	1 1090	1990	1990	175.77	-		-	. 6000	9000	9800
-160			* 23650	+ 23650	16890	* 10950					13200	* 10200	220

Illustration 203

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

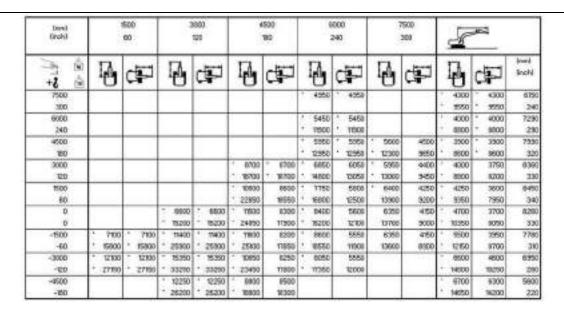


Illustration 204 g06225537

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

inini Inchi		500 80	100	1210		1900 180			009 140		9500 3000		8	351	
- ·	4	ďP	4	d P	4	dP	I	d	ď₽	10	ď	1	0	æ	(mak) (mak)
7900							-	4590	4950			1	3890	1 1960	96
300									100000			11	6750	1750	246
8800	-						10	4990	+ 4250		-		3620	1 3650	7250
240							*	0800	10900	S	07.00	45	8050	1 8050	29
4500							*	5400	5400	590	4450	1	5600	1 3600	7900
190	k				Section 1	Community of		11750	11750	. 11100	9500		T900	* T900	321
3000					* 7900	. 3900	-	6200	9990	* 5400	4390	1	3850	+ 1850	6361
120	1				1 16350	. 8350	7.	10400	12050	10750	9300		8850	* 8050	338
1500					9500	.0500	*	7000	5700	* 5000	4000	1	2900	1660	0451
80					20550	18300		5200	12300	12580	5090	10	8550	1850	341
0			6250	6250	10400	6200	1	7600	9990	* 6500	4/00	1	4300	3660	8286
a	l		* 14380	14350	22500	17650	-	19450	11930	13280	6890	1	5450	1950	338
-1500	5700	* STEE	, 30000	* 10000	* 10500	8100	15	7750	5450	6050	4100	+	5050	3500	710
-00	14900	14906	24450	* 24450	22750	17450	1.	6900	11750	13060	8600	1	1100	6600	31
-3800	1 19450	* YMSE	13500	13300	* 3000	850		7300	5500	5-200	200	75	6000	4550	5058
×120	* 25650	* 15851	+ 30100	+ 50100	7 21200	17550	+:-	5700	11000	P		+	1380	10100	200
-4500			11050	11050	7950	1950	1	(10.01		N	-		6000	. 9000	580
-100			* 23650	1 23650	* 10350	16950	1					4	10000	+ 11000	221

Illustration 205 q0622558

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

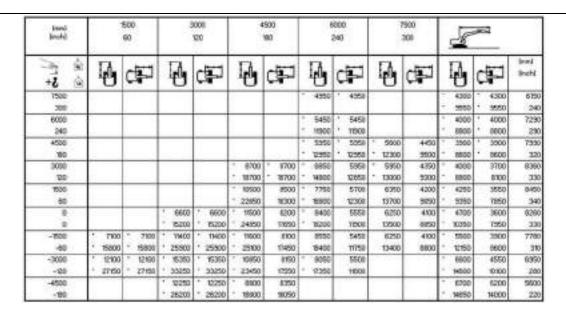


Illustration 206 g06225586

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

700 mm (28 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

Inini Inchi		500 60		120 120	5.	1900 190			900 NKO	1.50	7500 300	8	302	
-3 m	14	æ	4	æ	14	æ	I	ð	æ	100	æ	1	ď	(me) (mc))
7900			- 1					4590	4550			3960	1 3950	6750
300												1 8750	1 11750	240
6000	P						-	4990	4553			3650	3650	7250
240								0000	10800		and the second	9050	8050	290
4500								5400	5400	5100	4550	3000	3600	7990
100					1.0779.5	201012	-	11750	* 10753	. ALMO	5000	7500	. 1200	320
3080					* 7900	1900	-	8200	6153	1 5400	4450	3650	9650	8390
120				1	16350	- W050		13400	13200	. 11120	9550	. 9089	1000	330
1000					* 9500	1790	+	7000	\$500	1 5660	4000	1 3900	1650	0450
80					20550	1800	=	5200	12650	, 15800	9300	8550	3050	340
0			* 6260	* 6250	10400	8490		7900	\$700	' 6100	4250	4300	3750	8290
0			- 14350	* 14250	12500	, M120	-	8450	12250	10250	300	1 5450	5200	330
-830	6700	5700	* 10500	- 10800	10500	8350	-	7750	5800	. 8080	4250	5050	4000	7700
-60	14800	14900	* 24450	24450	22750	17990		9800	12100	1 13090	9050	1 1100	(6850)	310
-3000	* TM50	* TH50	* 13300	* 13300	9000	8400	-	7300	5650	7-330	77.77	6000	4700	6350
120	+ 25650	* 25050	* 30100	* 30100	* 21000	9050	-	5700	2.69	0		1000	10400	200
-4500	-	-	* T1050	* 11050	7950	1990		-				. 6000	* 8000	5600
-90			* 23650	* 23650	18950	· waso		_				13390	10200	220

Illustration 207 q0622553

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift OFF

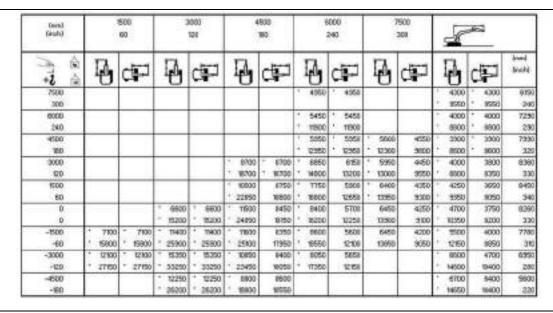


Illustration 208 g06225539

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift ON

Product Information Section
323 Reach Boom/Variable Angle Boom/Super Long Reach Boom

170

790 mm (31 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

Inotic Inotic		500 60	1	120		1900 1900	1	8000 240	1 2	7500 308	F	1	
→ 6	1	dD	1	æ	10	æ	P	di	10	Œ.	4	æ	lined linebi
7500	1/						455	0 1 4558			3850	+ 3550	6190
300											- 8750	+ 6750	240
6000	0.5			1			498	8 4950			9950	. 9650	7290
240							" 1000	0 , 10000			* 8050	* 8050	290
4500	1						540	0 ' 5400	. 2100	4000	3500	1 3500	7330
190	4					-C1/43	1175	o · msi	* 11100	3900	7900	* T900	320
3000					7900	1900	- 620	6201	5400	4900	9990	1 3650	8390
20	13				18350	* 16350	7340	0 13350	* 11750	5100	8050	* 8050	330
1600					2500	8800	* 700	0 5850	. 2000	4400	. 3900	3700	8/60
80					1 20550	19000	* 1520	0 12800	* 12800	5400	8960	6150	340
0			1 6250	9250	10400	#900	* 760	6 5758	6100	4300	1 4300	3750	9290
			* W353	* 14350	22500	16350	1045	0 10400	13200	5200	5450	6300	330
-800	5700	6700	* 10800	, 10000	10500	5450	* 775	5700	* 6050	4250	5050	4050	7700
-60	* 14900	* 14900	1 24450	1 24450	22750	18150	* 1888	8 12200	* 15050	950	* 1100	8950	310
-3000	11450	* 11450	13500	10900	9100	8500	* 730	5700		723	6000	4750	6390
-98	25050	25050	1 30100	3000	21200	10250	570	0 \$2300			13150	10500	280
-4500			1 1050	* 11050	* 2550	* 2950	-	111111111111111111111111111111111111111			* 1000	, 2000	5500
-180	4		* 23680	* 23650	18990	18990					13200	+ 13200	220

Illustration 209 q0622554

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift OFF

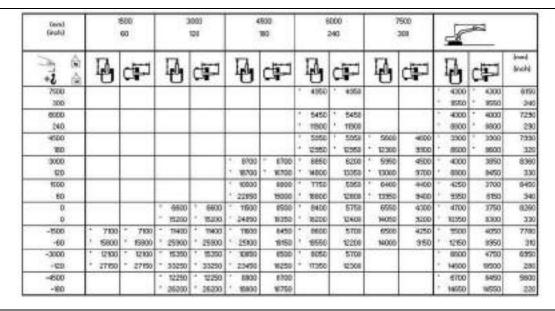


Illustration 210 g06225543

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift ON

900 mm (35 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

(insk) (insk)		1500 60	100	120		1500 180			000 140		7580 300	j	R	200	
-) û û	10	di	0	中	10	æ	I	ð	æ	10	æ	1	ð	æ	(hel)
7500							1	4550	4550			-	1550	7,750	650
300													11750	. 9520	241
9000				4.			4.5	4950	4990			+	3650	* 3990	7290
240							* 1	10000	10900	S	11000		8050	7 8050	250
4500							10	5400	5400	5'90	4650	+	3500	7 3000	7900
100								11750	11750	* 1790	10000		7300	* 7500	321
9000					7900	7900	1	6200	* 6200	* 5480	4550		9650	9990	8368
TO					. AS220	7 16550	+ 1	13400	13400	* 11750	3000		8050	9050	330
1000					5500	6950	*	7000	6000	* 5800	4450		3500	3750	0453
60					20690	19250		5200	12950	12500	9650		8550	8290	341
0			6250	6250	10000	9650		7600	9890	* 6'90	4350	7	4300	3850	8260
0			* W350	* 14250	22500	16600	+)	6450	12550	- 100390	5350	+	3450	0400	238
-1500	* 670	* 6700	10000	* 10800	. 80500	7550	+	T750	5750	* 6050	4300		5050	4100	7700
-60	1 1490	1 14506	1 24450	* 24450	12790	16350	+ 7	16800	12400	13050	9300	+	11100	9090	. 58
-3000	1 149	11452	13900	13300	9000	9600		7300	5900		100		6000	4900	6553
-100	1500	15888	30100	30100	2 2 2000	10500	1 9	5700	12450			4	10150	10050	200
-600		-	, 11025	* 11050	* 7950	1950			7.71500			+	8000	* 6000	5800
-180			1 23650	* 23850	16890	* 16960			M			+	13200	* 18300	221

Illustration 211 q0622554

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift OFF

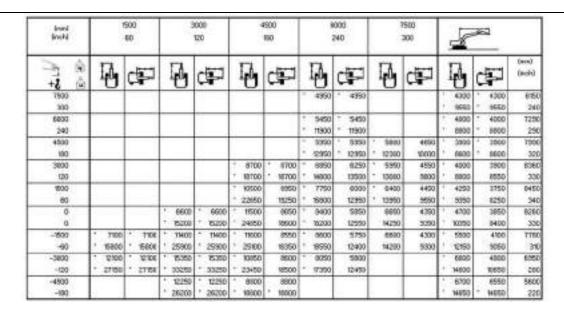


Illustration 212 g06225549

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift ON

HD Reach Boom with a 2.9 m (9 ft 6 inch) Extended Stick and 5400 kg (11905 lb) Counterweight

600 mm (24 inch) Triple Grouser Shoe

172

(Ireh)			600 80	3	120 100ii		1900		6006 240	100	7900 300	J	1	
-3	(A)	4	æ	1	æ	16	æ	14	ď₽	100	æ	4	di	(ma) (min)
7900								499	4508			3950	1 1660	6/69
000												1 8600	9600	241
6000								490	7 4808			7 3990	1 3800	7239
240	2							* 1055	10658			7900	1 7900	250
4500								* X30	5300	, 6320	4400	. 3900	3500	7900
160								* 1950	1 1500	* 10850	9400	1700	* 2200	329
3000	8					7750	1750	005	5550	5250	4200	3600	3600	6368
120						19950	1 16650	1019	12800	* 11500	9200	1900	* 7900	33
1500	8					9350	1490	. 882	1668	. 2650	450	3000	3900	845
60	9					20150	A500	* 1485	12200	+ 15300	8150	* 8050	7750	341
. 0		0-		. 8500	+ 6200	10250	1150	7 745	5500	* 5950	4050	4200	3550	826
0				1 14200	1 14200	22100	17500	1 610	1601	12900	8750	1 3900	7960	336
-1900		9900	9800	1 10700	* 10700	10000	8090	* 760	9400	6900	4000	4990	3960	770
-60	8_	* 14750	* 14754	1 24300	24300	* 22950	17300	945	1600	12750	9050	10950	8450	31
-3000		* 1350	* 1058	* 13650	* 13650	* 3650	1100	715	5458	5-201	- 0	- 5890	4500	6951
-123)	- 1	29900	. 19800	, 52600	* Z9600	. 33950	11490	* 339	71700		100	10990	10000	239
-4900				1 10650	1 10950	7800	1900	-	1			5900	* 8900	560
-180	-1			* 23200	* 23200	18500	- 90000				1	* 12300	12500	221

Illustration 213 g0622564

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

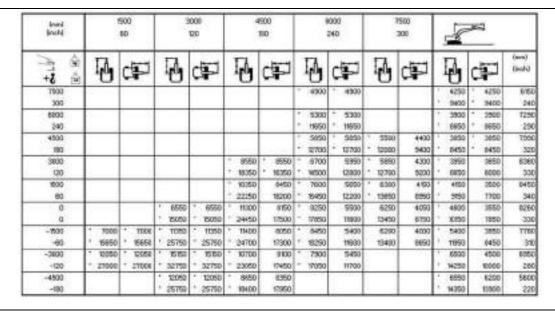


Illustration 214 g06225644

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

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Product Information Section

600 mm (24 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

inel Inchi		1900 80		120	100	1500 180	100	240 240	- 23	7900 309	-8	263	
A 68	14	ďP	4	d P	10	ďP	4	ďP	4	dip	1	æ	ined Inchi
7900							1 4500	4500			1 3050	3090	6150
300											. 8000	* 8600	240
6800							4000	4000		- "	3500	3800	7290
240							* 0990	10650			7900	* 7900	290
4500							5300	5009	4000	4350	2500	3500	7330
190			_		0.000		12500	* 11500	10850	3100	* 7700	* 7700	320
3000					* 7750	* 1790	- 9390	585)	1 5250	4200	1 3800	3990	8390
120		1 2		- 1	16450	16050	10190	12608	19500	3050	7000	7950	300
1600					. 5000	6390	9990	5600	1 5050	4100	+ 2000	3450	9450
60					2050	17990	* 14850	10000	, 15:300	8500	+ 8350	7600	340
0			+ 6200	* 8200	10050	8000	7490	5400	1 5990	4000	4200	7500	8290
0			1 W200	14200	22100	11250	" W100	71004	15000	96000	9300	7700	330
-1500	* 6600	. 6606	1 10700	* 10700	10000	7900	* 7800	1300	1 5300	3950	4950	3000	7790
-60	* 14750	* 14158	* 24300	* 24300	1 22350	11050	* 18450	11400	12750	8550	10950	\$250	310
-3000	1 Y050	, A325	13650	* 13650	9450	1000	7190	5350		31773	\$850	9450	8990
-620	25500	15500	1 20000	29000	20450	17150	5350	1600	2		12050	5500	280
-4500			10850	* 10850	7900	* 1800	10.00	-			* 5900	5900	9600
-180			1 23200	* 23200	19800	* 19800					12900	12900	220

Illustration 215 g0622564'

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

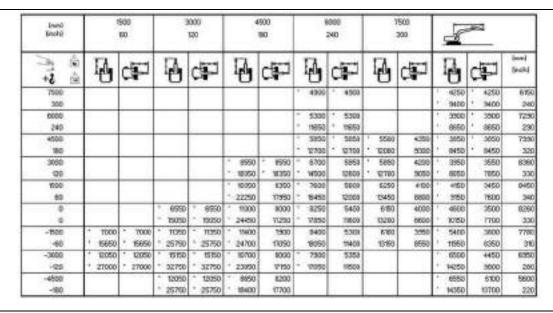


Illustration 216 g06225650

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

900 mm (35 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

(med (mobil)			508 60			120	W. 1			#300 #30				240				900 300		8	E	2	
A 6	4	4	d		0	d	P		4	c	P		4	c			0	æ		4	c	F	ined (Inchi
7500				t		Т		Т		Т		-	4500	7	4500	7			7	3850	+	3850	670
300				L								L		L					-	8600		8500	24
±000				Т		П		Г		Г		4	4800	1	4808				+	3600	+	3600	729
240				L									10550	1	10553	Ċ,	55.00		-	7900	*	7900	29
4500				т		т		Г		т		-	5300	7	5300	٠	4350	4250	-	3500	+	3500	733
190				L		Ш						-	15500		TEXAS	٠	10250	3750	-	T700		T700	32
3000				Т		П		+	7750		7790	-	.9050	*	6050	٠	5250	4450	-	3900	+	3600	839
500				L					19650		18050		10150	,	15/63		11500	9550	-	7900		T900	33
1000				т		т		+	9350	Г	9790	-	9950	Г	5900		5050	4300	7	3000	Г	3650	049
60				L				*	2050		18900	-	14950		12650		12300	9000	-	8350		8000	34
0				1	6200	+	6290	. +	10250		8450	-	3450	Г	5700		5950	4200	-	4200		3700	829
0				1	14200	7	W200	+	22/00		16200		8100		12250		15300	3620		5000		950	33
-1500	7.3	600	, 6600	1	10700	*	10790		10100		8390	-	7900	Г	1600		5900	4200	7	4950		4000	779
-60	+ 14	150	* 16750		24300	+	24300	+	22350		18000	-	19450		10050	+	12750	3000	+	10850		8660	31
-3000	+ 1	1350	11390	1	13660	+	13680	+	9650		8400	-	7150	Г	5850	1	1000	11100	4	5850		4700	699
-90	+ 37	500	. 18800	1	29800	1	25600	1	20150	1	19100	-	16350		2.60				-	12950		10050	20
-4500	-			t	10850	1	10850		7900	,	3900	г		Г	77.77	Т			+	5900	+	5900	560
-190				1-	23200		23200	,	10600		18600								+	12900		12900	22

Illustration 217 q0622564

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift OFF

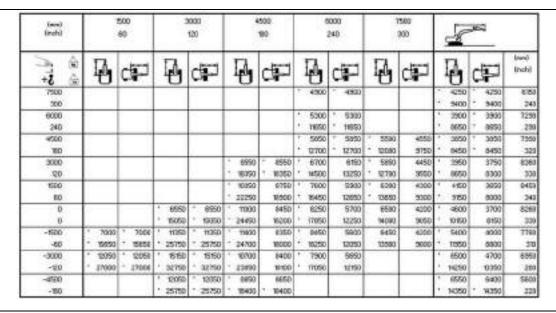


Illustration 218 g06225648

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift ON

HD Reach Boom with a 2.9 m (9 ft 6 inch) TRS Extended Stick and 5400 kg (11905 lb) Counterweight

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Product Information Section

600 mm (24 inch) Single Grouser Shoe (14 mm (0.6 inch) thickness)

Smoke)		500 60		120		1500 180	1.00	9000 240	123	7500 200	Je	J#2	
→ û	4	æ	10	æ	4	æ	10	æ	4	d P	4	æ	lined linebil
7500							4500	1 4500			3850	+ 3850	6190
300											- 8800	* 8600	240
6000	1.0						4250	4750			3900	* 3600	72%
240							* 10400	, 40408	E	- 100000	1900	* 1900	290
4500							5200	5200	4300	4250	3500	+ 3500	7330
160					at-capture	0.000	* 11300	, A200	* 10700	2000	* T700	· TT00	320
3000					* 7600	1 3900	* : 9990	5850	5 8300	4300	1 3600	3550	8390
700	12-3				16400	16400	* 12500	12600	* 11300	9650	7850	7650	330
1600					+ 9300	8300	6750	5880	5500	4100	. 3800	3450	0450
80					+ 19850	17900	* 14650	12000	+ 12100	8790	8380	1550	340
0.			. 6500	6290	10050	8000	* 2350	5350	9950	3950	1 4200	3500	9290
			* '4200	1 N200	* 2800	11200	* T0050	1550	12700	8550	5250	7550	330
-7500	* 5500	6800	* 10700	10790	+ 10150	7900	7500	5300	5050	3950	4950	3750	7700
-60	1 14750	14790	* 24350	24390	* 22000	18950	* 16200	T050	+ 12550	8800	10900	8300	310
-3000	11390	* 11090	13450	13450	9500	1990	* 7050	5300	1	177.77	5750	4400	6990
-120	1 25500	25500	1 25/50	1 2560	20500	17100	15100	1950			10050	9000	200
-4500	-		10650	10650	* 7650	* 1650	-	10000			5750	* 5750	5600
-180	1		* 22800	1 22880	16300	18300			V	77	12990	12650	220

Illustration 219 q0622569

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift OFF

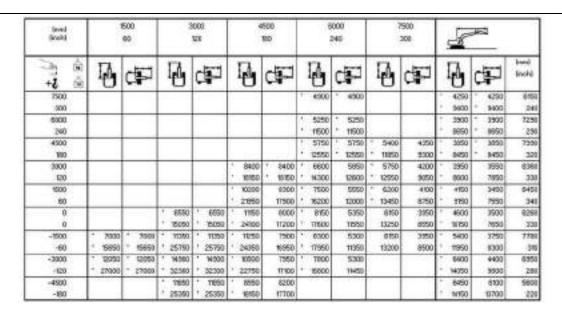


Illustration 220 g06225700

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift ON

Product Information Section
323 Reach Boom/Variable Angle Boom/Super Long Reach Boom

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600 mm (24 inch) Double Grouser Shoe (13 mm (0.5 inch) thickness)

(mm) (inch)		500 60	100	120 120		190		5000 240		990 990	5		
À É	4	ď₽	0	di	1	æ	1	dP	10	ďP	P	c‡⊐	Inni Inchi
7500							4500	4500			1850	3850	88
500											1800	5600	24
6000				11		- 1	4750	4750			, 3600	9900	729
240							10400	10400			7300	7 7900	290
4500							* 5200	5200	4500	4350	* 2500	1 3500	730
700					200	-	* 11300	* 11303	10790	9300	* 7700	7700	- 32
9000					. 3800	7800	5950	5850	* 5290	4200	1600	3990	836
.60		9			* WA00	1 16400	, 55000	12900	* 1000	.9050	7050	7890	30
1000					1 5000	9300	0750	-0000	. 2690	4000	1 3000	3490	040
60				1	1, 10000	17500	+ 14650	12000	- 2200	MIDD	* 8350	7550	34
0			+ 6200	* 6200	10090	8000	1 7350	8390	* 5890	3950	4200	3900	828
0			1 M200	14200	2900	17160	15050	11990	1 92110	9550	1 3250	7690	33
-1900	9900	* 6606	1 4070h	* 10700	, 40420	7900	* 7500	5300	* 5860	2950	1 4950	3790	779
-60	* 14750	* 14750	24350	+ 24350	- 22900	16550	* 16200	71350	7 12580	8500	10300	8333	31
-3000	1350	* 11058	1 13450	+ 13450	9900	1950	* 7090	5300			+ 5750	4490	699
-120	- 15900	- 11606	20100	29150	- 20500	17100	15100	19850			12650	3900	29
-4500			1 10650	10650	1 7990	1650					* 5750	1 5790	560
-160	J		* 22800	* 22500	· W300	" M300					10550	13650	22

Illustration 221 g0622569

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift OFF

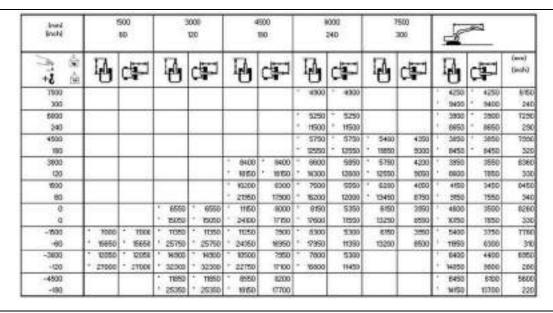


Illustration 222 g06225697

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe

(me) (iroh)			500 60	>	120	- 0	100			000 (40			300		8	, E	ä	
	À (4)	1	d	1	ď	4	æ		4	æ		4	4		4	¢	P	Ineril Ineril
7500	\top							+	4500	450	T			+	3950	+	1990	6190
900														¥	8600	1	8600	340
8000	\neg	7						+	4750	4758	Т			Ŧ	3000	+	3600	7290
240	-1							4	10400	10400				+	7500		7900	230
4100	1							4	5200	5200		4000	4350	٠	2500	1	2500	7330
100	- 1:	- 0				-		4	7000	1 100		10700	3300	+	7700	*	7700	320
3000	\neg					. 1800	1 7500	1	5360	5850		5200	4200	*	3500	П	2550	8380
120	-1					16400	1 16400	1	\$2000	1260	1.	11300	9050	,	7850		7850	930
1500	\neg					9000	9300	4	6750	Deco	1	5900	4100	+	2000		3490	0490
80						10050	11950	+	WESD	1000		12100	8750	+	8250		7550	340
0				* 6200	1 6800	10090	8000	4	1350	5400		9850	4000	1	4200		2900	8290
0	_ [* 14200	1 14200	2800	11200	4	Teto	7650	1	65,100	8550	+	\$250		7700	330
-1500	7	. 6600	* 6600	* 10700	+ 10700	10620	7900	*	7500	5000		5050	3950	*	4350	г	3750	7790
-60		19750	* 14750	* 24350	* 24390	22900	11000	+	16200	71400		12550	8500	٠	10500		5300	310
-3000	1	H350	* #350	* 13450	10450	9900	1960	1	7060	535			1773	Ť	5750		6450	9350
-20	1	25500	25500	29:50	1 25/50	20500	17150		6300	150				à.	12050		5500	280
-9500		1710000		* 10650	10600	1950	1650		01/00	- 1177	Т				5750		5750	5900
-180	- 1			* 22900	1 22800	16000	16300				1			+	10650		10690	220

Illustration 223 q0622568

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

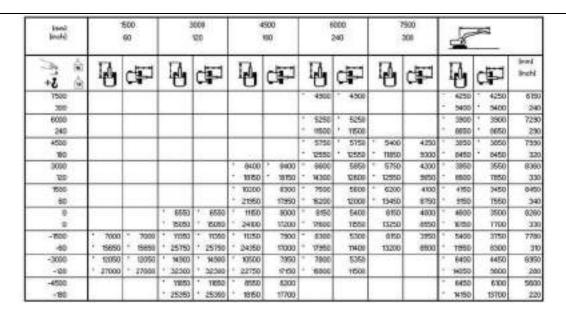


Illustration 224 g06225688

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

Gend Grohil		500 60		120		1500 180			000 240		7500 304	F	363	
) û E	12	æ	0	æ	4	æ	I	ð	ď	F	, d	1	ďP	lord lookl
7500							4.5	4500	4500			9950	1990	619
300												9600	. 9600	340
6000	- 1						*	4750	4758			3600	* 3500	7290
240							7 7	10400	10400	linn:	·	7900	7900	290
4500								5200	5000	* 50	60 4050	2500	2500	7330
100	6				100		1	90000	1 1000	1 107	00 350	7700	* 7700	320
3000					1 7900	* 3800	*	8850	5750	* 52	450	1 3800	3900	8390
100					10400	7 96400	7.7	12900	12450	. 10	0000	7650	7700	330
1000					1 9000	6200	4	6750	5500	. 20	60 4000	+ 3000	3400	0.450
80					19850	11950		14650	T1608	+ 12	00 8650	8550	7450	340
0			9200	6200	10050	1950		1360	5308	1 50	50 3300	4200	3450	8290
D			* 14200	* 14200	23900	N500	+	5850	71400	* 327	00 9400	5250	7550	330
-1500	5600	- 6500	- 10700	+ 10100	10850	1750	+	1500	5200	* 50	50 3500	4950	3700	7780
-60	1 14750	14790	24090	24390	22900	16700	1 1	6200	11200	1 125	50 8350	10900	8190	310
-3000	11050	. 11350	* 13450	10450	5500	1850	*	TOSO	5258			5150	4350	6950
-20	+ 25500	. 52200	- 2550	* 29/90	1 20000	16850	+	6300	71308			+ 12050	9050	280
-4500			* 10850	10690	7950	1950			1,100	-		5750	5750	5900
-100			* 22800	+ 22900	. Wago	* \$300						1 12650	10050	230

Illustration 225 g0622570

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

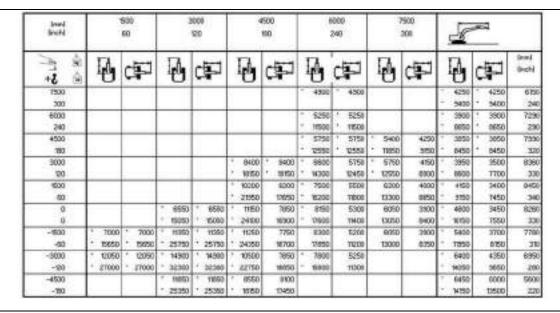


Illustration 226 g06225703

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

700 mm (28 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

(mm) (inch)			500 60			1000 120	l		190			240	0.75			500 000		8	-	2	
-3 é è		0	dF	1	0	æ	İ	14	ď		1	c	F		0	æ		0	c	F	(nch)
7500	t			t			t			1	4500	=	4500	Н			-	3850	F	3850	65
300	L			1			L			1.				L			*	8500	1	9990	241
6000				Т		1	Т			1	4750		4750				1.	3660		3835	7290
240				L			L				10400	*	10400	ß.				7900	7	7900	200
4500	т			т			т			1	5200	+	5200	T	4500	4400	+	2500	T	3500	7900
700				1			L			1.	71300	-	11300		10710	5400		7700	+	7700	321
9000	Т			Т			ŀ	7900	180) '	5950	Г	5950		5290	4250		1600	٠	3900	8368
20				1		100	Ŀ	10400	1 1640) .	12000		12000		1000	3000		7850	,	7890	300
1000	т			т			Ħ	9000	6450	1	6750	Г	19050	1	5600	450	•	3000	Г	3500	9451
600	L						ŀ	18850	1050	1	148550		12850	+	12190	8500	+	1350	ı	7650	340
0				1	6200	* 6200	1	10090	8400	9 1	7350		5490		5860	4050		4200		3990	8261
0	L			1	N200	* 34200	ď	1900	17650	1	15050		11750		12790	9650	1	1250	l.	7000	339
-1600	1	9900	* 660	0 3	4070b	* 10700	Ť	10150	9000	9	7500	Г	(6350)	7	6860	6000	T	4960	Т	3990	7790
-60		14750	* 1475	1 .	24350	* 2439	ıĮ-	22900	1120	,	162000		11550	7	12580	8600	+	10300		8400	310
-3000	-	1350	* 105	1	19450	+ 13450	1	9900	8101	1	7050		5400				+	5750		4500	6968
-100	1	15900	- 2550	6 .	23100	2910	1	20900	17901	5 4	15100		11010	ľ				12050	L	3950	280
-4500	1	0717		7	10650	10650	1	7950	* 165	1				1			4	5750	Ŧ	5750	5800
-150				1.	22800	- 2280		76300	* 16300	1								13550		13850	221

Illustration 227 q0622568

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift OFF

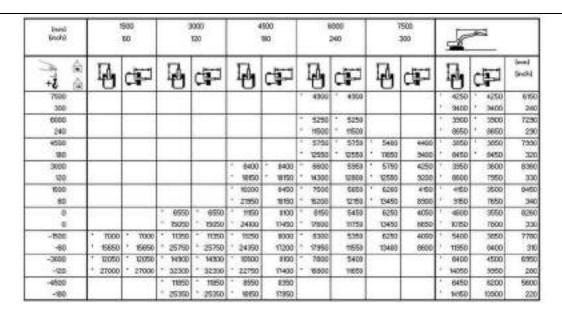


Illustration 228 g06225690

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift ON

Product Information Section
323 Reach Boom/Variable Angle Boom/Super Long Reach Boom

180

790 mm (31 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

(mm) (inch)	500 60		3000 120		4500 190		5000 240		7580 900						
-> & ⊕	4	ф	10	d	10	æ	Į	d	dip	100	æ	-	0	di-	(nch)
7500							7.0	4500	4500			7	3850	* 585	0 65
300												*	8500	* 560	0 24
6000					1	- 12	* .	4750	4750			1	3660	* 380	0 729
240							. 1	0400	10400	S		*	7900	7 790	0 20
4500							1	5200	5200	* 4500	4450	+	2500	* 350	7550
700	4				100	-075	. 1	1200	* 11300	* 10730	2500	*	7700	778	0 32
9000					. 7900	7800	1. 3	5950	* 5950	* 5290	4300		1600	* 390	0 836
20				1	10400	1 16400	. 1	5000	12900	* 1000	9300	1	7050	785	0 30
1500					9000	0500	1	0750	\$700	* 5690	4000		3000	39	0 645
60					19850	16350	+ 1	4650	12300	+ 12190	9000		8350	775	0 34
0			6200	6200	10090	8200		7350	9900	5860	400		<200	390	0 826
0			1 M200	* 34200	12900	17650	1.3	5050	11050	1 (21)0	0000	90	1250	790	0 33
-600	1 8900	* 6606	1 9070b	* 10700	, 40450	8100		7500	19400	* 6860	6050	+	4950	39	0 7790
-60	* 14750	* 14750	* 24350	+ 24250	- 22900	11400	. 1	6200	11700	7 12580	0100	+	10300	030	31
-3000	* 1350	* 1058	1 13450	+ 13450	9900	8150	10	7050	5450	-	0.00	+	5750	49	0 896
-100	. 12000	- 15500	. 53.00	29100	- 20900	11800	41.7	6100	11900			1	12050	1001	0 200
-4500	70777		1 10650	* 10950	1 1990	1850		-				4	\$750	1 525	0 560
-100		-	* 22800	* 22800	· #300	* 16300		-					10650	1265	0 221

Illustration 229 q0622569

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift OFF

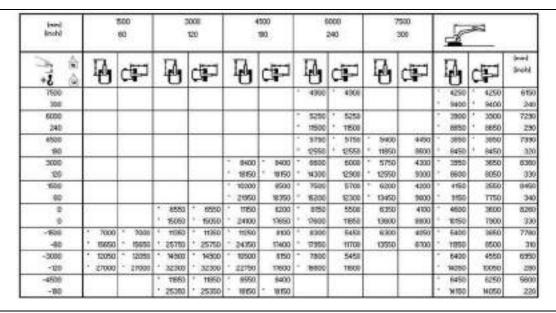


Illustration 230 g06225692

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift ON

900 mm (35 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

(med (inch)		500 60	10.00	120 120	100	600 160	T X	9990 240		7500 300	A	283	
) û	14	ď	4	dP	4	d	1	c 🖘	4	d	4	di	(noh)
2500							- 450	4500			1 3890	3850	65
300											+ 8000	* 9500	241
9000	1						* 479	4790			1900	9900	7290
240							* 1540	10400	E		1900	7900	250
4500							520	9200	* 4500	4500	1500	3500	7900
100	(z					A	* 1130	naos	* 10700	9650	* 1700	* 7790	321
3000					1 7900	7600	* 599	9860	5200	4400	* 3930	3900	8368
120	100			100	10400	1 10400	. 1530	12900	* 11300	9100	7 1090	7890	330
1500					1 9200	9650	079	5900	, 2000	4250	+ 3000	3900	0461
60					15850	18600	* 14659	12450	. 1210	9100	* 8350	7850	34
0			1 6200	* 6200	10090	8300	+ 739	9600	* 5890	450	+ 4200	3690	8261
0			+ M500	* 14200	. 5800	17950	1999	12050	12700	8100	1 1250	0000	331
-1500	1 9900	* 6600	* 10700	* 10700	1 9060	1200	* 750	0000	, 200	-6100	. 6850	3990	7790
-60	14750	* 14750	* 24350	* 24390	22800	17650	- 1620	11850	· U580	8850	· 12900	9990	310
-3000	1350	1350	* 13490	+ 19450	9900	8300	* 709	9880		1	+ 5790	4900	6950
-100	4 25500	. 55500	29150	1 2250	. 50000	17000	- 610	0 11000	1		10090	0200	200
-4900			* 10950	* 10690	7950	* 7650	-	1			* 5750	1 5750	5600
-150			* 22800	* 22600	. A0300	16300					10050	12650	221

Illustration 231 q0622569

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift OFF

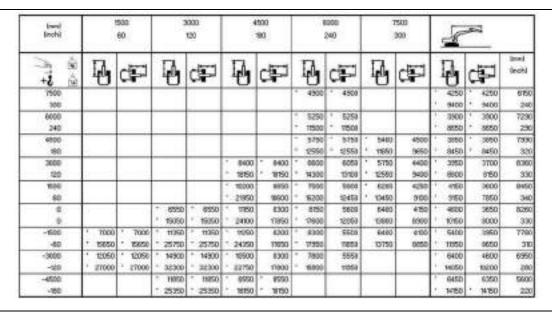


Illustration 232 g06225695

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift ON

HD Reach Boom with a 3.9 m (12 ft 8 inch) Stick and 5400 kg (11905 lb) Counterweight

600 mm (24 inch) Single Grouser Shoe (14 mm (0.6 inch) thickness)

Ined Inedd		100 100	8	100	100	1500 1600		240		1506 300		1600	I	-	
3 8	4	œ.	P	œ	14	æ	10	æ	P	ď	4	d P	P	œ	leed frakt
7900	1111111111		100	-	- 177		1000	-			-		* 2700	, 1460	730
100									20101				6000	. 8000	19
6000									- 4080	1050			1590	1580	530
240									- 6750	1 8750			* 5800	5600	33
4500									4250	4250			* 2500	2500	850
190					0.000000	100000	11/11/20	30,341,27	5050	1 3350			* 5800	5500	38
. 3000					1 6400	8400	* tooo	1 5300	4700	4350	3500	3250	1 2550	2550	925
120			100		* 10800	* 10000	* 1450	* 1450	* 10090	3300	1 9500	* 8500	* . 5800	1 5800	37
1000			5250	5250	8250	1050	6200	5750	5200	4/50	4050	3200	2790	2700	233
60			* 22000	* 22900	17000	1 1000	* tid50	1/350	* 1000	1950	* 7750	9900	9 5890	1 5860	979
0			7900	, 5800	1 1900	9450	1000	5450	5890	4000	1 2000	3100	1 2900	1 2900	910
- 0		-	17100	17400	20790	17600	16150	1750	10200	1650	1600	8900	0400	1 0400	36
-1900	5 5700	5.5700	* 5900	* 5900	* 10200	7950	* 1950	8900	5850	3950			* 3900	3200	873
-60	* 12890	12700	* 22250	* 22250	+ 22050	1060	1100	1450	12100	3450			+ 1300	7090	35
-3000	. 8990	1000	* 19660	13950	10090	7000	1400	5250	- 5700	2960			4090	36/63	900
-120	19900	19900	* 30950	* 30950	* 21990	17000	. 8950	1750	- 10200	3450			+ 9000	8000	301
-4500	1 12990	12300	* T3000	- 13000	+ 9000	6000	* 8800	5350					* 5390	4500	-581
-190	29090	28060	- 23950	+ 27950	+ 19390	11250	* 14080	1950					* 7800	10100	27
-6800		-			1 6350	1 6350	-	-					1.1800	1 5800	401

Illustration 233 q0622550

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift OFF

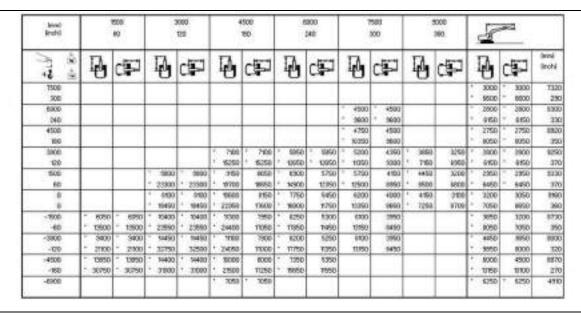


Illustration 234 g06225504

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift ON

600 mm (24 inch) Double Grouser Shoe (13 mm (0.5 inch) thickness)

(make) (make)			89				120	7.			500 180				800 940				580 100			990		127	8	æ	2	
3 8		0	c	P	0.00	4	c	P		4	c₫	P		4	d	P	1	4	dP		4	c	P	1	4	c	P	(mod (inch)
7500	1	-	Т		Т	77.7			Т				Т					-		t	-	Т	-	Ť	2700	7	2700	732
300	L						ŀ											disco		L			-		8000		8000	230
1000	т		Г		Г		Г		Г				Г					4000	1 4050	Г		Г		+	2550	-	2550	100
240	Ł						L										4	1090	9 9750	Į.				Ψ.	9600	-	9900	33
4500	Т		Г		Г		Г		Г				Г				15.	4250	1 4250	Г		Г		+	2500	*	2900	892
100	1			-			L	-		- 0				200		200		1250	1 1000	Ł	74			4.	\$500		9900	39
3000	Т		Г		Г		Г			8400	7. 1	400	-	5300	-	5300	-	4200	4390	•	2500		3250	۳	.0950	-	2950	529
120	Ł					100	Н	1114	+	1000	+ 1	1900		1450	+	1450	-	10000	3300	٠	4600	2	1500	+	9600	4	9900	179
. 1600	т		Г		-	3620	7	3/50	F	1250	1	250	1	6200		\$750	7	5200	(19)	11	1050	1	3200	L	2700	-	1700	113
68	1				1	22900		22000		17600	. 1	900		19450		U350	-	1000	8990	ļ÷.	1750		8800	+	5950	-	5850	375
.0	Т		Г		+	7900	+	1600	٠	3500	13	160	+	1000		5450	-	18850	4000		3600		3100	+	2900	+	2900	510
0	Ł				4	19400	+	17400	٠	20150		550		10150		1750	٠	1200	8850	1	5600		3600	+.	9400	+	6400	39
-500	T	5700	-	5700	7	:9800	7	2600	•	8200		1950	-	.1450		5300	-	5850	1980	Г		_	-	*	3300		3200	173
-68	1-	12700	-	12700	+	22250	٠	22250		22050	7	1050		1100		11450		11700	8450	1		Н		+.	7300		1050	150
>3000	Ť	18900	-	8900	7	13850	•	10850	•	10050	- 3	500	-	1400		5250	-	5200	3800	t		Т		+	4050	$\overline{}$	3650	.880
-00		11000	-	12500		30950		30950	٠	21700		9000		1000		YOU	=	12200	8450					+	9000		9000	32
-4500°	T	12500	-	12900	7	13000	+	10000	7	2000		000		8500		5350				г		Г		7	5350		4500	.007
-100	1	25050	-	25050	7	27950		27550	1	2000	T	1250	-	14050		1550				L				+	9800		11100	27
48000	T		Т	-			г		1	100	1 1	1960		-						т		т		+	9600	7	\$600	431

Illustration 225

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift OFF

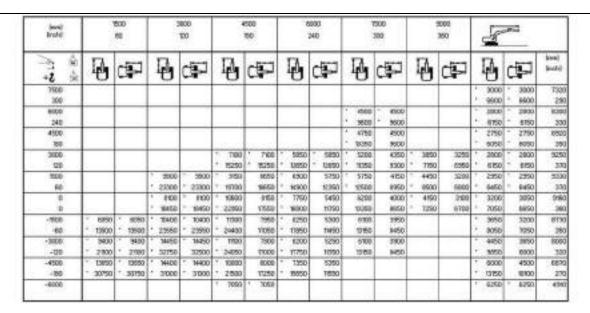


Illustration 236 g06225499

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift ON

184Product Information Section323 Reach Boom/Variable Angle Boom/Super Long Reach Boom

600 mm (24 inch) Triple Grouser Shoe

(med) Brishle			60		T20	100	180		9000 240		1900 380		160 160	18	=	
3 8		10	d P	10	æ	P	æ	10	ď	14	ď	4	æ	1	ď₽	South)
7500	1	11000		-		11/2/17		-		1000		1000		2700	- 2700	730
300	1									0.0000				9000	8000	29
6000	т									1. 4000	* 405b			. 1040	2990	836
240	1				-					1 8750	1750			9800	* 9800	33
4500	Т									1 4250	4250			2500	2500	882
100	4					0.000000	0000000	0025	100004	1 3350	8350		2002	9900	5900	39
3000	Т					1 6400	8400	. \$300	* 5300	4700	4350	. 3200	3250	2550	2550	925
120	1			1000		1 10800	* 30000	* 1950	1950	1 10200	\$300	* 6500	* 6500	. 9800	5800	330
1000	$^{+}$			550	5250	6250	1 6250	1 6200	5750	5200	480	- 4050	5299	7 2700	2700	5330
60				. 53000	22000	17000	1 1000	° tiu50	12390	9300	8950	* 1790	5000	9950	9990	39
0	_			1 7000	1 7900	1 9600	1200	1000	5800	1 9668	4050	* 2000	2100	, 5300	* 2900	9180
	1			1,1000	17400	20790	17600	6150	1000	1 32200	8650	* 8600	0.000	9400	6400	360
-900	1-	5700	*: 5100	* 980E	* 9900	* 10200	7950	1450	8300	1 5850	3950			3300	. 3200	8770
60	113	12700	12110	22250	* 22250	+ 22090	1700	* 1100	1490	1, 15,000	1450			7300	7100	380
-3600	7	8900	8900	1860	19650	10090	7900	1400	5300	5700	7950			4050	3890	8000
-00	1.	19900	19900	1 30950	- 30950	7 20700	17000	. 4000	1050	10200	9450			9000	8800	330
-4500	13	12900	12500	· 13000	, £3000	1 2000	8050	* 6500	5350					1 5350	4500	8870
-86	1	25950	25050	27550	- 21550	7 15050	37300	14050	7800					* 18500	10100	270
-8000	1		-			1 4999	1 6358							1 9900	1 5800	436

Illustration 237 q0622545.

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

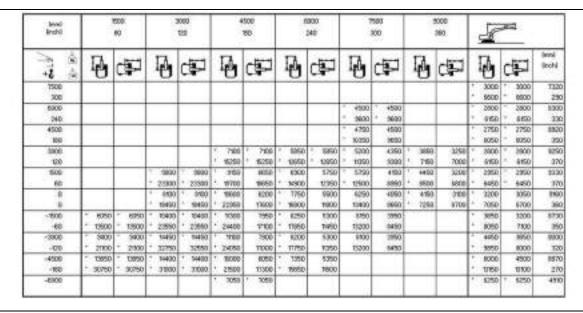


Illustration 238 g06226163

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

frend Brohl		100				120				500 166				300 343				900			160 160	100	8	pilet	=	
7.4	4	0	<u>s</u>	1	1	d	F	7.47	4	cli	p		0	c₽	7	200	0	CFJ	Ę	4	倒	1	4	C	P	(med (looks)
7500		†		Т	-			Т	-	$\overline{}$		Н	-			_	-			-		1	2798	+	2700	732
300								L				L					on dis						5000	+	8000	20
9000		Т		Г				Г				Г				-	4050	. 4950				1	1580		2550	330
245				L				L			- 1	L				9.	1750	* 6750				+	5000	T.	5000	. 33
4500		Т		Г				Г				Г				+	4250	4250				1	2500	+	2500	892
100									-0.07			L	9.555		23	*	\$350	1200		W	1277		5500		5500	. 35
3009		Т		Г				Y	6400	7.0	i400	7	6300	7 8	300	P.	4700	4290	9 11	1600	3290	*	2680	4	2550	825
100					ans/			+	10000	2.8	2000		9450	1 9	450	+	10200	5200	1	1900	4 9500	1	5600	+.	9600	97
1500		Т		T	5250	4	3250		1050	4. 1	1259	1	4200	- 9	(50)	0	5200	4100		1000	3190	1	2700		2700	333
60:			- 10	4	22900	+	20500	4	12000	1. 1	1000	+	19450	- 10	150		1900	8900	3.1	790	6790	1	5650	+	9850	377
		Т			7900		7900	+	3900		1050	+	7000	- 3	400		9950	3990		3900	0090		2900	+	2900	316
- 8				+	17400		17400	+	20790	- 5	2000	+	15150	- 11	900	4	12200	6600	- 1	iego.	1600	+	\$400	+	8400	366
-1500	570	0 7	5700	-	5800	-	.9900	+	10200		2800		1450	- 5	250	-	5850	1850					3300		350	873
-60	. 4310	0 .	12700	-	22250	-	22250	+	22050	- 1	6000	+	8100	- 7	150		12700	6300			-	+	7300		1950	35
-3000	. 490	6 .	6900	-	T3950	-	1890	+	10090	- 3	7600	7	1400	-50	2000	-	1700	3850				1	4060	г	3650	800
-100	1990	0 .	19900	-	30950	+	30950		27700		1750		2000	7	60		25500	6350					1000		7500	303
4500	* T250	0	12900	-	T3000	-	10000	7	3900		2000		8500	- 5	500								. 5350		4450	5577
180	1, 2806	1	25050	-	27950	+ :	27990	+	15350	- 1	1000	+	3050	- 8	400								19800		5550	zn
-6000	-	1	-	Г	-			7	6350	7. 1	E150		-	-								1	5800	1	5500	451

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

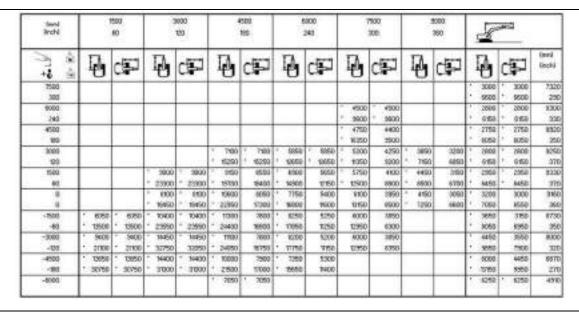


Illustration 240 g06225512

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

700 mm (28 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

lend Brokii	1.59	80 80	1.0	120 120	111	160	111	5800 248		100 100		160	1	JE2	
9.4	12	ď	10	œ	1	æ	10	Œ,	10	di	4	æ	14	æ	Smill Srohl
7500					-				_		-		* 2700	- 2700	T120
300									00.000	0.000			* 5000	- 6000	290
5000									4950	+050			2550	2550	1300
240									* 3750	1 0750			* 9600	* 9900	330
4500									* 4250	1 4250			* 2500	* 2500	8920
100				-	1000		2.29622	10000	2350	9350		2000	5500	- 9500	390
2000					7 9400	* NICO	* 8300	* \$300	4200	4400	1 3600	3000	° 2660	* 2990	9250
120			- 105		1, 40000	1 5000	1 8450	* 1950	- 40200	9490	1 4500	* 4500	9600	9900	370
500			5290	1250	1 9259	1,6250	6200	5800	5200	4290	1 4000	3250	2700	2700	100
60			* 23900	* 21000	1, 10000	1. 1800	* 19450	12500	* 1000	9900	+ 7790	8908	* 8850	- 9950	320
- 0			* 7900	* 7600	5600	6300	* 1000	1999)	* 9890	4100	1 3800	350	* 2900	2900	- 8160
0			4 17400	17400	1 20750	11050	650	1050	10200	1600	4600	* 8600	6400	- 8400	360
-1900	5700	5700	* 9800	* 5600	, 2000	8050	1450	5400	1990	4000			* 3300	1250	8730
-60	- 12700	* t2700	+ 21290	+ 22250	22060	17300	* W100	1600	10700	9600			+ 5300	3200	390
-3000	- 8900	- 6900	13890	10890	10068	8000	- 1400	5250	5300	4000			4050	7700	9900
-00	19900	19900	* 30950	* 50950	, 51100	11250	. 4920	7800	- 11200	8600			9000	1150	150
>4500	. £500	- 12900	10000	10000	1 5000	5700	. 8800	5450					1 5350	4900	8870
-180	. 55020	23050	* 27950	* 27550	10350	11550	1050	1750					1800	16250	270
-6900					1, 3350	7 6350	-						* 5500	7 :5500	4910

Illustration 241

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift OFF

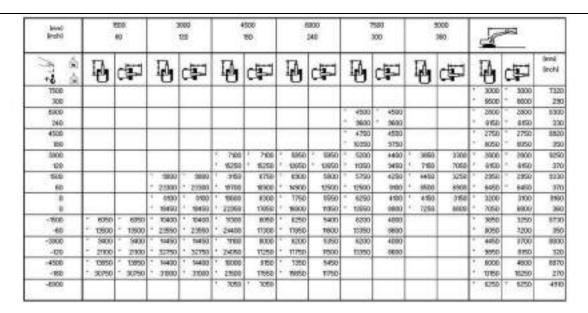


Illustration 242 g06225460

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift ON

790 mm (31 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

land linchil		60	1.0	120	1.0	160		300 340		100		160	5	253	
9 6	10	田	1	d	4	ď	4	电	14	din	4	æ	4	ď₽	(lenn) (lenh)
7500		-	-	-	-			-	77.00			-	1 2700	- 2700	T12
300									000000	00/410-22			* 5000	- 8000	250
5000									4950	1050			2550	2550	5300
240									* 8790	* 0790			9 9500	* 9900	230
4500									4250	1 4250			7 2500	* 2500	182
100					1000	1000	- TUT-MA	10000	2350	9350		10000	5500	5500	39
2000					5 9400	FH00	* 8300	* \$300	4700	4450	3600	3350	* 3950	* 2950	9250
100			200		1, 0000	1 6000	1 9450	* 1950	- 40000	1000	4500	* 8500	9600	9900	370
500			5290	1250	1 9259	1 8250	6200	\$900	5200	:4390	1 4000	3259	2700	7700	223
60			7 22900	· 21000	1 1000	1 1900	* 19450	13650	* 1000	3900	+ 1790	7008	9950	9950	370
- 0			7900	+ 7600	5600	8400	* 1000	5900	9890	4190	1 3800	3200	2900	* 2900	1190
			4 12400	1 17400	1 20750	1050	650	12100	10200	1990	1 0000	- 1600	9400	- 8400	360
-7800	* 5700	- 5700	* 9800	* 5600	. 20000	480	* 1450	5450	- 5850	4890			* 3300	3300	8790
-60	12700	- t2700	- 22290	* 22250	. 55080	17500	. MI00	T750	12700	8100			+ 7300	1250	350
-3000	- 8900	- 6900	13890	10890	1 1058	9100	- 1400	:6400	- 5800	4250			4050	1750	9900
-00	- 19900	- 1900	- 30950	* 30990	. 51100	11450	- 2550	1650	- 12200	6100			* 9000	8250	150
×4500	* T2900	- tiaco	10000	* 10000	1 5000	6250	* 880D	9500	-				* 5350	4850	8870
180	25050	- 29050	- 27950	· 27550	19350	17700	* 1000	1850					* T800	1050	270
-6900	-		-	-	1 5350	7 6950	-	-					* 5500	7 5500	4510

Mustration 243

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift OFF

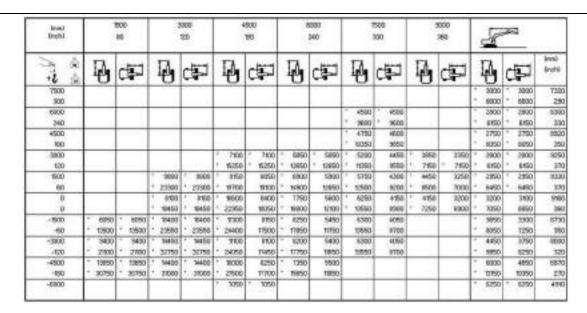


Illustration 244 g06225465

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift ON

900 mm (35 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

lineki lineki		60	1.0	120	1.0	160	0.00	300 340		100		160	5	- File	
10 A	1	田	1	æ	4	ď	4	电	14	æ	4	æ	4	œ	(Inni (Inchi
7500		-		-	1000	-		-	777			-	* 2700		T120
300									000000-0	0.000			* 5000	6000	250
5000									4950	+050			2550	2550	8300
240									* 8790	1 0750			9 9500	9900	330
4500									* 4250	1 4250			* 2500	* 2500	18820
100					1000	200	107.00	Constant	- 3350	9350		17.27	5500	5500	390
2000					7 9400	* WIDD	* 8300	* \$300	* 4700	4500	* 3600	3400	* 3660	2990	9250
120			200		1 0000	1 5000	9450	* 1950	- 10000	9650	4 4500	* 4500	9600	9900	370
500			1 5250	1250	1 6259	1 1050	6200	1950	5200	4350	1 4000	3300	2700	2700	\$330
60			7 22900	· 21000	1 1000	1 1900	* 19450	13800	* 1000	1990	+ 1790	7108	9850	9950	370
- 0			1 7900	+ 7600	1 5600	8500	1000	5700	9890	4200	1 3800	3258	* 2900	2900	1190
			4 12400	1 17400	1 20750	9250	650	1250	10200	10000	1 4600	* M00	- 6400	- 8400	390
-1800	* 5700	* 5700	* 9800	* 5600	. 20000	6250	1450	1950	- 19950	4100			* 3300	3300	8790
-60	- 12700	- t2700	- 22290	* 22250	. 55080	17790	* W100	1900	- 10100	8800			+ 7300	- 1900	250
-3900	- 8900	- 6900	13890	10890	1 1058	\$200	- 1400	1900	- 5700	4100			4054	8900	9900
-00	- 19900	- 1900	- 30950	* 30990	. 51100	TITOO	- 2550	1800	- 12200	8800			* 9000	E150	150
:4500	· 12900	- tiaoo	10000	* 10000	1 5000	8350	* 8800	5500					1 5350	4700	8870
180	. 55020	- 29050	- 27950	* 27550	19350	11950	* MOSD	12050					* T800	19900	270
-6000	-		-	-	1 5350	7 4350	-						* 5500	7 5500	4910

Illustration 245 g0622546

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift OFF

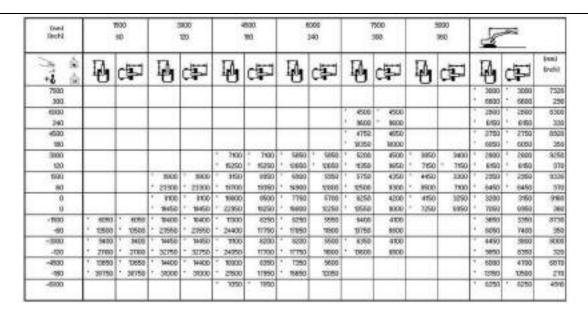


Illustration 246 g06225468

Lift Chart Above: 323, 5675 mm (224 inch) reach boom, 3900 mm (154 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift ON

Variable Angle Boom with a 2.5 m (8 ft 2 inch) Stick and 5400 kg (11905 lb) Counterweight

600 mm (24 inch) Single Grouser Shoe (14 mm (0.6 inch) thickness)

Iron) Iron)		600 60		3800 130		100	100	9000 240		1900 100	J	=	
3 6	10	d P	4	中	P	œ	14	œ	14	diam'	4	di	(mm) (boh)
5000	-	-	-	-	-	-	-		-		* 5550	1 5550	411
760					11500	100000	2000	positive.		-	* 13600	1 2600	753
7900					7,0000	1 6050	, 4900	4800			4800	4800	908
300					+ M000	1 9000	1000	-453			* 10650	1 0650	24
8000					+ 6750	+ 6750	* 4250	4300			* 4400	1 4400	723
240				10000	" Hipas	1 M000	1900	* 3500		1	2000	2799	25
4500			10000	10400	* 6890	1 9560	* .4200	4200	1.4400	4250	* 4390	3900	793
90			1 22560	23990	* 14200	1 14200	9990	* 3690	9550	9150	9400	9600	- 31
2000			9454	9450	5900	1900	4090	4290	4600	450	4390	3550	: 830
100			7, 21000	2 2 2 2 2 2 2	- 12300	. 1000	* 8800	- 8800	1 3000	1900	* 5500	7800	33
9000			5450	6450	* 6050	1 6050	* 4800	4830	5100	4000	* 4550	3400	333
60			13800	* T3800	* 10000	1000	* 10000	- 10000	11100	8800	* 10000	7500	33
0	9250	7 3250	* KOSE	- 6050	1 0000	7750	* 5950	.5290	1 5460	3900	* 4800	3500	.629
0	2050	20100	19450	1060	17300	W700	13000	1000	* NT00	9400	10100	7650	33
-900	10400	10400	* 885E	6850	7750	7750	150	5200	. 4400	3500	4000	3800	772
-60	22900	1 22005	10000	- 4900	1 16860	9650	* 6250	1000	1 ,6200	8450	* 8800	.0360	36
-3400	1 19850	1 16350	1 6950	9950	* 5860	1 5050	1 4290	* 4290			3600	3600	.670
-428	96350	1 16150	19400	19400	12100	. 6400	1 8950	8990			1 8800	9000	27
4806	. 5080	11.20900	* 8400	- 6400	-	-					- 8800	1. 1850	478
-100	1 200	-	20300	- 20300		1	- V				- 19890	+ 16583	161

Illustration 247 g06226166

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift OFF

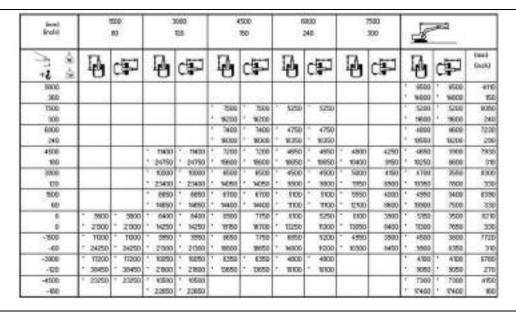


Illustration 248 g06226168

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift ON

600 mm (24 inch) Double Grouser Shoe (13 mm (0.5 inch) thickness)

lend linchi		80 E00		125 125		180	2.2	5800 240	1.00	750U 100	5	-	
3 6	10	ď	14	c#I	P	dia	4	æ	4	ď	4	C≨⊒	(mrd (mck)
9900			-				_		_		1 5550	1 5550	- 411
360					200-04	11555		oome.			1 10600	10600	10
7500					1 5550	1 6050	4300	4800			1 4800	4800	806
100					1 14000	1 14000	1000	1223			1 10000	1 0050	24
6000					1 6750	1 6750	* 4350	4350			1 4400	* 4400	723
240				11500	* W000	1 1600	2200	2500	2000	0.000	* :9700	3100	29
-4500:			10400	10400	1 4550	1 6558	4200	4200	* 4400	4290	1 4290	2900	793
100			* 22550	1 22550	1 14200	1 9500	9950	9950	* 1990	960	1 9400	1600	
2000			3450	1 3450	1, 1000	1 5900	4050	9200	* 4900	4190	4300	2550	100
120			- 2200	+ 21200	1, 10700	* 17700	+ 8900	* 8900	* 10000	1990	9500	7900	330
1600			6490	9450	1 6060	1 6050	4600	4800	9100	4000	1 4550	3400	139
60		-	* 10000	1 2000	1 10000	1 1000	10000	- 10000	* 7100	0000	1. 10000	7600	33
. 0.	* 8250	* 8250	* 6050	* 8080	* 8058	7750	* 9950	5250	5450	3900	4600	3500	828
. 0	20150	25150	+ 19450	10450	* 57300	W100	+ 49000	1000	- 1000	8400	. 10100	7660	33
-1800	10400	10400	- 8850	1 8860	7150	7150	9150	5200	4400	3900	4000	3800	772
-60	22900	- 22900	* 18900	1 10000	1 3650	9050	· 10250	1200	- 5200	3450	+ 3800	650	31
-3000	16250	* 16250	7 8950	1 8880	1 5680	* 5550	1 4250	4250		-	1 3600	1 3600	1760
- 1231	96350	* 36350	15400	1 19400	10700	. 8300	* 8950	* 8950			* 8000	1000	211
-4500	1 20950	1 20950	T 9400	7 5400							1 5500	1 9500	488
-100		C-XXX	* 20300	* 20300							1 9880	9550	160

Illustration 249 g06225901

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift OFF

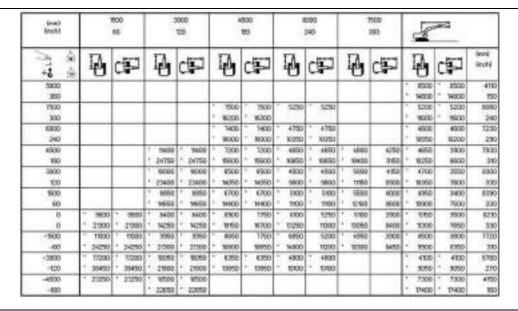


Illustration 250 g06225902

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe

Good Sincks	- CHILD	900 60		5000 120	100	1900 1900		1003 140		100	4	344	
3 à	10	ďP	1	di	14	中	4	æ	14	di	4	c‡⊒	line) lirchi
9000	_				-		_	-	-		- 5950	* 1950	411
390					0.000		00000	0.000			- 19600	* 13600	15
7900					5000	- 6050	4800	×800			- 4900	4800	. 505
300					1 14000	* 14800		120			* 9050	* 10000	- 24
6000					1 6750	6250	* 4350	1 4350			* 4400	* #400	723
240					1 14500	- H900	2500	2500		4000	5700	9700	.25
4900			7. 10000	° 8400	* 4990	* 6990	4200	1 4200	* -0400	4250	* 4050	9900	790
100			1 22550	1 2350	14200	* N200	1 1000	1 9650	9550	950	* 3400	9900	3
3000			3450	3650	1 5900	5900	+000	4000	46.00	450	4350	3950	830
120			+ (2000	* 25000	. 45500	* 11200	* 8800	1 3800	1 10000	8900	* 3900	7900	- 18
1900			* 8458	6450	0050	* 6090	4800	1 4600	. 2400	4000	* 4950	3400	839
90			1 0000	1900	11000	10000	10000	* 10000	1 1100	1600	- 10000	7500	- 20
.0	7. 5250	1.5250	* 8058	* 0050	* 8050	1750	* 5950	5250	1 3450	3900	* 4900	3500	- 62
.0	+ 20180	1 20160	1 19450	11450	* 11300	16100	* 10000	19300	т тто	8450	+ 8100	1990	10
-1900	10400	10400	1 8850	* 8850	1790	7750	- 6150	5200	4400	3900	- 4000	8900	175
-80	1. 27500	22500	. 4600	* 95900	16850	16500	* 15250	70200	5200	1450	- 8900	1050	3
-3100	1 18250	1 9250	1 8950	1 8950	5850	5850	4250	4250			* 3600	* 3600	576
120	* 36390	36350	19400	19400	. 5100	- 12100	* 8990	3980	3		- 1000	* 8800	27
→F500	* 20950	1 20950	7 5400	7 5400		-		-			* 4500	* 18000	410
-690	1.0000	0.000	28300	* 26200							* E550	* 15550	10

Illustration 251 g06225837

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

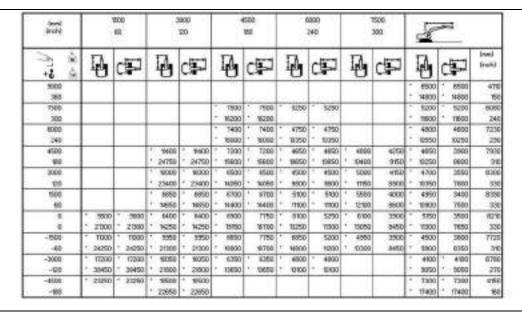


Illustration 252 g06225840

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

(matri) (matri)		60	01.5	0000 tao	1 60	to to	11.	900 240		7500 300	1	2003	
A 48	10	母	10	c#J	14	45	10	œ	14	中	4	c₽	(mold
9000					-		-		-		9960	1 9968	att
360					255	_					10600	19600	15
7900					1050	4050	* 4900	4900			1000	4000	. 600
100				- 4	* 3800	14800					* 3850	1 19650	24
6000					1 4750	* 1750	4050	1.4990			4400	4400	723
240					1 1600	1 9600	* 9900	* 9900			1 9700	+ 9700	25
4500			1, 10400	7 - 10400	1 5550	1 9550	* 4200	- 4200	1 4400	:4200	4250	3850	-293
160			* 27550	. 22580	1 14200	* 14200	5650	- 8850	* 3550	5000	3400	9450	3
3900			* 9450	1 3490	* 5900	* 6900	4050	4050	* 4800	4100	1 4360	7500	330
00			* 2000	1 2000	10700	· 0700	* 8800	- 8800	10000	9750	9500	7700	33
7500			7 6450	* 8450	1 6050	* 6050	* 4500	4500	* 5700	3550	1,4550	3350	625
60			10800	10800	. 2000	* 13000	* 10000	10000	- moo	8500	, 10000	7400	33
0.	* 5250	1 5250	1 6050	1 4000	1 4059	1050	9550	5890	7 5450	3000	1 4600	1452	921
. 0	. 3660	* 2050	1 10450	1 10450	* 97300	9450	* 10000	1150	1000	9380	, 10,000	7550	33
+4200	10400	10400	7 (850)	1 8850	7750	1650	100	5100	* 4400	3850	4000	3750	772
-60	22900	1 22900	1 10900	1 10000	9050	9400	1 10050	+000	1000	1000	1 1000	8200	31
-3000	1 80250	1 16250	1 0950	1 0050	1 5050	1 5650	4250	- 4250			1 0000	9000	570
-00	" 36350	1 36350	1 19400	1 10400	7 72 000	7 100	* 8950	- 8850		- 1	1 0000	1 8000	27
-4600	- 20990	* 20990	1 3430	* 9400							1 9500	* 4500	m
-100			20300	1 20300							1 16550	1 16560	16

lllustration 253 g0622591

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

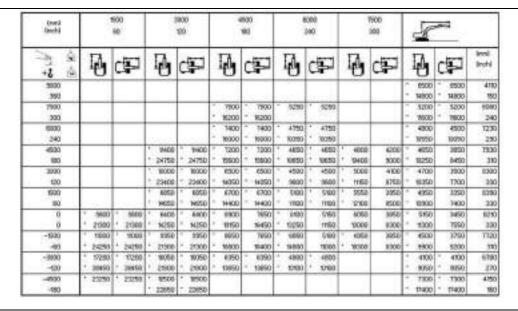


Illustration 254 g06225913

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

700 mm (28 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

(mmi (inch)		1000 80		3006 120	- 1	80 80		6300 243		500 100	1	25 2	
9 8	10	ďP	14	dip	14	œP	4	ď	4	æ	4	ď₽	Snahi) Snahi)
3000											1 9950	* 5990	455
190					Carlo Sales Annie	0.000	0.00				10000	19600	46
7993					- 8850	* 8690	, 4000	- 8900			4900	4800	100
303					* 14800	* 14800		S-1773		-	* 10650	10650	24
. 8000					* 6750	* 6790	1. 1080	4350			4400	4400	723
241			1145252	to ac-v	14500	14600	9500	9900	Section 1	7 -5 -	3700	9700	25
4500			1 10400	9400	* 6550	* 6550	4200	4200	* 4400	4350	+ 4250	3950	790
100			* 22550	1 22580	* M200	* 14200	1 9880	* 9550	* 9550	9300	9400	8700	38
3000			9450	9450	1900	5500	1050	4050	4600	4200	4350	2600	630
120			* 2:200	1 24200	* 1/700	11700	9000	9900	* 10000	9068	9500	7900	39
1000			1 9450	9450	6050	6090	1 4600	4900	6 5000	4060	4950	2490	029
60	-	-	10000	1 0000	11000	10000	1 10000	* 19000	1100	9799	* 9000	1890	39
0	1. 5050	* 8250	* 6080	1 8050	* 8050	7990	9550	1950	* 5450	3968	4800	7990	821
0.	2150	26450	+ 19450	1 0450	* 11300	16850	42000	1900	- тлоо	3680	10100	1900	33
-1900.	10400	10400	* 8850	1 8850	* T790	- 1190	1 950	5300	4400	3960	* 4000	3890	772
-90	12500	- 22500	1 16500	, MA00	* 16550	* 16850	9050	1150	* 5000	8580	* 8800	8450	39
-3000	1 8250	16250	7 8850	1 8950	* 5550	1 5650	1 4250	4250			* 3600	3600	5TB
-120	36350	- 36350	1 19400	9400	- 8300	- 11100	- 3550	* 8950		- :-	- 8000	- 8800	23
~#500·	1 20960	* 20900	7 9400	9400				-			9500	* 6500	419
-00	000000		* 20300	1 28300							9550	- 6550	

Illustration 255 g06225880

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift OFF

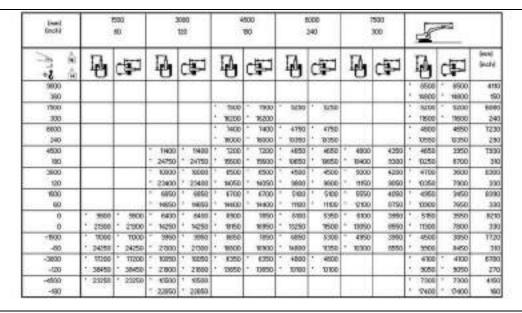


Illustration 256 g06225881

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift ON

Product Information Section
323 Reach Boom/Variable Angle Boom/Super Long Reach Boom

194

790 mm (31 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

(mod (mode)		80 800		200		600 600	52	240	100	1900 300	1	=	
9 6	10	电	1	Ċ₽	4	æ	16	di	14	中	4	di	Inmi (neh)
5000	-	-	-	-		enecurity.	-	-	-	-	5550	1 5350	411
360						0.000	0.00	Description (* 13600	13600	75
7500					6890	1 5950	- 4900	4800			4900	4800	1905
300					* 14600	9000	- 3333	- 3			* 10050	* 10050	24
6000					6790	1 4750	4350	* 4350			* 4400	* 6400	723
240			1000	- 9	* 14600	* W600	2500	9000			1 2700	5 2700	25
4500			1.36400	10400	* 6990	* 8550	4200	* 4200	7 4400	4400	4250	4000	793
100			1 20564	* 23990	14200	* 9200	+ 3650	* 9990	+ 9650	9400	9400	6600	31
3000			956	3450	5800	1900	4050	4090	1 4600	4250	* 4390	3660	830
100			. 52500	- 25200	- tinoo	10700	* 8800	- 8800	* 100100	950	9500	8000	33
1506			1 5450	. 6460	- 6050	1 8050	+ 4500	* 4600	5'00	4100	4550	3800	835
80			1800	* 13900	- 13000	10000	, 38000	* 10000	* TTEG	8950	- 10000	7100	33
- 6	* 5250	1 :5050	1 6051	* 6050	* .0050	.7962	7 .5950	\$400	1 9450	4000	* 4600	3600	. 021
	* 2080	7 20150	1 0450	* 19450	* 11300	15.00	+ £0000	1000	* 11700	9550	- 10100	7650	33
+1500	* 10400	10400	1 8050	* 8850	" T750	17150	0.00	5350	4400	4000	4000	3900	3770
-80	22900	- 22900	990	± 4900	* 90990	1 9050	1 10000	1600	1 9288	9650	- 8800	9650	21
-3000	1 16050	1 16250	1 1960	1 1950	* 8890	1 3668	1 4250	1 4290			3800	1 3000	679
-00	96050	~ 36350	1 19400	11400	12100	, 540	1 8950	1 8890			* 8000	7 8000	27
-4100	- 50990	* 20960	1 9400	* 9400							- M800	* 18800	. 46
-180			28300	. 26300							* 5550	+ 55550	16

Illustration 257 g06225884

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift OFF

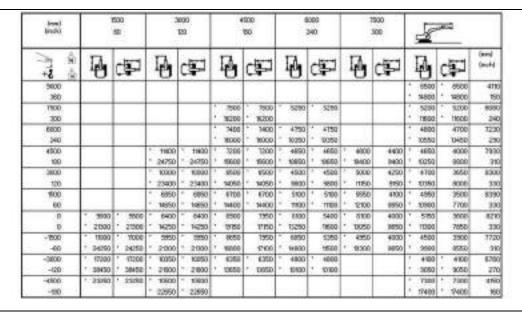


Illustration 258 g06225888

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift ON

900 mm (35 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

(med (moh)		500 60		3000 120		900 180		5000 340	100	1500 300	Je	200	
- A	130	倒	P	œ.	P	电	4	c#J	14	di di	4	c₩	Service Service
3000	-		100			-	-		-		1 9958	5950	4190
160					11255	000004	discount for				. 19800	* 19900	180
7900					1 6000	* 8850	4800	4800			4800	4800	8090
300					* M800	* 14800	bre Dille	C. N. C.			10650	10050	240
6000					1750	6750	4350	050			4400	* 4400	1230
240			5500	1,00000	, M800	14900	2500	3500	nous e	2000	3100	9700	25
4500			10400	10400	1 6550	* 6990	1 4200	4200	* 4400	4400	4250	4050	7900
100			* 22550	22550	* M200	* 14200	1 1000	1 9650	* 9950	9600	9400	8950	31
3000			9490	.3450	1 5200	5900	+000	4050	+900	4390	4066	3700	839
100			- 2200	+ 2000	17700	12700	* 3800	1 8800	* 10200	9250	1 9500	8100	33
1900			6450	* 8450	+ 6050	+ 6050	* 4600	4600	* 5100	4190	4550	3950	8390
60			* 13800	1 10000	* 10000	+ 18000	* 10000	+ 8000	- 11100	8990	10000	7950	330
.0	1, 3250	550	- 6850	1 6050	. 6050	* 850	1 5550	5450	* 5450	4100	* 4800	3950	8210
0	. 31.60	. 38150	- T3450	1 10450	* 11300	. 11300	- 0000	11150	- T/00	8800	10100	8300	330
-T500	19400	. 30400	- 8850	* 8650	* T/50	1750	5750	3400	* 4400	4100	4000	1950	1120
-60	1 22900	* 22900	* 10900	1 10000	1 9050	1 40850	1 10050	9050	1 8200	0000	1 0000	6700	360
-3000	1 16250	1 46250	- 10050	1 4050	1 5000	1 5950	1 4250	1 4250			1 .0000	* 3600	6700
-120	7 36350	1 36350	10400	1 10400	1, 15,100	- 11100	1 0050	9350			* 0000	- 8000	270
H800	1 2090	* 20960	- 9400	* 3400			-				+ 9500	+ 6900	190
-190			- 20900	20000				1 6			1 19550	* 6550	190

Illustration 259 g06225889

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift OFF

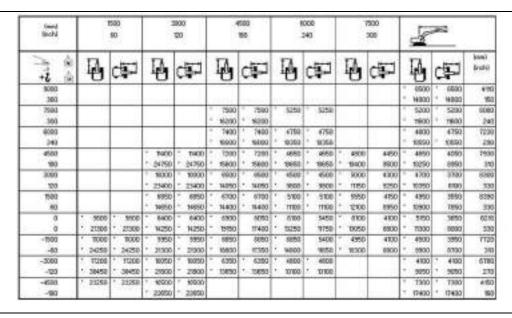


Illustration 260 g06225894

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2500 mm (98 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift ON

Variable Angle Boom with a 2.9 m (9 ft 6 inch) Stick and 5400 kg (11905 lb) Counterweight

600 mm (24 inch) Single Grouser Shoe (14 mm (0.6 inch) thickness)

(ned (inch)		100 10				100	e III			190	7			190	8 111			500		17	5	3	3	
73 à	4	c	Ţ		4	c	F		4	c	和		1	c	F		4	c	P		4	c	P	limi limbi
9000	_	+	-	H		-	-	-	4700	-	4700	Н		H	-	Н		Н	-	-	4750	+	4750	480
390			- 1	ı		l			10750	-	10750			١.,		L			- 1	-	11750	+	10750	19
7900		_		Н		Н		-	£500	-	6500	-	3950		7750	Н		Т		-	1950	-	3950	862
300			- 4	L				÷	H200	*	9000		6600		9650					-	6000	+	9900	26
6000		т		Т		г		-	6700	-	6700	-	4750	1	4750	1	3750	+	3750	-	1700	+	3700	783
240				l.			-4	-	14950	-	H850	-	8150	٠	1150	ŀ	5250	+	1200	-	(1100	-	8000	30
4500		_		*	16200	0	10500	¥	6850	2	6650	4	4650	4	4650	+	3650	Ŧ	3650	~	3900	*	3900	0.005
100	_	1		1	20050	0	20050		1000		M350		9899	1	1650		9059	1	9050	-	7900		7900	- 20
3990		т	-121-	1	10000		10000	-	6400		6400		1890	1	3650	1	2050	1	2050	-	3650	Г	1250	871
120	1: 5990	1	1060	+	2550	-	21990		11900		19900		1050	4	8350		9500	+	8500	-	7950		1300	. 36
1900	117000	1		+	1750		1750	-	9600		\$800		4390	+	4980	+	4450	Г	4050	-	3900	Г	1000	879
60		Н		+	10050		10050	-	12100	-	12100		3400	4	3400	1	1060		1700	-	1050		1050	- 8
.0	1 8500	1 7.0	8500	٠	8500	-	5300	-	1400	-	1400		: 5750	•	- 5780	+	9050	Г	3900	-	4150	Г	1050	1981
0	* 14100	1	W100		1550	-	1950	-	19300		18800	4	1000	1	1200	1	19950	Н	3450	+	9050		1200	34
-1900	1 60%	1	5250	F	1500	-	8900	-	8350	Г	1750	-	4600	г	5200	т	4660	г	7900	F	3950	г	2800	E196
-60	1 18380	1	9350		820		11000	-	1000		16500		14000		10200		1000		6350	-	M50		1750	12
-3000	1 10250	11.	10250		8850		8850	-	6200	-	6500	-	4500	1	4500	г		Г	-	-	1250	-	3250	134
420	* 29800	1	29600	+	1000		11200	-	19400	+	11400	+	10450		10450				-	-	7200	-	1200	25
-600	7. 20450	131	29450	7	350		150		1900	-	1800	Г	-	г	-	г		Г		-	4850	+	4850	535
-590	1 44530	19.	44550		H150		H750		12500	-	12500			L		L					10500		10900	21

Illustration 261 q0622572:

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift OFF

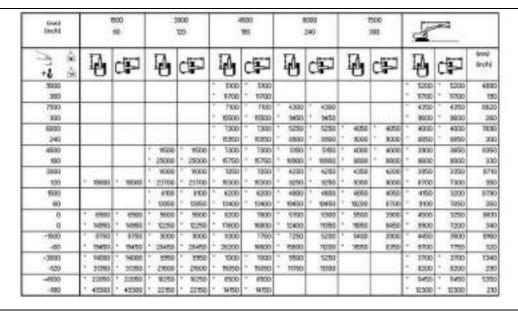


Illustration 262 g06225724

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift ON

600 mm (24 inch) Double Grouser Shoe (13 mm (0.5 inch) thickness)

(nord (inch)			100 HD		7.0	120	8 11			190	7			190	8 111			500		100	8	*		
7 4	P	,	ďP		4	c	P		1	c	P		4	c	P		4	c	P		4	c	ĘJ	limi limbi
9000	_	7		t	-	Н		-	4700	-	4700	Н	-	Н		Н	_	Н		-	4750	-	4750	480
390		л		L					10750	-	10750			١.,		L				-	11750	+	10750	19
7900		-		t		Т		-	£500	-	6500		3950		7750	Н		Т		-	1950	-	3950	862
300				L				÷	H200		9000		1600		9650	ŀ				+	6000	+	9900	- 26
6000		_		t		Т		-	6700	-	6700	-	4750	1	4750	1	3750	+	3750	-	1700	+	1700	763
240		. 1		L				-	14950	-	H850	-	8150	٠	1150	ŀ	5250	+	1200	-	(1100	-	8800	30
4900		7		ŧ	W500	8	10500	¥	6650		6650	¥.	4650	4	4650	+	3650	Ŧ	3650	w	3900	*	3800	606
100		-1		16	20050	0	20050		1000		M350	*	9899	1	1650		9059	1	9050	-	7900		7900	- 20
3990			-1.1-	Т	10000		10000	-	6400		6400		1890	1	3650	1	2050	1	2950	-	3650	Г	3250	821
120	7: 579	50	1 10060	ŀ	2550		21990		11900		19900		6090	4	8350		9500	+	8500		7950		1900	. 36
1900		7		+	1750		1750		9600		\$800		4390	+	4980	+	4450		4050	4	3900		1200	.079
60		. 1		٠	10050		10050	-	12100	-	12100		3400	4	3400	1	1060		1700	-	1050		1050	- 8
.0	7 85	80	1.18500	·	8300	-	5300	-	1400	-	1400	•	5750	•	- 5750	+	9050	Г	3900	-	4150		1250	1981
0	+ 141	00	* 18100	ŀ	1550		1950	-	19300	-	18800	+	1000	1	1000	1	19950		3450	+	9050		1190	34
-1900	1 80	50]	1 8250	F	1500	-	8900	-	8350	Г	1750	-	4600	г	5200	т	4660	г	7900	-	3950	$\overline{}$	3600	E196
-60	1 183	50	1 16350		820		11050	-	1000		16500		14000	1	meg		1000		6350	-	M50		1700	12
-3000	1 102	50	10250	1	8850		8850	-	6200	-	6500	-	4500	1	4500	Г		Г		-	1250	-	3250	134
420	* 256	00	29600	+	7000		11200	-	19400	-	11400	+	10450		10450					-	7200	-	1200	29
-4500.	7. 204	50	1 29450	7	350		1150		1800	-	1800	г	-	Г		г		Г		-	4850	*	4850	535
-690	1 445	50	1 44550		8150	-	8750		12500	-	12600			ı		L					10500	-	10900	21

Illustration 263 g06225720

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift OFF

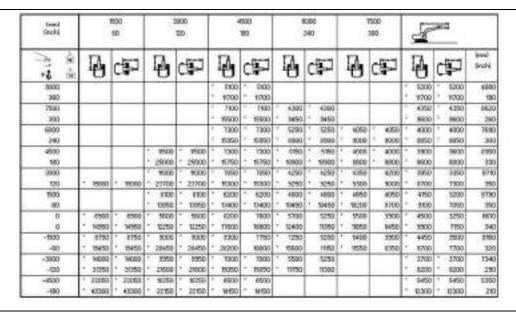


Illustration 264 g06225722

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe

198

Inel Indo			500 500				120				150				240	2		7.77	500		3	Je	-	2	
- A	T	100	c	P	7	10	c	F		1	C	ş		4	c	F		4	c	F		4	c	\$ 2	(sent
9800	t		t		H	433	Н		4	4766	1	4700	H	1.11	H		Н	-	Н		4	4790	٠	4750	489
360	1		L						٩	10750		10750			l.		L				4	10750		10750	19
T100	т		г		Г		Г		Å	1000	-	6100	-	2890	4	2790	г		Г		4	3090		1100	860
200	1		L					_	ŀ	14200	1	14200	-	8620	1	8650	b			200	4	8800		3300	26
6000	Т		Г		Г		Г			6100	+	1700	-	4790	-	4750	*	1750	-	3750		3100		3700	753
240	1		L					aun su	+	1660	-	1650	-	9190	-	8780	1	\$200	-	5200	4	8100		800	90
4500	т		г		F	10000	+	10500	Ŧ	6650	F	6050	-	4650	1	4650	7	3050	+	3650	1	3600	*	3600	835
100	1		L			22950	-	22850	4	H350	1	N350	-	9850	1	3052		8050	-	8050	+	T500		7900	33
3800	Т	(3117)	Г	10/16	-	10000	-	10000	1	6400	-	1400	-	3850		3650		3950	-	1950	-	3650	Г	3350	87
120	1	17990	Þ	17160	2	2650	=	2550	ŀ	10900	10	1900		6990	9	1050	+	9500	-	8900	4.	7990		7350	- 95
4000	Т		Г			5750	=	\$750	1	1000		9600		4390	1	4350	1	4450	Г	4050	1	2000	Г	3200	979
60	1		Ŀ		+	13050	3	10090	ŀ.	12/80		6100	-	5400	4	3400	4	1250		8700	4	8050		7050	35
0.	1	6500	F	6500		5300	-	5300	+	7400		1400	-	1150		5780		9050	Г	1990		4190	Г	3250	951
D	1.	14300		54700		1550	-	1650	ŀ	18900	+	1900	-	1200	+	15200	+	18850		9490	4	3050		7000	- 34
+1900	1	8290	1	8250	F	6900	-	8500	Т	6350	Г	1750	F	.6900	Г	52'00	т	4850	Г	7900	Ŧ	3990	г	3500	116
-60	1.	18390		16350		10050	+	19050		99100		9650	-	14000		1000		1000		9400		0050		7750	32
-3600	1	13250		15250	-	8850	-	8850	Ŧ	5200	+	6200	-	4900		4500	Г			-		3250	*	3250	. 134
+030	1:	25000	k	25500		15200	-	15200		10400		10400	-	10450		10450				-	1	1200		7200	23
H500	1	30450	1	20150		960	-	9690	1	1000	1	\$900	Г		Г		Г		Г		1	1050	1	4050	539
-100	1 1	44550	1	44000	,	19750	-	10050	,	\$600	1	12600										10000		10000	21

Illustration 265 g06225705

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

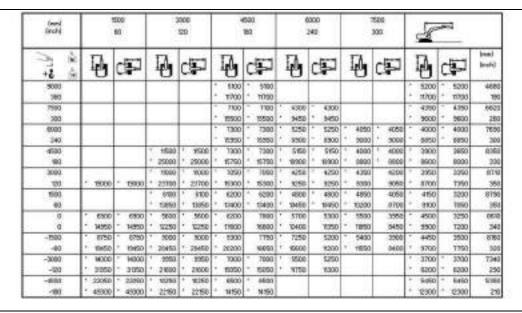


Illustration 266 g06225707

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

600 mm (24 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

Snext findia	I		500				120	8			80				240				500			8	, and	9	
77.00		4	c	ş	0000	4	c	5 2		4	C	F		4	c	F		6	c	F		4	c	F	(mold (mold)
9800	+	-	۰		Н		_	-	1	4700	-	4700	Н		H		Н		Н	_	4	4790		4750	4990
360			L						٠	11750	10	10750			l.						4	10750	4	10750	190
THOO	Ť		T		Г		Т		Ŧ	4000	-	6900	-	2000	1	7700	Т		Г			3760		2300	860
200	1		Ŀ							14200	-	14200	-	8890		9880	0		-		4	8800	4.	5500	260
6800	Т		г		Г					£700	-	1700	-	4790		4750	+	3750	+	3750	*	3700	4	3700	7530
240			L					324°C	+	1650	-	14650	-	8180		0.00	-	\$200	-	5200	4	8100	4	8100	300
4800	т		т		F	10000	+	10500	7	6550	-	6550	-	4950	1	4650	1	3050	-	3650		3600		3550	8350
100	1		L			22950	+	22850	1	N350		W350	-	9890	H	3050	+	1050	-	8050	1	T500		7900	330
3800	Т	na lini	Г	- 1/2	-	10000	-	10000	1	6400	-	8400	-	3890	1	3650	*	3950	-	3550	7	3650	П	3300	8710
120	1	17990	Ŀ	11968	b.	2650	*	2550	4	10900	0	19900		6090		1050	+	9500		9900	4	7960		7200	390
4900	Т		Г		-	5750	,th.	\$750	•	5600		9900	-	4390	1	4060	*	4450	Г	4000	1	3600	Г	960	8790
60	1		Ŀ			13050	7	10090	4	55.00		6100	-	3400	1	5400	4	1350		8990	٨	0359		9350	390
0.	1	(50)	•	eson	-	5300		5300	*	1400	-	1400	-	1750		5'80		9050	Г	3890		4750	Г	3200	881
0	+	14780	ŀ	14700	-	1550	4	1850	9	8900	-	1900	-	1000		14200	+	19950		8300	+	9080		1050	340
+1900	1	8290	1	6250	F	8500	-	6500	Ŧ	1358	Г	1600	=	.6500	Г	5700	7	4950	г	3800		3950	Т	3450	1190
-60	1	18350		1050	-	19950	+	10050		19100		W350	-	14000		19000		1000		5250	+	0880		7500	320
-3800	1	13250	F	13250	-	8850	7	0850	7	5200	-	6200	-	4500	1	4500	Γ				*	3250	*	3250	7340
+120	1	29100	1	22500	-	T5200	-	15200		10400		1)400	-	10450		19450						T200		7200	290
-H500		30(5)	1	20450		360	T	960	1	10000		\$900			Г		Г				1	1050	1	4050	5390
-100	13	44650	ь	44550		19750		10750	,	12600		10600									1	10000		19900	210

Illustration 267 g06225726

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

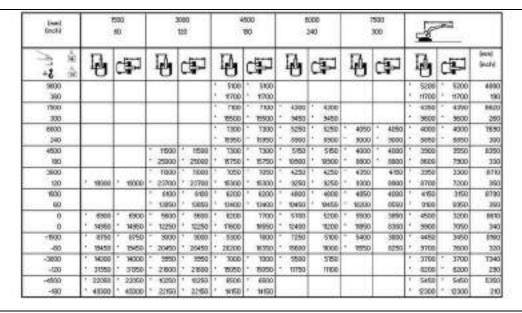


Illustration 268 g06225727

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift ON

700 mm (28 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

(nord (inch)			00		7.0	100				190				190	8 111			500		2	F	, it	2	
7 8	10		d P		6	c	F		100	c	P	100	4	e	P		4	c	P		4	c	P	lmi lirchi
9000	_	+		t	_	Н		-	4700	-	4700	Н	-	H		Н	-	Н	_	-	4750	-	4750	480
390		1		l		ı			10750	-	10750			١.,		L			- 1	-	11750	-	10750	10
7900		7		t		Н		-	£500	-	6500		3950		7750	Н		Т		-	1950	-	3950	862
300		н		ı		ı		+	94200	0	94200		0000		0050					+	6000	+	9900	- 26
6000		7		T		т		-	6700	-	6700	-	4750	1	4750	1	3750	+	3750	-	.1700	+	1700	763
240		н		L			-4	-	14950	-	14850	-	8150	٠	1150	ŀ	5250	+	1200	-	(1100	-	8000	30
4900		7		ŧ	W500	0	10500	¥	6650		6950	¥.	4650	4	4650	+	3650	Ŧ	3650	v	3900	*	3900	605
100	_	1		1	20050	0	20050		1000		M350	*	9899	1	1650		9059	1	9050	-	7900		7900	- 20
3990		т	-121-	Т	10000		10000	-	6400		6400		1890	1	3650	1	2050	1	2050	-	3650	Г	3400	821
120	7: \$795	ol:	10000	4	2550	-	2990		11900		19900		6090	4	8350		9500	+	9500	-	7950		1450	. 36
1900		т		+	1750		1750	-	9600		5800		4390	+	4980	+	4450		4100	4	2900	Г	1250	879
60		н		+	10050	-	10050	-	12100	-	12100		3400	4	3400	1	1050		1000	-	1050		1200	- 8
.0	1 850	0	8500	·	8300		5300	-	7400	-	1400	•	5750	•	- 5750	+	9050	Г	4000	-	4150	Г	1000	160
0	* 1410	0	W100	١	1550		T950	-	19300		18800	+	1000	1	16200	1	19950		1950	-	9050		1300	- 14
-1900	1 805	矿	1050	F	1500		8900	-	8350		1850	-	4600	Г	5250	r	4660	Г	1950	-	3950	Г	2990	116
-60	1 1838	ol:	16350		820		11050	-	1000		16500		14000	1	1080		1000		\$500	-	8050		1850	10
-3000	1 1025	0	10250	1	8850		8850	-	6200	-	6500	-	4500	1	4500	г				-	1250	-	3250	134
420	* 2560	0	29600	+	7000		11200	-	19400	-	11400	+	10450		10450					-	7200	-	1200	25
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Illustration 269 q0622570'

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift OFF

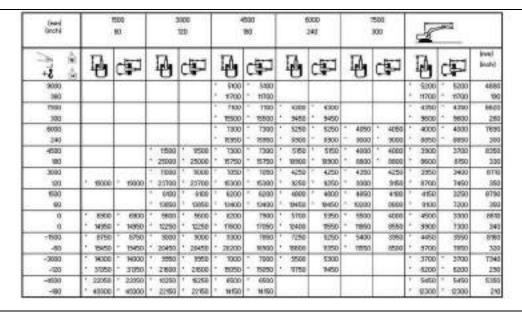


Illustration 270 g06225711

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) triple grouser track shoes, heavy lift ON

790 mm (31 inch) Triple Grouser Shoe (12.5 mm (0.50 inch) thickness)

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.0	* 14100	- 14100	1550	1 1880	. 8500	15500	* W200	- 1200	- 10850	8690	1 5050	7400	34
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Illustration 271 q0622571:

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift OFF

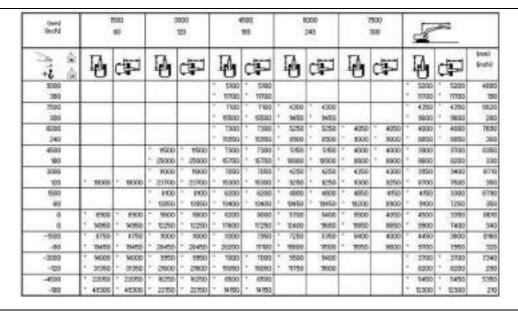


Illustration 272 g06225715

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) triple grouser track shoes, heavy lift ON

900 mm (35 inch) Triple Grouser Shoe (10 mm (0.4 inch) thickness)

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Illustration 273 g06225716

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift OFF

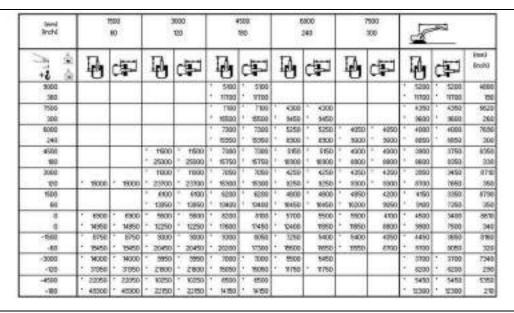


Illustration 274 g06225719

Lift Chart Above: 323, 2686 / 3300 mm (106 / 130 inch) variable angle boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) triple grouser track shoes, heavy lift ON

Super Long Reach Boom with a 6.28 m (20 ft 7 inch) Stick and 5400 kg (11905 lb) Counterweight

M0068104-12

600 mm (24 inch) Heavy-Duty Triple Grouser Shoe

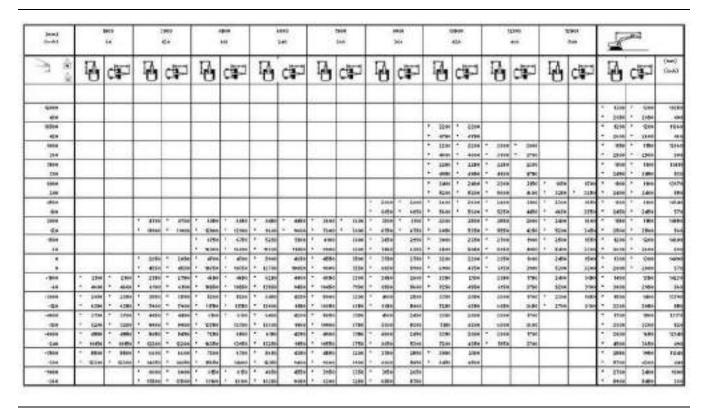


Illustration 275 g06357087

Lift Chart Above: 323, 8850 mm (348 inch) Super Long Reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) heavy duty triple grouser track shoes, heavy lift OFF

700 mm (28 inch) Heavy-Duty Triple Grouser Shoe

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Illustration 276 g06357093

Lift Chart Above: 323, 8850 mm (348 inch) Super Long Reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 700 mm (28 inch) heavy duty triple grouser track shoes, heavy lift OFF

790 mm (31 inch) Heavy-Duty Triple Grouser Shoe

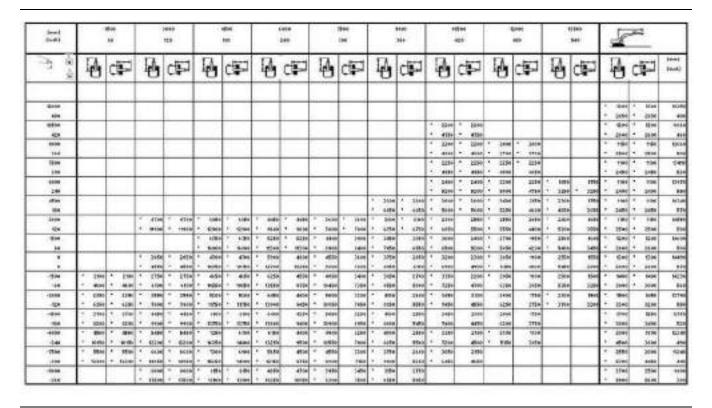


Illustration 277 g06357259

Lift Chart Above: 323, 8850 mm (348 inch) Super Long Reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 790 mm (31 inch) heavy duty triple grouser track shoes, heavy lift OFF

900 mm (35 inch) Heavy-Duty Triple Grouser Shoe

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Illustration 278 g06357268

Lift Chart Above: 323, 8850 mm (348 inch) Super Long Reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 900 mm (35 inch) heavy duty triple grouser track shoes, heavy lift OFF

M0068104-12

600 mm (24 inch) Single Grouser Shoe

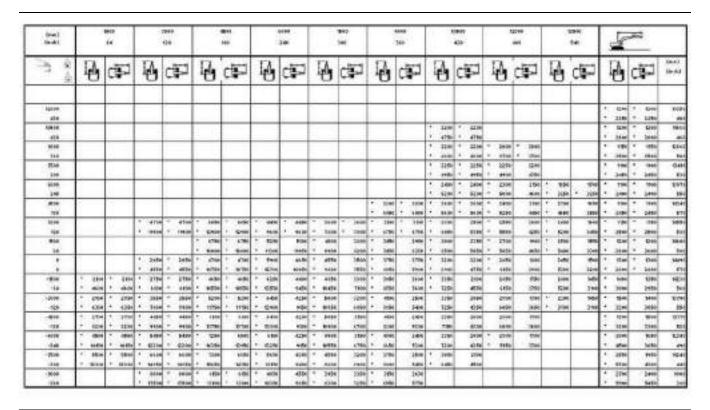


Illustration 279 g06357297

Lift Chart Above: 323, 8850 mm (348 inch) Super Long Reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) single grouser track shoes, heavy lift OFF

600 mm (24 inch) Double Grouser Shoe

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				1889	4 410	- HH	- inter	4 4	d-Tree	dente	4 44	-	ment .	1000	191		1,400	4194	- 1000	lates	684			2460	4 2000	-33
1500	7 259	+ 21		37%	+ 219	* 43	1.49	47.0	425k	9001	+ 45	54	3046	3081	bee	+	3094	299	2450	(75)	240	169		1404	684	- 14
166	9 464	2 4	4 !	MIN	7 4894	9 8/85	1. 96%	2.8	(KS)	1491	A 160	Sid.	THIS !	991	504		7094	4790	Lette	(1954)	594	740		3004	Sign	
- 1000	1296	* 11	1	1896	7.048	* 100	* XM		1480	500	* 10	86	3046	1911	(24	4	1191	3386	2310	- INV	+ 586	189		1994	188	:10
-18	* 4064	+ 42	90	Tree	+ 300	* 119	* 1190		0998	950	* ##	60	HINE	101	H	1	700	409	6668	3699	*) the	369	3	1004	3664	- 3
-816	2. 204	7 25	90	4491	* 449	7 186	+ 480	7	1400	491	7 M	64	2890	4941	049	1	2281	2100	1,000	(800				1794	tee	- 3
-101	7 10H	+ 11	100	7106	+ 100	* 179	10786	* 1	pew.	1690	+ 111		1966	.00	134	1	101	4000	1000	3900		1 3		3194	2398	
-8794	* 684	. 4		3400	* 100	+ 101	1000		4194	48	* #	66	1997	-	10	0	2284	Died	7. 299	1900				2391	1100	- 3
46	* 10004	2. 90	m !	10156	* 1019	* ADR	DH46	2.1	ogmi.	496	* 10	16	1205	. 880	the	1	1284	cne	* 1011	2500				4104	3006	- 3
-99	7 1889	7 10		9189	* MS	* 130	N/M		PROF	691	* #	411	THE !	3790	the		2101	294		1000	1			2169	1000	- 9
1066	9 600	1 600	-	10.00	4. Mith	4 460	46/00	+ 4	12400	tuin)	4 10	86	Desc.	200	640		1,400	ation	5					62We	4344	- 3
reine .		-	1	3190	* 1000	10	+ 100	3.	400	480	7 : 19	fit	1000	181	(10)	4								2794	2494	19
166	E		1.3	Tribe	7 (160)	* 640	1 1000	10.3	solei.	Melter.	+ - 48	-	2000	Little	619	1	-10					1	1	Sheet.	Auto	

Illustration 280 g06357333

Lift Chart Above: 323, 8850 mm (348 inch) Super Long Reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) double grouser track shoes, heavy lift OFF

600 mm (24 inch) Triple Grouser Shoe

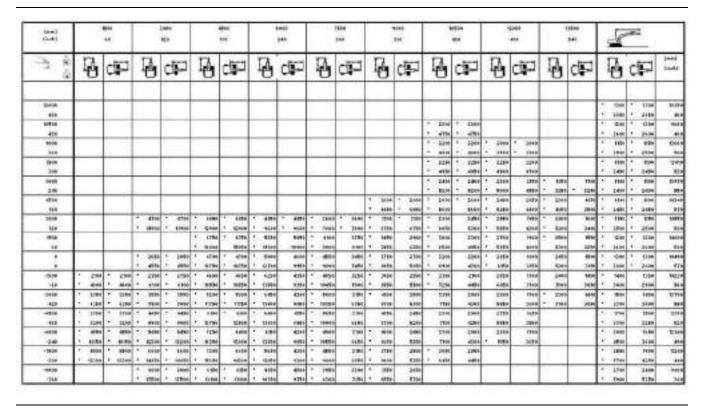


Illustration 281 g06357360

Lift Chart Above: 323, 8850 mm (348 inch) Super Long Reach boom, 2900 mm (114 inch) stick, 5400 kg (11905 lb) counter weight, and 600 mm (24 inch) triple grouser track shoes, heavy lift OFF

i08287326

Lifting Capacities

(320 - Reach Boom/Variable Angle Boom/Super Long Reach Boom)

SMCS Code: 7000

S/N: KFE1-Up S/N: MYK1-Up S/N: YCP1-Up

S/N: HEX1-Up

MARNING

Failure to comply to the rated load can cause possible personal injury or property damage. This includes the risk of unintended boom lowering. Review the rated load of a particular work tool before performing any operation. Make adjustments to the rated load as necessary for non-standard configurations.

There may be local regulations and/or government regulations that govern the use of excavators which lift heavy objects. Obey all local and government regulations.

Lifting capacities should be used as a guide. Work tools, uneven ground conditions, soft ground conditions, or poor ground conditions have effects on lifting capacities. The operator is responsible for being aware of these effects.

The lifting capacities are defined by "ISO 10567 2007". The lifting capacities are defined as the lower value of 75% of the static tipping capacity or 87% of the hydraulic lift capacity.

Note: Lifting capacities are based on a standard machine with the following conditions:

- · Lift point: Stick nose without bucket
- Lubricants full
- Fuel tank full
- Steel track
- Complete cab with a 75 kg (165 lb) operator

Lifting capacities will vary with different work tools and attachments. The weight of a work tool attachment must be subtracted from the lift capacity. Consult your Cat dealer regarding the lifting capacities for specific work tools and attachments.

This machine may be equipped with various sticks. Lifting capacities may vary between the different sticks. Measure the distance on the stick between the boom hinge pin and the work tool hinge pin. This distance will inform you of the size of the stick that is equipped on the machine.

Use the lifting eye that is provided on the linkage to lift objects. When the lifting eye is used, the connection must be made with a sling or shackle.

Note: Japan regulations require a shovel crane configuration to lift certain objects. A shovel crane has a rated load capacity, therefore, the lift capacities discussed below do not apply to a shovel crane configuration. Contact your Cat dealer for additional information.

Note: In European countries, regulations require an overload warning device and a boom and stick lowering control valve if more than 1000 kg (2200 lb) is lifted during object handling applications. Regulations also require an overload warning device and a boom lowering control valve if a force that is greater than 40000 N·m (29500 lb ft) is created during object handling applications. If the machine is not equipped with these devices, even if the hydraulic lift capacity is capable, do not exceed a load of 1000 kg (2200 lb). Do not exceed a force of 40000 N·m (29500 lb ft) in European object handling applications.

Configuration Identification

Note: Each component has a stamp to identify the configuration affecting lifting capacity.

The owner will need to check the machine configuration to identify the correct lifting capacity.

The configuration identifier will be located with the part number stamped on the component. Refer to the following table for the abbreviation of the configuration.

Table 24

	Configuration Identification	
Compo- nent	Configuration	Ab- brevi- ation
	Reach Boom	R
	Mass Boom	М
	Variable Angle Boom	VA
	Super Long Reach Boom	SLR
	Standard	STD
Front	Short Reach Stick	SR
	Severe Duty Bucket	SD
	Heavy Duty	HD
	Semi-Heavy Duty	S-HD
	Extreme Special	ES
	Thumb Ready Stick	TR
	Short Undercarriage (Crawler)	STD
Undercar- riage	Long Undercarriage (Crawler)	LC
	Long Narrow Undercarriage (Crawler)	LN
Cylindor	Standard	-
Cylinder	Heavy Lift	HL
Counter- weight	Metric Ton (tonne)	t(1)

Counterweight stamp indicates metric ton. (example 1.0t = 1000 kg)

Symbols Found in the Lifting Capacity Charts

Below are symbols that are commonly found on lifting capacity charts for track excavators.

Note: Depending on the machine configuration, some symbols may not be used.

(mm) Measurements are provided in millimeters and inches



Lift Capacities are provided in kilograms and pounds



Load is limited by hydraulic lifting capacity rather than by a tipping load



Lift point radius



Lift point height



Lifting capacity over the front of the machine



Lifting capacity over the side of the machine



Heavy Lift ON

Reach Boom with a 2.5 m (8 ft 2 inch) Stick and 4200 kg (9260 lb) Counterweight

600 mm (24 inch) SG shoe

212

(mm) (inch)		1000 60		123		100 100		8000 340		7580 390	4	-	
3 6	10	œ	10	œ	B	ď₽1	100	œ	0	œ	1	ď₽	(mat)
7509	-	-		_	_	_				_	4750	* 4758	369
300							control				* 10653	* 10668	201
6000	1						4 6368	* 6368			* 4368	* 4362	6616
240			_			on more	* Tiron	71900	a Linear	wi	- 1003	- 9600	211
4509					* 8190	+ 6708	* \$750	5258	* 4800	3706	* 4258	3658	7670
100			· .		* 14000	* 14500	1 12508	11306	22.77	1 - 2009	* 9400	0100	300
3000					. 9450	3606	* 8506	9000	1806	3656	4358	3358	7968
129					+ 18150	96408	* 14168	10950	12100	7900	* 9608	7900	325
1509					* 9960	7168	* 7308	4800	5500	3956	* 4858	3208	8068
- 0					* 21450	19400	* 16758	70758	11850	7906	* 10258	7068	331
					* 10000	6968	7500	4700	5448	1600	6108	3306	7668
					* 23090	14908	10108	10050	11700	7500	11368	7200	311
-1509			+ 11360	1 11060	+ 16580	6900	7468	4660			6808	3668	736
-69		1 3	* 26800	20100	* 20780	34968	16064	9950	15		12358	7913	214
-3000			+ 13150	1 13150	* 9550	1000	* 7956	4706			* 6308	4300	6411
-109			* 28500	1 28580	* 20050	19000	* 11100	10150			* 13900	9800	260
-4000					* 3180	+ 7168					- 6000	* 4261	4896
-160	1				* 14960	+ 54968				10	* 13650	+ 1968	211

Illustration 282 g06464516

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) SG track shoes, heavy lift OFF

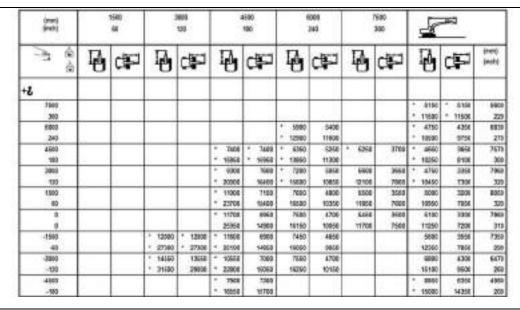


Illustration 283 g06464524

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) SG track shoes, heavy lift ON

600 mm (24 inch) DG shoe

(mm) (mch)		1500 80		120		168	1 33	0000 240		7580 380	F	22	
3 6	160	ď₽	4	ďĐ	P	ď₽	149	æ	4	ď	Ð	œ	(nch)
1900		-	_	-							- 4110	+ 4150	900
300 6000		-	-	-	-	-	+ 5350	* 6350		-	* 18558	* 18580	50
240					200		4 11/190	11900		10000	1 360	9000	. 2
4900					. 6780	* 6790	+ 1750	6860	* 4800	3706	* 4264	3660	76
190	-	1		0.00	* 14500	1 14580	+ 17660	11900	111111111111111111111111111111111111111	111111111	* \$400	8100	- 1
3900					. 8480	7600	+ 9600	5850	6600	2658	4366	3360	79
120		1			* 18850	18460	1 14150	10850	12850	7908	* 1606	7300	
1900					* 9860	7150	1 1300	4800	5500	3558	4500	3200	80
60					* 21480	15400	1 15750	10350	11850	7906	10250	7050	. 3
4					* 1040	6960	7930	4700	6460	3608	5.108	3000	76
0	-	-			* 23090	14980	19150	10950	11700	7500	11200	7200	3
1500			1 11350	* 1968	* 10580	6980	7490	1860			9400	3660	73
-60			1 01904	* 26800	· 20100	14680	10000	9860			12368	7969	2
-3900			4 12/58	1 1380	* 9580	7000	+ 7660	4700			* 6300	4300	64
-120			1 20000	- 2880	* 20580	19050	+ 15100	10150			* 13900	3500	2
4900					* T160	+ 7160					* 800E	+ 6200	40
-180			-	-	* 14960	+ 14960				17	* 19664	* 13560	2

Illustration 284 g06464526

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) DG track shoes, heavy lift OFF

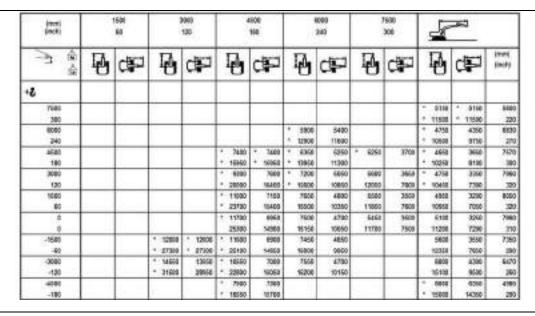


Illustration 285 g06464527

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) DG track shoes, heavy lift ON

600 mm (24 inch) TG shoe

214

(men) (men)		1903 40		3080 130		1900 190		6000 248		1508 300	4	22	
) & &	10	Œ,	8	围	4	ď₽	4	æ	4	ď₽	0	ďP	(met) (met)
7900	_	-	-	-				-		-	* 4750	* 4250	5400
300											* 10856	* 10553	220
6000							+ 3360	5300			* 4356	4300	683
240						C STAN	* 11780	111480	ov	100000	* 9808	9606	21
4500					* 6706	* 6700	* 6160	\$290	* 4800	1650	* 4258	3608	257
100					1 14506	+ 14500	+ 10680	11160		10.000	* 9400	7968	300
2000					* 9468	7589	* 6600	4990	9660	3600	* 4366	309	799
120					* 38988	16168	1 9880	19683	11850	7700	* 1600	7700	30
1000					1 2008	7069	1 7300	4750	5400	2000	* 4655	3158	890
10					* 21458	10100	* 16750	10290	11680	7900	* 10250	6800	32
					1 1068	6000	7980	4600	8360	3400	6.000	1000	790
4					* 23006	14668	16850	9900	11680	7350	71958	7969	31
-1500			11360	* 11058	* 10508	6000	7360	4560			5506	3509	736
40			1 25806	- 25864	* 22706	54600	16790	9090			52100	7700	20
-2005			13166	* 13168	* 9664	6960	* 7060	#680			* 6306	4200	647
-120			1 29606	29604	* 20998	14500	+ 15180	10000			+ 17800	9068	. 20
4000					* THER	* 7190					* 6206	* 6200	499
-100					* 34000	1 14000					* 13656	13859	20

Illustration 286 g06464530

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) TG track shoes, heavy lift OFF

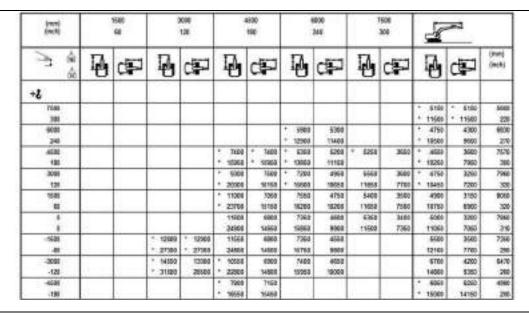


Illustration 287 g06464532

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) TG track shoes, heavy lift ON

700 mm (28 inch) TG shoe

(Mol)		1600 80		128 128		190	1 1	1008 243		7900 300	4	_	
100	å ₽	æ	4	æ	14	ď	14	di P	4	ď	0	ď₽	(man)
7516	+	-	-		_	-				-	+ ATS0	* 4756	560
300	_							S-150-			+ 10660	+ 10661	22
9000	\neg						+ 6390	* 5360			+ 4360	* 4358	983
240					11000	0.000.000	* 11700	11600	consci.		* 3600	1 9600	2
4500					* 4706	* 4708	+ 6760	6250	* 4800	3700	* A350	3600	267
100				1	+ 14500	* 14500	+ 10000	11300	11000	1,1111111111111111111111111111111111111	+ 9400	8100	- *
3000					+ 9466	7606	+ 6680	9890	6600	3668	+ 4390	1006	796
126			1		1 18158	16358	7 94190	10850	12958	7888	1 1800	1306	3
9580					* 5956	7168	* 7300	4800	8508	3580	* 4650	3206	80
00					* 21450	15358	* 10750	10350	11866	7000	1 10250	TRSE	30
					1 1960	9906	Nes	1960	6468	3460	6100	1961	796
					* 23906	14508	16100	10050	11706	7460	11200	1201	31
-1680			* 11360	* 11360	* 19500	6908	1460	4856			5690	3654	736
-40			* 2000	* 25090	+ 33706	14806	19000	9850			12300	7904	25
-3000		1 3	* 13164	, 13180	+ 9000	7908	* 7060	4700			* 6300	4300	647
+120			- 30000	, 38290	* 20800	19000	* 15180	10150			+ (1990)	9606	- 28
400					* FISH	1169					. 4580	+ 8206	490
-190					* 14858	* 11000					* 13850	* 13658	20

Illustration 288 g06464534

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 700 mm (28 inch) TG track shoes, heavy lift OFF

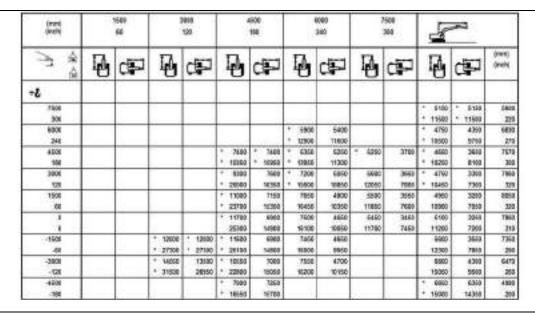


Illustration 289 g06464535

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 700 mm (28 inch) TG track shoes, heavy lift ON

790 mm (31 inch) TG shoe

216

(next)		1900 M0	- 2	3000 130		4500 190:		8008 348		1508 308	4	=	
→		ŒP	P	ď₽	4	ď₽	4	œP	4	促	4	æ	(mm) (mch)
THES	-	-	-	-	_	-		-	-	-	- 4190	* 406	Max
300							-cone	MADE DE			* 19560	10550	22
6000							* 5352	* 5380			4360	4 4358	983
240							11708	11/190		1170	9500	* 5606	27
4900					T. 6700	* 6790	* 6768	1300	* 4000	3750	4290	3706	767
100					+ 14900	* 54580	4 12500	17980		- Y- YE	* \$400	9200	30
3000	1				+ 8450	7790	* 4608	(100)	* 9662	3000	4360	3968	794
126					* 18550	98580	1 14150	10000	12200	7990	9500	7400	32
1800					* 1050	7290	1 1300	1850	9500	3600	4000	3210	809
60					* 29450	19580	1 11758	19800	13000	7700	18250	THE	32
					+ 19660	7080	1906	1326	9699	3690	6162	3306	799
					+ 20000	19180	16368	19090	11960	7950	71360	7900	39
1600			* 11360	1 11968	1 18500	7000	7964	4790			5660	3600	739
-65			* 26500	+ 26808	* 00790	10000	10308	19100			50100	7960	79
-3600			12150	12000	+ 5050	1100	* 1958	4750			. 8360	4358	947
-120			* 28580	* 26500	* 20050	19250	* 11306	19250			1,0000	9858	26
-4500					+ 7150	* 7150					- 6200	+ 6506	me
-193	1	1		1 2	+ 14950	* 14960	19	1			* 19660	+ 19960	- 29

Illustration 290 g06464537

Lift Chart Above: 320, 5675 mm $\,$ (224 inch) reach boom, 2500 mm $\,$ (98 inch) stick, 4200 kg $\,$ (9260 lb) counter weight, and 790 mm $\,$ (31 inch) TG track shoes, heavy lift OFF

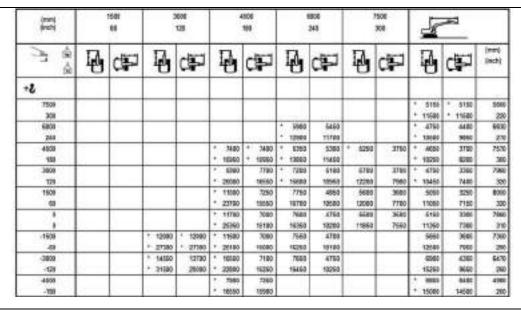


Illustration 291 g06464540

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 790 mm (31 inch) TG track shoes, heavy lift ON

217

M0068104-12

900 mm (35 inch) TG shoe

(Park) (Pach)		1506 60		120 120		100	1 2 2	340 340		7506 306	4	-	
<u>→</u> â		ď	0	æ	10	ď	4	면	4	ďП	1	æ	(mot)
7590	-	_	_	_	_	_					- 4750	4758	5000
300							110000				* 10663	* 10668	220
9800							+ 6368	* 6360			* 4360	* 4368	9900
240						CATHOLIC PROPERTY.	+ 111100	11700	V-20-3000	Lanca de	- 9900	9808	270
4600					* \$100	+ 6780	* 5758	6800	* 4880	3900	* 4200	3868	7570
180				11 1	* 14900	+ 14580	1 12550	11800	1777	3-37	* 5400	5452	300
3600					* 8450	7980	* 9508	5250	* 5660	3000	* 4350	3506	7960
120					* 18150	12100	+ 14158	11700	* 12350	8200	* 9900	768	320
1500					* 9950	7450	* 7306	6850	5880	3700	* 4850	3364	9050
80					* 21450	18100	* 19758	10850	12490	9000	* 16250	7400	320
.0					* 19650	7959	* 7900	4900	F/790	3000	* 6200	3418	7000
0					4 33900	15000	* 99902	10610	12290	7960	4 11469	7648	380
1500			* 11360	11366	19900	7290	+ 7908	4850			6860	3714	7360
-00			* 25800	1. 25800	* 22700	19580	76804	10450			12900	8258	290
-3600			* 13190	13150	7 9150	7300	+ 7058	4950			* 6300	4800	6470
-120			* 28508	* 28806	* 20050	15750	* 19100	10500			* 12900	9868	290
-4800					* 7190	+ 7160					* 6900	+ 6000	4100
-190	1				+ 14950	+ 14860					* 13660	1 13648	200

Illustration 292 g06464541

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) TG track shoes, heavy lift OFF

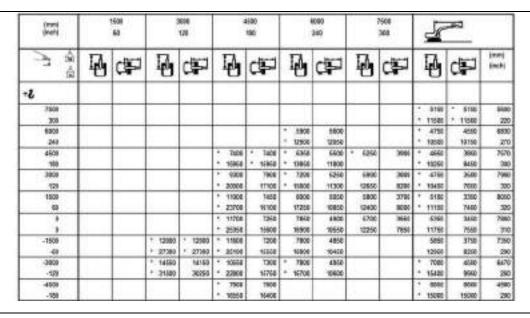


Illustration 293 g06464543

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) TG track shoes, heavy lift ON

Reach Boom with a 2.9 m (9 ft 6 inch) Stick and 4200 kg (9260 lb) Counterweight

600 mm (24 inch) SG shoe

(man) (man)	T		500 60		120 120		100	7.5	1000 248		1500 300	1	-	
-31	命命	4	фP	0	œ	P	ф	10	ď₽	10	ď₽	0	ď	(inet) (inch)
7500	+					_		4550	4550			- 3960	* 3960	8100
908								10 B				+ 8760	· 8760	240
6000								+ 4960	+ 4960			* 3660	* 3660	7290
249								* 19060	* 10860	122000	and the second	* 8080	* 8060	200
4808	\neg	_						* 5460	5360	* 6100	3900	* 3600	3400	7990
100								+ 11000	11680	+ 11200	8100	+ 7900	7660	300
3000						* 7980	7799	+ 8399	6180	+ 6460	3700	+ 3600	3100	8360
129					100	1 12050	10703	1 13500	11080	* 11888	7900	* 8050	5390	23
1500						* 9000	7250	1 7080	4850	8580	3555	7 2900	3000	\$400
60						* 28650	18500	15300	10450	11000	7650	* 8553	8500	340
				+ 6060	* 6360	+ 16680	6962	7640	4700	6460	3500	+ 4300	3960	8290
				+ 14550	14350	* 22190	19000	16280	19180	11788	7504	* \$460	6700	330
-1509	1	#7f0	* 6790	1 19890	18880	* 10680	6983	. 1460	.4650	5400	3460	1 5060	3300	7760
40		14900	* 14990	1 24450	94450	* 22560	14000	10000	9060	19000	7401	1 11100	7200	3%
-3000	1	11600	* 1160	1,4050	13400	* 9960	6969	* 7480	4650			* 9060	3000	6990
-129		26500	+ 29900	* 38450	38190	* 21150	14960	+ 10000	19069			+ 13300	\$560	200
4509				+ 11200	1 1190	+ :8000	7199					* 6100	\$300	9500
-100				* 34000	1 24100	* 17150	15450					+ 13400	11980	220

Illustration 294 g0646454

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) SG track shoes, heavy lift OFF

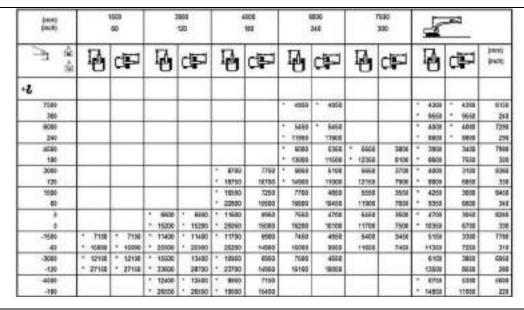


Illustration 295 g06464546

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) SG track shoes, heavy lift ON

320 - Reach Boom/Variable Angle Boom/Super Long Reach Boom

M0068104-12 219

600 mm (24 inch) DG shoe

(Moto)		1688 68		138	1	4100 100		1800 240		7600 200	4	=	
-3 A	10	œ	10	œ	10	c₩	4	ď	4	ď₽	8	¢₽	(mot)
7549 See							4588	* 4580			- 3658 - 8768	* 2950 * 8760	815
8000 240							* 1963	+ 1960 + 19890		1000000	* 5668 * 8068	* 3660 * 8060	729 29
4500							* 5469 * 11000	5360 11490	+ 6190	3800 8190	* 3606 * 7906	3400 7568	796
3060 120					* 7906 * 17956	1768 16708	1 13500	9190 11090	+ 6460 + 11860	3790 7900	* 3468 * 8808	3100 6853	836
1540 80					" 9800 " 20856	1258 15508	1 7088 1 76300	4850 19450	5880 11980	3650 7650	* 2906 * 8858	3000 6800	345
			* 6360 * 14360	+ 4350 + 14350	* 19608 * 22708	9962 16908	7668 16168	4790 19190	6460 11790	3900 7900	* 4308 * 5468	8963 6709	809
-1500 400	* 6700 * 54900	* 6790 * 14190	18880 124450	* 19800 * 24450	* 10806 * 22906	6908 14908	7468 19089	4690 9960	5480 11680	3450 T450	* 5854 * 11106	3309 7200	776
-3066 -130	* 11460 * 26460	* 11650 * 26450	1 14050 1 36450	13430	" 5058 " 21450	0908 16908	* 7480 * 10963	10050			* 6868 * 12008	3868 8668	696 28
-4500 -100			11190	11500 11500	- 1715E	7169 15400					+ 6100 • 13406	6309 11959	900

Illustration 296

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) DG track shoes, heavy lift OFF

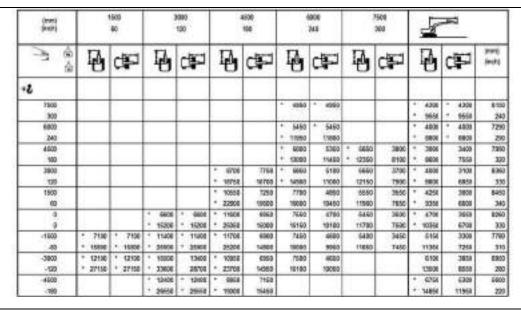


Illustration 297 g06464550

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) DG track shoes, heavy lift ON

600 mm (24 inch) TG shoe

220

(moto		150) 84		3000 120	1	4900 168		8000 360		1500 300	\$	-	
73 6		ď	1	œ	4	ďP	4	ď₽	1	ďĐ	0	ď₽	(hen) (neb)
7506	-	-	-	-			* 4556	4558			* 2068	1 3950	815
300		1					573	(500)			+ 8758	+ 9750	24
9000	1						+ 4968	1 4960			* 3660	+ 3660	129
200							* 19850	* 10000	1000000		* \$050	* 10000	29
4530	1						* 5450	5250	+ 5100	3700	* 3600	3380	799
190	1					1000	11900	11308	+ 11200	7950	* 7900	7480	32
3000		$\overline{}$			* 7906	7680	* 4250	9000	* 5450	3600	* 3600	3060	130
120	1				* 17958	16450	* 11600	19000	+ 11850	7756	* 8068	4790	33
1580					* 9608	7190	* 7950	4906	5450	3900	* 3900	- 2990	645
60		1			* 29664	16360	* 11300	18700	11790	7960	9560	6600	340
0.	1		. 6500	\$350	* 10500	8050	1900	4500	5760	3400	4301	3000	800
			* 14300	+ 14350	* 22706	54750	11500	9990	11500	7350	* 3452	6000	33
-1600	. 6700	6708	10000	* 19900	* 10000	6750	1306	4500	\$300	3400	1 3060	3250	770
46	+ 1800	1,1800	* 24160	1 2000	* 20982	14660	11750	9600	10460	7300	* 11160	7160	311
-3000	1: 11450	11468	+ 14160	13000	* 9968	8890	7960	4600			6000	3890	(86)
-120	1 25650	2568	* 30450	28250	1 21468	14790	15800	3950			19290	3480	29
-4000		1	* 11200	* 14000	* 9908	7060					* 0100	6050	140
190		1	* 24000	1 26900	* 1798	15290					* 13400	11/750	22

Illustration 298 q0646455.

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) TG track shoes, heavy lift OFF

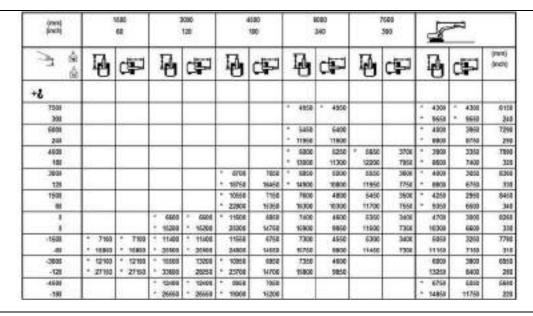


Illustration 299 g06464553

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) TG track shoes, heavy lift ON

M0068104-12 221

700 mm (28 inch) TG shoe

(male) (inch)		1500 60	11 9	1000 1001		190 190		1890 340		7500 300	4	-	
3 6	1 1 1 1 1	œ	4	æ	14	æ	4	ď₽	0	æ	1	ŒP	(mm) (mch)
7580	-	-	_	-		_	4552	* 4558			* 2900	* 3950	\$10
300											+ 8760	+ 8760	240
6000	1						* 4968	4968			+ 3660	* 3990	7290
240							* 10916	* 10950			+ 8060	* B050	25
4500							* 5468	6368	+ 6100	3765	* 3600	3400	7960
180	100					1.50	+ 11800	11002	+ 11200	8100	+ 7000	7600	300
3000					* 7906	7768	* 6268	5100	* 6460	3700	+ 3600	3100	136
130					17958	16858	1 15500	10000	* 11868	7960	* 8060	6850	33
1500					* 9800	1268	7 7969	4850	5580	3588	* 3900	3000	9450
80					* 20656	15500	* 31300	19452	11000	7586	* 8550	6500	360
0			4, 4968	* 6362	* 10608	4962	7508	4708	6160	3686	1 4300	3060	9260
0			14358	* 14058	* 22706	16008	16/68	10100	13796	7468	* \$460	6700	38
-1500	* 8716	1 6700	1 10808	* 10806	* 10806	6908	7468	4500	5400	3460	1 9060	3300	7700
-60	* 14906	* 14000	* 34468	* 34408	* 22904	14506	90000	9908	19008	7460	+ 11100	7200	.210
-3000	* 11490	* 11450	14056	13406	1 5954	9908	* 7400	4666			+ 6000	3900	6960
-120	+ 25656	+ 25656	1 20452	29608	* 21450	11900	+ 16868	16006			+ 13300	8500	200
4100			11006	11000	* 1914	7168					* 8100	\$300	9640
-180			* 34000	* 24100	* 17150	11400					* 13400	11980	200

Illustration 300 g0646455

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 700 mm (28 inch) TG track shoes, heavy lift OFF

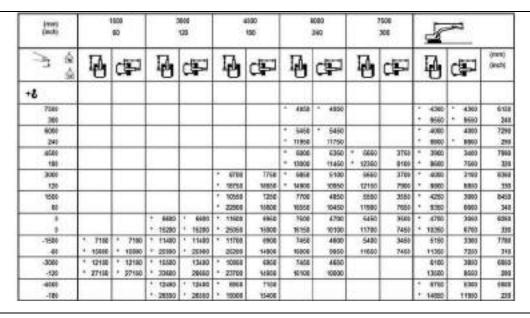


Illustration 301 g06464557

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 700 mm (28 inch) TG track shoes, heavy lift ON

790 mm (31 inch) TG shoe

222

(ment	T		60 60		129		100		340 340		1900 3900	4	-	
	à à	4	æ	16	dip)	10	ďĐ	10	æ	P	dip	10	ďP	(ma)
7509	4			-				4568	* 4558			* 3659	- 5958	615
301	- 1							577	-575			* 8768	* 8750	241
6900	_							+ 4968	4960			* 3660	* 3668	729
248	-1							* 30994	1 10950		Laconi.	7 8958	* 8848	29
4500	_			-				* 5468	5406	* 6108	2806	* 3600	3463	799
100	- 1						1100	+ 11900	11908	+ 11200	8206	* 7908	7900	30
3000	_					* 7900	7998	+ 6268	5168	+ 6468	3706	* 3668	2162	634
123	- 1				1000	17060	18863	1 13500	11100	* 11858	8808	* 8858	6910	. 33
1509						1 5500	7380	* 7066	4900	5800	3800	* 3900	3850	845
60	- 1					* 20080	198800	* 56300	10500	12050	1754	* 8858	6700	34
	\neg			+ 6060	1 6060	* 10600	3064	7606	4768	6406	1606	4 4309	2150	836
				+ 14350	14360	* 22700	16268	15400	18258	11958	7900	* 5459	6600	33
-1509	7	6760	. 6790	1 10800	10800	* 10500	1960	7558	4708	5508	3500	* 5858	3350	779
40		14900	* 14080	+ 24450	1. 24480	* 22560	10000	95200	19000	19808	7500	+ +1100	7300	31
-3900	7	11400	+ 11460	+_14050	12686	, 8000	7060	+ 7400	4700			* 6859	3906	CRE
-129	1	29600	+ 29500	* 30450	29060	* 2960	10150	+ 10908	19168			+ 12308	0798	.20
4509				* 11290	1 11200	+ 8000	7289					* 6109	6400	640
-150				24000	* 24000	+ 17150	19600					13408	12100	100

Illustration 302 g0646455

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 790 mm (31 inch) TG track shoes, heavy lift OFF

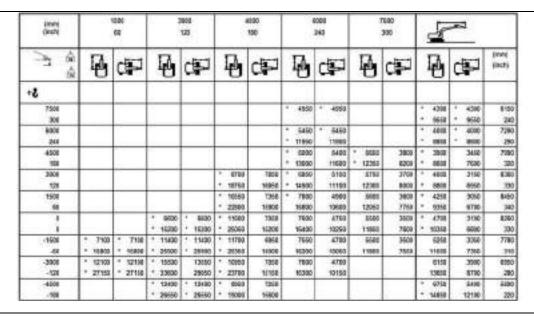


Illustration 303 g06464559

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 790 mm (31 inch) TG track shoes, heavy lift ON

223

M0068104-12

900 mm (35 inch) TG shoe

(mot) (mot)		1500		120		150 150	100	8000 340		7508 308	4	-	
\$ 6 \$	1	æ	4	œ	1	ďP	14	Ċ₽	1	ď₽	1	ď₽	(trant)
1936 300						-	* 4500	- 4510	_		. 3960	* 9960 * 8790	# To
6000							* 4950	* 4950			* 8790 * 3680 * 9060	* 3000	729 729 29
1500 190							* 5456 * 11800	* 5450 * 11800	- 6100 - 11200	(M60 (8450	* 360 * 7560	3590 2990	791
3000					* 1900 * 1900	* 1969 * 1368	* 8256 * 10600	5300 11450	* 5450 * 11850	3850 8050	* 3680 * 8060	3290 7200	63 X
1500 60					1 9080 1 20660	7568 16360	1 7300 1 16300	£100 10850	5800 12450	3790 9090	* 3000 * 9060	2100 6900	36
1			+ 6360 + 14360	· 6360	* 10680 * 22790	71900 16700	+ 7660	10600	12300	3886 7850	· 4100	2201 2090	120
-1900 -66	* 6708 * 54509	* 8700	* 19800 * 34450	1 18890 1 24450	10500 22960	7208 16088	7800 16766	4850 10400	5/00 12250	3686 7986	* 5060	349) 7900	771
-3000 -126	* 11452 * 26668	* 11460 * 36660	+ 14050 + 38450	14000 38000	* 9960 * 21150	7368 16668	* 7400 * 19866	4900 10600			* 9060 * 13360	4990 8000	69
4900 -100			* 11390	* 11390 * 24000	* 6068	7689 90190					· 0180	12500	860

Illustration 304 g06464561

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) TG track shoes, heavy lift OFF

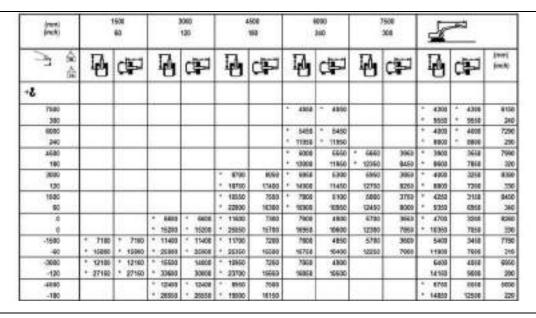


Illustration 305 g06464565

Lift Chart Above: 320, 5675 mm (224 inch) reach boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) TG track shoes, heavy lift ON

Variable Angle Boom with a 2.5 m (8 ft 2 inch) Stick and 4200 kg (9260 lb) Counterweight

600 mm (24 inch) SG shoe

224

(med) Broft()		500 60		1000		1900 1900		0000 345		708 908	4	=	
→ è	4	c∰⊡	0	ď₽	1	C#FI	19	clar	4	ď₽⊐	10	œ	inni treft
	_				_			_					-
90ID 380											1000	* 15600	150
7010					1 8950	1 6050	4000	+ 4000			* 4000		6800
300					* 14800	+ 14800	0.0000				* 10660	* 10881	246
9000					5750	1 6750	1 4350	4350			* 4400	3053	723
240			120,000	2000	14800	1. 36500	. 5500	9500		1.500	5700	8600	25
4500			10400	* 10400	* 8050	1 0550	4200	4200	* 4400	3500	4250	3250	790
100		. 1	* 21680	22990	* 14200	* N200	* 980	5650	9990	7980	* 19400	786	31
3060		7	* 9490	* 9450	* 5900	9900	4080	4060	4600	3480	1 4350	2501	830
920			* 21290	* 2900	* 12700	* tr700	* 6000	. 6900	1 10200	3400	* 9500	8400	500
1000			* 8450	0450	B. 11. 20000	A CONTRACTOR	* 4600	4100	. 4400	3190	4000	3600	(05)
60	Section	School Services	* £1600	1,1900	19000	1 19000	10000	9700	11100	790		6/50	330
	, 3600	8080	- 6060	0.0000000	100000		, 8960	 1225 	5250	3290	U. V. O	2950	85.8
. 0	1 20100	30160	* 10450	1, 19450			43000		1000	9100	-	6250	336
+8580	, 10400	10400	0050	0050	0.000	1000000	. 640	2000	4400	1290		5/00	772
-40	22000	. 55000	19900	1000	10000	100.00	10050	-	, 3550	6000	. 2000	6051	.71
-3060	, 48580	1 48250	1850	1000000	100000	14.1.10.000	4250				, 3000		6796
-100	. 36360	36350	19400	* 19400		1000	, 6960	, 8980			* 9000	* 808	370
-4560	, 58900	20050	9400	9400							9560	- 6500	+100
-100			. 50300	- 20300		7				6	1 19550	15591	758

Illustration 306 g06464566

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) SG track shoes, heavy lift OFF

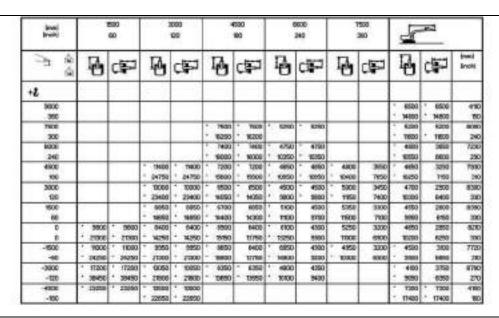


Illustration 307 g06464570

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) SG track shoes, heavy lift ON

600 mm (24 inch) DG shoe

M0068104-12

Eneral Greated		900		1890	1	80 400		9000 240		7500 300	4	-22	
- A	100	C)	10	œ	10	œ	10	¢₽	16	æ	0	마	(min) (inch)
9000		3 1									5850	. 5950	411
380										1	13800	13600	150
7501					+ 4890	* 6860	* (800)	* 4101			1 4800	* 4100	606
300		1-1			* W800	* N000					1 10000	10050	26
6000					* 0790	* F150	1 4050	F 4350			4400	3690	723
240			92500	20007	* 9600	1600	9500	* 5500	20000	2 773	9100	8900	. 29
4500			10400	11400	6850	* 6550	4200	4200	4400	2650	4250	3250	758
100			* 20590	* 2000	* waso	* 1600	1 3050	- 2050	. 3950	1100	3400	rea	żn
3000			1 3450	960	5500	* 5900	1 4050	4050	4000	3450	4350	2900	200
120			* 21800	- 52500	+ \$300	12700	+ 8800	- 8800	10300	7100	. 2000	8400	39
1500		7	* 0450	1 9450	+ 9860	* 6060	+ 4900	4500	, 0000	2000	4950	2990	000
83			10800	* 13800	* 10000	* 13000	10000	59700	1100	7100	9950	550	35
0	5050	, 2525	6090	9050	8050	8400	5950	4300	5250	3200	4800	2650	001
0	~ 20/60	7 20150	* 10450	* 19450	+ 97300	11750	* 12000	2000	1000	6500	, (0000	6250	35
-1600	* 10400	, 19400	* 8990	* 8950	+ 1790	8400	. 8480	4(50	4400	3090	4800	200	PR
-60	* 22960	72500	7 (6500	16900	* 6850	11750	1 10250	5000	9300	6000	. 6800	6850	31
-3000	- 16250	. 8520	1 8880	8950	* 8890	9550	* 4250	4250			. 3800	3800	615
-520	7 30300	* 30350	* 9400	* 19400	* 12100	. 500	* 6950	- 6060			0000	9000	27
4600	. 30000	1 20800	9400	1400							. 6800	6000	410
-190			* 20000	- 20000							15860	40000	- 6

Illustration 308 g06464572

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) DG track shoes, heavy liftOFF

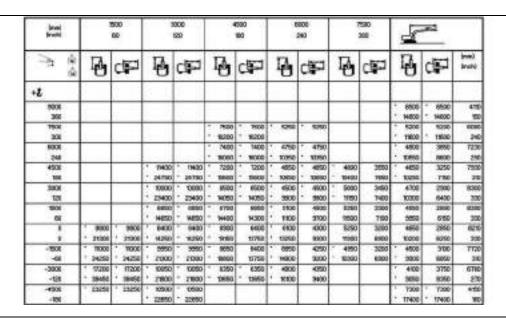


Illustration 309 g06464575

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) DG track shoes, heavy lift ON

600 mm (24 inch) TG shoe

jewij breid		900		5000 520		658G 100		9000 240		1900 1800	4	=	
-> À	April 1	먇	8	ď₽	4	ď	4	學	10	æ	1	ďP	(ne) (neh)
9000	-			-	_						. 8990	. 9960	479
360			10						Y		13500	. 2000	15
7000	+	_			7 0000	1 6880	+ 4600	* 4100			* 4500	* 4000	808
360					* M800	1 M000		-0.53			1 10050	1 10050	24
8000	$\overline{}$				1 6750	. 1130	7 4990	4780			4400	3000	723
240	1		Salesa	1000	14600	14800	. 6880	9900	\$-500	12.000	. 9700	8450	29
4500			1 10400	1 (0400	1 8550	1 (6550)	1 4200	4200	9400	3500	4250	3150	750
180	1		" ZERON	* 2000	14200	* 1000	* 3650	2000	3000	7900	. 3400	7000	31
3000			1 9450	9450	\$906	, 8300	4050	4650	4600	3400	4350	2660	.630
130			* 2990	* 21200	12700	+ 12700	+ 8600	* 5800	* 60000	1250	+ 9500	6300	30
1980	-		1 9490	F 9490	905/0	+ 6050	+ 4000	4400	100	3290	4400	2180	939
80		Second Second	10000	1,19800	, 19000	1 13000	* 10000	9900	1100	6893	5600	8050	30
.0	, 8680	3580	9000	, 6090	9066	6300	9880	4390	966	160	4990	2000	821
0	1 2050	30160	10450	10400	* 11300	1980	. 4000	950	19060	6750	10000	450	33
-1500	, 40400	* T0400	7 8550	0850	1750	6300	. 680	4300	4400	380	4000	3050	712
-80	22900	22900	10000	10000	1000	12500	+ 45890	3050	3200	6800	, M000	6700	- 26
-3000	, R550	1 80250	* 6950	1000000	BUILDING TO STATE OF	0.00	4250		2	1/	9600	1 3000	678
-100	, 36380	, 38380	19400	* 19400	. 5400	, 5.80	1 8860	8890	5		, 8000	9000	23
-4500	, 18900	, 38350	3400	9400					1	1	, E200	9500	413
-190	1		1 20300	- 30300							· E550	. 9550	- 10

Illustration 310 g06464577

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) TG track shoes, heavy liftOFF

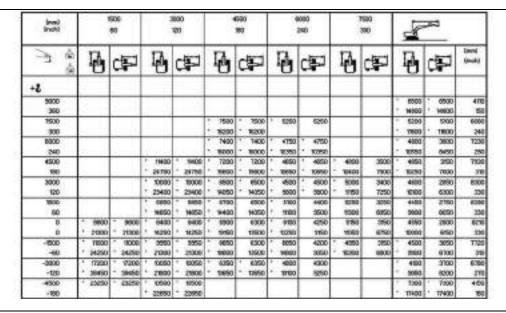


Illustration 311 g06464578

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) TG track shoes, heavy lift ON

M0068104-12 227

700 mm (28 inch) TG shoe

bred)		800 800	0/.—60 N	1000 100		100		5600 240		7500 360	\$	A	
−g & â	1204	ŒP	4	ď₽	10	먣	P	먣	1	中	8	中	(Incid
9000			5 1				_				5 9990	1 5960	49
360	Tr.		-				- 7				10000	13600	19
7900					* 4890	6860	* 4800	- 4900			3 4000	4800	808
300					* 9800	* M005		- 18			10050	10000	29
9000					* 8790	1150	4350	490			4400	3850	70
240			11.35	0002102	* 9600	1 14800	. 9800	- 5900	2000	- "	1 8900	9850	- 29
4500			19400	1 10400	1 6850	6550	4200	4200	* 4400	3550	4250	3200	790
300			- 32500	* 2000	* 16000	1400	* 3650	* 3650	3000	7900	. 3400	700	- 31
3000			3450	9450	1 5900	* 5900	4050	4090	4900	3450	4050	2900	830
120			- 54500	* 21200	* 12700	12700	* 8800	. 9900	* 10200	7750	. 9500	6400	30
1900			9450	+ 6400	* 1000	- 8000	+ 4800	4000	. 8100	3300	4100	3900	820
.00			* 13000	1 (3800)	10000		1 10000		* 1900	7100	9990	680	20
0	1050	, 8520	9090	1 8050	1090	6400	9550	4000	SSSE	3300	4100	2860	821
	7 3060	1 20160	9460	1 teelo	10300	11752	1 120000	3000	1958	8000	. 4500	80%0	30
-1900		10400	5050	1 8850	1150	9400	. 6850	4250	* 4400	3300		3/00	712
-60	1 22900	1 22500	9000	1 10000	10050	11750	10250	3890	9000	6900	6000	0000	26
-3000	, A520	1 16250	9950	+ 6950	5650	9850	+ 4250	4250			3000	, 2800	477
-120	1 36050	1 36390	* 9400	1 19400	2100	5.00	1 8950	8880			9000	, 8000	27
-4500	1 20000	1 20000	9400	9400							. 6000	5500	46
-180			* 23500	* 20000							1 8850	. 6990	- 8

Illustration 312 g06464580

Lift Chart Above: 320, $2686 \, \text{mm} / 3300 \, \text{mm}$ ($106 \, \text{inch} / 130 \, \text{inch}$) Variable angle boom, $2500 \, \text{mm}$ ($98 \, \text{inch}$) stick, $4200 \, \text{kg}$ ($9260 \, \text{lb}$) counter weight, and $700 \, \text{mm}$ ($28 \, \text{inch}$) TG track shoes, heavy lift OFF

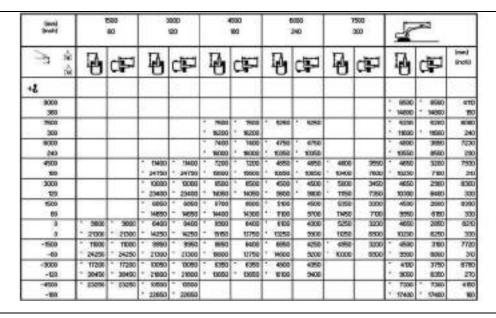


Illustration 313 g06464582

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 700 mm (28 inch) TG track shoes, heavy lift ON

790 mm (31 inch) TG shoe

(mode)		60	-	1000	- 3	650G 600		9808 240		7530 300	4	3 2	
3 6	8	(F)	100	æ	16	CPI	16	æ	10	中	8	œ	(net)
See.													-
300											15600	* 5960 * 5960	41
7900	1	_		_	+ 8050	* HIND	• (80)	* 4900	-	_	+ 4800	* 4800	800
200					1 14000	1 14800			-		10000	10050	24
6000	1				* 1750	1. 6750	· 4990	4750			* 8400	3900	723
240			Calvas	0.000	* 16000	1 1600	9500	9600	0.0000	250	9700	8790	25
4500			* 10400	* 10400	* 8550	. 6850	4200	4300	4400	3600	4250	3250	750
100			* EX200	- 22500	* 14200	M200	, 2620	9850	2500	7700	. 3400	7200	2
3000			* 9450	3450	2900	* 5900	4050	4050	4000	3500	4350	2950	400
120			. 54500	21200	* 17700	10700	* 8800	. 8800	* 10000	1460	* 9600	6500	30
1000			0490	- 0450	1 8050	1 9050	+ 4900	4990	990	2050	4900	2650	925
86			* 15800	73800	* 11000	19000	. 10000	9900	* 1100	T200	10000	6250	30
0	1 5250	1 5250	6050	0050	9050	6500	5550	4400	5100	3250	4000	2500	H25
0	+ 2059	* 2060	* 15450	9480	+ 17300	10950	. 5500	9400	9950	7000	1000	8350	
-1600	, 10401	, 40400	- 8890	. 8660	+ 1790	8900	+ 6590	4950	4400	3090	* A000	3160	772
-60	1 22906	1 22900	10000	8000	1 8650	10850	1 0250	2300	. 5090	7000	0000	6900	38
-3000	16256	16250	- 8890	5950	1 9850	. 6650	4250	4250			3600	3600	676
-00	* 36358	* 36350	1 19400	9400	, 5.00	12100	* 0950	* 6950			. 0000	* (0000	21
-4500 ·	. 50808	, 30880	- 0400	9400							, 6000	, 0000	48
-100			* 20300	* 20000							1586	* 15550	10

Illustration 314 g06464583

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 790 mm (31 inch) TG track shoes, heavy lift OFF

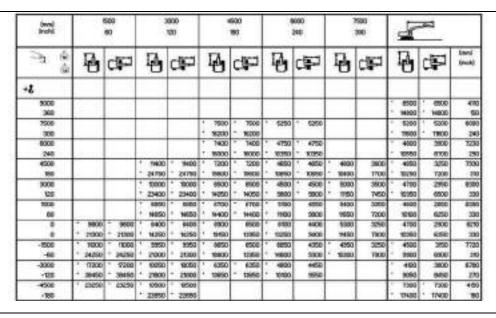


Illustration 315 g06464586

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 790 mm (31 inch) TG track shoes, heavy lift ON

M0068104-12 229

900 mm (35 inch) TG shoe

(ma) (md)		800 800	13	100 100	- 6	903 6000	1 8	248 248		1500 300	4	33	
7 6	8	d₽	8	c i	B	c)(C)	8	œ	В	æ	10	ď₽	tred instit
9000			_				_		_		* 6862	- 680	411
300							1				- 13600	- 13600	10
7500					+ 1680	- 6050	* 4800	~ 4800	7		* 4800	* 4808	900
300				15 10	1 10000	9000		-	1		10000	1000	24
8000					" F790	- 690	4050	4750			* 4400	4000	12
240			022:02	33777	1 10000	* 1600	- 9900	- 9900	Second.		- 9700	6953	- 25
4500			. 49400	1, 0400	1 5550	. 6550	4200	4300	9400	3750	4250	3400	730
100			1, 32500	1 2000	* 14200	* 16200	- 9050	3000	. 3000	0000	2400	1900	- 3
3000			3450	3450	* 5900	2500	* 4050	4050	4600	3600	4350	3058	600
100			1 21204	1 21208	* 10700	10790	. 8800	8800	10000	7110	9600	6750	#1
1500			6450	1 6450	1 9050	· 8050	+000	4000	500	3450	4500	2968	905
80			19900	, 3800	* TIORO	- 0000	* 10000	. 40000	1100	7450	* 10000	6600	(8)
0	1259	9256	9050	0050	9050	1700	2550	4550	5450	5400	4600	3001	62
- 0	* 3069	. 1668	10452		77300	14450	18000	9750	11100	7250	- 10108	8800	33
-1500	10400	10400	9050	6050	7790	6790	950	4900	4400	3400	4000	5253	772
-60	. 55800	. 55908	1 8906	3900	* 19890	1480	1890	960	9200	T300	- 8800	1201	. 7
-9000	1 16250	16254	, \$950	* 8964	9690	- 9660	4290	4390			3600	3800	676
-00	* 36350	1 36358	, 19400	* 19400	. E80	. E.60	- 8990	6890			- 600D	* 8000	21
-4000	, 10000	. 30800	, 3400	, 3400							* 1500	- 6600	911
-80			* 20000	* 20000					1		15550	+ 40001	W

Illustration 316 g06464587

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) TG track shoes, heavy liftOFF

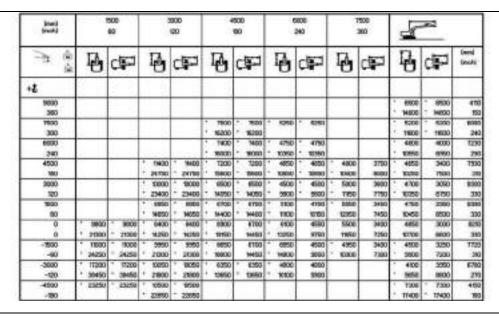


Illustration 317 g06464590

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2500 mm (98 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) TG track shoes, heavy lift ON

Variable Angle Boom with a 2.9 m (9 ft 6 inch) Stick and 4200 kg (9260 lb) Counterweight

600 mm (24 inch) SG shoe

230

Smort Smort		60 80		120		600 100		9000 290		7500 300	4	, m-2	
- h &	8	CE	8	CP	10	C FI	10	얟	В	ď	4	ďP	(mah)
3000	-		-		- x700	- 4700	_			_	4790	4790	488
360					- 11750	1 8750					10750	· wrso	5
7500	1				- M200	* 6500	1 2000	0950			+ 1990	1 3900	1000
300	1				1000	14200	9000	. 9850			. 8600	. 8800	- 26
6000	1				- 6700	* 6700	1 4750	1 4750	3750	3790	1 3790	2550	765
240	1		E-mail	10000	* 14650	* 14550	1 680	* 860	- 6300	7050	. 100	1993	- 20
4500			* 10500	" 10900	· 9050	9550	4660	4650	9890	3050	1 3690	3000	630
180			22890	. 52680	* 14380	* N386	. 986	. 9680	8660	7800	7900	8890	30
3000	2-5720	desaw	. 10000	10000	* 9400	* 8408	1 3950	* 3850	3950	2500	. 3650	2790	. 871
120	1 1795	+ 17950	* 2850	- 1420	. A3000	+ 11900	1 6050	. 9320	: 6500	7500	1 7990	9000	35
Wilde		10000	* 6750	* 0750	- 1000	* 1600	* 4380	4000	9450	3300	* 3690	2600	879
60	0.000	11.000	+ 19650	* 10050	. 5400	6,100	* 5600	9400	3350	760	. 8000	5800	30
0	. 6200	6500	5300	5300	1 N00	6450	1950	4250	5050	3220	480	2990	86
	, 2600	* 14100	* 1990	- 1680	- 36900	1980	+ 1900	990	, 100900	6300	+ 9050	6893	. 34
-1500	1 8256	1 6250	0500	* 9500	* £350	6000	, 9200	4250	4650	3290	1 2990	2900	810
-80	* 16954	. 8000	* 19090	* 9350	8100	11700	14000	3300	10300	6890	, 8880	8300	. 10
-3000	10000	, 19360	* 8890	* 9850	. WS00	6200	4 600	6000			, 350	, 350	T34
-120	7 25000	* 25600	* 60000	70200	* 10400	* THOO	1 10450	5000			1 T290	1200	25
-490C	Libera	20490	3090	- 3180	- 9000	1900					4800	6890	100
-100	1.44938	* 44550	1 6750	9750	* 6000	* 10000					1. 10000	. 45000	2

Illustration 318 g06464593

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) SG track shoes, heavy lift OFF

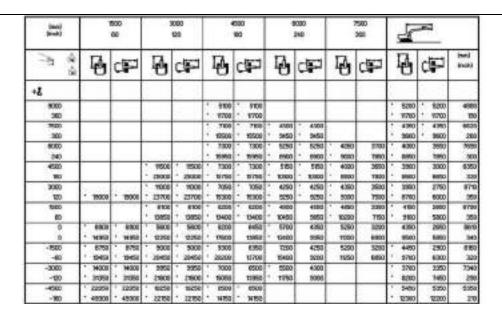


Illustration 319 g06464595

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) SG track shoes, heavy lift ON

600 mm (24 inch) DG shoe

(level) Brichi		600 60		150 1008		80 600	25	9000 240		7500 308	4	-	
-n -ê ŵ	8	c#P	4	C)(C)	19	ď₽	4	ď₽	4	個	10	æ	Ornal Ornalia
9000					* 4700	* 4700					4150	* 4750	4850
960					9750	1 60750					10750	19750	100
7500					- M500	1 6800	1 0960	1 2000			1 0950	3050	040
300					* 14200	* N200	* 8850	- 8860			. 9600	9800	28
9000					* \$790	1 6700	1 4750	1 4750	3750	3700	3700	3550	750
240		-	325-55	de ma	* 14650	* M650	. 9.60	180	. 4500	1950	. 8000	7890	20
4500			* 0500	1 10900	9050	1 6850	4650	4650	1 0000	3650	1 3000	3000	809
160			. 55980	* 23890	* 16380	1 14390	* 5850	9860	* also	7900	7800	9680	38
2000	200000	-045.59		10000	* 9400	4 6400	. 3890	1 3960	3950	3500	3650	2790	877
620	* 17950	+ 17950	1 21550	+ 2/550	- '0900	+ 10000	+ 6350	* 6550	, 9800	7500	7950	8000	. 3
1900		11000	. 11.20	1700	- 1660	* 9800	, 4380	4000	. 4400	3080	. 3800	5680	873
60		Colons.	1 10050	1 15050	- 5.00	1 1100	1 3400	9 5400	9350	750	9250	5000	35
	. 6900	. 9980	5308	1 5300	* M00	8450	1950	4350	, 8890	3290	450	2690	881
	* 9000	1 MW	* 19060	1 1990	- 6300	10950	1 10000	3052	1 10890	8900	9660	5160	. 54
-1500	* 8250	0250	9500	* 8500	* 8350	6350	* 6500	4250	4950	3290	3950	2050	810
+60	* W000	1 10050	* 1000	1 19050	* 1000	10700	1 9000	3000	. 40000	8660	9660	6300	30
-3000	1200	10090	9050	1 9850	* K200	1 6200	1 4000	4300			2050	3250	736
-tm	* 29800	+ 29600	- 9200	1 9800	* 19400	* 19400	10490	8800			7200	7300	25
+4500	1 20450	1 20450	- 260	. 9450	5000	5800					4650	4050	500
-160	* 44950	+ 44550	* B160	* 19750	- 2500	* T0500					10100	10500	2

Illustration 320 g06464596

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) DG track shoes, heavy liftOFF

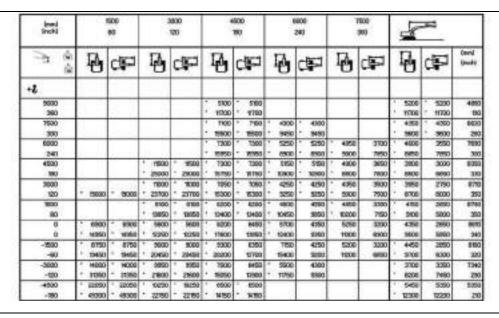


Illustration 321 g06464598

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) DG track shoes, heavy lift ON

600 mm (24 inch) TG shoe

232

Emmi Gnahii		60 60		1008 100		90 180		9800 247		1500 300	1	-	
À 6	0	ďP	16	œ	16	ďP	10	œ	10	땅	Ð	æ	(mah)
9000	_			_	* 4700	* 4700	_				- 4750	4790	4000
360	16		30		0790		- 7				10750	1 10750	100
7500					+ 8500	* etco	5 5950	* 3950			- 5900	* 1990	660
300			100		1 9200	* M200	9850	9800	_		9000	9000	200
6000					5700	1 6700	1, 4750	4750	2 3750	3850	3100	1980	155
240			0000		* 50050	1 1660	. 160	. 880	8000	7760	800	7790	30
4500			* 10500	1 10500	1 5850	6550	1 4650	4850	3650	3600	1 3800	2550	835
100			1 22000	+ zono	* 9390	* H300	1 3850	- 300	- 8000	7900	7300	8580	33
3000	- more	Acroso	, 10000	10000	6400	6600	1 3850	3850	2000	360	3050	2790	821
120	* 17990	1 17550	1 21650	* 2650	* T500	* 13500	* 8960	. 8350	* 8500	7759	7550	5500	36
1000		171175	1 9750	+ 1750	* 1600	* 19000	* 4000	* 4390	4450	3050	3800	2080	879
80		No. inches	1 13050		1, 15,000	6,000	* 9400	9400	5050	7950	8350	9680	36
- 0	6600	6506	1, 1900	1 5300	7400	6300	5150	4250	5050	268	450	2000	201
ė.	* 14/00	* W/00	1 1625	1 1850	* 5500	1900	1 H200	9890	10653	6600	9050	5750	34
-1500	* 8250	- #350	, 8500	, 8800	8390	6250	, 6800	4800	4150	3100	390	5000	19
-60	1 80350	8350	T 0000	190900	16100	0460	† 14000	9900	10000	6100	5650	8290	30
-3000	19590	. 0350	8850	B > 1 CONT.	1500		, 4800	4250	6		3250	, 3580	1794
-900	* 20000	* 39000	1 8200	1 10200	10400	10400	1 10450	2900			7900	7280	23
4500	. 30400	. 10460	1 8400	, 9400	5000	1000					. 4650	* +050	530
-300	* 44550	* 44550	10760	1 19750	+ \$800	* tiese	- 0				10000	4. \$2300	#1

Illustration 322 g06464601

Lift Chart Above: 320, $2686 \, \text{mm} / 3300 \, \text{mm}$ ($106 \, \text{inch} / 130 \, \text{inch}$) Variable angle boom, $2920 \, \text{mm}$ ($115 \, \text{inch}$) stick, $4200 \, \text{kg}$ ($9260 \, \text{lb}$) counter weight, and $600 \, \text{mm}$ ($24 \, \text{inch}$) TG track shoes, heavy liftOFF

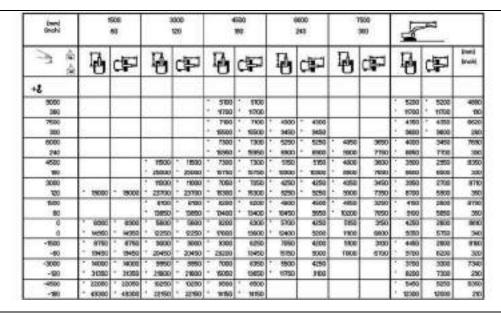


Illustration 323 g06464603

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 600 mm (24 inch) TG track shoes, heavy lift ON

700 mm (28 inch) TG shoe

(mod) (mod)		500 60		120		100		5800 240		7500 200	\$		
÷ €	0	œ.	4	œ	1	ď₽	0	鸣	Ð	ď	10	ď	inoti inoti
9000	9 11	-		-	4 4700	* 4700					4750	4758	4000
260					* N750	- 10750					10150	10750	- 15
2500					* 9900	* 4900	+ 19900	* 3980			· new	3880	9626
200					1 14200	1 9000	9950	9000			9800	0000	290
900E					* 6700	* 6700	4750	- 4750	* 3750	2/7/0	. 3100	3600	769
240			0217007	CH1041	1 1050	10050	+ 8660	* 150	0000	7960	. 000	1950	30
4500			10900	* 1600	1 6650	. 4690	4850	4580	. 3620	3650	. 3600	3000	839
100			1 20000	, 15000	* N350	1 1000	2000	9050	- 0050	7000	7900	\$150	23
2008	Jan	de coi	10000	, ,0000	9400	* 8400	3950	3050	5950	3500	9050	2750	9730
120	* 17950	* 12960	7 27950	+ 2880	* tisoo	. A300	+ 8950	* 8350	* 8900	7500	7950	6000	39
150E	2011	12.400	+ 5750	5750	* 9900	5000	4050	4000	9450	3050	, 3600	2450	. 979
60			* 19050	* 10000	. 600	. 5.00	5400	* 9400	9090	760	4 8350	5750	750
. 0	* E500	. 9250	5300	, 2300	7400	6450	. 1620	4350	5850	3296	4850	1655	DEK
	* 14100	+ WEG	+ 1650	* 1650	+ 8900	10050	+ 1900	9550	* 10050	6500	9050	5850	39
-1500	* 8250	* 8250	* 9900	* 8500	+ 8950	8390	+ 6900	4250	* 4890	3000	, 3820	2850	8160
-60	6050	16360	1 10050	1 10050	, MICO	10700	* MG00	760	10300	6850	, 0680	6006	320
9000	* BSS0	70250	* 8850	1 3880	* 6200	1 1200	1 4900	4300			3250	3250	734
-100	* 29600	* 29000	1 19200	, 8500	+ \$3400	1 (0400	* 10450	2000			7,000	1200	290
-4006	. 39400	20480	* 8100	9780	. 8900	. 1000					4000	4000	539
-100	* 94550	* 44550	1 19750	1 20750	1 tissoo	12600					10300	10000	21

Illustration 324 g06464604

Lift Chart Above: 320, $2686 \, \text{mm} / 3300 \, \text{mm}$ ($106 \, \text{inch} / 130 \, \text{inch}$) Variable angle boom, $2920 \, \text{mm}$ ($115 \, \text{inch}$) stick, $4200 \, \text{kg}$ ($9260 \, \text{lb}$) counter weight, and $700 \, \text{mm}$ ($28 \, \text{inch}$) TG track shoes, heavy lift OFF

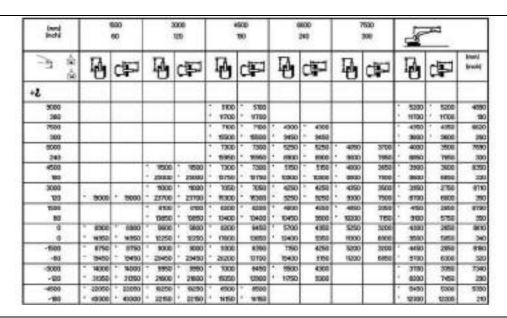


Illustration 325 g06464605

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 700 mm (28 inch) TG track shoes, heavy lift ON

790 mm (31 inch) TG shoe

234

(med) (inch)		800	13	1000 120		80		243 2000		900	4	-	
A S	4	ď₽	8	ď₽	4	ď₽	4	ď₽	4	ciga	10	æ	ined inedi
9000	_				* 4700	- 4790					* 4750	479	450
300					+ 47750	9750					1075	* 10753	to
7500					* M200	* 8900	- 3900	9900			- 0860	* 1963	660
300					1 14200	* 16200	- 8690	8650	8		- 8800	· 6801	26
6000					* 6700	* \$700	4750	4750	3750	3750	5700	3553	195
240			255		14650	- 14050	1 880	- 880	9000	7960	* 8700	1958	00
4500			1 8500	1 9500	1 9050	" M050	4050	4650	9650	1 3000	3600	3058	600
100			12850	1 22890	* 36380	1080	* 8690	9890	800	7900	* T905	8700	33
3000	Sec.	455.00	, 8000	, 8000	9480	* 8400	3990	3850	3960	3550	3650	2903	:87
120	11958	11958	19550	1 2550	+ 13900	12500	* 8350	6350	9500	7600	7950	8100	30
1000	111000		1 1700	* 8790	+ 1680	- 1600	4300	- 4350	960	3400	7 3800	2803	870
60	Service.		, 19028	* 13050	1 2:00	5.00	9400	9400	9350	7250	0350	5800	30
0	. 6903	, 6604	, \$300	+ 5008	* M00	#500°	5780	4400	. 9090	3250	4160	2708	.00
.0	1 1101	14100	1 1993	1688	1 6000	14050	- 1000	9000	. 400ED	7000	* 966a	590	34
+500	6258	, 9528	8500	+ H500	1050	8450	6500	4300	4000	3000	0950	2908	810
-60	1 1000	1058	0000	19098	680	13300	* 96000	9300	10000	Hele	. 9885	9400	- 22
-3000	11050	, 4558	, 9955	1 8050	+ RSEG	, 1500	4900	4150	2		1 0050	1 2050	734
-100	, 38600	* 29900	, 1850E	- 28200	+ 19400	* THEOD	* 18450	9400			150	7200	29
-4900	, 50429	1.0900	, 366	1 260	5000	5000					4050	4000	535
-180	* 44553	* 44958	19750	* B150	+ 19500	- 5800					* 10900	+ 10501	- 21

Illustration 326 g06464619

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 790 mm (31 inch) TG track shoes, heavy lift OFF

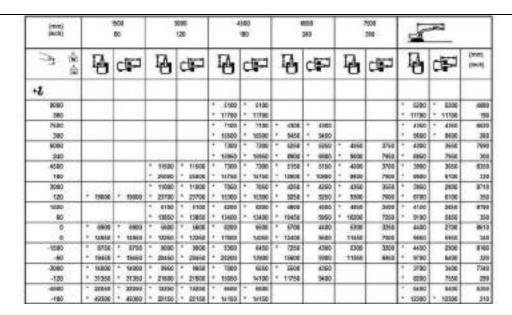


Illustration 327 g06464622

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 790 mm (31 inch) TG track shoes, heavy lift ON

235

M0068104-12

900 mm (35 inch) TG shoe

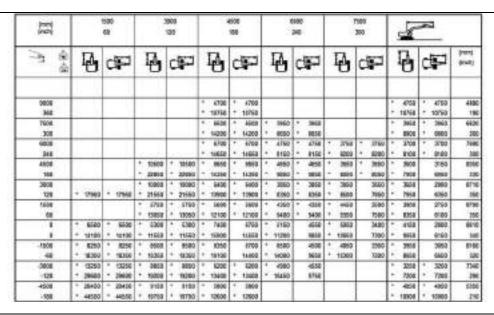


Illustration 328 g06464624

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) TG track shoes, heavy liftOFF

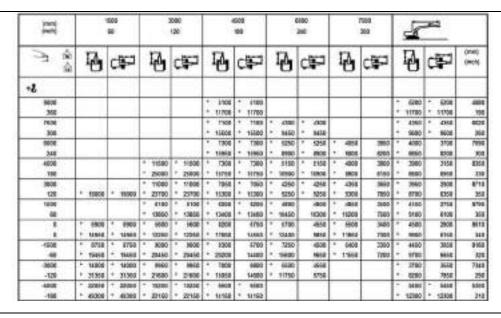


Illustration 329 g06464625

Lift Chart Above: 320, 2686 mm / 3300 mm (106 inch / 130 inch) Variable angle boom, 2920 mm (115 inch) stick, 4200 kg (9260 lb) counter weight, and 900 mm (35 inch) TG track shoes, heavy lift ON

Super Long Reach Boom with a 6.28 m (20 ft 7 inch) Stick and 4700 kg (10362 lb) Counterweight

600 mm (24 inch) SG shoe

(mail)		48 482	3	5000 126		4900 180	127	248.		1500 1600		9001 361		420 420		450 450		546	1	-	
<u>→</u> é	4	ĠP	0	c∰⊐	0	cipi	10	dip:	8	di-	19	dP	0	dP	0	c#P	10	ď₽	8	œ	(86)
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480																			- 3800	7808	
11600				-						_		_	* 3300	* 3200					* 1200	*******	119
420													+ 4704	4 4700	li-com				+ 3680	. 3600	1
1000												_	+ 1000	* 2230	. 3800	1900			1150	the state of the s	10
360													4 4800	4500	* 3650	1 3886			1 3480	2450	100
1900								-	-				+ 2250	* 2256	+ 1050	1960			+ 1186	* 1108	15
300													+ 484	- 1000	+ 1800	2000			+ 5486	- 3600	1
1000			-										+ 3400	* 248	+ 1200	1900	* 1668	1450	+ 1100	* 1100	12
340												I	* 5000	5200	* 1000	- 400	- 3300	2106	1 3100	9800	1 3
(800											* 2000	* 3860	+ 3800	3200	* 2400	1990	+ 2300	1400	+ 1100	* 3100	14
180											* 6000	* #100	+ 860	4960	1 1050	1980	* 4600	8000	1 3400	9 3400	- 71
1000			+ 478	1 4794	4 9000	* 3600	- H50	* 4400	+ (1659)	+ .1850	- 5158	2000	+ 380	2159	* 1999	15.86	3259	1999	+ 1190	- 1110	14
cgo .			1 11800	* 11880	* 12880	* 12862	* 1900	* 900	* 7880	+ TENC	* 6110	8840	* 6000	8886	1 1980	1060	4000	2901	* 3500	* 2908	- 1
1900					4150	. M100	* 528	4500	4160	1000	* 3450	2550	+ 5800	2006	2818	1900	3299	1300	* 1290	71108	14
80					* 14000	14562	+ 11000	9000	* 8600	11180	* 100	6800	* #800	4100	6/100	3188	ins	2000	7 3400	260	-
			- 3096	1 2800	* 4650	* 4650	1 5900	4086	* 4556	1000	3759	2360	3198	1908	2800	1580	2119	1260	1 1250	1108	100
.0	10000		+ .4000	* 4000	* 11790	* 16100	* 12700	6791	* 8008	1000	+ eros	E110	9798	4058	1800	1250	+010	2000	+ 2750	3400	- 1
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- 40	+ 4000	4800	* 6100	* 6105	+ 11580	- 10500	* 13650	0100	19408	3100	8658	4710	6500	3650	5250	3100	4580	2600	* 3090	3453	- 3
-3000	- 2800	2800	3880	- 3860	4 1000	. 9000	8480	3600	#108	1790	3888	2110	3800	1766	2900	1100	2400	1000	1000	1989	13
-100	6110	* 6306	+ 7900	* Page	+ 11750	11100	13900	7901	10100	1800	788	4555	4006	2750	1250	2000	* 3000	2000	+ 3000	2000	- 1
-4880	* 3860	, 1992	* 4400	. 5460	* 6060	9460	* 8400	3601	4845	-2000	2772	0.000	2900	1730	2690	1100	11/01	1000	* 1760	1366	13
166	* 8150	* \$100	* 8401	* 9900	· tires	75760	13600	1791	eate	1700	1156	4400	6306	3696	1200	jeet			+ 1990	2758	- 3
4000	* 480	7 1890	* 8400	* 8400	, 1200	9900	4000	3656	MESC	1890	3400	2110	2800	1700	2410	1100			, 3000	1403	12
-240	18160	* 1999	* 12186	* 12150	4 15350	12909	13390	7861	16000	1750	1754	4500	6364	3684	+ 599	3946			+ 4486	3089	- 3
-/100	* 8800	. Help	- 8600	* 4600	4 1380	8800	· APR	3790	. 1600	2790	3000	# CONT.	1880	1792					* 2100	1810	- 10
-360	12250	+ (22%	4 1488E	* 14000	4 41580	12/09	12290	8166	9 8000	1960	7900	4000	8800	2808					1.990	3059	
4000			* .7900	7 7990	* 1000	9900	1 4600	1990	- 366	1990	. 3150								* 3700	2000	
-360			* 5566	* 17050	* 11090	13000	+ 19400	8884	* 8356	1250	+ 6859	4000				(=1)	- "		1 5980	4019	

Illustration 330 g06225566

Lift Chart Above: 320, 8850 mm (348 inch) Super long reach boom, 6283 mm (247 inch) stick, 4700 kg (10362 lb) counter weight, and 600 mm (24 inch) SG track shoes, heavy lift OFF

(mont) ((mont)		es es		5000 128		100		SAL SAL		1508 508		1670 361		3900 420		400 400		546 546	4	-	
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11000																			+ - t380	1210	199
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11600													* 3300	- 2310					* 1380	* 1000	110
429													+ 4700	4708	Š-1	177.55			+ 3690	2600	. 4
yomo													* 1400	* 2408	* 1900	1800			* 1136	1 1100	1,01
360													1 5460	* 8488	1 1850	1 3650			4 2450	2450	- 5
7560													+ 2500	2504	* 1500	1966			+ 1100	+ 1100	134
360													+ 8866	6406	* 1000	AHDE			+ 2100	+ 2400	
1990													+ 2766	2450	* 1800	1900	+ 1660	1400	+ 1100	+ 1988	1390
240												L	* 8600	8300	7 1000	4000	- 200	37906	* \$100	9 0403	. 1
4500											* 2150	3000	+ 2900	2200	+ 1760	1900	2260	1400	* 1100	* 1900	10
160											F 8060	8400	* 8000	4962	* 1902	1850	* 4600	1000	F 3400	7 2400	- 9
1000			+ 4798	+ ×769	- 4196	+ 9100	1996	* 5989	- 4100	1894	- 5568	2000	+ 1194	2158	1799	1798	329	1999	+ 1100	+ 1000	140
120			* 1180	* 11882	* 1446	1 1966	1270	2.16794	* \$800	7900	- 7900	9910	* 8831	9114	1800	7862	4880	2001	* 3100	* 2900	- 0
1500					4 6528	9100	1 590	4590	- 4650	1590	. 3606	266	3000	2006	2959	1906	2290	1300	. 1200	1100	140
40					* 14000	14590	+ 1256	9401	- 100AD	7180	- 8000	Most	1000	4100	6700	1980	400	0800	* 2600	3660	- 0
			. 308s	. 5800	4550	4855	. 960	4055	5056	3950	3900	1360	3186	1998	2500	1156	2110	1294	1250	1960	180
	2000	V	* 4000	+ 4500	* 11719	* 16700	* 14200	6730	19000	1000	9409	E100	4790	4058	1800	2030	+600	2000	+ 2750	2400	- 6
-1500	2 200	218	2100	+ 2700	* 4650	+ 4855	6600	2520	4819	3880	3158	3300	3954	1006	2500	1458	2590		* 1550		142
-60	* 4000	400	1 910	+ 6100	* 1000	+ 16500	14000	étit	19400	9190	8058	4750	6500	3000	5250	3100	4580	2900	* 3000	2450	
-3980	2000	2006	- 3000	- 1800	, 1306	. E300	0400	3686	4709	2790	3619	2110	2900	1798	21600	1100	2410	1204	4 9866	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	127
-120	1 6350	+ 6006	* 7900	+ 7900	1 1/750	11100	13900	7000	12106	1800	7950	4000	6096	2100	1280	2000	+ 3000	399	* 3000	2000	- 8
4600	1 3660	1 360	- 6425	* 6400	* 8060	9490	9401	360	4010	2000	3608	2100	2800	1700	2680	1100	71107	- U	1 1100	1269	130
-160	. 640	+ 410	- 6405	* 4600	* 15790	11788	13800	7750	(MIS)	1790	1156	4460	6098	3606	1050	1999			* .100	2968	. 1
4000	4380	+ 4600	. 8400	* 6400	, 480	9400	840	3650	MHC	1890	3808	2100	2901	1130	2690	1160			+ 3000	1400	125
-240	18:00	* 1008	- 12155	* 12/69	* 16350	12606	1380	7686	18000	- 1750	1788	400	6094	3884	+ 5986	3100			+ 4486	3600	- 4
-1900	. 460	* 8600	. 8600	* 6800	* 8300	8800	, 960	3100	4790	3790	388	2140	3000	1750					* - 2100		110
-010	12250	1,1558	* 14600	+ 14800	* 11996	10/69	* 10000	6196	19309	.1980	7100	- 4600	8800	3808					* 1000	3000	- 4
-0000			7 7911	* 7990	1 1000	8100	1 100	3901	* 4000	3960	. 3008	2200							+ 3488	1.000	- 80
-860			1 19000	* 10000	* 14066	19050	+ (1800	6584	* 9600	4250	* 7500	4960							* 6690	4010	9

Illustration 331 g06225569

Lift Chart Above: 320, 8850 mm (348 inch) Super long reach boom, 6283 mm (247 inch) stick, 4700 kg (10362 lb) counter weight, and 600 mm (24 inch) SG track shoes, heavy lift ON

600 mm (24 inch) DG shoe

inesi (ineh)		NO.		120		4500 160	100	241		1500		360		0102 429	-	48E		9800 940	4	-	
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10900													- 2300	· 2000			_		* 1200	-	119
431													+ 4700	1. The Control of the					1 3800	T. 17 6 7 7	
9999											-		- Itán	* 8280	- 2000	1900			11150	* 7158	19
360													- 4800	+ 4600	* 3650	* 360			* 2000	* 3680	
7908						7							+ 2250	+ 2250	- 2259	1950			+ 1100	* 1106	10
500												1.	+ 3845	+ 4000	* 0000	980		L	+ 7600	9 3600	3
8000			1						7				* 2400	* 3480	7. 2500	1900	1 150	1459	+ 1000	* 1100	10
240													- 5300	1000	* 1000	4000	1 300	3100	+ \$400	- 3400	3
4510											+ 2880	1 2000	* 2000	2280	* 3408	1900	+ 2008	1400	+ 1900	* 1100	194
100											* 62	9130	* \$800	4900	- 5350	3000	1. 400	3000	1 3400	* 3400	- 6
9000			+ 4784	- 4794	* 1999	- 1948	* : 40	* 440	+ 360	+ 3652	1:30	2716	- 280	2106	. 2004	1760	184	1360	+ 1909	+ 1100	- 14
tin			* 11900	* 1988	* 12990	* 13900	= - Bidd	- 9800	* 7000	+ 1950	* 876	380	- 6000	4600	7 1960	200	488	3900	+ 1000	* 3105	
1800				- 5	* 6760	8650	- 4110	1600	4160	1300	4 386	2000	* 3000	2001	2864	1900	124	1349	* 1200	11100	. 54
60				- 0	+ 19000	34000	- 11110	1011	+ 1600	7110	+ 766	8100	+ 6000	4000	6710	3400	670	3750	+ 3800	3455	- 1
			7 2904	1 2000	1 4696	1 4882	. 6665	1000	1 4860	1860	1 276	2166	:7196	1900	3604	1986	2188	1250	1 1260	1100	119
			* 489	4556	* 19790	+ 10756	+ 12750	6701	+ 9656	1500	+ 880	5100	6750	4950	.5000	3260	466	2650	+ 2760	3400	12
4800	" 2100	- 2100	+ 2791	* 2708	* 486	1 486	* 6340	1781	4880	2860	A-M	3010	3055	1600	2606	1095	2100	1200	+ 1380	1100	. 194
-40	* 4608	+ 4600	+ 388	* 6100	+ 11500	*. 10886	- 13650	5106	16400	F100	8850	4758	9500	3880	5368	3100	4598	2600	4 3800	3458	- 3
0000	* 2000	7 2000	4 2000	5 2000	+ 1260	. 0000	8400	3600	4100	2700	3600	2110	2900	1780	2400	1400	2100	1200	1 1800	1110	180
-125	* 6858	+ 8260	7 7900	* 7906	* 11750	11700	12960	7806	16190	5800	7950	453	826	5796	5250	3950	1 389	2580	+ 5500	2558	
-600	* 3658	7 2600	* 4400	* 4400	* 4600	3150	8400	3600	4600	3650	360	2110	2900	1790	2400	1600	11/1/2	-	+ 1700	tise	- 13
-166	- 8158	* 9110	+ 9900	* 9668	+ 15760	+1786	13666	7758	9000	5766	7759	4458	8296	3600	1259	3901			+ 3768	2119	
4000	* 4853	* 4010	* 3401	* 5400	1 1200	\$400	- Aire	1800	4680	2000	300	2110	2950	1700	3458	160			* \$800	1100	- (3
340	P 10H6	* 1889	* 12996	12160	* 16080	12200	* 12380	ner	IRODE	1798	7796	*100	E300	3880	3 7000	3/84			1 4464	SONE	
7900	* 2008	* Bisse	+ 8800	* 8000	+ 1300	8750	* 100	3760	+ 4600	2750	3800	2150	3000	1798					* 3860	1600	- 11
300	. 12310	12260	* 34800	* 14600	11760	1260	1 12280	8100	1 8860	1900	7900	4600	8906	3801					* 9860	7610	- 3
-0000			* 1901	- 7668	* 9000	0100	- 4919	1001	* 3660	1900	* 20	2000							* 1766	2000	
-363			+ 1100	* 17886	* 11200	11060	- 10400	8804	1 8160	1290	+ 8880	4000							1 8984	4886	

Illustration 332 g06225573

Lift Chart Above: 320, 8850 mm (348 inch) Super long reach boom, 6283 mm (247 inch) stick, 4700 kg (10362 lb) counter weight, and 600 mm (24 inch) DG track shoes, heavy lift OFF

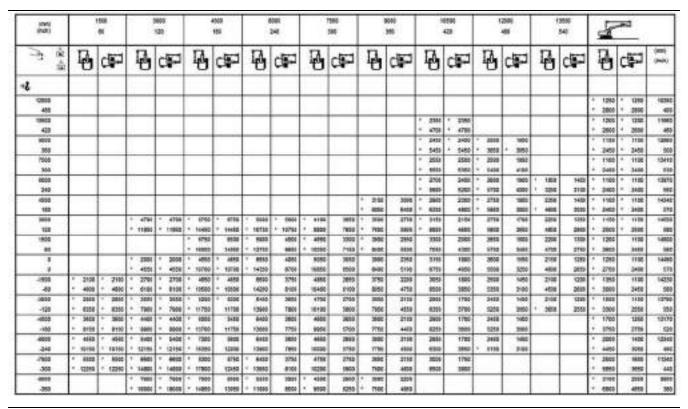


Illustration 333 g0622557

Lift Chart Above: 320, 8850 mm (348 inch) Super long reach boom, 6283 mm (247 inch) stick, 4700 kg (10362 lb) counter weight, and 600 mm (24 inch) DG track shoes, heavy lift ON

600 mm (24 inch) TG shoe

240

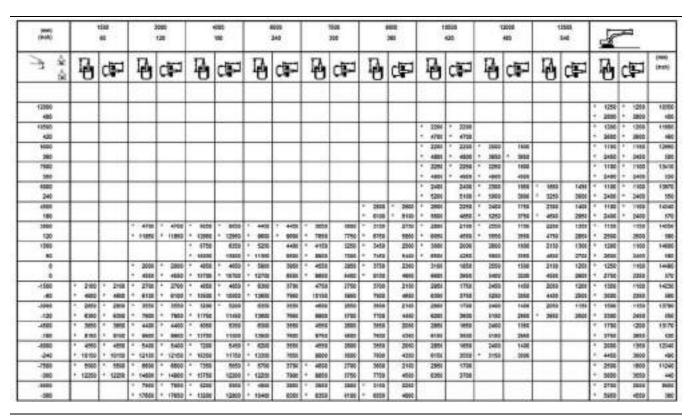


Illustration 334 g06225581

Lift Chart Above: 320, 8850 mm (348 inch) Super long reach boom, 6283 mm (247 inch) stick, 4700 kg (10362 lb) counter weight, and 600 mm (24 inch) TG track shoes, heavy lift OFF

(men) (men)		es es		120		==		248		NOD NO		200		405		480	3.5	isso Aut	4	_	
A 8	4	ď	4	ďP	14	œ	4	ďP	0	œ	P	图	8	c#J	4	ďP	1	æ	4	다	(942)
+2																					
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100													+ 4860	6300	* 6000	-040			+ 3400	* 2400	
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240												L	+ 1900	5150	* 5700	3996	* 2000	Depos	+ 3400	3400	- 2
4590			3 1			- 1			10		* 315	2000	* 2900	2256	1 2750	1756	2300	1400	+ 1180	* 1100	10
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1000			+ 4794	1 1790	* 6796	. 8188	* 1006	6000	- 4100	1000	- 556	276	+ 3100	2100	1700	1194	2286	199	+ 1100	1100	140
100			1100	* 11880	1 1460	+ 14450	* 10730	* 10756	* 8000	7790	- 160	Desc	* 6000	4000	1800	3588	4110	2000	+ 3580	2000	- 9
1500					. 4180	8162	1900	400	. 1610	1290	" .390	2100	1000	3000	2000	1900	2118	1300	* 1200	1908	160
- 40					+ 14000	13900	+: 13700	9001	- Incta	7800	* 049	8460	.0000	4950	1600	1966	400	2766	+ 3600	3409	- 10
			, 3000	7 2000	* 4866	* 4680	. 486	3860	4995	1960	286	2300	2100	1860	2990	1100	2126	1260	4 4264	1900	160
	-535.0	100	488	+ 4869	· street	+ 10100	* 14290	8591	19659	\$400	625	4800	- 6800	3959	5400	3096	4599	2604	+ 2186	2269	- 5
4900	7 2100	1 2148	* 21%	+ 2700	4886	* 4855	8800	31.00	698	2790	379	1000000		1750	2490	1188	3010	1300	+ 1380		149
-60	4000	1 466	* MB	* 6106	* 10500	+ 10500	15990	7990	18158	:5960	799	4000	6360	3156	1059	3956	4400	2504	1.3090	2859	9
-0000	1 2000	200	. 3000	2000	, 1200	, 8300	4000	3500	4600	2000	380	2100	2800	1798	2400	1100	2010	1196	* 1000	7100	1379
-120	* E350	* 6066	1.768	+ 7900	* 11756	11459	13666	7690	1906	5790	710		6200	3688	5150	2966	- 3666	2504	+ 5000		2
+4500	· 3650	1 269	* 4400	* 4400	* 9050	8000	4300	3600	4000	3600	300	2000	2800	1000	2400	1386			* 1790	1200	150
-160	9:80	+ 800	* R90K	* 9800	+ 11790	11100	1350	7600	\$150	5500	790		-	3506	5150	2984			+ 1150		- 5
4000	* 480	+ 4506	* 5600	* 5400	* 1296	5452	6336	3601	4639	100,000	300	2.50	73.23	9 0.571	2400	1100			1 3000	1000000	125
:040	F take.	10166	12166	1 (\$166)	4 HHE	3191	13900	7686	9600	1800	710	6340	_	_	1090	1666			4 446	_	- 16
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-080			* 16000	* 16000	- 11000	12800	+ 1188	8365	* 8600	8180	- 710	4000				(7)			4 6800	4694	1 1

Illustration 335 g06225584

Lift Chart Above: 320, 8850 mm (348 inch) Super long reach boom, 6283 mm (247 inch) stick, 4700 kg (10362 lb) counter weight, and 600 mm (24 inch) TG track shoes, heavy lift ON

700 mm (28 inch) TG shoe

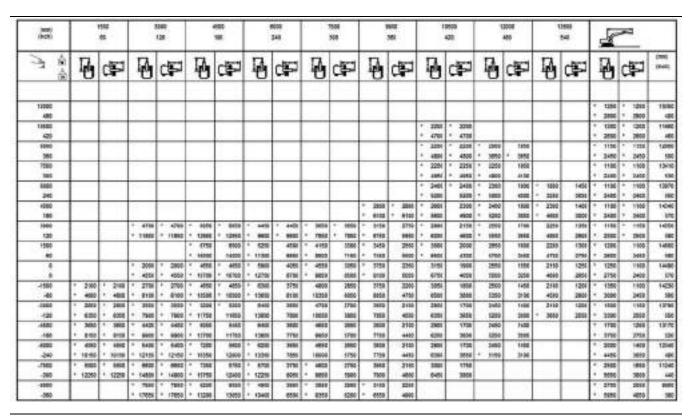


Illustration 336 g06225587

Lift Chart Above: 320, 8850 mm (348 inch) Super long reach boom, 6283 mm (247 inch) stick, 4700 kg (10362 lb) counter weight, and 700 mm (28 inch) TG track shoes, heavy lift OFF

(ext)		508 61	1	100		4903 190	100	24E		7566 566		366		0000 429		200) 486		9900 540	4	200	
4	1	图	4	æ	1	æ	4	中	1	中	1	ŒP	100	æ	1	中	1	电	8	中	(800)
3+																					
12000											-								+ 1280	1280	140
486			10			100			Y 15										+ 1800	1 3800	- 4
19903													1.286	1 3380					+ 1200	1 1200	19
420			11/2										+ 400	+ 4700	laren.				+ 2600	4 2600	. 3
90000													* 2410	1 3100	" 2000	1900			+ 1100	1 1100	10
360													+ 5450	1 5480	* 3650	* 3650			* 2450	3450	1
7909									-				* 2000	2560	* 2000	1950			* 1100	* 1136	13
360											_		+ 1000	6360	* 9456	#86			+ 9466	* 3400	
8000			-						7-11				+ 2706	2400	* 3000	1900	1 100	1450	+ 1100	* 1100	13
210													* 8800	1000	* 9750	6000	1 104	3080	+ 3400	* 1100	
1900											+ 3100	3000	* 2900	2000	* 210	1900	2200	1460	* 1900	* 1100	. 94
160											+ 1000	8100	+ #300	4800	* MHG	3000	1 400	2000	1 2000	1 3400	- 9
3000			+ 4791	* 4756	+ 1000	* 9779	- 2000	* 2001	+ 4190	motor	+ - 3000	2791	* 919	8100	8759	1790	9209	1500	+ 1100	+ 1139	14
GI			* 1986	* 11082	* 1689	* 1115	* 18198	10794	1 8860	7880	* 700	880	- 000	1600	9800	380	180	2605	1 2800	. 300	
1909					1 1750	6606	- 5000	4800	1. 4680	1000	* 3660	2550	3050	2000	3859	1600	228	1300	7 1,000	1196	14
40					* 16000	34000	+ 10000	9885	7 10000	7980	+ 800	****	7000	4100	6710	3000	4700	2710	1 3600	200	113
			+ 2900	* 2000	+ 4855	* 4656	- 6689	4000	5080	: 1000	3600	2556	3150	.1900	2559	1050	2158	1250	+ 1250	1190	194
			* 4600	- 4000	* 19760	* 10700	1 14250	8791	1986	8900	90	9000	8730	4050	3000	XXIO	100	2010	+ 9760	3400	- 3
-1900	* 2108	+ 2100	+ 2766	* 2706	* 4850	+ 4856	6660	3761	4886	2600	3750	2299	3050	1500	2006	1450	298	1200	+ 1360	1100	14
-60	* 4603	* 4800	+ 6101	* 8100	+ 10500	* 10500	14890	8105	10160	1000	86	4718	6500	3860	5350	2/00	4500	3800	+ 3000	3450	0
-3600	+ 3MS	- 2600	* 3686	* 965K	* 1200	* 1000	8110	3804	4790	3704	3850	2100	2000	1760	5468	1490	2196	1300	4 4800	1150	- 53
125	- 6000	* 8380	+ 1900	* 7900	* 11780	11100	13000	7800	10000	1800	7960	4500	6310	2600	5331	3900	1 388	2150	+ 3300	2506	
4800	* 3880	3660	* AND	* 4405	* 4080	\$160	8410	5801	ARRO	2880	7840	2110	2900	1766	2460	9400	To like	210	* 1760	1290	- 03
198	* 8160	* \$110	+ 4400	- 9400	+ 11/100	11118	12620	1794	9460	lines.	TTRE	4400	6211	3600	1010	3100			1 3750	2756	. 9
4000	* 4888	* 986	* 5400	* 5400	* 1200	9600	8440	3890	4888	2860	390	2100	281	1700	2486	1460			1 2000	1100	12
349	10110	* 19100	+ 12156	+ 12158	+ 11006	12300	12000	1964	16060	1750	7750	4409	1000	3650	* 389	266			+ 4460	3096	- 8
-7900	* 8800	* 9865	* 8800	* 6600	· 1000	- 6750	* 8410	5784	4700	2760	380	2150	3000	1790					+ 2800	1884	100
-506	· (239)	+ 12210	+ 14800	+ (400)	+ 17900	1946	+ +3660	6000	10120	1900	7900	+010	9400	3600					+ 5005	. 3600	
6000			7 . 7900	* 7961	* 1900	0000	1 0000	2901	+ 4000	2000	* 30	3200							1 2100	3000	-
-300			* 10000	* 18008	+ 14800	13856	+ 11500	6004	1 1550	1200	+ 759	4000	1			1			+ 4800	4000	- 3

Illustration 337 g06225589

Lift Chart Above: 320, 8850 mm (348 inch) Super long reach boom, 6283 mm (247 inch) stick, 4700 kg (10362 lb) counter weight, and 700 mm (28 inch) TG track shoes, heavy lift ON

790 mm (31 inch) TG shoe

244

(not) (not)		66		126		100		DAR.		7508 508		561 561		13900 420		400 400		545 545	4	~	
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11000			_			_	_				_	-		-		-			+ 1360	1 1210	11
480											1	1							* 2800		
11600							-		-			-	1 300	- 3300					* 1380	-	- 11
420													+ 470	DECL STORY	i				+ 3690	2600	
somo			_		_							_	* 120	* 2276	* 1900	2700			* 1126	-	11
360													4 480	4800	1 1850	1 365			1 2480	# LINS90/I	
7560													+ 228	-	+ 1266	1968			+ 1100	+ 1100	1
500											l.	1	+ 486	- 300	+ 1900	448			+ 2100	+ 2400	
1000			7.										+ 340	+ 2400	+ 1300	1906	- 1660	1900	+ ++50	+ 1100	1
240											ı		* 100	- 5000	1 6000	4068	- 200	2100	1 5100	0400	
4560											+ 390	r. 2000	+ 200	3266	+ 2400	1900	+ 2300	1460	+ 1100	* 1900	1
160											- 600	+ #100	* 840	Bood	< 1080	1800	* 4600	1000	T 3400	7 2400	
1000			+ 4796	+ x769	- HM	+ 10000	1.04%	+ 4100	- (40)	+ 1000	- 945	B000	+ 100	2294	+ 2500	1198	2166	1401	+ 1100	+ 1100	- 11
120			* 1180	* /1880	* 1386	1 12862	- 80	* ##	- 786	+ resc	- 419	8010		1700	* 1865	1700	4900	2891	* 2100	* 2000	
1500					* 6750	(6660)	1 529	4680	4150	1580	* 348	_	_	2058	* 2700	1950	2250	1084	+ 1200	1150	1
40					* 14000	18300	+ 1198	9801	- 1900	1280	- 10	ON 1885 SEE	B 1 1 2 2 2 2	200	4800	1106	4600	3800	* 2600	3600	1
- 4			* 200K	1 2800	4550	4855	1 560	4180	· 485	1100	* 515	3400	320	1998	2500	1556	2299	1304	1 1250	11950	-
	1000	v.com	* 400	+ 4550	1170	* 16100	+ 12700	8000	- 900	-0.500	- 900	SHELL MARKET	2.000	24	1800	2000	4050	2701	+ 2750	A	
-1500	2100	1 248	* 2118	+ 2700	* 4650	+ 4855	+ 650	3861	1 4861	1850	360	3260	310	1800	2550	1506	2150	1200	* 1350	1968	1
-60	+ 4000	+ 400		+ 6100	* 1000	+ 16500	+ 15600	6250	+ 10000	9150	800	4600	600	3900	5450	300	4060	2600	* 3000	2500	
-5960	- 2000	2000	- 300	1 3800	1 1200	F 18300	- 9400	2796	470	2790	379	2100	300	1 1711	2800	1100	2110	1201	4 1000	1200	-
-120	· 600	+ 6006	+ 7900	+ 7900	1 1750	+ 11750	+ 14000	7900	19250	1900	796	4000	640	2750	1000	2100	- 3660	3900	* 3000	2800	
4600	1 366	1 1002	- 6400	* 6400	* 8060	2000	1 860	3650	6700	11700	386	2100	250	1700	2900	1100	7727		7 1700	1268	- 1
-160		4 6100	- 6600	+ 4600	* 15790	11990	* 13666	7600	18100	1000	110	4000	628	2100	6060	1999			+ .tm	7900	
4000	* 4380	1 1600	* 8400	* 6400	* 1989	889.0	. 428	31%	1700	Tree	388	2100	100	1790	2900	1160			* 3000	1400	- 1
-240	19:00	+ 1008	- 12155	* 12/60	4 16350	15300	+ 1000	7966	1919	1860	190	4500	.00	3196	+ 5185	3116		1	+ 4486	31990	
-/1000	* 860	+ 1600	* 8600	+ 6800	* 1984	1000	1 8700	388	* 1800	1800	319	2200	320	1800					* - 2100	1865	- 1
-000	12250	1 1228	* 14800	+ 14800	* 1999	10000	1 12290	6291	- 865	1000	895	4710	+ 880	2000					* 1000	3700	
-0000			7.7900	* 7990	1 6200	9100	1 190	- 4000	- 386	1200	- 210	E200							1 2710	2100	
-060			1.17686	17850	+ 11200	* 13300	+ 1940	8890	- 835	4300	- 685	1000				10			* 5980	4700	

Illustration 338 g06225593

Lift Chart Above: 320, 8850 mm (348 inch) Super long reach boom, 6283 mm (247 inch) stick, 4700 kg (10362 lb) counter weight, and 790 mm (31 inch) TG track shoes, heavy lift OFF

(reft)	1902		100		460 18E		202 202		1618 168		36		1200		1200E		12800 840					
- A	4	æ	8	æ	1	æ	1	æ	1	di-	P	di	P	5	æ	4	æ	1	æ	8	di-	(ma)
-2																						
12500												1		\neg						+ 125	. 12	8 185
480												1	- 1		1000					* #	1 200	
19880												1	7. 2	20d	* 3358					+ 120	1.0	116
100				_								1	+ 4	701	· ertn		10000			+ 380	* 36	
1000												1	+ 5	est.	- 3466	. 5666	2990			4119	2000	129
360												1	1 8	980	6460	* 1660	* 1682			* 388	* 24	a 8
7500													1.2	900	2584	* 2500	1966			* 110	· 188	134
300												1.	+ 4	100	8480	* 6000	1188			* 3450	- 34	
1900												$\overline{}$	+ 2	700	2489	+ 2000	1960	160	1504	+ 1100	- 10	6 (30
240												1	+ 1	Mit I	5950	1 5700	4000	* 388	2106	+ 346	24	8 3
4500											+ 365	8 3000	+ 3	900	2566	+ 2750	1950	2360	0450	+ 110	- 19	8 10
190											9 686	8 8585	7 6	200	2006	+ 1965	3000	* 4600	3600	1. 340	1 36	0 1
1666			* ow	1 1704	* 6790	* 8184	- 600E	+ 6000	* #100	1790	- 340	B 2000	+ 3	194	3204	2000	1799	2166	11000	* 110	- 10	1 10
100			+ 1160	* 11882	1 1460	+ 14400	* 10730	* 10790	* 8000	1900	+ 160	E 900	* #	100	4730	1000	2700	34900	2950	+ 3500	- 30	0 1
1900					. 1180	8162	* 69th	4561	4 4650	1090	+ 300	8 360	- 1	300	2082	2740	1980	2290	1380	* 120	110	2 146
.00					+: 11000	1600	+ 1000	9001	* 18088	1200	+ det	H 1000	. 1	100	4400	5800	3590	4888	2806	+ 360	.59	6 1
			1 3000	* 2000	* 4680	* 4880	- 4865	4181	8100	1180	396	2400	- 8	300	1900	2800	1966	229	1300	* 126	.19	1 160
	-6354	22.00	4 4888	* 4859	1 11780	+ 10100	+ 14500	8661	11000	1600	888	8 519	- 49	101	4100	3600	3090	4659	2304	4 279	24	8 1
4900	1 2100	1 2100	1 21%	* 2708	* 4850	* 4884	6100	3860	4900	1890	360	8 2210	. 1	100	1808	2880	1900	2110	1281	1 138	310	142
-60	· 4000	4800	* 6100	* 8100	* 1000	+ 10500	14400	8260	18656	H160	800	6 400	- 81	100	3000	5450	3990	4698	2000	* 300	1 39	8 5
-0860	- 3000	1 2800	7. 3000	* 3800	1 1000	* , 9300	6010	3794	4700	2790	210	2100	- 20	100	1798	1800	1100	2100	1300	1 1000	100	127
-120	6880	+ 8390	1.798	7900	+ 11790	- 11758	14105	7900	16259	5900	795	4000	. 6	400	3756	5950	5100	* 369	2000	+ 509		
-4560	1 3610	1 2000	* 4400	* 4400	* 9000	1000	9500	3650	4700	2760	360	E 2160	- 3	100	1730	2500	1456	-	100	* 170	100	2 13
-180	. 6455	+ 910	- B90K	- 900	+ (170)	91953	1400	7880	18105	3800	198	400	- 10	986	3156	1356	3666			+ 579	286	W
4000	+ 4850	+ 4595	* 1400	* 5400	· 1200	5860	8030	3790	4700	1760	36	210	1	100	1750	2500	1100			* 209	140	120
1040	1000	* 10100	4 12186	1 (2)60	4 91000	18330	16100	1964	19769	isso	710	4160		100	3134	1 9100	244			+ 4440	199	
-7500	* \$900	+ 1000	+ 8600	* 8000	+ 1000	180	1 9400	1991	4805	1800	200	0 200	11	200	1000					* 350	18	8 110
.300	- 12360	1220	* 14800	1 14800	4 11980	12800	* 10840	6260	18399	1000	601	8700		100	3881					* 9000	275	
4800			- 7600	* TWH	1 1686	9100	- 1000	+000	+ 4000	2860	- 101	9 3399								+ 110	1.00	9 99
-260			* 18000	* 16000	11000	15366	+ 11000	8884	- 9000	6300	- 190	8 900		- 1			100	- 0		+ 880		

Illustration 339 g06225596

Lift Chart Above: 320, 8850 mm (348 inch) Super long reach boom, 6283 mm (247 inch) stick, 4700 kg (10362 lb) counter weight, and 790 mm (31 inch) TG track shoes, heavy lift ON

900 mm (35 inch) TG shoe

(925)	95 95		3000 126		4660 196		8009 245		7538 508		501) 501		19500 420		382	12008 400		13500 046				
- ×	4	ŒP	8	dP	4	œ.	4	æ	4	æ	P	Œ.	P	,	CF2	8	ď₽	4	ď	0	먇	(max
12000		_	_		_	_					_	-	-	+	-					+ 1260	1 1280	110
480											1	1		- 1	- 1					* 3890	* 2800	1
13600									-		_	-	* 32	100	2200					* (300	Contractor	- 11
420											l	1	. 47		4700					* 2000	2600	
9000									-		-	-	* 11	200	2210	1 2380	. 1508		$\overline{}$	7 1150	1 1988	11
360													4 48	100	4000	* 1980	* 3886			4 3460	* 7450	1
7500													+ 32	min i	2211	+ 1980	2056			+ 1130	1 1100	1.
566													+ 45	mi I	- 4069	+ x800	4558			+ 3400	+ 3ats	
8000													+ 29	61	2400	* 1000	.2000	* 1880	1500	* 1100	+ 1900	1
240											l		7 19	100	8202	1 9000	4000	- 2380	1200	* 2100	* 2400	
1500											- 300	2 7 2000	* 26	ios	3400	* 2000	1990	- 2000	1500	+ 1100	* 1900	- 1
160											- 600	t + #100	* 34	mi i	3110	 láto 	4050	9 4600	1000	* 3400	1 3400	
1000			+ 3798	+ ×296	* 6000	- Mete.	+ +404	7 6400	- 180	+ 1000	- 366	994	+ 38	148	2346	+ 1984	1600	2400	1404	+ 1100	+ 1468	-
100			* 1188	* 11882	* 1,3900	1 12892	1 1900	* 9900	* 786	* 7880	- 411	F410	* 80	100	ASSE	1 1000	7860	300	31106	* 3100	* mon	
1900					. 4110	+ 6160	. 434	4190	* 4180	3500	* 348	2790	* \$6	94	2160	1700	1120	2340	1400	4 4300	1,1300	1
80					* 14000	14100	+: 11300	10180	* 8900	1100	- tu	9 9000	+ #	100	4960	1 1860	1890	8000	3901	+ 2400	* 3M00	
4			1 300K	1 2000	* ARRE	4000	1 560	4280	1 4650	1290	. 311	2940	7 32	394	2008	2769	1882	3399	1360	1 (340	1200	1.1
	50000	1000	4000	+ 4500	* 16739	* 16100	+ (279)	9096	* 980	5980	- 000	E250	7 89	66	4298	1809	360	4990	2856	+ 2150	2600	
-1500	2 2 900	1 2168	1 2500	+ 2790	* 4650	+ 4855	+ 650	4000	486	1000	. 396	296	30	100	1908	2950	1150	2250	1300	* 1360	1200	
-80	* 4000	+ 4805	* 1100	* 6106	* 1898	+ 18500	+ 1986	8890	1.1850	6450	860	500	- 66	108	489	5700	3566	4680	2750	* 3000	2809	
5000	1 2000	5 200	3 300	* 3800	1 1200	1 8300	9400	3400	1000	4900	200	2340	31	DE	1000	3600	1100	2210	1300	* 1000	1200	- 63
-100	* - 6356	* 6000	* 7906	+ 7900	* 11750	+ 11750	+ 14600	.0000	19600	1280	600	4000	67	100	3600	3600	3656	- 3000	2760	+ 3000	2700	
+600	* 3660	1 3600	* 4400	* 4400	1 9050	8800	* 640	3661	1900	1850	360	1 100	21	100	1800	2800	1100	-110	100	* 1100	1289	1
-160	1 8100	* \$115	- 9904	+ 5600	* 15790	10466	+ 13666	6298	HMS	6000	900	475	- 66	80	3000	1556	1000			+ .1196	2905	1
4000	* 480	1 A550	* Sebt	9 5400	* 1300	9800	. 6330	300	HIGH	1860	340	1200	11	#	188	1860	1160			* 3000	1903	- 1
-240	* 18 Hp.	1918	* 12188	1 (298)	* 16560	10700	* 13360	8188	18866	1100	860	9110	- 67	100	3000	- 5196	1006			4 4480	3944	
-/1900	* 8900	· 1600	* #800	* 6600	* 1356	#100	1 870	388	* 480	1800	" 325	3340	+ 11	100	1862					+ 3100	1790	- 1
-292	12365	1 1220	* 04800	1 14800	* 11790	12100	1229	8581	* 1000	G50	· 101	8 4940	* #	94	4015					* 1090	1860	8
-1000			* Test	* 1990	* 6250	* 6300	* 490	4181	* mee	1000	- 345	P 2400		Т						* 2790	[D00	
-085			* 17085	* 17990	11200	* (3300	+ 19400	9000	* 135	MISC	- 888	1310		- 1						* 5000	1805	1

| Illustration 340 g06225598

Lift Chart Above: 320, 8850 mm (348 inch) Super long reach boom, 6283 mm (247 inch) stick, 4700 kg (10362 lb) counter weight, and 900 mm (35 inch) TG track shoes, heavy lift OFF

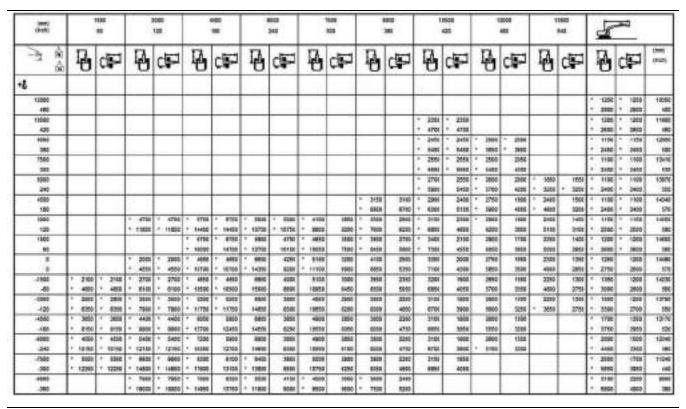


Illustration 341 g0622560

Lift Chart Above: 320, 8850 mm (348 inch) Super long reach boom, 6283 mm (247 inch) stick, 4700 kg (10362 lb) counter weight, and 900 mm (35 inch) TG track shoes, heavy lift ON

Identification Information

i08271901

Plate Locations and Film Locations

SMCS Code: 1000; 7000

The Product Identification Number (PIN) will be used to identify a powered machine that is designed for an operator to ride.

Caterpillar products such as engines, transmissions, and major attachments that are not designed for an operator to ride are identified by Serial Numbers.

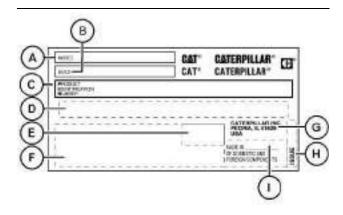
For quick reference, record the identification numbers in the spaces that are provided below the illustration.

Product Identification Number (PIN) Plate



Illustration 342 q06184412

The PIN plate is positioned on the front of the machine, close to the operator compartment.



Manufacturer Name and Address _______

Model (A)______

Build (B)______

Product Identification Number (C)______

Bar Code (D)______

Month and Year of Manufacture Plate (If Required) (E)______

Regional Certification Plate (If Required) (F)______

Address of Manufacturer (G)______

Issue (H)______

Local regulation may require documentation of the month and/or year of manufacture in the Operation and Maintenance Manual. Comply with these regulations

Country of Origin Info Plate (If Required) (I)_____

European Union



Illustration 344 g06201193

This plate is positioned on the bottom-left side of the plate for the PIN.

Note: The CE plate is on machines that are certified to the European Union requirements that were effective then.

For machines compliant to 2006/42/EC, the following information is stamped onto the CE plate. For quick reference, record this information in the spaces that are provided below.

- Engine Power Primary Engine (kW)_
- Engine Power for Additional Engine (kW) (If Equipped)
- Typical Machine Operating Weight for European Market (kg)
- Year of Construction______
- Machine Type ______



Illustration 345 g06201198

This plate is positioned on the bottom-left side of the plate for the PIN.

Note: The CE plate is on machines that are certified to the European Union requirements that were effective then.

For machines compliant to 98/37/EC and 89/392/ EEC, the following information is stamped onto the CE plate. For quick reference, record this information in the spaces that are provided below.

- Engine Power Primary Engine (kW)______
- Typical Machine Operating Weight for European Market (kg)
- Year

For manufacturer name and address and the country of origin, see the PIN plate.

Eurasian Economic Union

For machines compliant to the Eurasian Economic Union requirements, the EAC plate is positioned on or near the Product Identification Number (PIN) plate (see "Product Information Section" of the machine Operation and Maintenance Manual). The EAC plate is placed on machines certified to the Eurasian Economic Union requirements effective at the time of market entry.

Note: One of the below plates may be installed on the machine.



Illustration 346 g06094564

If equipped, the Month and Year of Manufacture are on the PIN plate.

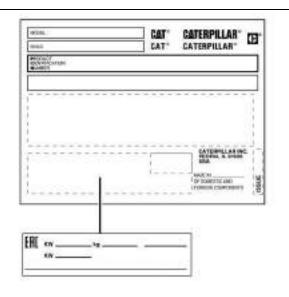


Illustration 347 g06532250

If equipped, the following information is stamped onto the EAC plate. For quick reference, record this information in the spaces provided below.

- Primary Engine Power (kW)_______
- Additional Engine Power (kW) _______
- Typical Machine Operating Weight for Eurasian Economic Union (kg)
- Month and Year of Manufacture______
- Machine Type _______

Manufacturer Information

Manufacturer:

Caterpillar Inc., 100 N.E. Adams Street Peoria, Illinois 61629, USA

Entity authorized by the manufacturer at the territory of Eurasian Economic Union:

Caterpillar Eurasia LLC 75, Sadovnicheskaya Emb. Moscow 115035, Russia

Machine Specification Film

The machine specification film is on machines that are going into Japan.

The Japanese Industrial Safety and Health Act requires machine specifications to be displayed on a film that can easily be seen by the operator.

If equipped, this film will be on the cab door.



Illustration 348

g06178867

Typical example

Electromagnetic Emissions

Note: This label is on machines that are going into Canada.

M0068104-12 251

CANADA ICES-002

NMB2

Illustration 349

g06063443

If equipped, this label is located next to the PIN plate. This label verifies that the product meets the requirements of ICES-002 Issue 6. Compliance to ICES-002 Issue 6 is accomplished by meeting electromagnetic emissions industry standard CISPR-12.

Engine Serial Number

This label is on the engine.

Engine Serial Number _

Sound Certification Film

If equipped, this label is on the cab door.



Illustration 350

g03533258

For 320



Illustration 351

For 323

If equipped, this label will be on the cab door. The certification label is used to verify the environmental sound certification of the machine to the requirements of the European Union. The value that is listed on the label indicates the guaranteed exterior sound power level L_{WA} at the time of manufacture for the conditions that are specified in "2000/14/EC".



Illustration 352

a03105800

g01447432

- (A) Low Noise Film
- (B) Super Low Noise Film

If equipped, these certification labels are used to verify the Japan Ministry of Land, Infrastructure, Transportation, and Tourism (MLIT) noise designation according to the Japan "Designation Rule of Low Noise Type Contrauction Machine".

Low Noise (A) – Verifies that the Japan "MLIT" designates the machine as a "Low Noise" type construction machine.

Super Low Noise (B) – Verifies that the Japan "MLIT" designates the machine as a "Super Low Noise" type construction machine.

i05757951

Emissions Certification Film

SMCS Code: 1000; 7000; 7405

Note: This information is pertinent in Japan.



Illustration 353

g03654940

2014 certification label example

A certification label is located on the cab door.

The certification label verifies that the machine conforms to the 2014 Japan Nonroad Special Motor Vehicle Exhaust Regulation.

i08085827

Emissions Certification Film

SMCS Code: 1000; 7000; 7405

Consult your Cat dealer for an Emission Control Warranty Statement.

The emission certification film is on the engine.

Declaration of Conformity

SMCS Code: 1000; 7000

Table 25

An EC or EU Declaration of Conformity document was provided with the machine if it was manufactured to comply with specific requirements for the European Union. In order to determine the details of the applicable Directives, review the complete EC or EU Declaration of Conformity provided with the machine. The extract shown below from an EC or EU Declaration of Conformity for machines that are declared compliant to "2006/42/EC" applies only to those machines originally "CE" marked by the manufacturer listed and which have not since been modified.

ORIGINAL EC or EU DECLARATION OF CONFORMITY					
	-1	weiller to a 400 N F. Adems Obsert I	Description in 04000 HOA		
		rpillar Inc., 100 N.E. Adams Street, I			
		to compile the Technical File and r States on request:	to communicate relevant part (s) of the	Technical File to the Authorities of Euro-	
			Standards & Regulations Manager, Cater 40 Avenue Leon-Blum 38000 Grenoble, I		
I, the undersigned,, hereby certify that			e construction equipment specified here	eunder	
Descrip	tion:	Generic Denomination:	Earth - moving Equipment		
		Function:	Hydraulic Excavator		
		Model/Type:	320,323		
		Serial Number:			
		Commercial Name:	Caterpillar		
Fulfills all the relevant provisions of the following Directives					
_					
		Directives	Notified Body	Document No.	
2	2000/14/EC a	amended by 2005/88/EC, Note (1)			
2	2006/42/EC		N/A		
2	2014/30/EU		N/A		
Note (1) Guaranteed Sound Power LeveldB (A) Annex VI Representative Equipment Type Sound Power LeveldB (A) [Engine Power per ISO 14396 kW, Rated engine speed rpm Technical Documentation accessible through person listed above authorized to compile the Tech				to compile the Technical File	
Done at:				Signature	
Date:				Name/Position	

Note: The above information was correct as of June 2017, but may be subject to change, please refer to the individual declaration of conformity issued with the machine for exact details.

254 M0068104-12

Operation Section

Before Operation

i07103304

Mounting and Dismounting

SMCS Code: 6700; 7000



Illustration 354

g06224270

Typical example

Mount the machine and dismount the machine only at locations that have steps and/or handholds. Before you mount the machine, clean the steps and the handholds. Inspect the steps and handholds. Make all necessary repairs.

Face the machine whenever you get on the machine and whenever you get off the machine.

Maintain a three-point contact with the steps and with the handholds.

Note: Three-point contact can be two feet and one hand. Three-point contact can also be one foot and two hands.

Do not mount a moving machine. Do not dismount a moving machine. Never jump off the machine. Do not carry tools or supplies when you try to mount the machine or when you try to dismount the machine. Use a hand line to pull equipment onto the platform. Do not use any controls as handholds when you enter the operator compartment or when you exit the operator compartment.

Machine Access System Specifications

The machine access system has been designed to meet the intent of the technical requirements in "ISO 2867 Earth-moving Machinery – Access Systems". The access system provides for operator access to the operator station and to conduct the maintenance procedures described in Maintenance section.

Alternate Exit

Machines that are equipped with cabs have alternate exits. For additional information, see Operation and Maintenance Manual, "Alternate Exit".

i08019624

Daily Inspection

SMCS Code: 1000; 6319; 6700; 7000

MARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

At operating temperature, the engine coolant is hot and under pressure.

Steam can cause personal injury.

Check the coolant level only after the engine has been stopped and the cooling system pressure cap is cool enough to touch with your bare hand.

Remove the cooling system pressure cap slowly to relieve pressure.

Cooling system conditioner contains alkali. Avoid contact with the skin and eyes to prevent personal injury.

NOTICE

Accumulated grease and oil on a machine is a fire hazard. Remove this debris with steam cleaning or high pressure water, at least every 1000 hours or each time any significant quantity of oil is spilled on a machine.

For maximum service life of the machine, perform a thorough walk-around inspection before you mount the machine and before you start the engine.

First 100 Hours

Daily, perform the procedures that are applicable to your machine:

 Operation and Maintenance Manual, "Boom and Stick Linkage - Lubricate"

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 Operation and Maintenance Manual, "Bucket Linkage - Lubricate"

Daily Basis

Daily, perform the procedures that are applicable to your machine:

- Operation and Maintenance Manual, "Cooling System Coolant Level - Check"
- Operation and Maintenance Manual, "Engine Oil Level - Check"
- Operation and Maintenance Manual, "Fuel System Water Separator Drain"
- Operation and Maintenance Manual, "Fuel Tank Water and Sediment - Drain"
- Operation and Maintenance Manual, "Hydraulic System Oil Level - Check"
- Operation and Maintenance Manual, "Indicators and Gauges Test"
- Operation and Maintenance Manual, "Seat Belt -Inspect"
- Operation and Maintenance Manual, "Track Adjustment - Inspect"
- Operation and Maintenance Manual, "Travel Alarm - Test"

Refer to Operation and Maintenance Manual, "Maintenance Interval Schedule" for all maintenance recommendations.

Note: Watch closely for leaks. If you observe a leak, find the source of the leak and correct the leak. If you suspect a leak or you observe a leak, check the fluid levels more frequently.

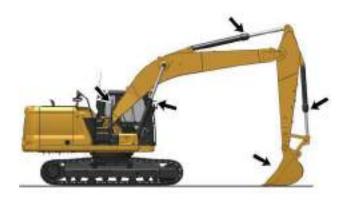


Illustration 355

g06181597

Inspect the attachment control linkage, attachment cylinders, and attachment for damage or excessive wear. Make any necessary repairs.

Inspect the lights for broken bulbs and for broken lenses. Replace any broken bulbs and any broken lenses.

Inspect the engine compartment for any trash buildup. Remove any trash buildup from the engine compartment.

Inspect the cooling system for any leaks, for faulty hoses and for any trash buildup. Correct any leaks. Remove any trash from the radiator.

Inspect all the belts for the engine attachments. Replace any belts that are worn, frayed, or broken.



Illustration 356

g06181620

Inspect the hydraulic system for leaks. Inspect the tank, cylinder rod seals, hoses, tubes, plugs, connections, and fittings. Correct any leaks in the hydraulic system.

Inspect the tubes and hoses along the boom and stick for wear and leaks. Replace any hoses or tubes that are worn or leak.

Inspect the differential and the final drives for leaks. Make any necessary repairs.

Inspect the swing drive for leaks.

Make sure that all covers and guards are securely attached. Inspect the covers and the guards for damage.

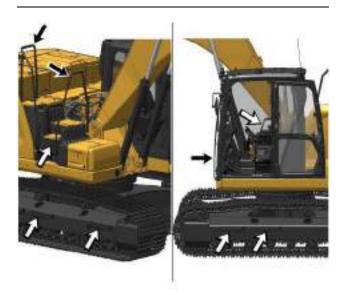


Illustration 357 g06181696

Inspect the steps, the walkways, and the handholds. Clean the steps, the walkways, and the handholds. Make any necessary repairs.

Inspect the operator compartment for trash buildup. Check for trash buildup under the floorplate and on the crankcase guard. Keep these areas clean.

Adjust the mirrors to achieve the best visibility.

Machine Operation

i06952448

Alternate Exit

SMCS Code: 7310

Rear Window with Ring Seal (If Equipped)

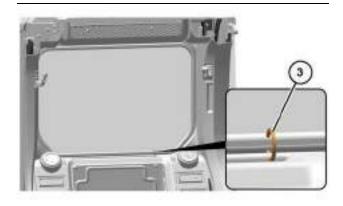


Illustration 358 g06187008



Alternate Exit – The rear window serves as an alternate exit.

To remove the rear window, pull ring (3) and completely remove the window seal, then push out the glass. Climb through the rear window opening to exit the cab.

Rear Window with Lever (If Equipped)



Illustration 359

g06213470

Inside lever in latched position



Alternate Exit – The rear window serves as an alternate exit.

To remove the rear window, rotate handle from its latched position, then push out the glass. Climb through the rear window opening to exit the cab.

i07383859



Illustration 360 g06213471

The window is also equipped with an outside handle. If the operator is unable, outside personnel can rotate the outside handle and pull the window out.

Seat

SMCS Code: 5258-025; 7312-025; 7324; 7327

Comfort Level Seat (If Equipped)



Illustration 361

g06225151

- (1) Headrest
- (2) Backrest adjuster
- (3) Seat and console fore and aft adjuster
- (4) Indicator
- (5) Seat height adjustment lever
- (6) Seat fore and aft lever

The operator can adjust the height of headrest (1). To adjust the headrest, hold the headrest with both hands. Move the headrest up and down. Release the headrest when the desired position is attained. The headrest will remain in the desired position.

Pull up on backrest adjuster (2) to release the lock. Move the backrest to the desired position and then release the adjuster.

Lift up on fore and aft adjuster (3) to release the seat from the locked position. Adjust the seat and console forward or rearward to the desired position and then release the lever to lock the seat.

Use seat height adjustment lever (5) to adjust the seat for the operator's height and weight. Move the adjuster switch to the "+" symbol to raise the height. Ratchet the seat upward without sitting in the seat. Then sit in the seat to check the color of indicator (4). When the indicator is showing green, the seat is in the right range for the operator. Further adjustment can be made as long as the indicator stays green.

To lower the seat, move the adjust switch to the "-" symbol. Ratchet the adjuster downward without sitting in the seat. Then sit in the seat to check the color of indicator (4). When the indicator is showing green, the seat is in the right range for the operator. Further adjustment can be made as long as the indicator stays green.

Pull upward on seat fore and aft lever (6) to release the cushion lock. Adjust the seat cushion forward or backward to the desired position and then release the lock to lock the cushion in place.

Deluxe Level Seat (If Equipped)



Illustration 362

g06303504

- (1) Adjustment lever for the lumbar support
- (2) Seat heater switch
- (3) Adjustment lever for reclining the seat
- (5) Indicator
- (6) Seat and console fore and aft lever
- (7) Seat height adjustment
- (8) Seat cushion angle adjuster
- (9) Console height adjustment (10) Seat fore and aft adjuster
- (11) Seat cushion fore and aft adjuster
- (12) Headrest

Operation Section Seat

The lumbar support is located in the back of the seat. Turn knob (1) (if equipped) counterclockwise to increase the force of the lumbar support. To decrease the lumbar support, continue to turn the knob counterclockwise.

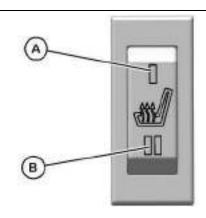


Illustration 363

g06251600

- (A) Low heat (B) High heat
- Seat heater switch (2) is a three position switch. The middle position of the switch is off. Press the top position of the switch for low heat. Press the bottom of the switch for high heat.

MARNING

Heat-induced burns can occur when some people use a seat heater. Do not use the seat heater if you have a reduced ability to sense temperature changes, a reduced ability to feel pain, or have sensitive skin.

Pull up lever (3) to change the angle of the backrest. With the backrest in the desired position. Release the lever.

Push in adjuster (11) to adjust the fore/aft position of the seat cushion.

Pull lever (6) to adjust the seat and the console forward and backward.

Operate seat height adjustment (7) to adjust the seat and the console to the desired height. Pull up the lever to raise the height of the seat. Push down on the lever to lower the seat. Indicator (5) will turn green when the seat is at the optimum height for the operator's height and weight. If the indicator is yellow, further adjustment is required.

Note: Do not operate the seat compressor for over a minute or damage can result.

Use handle (9) to adjust the height of the console. When the lever is pulled forward, a gear is released. The operator can rotate the lever freely. Release the lever to return to the original position.

To adjust the seat forward or backward, pull up lever (10) and hold the lever. Move the seat to the desired position. To lock the seat in the selected position, release the lever.

Push the adjuster (8) to adjust the tilt angle of the seat cushion.

The operator can adjust the height of headrest (12). To adjust the headrest, hold the headrest with both hands. Move the headrest up and down. Release the headrest when the desired position is attained. The headrest will remain in the desired position.

Premium Level Seat (If Equipped)

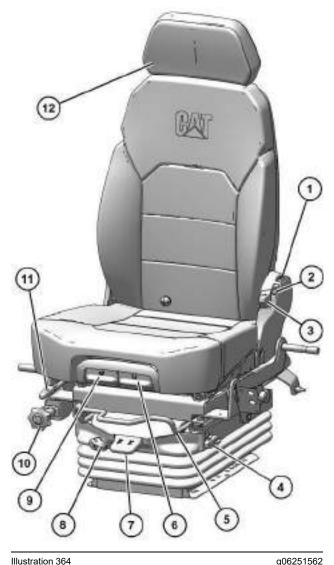


Illustration 364

- (1) Seat heater switch
- (2) Cooling switch
- (3) Adjustment lever for reclining the seat
- (4) Fore/Aft isolator activate/deactivate lever
- (5) Seat and console fore and aft lever
- (6) Seat cushion angle adjuster
- (7) Seat height adjustment
- (8) Adjustable damper
- (9) Seat cushion fore and aft adjuster
- (10) Console height adjustment
- (11) Seat fore and aft adjuster
- (12) Headrest

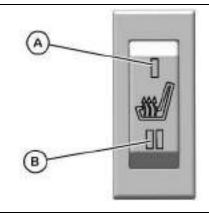


Illustration 365

g06251600

- (A) Low heat
- (B) High heat

Seat heater switch (1) is a three position switch. The middle position of the switch is off. Press the top position of the switch for low heat. Press the bottom of the switch for high heat.

WARNING

Heat-induced burns can occur when some people use a seat heater. Do not use the seat heater if you have a reduced ability to sense temperature changes, a reduced ability to feel pain, or have sensitive skin.

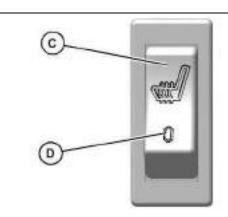


Illustration 366

g06251623

- (C) Cooling on
- (D) Cooling off

To cool the seat, press the top of cooling switch (2). Press the bottom of the switch to turn the cooling off.

Pull up lever (3) to change the angle of the backrest. With the backrest in the desired position. Release the

Push in adjuster (9) to adjust the fore/aft position of the seat cushion.

Pull lever (5) to adjust the seat and the console forward and backward.

Operation Section Seat

Fore/Aft isolator activate/deactivate lever (4) allows the operator to lock the seat and console or allow the seat and console to float with the movement of the machine. With the adjuster pointing to the front of the machine, the console is locked. Rotate the lever to the rear to unlock the console and allow it to float.

Operate seat height adjustment (7) to adjust the seat and the console to the desired height. Pull up the lever to raise the height of the seat. Push down on the lever to lower the seat.

Use adjustable damper (8) to stiffen or loosen the seat suspension.

Note: Do not operate the seat compressor for over a minute or damage can result.

Use handle (10) to adjust the height of the console. When the lever is pulled forward, a gear is released. The operator can rotate the lever freely. Release the lever to return to the original position.

To adjust the seat forward or backward, pull up lever (11) and hold the lever. Move the seat to the desired position. To lock the seat in the selected position, release the lever.

Push adjuster (6) to adjust the tilt angle of the seat cushion.

The operator can adjust the height of headrest (12). To adjust the headrest, hold the headrest with both hands. Move the headrest up and down. Release the headrest when the desired position is attained. The headrest will remain in the desired position.

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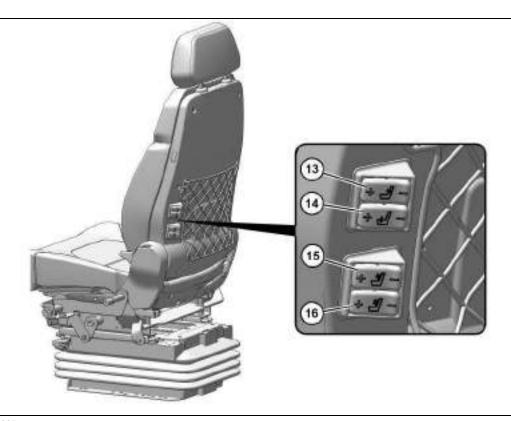


Illustration 367 g06251575

- (13) Seat back side bolster control
- (14) Seat cushion side bolster control
- (15) Upper lumbar control
- (16) Lower lumbar control

The lumbar controls on the back of the seat back all use two position switches. Press the + symbol to increase lumbar support. Press the - symbol to decrease lumbar support.

i07092308

Seat Belt

SMCS Code: 7327

Note: This machine was equipped with a seat belt when the machine was shipped from Caterpillar. At the time of installation, the seat belt and the instructions for installation of the seat belt meet the SAE J386 and ISO 6683 standards. Consult your Cat dealer for all replacement parts.

Always check the condition of the seat belt and the condition of the mounting hardware before you operate the machine.

Seat Belt Adjustment for Retractable Seat Belts

Fastening The Seat Belt



Illustration 368 g06223891

Pull seat belt (2) out of retractor (1) in a continuous motion

Fasten seat belt catch (3) into buckle (4). Make sure that the seat belt is placed low across the lap of the operator.

The retractor will adjust the belt length and the retractor will lock in place. The comfort ride sleeve will allow the operator to have limited movement.

Releasing The Seat Belt



Illustration 369 g06223894

Push the release button on the buckle to release the seat belt. The seat belt will automatically retract into the retractor.

Extension of the Seat Belt

A WARNING

When using retractable seat belts, do not use seat belt extensions, or personal injury or death can result.

The retractor system may or may not lock up depending on the length of the extension and the size of the person. If the retractor does not lock up, the seat belt will not retain the person.

Longer, non-retractable seat belts and extensions for the non-retractable seat belts are available.

Caterpillar requires only non-retractable seat belts to be used with a seat belt extension.

Consult your Cat dealer for longer seat belts and for information on extending the seat belts.

i07098988

Selective Catalytic Reduction Warning System

SMCS Code: 1091-WXX; 7400

The selective catalytic reduction (SCR) system is a system used to reduce NOx emissions from the engine. Diesel exhaust fluid (DEF) is pumped from the DEF tank and is sprayed into the exhaust stream. The DEF reacts with the SCR catalyst to reduce NOx and leaves a nitrogen and water vapor. The Exhaust Gas Recirculation (EGR) system cools, measures, and introduces recalculated exhaust gas into the intake manifold to aid in NOx reduction.

NOTICE

Stopping the engine immediately after the engine has been working under load can result in overheating of SCR components.

Refer to the Operation and Maintenance Manual, "Engine Stopping" procedure to allow the engine to cool and to prevent excessive temperatures in the turbocharger housing and the DEF injector.

Note: With the operator key in the OFF position, the purge system will activate.

Definitions

Observe the following definitions.

Self-correct – Fault condition no longer exists. An active fault code will no longer be active.

Notification – Action taken by the system to alert the operator of pending Inducement.

Inducement – Engine derates, vehicle speed limits, or other actions intended to prompt the operator to repair or maintain the emission control system.

Inducement Trigger – Fault conditions that result in activation of the inducement strategy. DEF level inducement faults have a diagnostic fault code. DEF quality fault, SCR tampering fault, SCR system fault, and EGR system faults will all have a related diagnostic fault code along with an inducement diagnostic fault code.

First occurrence – A DEF quality fault, SCR tampering fault, SCR system fault, or an EGR system fault becomes active for the first time.

Repeat occurrence – If any DEF quality fault, SCR tampering fault, SCR system fault, or an EGR system fault becomes active again within 40 hours of the first occurrence.

Safe Harbor Mode – Safe harbor mode is a 20 minute engine run time period. The engine can be operated with full power after reaching a level 3 inducement. Once in level 3 inducement, the operator can perform a key cycle and the engine will enter safe harbor mode. Safe harbor mode can only be implemented once. Safe harbor mode is not allowed for DEF level inducements.



Illustration 370

g06223861

DEF Level Normal

Inducement Strategy for DEF Level

If multiple warnings are present in the system, the most important problem is shown first. Press the right key or press the left key to view all the warnings that are present in the machine. If no keys are pressed within 5 seconds, the display will return to the most important problem.



Illustration 371

g06223864

DEF Level Low

If the DEF level falls below 19%, "DEF Level Low" message will be displayed on the monitor. To avoid further inducements, turn the key to the OFF position and add DEF to the DEF tank.

266

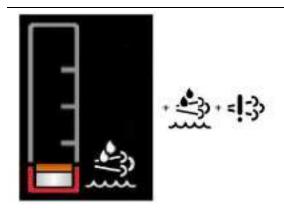


Illustration 372

DEF Level Low and Emission Fault

If the DEF level falls below 12.5%, a level 1 inducement event will occur. a "DEF Level Low" message and an "Emission Fault" message will appear on the monitor.

g06223865

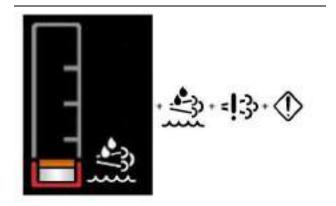


Illustration 373 g06223866

DEF Level Low, Emission Fault, and Flashing Action Lamp

If the DEF level is below 6%, a level 2 inducement event will occur. a "DEF Level Low" message and an "Emission Fault" message will appear on the monitor. The action lamp on the monitor will flash. If the ECM is configured to "Reduced Performance" and the DEF level has reached 0%, the machine will be limited to 75% torque.

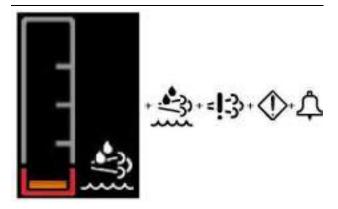


Illustration 374 g06223883

DEF Level Low, Emission Fault, Flashing Action Lamp, and Audible Alarm

If the ECM is configured to "Reduced Performance" and the DEF tank has been emptied of all DEF, the engine will be in a level 3 final inducement. If the ECM is configured to "Reduced Time" and the DEF level is 0%, the engine will be in a level 3 final inducement. Prior to final inducement a "DEF Level Low" message, and an "Emission Fault" message will appear on the monitor. The action lamp on the monitor will flash and an audible alarm will sound 20 seconds prior to the final inducement. The engine will be taken to low idle or will be shut down. Once shut down, the engine can be restarted for 5 minute periods at reduced speed and torque. If set to idle, the engine will idle indefinitely at reduced torque. The amber indicator next to the DEF level gauge on the dash will remain lit.

Note: Turn the key to the OFF position and add DEF to the DEF tank to reset the DEF level inducement.

Inducement Strategy for DEF Quality, Tampering, SCR System Fault, and Impeded EGR

If multiple warnings are present in the system, the most important problem is shown first. Press the right key or press the left key to view all the warnings that are present in the machine. If no keys are pressed within 5 seconds, the display will return to the most important problem.



Illustration 375 g03623190

A "Engine Fault Check Engine" message and an "Emission Fault" message will appear on the monitor for a fault resulting from poor DEF quality, SCR system tampering, SCR system fault, or an EGR system fault. If the fault is the result of poor DEF quality, SCR system tampering, or SCR system fault, a first occurrence will result in a level 1 inducement for a duration of 2.5 hours. The level 1 inducement will also illuminate the check engine lamp. Repeat occurrences will result in a level 1 inducement duration of 5 minutes. If the fault is the result of an EGR system fault, a first occurrence will result in a level 1 inducement for a duration of 35 hours. Repeat occurrences will result in a level 1 inducement duration of 48 minutes.

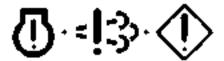


Illustration 376 g0362319

If a fault condition exists for the entire duration of inducement level 1, the strategy advances to inducement level 2. A "Engine Fault Check Engine" message, and an "Emission Fault" message will appear on the monitor and the action lamp on the monitor will flash for a fault resulting from poor DEF quality, SCR system tampering, SCR system fault, or an EGR system fault. For poor DEF quality, SCR system tampering, and SCR system faults, the duration for a level 2 inducement is 70 minutes for the first occurrence. For EGR system faults, the duration for a level 2 inducement is 60 minutes for the first occurrence. Repeat occurrences for poor DEF quality, SCR system tampering, and SCR system faults will result in a level 2 inducement of 5 minutes. Repeat occurrences for EGR system faults will result in a level 2 inducement of 60 minutes.

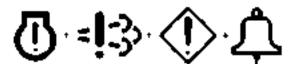


Illustration 377 g03623193

If a fault condition exists for the entire duration of inducement level 2, the strategy advances to inducement level 3. A "Engine Fault Check Engine" message, and an "Emission Fault" message will appear on the monitor, the action lamp will flash, and an audible alarm will sound 20 seconds prior to the level 3 inducement. The engine will be taken to low idle or will be shut down. After the level 3 inducement you may cycle the key, which will allow 20 minutes of engine run time with full torque. After 20 minutes, the engine will be in level 3 final inducement and will allow idle only or be shut down until the issue has been resolved. Once shut down, the engine can be restarted for 5 minute periods at reduced speed and torque. If set to idle, the engine will idle indefinitely at reduced torque.

Note: Contact your Cat dealer for repairs if a fault occurs.

i08036134

Operator Controls

SMCS Code: 7300; 7301; 7451

Note: Your machine may not be equipped with all the controls that are described in this topic.

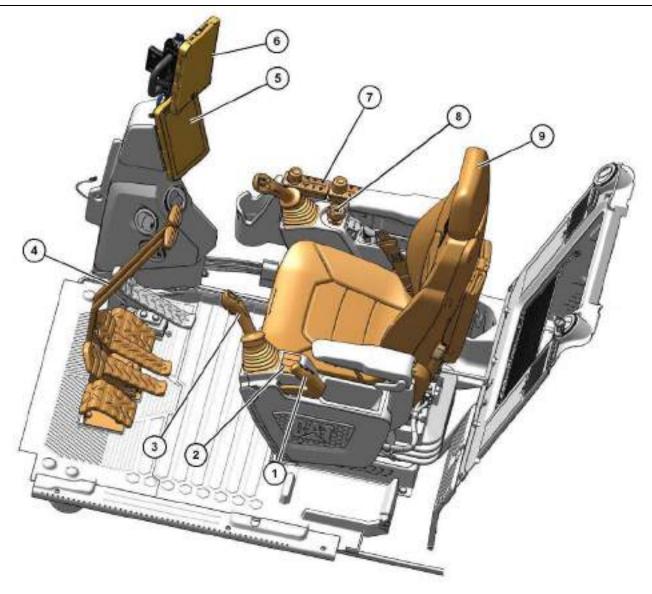


Illustration 378 g06178344

- (1) Hydraulic lockout control
- (2) Left side switch panel
- (3) Joystick controls

- (4) Travel controls
- (5) Monitor
- (6) Cat Grade Control Monitor (If Equipped)
- (7) Right side switch panel
- (8) Engine start switch
- (9) Operator seat

Hydraulic Lockout Control (1)

The lever for the hydraulic lockout control is at the left side of the left console.



Locked - Move the travel levers/pedals and move the joysticks to the HOLD (center) position. Move the lever for the

hydraulic lockout control backward to the LOCKED position. All the factory installed hydraulic controls will become inoperable.

Note: Make sure that the lever for the hydraulic lockout control is in the LOCKED position before attempting to start the engine. If the lever is in the UNLOCKED position, the engine start switch will not function.



Unlocked - Move the lever for the hydraulic lockout control forward to the **UNLOCKED** position. All the factory installed hydraulic controls will become operable.



Tilt - For machines equipped with the tilt-up console, pull the lever to the rearmost position to release the console lock and tilt the console upward for easier exit and entry.

Left Side Switch Panel (2)



Illustration 379 q06219690

Beacon Light Switch (2A) (If equipped)

Beacon Light Switch - Push the top of the switch to turn on the beacon light. Push the bottom of the switch to turn off the beacon light.

Quick Coupler Control (2B) (If equipped)



If equipped, the switch for the quick coupler control is on the left console. The switch is equipped with a spring loaded lock button. To operate the switch, the lock button must be pushed forward to release the switch. With the lock held forward, press the rear of the switch downward to uncouple the bucket or work tool. Press the button again to attach the bucket or work tool.

Note: An alarm will sound whenever the switch has been activated to lock or unlock a work tool.

For further details, see Operation and Maintenance Manual, "Quick Coupler Operation".

Joystick Controls (3)

The joystick control is used to control the functions of the machine implements. For more information on the individual functions of the joysticks, refer to Operation and Maintenance Manual, "Joystick Controls".

Travel Control (4)



Illustration 380

q06178249

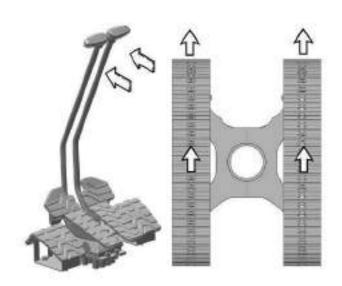
Position for normal travel

- (A) Rear of machine
- (B) Final drive
- (C) Idler

When you travel, make sure that final drive sprockets (B) are under the rear of the machine.

Stop – Release the travel levers/pedals to stop the machine. When you release the travel levers/pedals from any position, the travel levers/pedals will return to the CENTER position. The travel brakes will be applied.

Move both of the travel levers or both of the travel pedals equally in the same direction to travel straight.





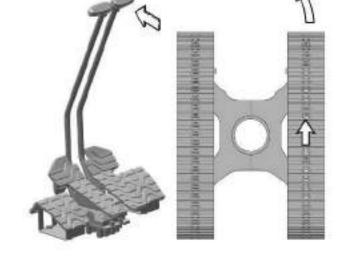


Illustration 383
Pivot left turn (FORWARD)

g06178269

g06178288

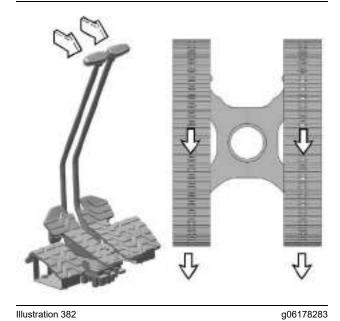


Illustration 382
REVERSE travel

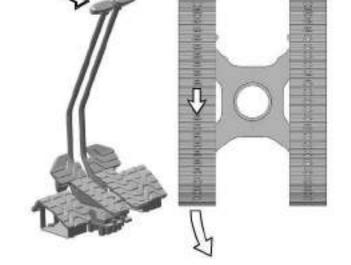


Illustration 384
Pivot Left Turn (REVERSE)

g06178294

M0068104-12 271
Operation Section
Operator Controls

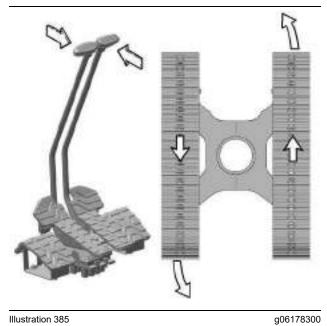


Illustration 385
Counterrotate turn (LEFT)

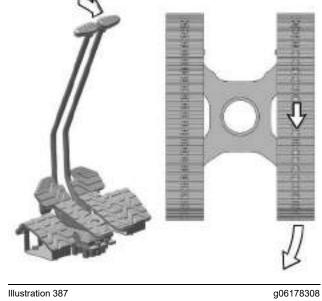


Illustration 387
Pivot right turn (REVERSE)

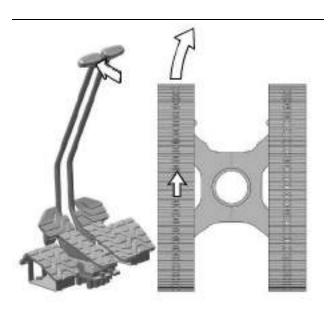


Illustration 386
Pivot right turn (FORWARD)

g06178305

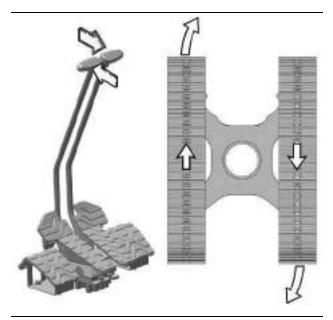


Illustration 388 Counterrotate turn (RIGHT)

g06178313

Monitor (5)

The monitor is used to display various operating information of the machine. For more information on the operation of the monitor, refer to Operation and Maintenance Manual, "Monitoring System".

Cat Grade Control Monitor (6) (if equipped)

Monitor (6) is used to display Cat Grade Control operating information. Cat Grade Control is designed to calculate bucket tip position and provide visual and audible feedback to the operator. This feedback allows the operator to achieve the desired grade safer, quicker and more accurately than traditional grading techniques. For more information on the operation of the monitor, refer to Operation and Maintenance Manual, M0082987, "Cat 2D and 3D GRADE System for Next Gen Hydraulic Excavators".

Engine Start Switch (8)

NOTICE

The engine start switch must be in the ON position and the engine must be running in order to maintain electrical functions and hydraulic functions. This procedure must be followed in order to prevent serious machine damage.

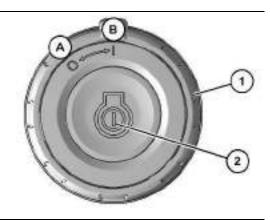


Illustration 389

g06180554

- (A) Off
- (B) On
- (1) Engine start ring
- (2) Start button



OFF - Turn the engine start ring (1) to the OFF position (A) to stop the engine.



ON - To activate the electrical circuits in the cab and enable engine starting, turn the engine start ring (1) clockwise to the ON position (B).



START - To start the engine, enter the code on the monitor. Press start button (2). After the engine starts, release the

Note: Pressing the start button with the engine on will also turn off the engine.

Engine Idle Shutdown

If the operator has not operated the machine for a period of time, this function shuts down the engine. Engine Idle Shutdown does not shut down other systems, such as the AC, which can run down the battery after idle shutdown. This function comes disabled from the factory but can be enabled and adjusted in the monitoring system. Refer to Operation and Maintenance Manual, "Monitoring System"

Note: Engine Idle Shutdown may be required for local regulations.

The Engine Idle Shutdown (EIS) shuts down the engine if the following conditions are met:

- The control levers are in neutral.
- The engine coolant temperature is greater than 70° C (158° F).
- The battery voltage is greater than 24.5V
- The engine speed is less than 2000 rpm.

- The ambient temperature range is between 0° C (32° F) and 30° C (86° F).
- The Back Pressure Valve (BPV) is not working.

Note: If any service tests or calibrations are running, the machine will not enter into engine idle shutdown.



Engine Idle Shut down – The action lamp will illuminate and the monitor will display a message 20 seconds before

the engine shuts down. An operator can cancel the shutdown by pressing a button on the monitor or move one of the controls.

Operator's Seat (9)

There are different options for operators seats. Each operator seat and console have various adjustments to meet a wide range of operators. For more information, refer to Operation and Maintenance Manual, "Seat".

Tilt-Up Console (9A)

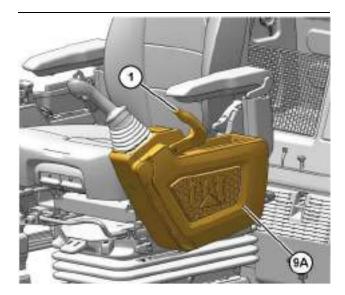


Illustration 390

g06226523

- (1) Hydraulic lockout control
- (2) Tilt-up console

Some optional seats are equipped with a tilt-up console. The console can be tilted upward for easier exit and entry. The console is unlocked by pulling the hydraulic lockout control (1) to the rearmost position. The console will then tilt upward. Simply push the console downward until the console locks into place when ready for use.

Right Side Switch Panel (7)

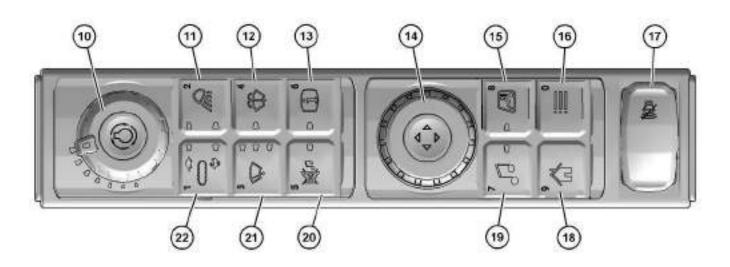


Illustration 391 g06178333

Right side switch panel

- (10) Engine speed / power mode control
- (11) Light switch
- (12) Window washer
- (13) Operator Information
- (14) Jog dial

- (15) Heating and air conditioning
- (16) Next menu
- (17) Travel alarm mute (If Equipped)
- (18) Home
- (19) Radio control

- (20) Radio mute switch
- (21) Window wiper
- (22) Travel speed control

Note: In addition to the intended functions, the buttons on the switch panel are numbered from 0-9. The numbered buttons can be used to enter numbers into the monitor for screens such as the passcode screen

Engine Speed / Power Mode Control (10)

Engine Speed Control – Turn the dial to control the engine speed (engine rpm). Select the desired position from the seven available positions. Turn the dial counterclockwise to decrease the engine speed (engine rpm). Turn the dial clockwise to increase the engine speed (engine rpm).



Power Mode Control – Push in the dial to change the power mode settings. The Power Mode Control allows the operator

to choose what power mode to operate the engine. The modes that can be selected are: "ECONOMY", "SMART", and "POWER".

Note: The default power mode setting can be set within the monitor. For more information, refer to Operation and Maintenance Manual, "Monitoring System".

Note: "ECONOMY" mode is **not** available on GC models.

M0068104-12 275

Light Switch (11)

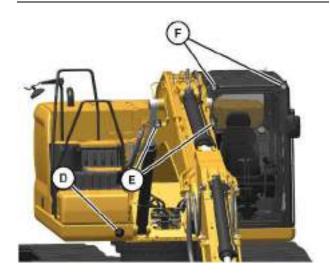


Illustration 392 g06178337



Light Switch – Push the switch to turn on the work lights.

Whenever you push the switch, you change the pattern of the work lights that are turned on. The indicator lights in the cab indicate the pattern of the work lights.

Pattern 1 – When you press the light switch once, the first indicator light turns on. When the first indicator light is on, the following work lights are turned on: work light (D), which is mounted on the chassis, and work lights (F), which are mounted on the cab.

Pattern 2 – When you press the light switch twice, the first indicator light and the second indicator light turn on. When the first indicator light and the second indicator lights are on, the following work lights are turned on: work light (D), which is mounted on the chassis, work lights (F), which are mounted on the cab, and work lights (E), which are mounted on the boom.

OFF – When both of the indicator lights are off, all the work lights are off.

Note: Your machine may be equipped with a premium surrounding lighting package with left side, right side and rear lights. Refer to M0109053, "Next Generation Hydraulic Excavator Monitoring System Supplement", Function List Screen, Work Light Control for more information.

Note: Your machine may be equipped with a lighting system that has a time delay. When this system is installed, the exterior lights will not turn off for a predetermined amount of time after the engine start switch has been turned to the OFF position. Refer to M0109053, "Next Generation Hydraulic Excavator Monitoring System Supplement", Application Menu, Lighting Shutdown Timer for more information.

Window Washer (12)



Window Washer (12) – Push the switch to activate the window washer. While the switch is depressed, the indicator light

will come on and washer fluid will spray from the nozzle. The window wiper will also operate while the switch is depressed. After the switch is released for approximately 3 seconds, the window wiper will stop.

NOTICE

If the wiper does not operate with the switch in the ON position, turn the switch off immediately. Check the cause. If the switch remains on, motor failure can result.

NOTICE

If the washer is used continuously for more than 20 seconds or used when no washer solution comes out, motor failure can result.

Operator Information (13)



Operator Information Button (13) – Press and hold this button to view the operator information screen. The light will illuminate when the button is

indicator light will illuminate when the button is pressed.

Jog Dial (14)

The jog dial can be used to select items displayed on the monitor screen. The dial can be rotated 360 degrees. The dial can also be moved left, right, up, and down. The dial can be pushed in to make a selection.

Air Conditioning and Heating (15)



Air Conditioning and Heating (15) – Press this button to bring up the air conditioning and heating menu. The

indicator light will illuminate when the heating and cooling system is active. The jog dial (13) can be used to make selections. If equipped with a touch screen, the selections can be made by touching the monitor.

Refer to Air Conditioning and Heating Control for more information.

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Operation Section Operator Controls

Next Menu (16)



Next Menu (16) - Press the next menu button to access the next higher menu. If there is not a menu above the current screen being viewed, the button will not do anything.

Refer to Monitoring System for more information.

Travel Alarm Mute Switch (17) (If Equipped)



Travel Alarm Mute Switch (17) - Press travel alarm mute switch (17) to mute the travel alarm.

Note: The travel alarm will sound when the travel levers or the travel pedals are activated.

Home (18)



Home Key (18) - Press the home key to return to the default display at any time.

Refer to Monitoring System for more information.

Radio Control (19)



Radio Control (19) - Press this button to display the radio controls on the monitor. The indicator light on the button will illuminate when the radio is turned on. Use jog dial (14) to make selections. If equipped with a touch screen display, touch the icons on the screens to make a selection.

Refer to Radio for more information.

Radio Mute (20)



radio.

Radio Mute (20) - Press radio mute switch (20) to mute the radio. The indicator light will illuminate when mute is activated. Press the button again to unmute the

Window Wiper (21)



Window Wiper (21) – Push the switch to activate the window wiper. Whenever the switch is depressed, the mode of the window wiper will change according to the indicator light that is illuminated.

6 Second Delay – When the window wiper switch is depressed one time, the first indicator light will turn on. The window wiper will operate intermittently at six second intervals.

3 Second Delay – When the window wiper switch is depressed two times, the second indicator light will turn on. The window wiper will operate intermittently at three second intervals.

Continuous Operation – When the window wiper switch is depressed three times, the first indicator light and the second indicator light will turn on. The window wiper will operate continuously.

OFF – When the window wiper switch is depressed four times, the indicator lights will turn off. The window wiper stops.

Travel Speed Control (22)

⋒ WARNING

Do not change the setting of the travel speed control switch while you travel. Machine stability may be adversely affected.

Personal injury can result from sudden changes in machine stability.



Travel Speed Control Switch (22) -Press the travel speed control switch to select automatic travel speed or low

travel speed. When the engine start switch is on, the travel speed control switch is always set at the LOW SPEED position. Whenever the travel speed control switch is pressed, the travel speed changes. The indicator lights illuminate to show which speed selection is active.



LOW SPEED - Select the LOW SPEED position if you travel on rough surfaces or on soft surfaces or if you require a

great drawbar pull. Also, select the LOW SPEED position if you are loading a machine onto a trailer or you are unloading a machine from a trailer.



AUTOMATIC - If you travel on a hard, level surface at a fast speed, select the **AUTO** position.

Continuous driving at high speed should be limited to 2 hours. If you need to continue driving at high speed for more than 2 hours, stop the machine for 10 minutes. This process will cool down the travel drives before you resume driving.

USB/Aux Ports (23)

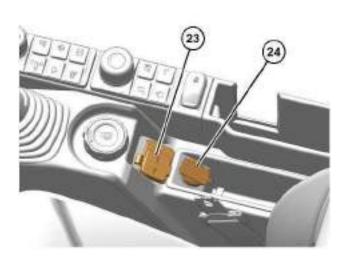
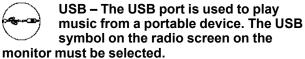


Illustration 393
(23) USB/AUX/MIC port

(24) 12 V socket



g06204950

AUX – The AUX port is used to play music from a portable device. AUX must be selected on the radio screen on the monitor.

12V Power Receptacle (24) & (25)

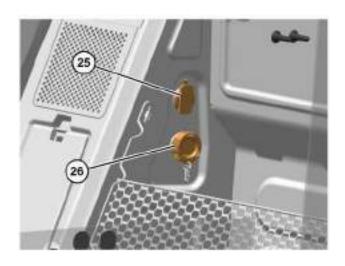


Illustration 394 g06178354

Electronic Technician service port

12V Power Receptacle – The power receptacles can be used to power automotive electrical equipment or accessories. The power receptacle only operates when the engine start switch is in the ON position.

Service Port (26)

An Electronic Technician (ET) service port is located inside the cab behind the seat. This service port allows service personnel to connect a laptop computer that is equipped with Electronic Technician. Service personnel can use electronic technician to diagnose machine and engine systems.

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Contact your Cat dealer for additional information.

Dome Light (27)

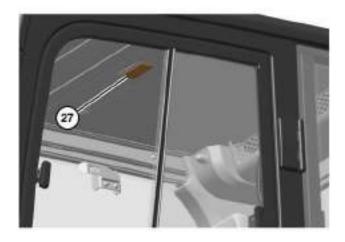


Illustration 395 g0620864

The dome light has three different positions. When the dome light is in the center position (horizontal), the light will come on when the door is open and shut off when the door is closed.

When the left side of the light is pressed, the lamp will be inoperable.

When the right side of the light is pressed, the lamp will be illuminated until the lamp is switched to another position.

i07945377

Battery Disconnect Switch

SMCS Code: 1411-B11



Illustration 396 g06179792

The battery disconnect switch is on the left side of the machine behind the rear access door.

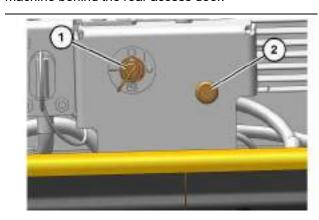


Illustration 397

g06179801

- (1) Battery disconnect switch
- (2) DEF purge light

M0068104-12 279

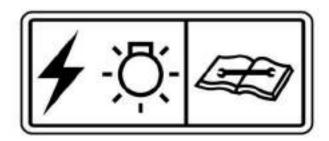


Illustration 398

g03796564

For machines equipped with a circuit that stays activated for DEF purge with the disconnect switch off.

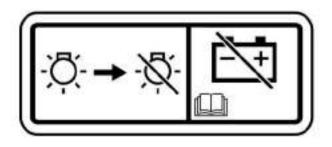


Illustration 399

g03408962

For machines not equipped with a circuit that stays activated for DEF purge with the disconnect switch off.

NOTICE

Do not conduct any service procedures on the DEF system until the DEF purge indicator lamp is not illuminated. The indicator lamp may remain illuminated for several minutes, even though the battery disconnect switch is OFF and the engine start switch is OFF. When the indicator lamp is on, the DEF system is still powered.

(* †

Battery Disconnect Switch – The battery disconnect switch can be used to disconnect the battery from the

machines electrical system. The key must be inserted into the battery disconnect switch before the battery disconnect switch can be turned.

ON – To activate the electrical system, insert the disconnect switch key and turn the battery disconnect switch clockwise. The battery disconnect switch must be turned to the ON to enable battery power to start the engine.

OFF – To deactivate the electrical system, turn the battery disconnect switch counterclockwise to the OFF

position.

The battery disconnect switch and the engine start switch perform different functions. The entire electrical system is disabled when you turn the battery disconnect switch to the OFF position. The battery remains connected to the electrical system when you turn the engine start switch to the OFF position.

Turn the battery disconnect switch to the OFF position and remove the key when you service the electrical system or any other machine components. If installed with a cover lock, close the cover and install a padlock.

Turn the battery disconnect switch to the OFF position and remove the key if you do not operate the machine for extended periods of a month or more. Turning off the disconnect switch will prevent the battery from being discharged.

A good practice is to use the disconnect switch after you operate the machine. Turning off the disconnect switch will prevent the battery from being discharged. The following problems can cause battery discharge:

- short circuits
- · current draw via some components
- vandalism

Machines equipped with circuit for DEF purge: A special circuit stays energized with the disconnect switch in the OFF position. The Diesel Exhaust Fluid (DEF) purge circuit is supplied power from this circuit with the disconnect switch off. The special circuit ensures that the system will purge and no damage will be done to engine components.



Illustration 400 g06217247

Note: Do not turn off the battery disconnect switch until 5 seconds have elapsed after turning the engine start switch to the OFF position. Do not turn off the battery disconnect switch while the "Lock Security?" screen is displayed on the monitor. Both conditions would prevent the Diesel Exhaust Fluid (DEF) system from being purged and could cause DEF fluid to freeze in the lines.

NOTICE

Do not conduct any service procedures on the DEF system until the DEF purge indicator lamp is not illuminated. The indicator lamp may remain illuminated for several minutes, even though the battery disconnect switch is OFF and the engine start switch is OFF. When the indicator lamp is on, the DEF system is still powered.

Machines not equipped with circuit for DEF purge: If DEF purge light (2) is illuminated, wait for the light to turn off before turning the disconnect switch to the OFF position. Waiting for the light to turn off allows the DEF system to fully purge the exhaust fluid and prevents damage to engine components.

i08001446

Product Link

SMCS Code: 7490; 7606

Note: Your machine may be equipped with the Cat [®] Product Link[™] system.

The Cat Product Link communication device utilizes cellular and/or satellite technology to communicate equipment information. This information is communicated to Caterpillar, Cat dealers, and Caterpillar customers. The Cat Product Link communication device uses Global Positioning System (GPS) satellite receivers.

The capability of two-way communication between the equipment and a remote user is available with the Cat Product Link communication device. The remote user can be a dealer or a customer.

Data Broadcasts

Data concerning this machine, the condition of the machine, and the operation of the machine is being transmitted by Cat Product Link to Caterpillar and/or Cat dealers. The data is used to serve the customer better and to improve upon Cat products and services. The information transmitted may include: machine serial number, machine location, and operational data, including but not limited to: fault codes, emissions data, fuel usage, service meter hours, software, and hardware version numbers and installed attachments.

Caterpillar and/or Cat dealers may use this information for various purposes. Refer to the following list for possible uses:

- Providing services to the customer and/or the machine
- Checking or maintaining Cat Product Link equipment
- Monitoring the health of the machine or performance
- Helping maintain the machine and/or improve the efficiency of the machine
- Evaluating or improving Cat products and services
- Complying with legal requirements and valid court orders
- Performing market research
- Offering the customer new products and services

Caterpillar may share some or all the collected information with Caterpillar affiliated companies, dealers, and authorized representatives. Caterpillar will not sell or rent collected information to any other third party and will exercise reasonable efforts to keep the information secure. Caterpillar recognizes and respects customer privacy. For more information, please contact your local Cat dealer.

Operation in a Blast Site for Product Link Radios

⚠ WARNING

This equipment is equipped with a Cat® Product Link communication device. When electric detonators are being used for blasting operations, radio frequency devices can cause interference with electric detonators for blasting operations which can result in serious injury or death. The Product Link communication device should be deactivated within the distance mandated under all applicable national or local regulatory requirements. In the absence of any regulatory requirements Caterpillar recommends the end user perform their own risk assessment to determine safe operating distance.

Refer to your products Operation and Maintenance Manual Supplement, "Regulatory Compliance Information" for more information.

For information regarding the methods to disable the Cat Product Link communication device, please refer to your specific Cat Product Link manual listed below:

- Operation and Maintenance Manual, SEBU8142, " Product Link - PL121, PL321, PL522, and PL523"
- Operation and Maintenance Manual, SEBU8832, " Product Link PLE702, PLE602, PLE601, PL641, PL631, PL542, PL240, PL241, PL243, PL141, PL131, PL161, PL083 and PL042 Systems"

Note: If no radio disable switch is installed and the equipment will be operating near a blast zone, a Product Link radio disable switch may be installed on the equipment. The switch will allow the Cat Product Link communication device to be shut off by the operator from the equipment control panel. For more details and installation procedures, refer to the following:

- Special Instruction, REHS7339, "Installation Procedure for Product Link PLE640 Systems"
- Special Instruction, REHS8850, "Installation Procedure for the Elite Product Link PLE601, PLE641, and PLE631 Systems"
- Special Instruction, SEHS0377, "Installation Procedure for the Product Link PL131, PL141, and PL161 Systems"

- Special Instruction, REHS9111, "Installation Procedure for the Pro Product Link PL641 and PL631 Systems"
- Special Instruction, M0098124, "Installation Procedure for Pro Product Link PL243 Systems"
- Special Instruction, M0109130, "Installation Procedure for Product Link PL683 and PL783 Systems"

i07785958

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Machine Security System

SMCS Code: 7631

General Information

NOTICE

This machine may be equipped with a Cat [®] Machine Security System (MSS) and may not start under certain conditions.



Illustration 401

g06223917

Machines that are equipped with Cat MSS can be identified by a decal in the operator station Read the following information and know your machines settings. Your Cat dealer can identify your machine settings.

The Cat Machine Security System (MSS) discourages unwanted operation of a machine. When armed, the MSS requires operator login to start the engine. The following methods of operator login to disarm the security system are available:

- Cat Bluetooth® key fob
- Cat App: Fleet Management
- Passcode

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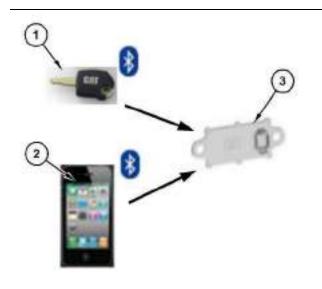


Illustration 402

g06212167

Bluetooth Connections

- (1) Cat Bluetooth key fob (CATBTFOB)
- (2) Cat App: Fleet Management mobile application
- (3) Cat Bluetooth transceiver (CATBTNT)

The Cat Bluetooth key fob (1) contains an electronic chip. The electronic chip has a unique identification number (ID). A Bluetooth transceiver is mounted in the cab to read the ID of the key. The Bluetooth transceiver module translates the information received from the key fob into a J1939 message. This message is sent to the Electronic Control Module (ECM) that is connected to the MSS. The ECM is typically the Machine ECM. The ECM is set up with the ID of the keys of the intended users.

When the MSS is armed, the ECM validates the ID of the key fob. If the key ID is on the list of authorized keys in the ECM and the key is valid, the machine will operate normally. If the key ID is not on the list of authorized keys in the ECM or is not valid, the MSS will keep the critical machine functions disabled.

Note: A Bluetooth enabled phone can disarm MSS if the phone is on the list. Operator Management System (OMS) is necessary to be able to add phones to the vehicle ID list. After the phone is added, OMS is no longer needed for the Cat App: Fleet management mobile application to function as a valid key.

If the MSS is not installed, the operator can skip the login and the machine will operate normally.

Components

The Machine Security System (MSS) consists of the following components:

Electronic Control Module (ECM)

- Cat Bluetooth key fob (CATBTFOB)
- Machine display
- Bluetooth transceiver module (CATBTNT)
- Engine start switch

System Overview

The Machine Security System (MSS) is designed to restrict operation of a machine. A list of the authorized electronic keys and passcodes for a machine is contained in the ECM for the MSS. A valid Bluetooth key fob, mobile application, or passcode can disarm the MSS. If the MSS is disabled or not installed, any operator may access critical machine functions.

The Cat [®] Electronic Technician (Cat ET) Service Tool can be used to program the ECM with the authorized keys and passcodes. Bluetooth devices and passcodes can be registered using the in-cab display if the operator is logged in to the system using a master access account.

When the engine start switch is turned to the ON position, the display boots up. If Bluetooth detection is enabled, the transceiver will receive a signal from any Bluetooth key that is present or from the mobile application. The ECM will then compare this ID to the list of authorized keys.

Note: If multiple devices are present, the first valid device detected by the transceiver will be read.

If the ID of the key matches an authorized key, the status indicator on the engine start switch will turn a green color and the MSS will disarm. This disarming will allow the operator access to critical functions of the machine.

If the ID of the key that is read does not match the list in the ECM, the status indicator will remain a red color. The MSS remains in the "armed" state and the machine will remain disabled.

If the MSS is disabled and the ID of the key matches an authorized key, the operator will be identified and allowed access to the critical machine functions. The operator will be able to save configurations and start the machine.

If the MSS is disabled and the ID of the key that is read does not match an authorized key, the operator must log in as a guest. The operator will not be able to save custom configurations but will have access to starting the engine.

Activating Bluetooth Functionality

For shipping purposes, Bluetooth functionality is deactivated. Ensure that Bluetooth functionality is active on your machine using the following procedure:

Operation Section Machine Security System

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 Ensure that the function is active from the radio screen:

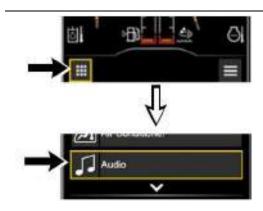


Illustration 403 g06319669

 a. From the home screen, press the navigation button in the lower left corner, then select "Audio".

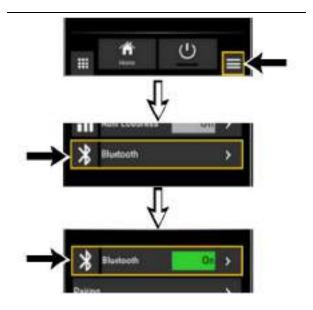


Illustration 404 g06319667

b. Press the radio function list menu button in the lower right corner, then select "Bluetooth" . Ensure that "Bluetooth" is set to "ON" .

Pairing Your Device to the Machine

Use to following procedure to pair your device to the machine:

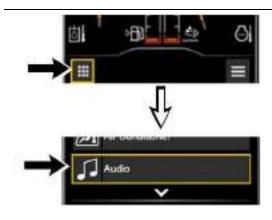


Illustration 405 g06319669

1. From the home screen, press the navigation button in the lower left corner, then select "Audio" .

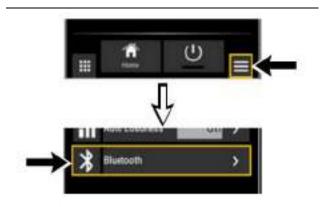


Illustration 406 g06319672

2. Press the radio function list menu button in the lower right corner, then select "Bluetooth".

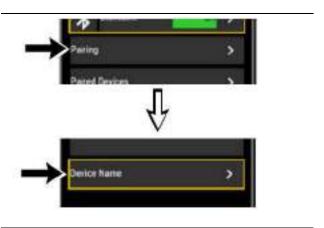


Illustration 407 g06319676

3. Select "Pairing", then "Device Name".



Illustration 408 q06319681

Machine name on monitoring system and operator device

4. Find your device on the list and pair the devices. Ensure that the devices are paired on your phone as well.

Note: The device name on your phone should be "## CAT RADIO", with the number being from "00" to "99".

Reading the ID of a Key

The Machine Security System (MSS) must identify a valid passcode, Bluetooth key fob ID, or Cat App: Fleet management mobile application ID.

When the engine start switch ring is turned to the ON position, the MSS will check the ID of any key fob or mobile application. If the ID matches a key ID stored in the machine ECM, the critical ECM functions are enabled. An enable message is also sent via the Cat [®] data link or J1939 data link to the other ECMs on the machine. The machine will operate normally.

Note: If the machine ECM has failed or has been removed, the critical machine operations controlled by the other electronic control modules will not operate.

Armed

When the MSS is armed, critical machine functions are disabled. The MSS disables the power that is supplied to each component that is powered by the output drivers. The machine will not be able to operate normally.

There are two states of operation within the "armed" mode:

Engine Start Switch Ring Position OFF – When no power is applied to the MSS, the MSS will default to "armed" state. When power is applied to the MSS and the grace period has expired, the MSS will return to the "MSS Armed".

Engine Start Ring Switch Position ON – When the engine start switch ring is first moved to the ON position, the display boots up and the system attempts to detect a Bluetooth key ID or mobile application ID. The ECM will continue reading until a valid key ID is read or a passcode is entered. If a valid key ID or passcode is not read, the MSS status indicator will remain red and the MSS remains armed.

Disarmed

When the MSS is disarmed, normal machine operation is allowed. A message is sent to the other machine ECMs over the Cat data link. or J1939 data link. The machine will be able to start. The green LED on the status indicator will illuminate.

There are multiple ways to disarm the machine:

- Use a valid passcode
- Use a valid Bluetooth key fob
- Use the Cat App: Fleet management mobile application
- Use the Cat [®] Electronic Technician (Cat ET) Service Tool to configure the MSS bypass schedule to allow machine operations during scheduled periods of time during the week.

Grace Period

After a machine has been started successfully, the operator will have a grace period after the machine is turned off before the MSS is automatically armed. The operator is not required to arm the system manually.

During the grace period an operator can start the machine without a key ID or passcode. When the grace period expires, the MSS will rearm automatically.

If the MSS is unable to read a key ID, the system will remain armed. When the MSS identifies a key with an invalid key ID, the system will remain armed.

285

The grace period for a machine can be configured with Cat ET if a factory password or master level account is available.

Navigating the User Interface Touchscreen Display

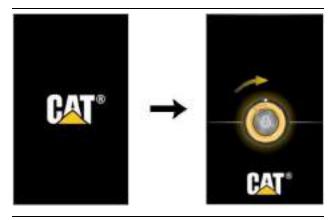


Illustration 409
Startup sequence screens

g06210561

The display will start up automatically after turning the battery disconnect switch to the ON position. The screen will prompt the operator to turn the engine start ring to the ON position. When the engine start ring is turned to the ON position, the display will navigate to the passcode entry screen.

If the operator has not turned the engine start ring to the ON position, the display will time out after 1 minute.

If the battery disconnect switch is already on and the display is off, the display will startup automatically after the engine start ring is powered on. The Cat screen will appear for a short time and then login keypad will appear.

Note: Avoid touching the screen with sharp objects.

The access level assigned to the operator can limit or expand the amount of freedom the user has to manage the system. The following paragraphs explain access levels.

There are three levels of operator access recognized by the touchscreen display. The following levels are available:

- Guest
- Standard
- Master

Guest – If an operator does not have an authenticated key or passcode, the user is able to bypass log in as a guest. Some menu features will not be available such as the options for saving

configurations and operator management. If the Machine Security System (MSS) is enabled, guest operators cannot start the machine.

Standard – A standard operator is a registered user of the machine. Operators with this access level can start the engine whether or not the MSS is installed. This user may save a control configuration for future application.

Master – Master accounts can perform operator management in addition to all standard level functions.

Any "Standard" or "Master" account may be created or removed by a "Master" level operator.

Table 26

Selections and Access for the Touchscreen Display				
Access Level	Operator Setting			
Guest	"Operator Input Configuration" "Response" "Change Operator"			
Standard	"Operator Input Configuration" "Response" "Controls Setup" "Change Operator"			
Master	"Operator Input Configuration" "Response" "Controls Setup" "Change Operator" "Manage Operator"			

Operation of Status Indicator



Illustration 410

Engine start switch with integrated MSS indicator

Operation Section
Machine Security System

286

The Machine Security System (MSS) uses a status indicator that is integrated into the engine start switch in the cab. This indicator provides a visible alert for the security system.

The operator can use the status indicator to determine the status of the system or for troubleshooting.



Illustration 411

g06226442

Status indicator when the MSS is armed

When the MSS is armed, the status indicator will be red. The red light warns the operator that the machine is armed with the security system and that an operator login is required. The red LED will remain ON until a valid key is read while the key switch or engine start switch ring is in the ON position.



Illustration 412

g06226444

Status indicator when the MSS is disarmed or uninstalled

When the MSS is disarmed, the status indicator will be green. The green light notifies the operator that an operator is logged on the machine and the security system has been disarmed. The status indicator will be green if the MSS is not installed on the machine. Also, the green LED will remain ON after power down for the duration of the grace period. After the grace period, the MSS automatically returns to the "armed" mode.

For machines with a standard key switch, a separate status indicator will be available.

Operator Login

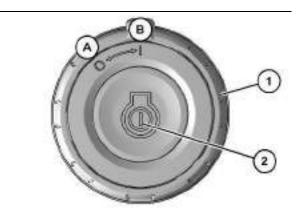
Any user may start the engine if the Machine Security System (MSS) is disabled.

If the MSS is active, only a "Standard" or "Master" account can start the machine engine. Before starting the machine engine, the security system must identify a registered operator. An operator can access the machine display using one of the following methods:

- Passcode
- Cat Bluetooth key
- Cat App: Fleet management mobile application

Passcode Entry

To log in using a passcode, refer to the following steps:



g06180554

Illustration 413

- (A) Off
- (B) On
- (1) Engine start switch ring
- (2) Engine start button
- 1. Turn engine start switch (1) to the ON position (B).

M0068104-12 287
Operation Section



Illustration 414 g06209470

2. Enter a registered passcode using the monitor keypad and then press "Enter".

Note: The jog dial or the numbered buttons on the right-side switch panel can also be used to enter the code.



Machine Security System

Illustration 415 g06211194

- 3. Select "Enter" to confirm the passcode. If a registered passcode is recognized, the operator information screen will appear on the display. If the MSS is not installed, the passcode screen will be bypassed automatically after 10 seconds. The operator will be logged in to the system as a guest. Refer to Illustration 415.
- **4.** Select "OK" to continue to the display homescreen.



Illustration 416 q06209482

5. After an operator logs in to the system successfully, an "Engine Start Allowed" message will appear across the top of the monitor. Refer to Operation and Maintenance Manual, Engine Starting for instructions on starting the engine.

Invalid Passcode



Illustration 417

g06209472

Invalid passcode screen

If a passcode is not recognized, the display will notify the user with an "Invalid code" message. Refer to Illustration 417. The operator has five tries to enter a valid passcode successfully. After a fifth unsuccessful attempt, a lockout screen will appear and remain on the display for a duration of 5 minutes.

Note: If the Machine Security System (MSS) is not active, the user can select the "Skip Login" button to avoid the lockout period. Refer to the "Bypass login" section for further information.

Bypass login

Operator login can be bypassed if the user selects the "Skip Login" button on the display. The operator will be logged in to the machine with "Guest" level access.

If the MSS is inactive, the operator will be able to start the engine as normal and view all display screens.

If the MSS is active on the machine, the operator is able to view all display screens but will not have access to starting the engine.

Bluetooth Entry

Alternatively, a Bluetooth Operator ID can be used to log in to the machine. For a Bluetooth key to be detected by the system, ensure that the following qualifications are met:

- The key must be registered with the machine
- · The key must be within the cab
- Bluetooth setting must be enabled on the display

Refer to the following steps when logging in to a machine using the Bluetooth key:

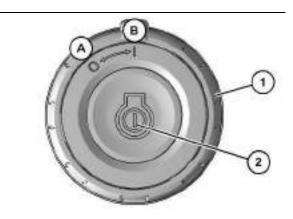


Illustration 418

g06180554

- (A) Off
- (B) On
- (1) Engine start switch ring
- (2) Engine start button
- 1. Turn engine start switch (1) to the ON position (B).

Wait several seconds for the system to detect the key when the passcode dialog appears. Once the key is detected, the "Operator Information" screen will display.



Illustration 419

g06209615

Bluetooth operator information screen

3. Select the "OK" button if the proper operator has been displayed.



Illustration 420 g06209482

4. After an operator logs in to the system successfully, an "Engine Start Allowed" message will appear across the top of the monitor. Refer to Operation and Maintenance Manual, Engine Starting for instructions on starting the engine.

NOTICE

The access level will change to a "Guest" account automatically if the key is removed from the cab at any time. If the MSS is enabled and the engine is on when the key is removed from the cab, the operator will not be able to start the engine if turned off. To turn on the engine again without the Bluetooth key, the operator will need to log in a registered account using either the smart phone application or passcode.

Note: If multiple Bluetooth devices are within the cab, the system will select the first device detected by the Bluetooth transceiver as the active operator.

Cat ®Fleet Management Mobile Application

Operators can also log in to a machine using the Cat App: Fleet management mobile application. For the application to be detected by the system, ensure that the following qualifications are met:

 The Mobile Device ID (MDID) of the mobile application must be assigned to the machine in the Operator Management System (OMS)

Note: It is not possible to assign mobile devices through the MSS interface.

The mobile device must be within the cab

Machine Security System

 "Operator Management Bluetooth Device Enabled Status" is enabled (Cat ET Configuration)

Note: For adding an operator, adding MDID to the machine key list, and pushing the machine key list from the OMS to the machine refer to the OMS documentation at:

https://myoperators.cat.com/

Mobile Device / Operating Software Compatibility

Table 27

Mobile Device / Operating Software Compatibility			
Make	Model	Operating Software	
Android	Varies	Android 8.x Oreo and up (Preferably Android 9.x Pie)	
Apple	iPhone 6/ iPhone 6 Plus and up	iOS 11.0 and up (Preferably 12)	

Note: Android mobile hardware support for Bluetooth can vary, so it is possible that a mobile device running Android 8.x software or higher could have hardware that does not support Bluetooth 4.1.

Mobile Application Entry (Android Devices)

To log in using the Cat App: Fleet management mobile application, refer to the following steps:

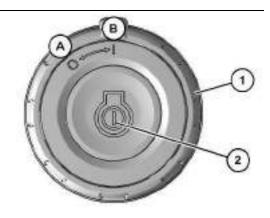


Illustration 421 g06180554

- (A) Off
- (B) On
- (1) Engine start switch ring
- (2) Engine start button
- 1. Turn engine start switch (1) to the ON position (B).



Illustration 422 g06400799

2. Open the Cat App: Fleet management mobile application on the mobile device.



Illustration 423 g06433500

3. Click "I Agree" to agree with the End-User License Agreement and sign in with Cat eCustomer account credentials.

Note: If you do not have a Cat eCustomer account, click "Get Started" to create one.

4. Select "Login".



Illustration 424
CWS login screen

5. Enter Cat eCustomer account credentials.





q06214518

Illustration 425 g06400826

6. Click "Allow" to enable the Cat App: Fleet management mobile application to work as designed.

Note: Cat App: Fleet management requires access to the mobile device location to use Bluetooth radio to connect to Cat machines.

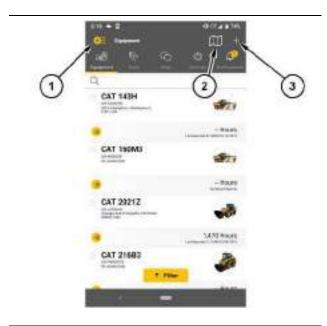


Illustration 426 g06433507

- (1) Menu Icon
- (2) Map Icon
- (3) Add Equipment Icon
- 7. Upon login, the Cat App: Fleet management mobile application will open onto the equipment tab.

Note: The "Equipment" tab will be empty on the first login.

The Menu Icon (1) includes "Preferences", "Notifications and Alerts", along with various documents covering the end-user license agreement, and privacy notice.

By tapping the Map Icon (2), the operator will be able to see the location of each vehicle on their "Equipment" tab on a map.

If a vehicle is not equipped with a telematics device, or the vehicle is a non-caterpillar machine it may be necessary to add it manually using the Add Equipment Icon (3).





Illustration 427 g06433513

8. Go to the keys tab.

Keys are necessary to connect to vehicles. If no keys are given, the screen in Illustration 427 will be displayed. The MDID is necessary to assign keys to the user account. The MDID of Android devices is linked to the app.

Note: Uninstalling the Cat App: Fleet management mobile application will result in the MDID and keys being deleted. The Sim card of the phone contains the MDID information, damage to the Sim card may result in keys being lost, if the phone is replaced transfer the Sim card to avoid key loss.

9. Pull the "Equipment Keys" down to refresh the list once the Fleet/Key configuration process has finished. Wait up to 30 seconds until the keys populate. If the keys do not populate, check that the MDID is correct and that the list was pushed properly through OMS.



Illustration 428 g06433520

10. Ensure that the machine is ON to connect to a machine.

The machine display should prompt the operator for a password. In the "Keys" tab in the Cat App: Fleet management mobile application and tap the key that matches the machine. If a vehicle is OFF, currently occupied, or too far away the key will be grayed out and say "Out of range".

Note: If the machine has a user signed in that is not in the cab and it has become necessary for a different user to operate the machine, change the operator in operator setting.

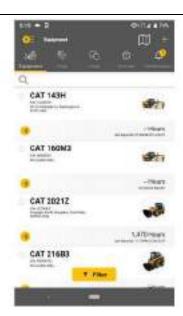


Illustration 429 q06433521

11. Access the "Equipment" tab by tapping it. The machines associated with the keys should have populated. To learn more about a machine, tap it.



Illustration 430 g06433525

12. Press the "Disconnect" button if the user wishes to disconnect. If the user wants to switch machines, tap the arrow in the upper left then tap the machine the operator wants to be switched to.

Note: Disconnect from vehicles if the user is not going to be using a vehicle again within a short time.



Illustration 431 q06209482

13. After an operator logs in to the system successfully, an "Engine Start Allowed" message will appear across the top of the monitor. Refer to Operation and Maintenance Manual, Engine Starting for instructions on starting the engine.

Mobile Application Entry (iOS Devices)

To log in using the Cat App: Fleet management mobile application, refer to the following steps:

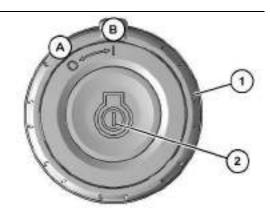


Illustration 432 g06180554

- (A) Off
- (B) On
- (1) Engine start switch ring
- (2) Engine start button
- 1. Turn engine start switch (1) to the ON position (B).
- **2.** Ensure that Bluetooth detection is enabled on the in-cab display.



Illustration 433 g06400799

Cat App: Fleet management mobile application icon

3. Open the Cat App: Fleet management mobile application on the mobile device.



Illustration 434 g06433528

4. Click "I Agree" to agree with the End-User License Agreement and sign in with Cat eCustomer account credentials.

Note: If you do not have a Cat eCustomer account, click "Get Started" to create one.

5. Select "Login".



Illustration 435 g06214875

6. Enter eCustomer account credentials to log in.



Illustration 436 g06433533

- (1) Menu Icon
- (2) Map Icon
- (3) Add Equipment Icon
- 7. Upon login the Cat App: Fleet management mobile application will open onto the equipment tab.

Note: The equipment tab will be empty on the first login.

The Menu Icon (1) includes "Preferences", "Notifications and Alerts", along with various documents covering the end-user license agreement, and privacy notice.

By tapping the Map (2), the operator will be able to see the location of each vehicle on the equipment tab on a map.

When using this for the first time, the Cat App: Fleet management mobile application will ask if it can use the location feature. Allow the location feature to use the map.

If a vehicle is not equipped with a telematics device, or the vehicle is a non-caterpillar machine it may be necessary to add it manually using the add equipment button (3).



Illustration 437 q06433536

- 8. Access the "Keys" tab. Keys are necessary to connect to vehicles. If no keys are given, the screen in Illustration 437 will be displayed. The MDID is necessary to assign keys to the user account. The MDID of IOS devices is linked to the user account.
- 9. Once the Fleet/Key configuration process has finished, tap the refresh button in the Cat App: Fleet management mobile application top right. Wait up to 30 seconds until the keys populate. If the keys do not populate, check that the MDID is correct and that the list was pushed properly in OMS.



Illustration 438 g06433538

10. To connect to a machine, ensure that the machine is ON. The machine display should prompt the operator for a password. At this point on the Cat App: Fleet management mobile application go to the "Keys" tab and tap the key that matches the machine. If a vehicle is OFF, currently occupied, or too far away the key will be grayed out and say "Out of range".



Illustration 439 g06433540

11. Press the disconnect button if the user wishes to disconnect. If the user wants to switch machines tap the arrow in the upper left, then tap the key of the machine to switch to. Operation Section Machine Security System

Note: Disconnect from vehicle if the user will not be using the vehicle again within a short time.



Illustration 440 g06209482

12. After an operator logs in to the system successfully, an "Engine Start Allowed" message will appear across the top of the monitor. Refer to Operation and Maintenance Manual, Engine Starting for instructions on starting the engine.

Engine Start Switch Troubleshooting

Table 28

Switch Status	Possible Cause	Resolution
Engine startswitch is not illuminated	Engine start accessory power not on	Turn engine start switch ring to ON position
	Power management triggered	Cycle engine start switch ring and try to restart
Engine start switch is green	Starting component failure	Contact your Cat dealer
Engine start switch is red	Machine interlock conditions not met	Hydraulic lock in LOCKED position
	Engine shut down without cycling start switch ring	Cycle engine start switch ring and try restart
	Operator not authenticated (Passcode login)	Add operator to machine authorized user list
		Switch operator from guest mode using display
	Operator not authenticated (Bluetooth key)	Add operator to machine authorized user list
		Replace key fob battery
		Ensure more than 4.5 m (15 ft) from other Bluetooth equipped machine

(Table 28, contd)

Switch Status	Possible Cause	Resolution
		Alternately login with display passcode or contact local Cat dealer
	Operator not authenticated (Cat Fleet management app)	Add operator to machine authorized user list
		Ensure more than 4.5 m (15 ft) from other Bluetooth equipped machine
		Enable phone Bluetooth and connect Cat Fleet management app
		Change Bluetooth system enable status to enabled (Cat dealer)
		Contact local Cat dealer if unable to see ma- chine Bluetooth device

i08257805

Monitoring System

SMCS Code: 7451; 7490

A WARNING

Do not operate the machine if the monitor is not functioning (for example, monitor has a black screen or is not responding) when the key switch is in the ON position.

The monitor provides images from the camera system and other information for safe machine operation. Operating the machine without a properly functioning monitor may result in injury or death. If the monitor is not functioning, place the machine in a safe state by following the procedures for stopping and parking the machine. Determine the cause of the monitor malfunction and correct before returning the machine to service.

NOTICE

When the monitor provides a warning, immediately check the monitor and perform the required action or maintenance as indicated by the monitor.

The monitor indicator does not guarantee that the machine is in a good condition. Do not use the monitor panel as the only method of inspection. Maintenance and inspection of the machine must be performed on a regular basis. See the Maintenance Section of this Operation and Maintenance Manual.

General Information

Reference: For complete monitoring system information, refer to M0109053, "Next Generation Hydraulic Excavator Monitoring System Supplement".

The monitoring system is an input and an output of the Machine Control System. The monitor has a multi-touch 8 inch or 10 inch display. The Machine Control System communicates back and forth on the data link. The monitoring system consists of the following components:

- Display (with numerous screens and menus)
- Indicators
- Gauges
- Soft Switch Panel
- Jog Dial



Illustration 441

g06397192

- (1) Action Lamps
- (2) Status Information Area
- (3) Event Indicator Area
- (4) Camera View Area
- (5) Gauge Area
- (6) Navigation Area
- (7) Function List
- (8) Shortcuts

The monitoring system displays various warnings and information about the condition of the machine, and the machines surrounding with various camera views. There are gauges and several alert indicators included on monitoring system display. Each gauge is dedicated to a parameter within a machine system. The monitoring system will allow the user to do the following:

- View Surroundings
- Interpret status information
- Interpret parameters
- View OMM
- View service intervals
- Perform calibrations
- · Troubleshoot machine systems

Action Lamps (1)

The action lamps illuminate to show that a problem has occurred with the machine.

Status Information Area (2)

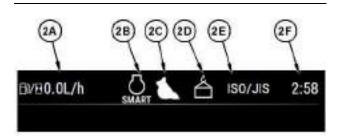


Illustration 442

g06464039

- (2A) Multi Status Information
- (2B) Seatbelt Switch Status (if equipped) / Power Mode
- (2C) Work tool
- (2D) Heavy Lift / Cat ® Dig Boost (if equipped)
- (2E) Lever Pattern / Fuel Level
- (2F) Clock

Reference: For complete status information, refer to M0109053, "Next Generation Hydraulic Excavator Monitoring System Supplement".

Event Indicator Area (3)

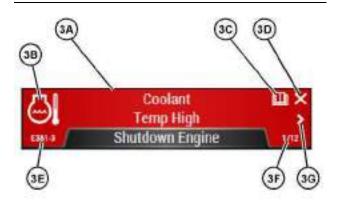


Illustration 443

g06223056

- (3A) Event Description
- (3B) Event Symbol
- (3C) e-OMM
- (3D) Close
- (3E) Event ID
- (3F) Order Number / Total Number
- (3G) Arrow (Next)

Event Description (3A) – This area will display the description of pop-up message of the impending problem.

· Line 1: System

Line 2: Condition

Line 3: Action to be taken

Event Symbol (3B) – This area will display the symbol of the problem

e-OMM (3C) - This area will indicate that the e-OMM is available for this event. If e-OMM is not available for this event, the area will be blank.

Close (3D) – Select this to hide the pop-up message and display the event icon list.

Event ID (3E) - The identification number for the event will be shown here.

Priority Number / Total Number (3F) – The priority number of the pop-up message is displayed next to the total number of messages. The messages are ordered from the highest to the lowest priority.

Arrow (3G) – The arrow is shown when there is a next or previous message. Select the arrow to display the next or previous message.

Camera View (4)

This area on the monitor displays the view of the cameras. A rear view camera mounted on top of the counterweight and an optional side view camera mounted in the side panel next to the hydraulic tank.

If both rear view camera and side view camera are equipped, the monitor screen can be toggled to show:

- Rear only
- Side only
- Split vertically
- Split horizontally

The camera view can be toggled when the cursor is on the camera view area and the area is touched or the jog dial is turned.

Gauge Area (5)

Fuel Level – This gauge indicates the amount of fuel that is remaining in the fuel tank. When the fuel gauge is in the red range, add fuel immediately.



Hydraulic Oil Temperature - This gauge indicates the temperature of the hydraulic oil. The normal operating

range is the green range. If the gauge is in the white range, the engine and machine warm-up is required. Refer to Operation and Maintenance Manual, "Engine and Machine Warm-up". If the gauge reaches the red range, reduce the load on the system. If the gauge stays in the red range, stop the machine and investigate the cause of the problem.



Engine Coolant Temperature – This gauge indicates the temperature of the engine coolant. The normal operating

range is the green range. If the gauge is in the white range, the engine and machine warm-up is required. Refer to Operation and Maintenance Manual, "Engine and Machine Warm-up". If the gauge reaches the red range, stop the machine and investigate the cause of the problem.



Diesel Exhaust Fluid (DEF) Gauge - This gauge indicates the level of DEF fluid in the DEF tank. When the DEF gauge is in the red range, add DEF immediately.

Navigation Bar (6)



Apps Key - Allows you to display different information in the gauge area related to operation. Also contains air

conditioner and audio controls. This key includes the settings screen allowing change of a multitude of parameters, some password protected.



Function List Key – Allows you to turn on and off various functions related to the active screen. This icon only

appears in certain screens where additional settings are necessary.

Shortcuts - Allows you to set certain shortcuts on the navigation bar.

Machine Warnings

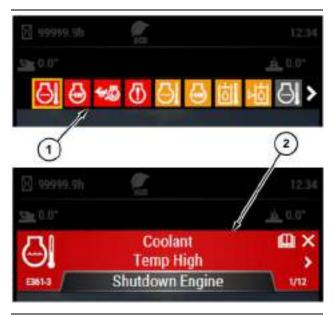


Illustration 444

g06223766

Event Indicator Area

- (1) Event Icon List
- (2) Pop-up Event Message

The Monitor will display warnings, and log events for machine conditions that are not within normal operating parameters.

The event warnings are classified into three warning levels. Warning Level 1 represents the least severe problem and Warning Level 3 represents the most severe problem. The warning levels, monitor response, and the required operator actions are given below.

Warning Level 1 (Gray) – Requires operator awareness. The icon and pop-up message will both appear gray.

Warning Level 2 (Amber) – Requires a change in the operation of the machine or a change in the maintenance of the machine to correct the condition. The icon and pop-up message will both appear amber and the action lamp will blink.

Warning Level 3 (Red) – Requires immediate shutdown of the machine to prevent damage to the machine or personnel. The icon and pop-up message will both appear red, the action lamp will blink, and the buzzer will sound.

When multiple warnings are present in the system, the highest warning is shown first. Press the right or left key to view all the logged warnings. If no keys are pressed within a few seconds, the display will return to the highest warning.

Reference: For complete machine warning information, refer to M0109053, "Next Generation Hydraulic Excavator Monitoring System Supplement".

Logging In



Illustration 445

g06242074

There are different ways to access the monitor which include:

- Guest access
- · Passcode access
- Bluetooth access
- Cat ® Fleet Management app

For more information on logging in, refer to Operation and Maintenance Manual, Machine Security System - Operator Login.

Navigation

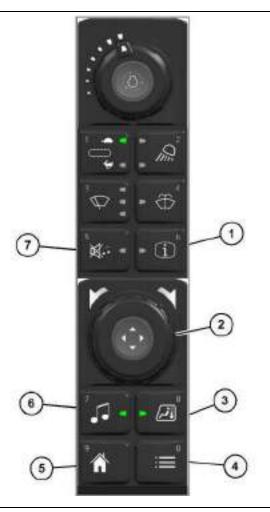


Illustration 446 g06464384

Right side switch panel

- (1) Operator information button
- (2) Jog dial
- (3) Air conditioner button
- (4) Next menu button
- (5) Home button
- (6) Audio button
- (7) Mute button

The monitor can be navigated by touch screen or the switch panel. Switch panel components can be used to interface with the monitor in the following ways:

Operator information button (1) – Press and hold this button to access the operator information screen. This screen shows information such as operator settings.

Jog dial (2) – Rotate the jog dial to highlight menu items in the monitor. Push the jog dial down to select the highlighted item.

Air conditioner button (3) – Press the button to access the air conditioner controls.

Next menu button (4) – This button is equivalent to the function list key on the monitor. This button can only be used on screens where the function list key is shown.

Home button (5) – Press this button to return to the main screen.

Audio button (6) – Press this button to access the audio controls.

Mute button (7) – Press this button to mute the audio. Press the button again to unmute the audio.

Each of the buttons is also assigned a number which is imprinted in the top corner of the button. These buttons can be used to enter the numerical passcodes used to log in to the monitor.

Application Menu

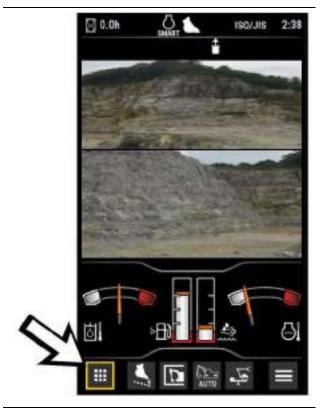


Illustration 447

g06391692

Press the application menu button to access the Application menu.



Illustration 448 g06247445

The Application menu "(Apps)" contains the list of applications. The available applications may differ depending on the machine configuration or software version.



Illustration 449 g06263058

Once an "App" has been selected, an operator can sort through the available "Apps" by swiping the selected area left or right.

Reference: For complete application menu information, refer to M0109053, "Next Generation Hydraulic Excavator Monitoring System Supplement".

Setting Menu

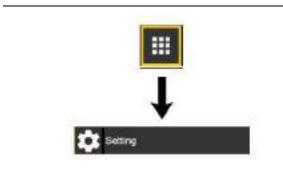


Illustration 450 g06213909

From the main screen, press the application menu button. In the Application menu, select "Setting".



Illustration 451 g06217518

A warning will appear notifying the operator that the camera is not visible in the Setting menu. After you have read the warning and understand the content, press the "OK" button.



Illustration 452 g06213929

The Setting menu contains the following menu items:

- Display Setting
- Information
- Machine Setting
- · Operator Setting
- Service

Note: A dealer password is necessary to access the Service menu.

Machine Setting

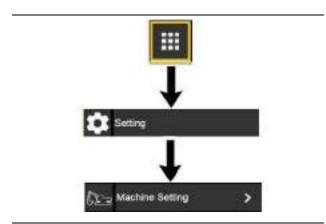


Illustration 453 g06217583

From the main screen, press the application menu button. In the Application menu, select "Setting". Next, select "Machine Setting".



Illustration 454 g06261306

The Machine Setting menu may differ depending on the machine configuration or software version. Basic settings are described below.

Reference: For complete machine settings information, refer to M0109053, "Next Generation Hydraulic Excavator Monitoring System Supplement".

Audio

The Audio screen allows the user to choose the radio region, enable Bluetooth, pair devices, and scan for Digital Audio Broadcast (DAB) channels.

Operation Section Monitoring System

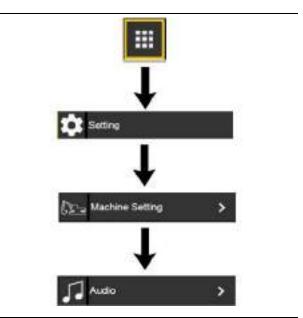


Illustration 455 g06261319

From the main screen, press the application menu button. In the Application menu, select "Setting". Next, select "Machine Setting", and then "Audio".



Illustration 456 g06241515

The Audio screen contains the following menu items:

- Radio Region Setting Choose the radio region from the list of locations around the world.
- Bluetooth Allows the operator to enable
 Bluetooth and pair a phone. This menu is also
 available through the main Audio screen. Refer to
 Operation and Maintenance Manual, Monitoring
 System Bluetooth for information on the
 Bluetooth screen.

- DAB Channel Scan Start a scan to find DAB channels in the area with good reception.
- Volume Gain Allows the user to individually adjust the gain on various outputs such as the AM radio, FM radio, and the phone.

Auto Warm Up

The Auto Warm Up screen allows the user to enable and set the auto warm-up feature. This feature automatically starts a warm-up period when the engine is started and the hydraulic oil is below the set temperature.

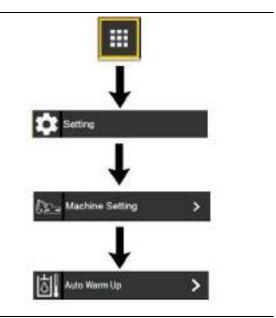


Illustration 457 g06261321

From the main screen, press the application menu button. In the Application menu, select "Setting" . Next, select "Machine Setting" , and then "Auto Warm Up" .

305



Illustration 458 g06219830

To set the auto warm-up temperature, press the "Auto Warm Up Target Temp" window, then enter the temperature. If the hydraulic oil is below the set temperature, the auto warm-up feature will activate after the engine is started.

Sleep Time



Illustration 459 q06360101

The Sleep time Setting feature allows the user to set a sleep timer for the engine start switch. If the start switch is left in the ON position, power will automatically shut off once the chosen timer interval has elapsed.

Security

Note: Master level access is required to adjust security settings.

The Security screen allows the user to set the operator lockout time. The lockout time is the amount of time after engine shutdown that an operator can start the engine without logging back in to the monitor.

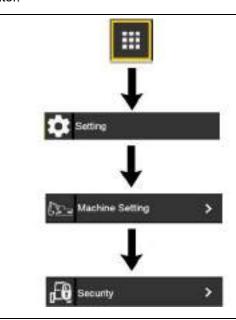


Illustration 460 g06261324

From the main screen, press the application menu button. In the Application menu, select "Setting". Next, select "Machine Setting", and then "Security".



Illustration 461 g06242069

Select "Operator ID Timeout" to select the amount of time before the operators passcode times out after engine shutdown. To block out periods of time throughout the week to bypass security, select "Security Bypass Time".



Illustration 462 g06242071

Enter the times and the days to bypass the security system.

Operator Setting

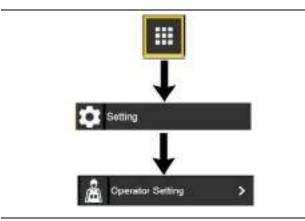


Illustration 463 g06217328

From the main screen, press the application menu button. In the Application menu, select "Setting". Next, select "Operator Setting".



Illustration 464 g06261330

The Operator Setting menu contains the following menu items:

- · Operator Inputs Configuration
- Response

Reference: For complete operator settings information, refer to M0109053, "Next Generation Hydraulic Excavator Monitoring System Supplement".

M0068104-12 307
Operation Section

Operator Inputs Configuration

The operator inputs configuration screen allows the operator to configure the joystick buttons for personal preference. The settings will be stored in the preferences for that login ID.

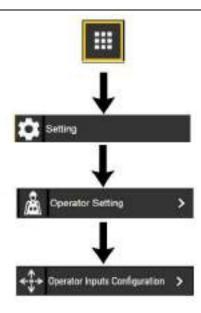


Illustration 465 g06261334

From the main screen, press the application menu button. In the Application menu, select "Setting". Next, select "Operator Setting", then "Operator Inputs Configuration".



Ilustration 466 g06222026

Choose the operator input to configure.

Lever Pattern



Monitoring System

Illustration 467 g06222026

From the Operator Inputs Configuration screen, select "Lever Pattern".

Select the desired lever pattern from the menu items. Press the "Home" button to return to the main screen.

Restore to Factory Setting



Illustration 468 g06222026

From the Operator Inputs Configuration screen, select "Restore to Factory Setting".



Illustration 469 g06222053

Select the item from the list to be restored.



Illustration 470 g06222061

A warning will appear asking if you want to proceed. Press "Restore" to restore the settings or press "Cancel" to abort. After pressing "Restore", the operator information screen will appear to show the new button assignments. Press the "OK" button to return to the main screen.

Air Conditioner

Refer to Operation and Maintenance Manual, Air Conditioning and Heating Control for coverage of the air conditioner screen in the monitor.

Audio

Refer to Operation and Maintenance Manual, Radio for coverage of the audio screen in the monitor.

Phone



Illustration 471 g06213901

From the main screen, press the application menu button. In the Application menu, select "Phone".



Illustration 472 g06340470

To make a call, select "Call", then use the keypad to dial the number.

Note: There must be a paired phone in the cab and Bluetooth enabled to make a call.

Reference: For phone and Bluetooth settings, refer to M0109053, "Next Generation Hydraulic Excavator Monitoring System Supplement".

Bucket/Work Tool Setting

The Bucket/Work Tool Setting screen allows the operator to choose the tool being used for work.

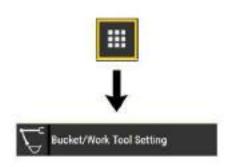


Illustration 473 g06220041

From the main screen, press the application menu button. In the Application menu, select "Bucket/Work Tool Setting".



Illustration 474 g06220034

Select the desired tool.

Reference: For complete Bucket/Work Tool settings, refer to M0109053, "Next Generation Hydraulic Excavator Monitoring System Supplement".

Electronic OMM

The Electronic OMM screen allows the operator to view the Operation and Maintenance Manual (OMM) for the machine.

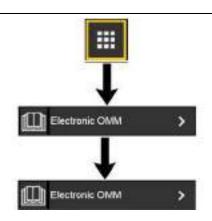


Illustration 475 g06261340

From the main screen, press the application menu button. In the Application menu, select "Setting". Next, select "Information" and then "Electronic OMM"

Note: Contact your Cat Dealer for information to update the electronic OMM.

Function List Screen

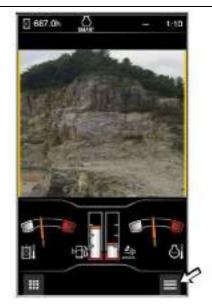


Illustration 476 g06213511

Press the Function List icon to access the Function List screen.

The Function List screen allows the user to turn on or off the available functions on the machine. Tap or select with the jog dial the item to turn on or off.

The Function list menu may differ depending on the machine configuration or software version.

Operation Section Fuel Transfer Pump (Refueling)

Reference: For complete function list information, refer to M0109053, "Next Generation Hydraulic Excavator Monitoring System Supplement".

i06951931

Fuel Transfer Pump (Refueling)

(If Equipped)

SMCS Code: 1256

Use the following procedure to pump fuel and store the hose.

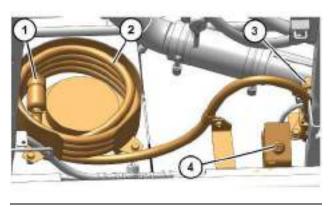


Illustration 477

g06180565

- (1) Suction valve
- (2) Suction hose
- (3) Electric refueling pump
- (4) ON/OFF switch



ON/OFF Switch - Push the ON/OFF switch to activate or deactivate the fuel transfer pump. A red indicator on the switch will illuminate when the fuel transfer pump

is activated.

If one of the following conditions occur, the fuel transfer pump will not activate and/or stop operating:

- Battery disconnect switch is in the OFF position
- Engine is operating
- Engine start switch is moved to the START position.
- Engine start switch is in the OFF position
- Hydraulic lockout control is not in the LOCKED position
- Fuel tank level is full
- Fuel is not detected at the suction valve.
- 30 seconds following a detection of no fuel at the suction valve.

Use the following procedure to pump fuel and store the hose.

- 1. Park the machine on a level surface. Move the hydraulic lockout control to the LOCKED position. Stop the engine
- 2. Turn the engine start switch to the ON position without starting the engine.
- 3. Remove the fuel tank cap from the fuel tank.
- 4. Open the access that is on the right side of the machine.



Illustration 478

q06180748

Suction valve (1) is at the end of hose (2).

Turn the end of the suction valve clockwise to open the valve

- 5. Uncoil the hose and turn the end of the suction valve clockwise to open the suction valve.
- 6. Properly insert the end of the suction valve into a container of fuel.
- 7. Push switch (4) to activate the fuel transfer pump and supply the fuel to the tank. A red indicator on the switch will illuminate when the fuel transfer pump is activated.

When the fuel tank is full, the fuel transfer pump will automatically stop.

When the fuel container is empty, push the switch again to stop refueling. If additional fuel is needed, wait 30 seconds and return to step 6.

Note: The red indicator on the switch will no longer illuminate when the fuel transfer pump has stopped refueling.

Note: The fuel transfer pump will not activate for 30 seconds following a detection of no fuel at the suction valve.

8. Push the switch at any time to deactivate the fuel transfer pump.

Note: The red indicator on the switch will no longer illuminate when the fuel transfer pump has stopped refueling.

- Drain excess fuel from the hose and turn the end of the suction valve counter-clockwise to close the suction valve.
- 10. Wind the hose and store in the hose container.

NOTICE

To prevent hose damage, do not coil the hose in a tight radius.

- 11. Close the access door.
- **12.** Install the fuel tank cap onto the fuel tank.
- **13.** Turn the engine start switch to the OFF position.

i07092848

Radio

SMCS Code: 7338

The radio is integrated into the monitoring system. All the radio controls are adjusted using the monitor. The actual radio is mounted in the right rear console behind the operator seat.



Illustration 479

g06213193

- (1) Jog dial
- (2) Home button
- (3) Radio button

The audio menu can be directly accessed by pressing radio button (3) on the right side switch panel. Input selections can be made using jog dial (1) or using the monitor touch screen. Home button (2) can be used to return to the main screen.



Illustration 480

g06213076

Press radio button (3) to go directly to the radio screen. To navigate to the radio screen from the main screen, press application menu button (4).



Illustration 481

g06213198

Use jog dial (1) to highlight "Audio" and then press the jog dial downward to select the entry. You may also access the screen by simply touching the "Audio" box on the touch screen.

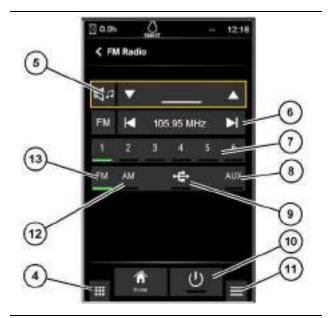


Illustration 482 g06213200

Radio screen

- (4) Application menu button
- (5) Volume control
- (6) Tuner
- (7) Preset stations
- (8) Auxiliary button
- (9) USB button
- (10) Power button
- (11) Radio Function List menu
- (12) AM button
- (13) FM button

Application menu button (4) – Use this button to return to the application menu.

Volume control (5) – The volume control is used to raise or lower the audio volume.

Tuner (6) – The tuner is used to tune the radio to the desired station.

Preset stations (7) – The preset stations store favorite radio stations for the operator. To set a station, tune to the desired station. Press and hold the preset number you want to assign to that station. Once a beep is heard, release the button. The indicator light for the active preset station will illuminate.

Auxiliary button (8) – When a device is plugged into the auxiliary port, press the auxiliary button to connect the device to the radio. The indicator light will illuminate when this mode is active.

USB button (9) – When a device is plugged into the USB port, press the USB button to connect the device to the radio. The indicator light will illuminate when this mode is active.

Power button (10) – Pressing this button turns the radio on and off. The indicator light on the monitor and on button (3) will illuminate when the power is on.

Radio function list menu button (11) – Pressing this button leads to the radio function list menu.

AM button (12) – Press this button to access AM radio. The indicator light will illuminate when this mode is active.

FM button (13) – Press this button to access FM radio. The indicator light will illuminate when this mode is active.

Radio Function List

To access the radio function list, press the function list button (11) in the lower right corner of the radio screen.



Illustration 483 g06223378

The function list menu consists of the following items:

Treble – Allows the user to adjust the treble.

Bass – Allows the user to adjust the bass.

Balance – Allows the user to adjust the balance between speakers.

Auto Loudness – When on, this feature automatically adjust treble and bass levels when reducing the volume setting. This effect allows the user to hear more clearly at a lower volume.

Bluetooth – Allows the user to pair a phone, view paired devices, and edit device names.

Refer to Operation and Maintenance Manual, Monitoring System - Bluetooth for information on the Bluetooth screen.

Selection Method

All settings can be made using the touch screen or by using the jog dial. The method depends on the preference of the operator. When using the touch screen, simply touch the icon you want to select. When using the jog dial, rotate the dial to switch to different selections within the screen. Press the jog dial downward to choose a selection.



Illustration 484 g06213233

When using the jog dial to set the volume or tuner, rotate the dial clockwise to increase and counter-clockwise to decrease. Press downward on the dial to enter the desired setting.

Radio Operation

- **1.** To operate the system, press power button (10).
- 2. Select between the AM button for AM stations or select the FM button for FM stations.
- **3.** Use tuner (6) to adjust to the desired station. If presets stations (7) are set, press the desired preset station.
- 4. Use volume control (5) to adjust the volume.

When the machine is in operation turn down the volume of the radio.

USB/AUX Operation

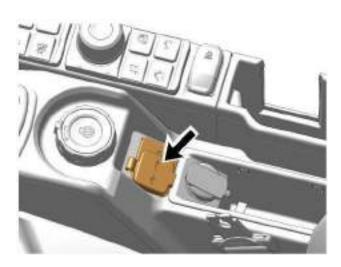


Illustration 485 g06213245

- 1. To play music from a device such as an MP3 player or a phone, connect the device using an auxiliary cable or a USB cable. Depending on the cable being used, plug the cable into the appropriate port on the console.
- 2. Select either USB or AUX depending on which type of cable was used. Play the music from the device. The music should be playing over the radio speakers if properly connected. Adjust the volume as necessary.

314

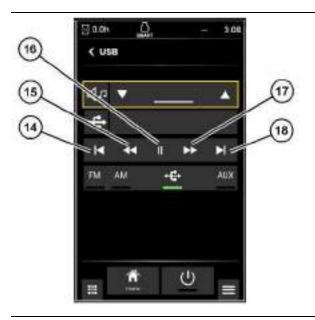


Illustration 486 g06213254

Note: If USB is selected, extra controls appear on the screen for playing music. They include the following:

- 14 Skip to the beginning of the track
- 15 Rewind the track
- 16 Pause/Play the track
- 17 Fast forward the track
- 18 Skip to the end of the track

i08031142

Air Conditioning and Heating Control

SMCS Code: 7304; 7320; 7337

Consult with your Cat dealer for periodic maintenance of the heating and air conditioning system.



Illustration 487 g06178710

- (1) Jog dial
- (2) Heating and air conditioning button
- (3) Home button

Air conditioning and heating functions are controlled through the monitor. The heating and cooling menu can be directly accessed by pressing button (2) on the right side switch panel. Input selections can be made using jog dial (1) or using the monitor touch screen. Home button (3) can be used to return to the main screen.



Illustration 488

g06213076

Press the Air Conditioning and Heating button (2) to go directly to the air conditioner screen. To navigate to the air conditioner screen from the main screen, press application menu button (4).



Illustration 489 g06213088

Use jog dial (1) to highlight "Air Conditioner" and then press the jog dial downward to select the entry. You may also access the screen by simply touching the "Air Conditioner" box on the touch screen.

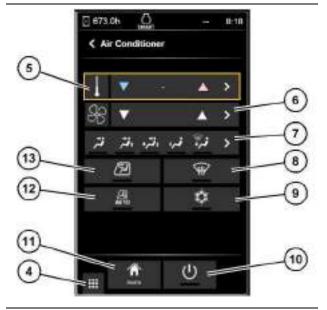


Illustration 490

g06213092

Air conditioner screen

- (4) Application menu button
- (5) Temperature control
- (6) Fan blower speed control
- (7) Air outlet settings
- (8) Defroster
- (9) Compressor ON/OFF
- (10) Power
- (11) Home button
- (12) Auto
- (13) Recirculation

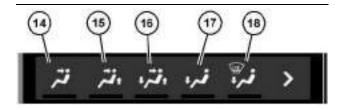


Illustration 491

g06213104

- (14) Front vents
- (15) Front and rear vents
- (16) Front, foot, and rear vents
- (17) Foot vents
- (18) Defrost and foot mode

Application menu button (4) – Use this button to return to the application menu.

Temperature control (5) – The temperature control is used to raise or lower the desired temperature.

Fan blower speed control (6) – The blower control is used to increase or decrease the desired blower speed.

Air outlet settings (7) – The desired air outlet setting can be chosen from this panel. The indicator light will illuminate to show the active setting.

Defroster (8) – Pressing this button activates and deactivates the defroster. Use the defroster to remove steam and frost from the windows. The indicator light will illuminate when this mode is active.

Compressor ON/OFF (9) – Pressing this button activates and deactivates the air conditioner. The indicator light will illuminate when this mode is active.

Power (10) – Pressing this button turns the heating and cooling system on and off. Push and hold the power button for 3 seconds to turn OFF the HVAC system. The indicator light on the monitor and on button (2) will turn green when power is on.

Home button (11) – Use this button to return to the main screen.

Auto (12) – Select this option to hold the system at the desired temperature. The system will modulate to keep the cab at the temperature that the system is set to. The indicator light will illuminate when this mode is active.

Recirculation (13) – This option recirculates air from the cab instead of pulling air from the outside. This mode is more efficient because the system is recycling conditioned air from the cab. However, no fresh air is coming into the cab when in this mode. The indicator light will illuminate when this mode is active

Front vents (14) – In this mode, air will only circulate from the front vents.

Front and rear vents (15) – In this mode, air will circulate from the front vents and rear vents.

Front, foot, and rear vents (16) – In this mode, air will circulate from the front vents, rear vents, and foot vents.

Foot vents (17) – In this mode, air will only circulate from the foot vents.

Defrost and foot mode (18) – In defrost mode, air will circulate from the defrost vents and foot vents.

Selection Method

All settings can be made using the touch screen or by using the jog dial. The method depends on the preference of the operator. When using the touch screen, simply touch the icon you want to select. When using the jog dial, rotate the dial to switch to different selections within the screen. Press the jog dial downward to choose a selection.



Illustration 492 g06213141

When using the jog dial to set the temperature or blower speed, rotate the dial clockwise to increase and counter-clockwise to decrease. Press downward on the dial to enter the desired setting.

Operation

- **1.** To operate the system, press power button (10).
- 2. Use temperature control (5) to adjust to the desired temperature.
- 3. Select the desired mode and outlet vents.
- 4. Use fan blower speed control (6) to adjust the blower. If the system is in "Auto" mode, the blower fan speed and air outlet setting will automatically be adjusted. But recirculation air intake is not changed automatically.

Note: In cold ambient temperature condition, fan speed is stopped or restricted depend on coolant temperature.

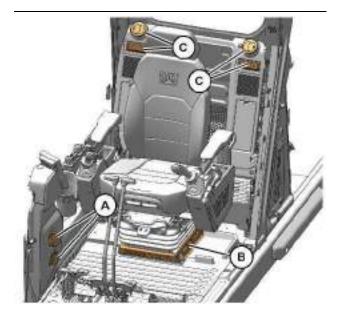


Illustration 493

q06178705

- (A) Defrost vent (front window)
- (B) Foot air vents
- (C) Rear air vents

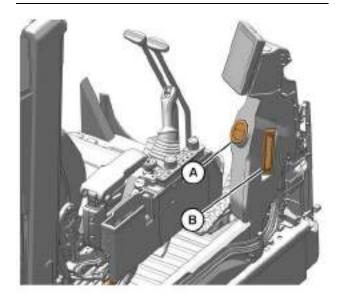


Illustration 494

g06287632

- (A) Front vent
- (B) Defrost vent (RH window)

M0068104-12 317
Operation Section
Mirror

Redirect the louvers for air outlets (A) and (C) by hand to the desired direction. The louvers for air outlet (B) cannot be redirected.

i07088628

Mirror

SMCS Code: 7319

A WARNING

Adjust all mirrors as specified in the Operation and Maintenance Manual. Failure to heed this warning can lead to personal injury or death.

Note: Your machine may not be equipped with all the mirrors that are described in this topic.

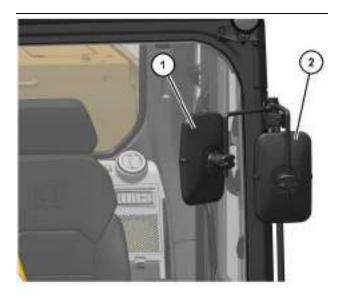


Illustration 495

g06220616

- (1) Right Side View Mirror on the Cab
- (2) Left Side View Mirror on the Cab

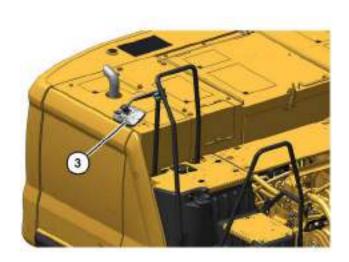


Illustration 496

g06220627

(3) Tank mirror

Mirrors provide additional visibility around your machine. Make sure that the mirrors are in proper working condition and that the mirrors are clean. Adjust all mirrors at the beginning of each work period and adjust the mirrors when you change operators.

Modified machines or machines that have additional equipment or attachments may influence your visibility.

Mirror Adjustment

- · Park the machine on a level surface.
- · Lower the work tool to the ground.
- Move the hydraulic lockout control to the LOCKED position. For further details on this procedure, refer to Operation and Maintenance Manual, "Operator Controls".
- · Stop the engine.
- Adjust rear view mirrors to provide visibility behind the machine at a maximum distance of 30 m (98 ft) from the rear corners of the machine.



g06220634

Illustration 497
Tightening sequence

After adjustment of the mirror angle, make sure that the CAT logo is at the top.

It may be necessary to periodically tighten the mirror mounting bolts. If the bolts are loose, tighten the bolts in the sequence shown in Illustration 497 . Tighten bolts (1) and (2) to $11 \pm 2 \text{ N} \cdot \text{m}$ (8.1 \pm 1.5 lb ft).

Tighten the bolts (3) through (6) to 2 \pm 0.4 N·m (1.5 \pm 0.3 lb ft).

Right Side View Mirror on the Cab (3)



Illustration 498 g06223277

If equipped, adjust the right side view mirror on the cab (1) so the front of the right track can be seen from the operator seat. A view of at least 1 m (3.3 ft) from the right front of the machine should be seen from the operator seat.

Left Side View Mirror on the Cab (4)



Illustration 499 g06223279

If equipped, adjust the left side view mirror on the cab (4) so the left side of the cab, access door, and rear of left track can be seen from the operator seat. A view of at least 1 m (3.3 ft) from the side of the machine should be seen from the operator seat. Additionally, provide as much visibility to the rear as possible.

Tank Mirror (3)



Illustration 500 g06223284

If equipped, adjust the tank mirror so the fuel tank and the hydraulic tank can be seen from the operator seat. A view of at least 1 m (3.3 ft) from the side of the machine should be seen from the operator seat.

Operation Section Camera

i07491391

Camera

SMCS Code: 7347; 7348

Rear View Camera



Illustration 501 g06184579

The rear view camera system consists of a camera that is located in the middle of the top of the counterweight.

Note: The rear view camera system has been set up by the factory or by a Cat dealer to provide views which comply with specified guidelines. Consult your Cat dealer before any adjustments are made to the system.

For more information refer to Operation and Maintenance Manual, "Monitoring System".

Side View Camera (If Equipped)



Illustration 502 g06214504

The side view camera system consists of a camera mounted on the panel next to the pump compartment.

Note: The side view camera system has been set up by the factory or by a Cat dealer to provide views which comply with specified machine side views. Consult your Cat dealer before any adjustments are made to the system.

For more information refer to Operation and Maintenance Manual, "Monitoring System".

360 Visibility (If Equipped)

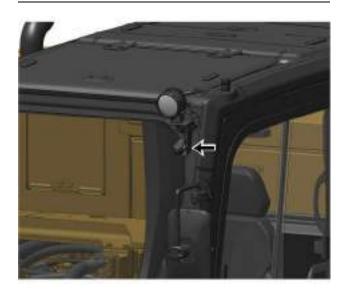


Illustration 503
Front camera



Illustration 504
Left side camera

g06263435

g06263449

If equipped with the optional side and front cameras, the 360 visibility feature can be toggled on and off to enable or disable the 360 degree visibility view in the monitor.



Illustration 505

q06263096

From the main screen, press the Function List icon. In the Function List menu, select "360 Visibility".

Note: The 360 visibility system has been set up by the factory or by a Cat dealer to provide views which comply with specified machine side views. Consult your Cat dealer before any adjustments are made to the system.

For more information refer to Operation and Maintenance Manual, "Monitoring System".

i07427990

Window (Front)

SMCS Code: 7310-FR

To provide full ventilation inside the cab, the upper window and the lower window can be fully opened.

A WARNING

When opening or closing the windows, be extra careful to prevent any personal injury. The hydraulic lockout control must be in the LOCKED position in order to prevent any possibility of sudden movement of the machine due to inadvertent contact with the hydraulic control(s).

Do not change the position of the window until the following items have been done:

- · Park the machine on a level surface.
- · Lower the work tool to the ground.
- Move the hydraulic lockout control to the LOCKED position.
- · Stop the engine.

322

Perform Step 1 through Step 3 to open the upper window.

Note: If equipped, the Cat Grade Control monitor may interfere with the window when opening. Ensure that the monitor is adjusted out of the way before opening the window.

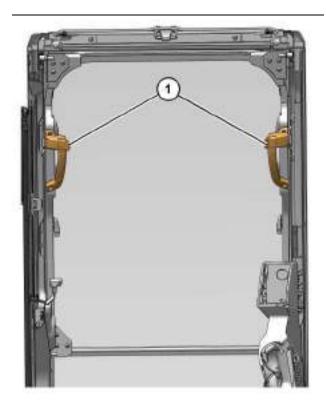


Illustration 506

g06185052

- (1) Release lever
- **1.** Release the auto-lock latches by pressing release levers (1) on the window handles.
- **2.** Holding both handles on the window frame, pull the window upward.
- Hold both grips that are provided on the window frame and move the window into the storage position until the auto-lock latches near the ceiling are engaged.

Perform Steps 4 through 5 to close the upper window.

Note: If equipped, the Cat Grade Control monitor may interfere with the window when closing. Ensure that the monitor is adjusted out of the way before closing the window.

4. Release the auto-lock latches by pressing release levers (1) on the window handles.

Reverse Steps 1 through 3 to close the upper window.

Perform Steps 6 through 8 to open the lower window and close the lower window.

6. Raise the lower window out of the window frame.

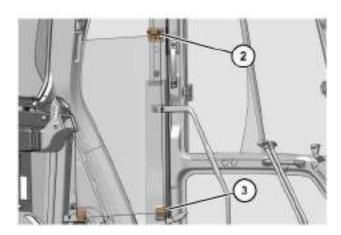


Illustration 507

g06185076

- (2) Catch
- (3) Brackets
- 7. Store the lower window in the holder that is located in the rear of the left side cab frame. To store the lower window, locate one end of the lower window into brackets (3). Secure the opposite end of the lower window with catch (2).
- **8.** To close the lower window, reverse the procedure that is used for opening the lower window.

Note: The lower window is curved. The lower window can only be positioned one way in the holders.

i07538754

Sun Screen

SMCS Code: 7165-ZZ

A WARNING

When opening or closing the windows, be extra careful to prevent any personal injury. The hydraulic lockout control must be in the LOCKED position in order to prevent any possibility of sudden movement of the machine due to inadvertent contact with the hydraulic control(s).

NOTICE

Do not change the position of the sun screen without performing the following actions:

- Park the machine on a level surface.
- · Lower the work tool to the ground.
- Move the hydraulic lockout control to the LOCKED position.
- · Stop the engine.



Illustration 508

g06179846

Pull sun screen (1) down from the ceiling. Hook the sun screen to the brackets (2) at both sides of the front window. The sun screen may be positioned at two different heights.

i07538807

Roof Hatch

SMCS Code: 7303

WARNING

When opening or closing the windows, be extra careful to prevent any personal injury. The hydraulic lockout control must be in the LOCKED position in order to prevent any possibility of sudden movement of the machine due to inadvertent contact with the hydraulic control(s).

NOTICE

Do not change the position of the roof hatch without performing the following actions:

- · Park the machine on a level surface.
- Lower the work tool to the ground.
- Move the hydraulic lockout control to the LOCKED position.
- · Stop the engine.

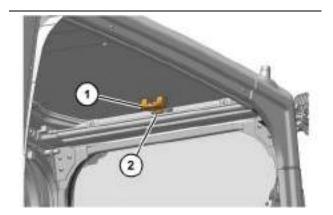


Illustration 509

g06179871

- (1) Grip
- (2) Lock

To open the roof hatch, release lock (2). Hold grip (1) and push the roof hatch upward.

To close the roof hatch, hold grip (1) and pull the roof hatch downward. Engage lock (2) securely.

NOTICE

Do not stand or walk on the hatch or the roof of the cab. Serious damage may occur.

i06949447

Cab Door

SMCS Code: 7308



Illustration 510 g06180275

To open the cab door from the outside of the cab, pull outward on the door handle.



Illustration 511 g06179959

To open the cab door while inside the cab, push forward on the lever for the cab door latch.

For additional ventilation, open the cab door all the way to engage the catch on the exterior wall of the cab.

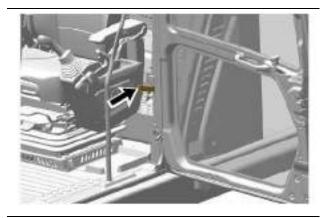


Illustration 512 g06180267

To release the cab door from the catch, pull downward on the cab door release lever.

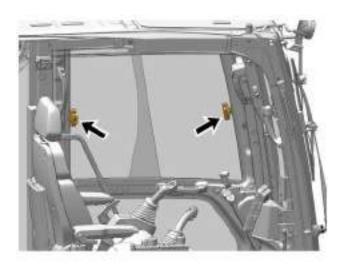


Illustration 513 g06179957

To open a window, release the window latch, and then slide the window to the desired position.

i06946782

Travel Control (Straight Travel Pedal (If Equipped))

SMCS Code: 5462

WARNING

With certain attachment combinations, the third pedal can have different functions. Always check for third pedal function before using the third pedal. Improper operation of the third pedal could result in serious injury or death.



Illustration 514

g06178249

Position for normal travel

- (A) Rear of machine
- (B) Final drive
- (C) Idler

When you travel, make sure that final drive sprockets (B) are under the rear of the machine.

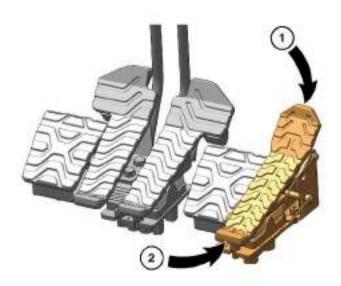


Illustration 515

g06178758

- (1) Forward Travel
- (2) Reverse Travel

The third pedal is to the right of the right travel pedal. The third pedal controls the forward and backward movement of the machine.

Note: If the third pedal is depressed and a travel pedal or a travel lever is operated, the machine will turn accordingly.

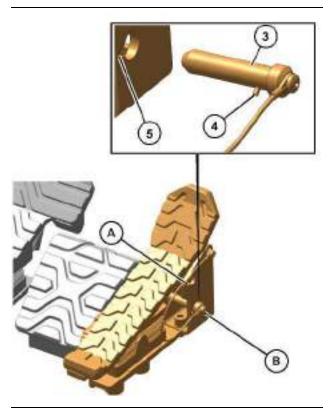


Illustration 516

g06178798

- (3) Lock pin
- (4) Pin
- (5) Notch
- (A) LOCKED position
- (B) UNLOCKED position

When the machine is not operated with the third pedal, install lock pin (3) at the LOCKED position to prevent accidental operation.

Note: To prevent lock pin (3) from being pulled out, insert pin (4) through notch (5) and turn lock pin (3) counterclockwise by 1/4 turn.

i07233941

Shovel Crane Control

(If Equipped)

SMCS Code: 7451

S/N: HEX1-Up

WARNING

Do not perform a lifting operation with the shovel crane on a slope greater than 5 degrees. Lifting on a slope greater than 5 degrees may cause the machine to become unstable or roll over. Lifting with the shovel crane on a slope greater than 5 degrees may result in property damage, personal injury, or death.

⋒ WARNING

Do not operate the shovel crane with a hook that has cracks or deformities. Failure to follow these instructions may cause the load to fall and result in injury or death. Replace the shovel crane hook if there are any signs of cracks of deformities.

⋒ WARNING

Do not operate the bucket without securing the shovel crane hook. Operating the bucket without properly securing the hook may result in personal injury or machine damage.

NOTICE

Do not perform a lifting operation if the monitors external display light does not come on. Do not perform a lifting operation if the monitor does not display the suspended load information.

NOTICE Lifting capacities are different than rated load capacities. Lifting capacities should not be used to determine the rated load of the shovel crane function. Only use the rated load capacities found in Operation and Maintenance Manual, "Specifications" to determine the rated load capacity for the shovel crane function.

NOTICE

Do not operate the shovel crane if the beacon light does not function properly. Before operation, check that the beacon light is flashing/rotating properly.

In some regions, regulations require a shovel crane configuration to lift certain objects. Always obey the local regulations in your region.

Refer to this Operation and Maintenance Manual, "Shovel Crane Operation" for additional information regarding the operation of the shovel crane.

Operate the machine according to the rated load table for your machine. Refer to Operation and Maintenance Manual, "Specifications (Shovel Crane)" for more information.

M0068104-12 327
Operation Section

Activating the Shovel Crane

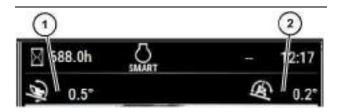


Illustration 517 g06224668

Use pitch indicator (1) and roll indicator (2) on the monitor to position the machine on a level surface.

Once the machine is in position on firm level ground, retract the bucket and lower the bucket to the ground.

Move the hydraulic lockout control to the LOCKED position. Stop the engine.

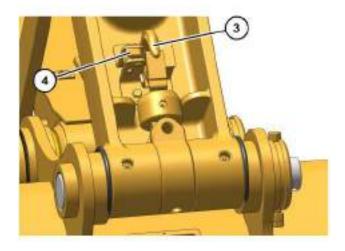


Illustration 518

- (3) Shovel crane hook
- (4) Shovel crane latch

Release latch (4). Lower hook (3) into operating position.

Inspect the shovel crane hook for damage. See Operation and Maintenance Manual, "Shovel Crane -Inspect"



Illustration 519 g06224672

Press the function list button on the home screen.



Illustration 520

g06205428

g06210063

If Equipped

Tap the crane option or if using the jog dial highlight the crane option and press down on the jog dial. The crane option should now say "ON"

Note: Tool Control should be turned OFF before the shovel crane can be activated. Select "Bucket" instead of any other tools. If any other work tool is selected, the shovel crane mode cannot be activated.



Illustration 521

(5) Shovel crane indicator

g06224673

Once the crane option is enabled, press the home button.

The monitor will display the following on the home page:

- Height
- Radius
- **Actual Load**
- Rated Load (not traveling)
- Rated Load (traveling)

Note: The rated load icon will turn yellow and a track will appear when the machine is travelling.

Shovel crane indicator (5) will display at the top of the monitor to indicate that the shovel crane feature is active.

Fully retract the bucket to activate the shovel crane mode. The bucket will lock into place and will not move, and the engine speed will then be reduced.

Note: If the hydraulic lockout control is moved to the LOCKED position, the shovel crane will become inoperable.

Refer to Operation and Maintenance Manual, "Shovel Crane Operation" for additional information regarding the operation of the shovel crane.

Deactivating the Shovel Crane



Illustration 522 q06191883

Return to the function list screen. Tap the crane option or if using the jog dial highlight the crane option and press down on the jog dial. The crane option should now say "OFF" .

Position the stick so that it is perpendicular to the ground and slowly lower the boom until the bucket contacts the ground.

Return the hook to the stored position and latch the hook.

Indicators and Warnings

Below is a list of indicators and warnings that may appear on the monitor during the shovel crane operation.

Travel With Lift Out of Work Area – If the radius is over 70% of maximum radius when traveling, the monitor will display this warning. If this warning occurs, stop traveling until the machine center of gravity becomes stable or reduce the suspended load

Crane 90% Load – If the suspended load is 90% of the rated load, the monitor will display this warning and an alarm will sound continuously. If this warning occurs, stop operation until the machine center of gravity becomes stable or reduce the suspended load.

Crane 100% Load – If the suspended load is 100% of the rated load, the monitor will display this warning and an alarm will sound continuously. If this warning occurs, stop operation until the machine center of gravity becomes stable or reduce the suspended load.

Crane Hook Interference – When the lifting height is too high, the monitor will display this warning. If this warning is present, stop lifting and lower the boom or retract the stick.

Boom Out of Work Area – When the boom cylinder is extended to the point near stroke end, the monitor will display this warning. If this warning is present, lower the boom.

Stick Out of Work Area – When the stick is retracted from the vertical position, the monitor will display this warning. If this warning occurs, return the stick to vertical.

Crane Malfunction – When an abnormality occurs with a shovel crane-related component, the monitor will display this warning. If this warning occurs, stop lifting and contact your Cat dealer.

Crane Mode Off – When the crane system has been stopped or disabled, the monitor will display this indicator.

i08015260

Joystick Controls

SMCS Code: 5705

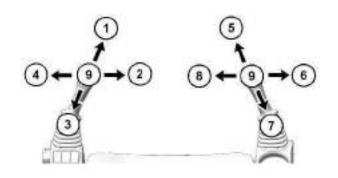


Illustration 523

g06180324

- (1) STICK OUT
- (2) SWING RIGHT
- (3) STICK IN
- (4) SWING LEFT
- (5) BOOM LOWER (6) BUCKET DUMP
- (7) BOOM RAISE
- (8) BUCKET CLOSE
- (9) HOLD

MARNING

The joystick and controls on the joystick can be configured with different functions. Always make sure to check the joystick configuration on the monitor before using the machine to avoid unexpected machine movement. These unexpected machine movements could cause a hazard resulting in serious injury or death.

WARNING

The Fine Swing Control delays the engagement of the swing parking brake.

If the machine is operating on a slope with the Fine Swing Control in the ON position, the swing motion may become uncontrollable which could result in property damage, personal injury or death.

Turn the Fine Swing Control to the OFF position when the machine is operating on a slope.

When you release the joysticks from any position, the joysticks will return to HOLD position (9). Movement of the upper structure will stop unless the fine swing control (if equipped) is ON. When the fine swing control is ON, the swing parking brake will not activate until 6.5 seconds after the joystick control for the swing function returns to the HOLD position.

Two functions may be performed at the same time by moving a joystick diagonally.

The machine control pattern is initially set at the factory to the SAE system, as shown. The pattern on the left pertains to the left joystick and the pattern on the right pertains to the right joystick.

The machine control pattern can be varied. Refer to Operation and Maintenance Manual, "Joystick Controls Alternate Patterns" for more information.

Manual Low Idle – Activate the manual low idle to reduce the engine speed to approximately 1000 rpm. Pressing the switch again will allow the engine speed to return to the original setting of the engine speed dial.

The manual low idle allows the operator to reduce the rpm without touching the engine speed dial. Manual low idle is useful when the operator wants to reduce the engine speed to talk to someone or while the operator is waiting for a truck.

Vertical Slider Joystick Controls



Illustration 524 g06224200

Vertical Slider Joystick Controls

- (1) Left joystick switch 3(2) Left joystick switch 4(3) Left joystick switch 1(4) Left joystick switch 2

- (5) Left joystick thumbwheel(6) Right joystick thumbwheel(7) Right joystick switch 2(8) Right joystick switch 1

(9) Right joystick switch 4 (10) Right joystick switch 3

Table 29

Joystick Configurations					
Switch Location	Machine Configuration				
	Grade	Grade Assist	Grade Payload	Grade Assist Payload	
1(1)	Hammer	Hammer	Hammer	Hammer	
2	Standby / Weigh	Standby / Weigh	Standby / Weigh	Standby / Weigh	
3	Horn	Horn	Horn	Horn	
4	Store	Store	Store	Store	
5(1)	Work Tool Rotation	Work Tool Rotation	Work Tool Rotation	Work Tool Rotation	
6(1)	Work Tool Open / Close				
7	Bucket Recall and Store				
8	Bench Mark	Bench Mark	Bench Mark	Bench Mark	
9	Grade and Bucket Assist Activation				
10	Laser and Touch Point				

⁽¹⁾ Button is configurable on machines without tool control.

Note: The following functions can be assigned to the configurable buttons: radio mute, one-touch low idle, work tool select, and HVAC.



Illustration 525 g06225116

Vertical Slider Joystick Controls

- (7) Left joystick switch 3 (8) Left joystick switch 4 (9) Left joystick switch 1
- (10) Left joystick switch 2

- (11) Left joystick thumbwheel(12) Right joystick thumbwheel(13) Right joystick switch 2

- (14) Right joystick switch 1

(continued)

- (15) Right joystick switch 4
- (16) Right joystick switch 3

Table 30

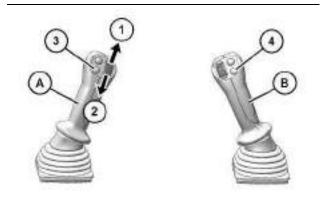
Joystick Configurations			
Switch Location	Joystick With Tool Con- trol Sliders		
7(1)	Hammer		
8	Configurable		
9	Horn		
10	Configurable		
11(1)	Work Tool Rotation		
12(1)	Work Tool Open / Close		
13	Configurable		
14	Configurable		
15	Configurable		
16	Configurable		

(Table 30, contd)

(1) Button is configurable on machines without tool control.

Medium Pressure (If Equipped)

Rotating Tool Control



g06260903

- (A) Left joystick

- (A) Lett Joystick
 (B) Right joystick
 (1) Thumb wheel (Clockwise)
 (2) Thumb wheel (Counterclockwise)
 (3) Horn switch
 (4) AEC switch

Illustration 526



(1) ROTATE CLOCKWISE - Move the thumb wheel upward to rotate the work tool clockwise.



(2) ROTATE COUNTERCLOCKWISE -Move the thumb wheel downward to rotate the work tool counterclockwise.



(3) HORN - Press the horn switch on the left joystick to activate the horn.



(4) AEC SWITCH - Press the AEC switch on the right joystick to activate low engine speed. Press the switch again to activate high engine speed.

i08233391

Joystick Controls

(Tilt-Rotator System (TRS) (If Equipped))

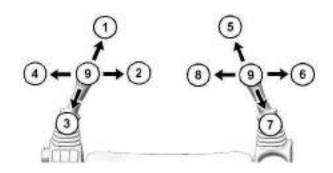
SMCS Code: 5705

⋒ WARNING

Verify the joystick control pattern and functionality parameters before operating machine.

Ensure that the joystick control film on the cab window matches the control functions of your machine. Consult your Cat dealer for additional information regarding the joystick control film.

Become familiar with the joystick controls before operating the machine.



g06180324

- Illustration 527
- (1) STICK OUT (2) SWING RIGHT
- (3) STICK IN
- (4) SWING LEFT
- (5) BOOM LOWER
- (6) BUCKET DUMP
- (7) BOOM RAISE
- (8) BUCKET CLOSE
- (9) HOLD

⋒ WARNING

The Fine Swing Control delays the engagement of the swing parking brake.

If the machine is operating on a slope with the Fine Swing Control in the ON position, the swing motion may become uncontrollable which could result in property damage, personal injury or death.

Turn the Fine Swing Control to the OFF position when the machine is operating on a slope.

When you release the joysticks from any position, the joysticks will return to HOLD position (9). Movement of the upper structure will stop unless the fine swing control (if equipped) is ON. When the fine swing control is ON, the swing parking brake will not activate until 6.5 seconds after the joystick control for the swing function returns to the HOLD position.

Two functions may be performed at the same time by moving a joystick diagonally.

The machine control pattern is initially set at the factory to the SAE system, as shown. The pattern on the left pertains to the left joystick and the pattern on the right pertains to the right joystick.

The machine control pattern can be varied. Refer to Operation and Maintenance Manual, "Joystick Controls Alternate Patterns" for more information.

Manual Low Idle - Activate the manual low idle to reduce the engine speed to approximately 1000 rpm. Pressing the switch again will allow the engine speed to return to the original setting of the engine speed dial.

The manual low idle allows the operator to reduce the rpm without touching the engine speed dial. Manual low idle is useful when the operator wants to reduce the engine speed to talk to someone or while the operator is waiting for a truck.

g06595878

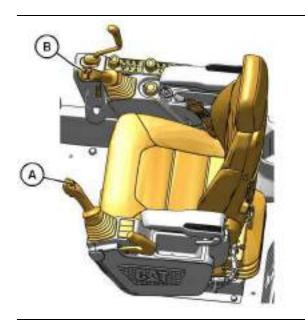


Illustration 528 g06595876

- (A) Left Joystick
- (B) Right Joystick

Rear View of Joystick Controls

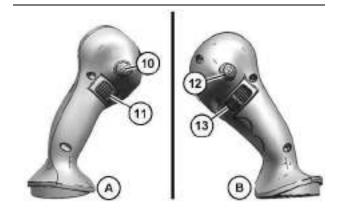


Illustration 529

g06596328

- (A) Rear View Left Joystick
- (B) Rear View Right Joystick
- (10) Left Joystick Switch
- (11) Left Joystick Thumb Wheel
- (12) Right Joystick Switch
- (13) Right Joystick Thumb Wheel

Left Joystick Control Patterns

The left joystick has seven buttons.

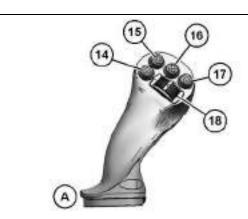


Illustration 530

Typical Example

(A) Left Joystick

Table 31

Joystick Control	Left Joystick Function
(14)	Tilt-Rotator Bucket
(15)	Horn
(16)	Weigh Mode
(17)	One Touch
(18)	-

Right Joystick Control Patterns

The right joystick has seven buttons.

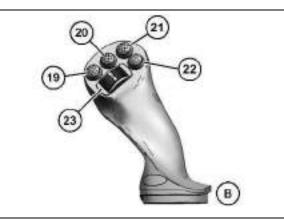


Illustration 531

Typical Example

(B) Right Joystick

g06595879

Table 32

Joystick Control	Right Joystick Patterns
19	Laser and Touch
20	Grade and Bucket
21	Bench Mark
22	Tilt-Rotator Rec
23	-

i06951419

SmartBoom Control

(If Equipped)

SMCS Code: 5461-ZS; 7332

A WARNING

Personal injury or death can result from not following the proper procedures.

To avoid the possibility of injury or death, follow the established procedure.

WARNING

Activating the SmartBoom function and using the work tool joystick control while the front of the machine is elevated could result in unexpected machine motion. Unexpected machine motion could result in serious injury or death. Do not activate the SmartBoom function if the front of the machine is elevated by the front linkage.

WARNING

Do not elevate or lower the track when in the SmartBoom mode. Follow the operation procedures for the SmartBoom in the Operation and Maintenance Manual. Failure to follow these instructions can result in serious injury or death.

A WARNING

Always make sure that the boom control joystick is in the NEUTRAL position before activating the SmartBoom control. Activating the SmartBoom control with the joystick out of the neutral position could resulted in unexpected machine motion which could result in serious injury or death.

WARNING

Do not select any SmartBoom mode, using the SmartBoom selector switch located on the console, while the tracks are elevated. Selecting the SmartBoom mode with the tracks elevated could result in a sudden drop of the machine which could result in serious injury or death.

A WARNING

If any SmartBoom mode is active and the boom control joystick is in the BOOM DOWN position (forward) with a bucket or a work tool on the ground, pressing the disable button that is located on the front of the right hand joystick could cause a sudden boom down motion. This control function could lift the machine upward, with unexpected machine movement that could result in serious injury or death. Do not press the disable button while the SmartBoom mode is active and the boom control joystick is in the BOOM DOWN position (forward) with a bucket or a work tool on the ground.

WARNING

Do not attempt to lift the tracks of the machine by using the disable button and applying downward force with the boom lowering control while the machine is in any SmartBoom mode. Releasing the disable button will immediately return the machine to the active SmartBoom mode. This action could cause the machine to drop down abruptly which could result in serious injury or death.

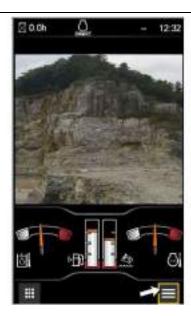


Illustration 532 g06210059

From the home screen, press the function list button.



Illustration 533

g06210090

Tap the smart boom option, or if using the jog dial, select the smart boom option and press down on the dial.



Illustration 534

g06210095

335

Select either "Up & Down" or "Down Only" from the list. The two options work as follows:

"Up & Down" mode: When the joystick is moved to the BOOM DOWN position, the boom will lower by the weight of the boom. The boom can move upward freely.

"Down Only" mode: The boom will lower by the weight of the boom when the control lever is moved to the BOOM LOWER position. This mode prevents the boom from moving upward. To move the boom upward, the operator must use the boom control joystick to activate the BOOM UP mode.

Press the home button when finished.

During operation of the SmartBoom function, the operator may wish to apply downward force to the boom. The operator can disable the SmartBoom function temporarily with the SmartBoom disable switch. While the trigger switch is pressed, BOOM RAISE and BOOM LOWER will operate in the normal modes. The SmartBoom disable switch is a configurable switch.

i08222281

Work Tool Control (One-Way Flow)

(If Equipped)

SMCS Code: 6700

The following information pertains to work tools that require hydraulic oil flow in one direction. Hydraulic hammers are an example of work tools that require hydraulic oil flow in one direction.

Note: For information that pertains to work tools that require hydraulic oil flow in two directions, refer to Operation and Maintenance Manual, "Work Tool Control (Two-Way Flow)".

Joystick

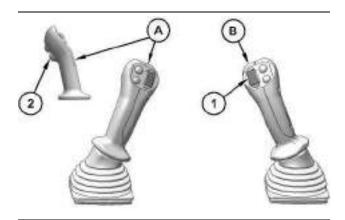


Illustration 535 g06588792

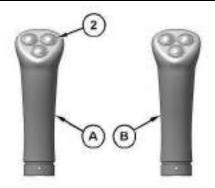


Illustration 536 g06588793

(A) Left joystick (B) Right joystick



(1) Variable Speed – Move the thumb wheel downward to activate the work tool. Move the thumb wheel further to increase the speed of the work tool.



(2-1) On/Off (Momentary) - While pressing this switch, the work tool will remain activate at a constant rate. Release the switch to turn off the work tool.

(2-2) On/Off (Toggled) - Press the switch once to activate the work tool. Press the switch again to turn off the work tool.

Work Tool Pedal

WARNING

With certain attachment combinations, the work tool pedal can have different functions. Always check for work tool pedal function before using the work tool pedal. Improper operation of the work tool pedal could result in serious injury or death.

The work tool pedal can be installed on either side of the travel pedals. The work tool pedal allows the operator to modulate the speed of the work tool.

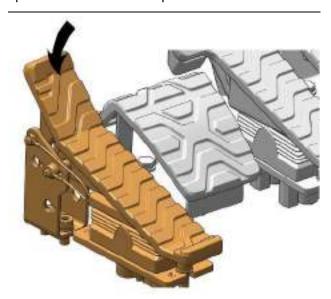


Illustration 537 g06180447

Variable Speed - Push down on the front of the pedal to activate the work tool. Move the pedal further to increase the speed of the work tool. Release the pedal to turn off the work tool.

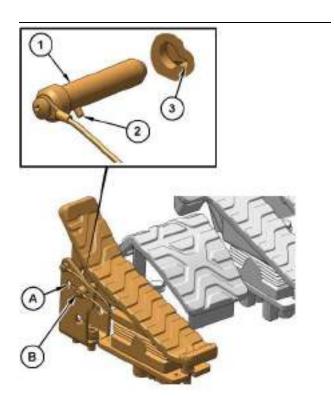


Illustration 538

g06591307

- (1) Lock pin
- (2) Pin
- (3) Notch
- (A) UNLOCKED position
- (B) LOCKED position

When you are not using the work tool, put the lock pin (1) in LOCKED position (B). This will lock the work tool pedal to prevent any unexpected operation of the work tool.

Note: To prevent lock pin (1) from being accidentally pulled out, insert pin (2) through notch (3) and turn lock pin (1) counterclockwise by 1/4 turn.

i07243676

Work Tool Control (Two-Way Flow)

(If Equipped)

SMCS Code: 6700

A WARNING

The joystick and controls on the joystick can be configured with different functions. Always make sure to check the joystick configuration on the monitor before using the machine to avoid unexpected machine movement. These unexpected machine movements could cause a hazard resulting in serious injury or death.

The following information pertains to work tools that require hydraulic oil flow in two directions. These work tools can also be equipped with a rotate circuit. Hydraulic shears, pulverizers, crushers, and grapples are examples of work tools that require hydraulic oil flow in two directions.

Note: For information that pertains to hydraulic hammers, refer to Operation and Maintenance Manual, "Work Tool Control (One-Way)".

Joystick

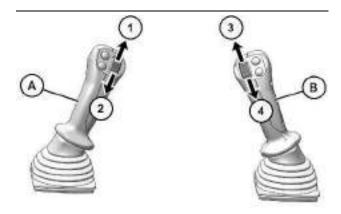


Illustration 539

g06180488

(A) Left joystick (B) Right joystick



(1) ROTATE CLOCKWISE – Move the thumb wheel upward to rotate the work tool clockwise.



(2) ROTATE COUNTERCLOCKWISE – Move the thumb wheel downward to rotate the work tool counterclockwise.



(3) CLOSE - Move the thumb wheel upward to close the work tool.



(4) OPEN - Move the thumb wheel downward to open the work tool.

Work Tool Pedal

MARNING

With certain attachment combinations, the work tool pedal can have different functions. Always check for work tool pedal function before using the work tool pedal. Improper operation of the work tool pedal could result in serious injury or death.

The work tool pedal can be installed on either side of the travel pedals. The work tool pedal allows the operator to vary the speed of the work tool.

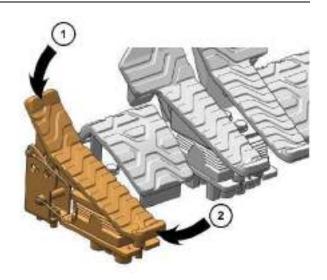


Illustration 541

g06180514

- (3) Lock pin
- (4) Pin
- (5) Notch
- (A) LOCKED position (B) UNLOCKED position

When you are not using the work tool, put the lock pin (3) in LOCKED position (A). This will lock the work tool pedal to prevent any unexpected operation of the work tool.

Illustration 540

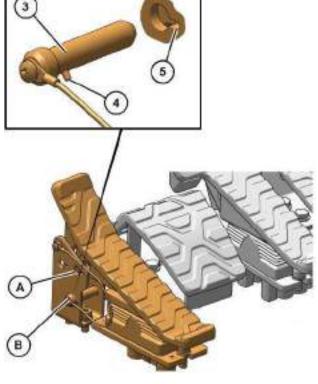
g06180510



(1) CLOSE - Push down on the front of the pedal to close the work tool.



(2) OPEN - Push down on the rear of the pedal to open the work tool.



Note: To prevent lock pin (3) from being accidentally pulled out, insert pin (4) through notch (5) and turn lock pin (3) by 1/4 turn.

i08209549

Joystick Controls Alternate Patterns

SMCS Code: 5059; 5137

Changing Machine Control Pattern (If Equipped)

A WARNING

Whenever a change is made to the machine control pattern, also exchange the pattern card in the cab to match the new pattern.

Check the machine control pattern for conformance to the pattern on the card in the cab. If the pattern does not match, change the card to match the machine control pattern before you operate the machine. Failure to do so could result in personal injury.

The machine control pattern can be changed to the ISO/JIS pattern, BHL pattern, MHI pattern, KOBE pattern, or the former SCM pattern. To change the joystick controls between the patterns, refer to Operation and Maintenance Manual, Monitoring System for more information.

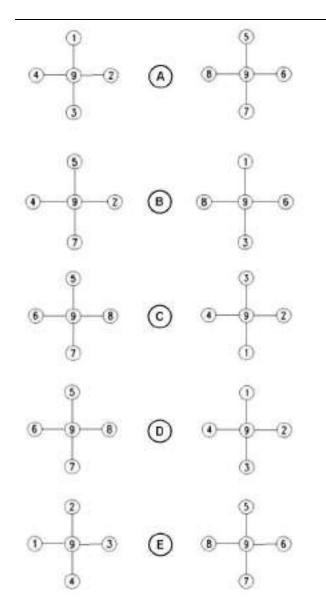


Illustration 542

g06136699

- (A) ISO/JIS machine control pattern
- (B) BHL machine control pattern
- (C) MHI machine control pattern
- (D) KOBE machine control pattern
- (E) Former SCM machine control pattern

The patterns on the left side of the Illustration show the possible configurations for the left control lever. The patterns on the right side of the Illustration show the possible configurations for the right control lever.



STICK OUT (1) – Move the control lever to this position to move the stick outward.



SWING RIGHT (2) – Move the control lever to this position to swing the upper structure to the right.



STICK IN (3) – Move the control lever to this position to move the stick inward.



SWING LEFT (4) – Move the control lever to this position to swing the upper structure to the left.



BOOM LOWER (5) – Move the control lever to this position to lower the boom.



BUCKET DUMP (6) – Move the control lever to this position to dump the bucket.



BOOM RAISE (7) – Move the control lever to this position to raise the boom.



BUCKET CLOSE (8) – Move the control lever to this position to close the bucket.

HOLD (9) – When the control lever is released from any position, the control lever will return to the HOLD position. Movement of the upper structure will stop.

Two functions may be performed at the same time by moving a control lever diagonally.

If the machine is equipped with a hydraulic hammer, the function of position (6) and of position (8) is different.

HYDRAULIC HAMMER RAISE (6) – Move the control lever to this position to raise the hydraulic hammer.

HYDRAULIC HAMMER LOWER (8) – Move the control lever to this position to lower the hydraulic hammer.

If the machine is equipped with a grapple, the function of position (6) and of position (8) is different.

GRAPPLE OPEN (6) – Move the control lever to this position to open the grapple arms.

GRAPPLE CLOSE (8) – Move the control lever to this position to close the grapple arms.

If the machine is equipped with a clamshell, the function of position (6) and of position (8) is different when in "Clamshell" mode.

Note: When in "Clamshell" mode, the work tool can only be operated if Work Tool Select also has clamshell selected.

CLAMSHELL OPEN (6) – Move the control lever to this position to open the clamshell.

CLAMSHELL CLOSE (8) – Move the control lever to this position to close the clamshell.

i06951805

Fuel Tank Shutoff and Drain Control

SMCS Code: 1273

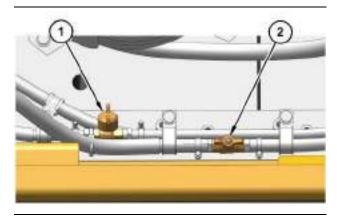


Illustration 543

a06214473

Fuel tank drain valve and shutoff

Fuel Tank Drain Valve (1) – The drain valve for the fuel tank is located behind the right side access door. To drain the water and sediment from the fuel tank, turn the fuel drain valve counterclockwise. To close the fuel tank drain valve, turn the drain valve clockwise.

Fuel Shutoff Valve (2) – The fuel shutoff valve is located behind right side access door. To shut off the fuel supply, turn the fuel shutoff valve clockwise. To turn on the fuel supply, turn the fuel shutoff valve counterclockwise.

Note: For more detailed information that pertains to draining the water and sediment from the fuel tank, refer to Operation and Maintenance Manual, "Fuel Tank Water and Sediment - Drain".

Engine Starting

i08185791

Engine Starting

SMCS Code: 1000; 1090; 1456; 7000

NOTICE

This machine is equipped with a Cat [®] Machine Security System (MSS) and may not start under certain conditions.

NOTICE

The engine start switch must be in the ON position and the engine must be running in order to maintain electrical functions and hydraulic functions. This procedure must be followed in order to prevent serious machine damage.

Note: The engine can start in areas that have temperatures as low as −18°C (0°F). For areas that are colder, a starting kit for cold weather is available.

1. Move the hydraulic lockout control to the LOCKED position.

This machine is equipped with an engine neutral start system. The system only allows the engine to start when the lever for the hydraulic lockout control is in the LOCKED position.

2. Ensure that the joysticks and travel controls are in the HOLD position.



Illustration 544 g06209482

3. The operator passcode, Bluetooth key or Cat App: Fleet management app must be authenticated before starting the engine. Once authenticated, an "Engine Start Allowed" message will appear across the top of the monitor and the start switch LED will turn green.

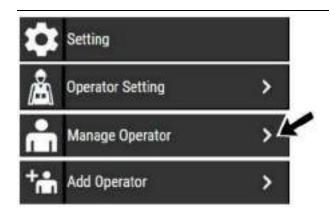


Illustration 545 g06579150

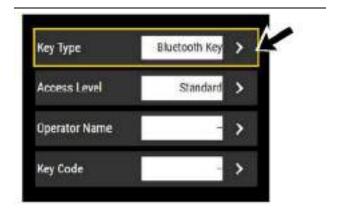


Illustration 546 g06579155

4. Bluetooth devices and passcodes can be registered using the in-cab display if the operator is logged in to the system using a master access account. Contact your Cat dealer for additional information.

Reference: Refer to Operation and Maintenance Manual, Machine Security System, Operator Login for instructions.

5. Before you start the engine, check for the presence of bystanders or maintenance personnel. Ensure that all personnel are clear of the machine. Briefly sound the horn before you start the engine.

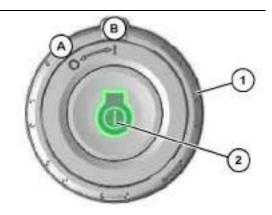


Illustration 547 g06226447

- (A) Off
- (B) On
- (1) Engine start ring
- (2) Engine start button
- **6.** Turn the engine start ring(1) to the ON position, then press and hold start button (2) to start the engine. Release the button after the engine has started.

If the engine is having trouble starting, do not crank the engine for more than 30 seconds. Cranking the engine for more than 30 seconds can damage starting system components.

i07552385

Engine and Machine Warm-Up

SMCS Code: 1000; 7000

NOTICE

Keep engine speed low and do not operate until the message 'Warm-Up Mode Power Derate" on the monitor goes out. If it does not go out within thirty seconds, stop the engine and investigate the cause before starting again. Failure to do so, can cause engine damage.

NOTICE

Always run the engine at low idle for at least ten minutes before performing any other operations in cold conditions or each time the engine oil and oil filter are changed in order to protect your engine and hydraulic components.

NOTICE

Depending on the ambient temperature, in order to prevent the machine operation with high speed without sufficient lubrication at the turbo bearing, the engine speed may be set to low speed and the hydraulic power minimized for a pre-determined time after the engine starts. Refer to turbo protection feature.

The engine may automatically change speeds when the machine is stationary and idling in cold ambient temperature for an extended time. This is to:

- Maintain desired coolant temperature.
- Maintain desired operation of engine systems.

During extended idling in cold ambient conditions, engine speed may operate between 900 rpm and 1000 rpm. Operation at 1000 rpm is minimal and will only last for up to 20 minutes.

Hydraulic System

Automatic Warm-Up

This machine comes with an automatic warm-up feature that can be enabled or disabled. If the feature is enabled, and the hydraulic oil temperature is below the threshold that has been set, a prompt will appear on the monitor after starting the machine. Follow the prompts on the monitor. If this feature is disabled or you would like to change the temperature setting, refer to Operation and Maintenance Manual, Monitoring System.



Illustration 548 g06219830

Manual Warm-Up

WARNING

When you cycle the machine controls, the machine can move suddenly. Contact between the machine and external objects or ground personnel can result in serious injury or death. Before you cycle the machine controls, the machine should be located in an unobstructed, hazard-free work area that is away from external objects and ground personnel.

 Make sure that the area is clear of personnel and equipment.

Note: The hydraulic lockout control must be in the UNLOCKED position before the hydraulic controls will function.

2. Allow the engine to warm up at low idle for at least 5 minutes. Engage the work tool controls and disengage the work tool controls. This will speed up the warm-up of the hydraulic components.

When you idle the machine for warm-up, observe the following recommendations:

- If the temperature is greater than 0°C (32°F), warm up the engine for approximately 15 minutes.
- If the temperature is less than 0°C (32°F), warm up the engine for approximately 30 minutes.

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 If the temperature is less than – 18°C (0°F) or if hydraulic functions are sluggish, additional time may be required.

NOTICE

The hydraulic oil temperature should be higher than 25 °C (77 °F) before performing work with the machine. Make sure that the warm-up procedure is performed.

If the hydraulic oil temperature is less than 25 °C (77 °F) and the machine is operated abruptly, serious damage to the hydraulic components may occur.

Note: The recommended operating temperature of the hydraulic fluid for this machine is 55 °C (131 °F).

3. To warm up the hydraulic oil, turn the engine speed dial to the medium engine speed. Run the engine for approximately 5 minutes and move the joystick intermittently from the BUCKET DUMP position to the HOLD position. Do not hold the joystick in the BUCKET DUMP position with the bucket cylinder fully extended for more than 10 seconds.

This allows the oil to attain relief pressure, which causes the oil to warm up more rapidly.

- **4.** Turn the engine speed dial to the maximum engine speed and repeat Step 3.
- **5.** Cycle all controls to circulate warm oil through all hydraulic cylinders and all hydraulic lines, and through the swing motor and travel motors.
- **6.** Observe the gauges and the indicators frequently during the operation.



Turbo Protection Power Derate – After an engine start, the engine speed will be set to low speed and the hydraulic

power limited for a time period. During this period, the monitor displays the message "Warm -Up Mode Power Derate". (Maximum is around 30 seconds). After the turbo bearing lubrication is sufficient, the engine speed goes to the setting dial speed and the monitor stops to display the message.

Improve Cold-Weather Performance

Covers installed over the vents in the radiator compartment door will help to control overcooling in ambient temperatures below -15° C (5° F).

The materials used for the covers and the method used to install the covers is at the installers discretion.

Install the covers if overcooling is observed while the machine is idling in ambient temperatures below -15° C (5° F).

Stop the machine, and remove the covers under the following conditions:

- The ambient temperature is above -15° C (5° F).
- The engine temperature gauge indicates overheating.
- The hydraulic oil temperature gauge indicates overheating.

Recommendation for Crankcase Breather Protection (Machines with C4.4 and C7.1)

Crankcase ventilation gases contain a large quantity of water vapor. This water vapor can freeze in cold ambient conditions and can plug or damage the crankcase ventilation system. If the engine is operated in temperatures below -25° C (-13° F), measures must be taken to prevent freezing and plugging of the breather system. Insulated hoses and a heated canister assembly should be installed.

Consult with your Cat dealer for the recommended breather components for operation from -25° to -40° C (-13° to -40°F).

Installation



Illustration 549

g06181368

Vent locations on the radiator compartment door.

 Clean the surface of the radiator compartment door. 2. Install the covers in the locations shown in Illustration 549. The covers should fully cover the door vents.

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Operation

i07348768

Operation Information

SMCS Code: 7000

Note: Operating Temperature Range for the Machine The machine must function satisfactorily in the anticipated ambient temperature limits that are encountered during operation. The standard machine configuration is intended for use within an ambient temperature range of -18 °C (0 °F) to 43 °C (109 °F). Special configurations for different ambient temperatures may be available. Consult your Cat dealer for additional information on special configurations of your machine.

Make sure that no personnel are on the machine or near the machine to prevent any personal injury. Keep the machine under control at all times to prevent injury.

Sound the horn and allow adequate time for bystanders to clear the area before moving the machine into a restricted visibility area. Follow local practices for your machine application. For more information refer to Operation and Maintenance Manual, "Restricted Visibility".

Reduce the engine speed when you maneuver the machine in tight quarters and when you drive over an incline.

Select the necessary travel speed range before you drive downgrade. Do not change the travel speed range while you drive downhill.

Use the same travel speed on a downgrade and on an upgrade.

When you travel for any distance, keep the stick inward and carry the boom in a low position.

When you drive up a steep grade, keep the boom as close to the ground as possible.

When you travel uphill or you travel downhill, keep the boom on the uphill side of the machine.

- 1. Adjust the operator seat.
- 2. Fasten the seat belt.



Illustration 550

q06181515

- **3.** Turn the engine speed dial to the desired operating range.
- **4.** Move the hydraulic lockout control to the UNLOCKED position.

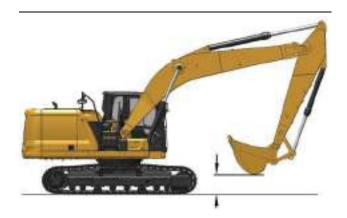


Illustration 551

g06181525

5. Raise the boom enough to provide sufficient ground clearance.



Illustration 552 g06181517

- **6.** Select the desired travel speed by operating the travel speed control switch. The indicator will light to display the active mode.
- 7. Make sure that the position of the upper structure and of the undercarriage is known before you move the machine. The drive sprockets should be at the rear of the machine.

Note: The directional steering controls will operate normally if the drive sprockets are at the rear of the machine and the idlers are at the front of the machine and under the cab. When the sprockets are under the cab, the travel controls will operate backward.

- **8.** Turn the engine speed dial to increase the engine speed (rpm) to the desired speed.
- 9. Push both travel levers forward at the same time to travel forward. If both travel levers are pushed farther, the travel speed at the selected engine speed (rpm) will be faster.

Note: If the machine does not operate or if the machine does not travel in a straight line, consult your Cat dealer.

10. See Operation and Maintenance Manual, "Operator Controls" for information about spot turning and about pivot turns.

- **11.** When you make turns in soft material, travel in a forward direction occasionally to clear the tracks.
- **12.** Slowly move both of the travel levers or both of the travel pedals to the CENTER position to stop the machine.

Lifting Objects

If the machine is equipped with the CE plate per requirements for the European Union, used to lift objects, then the machine must be equipped with a boom lowering control valve, a stick lowering control valve, and an overload warning device.

A fit for purpose test was completed to confirm that a properly equipped machine meets the requirements of the European Union Machinery Directive "2006/42/EC" for lifting objects.

The overload warning device (if equipped) must be adjusted for the bucket linkage and bucket size that is installed on the machine. Adjust the overload warning device for proper operation.

The setting for the overload warning device (if equipped) should be checked by an authorized dealer.

i06981624

Frozen Ground Conditions

SMCS Code: 7000



Illustration 553

g06185895

To free the tracks from frozen ground, swing the boom to the front of the machine. Use boom down pressure to free the idler end of the machine.

Swing the boom to the rear of the machine. Use boom down pressure to free the sprocket end of the machine.

i07474576

Equipment Lowering with Engine Stopped

SMCS Code: 7000

To lower the boom, place the hydraulic lockout control in the UNLOCKED position. Move the joystick to the BOOM LOWER position. If the accumulator is still charged, the boom will lower.

If the boom does not lower, the accumulator is empty. Use one of the following procedures to lower the boom.

Machines Equipped with Boom Lowering Control Valves

MARNING

Boom load may cause cylinder oil pressure to reach relief pressure of the boom lowering control device when the boom is supported by one cylinder. Boom can lower suddenly, causing possible injury or death.

To avoid possible injury or death, be sure no one is under or near the work tool before manually lowering the boom.

Keep all personnel away from the boom drop area when lowering the boom with the engine stopped.

MARNING

Be sure no one is under or near the work tools before manually lowering the boom. Keep all personnel away from the boom drop area when lowering the boom with the engine stopped in order to avoid possible personal injury.

A WARNING

Personal injury can result from hydraulic oil pressure and hot oil.

Hydraulic oil pressure can remain in the hydraulic system after the engine has been stopped. Serious injury can be caused if this pressure is not released before any service is done on the hydraulic system.

Make sure all of the work tools have been lowered to the ground, and the oil is cool before removing any components or lines. Remove the oil filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand.

If the engine or the hydraulic system is disabled and the boom is up, the boom can be lowered manually. Boom lowering control valves allow the boom to be manually lowered. The boom lowering control valves are located at the head end port on the boom cylinders.

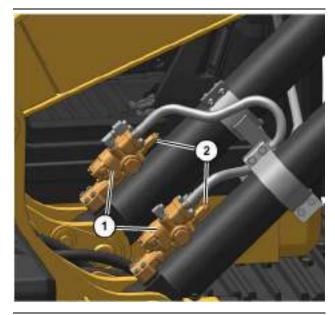


Illustration 554

q06263683

- (1) Boom lowering control valve
- (2) Line relief

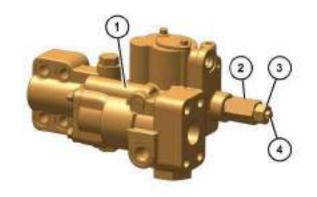


Illustration 555

g06263723

- (1) Boom lowering control valve
- (2) Line relief
- (3) Locknut
- (4) Set screw
- **1.** Loosen the locknut (3) at each of the boom lowering control valves.
- 2. Slowly, turn set screw (4) counterclockwise until the boom begins to lower onto the ground.

Note: Once the boom begins to lower, stop turning set screw (4).

- **3.** After the boom has lowered completely onto the ground, turn set screw (4) back to the original position.
- 4. Tighten locknut (3) to 40 ± 4 N·m (29.5 ± 3 b ft).
- **5.** Before operating the machine, make any necessary repairs.

For additional information, consult your Cat dealer.

Machines without a Boom Lowering Control Valve

MARNING

Be sure no one is under or near the work tools before manually lowering the boom. Keep all personnel away from the boom drop area when lowering the boom with the engine stopped in order to avoid possible personal injury.

Use the following procedure to manually lower the boom due to an engine malfunction.

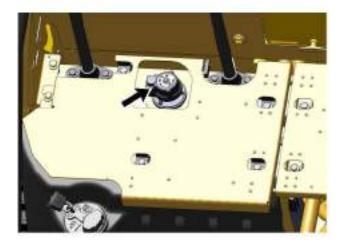


Illustration 556

g06184080

Hydraulic tank filler cap location

A WARNING

Pressurized system!

The hydraulic tank contains hot oil under pressure. To prevent burns from the sudden release of hot oil, relieve the tank pressure with the engine off. Relieve pressure by slowly turning the cap until the cap reaches the secondary stop.

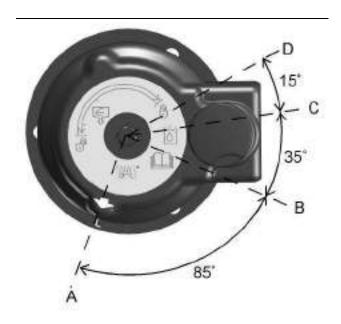


Illustration 557

q06184990

Filler cap

- (A) LOCK position
- (B) PRESSURE RELEASE START position
- (C) PRESSURE RELEASE END position
- (D) OPEN position
- Release the pressure that may be present in the return hydraulic circuit with the following procedure. Refer to Illustration 557 for filler cap positions.
 - a. Turn the filler cap counterclockwise and move the arrow from position (A) to position (B).
 - b. Release the pressure for a minimum of 45 seconds by moving the arrow from position (B) to position (C).
 - c. Move the arrow from position (C) to position (D)
 - d. After the tank pressure is relieved, remove the filler cap.



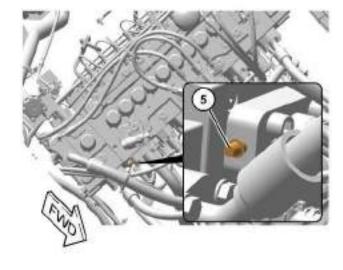


Illustration 558 g06225770

2. Open the engine hood.

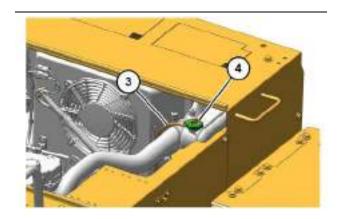


Illustration 559

- (3) Hose
- (4) Clamp
- **3.** Loosen clamp (4) and disconnect hose (3) from the reservoir. Remove the clamps and the cable straps that secure the hose to the machine.

Illustration 560 g06205184

Main control valve

(5) Screw

g06184089

- **4.** Connect one end of the radiator hose to screw (5). Put the other end of the hose into the hydraulic tank opening. The screw is located at the front, right side of the main control valve.
- **5.** Slowly loosen screw (5) by a maximum of 1/2 turn. This allows the hydraulic oil in the boom circuit to drain into the hydraulic tank. The boom will now start to lower.
- 6. Make sure that the work tool has lowered all the way to the ground. Tighten screw (5) to 13 ± 2 N⋅m (9 ± 1 lb ft).
- 7. Disconnect the hose from the screw. Do not allow the oil that is contained in the hose to spill. Drain the oil into a suitable container.
- **8.** Connect the hose to the original position on the radiator and install the hydraulic tank filler cap.
- **9.** Close the engine hood.

After completion of the manual boom lowering, make necessary repairs before you operate the machine again.

Pressure Release of Auxiliary Lines

A WARNING

Personal injury can result from hot oil spray and raised work tools.

Make sure all the work tools have been lowered, the oil is cool and the pressure has been released from the hydraulic system before removing any components or lines.

Do not allow hot oil or components to contact skin.

Note: Refer to Operation and Maintenance, "General Hazard Information" for information on containing fluid spillage.

Refer to the procedure below before any of the following conditions.

- · The work tool is changed.
- The position of the ball valve is changed.
- 1. Turn the engine start switch to the OFF position.
- **2.** Place the hydraulic lockout lever in the UNLOCKED position.
- Release the pressure in the auxiliary lines by pressing the auxiliary control buttons or the auxiliary control pedal three times.
- Place the hydraulic lockout lever in the LOCKED position.
- 5. Change the work tool.

Note: There should be movement in the auxiliary hydraulic lines as the pressure is released. If there is no movement in the auxiliary hydraulic lines, start the engine and run the engine for 20 seconds. Repeat steps 1 to 5.

For additional information, consult your Cat dealer.

Operating Techniques

i08069554

Operating Technique Information

SMCS Code: 7000

WARNING

Know the maximum height and the maximum reach of your machine. Serious injury or death by electrocution can occur if the machine or the work tools are not kept a safe distance from electrical power lines. Keep a distance of at least 3000 mm (118 inch) plus an additional 10 mm (0.4 inch) for each 1000 volts over 50000 volts.

For safety, one of the following may require a greater distance:

- Local codes
- State codes
- · Requirements of the job site

NOTICE

When swinging into a ditch, do not use the ditch to stop the swinging motion. Inspect the machine for damage if the boom is swung into a bank or an object.

Repeated stopping by an object can cause structural damage if the boom is swung into a bank or an object.

With certain boom-stick-bucket combinations, the bucket or worktool can hit the cab and/or the front structure of the machine. Always check for interference when first operating a new bucket or a new work tool. Keep the bucket or work tool away from the cab and away from the front structure during operation.

Whenever the tracks of the machine raise off the ground while digging, lower the machine back to the ground smoothly. DO NOT DROP OR CATCH IT WITH THE HYDRAULICS. Damage to the machine can result.

With certain combinations of work tools, the third pedal can have different functions. Always check the function of the third pedal before you use the third pedal.

Know the location of any buried cables. Mark the locations clearly before you dig.

Consult your Cat dealer for special work tool tips that are available for use in severe applications.

Move the machine whenever the position for operating the machine is not efficient. The machine can be moved forward or backward during the operating cycle.

When you operate the machine in close places, utilize the bucket or the other work tool to perform the following functions:

- · Pushing the machine
- Pulling the machine
- Lifting the tracks

Use a comfortable travel speed while you operate the machine.

Operating efficiency can be increased by using more than one machine control to perform a task.

Never swing a load over a truck cab or workers.

Position the truck so that material can be loaded from the rear of the truck or from the side of the truck. Load the truck evenly so that the rear axles are not overloaded.

An oversize bucket or a bucket that is equipped with side cutters should not be used in rocky material. These types of buckets slow down the cycle. Damage to the bucket and to other machine components could result.

Coaching Tips





Illustration 561

g06223763

Digging with a stable machine increases productivity. Create a stable work platform.

M0068104-12

353

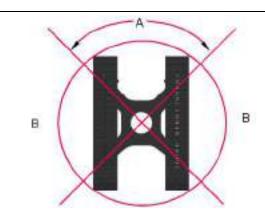


Illustration 562

g06210141

(A) Most stable dig

(B) Dump

For improved stability: Do not dig over the drives or perpendicular to the tracks.

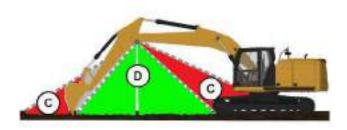


Illustration 563

g06212328

- (C) Weak crowd force
- (D) Ideal crowd force

Dig from the top down in layers. Try to have a full bucket by the time the stick is vertical, but do not reach too far with the stick. The most crowd force is generated with the stick +/- 30 degrees from vertical.

Minimize unneeded movement. Only curl/dump the bucket as much as required to hold/dump material.

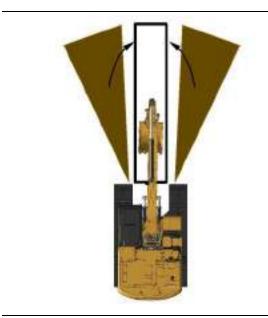


Illustration 564

g06210334

Minimize unneeded movement. During backfilling, start with the material closest to the trench.

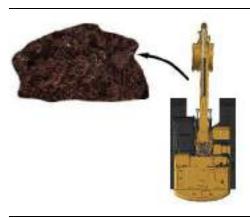


Illustration 565

g06210343

Watch your surroundings. Swing left to dump material for better visibility.

Watch the bucket. The bucket can contact the tracks or the cab.

Concentrate on being smooth, speed will come with practice.

354



Illustration 566 g06212604

Truck placement will affect efficiency: 45 degree truck loading is more efficient than 90 degree. Spotting the truck too far from the excavator causes excessive motion.

Load from a bench when possible. Bench loading is more efficient.

Restricted Operation



Illustration 567

g06222487

Do not use the swing force to perform the following operations:

- Soil compaction
- Ground breaking
- Demolition

Do not swing the machine while the bucket tips are in the soil.

These operations will damage the boom, the stick, and the work tool and the operations will reduce the life of the equipment.



Illustration 568

g06212594

Do not use the dropping force of the bucket or work tool as a hammer. This will bring excessive force on the rear of the machine. Possible damage to the machine could result.



Illustration 569

g06222492

If the cylinder is operated at the end of the stroke during operations, excessive force will occur on the stopper on the inside of the cylinder. This will reduce the life of the cylinder and structures. To avoid this problem, always leave a small margin of play when the cylinder is operated.

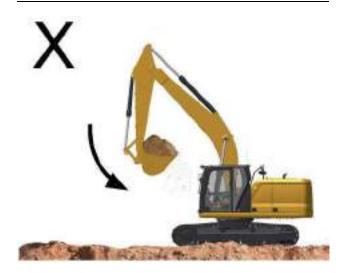




Illustration 570 g06222498

If the stick IN function is operated at full speed with a fully loaded bucket or heavy work tool attachment to the end of the cylinder stroke, excessive force will occur inside the stick cylinder. This action will reduce the life of the stick cylinder. To avoid this problem, always operate a stick IN function with moderate speed towards the end of cylinder stroke.



Illustration 571 q06222500

While the bucket is in the ground, do not use the travel force for any excavation. This operation will cause excessive force on the rear of the machine.

Illustration 572 g06222505

Do not use the dropping force of the rear of the machine for excavation. This operation will damage the machine.

Operating Precaution



Illustration 573 g06222507

NOTICE

Do not allow the machine to swing from the force of traveling when you use the bucket, the stick, or the boom to assist in travel. If the force from traveling causes the machine to swing, damage may occur to the swing motor and to the swing drive.

Do not use the force of the bucket, the stick, or the boom to assist in turning the machine while the machine is traveling. This technique is referred to as "jump steering". This technique will damage the swing motor and the swing brake.



Illustration 574 g06222509

When deep holes are dug, do not lower the boom so that the bottom side of the boom touches the ground.

When deep holes are dug, do not allow the boom to interfere with the tracks.

Grade and Assist Operating Tips

The following image displays proper stick speeds for accurate grading. One of the factors to accuracy is the grade assist speed setting. The setting can be set to Quick, Normal, or Fine. The settings are found in the Grade Assist screen on the monitor.

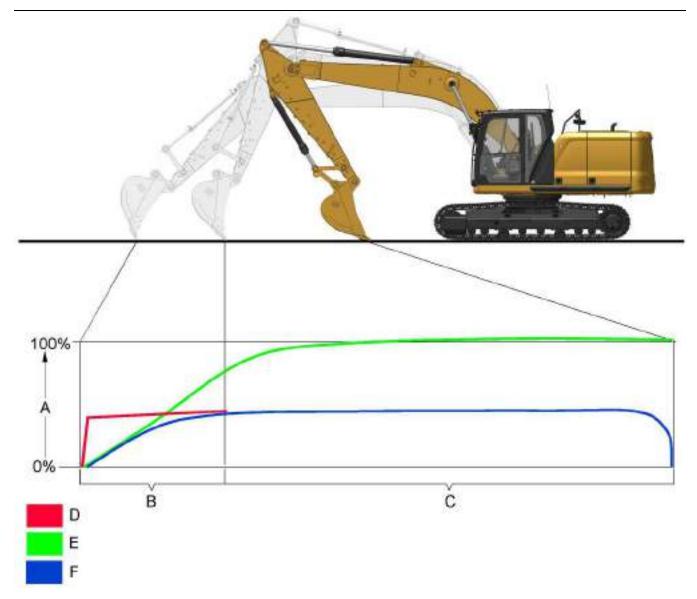


Illustration 575 g06250472

Stick speed vs. accuracy

- (A) Stick joystick movement
- (B) Joystick movement must be gradual
- (C) In fine or normal mode, joystick input can be at 100 percent.
- (D) Joystick movement too fast
- (E) Good for fine or normal mode
- (F) Good in any mode

For best results using Cat Grade, it is important to be cognizant of stick speed in order to obtain accurate results. When the bucket touches the ground before digging, the initial dig movement must be gradual. If operating in Fine or Normal mode, joystick speed can be increased to 100 percent after the slow initial engagement. Approximately 50 percent stick speed is necessary to maintain accuracy when in Quick mode after the slow initial engagement.

Cut/fill error can be minimized if the work tool is properly calibrated and the operator maintains a deliberate speed of operation.

Smart Boom

When using the smart boom function, it is necessary to slow down stick speed. Smart boom cannot keep up when the stick is operating at a rapid pace. This is particularly noticeable when the boom is at the raise/lower transition point and the stick is near vertical.

i07058371

Travel in Water and Mud

SMCS Code: 7000-V6

NOTICE

When working in or around any body of water, around a stream or river, or in conditions of heavy mud, be careful that the swing bearing, the swing drive gear, and the swivel joint do not dip into water, mud, sand, or gravel. If the swing bearing dips into water, mud, sand, or gravel, immediately grease the swing bearing until the used grease leaks from the outer circle of the swing bearing. Failure to carry out this procedure may cause premature wear in the swing bearing.



Illustration 576

g06223764

Depth of water to the center of the track carrier roller.

The following guidelines pertain to travel across water and travel through mud, sand, or gravel.

The machine can travel across a river only under the following conditions:

- The bed of the river is flat.
- The flow of the river is slow.
- The machine dips into the water only to the center of the track carrier roller (dimension A).

NOTICE

Do not allow the fan on the engine to contact the water while the machine travels through the water. Do not allow the fan on the engine to contact the water during a swing while the machine is in the water. Damage to the fan may occur if the fan contacts the water.

While you cross the river, carefully confirm the depth of the water with the bucket. Do not move the machine into an area that has a water depth that is greater than Dimension A.

The machine may sink gradually on soft ground. Therefore, you should frequently check the height of the undercarriage from ground level and the depth of water on the ground.

Check the swing gear by looking through the port for inspection that is on the upper frame. If there is water in the swing gear, contact your Cat dealer for the required maintenance on the swing gear.

After you travel through water, carefully clean the machine to remove any salt, sand, or other foreign matter.

Procedure for Removing the Machine from Water or Mud

NOTICE

Do not allow the machine to swing from the force of traveling when you use the bucket, the stick, or the boom to assist in travel. If the force from traveling causes the machine to swing, damage may occur to the swing motor and to the swing drive.



Illustration 577

g06222519

 You may not be able to move the machine by using the travel controls only. In this case use both the travel control levers/pedals and the stick to pull the machine out of the water or ground. M0068104-12 359

Operation Section
Boom, Stick and Bucket Operation



Illustration 578 g06222525

2. The machine may slip because of a steep slope. The procedure in Step 1 may not work. In this case, first rotate the upper structure by 180°. Then use both the travel control levers/pedals and the stick to move the machine up the slope.



Illustration 579 g06212337

3. It may be impossible to travel because the bottom of the frame comes into contact with the ground or the undercarriage is clogged with mud or gravel. In this case, operate the boom and the stick together. Raise the track and rotate the track forward and backward to remove the mud and the gravel.

i07058860

Boom, Stick and Bucket Operation

SMCS Code: 7000

Digging



Illustration 580 g06212506

1. Position the stick at a 70 degree angle to the ground.

360



Illustration 581 g06212513

2. Position the bucket cutting edge at a 120 degree angle to the ground. Maximum breakout force can now be exerted with the bucket.



Illustration 582 g06222533

3. Move the stick toward the cab and keep the bucket parallel to the ground.



Illustration 583 g06222535

4. If the stick stops due to the load, raise the boom and/or perform a curl to adjust the depth of the cut.

- **5.** To apply the greatest force at the cutting edge, decrease the down pressure as you move the stick toward the cab.
- **6.** Maintain a bucket attitude that ensures a continuous flow of material into the bucket.
- **7.** Continue the pass in a horizontal direction so that material peels into the bucket.



Illustration 584 g06222538

8. Close the bucket and raise the boom when the pass has been completed.



Illustration 585 g06223077

Engage the swing control when the bucket is clear of the excavation. M0068104-12 361



Illustration 586 g06223078

10. To dump a load, move the stick outward and open the bucket in a smooth motion.

Lifting Objects

WARNING

To prevent injury, do not exceed the rated load capacity of the machine. If the machine is not on level ground, load capacities will vary.

NOTICE

Damage to bucket cylinder, bucket or linkage could result if slings are placed incorrectly.

There may be local regulations and/or government regulations that govern the use of machines which lift heavy objects. Obey all local and government regulations.

If this machine is used to lift objects within an area that is controlled by the European Directive "2006/42/EC", the machine must be equipped with a boom lowering control valve, a stick lowering control valve, and an overload warning device.

Japan regulations require a shovel crane configuration to lift certain objects.

Contact your Cat dealer for additional information.

Short slings will prevent excessive load swing.



Illustration 587 g06212526

Use the lifting eye that is provided on the linkage to lift objects.

If the lifting eye is used, the connection must be made with a sling or with a shackle.



Illustration 588

An unstable condition can exist if a load exceeds the machine load rating or if a heavy load is swung over an end or over a side.

q06212532



Illustration 589 g06212530

The most stable lifting position is over a corner of the machine.



Illustration 590 g06212535

For the best stability, carry a load close to the machine and to the ground.



Illustration 591 g06212539

Lift capacity decreases as the distance from the swing centerline is increased.

Machines that are Equipped with a Long Reach Configuration

Machines with a long reach configuration require larger swing drift than standard machines when stopping, because inertial force in time of swing is large. Taking this into account, adjustments are made in timing for applying the swing brakes and speed of swinging.

Machines with a long reach configuration could be damaged and stability of the machine would be adversely affected if a control was suddenly operated, because inertial force of work tool is large.

i08036890

Shovel Crane Operation

SMCS Code: 6500

S/N: HEX1-Up

MARNING

Operating the machine using the correct method when performing a lifting operation is important. Incorrectly operating the machine may result in serious injury or death. Be sure to observe the following precautions.

Refer to this Operation and Maintenance Manual, "Shovel Crane Control" for additional information regarding machine controls for the shovel crane.

Operate the machine according to the rated load table of your machine. Refer to Operation and Maintenance Manual, "Specifications (Shovel Crane Specifications)" for more information.

Traveling with a Suspended Load



Illustration 592 g06222543

The rated load when traveling while suspending a load is limited to 50 percent of a stationary suspension. Make sure that the suspending load weight is within this limit before starting to move.

When traveling while suspending a load:

- 1. Make sure that the load is in the front of the machine, and operate within the maximum operating radius of 70° or less.
- 2. The height below the suspended load shall be 30 cm (12 inch) or less above ground.
- **3.** The traveling speed shall be 3 km/h or less.
- **4.** The traveling ground shall be level and of firm ground.

Traveling while suspending a swinging load may cause the machine to roll over. Wait until the load stops swinging before starting to move.

Dragging of load is prohibited.

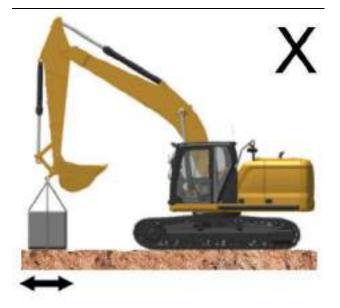


Illustration 593 g06222544

Horizontally, vertically or diagonally dragging a load may cause the machine to roll over, the wire rope to break, or the load to collapse, resulting in personal injuries.

Be sure to lift the load directly above.

Lifting operation on a slope is prohibited.



Illustration 594

Performing an operation on a slope of 5° or more and on a soft ground may cause the machine to roll over or the load to collapse, resulting in personal injuries. Make sure that the machine is on level and firm ground before performing the operation.

g06222549

Place an iron plate or other appropriate material on a soft ground.

Use in non-standard specification conditions is prohibited.



Illustration 595 g06222553

Use of the machine in non-standard specification conditions is prohibited as the lifting load and the operation range cannot be accurately displayed.

Sudden lifting operation is prohibited.

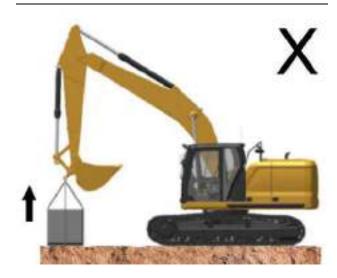


Illustration 596 g06222555

A WARNING

Suddenly lifting a suspended load will apply an abnormal force on the hook and cause the hook to break, resulting in serious injuries or death. Never perform such an operation.

Sudden swinging operation while suspending a load is prohibited.

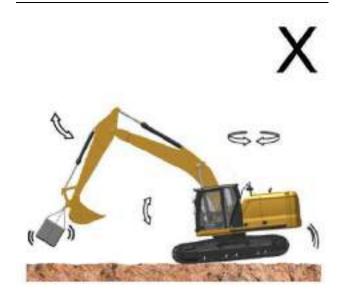


Illustration 597 g06222561

MARNING

Never perform a swinging operation suddenly while suspending a load. Doing so may cause the suspended load to be pulled with a centrifugal force, causing the machine to roll over.

Never suddenly swing, and stop or lower the hook suddenly, as doing so may cause the wire rope to come off the hook latch.

Factors that cause the wire rope to come off

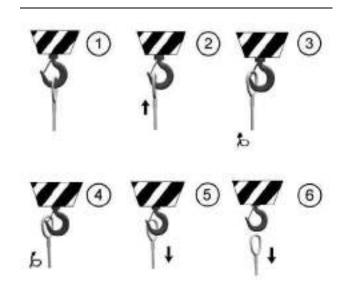


Illustration 598 g06222768

(1) Wire rope in normal condition.

- (2) The wire rope gets raised when the hook is lowered too suddenly.
- (3) If the wire rope gets twisted and gets untwisted in the direction of the arrow, the wire rope will go beyond the tip of the hook.
- (4) The wire rope goes around the back of the hook.
- (5) The hook goes up or the wire rope goes down.
- (6) The wire rope simply falls off.

Diagonal dragging operation is prohibited.

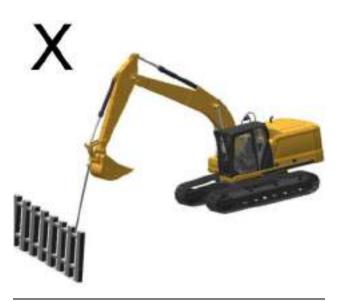


Illustration 599 g06222769

WARNING

Diagonal dragging operation applies an abnormal force on the hook and may cause the hook to break, resulting in serious injuries or death. Never perform such an operation.

Leaving the seat while suspending a load is prohibited.



Illustration 600

Do not leave the operator seat while a load is being suspended. The load may fall, resulting in personal injuries. Do not allow a slinging operator or another worker under the load.

Temporarily stopping the lifting operation.



Illustration 601 g06191918

When there is a large area to stop the machine, fully retract the stick cylinder and slowly lower the boom until the bucket contacts the ground.

Note: Make sure that the lifting tool does not get caught under the bucket.



Illustration 602 g06191883

When there is small area to stop the machine, press the shovel crane button on the switch panel in order to disable the operation. Position the stick so that it is perpendicular to the ground and slowly lower the boom until the bucket contacts the ground.

Note: Make sure that the lifting tool does not get caught under the bucket.



Illustration 603

g06191925

Hook in latched position

Be sure to store the hook during a bucket use. Otherwise, the bucket, the hook, and other parts may be damaged.

Wire rope suspension angle

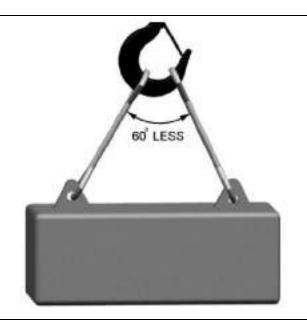


Illustration 604

g06222775

As a rule, try to set the wire rope suspension angle at 60° or below.

Keep out of the area under a suspended load.

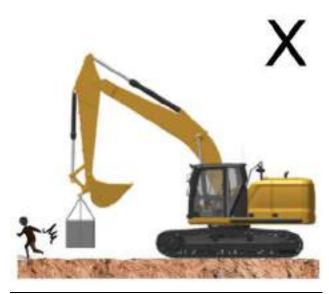


Illustration 605

g06222777

Never allow anyone to enter an area under a suspended load.

Lifting operation with a quick coupler device is prohibited.

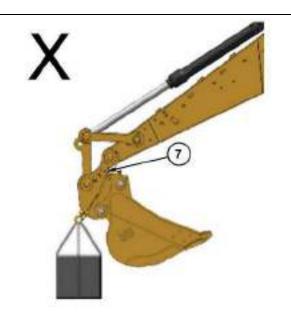


Illustration 606

g06222779

(7) Quick Coupler

Accurate lifting load and operation range cannot be displayed in a lifting operation equipped with a quick coupler. Furthermore, never perform a lifting operation with a quick coupler attached, as doing so causes the hook to contact the quick coupler, applies an abnormal force on the hook, and causes the hook to become damaged and/or the machine to roll over.

i03875131

SmartBoom Operation

(If Equipped)

SMCS Code: 5461-ZS; 7332

WARNING

Personal injury or death can result from not following the proper procedures.

To avoid the possibility of injury or death, follow the established procedure.

A WARNING

Activating the SmartBoom function and using the work tool joystick control while the front of the machine is elevated could result in unexpected machine motion. Unexpected machine motion could result in serious injury or death. Do not activate the SmartBoom function if the front of the machine is elevated by the front linkage.

A WARNING

Do not elevate or lower the track when in the SmartBoom mode. Follow the operation procedures for the SmartBoom in the Operation and Maintenance Manual. Failure to follow these instructions can result in serious injury or death.

⚠ WARNING

Always make sure that the boom control joystick is in the NEUTRAL position before activating the SmartBoom control. Activating the SmartBoom control with the joystick out of the neutral position could resulted in unexpected machine motion which could result in serious injury or death.

MARNING

Do not select any SmartBoom mode, using the SmartBoom selector switch located on the console, while the tracks are elevated. Selecting the SmartBoom mode with the tracks elevated could result in a sudden drop of the machine which could result in serious injury or death.

A WARNING

If any SmartBoom mode is active and the boom control joystick is in the BOOM DOWN position (forward) with a bucket or a work tool on the ground, pressing the disable button that is located on the front of the right hand joystick could cause a sudden boom down motion. This control function could lift the machine upward, with unexpected machine movement that could result in serious injury or death. Do not press the disable button while the SmartBoom mode is active and the boom control joystick is in the BOOM DOWN position (forward) with a bucket or a work tool on the ground.

WARNING

Do not attempt to lift the tracks of the machine by using the disable button and applying downward force with the boom lowering control while the machine is in any SmartBoom mode. Releasing the disable button will immediately return the machine to the active SmartBoom mode. This action could cause the machine to drop down abruptly which could result in serious injury or death.

The Caterpillar SmartBoom provides significant advantages in the following operations:

368 M0068104-12

Operation Section
Bucket - Remove and Install

Excavation and Loading

The operator should select the SmartBoom UP AND DOWN mode for excavating operations and for loading operations. This mode is effective during the return cycle. The BOOM DOWN movement is assisted by gravity, and the pump flow that is normally required for the boom circuit is available for faster STICK OUT and SWING functions. More work is performed for the amount of hydraulic oil flow that is provided by the pumps. This results in faster cycle times and improved fuel efficiency.

When the SmartBoom UP AND DOWN mode is active, no downward hydraulic force is applied to the boom. The operator can intermittently apply downward hydraulic force when the force is required for bucket penetration. A button on the right joystick enables the operator to override the SmartBoom mode.

Hammering

The operator should select the SmartBoom DOWN mode for hammering operations. In the SmartBoom DOWN mode, the weight of the hammer plus the boom and the stick provides sufficient downward force for effective hammering. This mode prevents the hammer from rebounding. The boom follows the hammer downward freely as the tool penetrates the rock. This mode also reduces strain on the machine structures.

Advantages

In hammering, the SmartBoom provides the following advantages:

- · The mode reduces shock in the cab.
- The mode reduces strain on machine structures.
- The mode prevents blank shots.
- The mode maintains optimum frequency.

In rock cleaning, the SmartBoom provides the following advantages:

- The mode reduces strain on machine structures.
- The mode reduces wear on the bucket and the teeth.
- · The mode maintains optimum frequency.

In a leveling operation, the SmartBoom eases the operation. Only STICK IN actuation and bucket actuation are required to level the surface.

In material handling, the SmartBoom reduces the chance of damage below the material.

i06978374

Bucket - Remove and Install

SMCS Code: 6001-011; 6001; 6001-012; 6101; 6102: 6523

Removal Procedure

WARNING

Failure to follow the instruction below for the installation of a work tool may result in personal injury or death. Special care must be taken if more than one person is installing the work tool.

- Confirm the verbal communication and the hand signals that will be used during the installation.
- Be alert for sudden movement of the front linkage and the work tool.
- Do not insert fingers into the bores of the support pins when the support pins and the bores are being aligned.

NOTICE

To facilitate removal of the bucket pins without causing damage to the pins, the bearings, and/or the Oring seals put the bucket on the floor and the stick in a vertical position, as shown.



Illustration 607

g06181120

 Start the engine. Park the machine on a hard, level surface. Position the bucket, the stick, and the bucket control linkage, as shown. Shut off the engine.

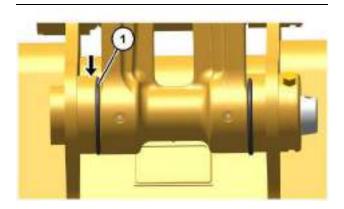


Illustration 608 g06192508

Slide O-ring seals (1) off the pin joints and onto the flanges of the bucket.

A WARNING

When the pin assembly is removed, the linkage assembly may swing out of the bucket. To prevent possible personal injury, do not stand in front of the linkage assembly when the pin assembly is being removed.

Note: Removing the support pin may be difficult due to excessive pressure on the support pin. Remove the pressure on the support pin by adjusting the front linkage.

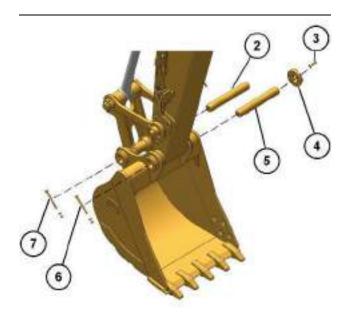


Illustration 609 g06186090

3. Remove nuts and retaining bolt (7) from support pin (2). Remove the support pin .

- **4.** Remove bolts (3) and adapter plate (4). Remove the shims.
- **5.** Remove nuts and retaining bolt (6) from support pin (5). Remove the support pin.
- **6.** Start the engine and raise the stick out of the bucket.
- 7. Remove the O-ring seals (1) from the flanges on the bucket.

Note: After the support pins have been removed, make sure that the support pins do not become contaminated with sand or dirt. Make sure that the seals on the end of the stick and the seals on the end of the link do not become damaged.

Installation Procedure

1. Clean each pin and each pin bore. Lubricate each pin bore with molybdenum grease.

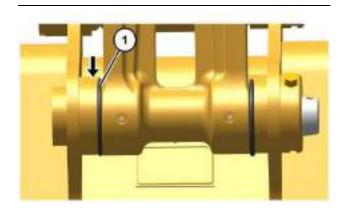


Illustration 610 g06192508

- Position the O-ring seals (1) onto the flanges of the bucket.
- **3.** Start the engine and lower the stick into the bucket until the pin bores are in alignment with each other. Stop the engine.

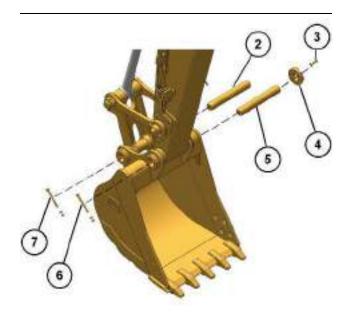


Illustration 611 g06186090

- **4.** Install support pin (5). Align the retaining bolt hole in the support pin with the retaining bolt hole in the bucket.
- **5.** Install the retaining bolt and nuts (6). Install adapter plate (4) without the shims, and without bolts (3) that hold the adapter plate.
- **6.** Refer to Operation and Maintenance Manual, "Bucket Linkage - Inspect/Adjust" to adjust the bucket clearance.
- **7.** Slide O-ring seals (1) in position over the pin joints between the bucket and the stick.
- **8.** Start the engine and position the bucket linkage into the bucket until the pin bores are in alignment with each other. Stop the engine.
- **9.** Install support pin (2). Align the retaining bolt hole in the bucket pin with the retaining bolt hole in the bucket.
- 10. Install retaining bolt and nuts (7).
- **11.** Slide the O-ring seals (1) over the pin joints between the bucket and the link assembly.

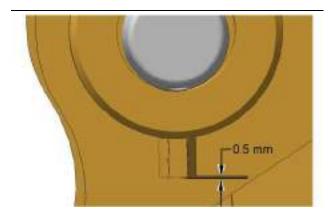


Illustration 612 q06192530

- **12.** Tighten retaining nuts (6) and (7). Position the outside nut even with the end of the retaining bolt or 0.5 mm (0.02 inch) beyond the end of the retaining bolt. Tighten the inside nut against the outside nut.
- Lubricate the bucket pins. Refer to Operation and Maintenance Manual, "Bucket Linkage -Lubricate".

i07757775

Quick Coupler Operation (Circuit for CW Coupler (If Equipped))

SMCS Code: 6129; 6522; 7000

NOTICE

The Cat Quick Coupler (CW Coupler) is not designed to be used in applications where there is long exposure to excessive vibration. The vibration caused by extensive use of a hydraulic hammer as well as the added weight of certain demolition tools such as shears, crushers, and pulverizers may cause premature wear and decreased service life of the coupler.

Be sure to carefully inspect the coupler daily for cracks, bent components, wear, distressed welds, etc. when operating with any of the above work tools.

General Operation

The quick coupler is used to change work tools while the operator remains in the cab. The quick coupler can be used with a broad range of buckets and work tools. Each work tool must have a set of pins in order for the quick coupler to work properly.

The work tools are held onto the quick coupler by hydraulic pressure. If pressure is lost, a locking bar keeps the work tool locked with the force of built-in springs. Ensure that the hydraulic system and the blocking bar are working properly before using the quick coupler.

A lifting eye is included on the quick coupler. Release the work tool from the quick coupler to use the lifting eye to pick up loads. To lift a load with the lifting eye, extend the bucket cylinder until the quick coupler is in a VERTICAL position. Do not exceed the rated load for the machine.

NOTICE

Once the work tool has been properly attached to the coupler, no loosening of the work tool should occur. Refer to the "Quick Coupler Installation and Removal" section of the quick coupler Operation and Maintenance Manual for additional information. If at any point after the proper attachment and back drag testing of the work tool, should the work tool then become loose or if the rear pin of the work tool detaches from the movable hook, stop work immediately and safely ground and detach the work tool. Consult your Cat dealer to inspect the coupler prior to putting the coupler back into service. This situation could indicate potential coupler damage that may not be readily visible to the customer or operator of the machine and coupler.

Electric Switch Operation

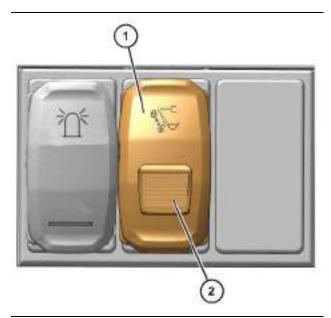


Illustration 613

g06184557

Quick coupler switch (1) is located inside the cab on the switch panel to the left of the operator's seat. The electric switch has only one position for coupling the work tool and uncoupling the work tool. The switch is equipped with a safety lock (2). The locking tab must be pushed forward before the switch can be pressed. Circuit for CW Coupler (If Equipped)

Coupling the Work Tool

WARNING

Inspect the coupler wedge engagement before you operate the excavator.

Serious injury or death may result from an improperly engaged coupler.

Inspect coupler wedge engagement from the cab by rotating the bucket or the work tool inward. Extend the bucket cylinder to bring the coupler actuator into view and bring the stick in until the wedges are visible.



Illustration 614 g06220881

- 1. Position the work tool on a level surface.
- Retract the bucket cylinder. Position the quick coupler in alignment between the hinges of the work tool.

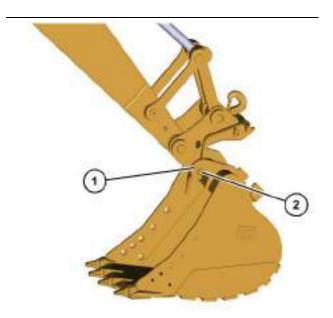


Illustration 615 g06220883

- (1) Hinges
- (2) Lower bosses
- Move the stick forward and raise the stick until the lower bosses (2) engage the hinges (1) of the work tool
- 4. There are two possible settings for locking the quick coupler in Cat ET, "Alarm" and "Hold to Run". For the "Hold to Run" setting, push the locking tab on the switch forward and then depress and hold the rear of the switch until the quick coupler engages the work tool. The message "Quick Coupler Locking" will display on the monitor. For the "Alarm" setting, push the locking tab on the switch forward and then depress, but do not hold, the rear of the switch until the quick coupler engages the work tool. The message "Quick Coupler Locking" will display on the monitor.

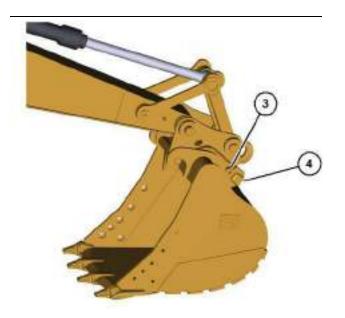


Illustration 616 g06220887

- (3) Center bosses
- (4) Locking area
- Extend the bucket cylinder to rotate the quick coupler toward the work tool.
 - Center bosses (3) must engage with the cutout of the hinge.
- **6.** Release the quick coupler switch to lock the work tool.

The springs in the quick coupler will move the wedge into the locking area (4).

The monitor will display the message "Verify Tool Locking".

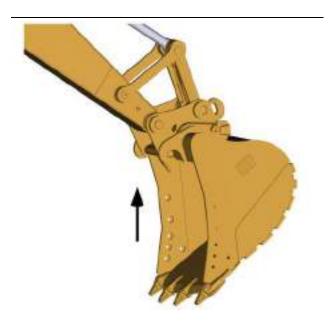


Illustration 617 g06220888

7. Raise the boom or raise the stick. Retract the bucket cylinder to confirm that the wedge is fully engaged. If the wedge is fully engaged, the work tool is locked in place. The work tool is ready to use.

Uncoupling the Work Tool

A WARNING

Place the work tool or bucket in a safe position before disengaging the coupler. Disengaging the coupler will release the work tool or bucket from control of the operator.

Serious injury or death may result from disengaging the work tool or bucket when it is in an unstable position or carrying a load.





- **1.** Level the bucket or level the work tool on the ground.
- 2. Push the locking tab on the switch forward and then depress the rear of the switch until the quick coupler releases the work tool. The message "Quick Coupler Unlock" will display on the monitor. For the "Alarm" setting, push the locking tab on the switch forward and then depress, but do not hold, the rear of the switch until the quick coupler engages the work tool. The message "Quick Coupler Locking" will display on the monitor.

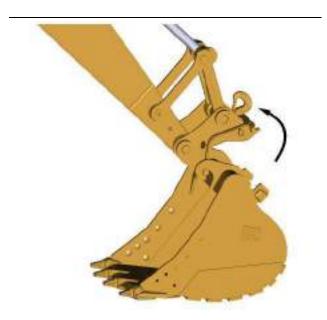


Illustration 619 g06220891

- **3.** Retract the bucket cylinder to move the quick coupler toward the machine.
- **4.** Release the quick coupler switch to retract the wedge.



The work tools are held onto the quick coupler by hydraulic pressure. If pressure is lost, a check valve in the hydraulic cylinder traps oil in the cylinder. Ensure that the hydraulic system is working properly before using the quick coupler.

A lifting eye is included on the quick coupler. Release the work tool from the quick coupler to use the lifting eye to pick up loads. To lift a load with the lifting eye, extend the bucket cylinder until the quick coupler is in a VERTICAL position. Do not exceed the rated load for the machine.

Illustration 620 q06220892

5. Lower the stick and move the stick toward the machine to disengage the quick coupler.

i07852525

Quick Coupler Operation (Hydraulic Pin Grabber Quick Coupler (If Equipped))

SMCS Code: 6129; 6522; 7000

NOTICE

The Cat Quick Coupler (Hydraulic Pin Grabber) is not designed to be used in applications where there is long exposure to excessive vibration. The vibration caused by extensive use of a hydraulic hammer as well as the added weight of certain demolition tools such as shears, crushers, and pulverizers may cause premature wear and decreased service life of the coupler.

Be sure to carefully inspect the coupler daily for cracks, bent components, wear, distressed welds, etc. when operating with any of the above work tools.

General Operation

The quick coupler is used to change work tools while the operator remains in the cab. The quick coupler can be used with a broad range of buckets and work tools. Each work tool must have a set of pins in order for the quick coupler to work properly.

NOTICE

Once the work tool has been properly attached to the coupler, no loosening of the work tool should occur. Refer to the "Quick Coupler Installation and Removal" section of the quick coupler Operation and Maintenance Manual for additional information. If at any point after the proper attachment and back drag testing of the work tool, should the work tool then become loose or if the rear pin of the work tool detaches from the movable hook, stop work immediately and safely ground and detach the work tool. Consult your Cat dealer to inspect the coupler prior to putting the coupler back into service. This situation could indicate potential coupler damage that may not be readily visible to the customer or operator of the machine and coupler.

Quick Coupler Operation

Electric Switch Operation

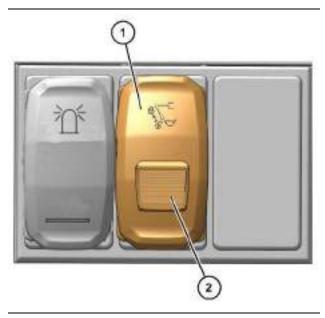


Illustration 621 g06184557

Quick coupler switch (1) is located inside the cab on the switch panel to the left of the operator's seat. The electric switch has only one position for coupling the work tool and uncoupling the work tool. The switch is equipped with safety lock (2). The locking tab must be pushed forward before the switch can be pressed.

Coupling the Work Tool

A WARNING

Place the work tool or bucket in a safe position before engaging the quick coupler. Ensure that the work tool or bucket is not carrying a load.

Serious injury or death may result from engaging the work tool or bucket when it is in an unstable position or carrying a load.

⚠ WARNING

Inspect the quick coupler engagement before operating the machine.

Serious injury or death may result from improperly engaged coupler.

MARNING

Crush injury. Could cause serious injury or death. Always confirm that the quick coupler is engaged onto the pins. Read the Operator's Manual.

A WARNING

The alarm will go off when the coupler is locked and the monitor will display a message. These assurances do not confirm that the coupler pins are engaged. A physical test is required by dragging the attachment on the ground to confirm the coupler pins are engaged.

NOTICE

With certain work tool combinations, including quick couplers, the work tool can hit the cab or the front of the machine. Always check for interference when first operating a new work tool.

- **1.** Position the bucket or the work tool on a level surface.
- Make sure that the pins are in the bucket or the work tool. Make sure that the pin keepers are installed correctly.

M0068104-12



Illustration 622 g06187057

3. Extend the stick cylinder and fully extend the bucket cylinder until the quick coupler is curled past a vertical position. This action must be performed before pressing the switch.



Illustration 623 g06300078

- **4.** Push the lock mechanism on the switch forward and then depress the rear of the switch. The alarm will sound continuously and the message "Quick Coupler Unlock" will display on the monitor.
- **5.** Hold the control lever for the bucket cylinder in the EXTEND position for 5 seconds to unlock the hook.

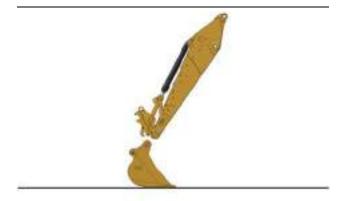


Illustration 624 g06187063

6. Align the quick coupler with the work tool.



Illustration 625 g06187068

7. Rotate the quick coupler to grab the top pin.

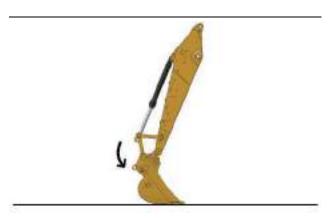


Illustration 626 g06187086

8. Rotate the quick coupler downward to grab the bottom pin.



Illustration 627 g06187108

9. Extend the stick cylinder and extend the bucket cylinder until the work tool is curled past a vertical position.



Illustration 628 g06300088

- 10. Push the lock mechanism on the switch forward and then depress the rear of the switch. The alarm will sound continuously and the message "Quick Coupler Locking" will display on the monitor.
- 11. Hold the control lever for the bucket cylinder in the EXTEND position for 5 seconds to lock the hook. The monitor will display the message "Verify Tool Locking" and the alarm will stop.

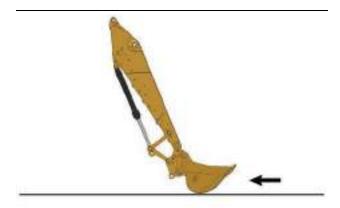


Illustration 629 g06187115

A WARNING

Inspect the quick coupler engagement before operating the machine.

Verify that the quick coupler is engaged per the procedure in the Operation and Maintenance Manual. Verify prior to operating the machine, after every engine start, and after an extended time of inactivity.

Serious injury or death may result from improperly engaged coupler.

- **12.** Verify that the quick coupler and the work tool are locked together.
 - a. Retract the bucket cylinder and place the work tool on the ground.
 - b. Apply pressure to the work tool against the ground.

NOTICE

Back drag the work tool on the ground to ensure the quick coupler is properly locked.

Do Not strike the work tool on the ground to ensure the quick coupler is properly locked. Striking the work tool on the ground will result in damage to the coupler cylinder.

c. Drag the work tool backward.

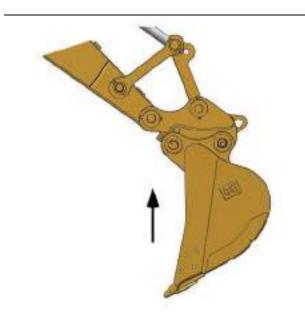


Illustration 630 q06458083

13. Raise the boom or raise the stick. Retract the bucket cylinder to confirm that the coupler is fully engaged. If the coupler is fully engaged, the work tool is locked in place. The work tool is ready to use.

Uncoupling the Work Tool

WARNING

Place the work tool or bucket in a safe position before disengaging the coupler. Disengaging the coupler will release the work tool or bucket from control of the operator.

Serious injury or death may result from disengaging the work tool or bucket when it is in an unstable position or carrying a load.

NOTICE

Auxiliary hoses for work tools must be disconnected before the Hydraulic Quick Coupler is disengaged.

Pulling the work tool with the auxiliary hoses could result in damage to the host machine or the work tool.



Illustration 631 g06187108

- Extend the stick cylinder and fully extend the bucket cylinder until the work tool is curled past a vertical position. This action must be performed before pressing the switch.
- 2. Push the lock mechanism on the switch forward and then depress the rear of the switch to unlock the work tool. The alarm will sound continuously and the message "Quick Coupler Unlock" will display on the monitor.

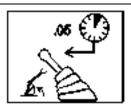


Illustration 632 g01231447

Hold the control lever for the bucket cylinder in the EXTEND position for 5 seconds to unlock the hook.

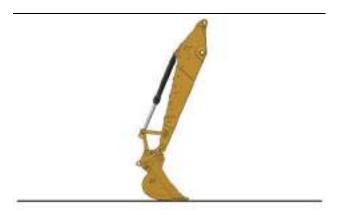


Illustration 633 g06187142

4. Move the boom and the stick until the tool or the bucket is in the storage position. Keep the tool close to the ground.

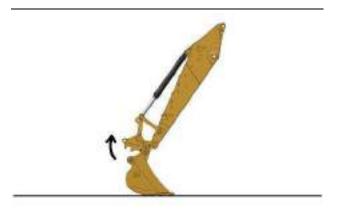


Illustration 634 g06187151

5. Rotate the quick coupler upward to release the bottom pin.

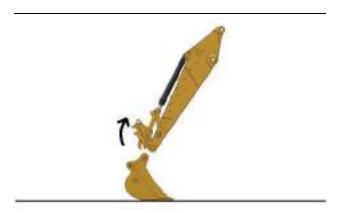


Illustration 635 q06187156

- **6.** Continue to rotate the quick coupler upward to release the top pin and completely release the work tool from the quick coupler.
- Move the stick to a position that is clear of the work tool.

Note: To lift objects with the lifting eye of the quick coupler, refer to "Coupler Lifting Eye Operation without Bucket" later in this chapter.

Coupling a Bucket that is Reversed



Illustration 636 g06187159

1. When you use a hydraulic pin grabber quick coupler, you can connect to a bucket that is in a reversed position. Refer to Illustration 636 for an example of connecting to a bucket that is in a reversed position.



Illustration 637 g06187057

- 2. Extend the stick cylinder and fully extend the bucket cylinder until the quick coupler is curled past a vertical position. This action must be performed before pressing the switch.
- 3. Follow the same steps for coupling the work tool to couple the host machine to a bucket that is reversed. Refer to "Coupling the Work Tool" for the proper procedure.

NOTICE

When some Caterpillar buckets are used in the reverse position, it can be more difficult to couple the bucket and uncouple the bucket than in the normal position.

Care must be taken to ensure that the position of the boom, stick, and bucket are aligned to ensure smooth coupling. The coupler must be in position between the bucket bosses.

If the bucket is not fully engaged in the jaw of the coupler, the quick coupler can become snagged on the bucket bosses. The full weight of the bucket is then carried by the quick coupler sideplates, which can cause damage to the quick coupler.

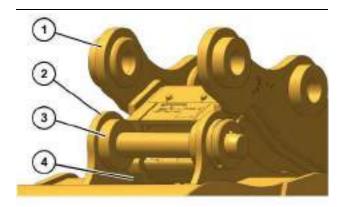


Illustration 638

g06187418

- (1) Quick coupler
- (2) Bucket
- (3) Boss
- (4) Hook

Coupler Lifting Eye Operation without Bucket

1. Remove the work tool. Refer to "Uncoupling the Work Tool" for the proper procedure.



Illustration 639 g06187057

2. The quick coupler must be curled past a vertical position before depressing the switch. Extend the stick cylinder and fully extend the bucket cylinder until the quick coupler is curled past a vertical position.



Illustration 640

g06300088

3. Push the lock mechanism on the switch forward and then depress the rear of the switch to lock the quick coupler. The alarm will sound continuously and the message "Quick Coupler Locking" will display on the monitor.



Illustration 641

g01231447

4. Hold the control lever for the bucket cylinder in the EXTEND position for 5 seconds to lock the hook. The monitor will display the message "Verify Tool Locking" and the alarm will stop.



Illustration 642

g06187164

5. Rotate the quick coupler downward and move the stick to a position that is clear of the work tool.



Illustration 643 q06223888

6. Use the lifting eye of the quick coupler, as needed.

7. To reinstall the bucket or the work tool, refer to "Coupling the Work Tool" for the proper procedure.

i07349163

Work Tool Operation (If Equipped)

SMCS Code: 6700; 7000

Hammer Operation (If Equipped)



Illustration 644 g06222793

NOTICE

Use only a hydraulic hammer that is recommended by Caterpillar.

The use of a hydraulic hammer that is not recommended by Caterpillar could result in structural damage to the host machine.

Consult your Cat dealer for information on recommended hydraulic hammers.

Only use the hydraulic hammer to break rocks, concrete, and other hard objects. Before you start hydraulic hammer operation, place the machine on a level, stable surface.

Before you start hydraulic hammer operation, close the front window. Caterpillar recommends the installation of a window guard on the front window for protection from flying debris.

NOTICE

In order to avoid structural damage to the host machine or the hydraulic hammer, comply with the following:

Do not attempt to break rocks or concrete by burying the hammer tool completely into the rocks or concrete.

Do not apply a prying force to the hammer tool in order to remove the hammer tool from the material.

Do not allow the hydraulic hammer to operate at one location and for more than 15 seconds. Change the location of the hydraulic hammer and repeat the procedure. Failure to change the location of the hydraulic hammer could cause the hydraulic oil to overheat. Overheated hydraulic oil could damage the accumulator.

Stop the hydraulic hammer immediately if the jumper lines are pulsating violently. This indicates that the accumulator nitrogen charge is lost. Consult your Cat dealer for the necessary repair.

NOTICE

Do not use the dropping force of the hydraulic hammer to break rocks or other hard objects. This could cause structural damage to the machine.

Do not use the sides or back of the hydraulic hammer to move rocks or other hard objects. Doing this could cause damage not only to the hammer but to stick or boom cylinder.

Do not operate the hydraulic hammer with any of the cylinders fully retracted or extended. Doing this could cause structural damage to the machine, resulting in reduced machine life.

Do not use the hydraulic hammer to lift an object.

Do not operate the hydraulic hammer while the stick is vertical to the ground. This could allow the stick cylinder to vibrate excessively.

Operate the attachment control levers carefully to keep the hydraulic hammer tool from hitting the boom.

Do not operate the hydraulic hammer under water unless the hydraulic hammer is properly equipped. Operating the hydraulic hammer under water could damage the machine hydraulic system. Consult your Cat dealer for information on underwater operation.

Do not operate the hydraulic hammer with the upper structure sideways to the undercarriage. Before you start hydraulic hammer operation, place the upper structure in the recommended positions that are shown in illustration 645. Any other operating positions could make the machine unstable. Any other operating positions could place excessive loads on the undercarriage.

Refer to the following for any additional questions about the operation and care of your Cat hydraulic hammer:

- Operation and Maintenance Manual, SEBU7346, "Hydraulic Hammers"
- The Operation and Maintenance Manual specific to your machine

An operation and maintenance decal, SMEU7397, is available for all hydraulic hammers. The decal provides procedures for operation and maintenance of the hydraulic hammers. The decal can be placed on the machine or the hammer. The decal can be obtained through the normal literature ordering channels.

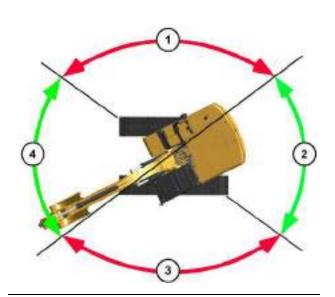


Illustration 645 g06192837

- (1) Incorrect working position
- (2) Correct working position
- (3) Incorrect working position
- (4) Correct working position

Shear Operation (If Equipped)



Illustration 646 g06222798

WARNING

Do not operate or work on this work tool unless you have read and understand the instructions and warnings in the Operation And Maintenance Manual for both the work tool and the host machine.

Failure to follow the instructions or heed the warnings could result in injury or death.

Contact your Caterpillar dealer for replacement manuals. Proper care is your responsibility.

NOTICE

Selection of a hydraulic shear must be done with extra care.

Use of a hydraulic shear not recommended by Caterpillar could result in structural damage to the host machine.

Consult your Cat dealer for hydraulic shear information.

MARNING

Serious injury or death could occur from the demolition of pipes, vessels, tanks or other containers that may contain gas, flammable materials or hazardous chemicals.

Do not perform any demolition work on these items until all of their contents have been removed.

Follow all regulations for the removal and disposal of these materials.

NOTICE

Using the demolition tool to level the work site or push over standing structures may damage the machine or the demolition tool. Use appropriate equipment to do site preparation or maintenance operations.

NOTICE

To avoid structural damage to the machine, do not break road surfaces by placing the cutting edge of the hydraulic shear on the ground and moving the machine.

Be sure that no one is near the work tool to prevent injury. Keep the work tool under control at all times to prevent injury. When a demolition tool is used, all personnel must maintain a minimum distance of 10 m (33 ft).

Close all windows. Make sure that all required guards are in place. Wear all required protective equipment. Follow the instructions in the Operation and Maintenance Manual for the work tool.

Crusher Operation (If Equipped)

WARNING

Improper operation and maintenance of the crusher could cause personal injury or death. Observe the following procedures for safe operation of the crusher.

Consult your Cat dealer for more information on the operation and maintenance of the crusher.

Do not operate the host machine with the work tool unless you have read and understood the instructions and warnings in the Operation and Maintenance Manual. Failure to follow the instructions or heed the warnings could result in machine or work tool damage, and/or serious injury or death. Contact your Cat dealer for a replacement manual, if needed.

When the crusher is installed on the host machine, always make sure that the protective guarding is in place.

Using the crusher in an incorrect manner can damage the machine and/or cause personal injury or death.

Always ensure that the work area is clear of ground personnel, due to the potential crush hazards with falling debris and machine movement.

Resting or placing your foot on the work tool pedal could result in unexpected movement of the machine / work tool which could result in personal injury or death. Always lock the crusher when not in use.

NOTICE

Selection of a hydraulic crusher must be done with extra care.

Use of a hydraulic crusher not recommended by Caterpillar could result in structural damage to the host machine.

Consult your Cat dealer for hydraulic crusher information.

Close all windows. Make sure that all required guards are in place. Wear all required protective equipment. Follow the instructions in the Operation and Maintenance Manual for the work tool.



Illustration 647 g06222800

Demolition work on the roof of a building could lead to serious personal injury if the building were to collapse and the excavator turned over or fell off the roof. The demolition work must be started ONLY AFTER surveying the building for its structural integrity.

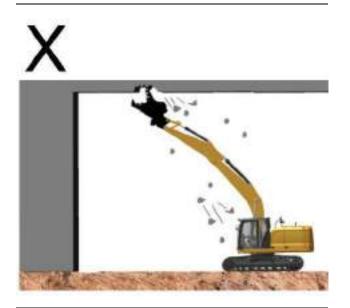


Illustration 648 g06222803

Crushing work above your head must be avoided because objects can fall and damage the machine.

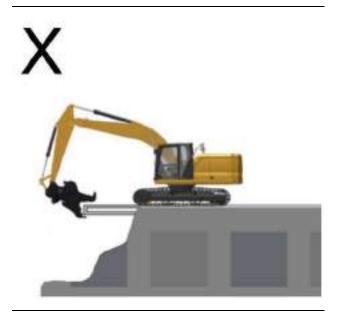


Illustration 649 g06222806

Do not perform demolition work at the base of the machine, because the ground could be unstable and cause the machine to fall.



Illustration 650 g06222809

Do not suddenly lower or stop the work tool, otherwise the excavator could turn over.

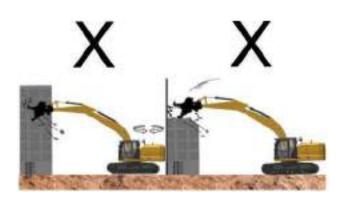


Illustration 651 g06222813

Crushing work using impact, swing, or dropping forces of the excavator could cause damages to the machine and also could lead to personal injury. As such, NEVER perform such an operation.



Illustration 653 g06222821

When performing work at elevated positions, always use care for the surroundings as well as for falling objects to avoid personal injury. Use guide personnel and signs as required.

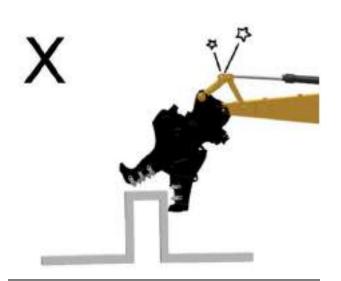


Illustration 652 g06222817

Crushing work with hydraulic cylinder at stroke end position could damage the excavator, resulting in shortening of lifespan. Also, as it could lead to unexpected personal injury due to breakage of the machine, do not perform any work at stroke end.

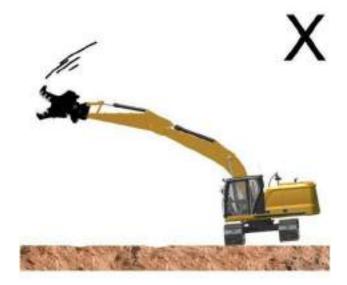


Illustration 654 g06222829

When working sideways, the track can lift. Avoid abrupt operation and operate slowly.



Illustration 655 g06222831

Crushers could interfere with the boom and the cab depending on the type and method of usage. Know the working range of the crusher being used.

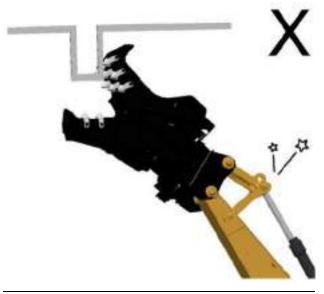


Illustration 656 g06222833

If the tooth of the crusher engages an object at a slant, excessive forces could be applied to the front regions. As such move the crusher to the front.

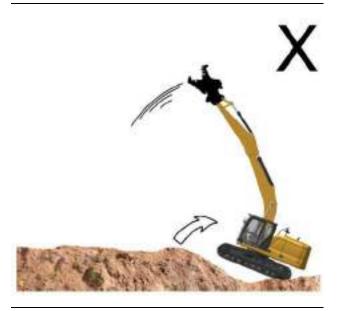


Illustration 657 g06222836

Never extend the boom cylinder suddenly. Sudden extension of the boom could cause tip backwards.



Illustration 658 g06222831

Sudden extension of the bucket cylinder, or sudden extension of the stick cylinder could cause damages at the stroke end position, resulting in personal injury. Operations that cause sudden extension of the cylinders is PROHIBITED!

Parking

i07868085

Stopping the Machine

SMCS Code: 7000

A WARNING

Leaving the machine unattended when the engine is running may result in personal injury or death. Before leaving the machine operator station, neutralize the travel controls, lower the work tools to the ground and deactivate all work tools, and place the lever for the hydraulic lockout control in the LOCKED position.

Note: There may be regulations that define the requirements for the operator and/or support personnel to be present when the engine is running.

Park on a level surface. If the machine must be parked on a grade, chock the tracks securely.

Note: The swing parking brake is automatically applied when the machine is stopped. The swing parking brake is released when the engine is running and the joystick is activated.

1. Turn the engine speed dial counterclockwise to reduce engine speed.



Illustration 659 g06181402

Release the travel levers/pedals to stop the machine.

- **3.** Lower the work tool to the ground. Apply a slight downward pressure.
- Move the hydraulic lockout control to the LOCKED position.

i07088536

Freezing Conditions

SMCS Code: 7000

If freezing temperatures are expected, remove the mud and the dirt from each track roller frame. Park the machine on wood planks. Use the following procedure to clean each track roller frame.



Illustration 660 g06188791

1. Position the boom over one side of the machine.

- 2. Use boom down pressure to lift the track on one side off the ground. Operate the track in the forward direction. Then operate the track in reverse. Continue this procedure until the maximum amount of material is thrown off the track.
- 3. Lower the track onto the wood planks.
- **4.** Repeat the procedure for the other track.
- Clean the area around the carrier rollers and around the track rollers.
- **6.** Lower the work tool onto a wood plank to prevent the work tool from touching the ground.

i07867959

Stopping the Engine

SMCS Code: 1000; 7000

NOTICE

Stopping the engine immediately after it has been working under load can result in overheating and accelerated wear of engine components.

Refer to the following procedure to allow the engine to cool and to prevent excessive temperatures in the turbocharger housing, which could cause oil coking problems.

NOTICE

Never turn the battery disconnect switch to the OFF position while the engine is running. Serious damage to the electrical system may result.

- Park the machine on level ground. Refer to Operation and Maintenance Manual, "Stopping the Machine" for the recommended procedure.
- 2. While the machine is stopped, run the engine for 5 minutes at low idle. Idling the engine allows hot areas of the engine to cool gradually.
- **3.** Turn the engine start switch to the OFF position.

Note: If the "Regen Active" indicator is illuminated, do not shut off the engine. Refer to Operation and Maintenance Manual, "Monitoring System" for more information on indicators.

Engine Shutdown Switch

NOTICE

Perform a walk around inspection after actuation of a shutdown device.

Take necessary corrective action to resolve the cause of the shutdown.

Ensure that no additional damage has been done or could occur before returning to operation.

Turn the engine start switch to the OFF position. If the engine does not stop, perform the following procedure.

Note: Always use the engine start switch to stop the engine. Use the engine shutdown switch as an alternate method to stop the engine if the start switch fails.

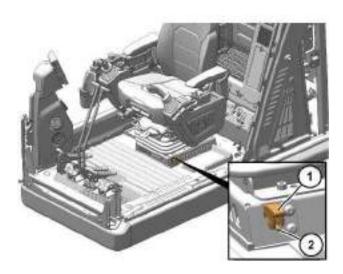


Illustration 661 g06181487

- **1.** The engine shutdown switch is located below the left side of the operator seat.
- Lift cover (1).
- **3.** Push switch (2) upward. Pushing the switch upward should stop the engine and prevent the engine from being started again.
- **4.** Return the switch to the original position. The engine will be enabled to start.

Note: Do not operate the machine again until the malfunction has been corrected.

5. Use the method that follows if the previous steps do not stop the engine.

Stop the Engine if an Electrical Malfunction Occurs

Turn the engine start switch to the OFF position. If the engine does not stop, perform the following procedure. M0068104-12 391

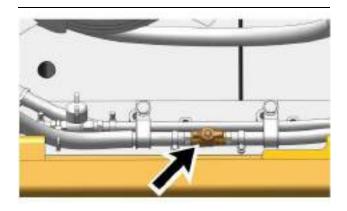


Illustration 662 g06214480

The fuel shutoff valve is located behind the right access door.

Shut off the fuel supply by turning the fuel shutoff valve clockwise. The engine will stop after consuming the fuel in the fuel line. The engine may continue to run for a few minutes.

Repair the engine before you restart the engine. The fuel system may need to be primed. See Operation and Maintenance Manual, "Fuel System - Prime" for instructions.

i07103299

Leaving the Machine

SMCS Code: 7000



Illustration 663 g06224270

1. Use the steps and the hand holds when you dismount. When you dismount, face the machine and use both hands.

- **2.** Inspect the engine compartment for debris. Clean out any debris to avoid a fire hazard.
- Remove all flammable debris from the front bottom guard through the access doors to reduce a fire hazard. Discard the debris properly.
- **4.** Always turn the battery disconnect switch to the OFF position before leaving the machine.
- If the machine will not be operated for a month or more, remove the battery disconnect switch key.
- Lock all compartments and all vandalism covers (if equipped).

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Machine Storage and Specified Storage Period

SMCS Code: 7000

Machine Storage

The Safety Section of this Operation and Maintenance Manual contains storage information for fuels, lubricants, and ether (if equipped).

The Operation Section of this Operation and Maintenance Manual contains information for short-term storage of this machine, including engine shutdown, parking, and instructions for leaving the machine.

For detailed steps on long-term storage refer to Special Instruction, SEHS9031, "Storage Procedure for Caterpillar Products".

Specified Storage Period

The specified storage period of this machine is 1 year.

After the specified storage period has expired, consult your Cat dealer for inspect, repair, rebuild, install remanufactured, or install new components, and disposal options, and to establish a new specified storage period.

If a decision is made to remove the machine from service, refer to Decommissioning and Disposal for further information.

Transportation Information

i08163556

Shipping the Machine

SMCS Code: 7000; 7500

WARNING

Automatic Engine Speed Control (AEC) will increase engine speed automatically when you operate the control levers and/or travel pedals with AEC switch on.

When loading and unloading the machine from the truck or working in close quarters always turn AEC switch off to prevent any possibility of sudden movement of machine, which could result in serious injury or death.

Set the travel speed control switch to LOW before loading the machine. Never operate this switch when loading the machine on a trailer.

Investigate the travel route for overpass clearances. Make sure that there will be adequate clearance for the machine.

Remove ice, snow, or other slippery material from the loading dock and from the truck bed before you load the machine onto the transport machine. Removing ice, snow, or other slippery material will help to prevent the machine from slipping in transit.

Note: Obey all laws that govern the characteristics of a load (height, weight, width, and length). Observe all regulations that govern wide loads. Certain regions may require the removal of door hooks and cab bumpers, if equipped. Consult all local and regional regulations

Choose the flattest ground when you load the machine or when you unload the machine.

- **1.** Before you load the machine, chock the trailer wheels or the rail car wheels.
- When you use loading ramps, make sure that the loading ramps have adequate length, adequate width, adequate strength, and an adequate slope.
- **3.** Maintain the slope of the loading ramps within 15 degrees of the ground.
- 4. Position the machine so that the machine can drive straight up the loading ramps. The final drives should be toward the rear of the machine. Do not operate the control levers while the machine is on the loading ramps.
- **5.** When you drive over the loading ramp joint areas, maintain the balance point of the machine.

- **6.** Lower the work tool to the bed or to the floor of the transport machine.
- 7. To prevent rolling of the machine or sudden movement of the machine, perform the following items:
 - Chock both tracks.
 - Install sufficient tie-downs at several locations.
 - · Fasten wire cables.
- **8.** If equipped, remove door hooks, cab bumpers, and fuel tank step as necessary. Refer to local regulations.

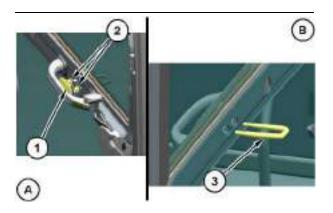


Illustration 664

g06516462

Typical example of door hook

- (A) Inside
- (B) Outside
- (1) Cover
- (2) Nuts
- (3) Door Hook
- a. Remove cover (1) and nuts (2) to remove door hook (3).



Illustration 665

g06516469

Typical example of cab bumper

b. Remove any bumpers on your cab.

NOTICE

Do not allow the chrome surface of the bucket cylinder rod to touch any part of the trailer. Damage to the rod can occur from impact with the trailer during transport.

Note: Refer to Operation and Maintenance Manual, "Specifications".

Shipping a Machine that is not Completely Assembled

If the machine must be shipped when the boom, stick, or counterweight is not assembled on the machine, follow the instructions in Operation and Maintenance Manual, "Operation".

A WARNING

The ROPS structural certification depends on the support of the boom, stick, and counterweight in the event of a machine tip over or a machine roll-over incident.

When the machine needs to be moved without the boom, stick, or counterweight being installed, avoid any machine operations which could affect machine stability as a machine tip over or a machine rollover incident could result in serious injury or death.

The machine should be operated slowly on flat, stable ground or pavement by qualified operators.

i07539618

Securing the Machine

SMCS Code: 7000

WARNING

Do not transport the machine if there is a malfunction of the swing parking brake system.

The machine may swing during transportation if the swing parking brake system is not functioning properly which could result in injury or death.

Contact your Cat dealer for service.

Comply with any laws that govern the characteristics of a load (length, width, height, and weight).

- **1.** Move the hydraulic lockout control to the LOCKED position.
- **2.** Turn the engine start ring to the OFF position or press button to stop engine.

- **3.** Turn the battery disconnect switch to OFF and remove the disconnect switch key.
- 4. Remove the ether starting aid cylinder. See Operation and Maintenance Manual, "Ether Starting Aid Cylinder - Replace" for the removal procedure.
- Lock the door and the access covers. Attach any vandalism protection.

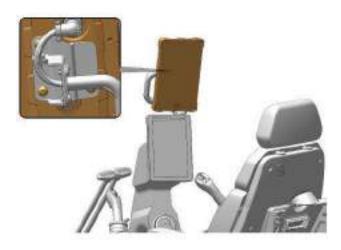


Illustration 666

g06181075

Note: Caterpillar strongly recommends removing the Cat Grade Control monitor (if equipped) before transporting the machine to protect the monitor from damage or theft.

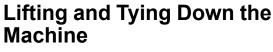
- 6. Disconnect the wiring harness from the Cat Grade Control monitor. Remove the three screws that secure the monitor to the mounting bracket and remove the monitor. Remove the monitor from the cab and store in the monitor carrying case.
- 7. Cover the exhaust opening.

NOTICE

Do not allow the turbocharger to rotate while the engine is not operating. Damage to the turbocharger can result.

Note: Before you unload the excavator from the transport machine, remove the protective covering from the exhaust opening.

i07785977





Improper lifting and tie-down techniques can allow the load to shift or fail resulting in personal injury or property damage. Use only properly rated cables and slings with lift and tie down points provided on the machine. Keep the deck of the transport vehicle clean and use anti-slip mats on steel decks.

Follow the instructions in Operation and Maintenance Manual, "Lifting and Tying Down the Machine" for the proper technique for securing the machine. Refer to Operation and Maintenance Manual, "Specifications" for specific weight information.

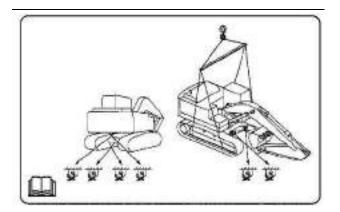


Illustration 668 g06289667

The lift and tie-down film is located near the base of the boom.

Illustration 667 q06289667

8. Chock the tracks and secure the machine with tiedowns. Make sure that you use the proper rated wire cable.

Use the front towing eyes on the lower frame, the rear towing eyes on the lower frame, and the rear towing eye that is on the upper frame.

Securely fasten all loose parts and all removed parts to the trailer or to the rail car.

When the engine is stopped, the swing parking brake is automatically applied. The swing brake prevents the upper structure from rotating.

NOTICE

In freezing weather, protect the cooling system with antifreeze, to the lowest outside expected temperature on the travel route. Or, drain the cooling system completely.

Lifting the machine



Illustration 669 g06184026

The machine center of gravity is located at the center of the swing gear.



Lifting Point – To lift the machine, attach the lifting devices to the lifting points.

The weight and the instructions that are given herein describe the machine as the machine is manufactured by Caterpillar.

Refer to the Operation and Maintenance, "Specifications" for specific weight information.

Note: Only lift objects from approved lifting points and with approved lifting devices

- **1.** Use proper rated cables and slings for lifting. The crane should be positioned so that the machine is lifted parallel to the ground.
- **2.** To prevent contact with the machine, lifting cables should have sufficient length.
- **3.** Move the hydraulic lockout control to the LOCKED position.
- **4.** Thread the cable between the first and second rollers at each end of the track.
- 5. Do not use the foot step as a lifting point.

- **6.** If the full length roller guard is equipped, remove the guard.
- 7. Apply the proper protector to prevent machine/wire damage and slippage. Make sure that the rollers are not affected by the load.

Tying Down the Machine

There are two methods that can be used to tie down a machine. Local and/or regional regulations will determine which method to use.

Note: Obey all local and regional governmental regulations.

Frictional and Direct Lashing

When allowed, a combination of frictional lashing and direct lashing is the preferred method to tie down a machine.



Illustration 670 g06184145

(A) Front of the machine

(B) Rear of the machine

Diagonal Lashing

In areas where frictional lashing is not allowed, diagonal lashing can be used as shown below.



Illustration 671 g06435607

(A) Front of the machine

(B) Rear of the machine

Tying Down the Machine



Tie Down Point – To tie down the machine, attach the tie-downs to the tie-down points.

The weight and the instructions that are given herein describe the machine as the machine is manufactured by Caterpillar.

Refer to the Operation and Maintenance, "Specifications" for specific weight information.

- Use proper rated cables and shackles for tying down the machine.
- 2. Use the rear eyes and the front eyes that are provided on the lower frame to fasten tie-downs. Use corner protectors for sharp corners.
- **3.** Move the hydraulic lockout control to the LOCKED position.
- 4. If there is a requirement of diagonal lashing for tying down, use the proper tie-down point on the lower frame. Set the lashing angle which is on the longitudinal axis of the machine and the cable, at 30 to 50 degrees.
- Keep the transport vehicle surface clean (for example, trailer deck).
- **6.** For steel deck transport vehicles use skid-inhibiting or anti-slip mats (for example, rubber mats) with a friction coefficient of at least 0.3.

Lifting the Machine Segments

Bucket

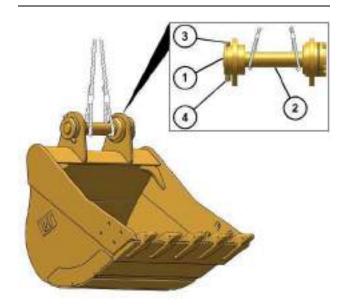


Illustration 672

g06184591

(1) Pin.(2) Sleeve.(3) Bolts.(4) Nuts.

Install pin (1) and install sleeve (2) in the brackets of the bucket. The previous illustration indicates the method to secure pin (1) with bolts (3) and nuts (4). Fasten two proper rated wire cables to pin (1). 398

Towing Information

i07348733

Towing the Machine

SMCS Code: 7000

WARNING

Personal injury or death could result when towing a disabled machine incorrectly.

Block the machine to prevent movement before final drives are disengaged. The machine can roll free if it is not blocked. With final drives disengaged, the machine cannot be stopped or steered.

Follow the recommendations below, to properly perform the towing procedure.

Relieve the hydraulic tank and line pressure before any disassembly.

Even after the machine has been turned off, the hydraulic oil can still be hot enough to burn. Allow the hydraulic oil to cool before draining.

NOTICE

To tow the machine, both final drives must be disengaged.

Do not operate the travel motors with the final drives disengaged. Damage could result.

These towing instructions are for moving a disabled machine for a short distance at low speed. Move the machine at a speed of 2 km/h (1.2 mph) or less to a convenient location for repair. Always haul the machine if long distance moving is required.

Shields must be provided on both machines. This will protect the operator if the tow line or the tow bar breaks.

Do not allow an operator to be on the machine that is being towed.

Before you tow the machine, make sure that the tow line or the tow bar is in good condition. Do not use a wire rope that is kinked, twisted, or damaged. Make sure that the tow line or the tow bar has enough strength for the towing procedure that is involved. The strength of the tow line or of the tow bar should be at least 150 percent of the gross weight of the towed machine. This requirement is for a disabled machine that is stuck in the mud and for being towed on a grade.

Do not use a chain for pulling a disabled machine. A chain link can break. This may cause personal injury. Use a wire rope with ends that have loops or rings. Put an observer in a safe position to watch the pulling procedure. The observer can stop the procedure if the wire rope starts to break. Stop pulling whenever the towing machine moves without moving the towed machine.

During towing, do not allow anyone to step between the towing and the towed machines.

Do not allow the wire rope to be straddled while the machine is being towed.

Keep the tow line angle to a minimum. Do not exceed a 30 degree angle from the straight ahead position.

Avoid towing the machine on a slope.

Quick machine movement could overload the tow line or the tow bar. This could cause the tow line or the tow bar to break. Gradual, steady machine movement will be more effective.

Prior to releasing the brake of the final drive, firmly lock both tracks to prevent the machine from moving suddenly. When the machine is ready to be towed, release the brake of the final drive. Refer to Operation and Maintenance Manual, "Final Drive Sun Gear Removal".

Normally, the towing machine should be as large as the disabled machine. Make sure that the towing machine has enough brake capacity, enough weight, and enough power. The towing machine must be able to control both machines for the grade that is involved and for the distance that is involved.

You must provide sufficient control and sufficient braking when you are moving a disabled machine downhill. This may require a larger towing machine or additional machines that are connected to the rear of the disabled machine. This will prevent the machine from rolling away out of control.

All situation requirements cannot be listed. Minimal towing machine capacity is required on smooth, level surfaces. Maximum towing machine capacity is required on an incline or on a surface that is in poor condition.

Do not tow a loaded machine.

Consult your Cat dealer for the equipment that is necessary for towing a disabled machine.

Retrieval and Towing of Machine

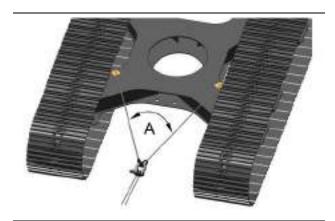


Illustration 673 g06289671

Note: Shackles must be used for towing the machine. The wire rope should be horizontal and straight to the track frame.

Install a properly rated wire rope to the lower frame of the towing machine and the lower frame of the towed machine. The permissible force for the lower frame is 100 percent of the gross weight of the towed machine.

Note: To prevent damage to the wire rope or the lower frame of the machines, use protective sleeves on the corners of the lower frame.

Retrieve the disabled machine carefully. The applied load for each wire rope should be equal. The angle (A) between each wire rope should be 60 degree maximum. Operate the machine at a low speed.

Lightweight Towing

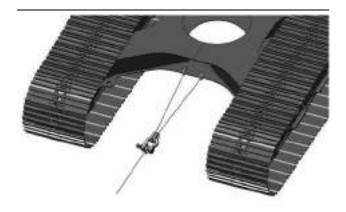


Illustration 674 g06186106

The maximum load for lightweight towing is 102900 N (75895 lb).

Shackles must be used for towing the machine. The wire rope should be horizontal and straight to the track frame.

Install a properly rated wire rope to the lower frame of the towing machine and the lower frame of the towed machine. Operate the machine at a low speed.

i06954175

399

Final Drive Sun Gear Removal

SMCS Code: 4050

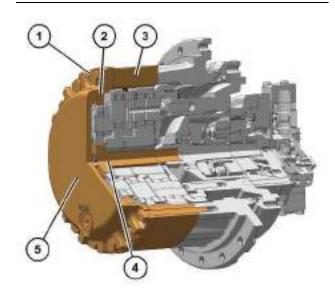


Illustration 675 g06188195

- (1) Bolt
- (2) Ring gear
- (3) Ring gear
- (4) Sun gear
- (5) Final drive cover

MARNING

Without the sun gear in place, the brakes are ineffective. Personal injury or death could result. Provide other means to hold or stop the machine.

 Thoroughly clean the area around the final drive.
 Make sure that you also clean the track shoes that are positioned above the final drive.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on containing fluid spillage.

2. Drain the final drive oil into a suitable container. See Operation and Maintenance Manual, "Final Drive Oil - Change" for the procedure.

- **3.** Remove 14 of 16 cover bolts (1) from final drive cover (5). Do not leave a bolt in the top hole of the cover.
- 4. Insert an alignment dowel through the top hole of the cover and into the threads in the final drive housing. This is necessary to support ring gear (2) and ring gear (3) while you are removing the final drive cover.
- **5.** Remove one track shoe to allow access to the face between final drive cover (5) and ring gear (2).
- **6.** Loosen remaining two cover bolts (1).
- 7. Use a hammer and a wedge to separate final drive cover (5) and ring gear (2). Make sure that ring gear (2) and ring gear (3) stay in place.
- **8.** Remove remaining two cover bolts (1) and final drive cover (5).
- 9. Remove sun gear (4) from final drive.
- 10. Install final drive cover (5) and 16 cover bolts (1).
- **11.** Fill the final drive with new oil. See Operation and Maintenance Manual, "Final Drive Oil Change" for the procedure.
- **12.** Repeat Steps 1 through 11 for the other final drive.
- **13.** Refer to the Service Manual for information on the installation of the final drive sun gear.

Engine Starting (Alternate Methods)

i06953771

Engine Starting with Jump Start Cables

(If Equipped)

SMCS Code: 1000; 7000

WARNING

Failure to properly service the batteries may cause personal injury.

Prevent sparks near the batteries. They could cause vapors to explode. Do not allow the jump start cable ends to contact each other or the machine.

Do not smoke when checking battery electrolyte levels.

Electrolyte is an acid and can cause personal injury if it contacts skin or eyes.

Always wear eye protection when starting a machine with jump start cables.

Improper jump start procedures can cause an explosion resulting in personal injury.

Always connect the battery positive (+) to battery positive (+) and the battery negative (-) to battery negative (-).

Jump start only with an energy source with the same voltage as the stalled machine.

Turn off all lights and accessories on the stalled machine. Otherwise, they will operate when the energy source is connected.

NOTICE

To prevent damage to engine bearings and to electrical circuits when you jump-start a machine, do not allow the stalled machine to touch the machine that is used as the electrical source.

Turn on (close) the battery disconnect switch prior to the boost connection to prevent damage to electrical components on the stalled machine.

Use only equal voltage for starting. Check the battery and starter voltage rating of your machine. Use only the same voltage for jump starting. Use of a welder or higher voltage will damage the electrical system.

Severely discharged maintenance free batteries do not fully recharge from the alternator after jump starting. The batteries must be charged to proper voltage with a battery charger. Many batteries thought to be unusable are still rechargeable.

Refer to Special Instruction, SEHS7633, "Battery Test Procedure" for complete testing and charging information. This publication is available from your Cat dealer.

When the auxiliary start receptacles are not available, use the following procedure.

- Lower the equipment to the ground. Move all controls to the HOLD position. Move the hydraulic lockout control to the LOCKED position.
- **2.** Turn the start switch on the stalled machine to the OFF position. Turn off all accessories.
- **3.** Turn the battery disconnect switch on the stalled machine to the ON position.
- 4. Move the machine that is being used as an electrical source near the stalled machine so that the jump-start cables reach the stalled machine.
 Do not allow the machines to contact each other.
- 5. Stop the engine of the machine that is being used as an electrical source. If you are using an auxiliary power source, turn off the charging system.



Illustration 676 g06181546



Illustration 677 g06181551

- (1) Red positive post to starter
- (2) The black negative post connects to the battery disconnect switch
- (3) Do not use these two connections for jump starting. The red positive post is connected in series to the black negative post.
- (4) Cover
- **6.** Ensure that battery caps on both machines are tight and correctly placed. Ensure that batteries in the stalled machine are not frozen. Make sure that the batteries have enough electrolyte.

Note: The positive terminal of the 24 V system of the source and the negative terminal of the 24 V system of the source must be identified correctly before the jumper cables are connected. The positive terminal of the 24 V system of the discharged battery must be identified correctly before the jumper cables are connected.

7. The positive ends of the jump-start cable are red. Connect one positive end of the jump-start cable to the positive cable terminal of the discharged battery. Some machines have battery sets.

Note: Batteries that are in series may be in separate compartments. Use the terminal that is connected to the starter solenoid. This battery or battery set is normally on the same side of the machine as the starter.

- Do not allow the positive cable clamps to contact any metal except for the battery terminals.
- **8.** Connect the other positive end of the jump-start cable to the positive cable terminal of the electrical source.
- Connect one negative end of the jump-start cable to the negative cable terminal of the electrical source.
- 10. Finally, connect the other negative end of the jump-start cable to the frame of the stalled machine. Do not connect the jump-start cable to the battery post. Do not allow the jump-start cables to contact the battery cables, the fuel lines, the hydraulic lines, or any moving parts.
- **11.** Start the engine of the machine that is being used as an electrical source or energize the charging system on the auxiliary power source.
- **12.** Wait at least two minutes before you attempt to start the stalled machine. This will allow the batteries in the stalled machine to partially charge.
- **13.** Attempt to start the stalled engine. See Operation and Maintenance Manual, "Engine Starting" for the correct starting procedure.
- Immediately after you start the stalled engine, disconnect the jump-start cables in reverse order.

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Engine Starting with Auxiliary Start Receptacle

(If Equipped)

SMCS Code: 1000; 7000



Illustration 678 g06179792

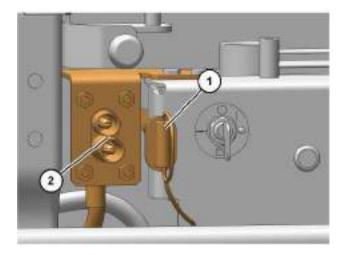


Illustration 679

g06181572

- (1) Cover
- (2) Receptacle

Some Cat products may be equipped with an auxiliary start receptacle as a standard part. If your machine is not equipped with an auxiliary start receptacle, the machine can be equipped with an auxiliary start receptacle from parts service. This will ensure that a permanent receptacle is always available to jump-start the machine.

There are two cable assemblies that can be used to jump-start the stalled machine. You can jump-start the stalled machine from another machine that is equipped with an auxiliary start receptacle or with an auxiliary power pack. Your Cat dealer can provide the correct cable lengths for your application.

1. Determine the reason that the engine will not start.

Reference: Refer to Special Instruction, SEHS7633, "Battery Test Procedure" for more information.

- Ensure that the travel control levers on the stalled machine are in the CENTER position. Engage the hydraulic lockout control. Engage the parking brake. Lower all work tools to the ground. Move all controls to HOLD.
- Turn the engine start switch key on the stalled machine to the OFF position. Turn off all accessories.
- Turn the battery disconnect switch on the stalled machine to ON.
- 5. Move the machine that is being used as a power source close to the stalled machine. The jumpstart cables should reach the batteries on both machines. DO NOT ALLOW THE MACHINES TO CONTACT EACH OTHER.
- **6.** Stop the engine on the machine that is being used as a power source. If you use an auxiliary power source, turn off the charging system.
- **7.** Connect the appropriate jump-start cable to the auxiliary start receptacle on the stalled machine.
- **8.** Connect the other end of the jump-start cable to the auxiliary start receptacle of the machine that is being used as a power source.
- **9.** Start the engine on the machine that is being used as a power source or energize the charging system on the auxiliary power source.
- **10.** Wait for a minimum of 2 minutes while the batteries in the stalled machine partially charge.
- 11. Attempt to start the stalled engine.
- Immediately after the stalled engine starts, disconnect the jump-start cable from the power source.
- **13.** Disconnect the other end of the jump-start cable from the stalled machine.
- 14. Conclude the failure analysis on the starting charging system of the stalled machine, as required. Check the machine while the engine is running and the charging system is in operation.

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Maintenance Section

Maintenance Access

i07945068

Access Door and Cover Locations

SMCS Code: 726A-CH

Engine Hood



Illustration 680 g06225770

Allows access to engine and coolant tank.

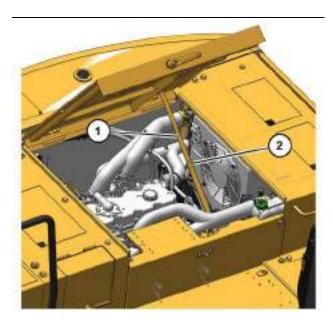


Illustration 681 q06225771

- **1.** Open the engine hood.
- **2.** Gas spring (1) will lock in place to hold the engine hood open.

WARNING

Operation of the Push Button Release for the Engine Hood

When closing the engine hood, only operate the push-button release by hand.

Failure to remove hands from the push-button release before closing the engine hood could result in personal injury.

Be sure to remove hands from the push-button release before completely closing the engine hood.

NOTICE

Do not add pressure to the engine hood when open.

MARNING

When closing the engine hood, Do Not operate the push-button release by foot.

Operation of the push-button release by foot could result in damage to the gas spring of the closing mechanism and/or personal injury.

Only operate the push-button release for closing the engine hood by hand.

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3. To close the engine hood, support the engine hood with the door handle. Press the push-button release (2) to unlock the gas spring. Release the push button and slowly close the engine hood.

Engine Service Door

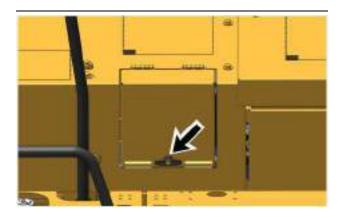


Illustration 682

g06183460

Allows access to the engine oil filler cap and the upper dipstick.

Left Rear Access Door



Illustration 683

g06179792

Allows access to the coolant sample port, coolant drain, cooling cores, power fuses, battery disconnect switch, and coolant reservoir.

Left Front Access Door



Illustration 684

g06181546

Allows access to engine air filter, batteries, and window washer reservoir.

Right Side Access Door



Illustration 685

g06182545

Allows access to the engine oil filter, engine oil sampling port, and ground level dipstick. Additionally, the compartment houses the hydraulic pump, fuel filters, refueling pump, fuel tank drain valve, and hydraulic tank sight gauge.

Right Front Access Door



Illustration 686 g06183098

Allows access to the Diesel Exhaust Fluid (DEF) tank.

Lubricant Viscosities and Refill Capacities

i07419350

Lubricant Viscosities (Fluids Recommendations)

SMCS Code: 7581

General Information for Lubricants

When you are operating the machine in temperatures below $-20^{\circ}\text{C}~(-4^{\circ}\text{F})$, refer to Special Publication, SEBU5898, "Cold Weather Recommendations". This publication is available from your Cat dealer.

Refer to the "Lubricant Information" section in the latest revision of the Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for a list of Cat engine oils and for detailed information. This manual may be found on the web at Safety.Cat. com.

The footnotes are a key part of the tables. Read all footnotes that pertain to the machine compartment in question.

Selecting the Viscosity

To select the proper oil for each machine compartment, refer to the "Lubricant Viscosity for Ambient Temperature" table. Use the oil type AND oil viscosity for the specific compartment at the proper ambient temperature.

The proper oil viscosity grade is determined by the minimum ambient temperature (the air in the immediate vicinity of the machine). Measure the temperature when the machine is started and while the machine is operated. To determine the proper oil viscosity grade, refer to the "Min" column in the table. This information reflects the coldest ambient temperature condition for starting a cold machine and for operating a cold machine. Refer to the "Max" column in the table for operating the machine at the highest temperature that is anticipated. Unless specified otherwise in the "Lubricant Viscosities for Ambient Temperatures" tables, use the highest oil viscosity that is allowed for the ambient temperature.

Machines that are operated continuously should use oils that have the higher oil viscosity in the final drives and in the differentials. The oils that have the higher oil viscosity will maintain the highest possible oil film thickness. Refer to "General Information for Lubricants" article, "Lubricant Viscosities" tables, and any associated footnotes. Consult your Cat dealer if additional information is needed.

NOTICE

Not following the recommendations found in this manual can lead to reduced performance and compartment failure.

Engine Oil

Cat oils have been developed and tested to provide the full performance and life that has been designed and built into Cat engines.

Cat DEO-ULS or oils that meet the Cat ECF-3 specification, API CJ-4, and the newer API CK-4, are required for use in the applications listed below. Cat DEO-ULS and oils meeting Cat ECF-3 specification, API CJ-4, the newer API ČK-4, and ACEA E9 oil categories have been developed with limited sulfated ash, phosphorus, and sulfur. These chemical limits are designed to maintain the expected aftertreatment devices life, performance, and service interval. If oils meeting the Cat ECF-3 specification, API CJ-4, the newer API CK-4 specifications are not available, oils meeting ACEA E9 may be used. ACEA E9 oils meet the chemical limits designed to maintain aftertreatment device life. ACEA E9 oils are validated using some but not all ECF-3 and API CJ-4 standard engine performance tests. Consult your oil supplier when considering use of an oil that is not Cat ECF-3, API CJ-4, or the newer API CK-4 qualified.

Failure to meet the listed requirements will damage aftertreatment-equipped engines and can negatively impact the performance of the aftertreatment devices. The Diesel Particulate Filter (DPF) if equipped, will plug sooner and require more frequent DPF ash service intervals.

Typical aftertreatment systems may include the following:

- Diesel Particulate Filters (DPF)
- Diesel Oxidation Catalysts (DOC)
- Selective Catalytic Reduction (SCR)
- Lean NOx Traps (LNT)

Other systems may apply.

Oils that are per API CI-4 or prior categories are not allowed. These oils have high ash and are not appropriate for use in engines with aftertreatment devices.

Table 33

Lubricant Viscosities for Ambient Temperatures						
Compartment or System	Oil Type and Performance	Oil Viscosities	°C		°F	
Compartment of Gystem	Requirements	Oil viscosities	Min	Max	Min	Max
	Cat DEO-ULS Cold Weather	SAE 0W-40	-40	40	-40	104
Engine Completes for all Machines	Cat DEO-ULS SYN	SAE 5W-40	-30	50	-22	122
Engine Crankcase for all Machines	Cat DEO-ULS	SAE 10W-30	-18	40	0	104
	Cat DEO-OLS	SAE 15W-40	-10	50	14	122
Pump Coupling (If Equipped)	Cat DEO-ULS	SAE 10W-30	-18	40	0	104

Hydraulic Systems

Refer to the "Lubricant Information" section in the latest revision of the Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for detailed information. This manual may be found on the web at Safety.Cat.com.

The following are the preferred oils for use in most Cat machine hydraulic systems:

- Cat HYDO Advanced 10 SAE 10W
- Cat HYDO Advanced 20 SAE 20W
- · Cat HYDO Advanced 30 SAE 30
- · Cat BIO HYDO Advanced, Multigrade

Cat HYDO Advanced oils allow 6000 hours or higher oil drain intervals for most applications. S·O·S Services oil analysis is recommended when the oil drain interval is increased to 6000 hours or higher. In comparison, non-Cat commercial hydraulic oils (second choice oils) allow 2000 hours oil drain interval. Itis recommended to followthe maintenance interval schedule for oil filter changes and for oil sampling that is stated in the Operation and Maintenance Manual for your particular machine. Consult your Cat dealer for details. When switching to Cat HYDO Advanced fluids, cross contamination with the previous oil should be kept to less than 10%.

Second choice oils are listed below.

- Cat MTO
- Cat DEO
- Cat DEO-ULS
- Cat TDTO
- Cat TDTO Cold Weather
- Cat TDTO-TMS
- · Cat DEO-ULS Cold Weather

Note: Oil drain intervals of the oils listed above are less than those of Cat HYDO Advanced oils. The oil drain interval of these oils is typically 2000 hours and up to a maximum of 4000 hours. An exception is Cat TDTO Cold Weather oil which allows 6000 hours or higher oil drain interval. S·O·S Services oil analysis is required when the oils listed above are used in Cat hydraulic system components and hydrostatic transmissions.

Table 34

Lubricant Viscosities for Ambient Temperatures						
Compartment or System	Oil Type and Performance	Oil Viscosities	°C		°F	
Compartment of System	Requirements	Oil viscosities	Min	Max	Min	Max
	Cat HYDO Advanced 10 Cat TDTO	SAE 10W	-20	40	-4	104
	Cat HYDO Advanced 20 Cat TDTO	SAE 20W	- 5	45	23	113
Hydraulic System	Cat HYDO Advanced 30 Cat TDTO SAE 30		10	50	50	122
	Cat BIO HYDO Advanced "ISO 46" Multi-Grade		-30	50	-22	122
	Cat MTO Cat DEO-ULS Cat DEO	SAE10W-30	-20	40	-4	104
	Cat DEO-ULS Cat DEO	SAE15W-40	-15	50	5	122
	Cat TDTO-TMS	Multi-Grade	-15	50	5	122
	Cat DEO-ULS SYN	SAE 5W-40	-25	40	-13	104
	Cat DEO-ULS Cold Weather SAE0W-40		-40	40	-40	104
	Cat TDTO Cold Weather	SAE 0W-20	-40	40	-40	104

For applications requiring the use of fire-resistant hydraulic fluids, Caterpillar recommends the use of EcoSafe FR-46. This product is a fully synthetic, non-aqueous hydraulic fluid. Water based and glycol-based hydraulic products are not recommended for use in Cat machine hydraulic systems. EcoSafe FR-46 is an ISO 46 multi-grade product. For more information refer to the product information provided by the manufacturer of EcoSafe hydraulic oil. Refer to your Cat dealer for availability.

Other Fluid Applications

Table 35

Excavators, Front Shovels, Mass Excavators, Demolition Excavators, and Track Material Handlers Lubricant Viscosities for Ambient Temperatures						
Comportment or System Oil Type and Performance Oil Vicessity Creds						
Compartment or System	Requirements	Oil Viscosity Grade	Min	Max	Min	Max
	Cat TDTO Cold Weather	SAE 0W-20	-40	0	-40	32
Final Drives and Swing Drives	Cat TDTO	SAE 10W	-30	0	-22	32
		SAE 30 ⁽¹⁾	-30	35	-22	95
		SAE 50	-15	50	5	122
	Cat TDTO-TMS	Multi-Grade	-25	25	-13	77
Track Roller Frame Recoil Spring and Pivot Shaft Bearings	Cat TDTO Cold Weather	SAE 0W-20	-40	0	-40	32
	C-4 TDTO	SAE 10W	-30	0	-22	32
	Cat TDTO	SAE 30 ⁽¹⁾	-20	25	-4	77

(Table 35, contd)

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Excavators, Front Shovels, Mass Excavators, Demolition Excavators, and Track Material Handlers Lubricant Viscosities for Ambient Temperatures							
Compartment or System	Oil Type and Performance	Oil Viscosity Grade	°C		°F		
Compartment of System	Requirements	On viscosity Grade	Min	Max	Min	Max	
		SAE 50	0	50	32	122	
	Cat TDTO-TMS	Multi-Grade	-25	25	-13	77	
	Cat DEO-ULS Cat DEO	SAE 15W-40 ⁽¹⁾	-10	50	14	122	
Track Idlers and Track Rollers	Cat DEO Cold Weather	SAE 0W-40	-40	40	-40	104	
	Cat DEO-ULS SYN	SAE 5W-40	-35	40	-31	104	
	Cat FDAO SYN	Multi-Grade	-30	50	-22	122	

⁽¹⁾ Factory fill oil for standard configuration machines.

Special Lubricants

Grease

To use a non-Cat grease, the supplier must certify that the lubricant is compatible with Cat grease.

Each pin joint should be flushed with the new grease. Ensure that all old grease is removed. Failure to meet this requirement may lead to failure of a pin joint.

Table 36

Recommended Grease						
Comportment or System	Crosso Tuno	NI CI Crede	°C	;	°F	
Compartment or System	Grease Type	NLGI Grade	Min	Max	Min	Max
	Cat Prime Application Grease	NLGI Grade 2	-20	140	-4	284
	Cat Extreme Application Grease Cat Extreme Application Grease-Artic	NLGI Grade 1	-20	140	-4	284
		NLGI Grade 2	-15	140	+5	284
External Lubrication Points		NLGI Grade 0.5	-50	130	-58	266
	Cat Extreme Application Grease-Desert	NLGI Grade 2	-10	140	+14	284
	Cat Utility Grease	NLGI Grade 2	-20	140	-4	284
	Cat Ball Bearing Grease	NLGI Grade 2	-20	160	-4	320

Diesel Fuel Recommendations

Diesel fuel must meet Caterpillar Specification for Distillate Fuel and the latest revisions of "ASTM D975" and "EN 590" to ensure optimum engine performance. Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for the latest fuel information and for Cat fuel specification. This manual may be found on the Web at Safety.Cat.com.

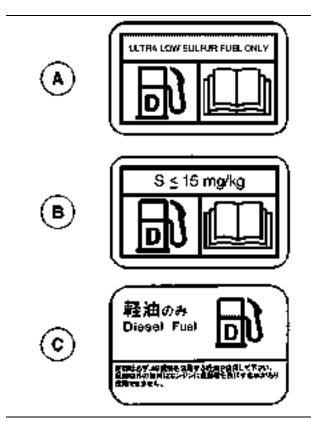


Illustration 687

g03218956

- (A) North America film
- (B) Europe, Africa, Middle East film
- (C) Japan film

NOTICE

Ultra Low Sulfur Diesel (ULSD) fuel 0.0015 percent (≤15 ppm (mg/kg)) sulfur is required by regulation for use in engines certified to nonroad Tier 4 standards (U.S. EPA Tier 4 certified) and that are equipped with exhaust aftertreatment systems.

European ULSD 0.0010 percent (≤10ppm (mg/kg)) sulfur fuel is required by regulation for use in engines certified to European Stage V type-approved nonroad engines. Additionally, the Cetane number should not be less than 45, and the biodiesel content should not be greater than 20% volume/volume.

Misfueling with fuels of higher sulfur level can have the following negative effects:

- Shorten the time interval between aftertreatment device service intervals (cause the need for more frequent service intervals)
- Adversely impact the performance and life of aftertreatment devices (cause loss of performance)
- Reduce regeneration intervals of aftertreatment devices

- Reduce engine efficiency and durability.
- Increase the wear.
- · Increase the corrosion.
- Increase the deposits.
- Lower fuel economy
- Shorten the time period between oil drain intervals (more frequent oil drain intervals).

Fluids Recommendations

Increase overall operating costs.

Failures that result for the use of improper fuels are not Caterpillar factory defects. Therefore, the cost of repairs would not be covered by a Caterpillar warranty.

Caterpillar does not require the use of ULSD in nonroad and machine applications that are not Tier 4/ Stage V certified engines and are not equipped with aftertreatment devices. For Tier 4/Stage V certified engines, always follow operating instructions to ensure that the correct fuels are used.

Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for more details about fuels, lubricants, and Tier 4/Stage V requirements. This manual may be found on the web at Safety.Cat.com.

Diesel Exhaust Fluid

General Information

Diesel Exhaust Fluid (DEF) is a liquid that is injected into the exhaust system of engines equipped with Selective Catalytic Reduction (SCR) systems. SCR reduces emissions of nitrogen oxides (NOx) in diesel engine exhaust.

Diesel Exhaust Fluid (DEF) is also known under other names including Aqueous Urea Solution (AUS) 32, AdBlue, or generically referred to as urea.

In engines equipped with SCR emissions reduction system, DEF is injected in controlled amounts into the engine exhaust stream. At the elevated exhaust temperature, urea in DEF is converted to ammonia. The ammonia chemically reacts with NOx in diesel exhaust in the presence of the SCR catalyst. The reaction converts NOx into harmless nitrogen (N2) and water (H2O).

DEF Recommendations

For use in Cat engines, DEF must meet all the requirements defined by "ISO 22241-1" Requirements.

Caterpillar recommends the use of DEF available through the Cat parts ordering system for use in Cat engines equipped with SCR systems.

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Fluids Recommendations

In North America, commercial DEF that is API approved and meets all the requirements defined in "ISO 22241-1" may be used in Cat engines that are equipped with SCR systems.

Outside of North America, commercial DEF that meets all requirements defined in "ISO 22241-1" may be used in Cat engines that are equipped with SCR systems.

The supplier should provide documentation to prove that the DEF is compliant with the requirements of "ISO 22241-1".

NOTICE

Cat does not warrant the quality or performance of non-Cat fluids.

NOTICE

Do not use agriculture grade urea solutions. Do not use any fluids that do not meet "ISO 22241-1" Requirements in SCR emissions reduction systems. Use of these fluids can result in numerous problems including damage to SCR equipment and a reduction in NOx conversion efficiency.

DEF is a solution of solid urea that is dissolved in demineralized water to produce a final concentration of 32.5% urea. DEF concentration of 32.5% is optimal for use in SCR systems. DEF solution of 32.5% urea has the lowest attainable freeze point of −11.5° C (11.3° F). DEF concentrations that are higher or lower than 32.5% have higher freeze points. DEF dosing systems and "ISO 22241-1" specifications are designed for a solution that is approximately 32.5%.

Caterpillar offers a refractometer, Cat part number 360-0774, that can be used to measure DEF concentration. Follow the instructions provided with the instrument. Appropriate commercial portable refractometers can be used to determine urea concentration. Follow the instructions from the manufacturer.

DEF Guidelines

DEF solution is typically colorless and clear. Changes to color or clarity are indicators of quality issues. Quality of DEF can degrade when stored and handled inappropriately or if DEF is not protected from contamination. Details are provided below.

If quality issues are suspected, testing of DEF should focus on urea percentage, alkalinity as NH3 and biuret content. DEF that does not pass all these tests or that is no longer clear should not be used.

Materials compatibility

DEF is corrosive. Due to the corrosion caused, DEF must be stored in tanks constructed of approved materials. Recommended storage materials:

Stainless Steels:

- 304 (S30400)
- 304L (S30403)
- 316 (S31600)
- 316L (S31603)

Alloys and metals:

- Chromium Nickel (CrNi)
- Chromium Nickel Molybdenum (CrNiMo)
- Titanium

Non-metallic materials:

- Polyethylene
- Polypropylene
- Polyisobutylene
- Teflon (PFA)
- Polyfluoroethylene (PFE)
- Polyvinylidene fluoride (PVDF)
- Polytetrafluoroethylene (PTFE)

Materials NOT compatible with DEF solutions include Aluminum, Magnesium, Zinc, Nickel coatings, Silver and Carbon steel, and Solders containing any of the above. Unexpected reactions may occur if DÉF solutions come in contact with any non-compatible material or unknown materials.

Bulk storage

Follow all local regulations covering bulk storage tanks. Follow proper tank construction guidelines. Tank volume typically should be 110% of planned capacity. Appropriately vent indoor tanks. Plan for control of overflow of the tank. Heat tanks that dispense DEF in cold climates.

Bulk tank breathers should be fitted with filtration to keep airborne debris from entering the tank. Desiccant breathers should not be used because water will be absorbed, which potentially can alter DEF concentration.

Handling

Follow all local regulations covering transport and handling. DEF transport temperature is recommended to be -5° C (23° F) to 25° C (77° F). All transfer equipment and intermediate containers should be used exclusively for DEF. Containers should not be reused for any other fluids. Ensure that transfer equipment is made from DEF-compatible materials. Recommended material for hoses and other non-metallic transfer equipment includes:

- Nitrile Rubber (NBR)
- Fluoroelastomer (FKM)
- Ethylene Propylene Diene Monomer (EPDM)

The condition of hoses and other nonmetallics that are used with DEF should be monitored for signs of degradation. DEF leaks are easily recognizable by white urea crystals that accumulate at the site of the leak. Solid urea can be corrosive to galvanized or unalloyed steel, aluminum, copper, and brass. Leaks should be repaired immediately to avoid damage to surrounding hardware.

Cleanliness

Contaminants can degrade the quality and life of DEF. Filtering DEF is recommended when dispensed into the DEF tank. Filters should be compatible with DEF and should be used exclusively with DEF. Check with the filter supplier to confirm compatibility with DEF before using. Mesh-type filters using compatible metals, such as stainless steel, are recommended. Paper (cellulose) media and some synthetic filter media are not recommended because of degradation during use.

Care should be taken when dispensing DEF. Spills should be cleaned immediately. Machine or engine surfaces should be wiped clean and rinsed with water. Caution should be used when dispensing DEF near an engine that has recently been running. Spilling DEF onto hot components will cause harmful vapors.

Stability

NOTICE

Storing Diesel Exhaust Fluid in high heat areas is not recommended. Do not store DEF in high heat generating areas on the machine, such as the pump compartment or the engine compartment. The quality of the DEF can degrade when exposed to high temperatures.

DEF fluid is stable when stored and handled properly. The quality of DEF rapidly degrades when stored at high temperatures. The ideal storage temperature for DEF is between -9° C (15.8° F) and 25° C (77° F). DEF that is stored above 35° C (95° F) for longer than 1 month must be tested before use. Testing should evaluate Urea Percentage, Alkalinity as NH3 and Biuret content.

The length of storage of DEF is listed in the following table:

Table 37

Storage Temperature	Expected DEF Life
Below 25° C (77° F)	18 months
25° C (77° F) to 30° C (86° F)	12 months
30° C (86° F) to 35° C (95° F)	6 months
Above 35° C (95° F)	test quality before use

Fluids Recommendations

Refer to "ISO 22241" document series for more information about DEF quality control.

Note: Dispose of all fluids according to applicable regulations and mandates.

Fuel Additives

Cat Diesel Fuel Conditioner and Cat Fuel System Cleaner are available for use when needed. These products are applicable to diesel and biodiesel fuels. Consult your Cat dealer for availability.

Biodiesel

Biodiesel is a fuel that can be made from various renewable resources that include vegetable oils, animal fat, and waste cooking oil. Soybean oil and rapeseed oil are the primary vegetable oil sources. To use any of these oils or fats as fuel, the oils, or fats are chemically processed (esterified). The water and contaminants are removed.

U.S. distillate diesel fuel specification "ASTM D7467" includes up to B20 (20 percent) biodiesel. Any diesel fuel in the U.S. may contain up to B20 biodiesel fuel.

European distillate diesel fuel specification "EN16709:2015" includes up to B20 (20 percent) biodiesel. Any diesel fuel in Europe may contain up to B20.

Note: The diesel portion used in the biodiesel blend must be Ultra Low Sulfur Diesel (15 ppm sulfur or less, per "ASTM D975"). In Europe the diesel fuel portion used in the biodiesel blend must be sulfur free diesel (10 ppm sulfur or less, per "EN 590"). The final blend must have 15 ppm sulfur or less.

When biodiesel fuel is used, certain guidelines must be followed. Biodiesel fuel can influence the engine oil, aftertreatment devices, non-metallic, fuel system components, and others. Biodiesel fuel has limited storage life and has limited oxidation stability. Follow the guidelines and requirements for engines that are seasonally operated.

To reduce the risks associated with the use of biodiesel, the final biodiesel blend and the biodiesel fuel used must meet specific blending requirements.

All the guidelines and requirements are provided in the latest revision of Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations". This manual may be found on the web at Safety.Cat.com.

Coolant Information

The information provided in this "Coolant Recommendation" section should be used with the "Lubricants Information" provided in the latest revision of Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations". This manual may be found on the web at Safety.Cat.com.

The following two types of coolants may be used in Cat diesel engines:

Preferred - Cat ELC (Extended Life Coolant)

Acceptable – Cat DEAC (Diesel Engine Antifreeze/Coolant)

NOTICE

Never use water alone as a coolant. Water alone is corrosive at engine operating temperatures. In addition, water alone does not provide adequate protection against boiling or freezing.

Table 38

Table 38				
	Recommendations f	or Finished Coolants for	use in Cat engines	
Coolant Type	Recommendations	Product	Service hours (1)(2)	Required Maintenance(3)
Preferred		Cat ELC	12000 hours or 6 years	Add Cat ELC Extender at 6000 service hours or one half of service life
	rielelleu	Cat ELI (water based) (4)	12000 hours or 6 years	Add Cat ELC Extender at 6000 service hours or one half of service life
Cat ELC, Cat ELI, or com- mercial coolant that meets Cat EC-1	Min requirements	Cat EC-1 specification and "ASTM D6210" and Organic Additive Technology (OAT) based on a combination of a monocarboxylic acid and a dicarboxylic acid. Free of phosphate, borate, and silicate. Tolyltriazole: minimum typical concentration of 900 ppm Nitrite: minimum typical concentration of 500 ppm in new coolants	6000 hours or 6 years	Add Extender at 3000 serv- ice hours or one half of service life
Cat DEAC, Cat SCA, conventional coolants, and	Accomple	Cat DEAC	3000 hours or 3 years	SCA at maintenance intervals
commercial extended life coolants that do not meet EC-1	Acceptable	Cat SCA (water based) (4)	3000 hours or 2 years	SCA at maintenance intervals

(Table 38, contd)

Recommendations for Finished Coolants for use in Cat engines						
Min requirements for fully formulated Heavy-Duty Commercial coolants	"ASTM D6210" and Nitrite (as NO2) concentra- tion: Minimum of 1200 ppm (70 grains/US gal) and maximum of 2400 ppm (140 grains/US gal) Silicon concentration: mini- mum of 100 ppm and maxi- mum of 275 ppm	3000 hours or 2 years	SCA at maintenance intervals			
Min requirements for SCA and water (4) (5)	Commercial supplemental coolant additive and water having Nitrite (as NO2) concentration: Minimum of 1200 ppm (70 grains/US gal) and maximum of 2400 ppm (140 grains/US gal) Silicon concentration: minimum of 100 ppm and maximum of 275 ppm	3000 hours or 1 year	Per manufacturer recommendations			

- (1) New Coolants at 50 volume percent diluted. Coolants that are prediluted at the coolant manufacturer must be diluted with water that meets Reagent 4 "ASTM D1193" requirements.
- (2) Maintain the in-service coolant at the given limits.
- (3) For appropriate maintenance procedures, refer to the details given in this Chapter. For applications that allow the use of Cat ELI in water, a minimum of 7.5 percent of Cat ELI is recommended. For applications that allow the use of SCA and water, a minimum of 6 percent to a maximum of 8 percent concentration of Cat SCA are recommended.
- (4) Water-based coolants are not allowed for use in machines that has NOx reduction aftertreatment devices, in engines that has AATAC and in Marine engines that have SWAC
- (5) There are currently no industry standards to define the quality of water-based conventional coolants. To control the quality of SCA and water coolants, the commercial SCA additive package should pass ASTM D6210 when this package is used in a glycol-based coolant. Do not use a commercial SCA additive package that only meets the ASTM D3306 or equivalent specification when used in a glycol-based coolant.

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Capacities (Refill)

SMCS Code: 1000; 7000

S/N: NDL1–Up **S/N**: LTN1–Up **S/N**: HDT1–Up **S/N**: RAZ1–Up

Table 39

Table 39						
323 Approximate Capacities (Refill)						
Liters	US gal	Recommended Type				
25	6.6					
345	91					
25	6.6	Refer to Operation and Maintenance Manual, "Lubricant Viscosities".				
115	30					
5	1.3					
	25 345 25 115	Liters US gal 25 6.6 345 91 25 6.6 115 30				

(Table 39, contd)

	323 Approximate Capacities (Refill)					
Component or System	Liters	US gal	Recommended Type			
Each Final Drive	5	1.3				
DEF Tank	41	10.8				
	kg	lbs				
Swing Gear	13.5	29.8	Refer to Operation and Maintenance Manual, "Lubricant Viscosities - Special Lubricants".			
Refrigerant(2)	0.9	1.98	R-134a			
	mL	oz				
Refrigerant Oil (2)	240	8	Polyalkylene Glycol (PAG) Oil			

⁽¹⁾ The amount of hydraulic fluid that is needed to refill the hydraulic system after performing Operation and Maintenance Manual, "Hydraulic System Oil - Change"

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Capacities (Refill)

SMCS Code: 1000; 7000

S/N: KFE1-Up S/N: MYK1-Up S/N: YCP1-Up S/N: HEX1-Up

Table 40

	320 Approx	imate Capad	cities (Refill)
Component or System	Liters	US gal	Recommended Type
Cooling System	25	6.6	
Fuel Tank	345	91	
Engine Crankcase with Filter - C4.4 Engine	15	4.0	
Hydraulic System ⁽¹⁾	115	30	Refer to Operation and Maintenance Manual, "Lubricant Viscosities".
Swing Drive	5	1.3	
Each Final Drive	5	1.3	
DEF Tank	39	10.3	
	kg	lbs	
Swing Gear	13.5	29.8	Refer to Operation and Maintenance Manual, "Lubricant Viscosities - Special Lubricants".
Refrigerant ⁽²⁾	0.9	1.98	R-134a
	mL	oz	
Refrigerant Oil (2)	240	8	Polyalkylene Glycol (PAG) Oil

⁽¹⁾ The amount of hydraulic fluid that is needed to refill the hydraulic system after performing Operation and Maintenance Manual, "Hydraulic System Oil - Change"

⁽²⁾ Refer to Service Manual, "Air Conditioning and Heating R-134a for All Caterpillar Machines" for additional information

⁽²⁾ Refer to Service Manual, "Air Conditioning and Heating R-134a for All Caterpillar Machines" for additional information

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S-O-S Information

SMCS Code: 1000; 1348; 3080; 4050; 5050; 7000; 7542-008

S·O·S Services is a highly recommended process for Cat customers to use in order to minimize owning and operating cost. Customers provide oil samples, coolant samples, and other machine information. The dealer uses the data in order to provide the customer with recommendations for management of the equipment. In addition, S·O·S Services can help determine the cause of an existing product problem.

Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluid Recommendations" for detailed information concerning S·O·S Services.

The effectiveness of S·O·S Services is dependent on timely submission of the sample to the laboratory at recommended intervals.

Refer to the Operation and Maintenance Manual, "Maintenance Interval Schedule" for a specific sampling location and a service hour maintenance interval.

Consult your Cat dealer for complete information and assistance in establishing an S·O·S program for your equipment.

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Maintenance Section Maintenance Support

Maintenance Support

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Prepare the Machine for Maintenance

SMCS Code: 1000; 7000

Refer to the following procedure before you perform any maintenance to the machine.

⋒ WARNING

Personal injury can result from hydraulic oil pressure and hot oil.

Hydraulic oil pressure can remain in the hydraulic system after the engine has been stopped. Serious injury can be caused if this pressure is not released before any service is done on the hydraulic system.

Make sure all of the attachments have been lowered, oil is cool before removing any components or lines. Remove the oil filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, PERJ1017, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat ® products.

Dispose of all fluids according to local regulations and mandates.

Note: Permit only one operator on the machine. Keep all other personnel away from the machine or in view of the operator.

1. Park the machine on a dry, level, solid surface that is free of any debris.

Note: The surface must be solid enough to support the weight of the machine and any tooling that is used to support the machine.

- **2.** Engage the parking brake. Place wheel blocks in front and behind the wheels or tracks.
- Lower all work tools to the ground.
- 4. Stop the engine.

5. Release the pressure in the hydraulic system. Refer to Operation and Maintenance Manual, "System Pressure Release" for more information.

Perform a visual inspection first. If the visual checks are completed but the problem has not been identified, perform operational checks. If the problem has not been identified, perform instrument tests. This procedure will help to identify system problems.

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Service Interval Chart

SMCS Code: 7000

The service interval chart is inside the battery compartment door on the left side of the machine.

Refer to the Operation and Maintenance Manual, "Maintenance Interval Schedule" for the correct maintenance intervals and procedures that are specific to your machine.

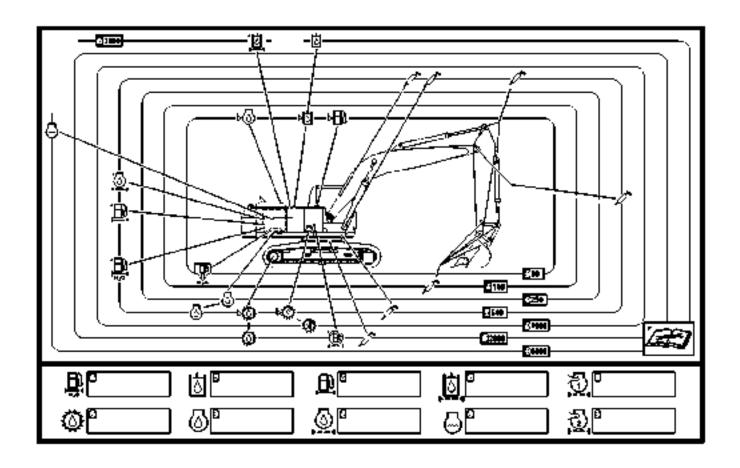


Illustration 688 g06255255



Operation and Maintenance Manual – Refer to the OMM for maintenance instructions and guidelines.



Service hour interval – Hourly interval in which a maintenance procedure should be performed.



Cooling system coolant – Change the ELC (Extended Life Coolant).



Engine air filter primary element – Clean or replace the primary air filter element.



Engine air filter secondary element – Replace the secondary air filter element.



Engine oil level – Check the engine oil level.



Engine oil - Change the engine oil.



Engine oil filter – Change the engine oil filter.



Final drive oil level – Check the final drive oil level.



Final drive oil – Change the final drive oil.



Fuel cap filter – Replace the fuel cap filter.



Fuel level - Check the fuel level.



Fuel system filter – Replace the fuel system filters.



Fuel system water separator – Drain the water separator.



Fuel system water separator element – Replace the fuel system water separator element.



Fumes Disposal Filter Element – Replace the fumes disposal filter element.



Grease zerk – Lubricate the designated locations.



Hydraulic oil level – Check the hydraulic oil level.



Hydraulic oil – Change the hydraulic oil.



Hydraulic oil filter – Change the hydraulic oil filter.



Swing drive oil level – Check the swing drive oil level.



Swing drive oil – Change the swing drive oil

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System Pressure Release

SMCS Code: 1250-553-PX; 1300-553-PX; 1350-553-PX; 5050-553-PX; 6700-553-PX; 7540-553-PX

MARNING

Personal injury or death can result from sudden machine movement.

Sudden movement of the machine can cause injury to persons on or near the machine.

To prevent injury or death, make sure that the area around the machine is clear of personnel and obstructions before operating the machine.

Coolant System

WARNING

Pressurized system: Hot coolant can cause serious burn. To open cap, stop engine, wait until radiator is cool. Then loosen cap slowly to relieve the pressure.

To relieve the pressure from the coolant system, turn off the machine. Allow the cooling system pressure cap to cool. Remove the cooling system pressure cap slowly to relieve pressure.

Hydraulic System

The release of hydraulic pressure in a hydraulic circuit is required before service is performed to that hydraulic circuit. Release the pressure in the following hydraulic circuits before any hydraulic lines are disconnected or removed from that hydraulic circuit.

- · Boom hydraulic circuit
- · Stick hydraulic circuit
- · Bucket hydraulic circuit
- Swing hydraulic circuit
- · Travel hydraulic circuit
- Attachment hydraulic circuits (if equipped)
- Pilot hydraulic circuit
- · Return hydraulic circuit

Note: Refer to the Disassembly and Assembly Manual for additional information concerning service of the components of specific hydraulic circuits.

Release of Hydraulic Pressure from the Main Hydraulic System

A WARNING

Personal injury can result from hydraulic oil pressure and hot oil.

Hydraulic oil pressure can remain in the hydraulic system after the engine has been stopped. Serious injury can be caused if this pressure is not released before any service is done on the hydraulic system.

Make sure all of the work tools have been lowered to the ground, and the oil is cool before removing any components or lines. Remove the oil filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, PERJ1017, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat ® products.

Dispose of all fluids according to local regulations and mandates.

Perform the following steps to release the hydraulic system pressure from the main hydraulic system.

Note: For additional safety, wrap hydraulic joint with material that could absorb/reduce any residual pressure of oil when released. Loosen the joint slowly, pause, and carefully check hydraulic joint for tensions indicating presence of pressure or spring force in lines or components.

1. Position the machine on level ground.



Illustration 689 g06185115

- 2. Fully retract the stick cylinder rod. Adjust the position of the bucket so that the bucket is parallel to the ground. Lower the boom until the work tool is flat on the ground. Refer to Illustration 689.
- **3.** Release the system pressure from the implement and swing hydraulic circuits.

Note: Perform Step 3b through Step 3d immediately after the engine is shut off to insure adequate pilot system pressure is available to release the pressure in the hydraulic circuits.

- a. Shut off the engine.
- b. Turn the engine start switch to the ON position without starting the engine.

c. Place the hydraulic activation control lever in the UNLOCKED position.

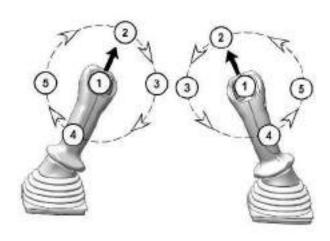


Illustration 690 g06184822

d. Move both joysticks in a circular motion to the FULL STROKE positions multiple times until the pilot accumulator has been exhausted.

Note: Pilot pressure is required to relieve hydraulic system pressure.

- e. Place the hydraulic activation control lever in the LOCKED position.
- f. Start the engine to recharge the pilot accumulator.

Note: Do not activate any controls when recharging the pilot accumulator.

- g. Shut off the engine.
- h. Repeat Step 3b through Step 3g until the highpressure lines have been released.

Note: Each time the accumulator is recharged, start the joysticks at different positions or rotate in the reverse direction. Doing so will ensure that the same circuit is not being relieved each time.

Note: You can also move only the joysticks or pedals of the hydraulic circuit that requires service to the full stroke positions after moving joysticks in a circular motion multiple times. This action will release the high pressure only in that single hydraulic circuit. This action will also release any pressure that might be present in the pilot hydraulic circuit.

- Release hydraulic system pressure in the attachment circuits.
 - a. Start the engine to charge pilot accumulator.
 - b. Shut off the engine.

Note: Perform Step 4c through Step 4e immediately after the engine is shut off to insure adequate pilot system pressure is available to release the pressure in the hydraulic circuits.

- c. Turn the engine start switch to the ON position without starting the engine.
- d. Place the hydraulic activation control lever in the UNLOCKED position.
- e. Activate the switch or pedal for the attachment circuit.
- f. Place the hydraulic activation control lever in the LOCKED position.
- g. Start the engine to recharge pilot accumulator.

Note: Do not activate any controls when recharging pilot accumulator.

- h. Shut off the engine.
- Repeat Step 4c through Step 4f for each attachment circuit.
- 5. After releasing the hydraulic pressure in each of the desired hydraulic circuits, place the hydraulic activation control lever in the LOCKED position.
- 6. Turn the engine start switch to the OFF position.

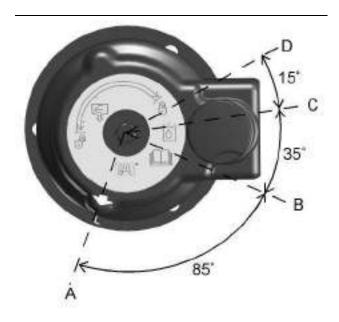


Illustration 691

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Hydraulic oil tank filler cap

- (A) LOCK position
- (B) PRESSURE RELEASE START position
- (C) PRESSURE RELEASE END position
- (D) OPEN position
- 7. Release the pressure that may be present in the return hydraulic circuit with the following procedure. Refer to Illustration 691 for filler cap positions.
 - a. Turn the filler cap counterclockwise and move the arrow from position (A) to position (B).
 - b. Release the pressure for a minimum of 45 seconds by moving the arrow from position (B) to position (C).
 - c. Push down the filler cap and move the arrow from position (C) to position (D).

Note: The travel hydraulic circuit is open to the hydraulic tank. Pressure from the travel circuit is released by releasing pressure from the return circuit.

- 8. Release the pressure that may be present in the boom circuit to remove the risk of residual pressure in the line. Make sure that the engine start switch is in the OFF position and the pressure in the hydraulic tank has been released.
 - a. Remove the hydraulic oil tank filler cap.
 - b. Remove any covers to access the main control valve.

Maintenance Section

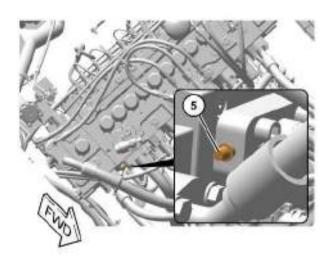


Illustration 692

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Main control valve

(5) Screw

- c. Use a clean hose of adequate length and size and connect to screw (5). Put the other end of the hose in the filler cap opening.
- d. Slowly loosen screw (5) by a maximum of 1/2 turn. Loosening the screw allows the hydraulic oil in the boom circuit to drain into the hydraulic tank.
- e. Tighten screw (5) to $13 \pm 2 \text{ N} \cdot \text{m}$ (9 ± 1 lb ft).

Note: Refer to the Operation and Maintenance Manual, Equipment Lowering with Engine Stopped for information on lowering the work tool with the engine off.

f. Disconnect the hose from screw (5). Do not allow the oil that is contained in the hose to spill. Drain the oil into a suitable container. 9. The pressure in the multiple hydraulic circuits that require service is now released and lines and components can be disconnected or removed from those hydraulic circuits.

i07746333

Welding on Machines and Engines with Electronic Controls

SMCS Code: 1000; 7000

Do not weld on any protective structure. If it is necessary to repair a protective structure, contact your Cat dealer.

Proper welding procedures are necessary to avoid damage to the electronic controls and to the bearings. When possible, remove the component that must be welded from the machine or the engine and then weld the component. If you must weld near an electronic control on the machine or the engine, temporarily remove the electronic control to prevent heat related damage. The following steps should be followed to weld on a machine or an engine with electronic controls.

- **1.** Turn off the engine. Place the engine start switch in the OFF position.
- If equipped, turn the battery disconnect switch to the OFF position. If there is no battery disconnect switch, remove the negative battery cable at the battery.

NOTICE

Do NOT use electrical components (ECM or sensors) or electronic component grounding points for grounding the welder.

- 3. Clamp the ground cable from the welder to the component that will be welded. Place the clamp as close as possible to the weld. Make sure that the electrical path from the ground cable to the component does not go through any bearing. Use this procedure to reduce the possibility of damage to the following components:
 - · Bearings of the drive train
 - Hydraulic components
 - · Electrical components
 - · Other components of the machine
- **4.** Protect any wiring harnesses and components from the debris and the spatter which is created from welding.

424

Severe Service Application

5. Use standard welding procedures to weld the materials together.

i04807435

Severe Service Application

SMCS Code: 1000

An engine which operates outside of normal conditions is operating in a severe service application.

An engine that operates in a severe service application may need more frequent maintenance intervals in order to maximize the following conditions:

- Reliability
- Service life

The number of individual applications cause the impossibility of identifying all of the factors which may contribute to severe service operation. Consult your Caterpillar dealer for the unique maintenance that may be necessary for your engine.

An application is a severe service application if any of the following conditions apply:

Severe Environmental Factors

- Frequent operation in dirty air
- Frequent operation at an altitude which is above 1525 m (5000 ft)
- Frequent operation in ambient temperatures which are above 32° C (90° F)
- · Frequent operation in ambient temperatures which are below 0° C (32° F)

Severe Operating Conditions

- Frequent operation with inlet air which has a corrosive content
- Operation with inlet air which has a combustible content
- Operation which is outside of the intended application
- Operation with a plugged fuel filter
- Extended operation at low idle (more than 20% of hours)
- Frequent cold starts at temperatures below 0° C (32° F)

- Frequent dry starts (starting after more than 72 hours of shutdown)
- Frequent hot shutdowns (shutting down the engine without the minimum of 2 minutes to 5 minutes of cool down time)
- Operation above the engine rated speed
- Operation below the peak torque speed
- Operating with fuel which does not meet the standards for distillate diesel fuel as stated in Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" "Distillate Diesel Fuel"
- Operating with a blend of distillate fuel which contains more than 20 percent biodiesel

Improper Maintenance Procedures (Maintenance Procedures Which May Contribute to a Severe Service Application)

- Inadequate maintenance of fuel storage tanks from causes such as excessive water, sediment, and microorganism growth.
- Extending maintenance intervals beyond the recommended intervals
- Using fluids which are not recommended in Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations"
- Extending maintenance intervals for changing the engine oil and engine coolant without S·O·S validation
- Extending maintenance intervals for changing air filters, oil filters, and fuel filters
- Failure to use a water separator
- Using filters which are not recommended by Special Publication, PEWJ0074, "2008 Cat Filter and Fluid Application Guide"
- Storing the engine for more than 3 months but less than 1 yr (For information about engine storage, refer to Special Publication, SEHS9031, "Storage Procedure for Caterpillar Products")

Maintenance Interval Schedule	"Condenser (Refrigerant) - Clean" 447
SMCS Code: 7000	"DEF Filler Screen - Clean"
S/N : RAZ1–10000	" Diesel Exhaust Fluid - Drain"
Ensure that all safety information, warnings, and	" Diesel Exhaust Fluid - Fill"
instructions are read and understood before any operation or any maintenance procedures are performed.	"Engine Air Filter Primary and/or Secondary Element - Replace"
The user is responsible for the performance of	"Ether Starting Aid Cylinder - Replace" 470
maintenance. All adjustments, the use of proper lubricants, fluids, filters, and the replacement of	"Film (Product Identification) - Clean" 472
components due to normal wear and aging are included. Failure to adhere to proper maintenance	"Fuel System - Prime"
intervals and procedures may result in diminished performance of the product and/or accelerated wear	"Fuel Tank Strainer - Clean"
of components.	"Fuses - Replace"
Use mileage, fuel consumption, service hours, or calendar time, WHICH EVER OCCURS FIRST, to determine the maintenance intervals. Products that	" High Intensity Discharge Lamp (HID) - Replace"
operate in severe operating conditions may require	" Oil Filter - Inspect"
more frequent maintenance. Refer to the maintenance procedure for any other exceptions that may change the maintenance intervals.	"Radiator, Aftercooler and Oil Cooler Cores - Clean"
Note: The aftertreatment system can be expected to function properly for the useful life of the engine	"Rollover Protective Structure (ROPS) - Inspect"
(emissions durability period), as defined by regulation. All prescribed maintenance requirements	"Shovel Crane - Inspect"
must be followed.	" Shovel Crane - Lubricate" 508
Note: Before each consecutive interval is performed,	" Track Adjustment - Adjust" 513
all maintenance from the previous interval must be performed.	" Undercarriage - Check" 517
The following guidelines should be followed if the	" Window Washer Reservoir - Fill" 517
service hours are not met:	"Window Wiper - Inspect/Replace" 517
Items listed between 10 and 100 service hours should be performed at least every 3 months.	" Windows - Clean" 518
Items listed between 250 and 500 service hours should be performed at least every 6 months.	Every 10 Service Hours or Daily for First 50 Hours
Items listed between 1000 service hours and 2500 service hours should be performed at least every year.	"Boom and Stick Linkage - Lubricate" 435
	"Boom and Stick Linkage - Lubricate" 436
When Required	"Bucket Linkage - Lubricate" 439
" Air Conditioner/Cab Heater Filter (Recirculation) - Inspect/Replace"	Every 10 Service Hours or Daily
"Battery Electrolyte Level - Check" 433	"Cooling System Coolant Level - Check" 451
"Battery or Battery Cable - Inspect/Replace" 434	" Engine Oil Level - Check"
"Bucket Linkage - Inspect/Adjust" 438	"Fuel System Water Separator - Drain" 480
"Bucket Tips - Inspect/Replace"	"Fuel Tank Water and Sediment - Drain" 481
"Cab Air Filter (Fresh Air) - Clean/Replace" 445	" Hydraulic System Oil Level - Check" 497

i08271903

"Indicators and Gauges - Test" 500	" Swing Drive Oil - Change" 509
"Seat Belt - Inspect" 504	Every 2000 Service Hours
"Track Adjustment - Inspect" 515	" Final Drive Oil - Change"
"Travel Alarm - Test"	"Fuel Cap Filter - Replace"
Every 100 Service Hours	"Fumes Disposal Filter Element - Replace" 482
"Bucket Linkage - Lubricate" 439	" Swing Gear - Lubricate"
"Oil Filter (Hydraulic Hammer) - Replace" 500	Every 3000 Service Hours
Every 250 Service Hours	"Cooling System Coolant Sample - Obtain" 452
"Cooling System Coolant Sample - Obtain" 452	" Hydraulic System Oil Filter (Return) -
"Engine Oil Sample - Obtain"	Replace"
Initial 500 Service Hours	Every 3 Years
"Engine Oil and Filter - Change"	"Seat Belt - Replace"505
"Final Drive Oil - Change"	Every 5000 Service Hours
"Swing Drive Oil - Change" 509	" Diesel Exhaust Fluid Filter - Replace"
Every 500 Service Hours	" Diesel Exhaust Fluid Injector - Replace" 458
"Boom and Stick Linkage - Lubricate" 436	"Receiver Dryer (Refrigerant) - Replace" 503
"Boom and Stick Linkage - Lubricate"	Every 6000 Service Hours or 3
"Final Drive Oil Level - Check"	Years
"Final Drive Oil Sample - Obtain"	"Cooling System Coolant Extender (ELC) -
"Fuel Lift Pump Strainer - Replace" 474	Add"
"Fuel System Primary Filter (Water Separator) Element - Replace"	Every 10 000 Service Hours
"Fuel System Secondary Filter - Replace" 478	" DEF Manifold Filters - Replace"
"Hydraulic System Oil Sample - Obtain" 499	Every 12 000 Service Hours or 6
"Swing Bearing - Lubricate" 509	Years
"Swing Drive Oil Level - Check" 511	"Cooling System Coolant (ELC) - Change" 447
"Swing Drive Oil Sample - Obtain" 512	
Every 1000 Service Hours	
" Battery - Clean"	
"Battery Hold-Down - Tighten" 434	
"Belt - Inspect/Adjust/Replace"	
"Engine Oil and Filter - Change" 466	

i08271904	" Camera - Clean"
Maintenance Interval Schedule	" Condenser (Refrigerant) - Clean"
SMCS Code: 7000	" DEF Filler Screen - Clean" 453
S/N : HEX1–10000	" Diesel Exhaust Fluid - Drain" 455
Ensure that all safety information, warnings, and instructions are read and understood before any operation or any maintenance procedures are performed.	" Diesel Exhaust Fluid - Fill"
	"Engine Air Filter Primary and/or Secondary Element - Replace"460
The user is responsible for the performance of maintenance. All adjustments, the use of proper lubricants, fluids, filters, and the replacement of components due to normal wear and aging are included. Failure to adhere to proper maintenance intervals and procedures may result in diminished	"Ether Starting Aid Cylinder - Replace" 470
	"Film (Product Identification) - Clean" 472
	"Fuel System - Prime"
	" Fuel Tank Strainer - Clean" 481
performance of the product and/or accelerated wear of components.	" Fuses - Replace"
Use mileage, fuel consumption, service hours, or calendar time, WHICH EVER OCCURS FIRST, to	" High Intensity Discharge Lamp (HID) - Replace"
determine the maintenance intervals. Products that operate in severe operating conditions may require	" Oil Filter - Inspect"
more frequent maintenance. Refer to the maintenance procedure for any other exceptions that may change the maintenance intervals.	" Radiator, Aftercooler and Oil Cooler Cores - Clean"
Note: The aftertreatment system can be expected to function properly for the useful life of the engine	"Rollover Protective Structure (ROPS) - Inspect"504
(emissions durability period), as defined by regulation. All prescribed maintenance requirements	" Shovel Crane - Inspect" 505
must be followed.	" Shovel Crane - Lubricate" 508
Note: Before each consecutive interval is performed,	" Track Adjustment - Adjust" 513
all maintenance from the previous interval must be performed.	" Undercarriage - Check" 517
The following guidelines should be followed if the	" Window Washer Reservoir - Fill" 517
service hours are not met:	" Window Wiper - Inspect/Replace" 517
Items listed between 10 and 100 service hours should be performed at least every 3 months.	" Windows - Clean" 518
Items listed between 250 and 500 service hours should be performed at least every 6 months.	Every 10 Service Hours or Daily for First 50 Hours
Items listed between 1000 service hours and 2500 service hours should be performed at least every	"Boom and Stick Linkage - Lubricate" 436
year. '	" Boom and Stick Linkage - Lubricate" 435
When Required	"Bucket Linkage - Lubricate"
Air Conditioner/Cab Heater Filter (Recirculation) -	Every 10 Service Hours or Daily
Battery Electrolyte Level - Check" 433	" Cooling System Coolant Level - Check" 451
Battery or Battery Cable - Inspect/Replace" 434	" Engine Oil Level - Check"
Bucket Linkage - Inspect/Adjust" 438	"Fuel System Water Separator - Drain" 480
Bucket Tips - Inspect/Replace"	" Fuel Tank Water and Sediment - Drain" 481
Cab Air Filter (Fresh Air) - Clean/Replace" 445	" Hydraulic System Oil Level - Check" 497

"Indicators and Gauges - Test" 500	" Swing Drive Oil - Change"509
"Seat Belt - Inspect" 504	Every 1500 Service Hours
"Track Adjustment - Inspect"	" Diesel Exhaust Fluid Filter - Replace" 456
" Travel Alarm - Test"	·
Every 100 Service Hours	Every 2000 Service Hours
"Bucket Linkage - Lubricate"	" Final Drive Oil - Change"
" Oil Filter (Hydraulic Hammer) - Replace" 500	"Fuel Cap Filter - Replace"
Every 250 Service Hours	"Fumes Disposal Filter Element - Replace" 482
•	"Swing Gear - Lubricate"
"Cooling System Coolant Sample - Obtain" 452	Every 3000 Service Hours
"Engine Oil Sample - Obtain"	"Cooling System Coolant Sample - Obtain" 452
Initial 500 Service Hours	" Hydraulic System Oil Filter (Return) - Replace"
" Engine Oil and Filter - Change"	
" Final Drive Oil - Change"	Every 3 Years
" Swing Drive Oil - Change" 509	"Seat Belt - Replace"505
Every 500 Service Hours	Every 5000 Service Hours
"Boom and Stick Linkage - Lubricate" 436	"Receiver Dryer (Refrigerant) - Replace" 503
"Boom and Stick Linkage - Lubricate" 435	Every 6000 Service Hours or 3
"Final Drive Oil Level - Check" 473	Years
"Final Drive Oil Sample - Obtain" 474	"Cooling System Coolant Extender (ELC) -
"Fuel Lift Pump Strainer - Replace" 474	Add"
"Fuel System Primary Filter (Water Separator) Element - Replace"	"Hydraulic System Oil - Change"
" Fuel System Secondary Filter - Replace" 478	Every 10 000 Service Hours
" Hydraulic System Oil Sample - Obtain" 499	"DEF Manifold Filters - Replace" 455
"Swing Bearing - Lubricate" 509	Every 12 000 Service Hours or 6
" Swing Drive Oil Level - Check" 511	Years
" Swing Drive Oil Sample - Obtain" 512	"Cooling System Coolant (ELC) - Change" 447
Every 1000 Service Hours	
"Battery - Clean"	
"Battery Hold-Down - Tighten" 434	
"Belt - Inspect/Adjust/Replace"	
" Engine Oil and Filter - Change"	

"Cab Air Filter (Fresh Air) - Clean/Replace" 445

Maintenance Interval Schedule	" Camera - Clean"
SMCS Code: 7000	" Condenser (Refrigerant) - Clean" 447
S/N: YCP1–Up	" DEF Filler Screen - Clean"
S/N: HEX10001–Up	" Diesel Exhaust Fluid - Drain"
Ensure that all safety information, warnings, and instructions are read and understood before any operation or any maintenance procedures are performed.	" Diesel Exhaust Fluid - Fill"
	" Engine Air Filter Primary and/or Secondary Element - Replace"460
The user is responsible for the performance of maintenance. All adjustments, the use of proper lubricants, fluids, filters, and the replacement of	" Ether Starting Aid Cylinder - Replace" 470
	"Film (Product Identification) - Clean" 472
components due to normal wear and aging are included. Failure to adhere to proper maintenance	" Fuel System - Prime"
intervals and procedures may result in diminished	" Fuel Tank Strainer - Clean" 481
performance of the product and/or accelerated wear of components.	" Fuses - Replace"
Use mileage, fuel consumption, service hours, or calendar time, WHICH EVER OCCURS FIRST, to determine the maintenance intervals. Products that	" High Intensity Discharge Lamp (HID) - Replace"
operate in severe operating conditions may require	" Oil Filter - Inspect"
more frequent maintenance. Refer to the maintenance procedure for any other exceptions that may change the maintenance intervals.	" Radiator, Aftercooler and Oil Cooler Cores - Clean"
Note: The aftertreatment system can be expected to function properly for the useful life of the engine	"Rollover Protective Structure (ROPS) - Inspect"504
(emissions durability period), as defined by	"Shovel Crane - Inspect"
regulation. All prescribed maintenance requirements must be followed.	"Shovel Crane - Lubricate"
Note: Before each consecutive interval is performed,	" Track Adjustment - Adjust" 513
all maintenance from the previous interval must be performed.	" Undercarriage - Check"
The following guidelines should be followed if the	" Window Washer Reservoir - Fill" 517
service hours are not met:	" Window Wiper - Inspect/Replace" 517
Items listed between 10 and 100 service hours should be performed at least every 3 months.	" Windows - Clean" 518
Items listed between 250 and 500 service hours should be performed at least every 6 months.	Every 10 Service Hours or Daily for First 50 Hours
Items listed between 1000 service hours and 2500 service hours should be performed at least every	"Boom and Stick Linkage - Lubricate" 436
year.	"Boom and Stick Linkage - Lubricate" 435
When Required	"Bucket Linkage - Lubricate"
" Air Conditioner/Cab Heater Filter (Recirculation) - Inspect/Replace"	Every 10 Service Hours or Daily
"Battery Electrolyte Level - Check" 433	"Cooling System Coolant Level - Check" 451
"Battery or Battery Cable - Inspect/Replace" 434	" Engine Oil Level - Check" 464
"Bucket Linkage - Inspect/Adjust" 438	"Fuel System Water Separator - Drain" 480
"Bucket Tips - Inspect/Replace"	" Fuel Tank Water and Sediment - Drain" 481

i08271905

Maintenance	Section
Maintenance	Interval Schedule

"Hydraulic System Oil Level - Check" 497	" Swing Drive Oil - Change" 509
" Indicators and Gauges - Test" 500	Every 1500 Service Hours
"Seat Belt - Inspect" 504	" Diesel Exhaust Fluid Filter - Replace"
"Track Adjustment - Inspect" 515	·
" Travel Alarm - Test"	Every 2000 Service Hours
Every 100 Service Hours	" Final Drive Oil - Change"
"Bucket Linkage - Lubricate" 439	"Fuel Cap Filter - Replace" 474
"Oil Filter (Hydraulic Hammer) - Replace" 500	"Fumes Disposal Filter Element - Replace" 482 "Swing Gear - Lubricate"
Every 250 Service Hours	Every 3000 Service Hours
"Cooling System Coolant Sample - Obtain" 452	-
"Engine Oil Sample - Obtain"	"Cooling System Coolant Sample - Obtain" 452
Initial 500 Service Hours	" Hydraulic System Oil Filter (Return) - Replace"
" Engine Oil and Filter - Change" 466	Every 3 Years
"Final Drive Oil - Change"	"Seat Belt - Replace"505
" Swing Drive Oil - Change" 509	Every 5000 Service Hours
Every 500 Service Hours	"Receiver Dryer (Refrigerant) - Replace" 503
"Boom and Stick Linkage - Lubricate" 436	Every 6000 Service Hours or 3
"Boom and Stick Linkage - Lubricate" 435	Years
"Final Drive Oil Level - Check" 473	" Cooling System Coolant Extender (ELC) -
"Final Drive Oil Sample - Obtain" 474	Add"
"Hydraulic System Oil Sample - Obtain" 499	"Hydraulic System Oil - Change" 489
" Swing Bearing - Lubricate" 509	Every 10 000 Service Hours
"Swing Drive Oil Level - Check" 511	" DEF Manifold Filters - Replace" 455
"Swing Drive Oil Sample - Obtain" 512	Every 12 000 Service Hours or 6
Every 1000 Service Hours	Years
" Battery - Clean"	"Cooling System Coolant (ELC) - Change" 447
"Battery Hold-Down - Tighten" 434	
"Belt - Inspect/Adjust/Replace"	
" Engine Oil and Filter - Change"	
"Fuel System Primary Filter (Water Separator) Element - Replace"	
"Fuel System Secondary Filter - Replace" 479	

i08271906	"Battery Electrolyte Level - Check" 433
Maintenance Interval Schedule	"Battery or Battery Cable - Inspect/Replace" 434
SMCS Code: 7000	"Bucket Linkage - Inspect/Adjust" 438
S/N: KFE1–Up	"Bucket Tips - Inspect/Replace"
S/N: MYK1–Up	"Cab Air Filter (Fresh Air) - Clean/Replace" 445
S/N: NDL1-Up	" Camera - Clean"
S/N: LTN1–Up	"Condenser (Refrigerant) - Clean" 447
S/N: HDT1–Up	"DEF Filler Screen - Clean"
S/N: RAZ10001–Up	" Diesel Exhaust Fluid - Drain"
Ensure that all safety information, warnings, and	" Diesel Exhaust Fluid - Fill"
instructions are read and understood before any operation or any maintenance procedures are performed.	" Engine Air Filter Primary and/or Secondary Element - Replace"
The user is responsible for the performance of	"Ether Starting Aid Cylinder - Replace" 470
maintenance. All adjustments, the use of proper lubricants, fluids, filters, and the replacement of	"Film (Product Identification) - Clean" 472
components due to normal wear and aging are included. Failure to adhere to proper maintenance	"Fuel System - Prime"
intervals and procedures may result in diminished performance of the product and/or accelerated wear	"Fuel Tank Strainer - Clean"
of components.	" Fuses - Replace"
Use mileage, fuel consumption, service hours, or calendar time, WHICH EVER OCCURS FIRST, to determine the maintenance intervals. Products that	" High Intensity Discharge Lamp (HID) - Replace"
operate in severe operating conditions may require more frequent maintenance. Refer to the	" Oil Filter - Inspect"
maintenance procedure for any other exceptions that may change the maintenance intervals.	"Radiator, Aftercooler and Oil Cooler Cores - Clean"502
Note: The aftertreatment system can be expected to function properly for the useful life of the engine (emissions durability period), as defined by	"Rollover Protective Structure (ROPS) - Inspect"504
regulation. All prescribed maintenance requirements	"Shovel Crane - Inspect" 505
must be followed.	"Shovel Crane - Lubricate" 508
Note: Before each consecutive interval is performed, all maintenance from the previous interval must be	"Track Adjustment - Adjust" 513
performed.	" Undercarriage - Check" 517
The following guidelines should be followed if the service hours are not met:	" Window Washer Reservoir - Fill" 517
Items listed between 10 and 100 service hours	" Window Wiper - Inspect/Replace" 517
should be performed at least every 3 months.	" Windows - Clean" 518
Items listed between 250 and 500 service hours should be performed at least every 6 months.	Every 10 Service Hours or Daily for First 50 Hours
Items listed between 1000 service hours and 2500 service hours should be performed at least every	
year.	"Boom and Stick Linkage - Lubricate"
When Required	"Boom and Stick Linkage - Lubricate" 435

"Bucket Linkage - Lubricate"	" Battery Hold-Down - Tighten" 434
Every 10 Service Hours or Daily	"Belt - Inspect/Adjust/Replace"
"Cooling System Coolant Level - Check" 451	" Engine Oil and Filter - Change"
" Engine Oil Level - Check"	" Fuel System Primary Filter (Water Separator) Element - Replace"
"Fuel System Water Separator - Drain" 480	" Fuel System Secondary Filter - Replace" 479
"Fuel Tank Water and Sediment - Drain" 481	" Swing Drive Oil - Change" 509
"Hydraulic System Oil Level - Check" 497	Every 2000 Service Hours
"Indicators and Gauges - Test" 500	-
"Seat Belt - Inspect"	"Final Drive Oil - Change"
"Track Adjustment - Inspect" 515	"Fuel Cap Filter - Replace"
" Travel Alarm - Test"	"Fumes Disposal Filter Element - Replace" 482
Every 100 Service Hours	" Swing Gear - Lubricate"512
"Bucket Linkage - Lubricate"	Every 3000 Service Hours
"Oil Filter (Hydraulic Hammer) - Replace" 500	"Cooling System Coolant Sample - Obtain" 452
Every 250 Service Hours	" Hydraulic System Oil Filter (Return) - Replace"
"Cooling System Coolant Sample - Obtain" 452	Every 3 Years
"Engine Oil Sample - Obtain"	" Seat Belt - Replace"
	•
Initial 500 Service Hours	Every 5000 Service Hours
Initial 500 Service Hours " Engine Oil and Filter - Change"	Every 5000 Service Hours
	Every 5000 Service Hours " Diesel Exhaust Fluid Filter - Replace"
" Engine Oil and Filter - Change" 466	Every 5000 Service Hours
" Engine Oil and Filter - Change"	Every 5000 Service Hours " Diesel Exhaust Fluid Filter - Replace"
" Engine Oil and Filter - Change"	Every 5000 Service Hours " Diesel Exhaust Fluid Filter - Replace"
"Engine Oil and Filter - Change"	Every 5000 Service Hours " Diesel Exhaust Fluid Filter - Replace"
 " Engine Oil and Filter - Change"	Every 5000 Service Hours " Diesel Exhaust Fluid Filter - Replace"
 " Engine Oil and Filter - Change"	Every 5000 Service Hours " Diesel Exhaust Fluid Filter - Replace"
 " Engine Oil and Filter - Change"	Every 5000 Service Hours " Diesel Exhaust Fluid Filter - Replace"
 " Engine Oil and Filter - Change"	Every 5000 Service Hours " Diesel Exhaust Fluid Filter - Replace"
 "Engine Oil and Filter - Change"	Every 5000 Service Hours " Diesel Exhaust Fluid Filter - Replace"
 "Engine Oil and Filter - Change"	Every 5000 Service Hours " Diesel Exhaust Fluid Filter - Replace"
 " Engine Oil and Filter - Change"	Every 5000 Service Hours " Diesel Exhaust Fluid Filter - Replace"

i06954215

Air Conditioner/Cab Heater Filter (Recirculation) - Inspect/ Replace

SMCS Code: 1054-040-A/C; 1054-510-A/C

NOTICE

An air recirculation filter element plugged with dust will result in decreased performance and service life to the air conditioner or cab heater.

To prevent decreased performance, clean the filter element, as required.

The air conditioner filter is on the lower left side of the cab behind the seat.

Slide the operator seat forward.

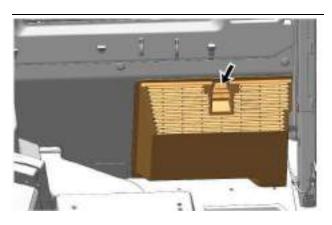


Illustration 693

q06181599

2. Release the cover latch.

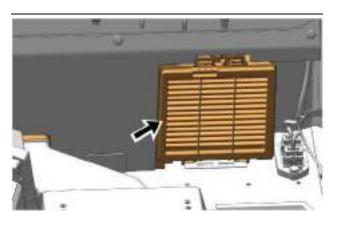


Illustration 694

g06181603

- **3.** Slide the filter element upward.
- **4.** Tap the air filter to remove the dirt. Do not use compressed air to clean the filter.

- **5.** After you clean the filter element, inspect the filter element. If the filter element is damaged or badly contaminated, use a new filter element. Make sure that the filter element is dry.
- 6. Install the filter element.
- Install the cover.

NOTICE

Failure to reinstall the filter element for the air conditioning system will contaminate and damage the system components.

i00934864

Battery - Clean

SMCS Code: 1401-070

Clean the battery surface with a clean cloth. Keep the terminals clean and keep the terminals coated with petroleum jelly. Install the post cover after you coat the terminal post with petroleum jelly.

i06019968

Battery Electrolyte Level -Check

SMCS Code: 1401-535-FLV; 1401; 1401-535

WARNING

All lead-acid batteries contain sulfuric acid which can burn the skin and clothing. Always wear a face shield and protective clothing when working on or near batteries.

Note: If the machine is operated in extreme temperatures, check the electrolyte level Every 500 Service Hours or 3 months.

When the engine is not run for long periods of time or when the engine is run for short periods, the batteries may not fully recharge. Ensure a full charge in order to help prevent the battery from freezing.

- 1. Clean the battery surface with a clean cloth. Clean the terminals and the cable clamps. Coat the clamps and the terminals with silicone lubricant or petroleum jelly. Install the post cover.
- 2. Inspect the electrolyte level in each battery cell. Maintain the electrolyte level to the bottom of the filler openings. Use distilled water. If distilled water is not available, use clean drinking water.

Maintenance Section
Battery Hold-Down - Tighten

i00934872

Battery Hold-Down - Tighten

SMCS Code: 7257

Tighten the hold-downs for the battery in order to prevent the batteries from moving during machine operation.

i07592714

Battery or Battery Cable - Inspect/Replace

SMCS Code: 1401; 1401-561; 1401-040; 1401-510; 1402-040; 1402-510

A WARNING

Personal injury can result from battery fumes or explosion.

Batteries give off flammable fumes that can explode. Electrolyte is an acid and can cause personal injury if it contacts the skin or eyes.

Prevent sparks near the batteries. Sparks could cause vapors to explode. Do not allow jumper cable ends to contact each other or the engine. Improper jumper cable connections can cause an explosion.

Always wear protective glasses when working with batteries.

- **1.** Turn all the switches to the OFF position. Turn the engine start switch key to the OFF position.
- Turn the battery disconnect switch to the OFF position. Remove the key.
- 3. Remove the battery hold-down.

Note: The machine may contain more than one set of batteries.

- Disconnect the negative battery cable at the battery.
- **5.** Disconnect the positive battery cable at the battery.
- Disconnect the battery cable at the battery disconnect switch.
- 7. Inspect the battery terminals for corrosion. Clean the battery terminals and the surfaces of the batteries with a clean cloth.
- **8.** Inspect the battery cables for wear or damage.

- **9.** Make any necessary repairs. If necessary, replace the battery cables and/or the battery.
- **10.** Connect the positive battery cable at the battery.
- 11. Connect the negative battery cable at the battery.
- **12.** Coat the battery terminals with petroleum jelly to prevent corrosion and install the terminal covers.
- **13.** Reinstall the battery hold-down. Tighten the hold-downs for the battery to prevent the batteries from moving during machine operation.
- **14.** Connect the battery cable at the battery disconnect switch.
- **15.** Install the key and turn the battery disconnect switch ON.

Recycle the Battery

Always recycle a battery. Never discard a battery.

Always return used batteries to one of the following locations:

- A battery supplier
- · An authorized battery collection facility
- Recycling facility

i07041934

Belt - Inspect/Adjust/Replace

SMCS Code: 1357-040; 1357-510; 1357-025; 1397-025; 1397-040; 1397-510

Note: This engine is equipped with a belt tightener that automatically adjusts the belt to the correct tension.

 Unlatch the engine hood and raise the engine hood.

i07531952

435



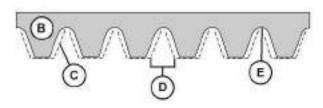


Illustration 695

g06206193

- (A) New belt
- (B) Worn belt
- 2. Inspect the condition of the serpentine belt. Over time the belt ribs will lose material (C). The space between the ribs will increase (D). The loss of material will cause the pulley sheave to contact the belt valley. This will lead to belt slippage and accelerated wear (E). Replace the belt if the belt is worn or frayed.
- **3.** If the belt requires replacement, perform Step 3a through Step 3f.
 - a. Remove the upper fan guard.

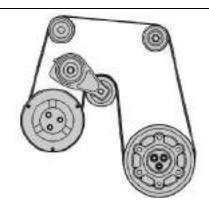


Illustration 696

g06206669

- Rotate the belt tensioner clockwise to remove the belt.
- c. Remove the belt.
- d. Install a new belt.
- e. Rotate the belt tensioner clockwise to install the belt.
- f. Install the upper fan guard.
- g. Lower the engine hood and latch the engine hood.

Boom and Stick Linkage - Lubricate

(VA Boom (If Equipped))

SMCS Code: 6501-086; 6502-086

Note: Caterpillar recommends the use of 5% molybdenum grease for lubricating the boom, and stick linkage. Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for more information on molybdenum grease.

Apply lubricant through all fittings after operation under water.

Wipe all fittings before you apply lubricant.

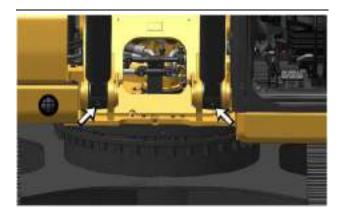


Illustration 697

g06183509

1. Apply lubricant through the fitting at the base of each boom cylinder.

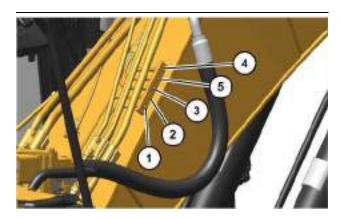


Illustration 698

g06183534

Note: Your machine may have the fittings mounted in a vertical position as shown in the illustration above, or your machine may have the fittings mounted in a horizontal position.

436

- 2. The fittings are at the base of the boom. The fittings can be serviced from the platform on the fuel tank. To lubricate the lower boom bearings, apply lubricant through fittings (1) and (2).
- **3.** Apply lubricant through fitting (3) for the head end of the VA boom cylinder.
- **4.** Apply lubricant through fittings (4) and (5) for the boom cylinder rod.

Note: To ensure proper lubrication of the lower boom bearings and of the boom cylinder rod end bearings, lubricant should be applied through fittings (1),(2),(4), and (5). Apply lubricant first when the boom is raised and any attachment is suspended. Then apply lubricant when the boom is lowered and the attachment is rested on the ground with a slight downward pressure.

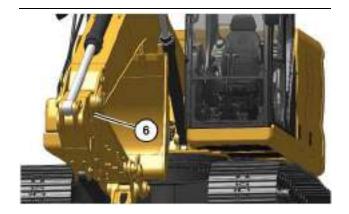


Illustration 699

g06183854

Typical example

5. Apply lubricant through fitting (6). Fitting (6) is at the connection point of the boom and of the stick.

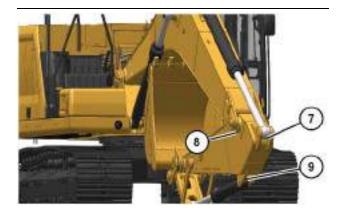


Illustration 700

q06183864

Typical example

6. Apply lubricant through fitting (7) on the stick cylinder rod. Apply lubricant through fitting (8) at the connection point of the boom and of the stick. Apply lubricant through fitting (9) at the bucket cylinder head end.

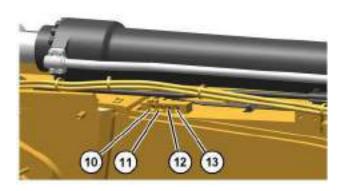


Illustration 701

g06192051

End of fore boom

- 7. Apply lubricant through fitting (10) and fitting (13) to lubricate the connection point between the stub boom and the fore boom.
- **8.** Apply lubricant through fitting (11) to lubricate the stick cylinder head end.
- **9.** Apply lubricant through fitting (12) to lubricate the rod end of the VA boom cylinder.

i07531958

Boom and Stick Linkage - Lubricate

SMCS Code: 6501-086; 6502-086

Note: Caterpillar recommends the use of 5% molybdenum grease for lubricating the boom, and stick linkage. Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for more information on molybdenum grease.

Apply lubricant through all fittings after operation under water.

Wipe all fittings before you apply lubricant.

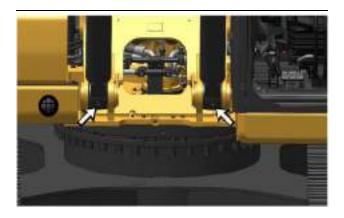


Illustration 702 g06183509

1. Apply lubricant through the fitting at the base of each boom cylinder.

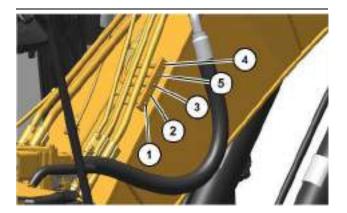


Illustration 703 g06183534

Note: Your machine may have the fittings mounted in a vertical position as shown in the illustration above, or your machine may have the fittings mounted in a horizontal position.

- 2. The fittings are at the base of the boom. The fittings can be serviced from the platform on the fuel tank. To lubricate the lower boom bearings, apply lubricant through fittings (1) and (2).
- **3.** Apply lubricant through fittings (3) and (4) for the boom cylinder rod.
- **4.** Apply lubricant through fitting (5) for the stick cylinder head.

Note: To ensure proper lubrication of the lower boom bearings and of the boom cylinder rod end bearings, lubricant should be applied through fittings (1), (2), (3), and (4). Apply lubricant first when the boom is raised and any attachment is suspended. Then apply lubricant when the boom is lowered and the attachment is rested on the ground with a slight downward pressure.

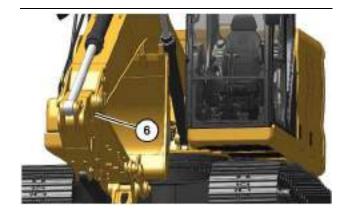


Illustration 704 g06183854

5. Apply lubricant through fitting (6). Fitting (6) is at the connection point of the boom and of the stick.



Illustration 705 g06183864

6. Apply lubricant through fitting (7) on the stick cylinder rod. Apply lubricant through fitting (8) at the connection point of the boom and of the stick. Apply lubricant through fitting (9) at the bucket cylinder head end. i06980273

Bucket Linkage - Inspect/ Adjust

SMCS Code: 6513-025; 6513-040

MARNING

Unexpected machine movement can cause injury or death.

To avoid possible machine movement, move the hydraulic lockout control to the LOCKED position and attach a Special Instruction, SEHS7332, "Do Not Operate" or similar warning tag to the hydraulic lockout control.

NOTICE

Improperly adjusted bucket clearance could cause galling on the contact surfaces of the bucket and stick, resulting in excessive noise and/or damaged Oring seals.



Illustration 706

g06185692

Area for linkage adjustment

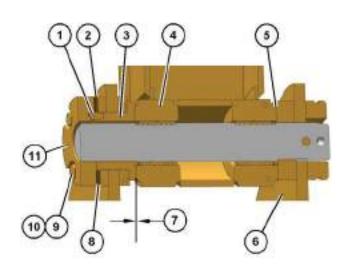


Illustration 707

g06185866

- (1) Pin
- (2) Shims
- (3) Flange
- (4) Stick boss
- (5) No gap
- (6) Bucket boss
- (7) Bucket clearance
- (8) Location
- (9) Bolts
- (10) Washers
- (11) Plate

The clearance of the bucket control linkage on this machine can be adjusted by shimming. If the gap between the bucket and the stick becomes excessive, adjust bucket clearance (7) to 0.5 to 1 mm (0.02 to 0.04 inch).

Two shims of different thickness are used at location (8). The thicknesses of the shims are 0.5 mm (0.02 inch) and 1.0 mm (0.04 inch).

- **1.** Position the machine on a level surface and lower the bucket to the ground.
- 2. Slowly operate the swing control lever until stick boss (4) and the bucket boss (6) are in full face contact at no gap (5). This will help to determine the total clearance of the connection point of the stick and of the bucket.
- **3.** Move the hydraulic lockout control to the LOCKED position. Stop the engine.
- Measure bucket clearance (7), which is the existing total clearance.
- 5. Determine the number of shims that need to be removed from shims (2) by using the following calculation:

Maintenance Section Bucket Linkage - Lubricate

Subtract 0.5 mm (0.02 inch) or 1.0 mm (0.04 inch) from bucket clearance (7).

- **6.** Remove the appropriate number of shims at location (8) to meet the above thickness. Make sure that you use a minimum of three 0.5 mm (0.02 inch) shims. To remove the shims, remove bolts (9), washers (10), and plate (11).
- 7. After the correct number of shims has been removed and pin (1) is aligned with the pin hole, install plate (11), bolts (9), and washers (10). Tighten the bolts to 240 ± 40 N·m (175 ± 30 lb ft).
- **8.** After installation, make sure that bucket clearance (7) is still correct.

i06970647

Bucket Linkage - Lubricate

SMCS Code: 6513-086

Note: Caterpillar recommends the use of 5% molybdenum grease for lubricating the bucket linkage. Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for more information on grease.

Wipe all fittings before you apply lubricant.

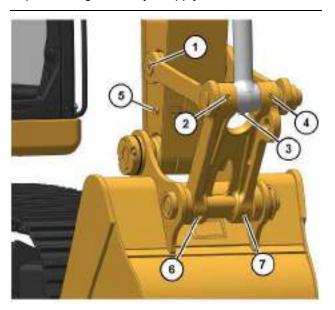


Illustration 708

g06183336

Note: Completely fill all cavities of the bucket control linkage with grease when you initially install a bucket.

- **1.** Apply lubricant through fittings for the linkages (1), (2), (3), and (4).
- Apply lubricant through fittings for the bucket (5),
 (6), and (7).

Note: Service the above fittings after you operate the bucket under water.

i08059817

Bucket Tips - Inspect/Replace

SMCS Code: 6805-510; 6805-040

MARNING

Personal injury or death can result from bucket falling.

Block the bucket before changing bucket tips or side cutters.

K Series GET Drive-through System Bucket Tips

Note: To maximize the life of the bucket tip and the penetration of the bucket tip, the bucket tip can be rotated.



Illustration 709
Acceptable wear

g01055179



Illustration 710
Replace this bucket tip.

a01055196

440

Check the bucket tips for wear. If the bucket tip has a hole, replace the bucket tip.

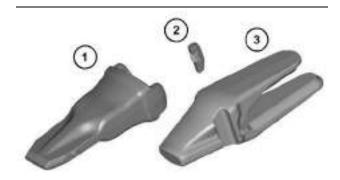
Removal Procedure

⚠ WARNING

Retainer pin, when struck with force, can fly out and cause injury to nearby people.

Make sure the area is clear of people when driving retainer pins.

To avoid injury to your eyes, wear protective glasses when striking a retainer pin.



q06528662

g01054386

Illustration 711

(1) Bucket tip

Internal view

- (2) Retainer
- (3) Adapter

Note: Retainers are often damaged during the removal process. Caterpillar recommends the installation of a new retainer when bucket tips are rotated or replaced.

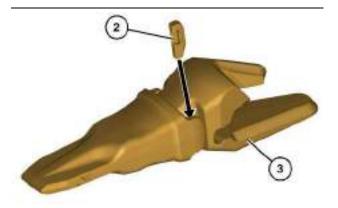


Illustration 712

- Use a hammer and a punch to drive out the retainer. The retainer can be removed from the top of the bucket tip or from the bottom of the bucket tip.
- **2.** Remove the bucket tip from the adapter with a slight counterclockwise rotation.

Installation Procedure

- 1. Clean the adapter, if necessary.
- **2.** Install the new bucket tip or the rotated bucket tip onto the adapter with a slight clockwise rotation.



llustration 713

Proper location for installing the retainer

g06528668

3. The retainer can be installed from the top of the bucket tip or from the bottom of the bucket tip. Use a hammer and a 1 inch X 1 inch X 8 inch steel bar stock to drive retainer (2) into adapter (3).

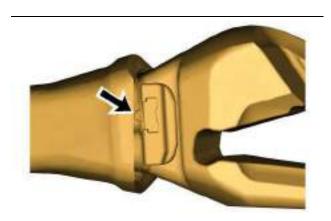


Illustration 714

g06528672

Internal View

The latch of the retainer is properly seated in the recess of the bucket tip.

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Maintenance Section

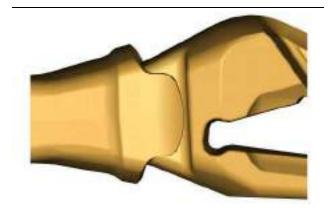


Illustration 715 g06528674

A properly installed retainer does not extend beyond the ear of the bucket tip.

4. The retainer is properly seated if the retainer can be moved slightly by the technicians hand. If the retainer cannot be moved, adjust the retainer, as needed. The ends of the retainer should not extend beyond the ear of the bucket tip.

J Series GET Bucket Tips

A WARNING

Block the bucket before changing the bucket feeth.

To prevent possible injury to the eyes, wear a protective face shield when striking the pin.

The pin, when struck, can fly out and cause injury to nearby personnel.

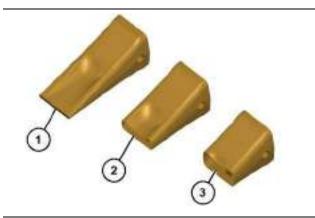


Illustration 716

g06528680

- (1) Usable tip
- (2) Replaceable bucket tip
- (3) Overworn tip

Check the bucket tips for wear. If the bucket tip has a hole, replace the bucket tip.

1. Remove the pin from the bucket tip. The pin can be removed by one of the following methods.

Bucket Tips - Inspect/Replace

- Use a hammer and a punch from the retainer side of the bucket to drive out the pin.
- Use a Pin-Master. Follow Step 1a through Step 1c for the procedure.

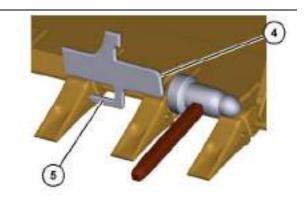


Illustration 717 g06214793

- (4) Back of Pin-Master
- (5) Extractor
- a. Place the Pin-Master on the bucket tip.
- b. Align extractor (5) with the pin.
- c. Strike the Pin-Master at the back of the tool (4) and remove the pin.

Note: Discard the old pin and the retainer assembly. When you change tips, use a new pin and a new retainer assembly. Refer to the appropriate parts manual for your machine.

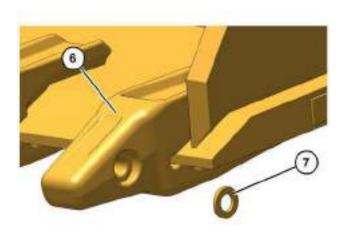


Illustration 718 q06214921

- (6) Retainer assembly
- (7) Adapter
- 2. Clean the adapter and the pin.
- 3. Fit retainer assembly (6) into the counterbore that is in the side of adapter (7). Make sure that the face of the retainer assembly with the marking "OUTSIDE" is visible.

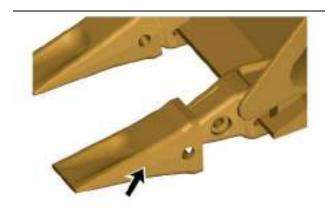


Illustration 719 g06214795

4. Install the new bucket tip onto the adapter.

Note: The bucket tips can be rotated by 180 degrees to allow the tip to wear evenly. You may also move the tips from the outside teeth to the inside teeth. Check the tips often. If wear is present on the tips, rotate the tips. The outside teeth generate the most

5. Drive the pin through the bucket tip. The pin can be installed by using one of the following methods:

- From the same side of the retainer, drive the pin through the bucket tip, the retainer assembly, and the adapter.
- Use a Pin-Master. Follow Step 5a through Step 5e for the procedure.

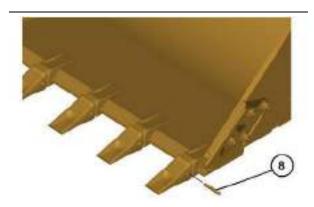


Illustration 720 g06214803

(8) Pin

a. Insert pin (8) through the bucket tip.

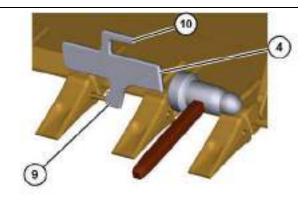


Illustration 721 g06214807

- b. Place the Pin-Master over the bucket tips so that the pin will fit into the counterbore of the pin holder (9).
- c. Strike the Pin-Master with a hammer at the back of the tool (4) to insert the pin.
- d. Slide pin holder (9) away from the pin and rotate the tool slightly to align pin setter (10) with the pin.

M0068104-12 443



Illustration 722 g06214812

Final assembly of pin into bucket tip

e. Strike the end of the tool until the pin is fully inserted.

Bucket Tips (Cat® Advansys) - If Equipped

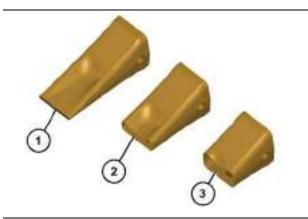


Illustration 723

g06528680

- (1) Usable tip
- (2) Replaceable bucket tip
- (3) Overworn tip

Check the bucket tips for wear. If the bucket tip has a hole, replace the bucket tip.

Removal

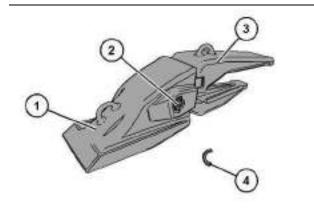


Illustration 724

g06528701

- (1) Bucket Tip
- (2) Retainer
- (3) Adapter
- (4) Compression Sleeve
- **1.** Use a 1/2" ratchet and rotate the retainer (2) 180 degrees to the unlocked position.
- 2. Remove the bucket tip (1) from adapter (3).
- 3. Clean adapter (3).

Installation

- **1.** Clean the adapter and the area around the latch, if necessary.
- 2. Install the new bucket tip (1) onto the adapter (3).

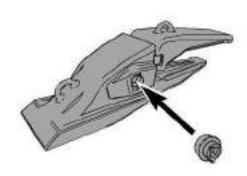


Illustration 725 g06528728

3. Use a 1/2" ratchet to rotate the retainer (2) 180 degrees to the locked position.

Side Cutters

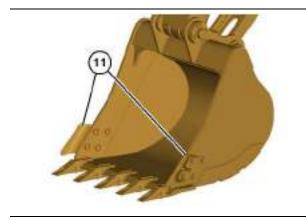


Illustration 726
Bucket With Side Cutters

g06214814

- **1.** Remove the mounting bolts and the side cutters (11).
- 2. Clean the mounting surface of the side plate on the bucket and of the side cutter. Remove any burrs or protrusions on the mating surfaces.

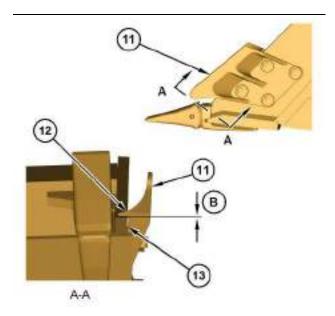


Illustration 727 g06214887

- (12) Shear ledge on a side cutter
- (13) Side plate on a bucket
- (B) 0.0 mm (0.0 inch)

Note: Some side cutters may be rotated for additional wear.

3. Install the side cutter.

Note: Certain bolts may require thread compound.

- **4.** Hand tighten the bolts.
- **5.** Make sure that there is not a gap between the side plate on the bucket and the shear ledge on the side cutter.
- **6.** Torque the mounting bolts to the correct specification.

Side Protectors (If Equipped)

Inspect the wear of the side protector. When too much wear is present, replace the protector.

M0068104-12 445 Maintenance Section

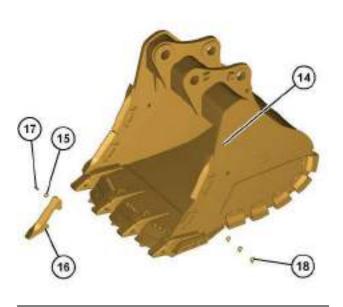


Illustration 728 q06219766

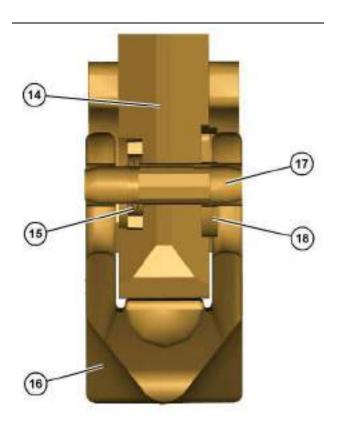


Illustration 729 g06219767

- (14) Side plate
- (15) Retainer
- (16) Side protector
- (17) Pin
- (18) Shim

- 1. Hit pin (17) from the side of the bucket without the retainer to remove side protector (16) from side plate (14).
- 2. Clean side protector (16), pin (17), retainer(15), and side plate (14) before installation.

Note: Lateral clearance between the side plate and the side protector should not exceed 1 mm (0.04 inch). Shims (18) may be required to decrease the lateral clearance which will decrease movement. Install the shims between the side plate and the side protector on the opposite side of the retainer.

- 3. Put retainer (15) in side plate (14).
- 4. Align two pin holes of the new protector and the side plate. Hit the pin from the retainer side of the bucket.

Note: If the pin and/or the retainer are worn, replace the pin and/or the retainer.

i07092323

Cab Air Filter (Fresh Air) -Clean/Replace

SMCS Code: 7342-070: 7342-510

The cab air filter is on the left side of the cab.

1. Use the ignition key to open the access panel.



g06182115 Illustration 730

- 2. Remove air filter (1).
- 3. Tap the air filter to remove the dirt. Do not use compressed air to clean the filter.
- 4. After you clean the air filter, inspect the air filter. If the air filter is damaged or badly contaminated, use a new air filter.
- 5. Install the air filter.
- 6. Close and lock the access panel.

446

i07243995

Camera - Clean

SMCS Code: 7348-070

WARNING

Failure to use an appropriate external ladder or an appropriate platform for direct access to the rear view camera could result in slipping and falling which could result in personal injury or death. Be sure to use an appropriate external ladder or an appropriate platform for direct access to the rear view camera.

The machine's counterweight and the engine hood are not approved as a maintenance platforms.

A WARNING

Unexpected machine movement can cause injury or death.

In order to avoid possible machine movement, move the hydraulic lockout control to the LOCKED position and attach a Special Instruction, SEHS7332, "Do Not Operate" or similar warning tag to the hydraulic lockout control.

Note: When you access the camera for cleaning, be sure to observe safe procedures for access. Maintain a three-point contact and/or use a body harness.



Illustration 731 g06184579

The rear view camera is on top of the counterweight.

If necessary, use a damp cloth to clean the glass of the camera. The camera is sealed. The camera is not affected by a wash with high-pressure spray.

Note: Alternatively, cameras may be cleaned from ground level by using a wash with a high-pressure spray or a damp rag on a wand.



Illustration 732 g06214504

If equipped, clean the right side view camera.



Illustration 733 g06263435

If equipped, clean the left side view camera.

M0068104-12

447

Maintenance Section
Condenser (Refrigerant) - Clean



Illustration 734 g06263449

If equipped, clean the front view camera.

i06969907

Condenser (Refrigerant) - Clean

SMCS Code: 1805-070

NOTICE

If excessively dirty, clean condenser with a brush. To prevent damage or bending of the fins, do not use a stiff brush.

Repair the fins if found defective.



Illustration 735 g06179792

 Open the access door on the left side of the machine. The condenser is located in front of the radiator.

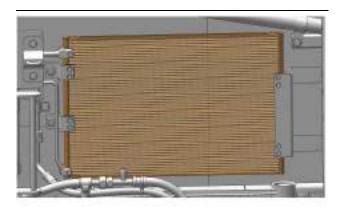


Illustration 736 g06183025

- **2.** Inspect the condenser for debris. Clean the condenser, if necessary.
- **3.** Use clean water to wash off all dust and dirt from the condenser.
- 4. Close the access door.

i06971000

Cooling System Coolant (ELC) - Change

SMCS Code: 1350-044

WARNING

Engine hood and engine hood parts can be hot while engine is running or immediately after engine shutdown. Hot parts or hot components can cause burns or personal injury. Do not allow these parts to contact your skin, when engine is running or immediately after engine shutdown. Use protective clothing or protective equipment to protect your skin.

MARNING

Personal injury can result from hot coolant, steam and alkali.

At operating temperature, engine coolant is hot and under pressure. The radiator and all lines to heaters or the engine contain hot coolant or steam. Any contact can cause severe burns.

Remove cooling system pressure cap slowly to relieve pressure only when engine is stopped and cooling system pressure cap is cool enough to touch with your bare hand.

Do not attempt to tighten hose connections when the coolant is hot, the hose can come off causing burns.

Cooling System Coolant Additive contains alkali. Avoid contact with skin and eyes.

NOTICE

Do not change the coolant until you read and understand the cooling system information in Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations".

Failure to do so could result in damage to the cooling system components.

NOTICE

Mixing ELC with other products will reduce the effectiveness of the coolant.

This could result in damage to cooling system components.

If Caterpillar products are not available and commercial products must be used, make sure they have passed the Caterpillar EC-1 specification for premixed or concentrate coolants and Caterpillar Extender.

Note: This machine was filled at the factory with Cat Extended Life Coolant.

If the coolant in the machine is changed to Extended Life Coolant from another type of coolant, see Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations".



Illustration 737

q06225770

 Unlatch the engine hood and raise the engine hood.

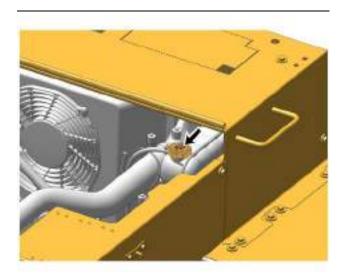


Illustration 738

g06183808

- Slowly loosen the pressure cap that is on the coolant reservoir to release pressure from the cooling system.
- 3. Remove the pressure cap.
- **4.** Inspect the gasket on the pressure cap. If the gasket is damaged, replace the pressure cap.



Illustration 739 g06179792

5. Open the rear access door on the left side of the machine.

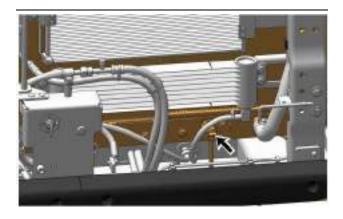


Illustration 740 g06183531

6. Open the drain valve and allow the coolant to drain into a suitable container. The drain valve is on the bottom of the radiator.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information that pertains to containing fluid spillage.

- **7.** Flush the cooling system. Follow Step 7a through Step 7h to flush the cooling system.
 - a. Close the drain valve.
 - b. Fill the cooling system with clean water.
 - c. Install the pressure cap.
 - d. Start the engine and run the engine until the engine reaches operating temperature.
 - e. Stop the engine and allow the engine to cool.
 - f. Loosen the pressure cap slowly to relieve any pressure in the cooling system.

- g. Open the drain valve that is on the bottom of the radiator and allow the coolant to drain into a suitable container.
- h. Flush the radiator with clean water until the draining water is transparent.
- 8. Close the drain valve.
- **9.** Add the Extended Life Coolant. Refer to the following topics:
 - Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations"
 - Operation and Maintenance Manual, "Capacities (Refill)"
- **10.** After the cooling system has been filled, perform the following procedures during initial start-up:
 - a. Start the engine without the filler cap.
 - b. Run the engine at low idle for 10 minutes.
 - c. Then, increase the engine speed to a high idle until the water temperature regulator is open and the coolant level is stabilized.
 - d. Maintain the coolant at the proper level as the water temperature regulator opens and air is purged from the system. Refer to Operation and Maintenance Manual, "Cooling System Coolant Level - Check".
- 11. Install the cooling system pressure cap.
- 12. Stop the engine.

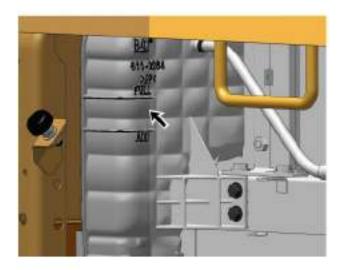


Illustration 741

q06205196

- 13. Check the coolant reservoir. Maintain the coolant level so that coolant is between the "ADD" and "FULL" lines. If more coolant is needed, see Operation and Maintenance Manual, "Cooling system Coolant Extender (ELC) - Add".
- **14.** If more coolant is necessary, remove the pressure cap and add the appropriate coolant solution.
- 15. Install the pressure cap.
- **16.** Close and latch the engine hood. Close the left access door.

i06972485

Cooling System Coolant Extender (ELC) - Add

SMCS Code: 1352; 1353; 1395

A WARNING

Engine hood and engine hood parts can be hot while engine is running or immediately after engine shutdown. Hot parts or hot components can cause burns or personal injury. Do not allow these parts to contact your skin, when engine is running or immediately after engine shutdown. Use protective clothing or protective equipment to protect your skin.

⚠ WARNING

Personal injury can result from hot coolant, steam and alkali.

At operating temperature, engine coolant is hot and under pressure. The radiator and all lines to heaters or the engine contain hot coolant or steam. Any contact can cause severe burns.

Remove cooling system pressure cap slowly to relieve pressure only when engine is stopped and cooling system pressure cap is cool enough to touch with your bare hand.

Do not attempt to tighten hose connections when the coolant is hot, the hose can come off causing burns.

Cooling System Coolant Additive contains alkali. Avoid contact with skin and eyes.

Use Cat Extended Life Coolant (ELC) when you add coolant to the cooling system. See Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for all cooling system requirements.

Use a Coolant Conditioner Test Kit to check the concentration of the coolant.

NOTICE

Mixing ELC with other products will reduce the effectiveness of the coolant.

This could result in damage to cooling system components.

If Caterpillar products are not available and commercial products must be used, make sure they have passed the Caterpillar EC-1 specification for premixed or concentrate coolants and Caterpillar Extender.

Note: This machine was filled at the factory with Cat Extended Life Coolant.

- 1. Park the machine on level ground.
- **2.** Stop the engine.

M0068104-12 451



Illustration 742 g06225770

3. Unlatch the engine hood and raise the hood.

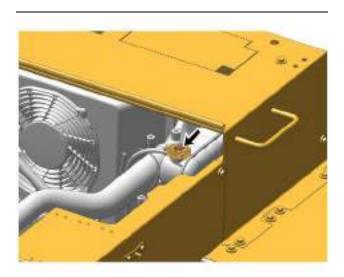


Illustration 743 g06183808

4. Make sure that the cooling system has cooled down. Loosen the cooling system pressure cap slowly to relieve system pressure. Remove the pressure cap.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on containing fluid spillage.

5. You may need to drain some coolant from the radiator so that Cat Extender can be added to the cooling system.

Note: Always discard drained fluids according to local regulations.

- **6.** Add Cat Extended Life Coolant (ELC) to the cooling system. Refer to the following topics for the proper amount of Cat Extender:
 - Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations"
 - Operation and Maintenance Manual, "Capacities (Refill)"
- Inspect the o-ring of the cooling system pressure cap. If the o-ring is damaged, replace the pressure cap.
- 8. Install the cooling system pressure cap.
- **9.** Close and latch the engine hood.

i07038988

Cooling System Coolant Level - Check

SMCS Code: 1350-040; 1350-535-FLV; 1395-535-FLV

A WARNING

Engine hood and engine hood parts can be hot while engine is running or immediately after engine shutdown. Hot parts or hot components can cause burns or personal injury. Do not allow these parts to contact your skin, when engine is running or immediately after engine shutdown. Use protective clothing or protective equipment to protect your skin.

MARNING

Personal injury can result from hot coolant, steam and alkali.

At operating temperature, engine coolant is hot and under pressure. The radiator and all lines to heaters or the engine contain hot coolant or steam. Any contact can cause severe burns.

Remove cooling system pressure cap slowly to relieve pressure only when engine is stopped and cooling system pressure cap is cool enough to touch with your bare hand.

Do not attempt to tighten hose connections when the coolant is hot, the hose can come off causing burns.

Cooling System Coolant Additive contains alkali. Avoid contact with skin and eyes.

- **1.** Park the machine on level ground.
- 2. Stop the engine.
- Open the rear access door on the left side of the machine.

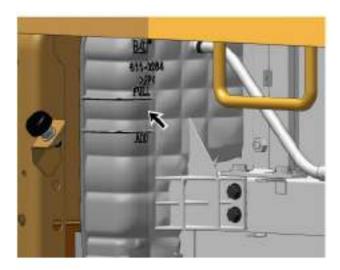


Illustration 744 g06205196

- 4. Maintain the coolant level so that coolant is between the "ADD" and "FULL" marks. If more coolant is needed, see Operation and Maintenance Manual, "Cooling system Coolant Extender (ELC) - Add".
- 5. Close the access door.

i07836536

Cooling System Coolant Sample - Obtain

SMCS Code: 1395-008; 1395-554

The cooling system coolant should be sampled and monitored with regular frequency. The samples should be analyzed per the following guidelines:

- Level 1 analysis: Every 250 hours
- Level 2 analysis: Every Year

Note: It is not necessary to obtain a Coolant Sample (Level 1) if the cooling system is filled with Cat ELC (Extended Life Coolant). Cooling systems that are filled with Cat ELC only require Level 2 analysis.

Note: Obtain a Coolant Sample (Level 1) if the cooling system is filled with any other coolant instead of Cat ELC. This includes the following types of coolants.

- Commercial long life coolants that meet the Caterpillar Engine Coolant Specification -1 (Caterpillar EC-1)
- Cat Diesel Engine Antifreeze/Coolant (DEAC)
- Commercial heavy-duty coolant/antifreeze

Note: A level 1 analysis may indicate the need for a Level 2 analysis.

Note: A Level 2 analysis is required after 500 hours of operation for the following reasons:

- · The cooling system is new
- The cooling system has been refilled
- The cooling system has been converted to a new coolant

NOTICE

Always use a designated pump for oil sampling, and use a separate designated pump for coolant sampling. Using the same pump for both types of samples may contaminate the samples that are being drawn. This contaminate may cause a false analysis and an incorrect interpretation that could lead to concerns by both dealers and customers.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, PERJ1017, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat ® products.

Dispose of all fluids according to local regulations and mandates.



Illustration 745 g06179792

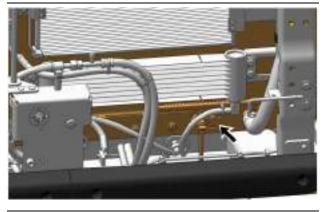


Illustration 746

a06183525

The coolant sampling port is on the radiator.

Obtain the sample of the coolant as close as possible to the recommended sampling interval. To receive the full effect of $S \cdot O \cdot S$ analysis, a consistent trend of data must be established. To establish a pertinent history of data, perform consistent samplings that are evenly spaced. Supplies for collecting samples can be obtained from your Cat dealer.

Use the following guidelines for proper sampling of the coolant:

- Complete the information on the label for the sampling bottle before you begin to take the samples.
- Keep the unused sampling bottles stored in plastic bags.
- Obtain coolant samples directly from the coolant sample port. You should not obtain the samples from any other location.
- Keep the lids on empty sampling bottles until you are ready to collect the sample.
- Place the sample in the mailing tube immediately after obtaining the sample to avoid contamination.
- · Never collect samples from expansion bottles.
- Never collect samples from the drain for a system.

Submit the sample for the appropriate analysis.

For additional information about coolant analysis, see Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" or consult your Cat dealer.

i06970259

DEF Filler Screen - Clean

SMCS Code: 108K-070-Z3

NOTICE

Ensure that the engine is stopped before any servicing or repair is performed.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Cat Dealer Service Tool Catalog" or refer to Special Publication, PECJ0003, "Cat Shop Supplies and Tools Catalog" for tools and supplies suitable to collect and contain fluids on Cat products.

Dispose of all fluids according to local regulations and mandates.

The filler neck adapter filter screen in the diesel exhaust fluid tank will need to be cleaned or replaced if contaminated.



Illustration 747 g06183098

1. Open the Diesel Exhaust Fluid (DEF) compartment.

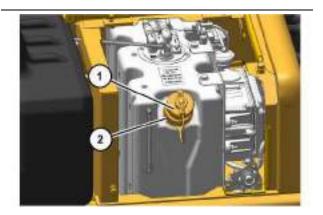


Illustration 748 g06183119

- 2. Remove fill cap (1).
- **3.** Use a screwdriver or pick to press the tabs on the strainer. Pull the strainer upward from both sides of fill neck adapter (2).



Illustration 749 g06183125

4. Use water or compressed air to clean out the filter screen (3). If there is any debris inside, dry and remove the debris by turning the screen upside down and dumping debris out. If the debris cannot be removed or if the filter screen is damaged, replace the filter screen.

i06970250

DEF Manifold Filters - Replace

SMCS Code: 108K-510-FI



Illustration 750

Replace the manifold filter (1). Refer to Disassembly and Assembly, "Manifold (DEF Heater) - Remove and Install" for more information.

i08258668

g06183110

Diesel Exhaust Fluid - Drain

SMCS Code: 108K-543

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the machine. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

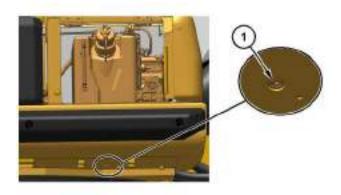


Illustration 751

g06604316

(1) Drain plug

- 1. Remove drain plug (1).
- Drain the diesel exhaust fluid into a suitable container.
- 3. Install and tighten the drain plug to a torque of 20 ± 3 N·m (177 ± 26 lb in).

i07391329

Diesel Exhaust Fluid - Fill

SMCS Code: 108K-544

Note: Stop the engine and turn the engine start switch to the OFF position before filling the DEF tank. Failure to stop the engine may cause fault codes.

Refer to Operation and Maintenance Manual, "Selective Catalytic Reduction Warning System" for more information.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the machine. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

Reference: See Operation and Maintenance Manual, "Capacities (Refill)" for the capacity of the DEF tank for your machine.



Illustration 752 g06183098

The DEF tank is located inside the storage box on the right side of the machine.

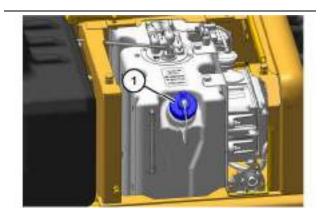


Illustration 753 g06306032



Illustration 754 g06306029

Blue DEF Tank Filler Cap

- **1.** Clean the blue DEF tank filler cap and the surrounding area.
- 2. Remove the blue DEF tank filler cap.

Fill the tank with diesel exhaust fluid (DEF). DEF level gauge is located on the front side of DEF tank.

Note: Do not fill the DEF tank from a contaminated container or funnel.

Note: Do not over fill the tank. DEF can freeze and needs room for expansion.

4. Install the blue DEF tank filler cap.

Refer to Operation and Maintenance Manual, "Lubricant Viscosities" for more information on diesel exhaust fluid (DEF) guidelines.

i07942245

Diesel Exhaust Fluid Filter - Replace

SMCS Code: 108K-510-FI

S/N: YCP1-Up S/N: HEX1-Up



Illustration 755 g06183098

- **1.** Open the Diesel Exhaust Fluid (DEF) compartment.
- Ensure that the area around the DEF filter is clean and free from dirt. The DEF filter threaded cap and the filter element are a combined assembly.

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Maintenance Section

Diesel Exhaust Fluid Filter - Replace

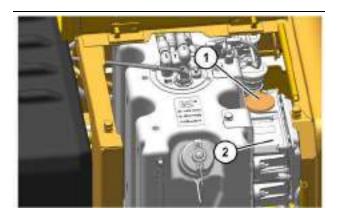


Illustration 756 g06183089

3. Remove the protective cover (1) from DEF pump housing (2).

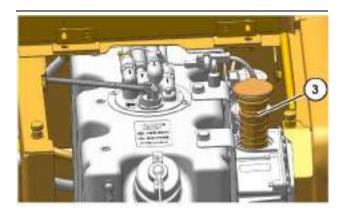


Illustration 757 g06183092

- 4. Remove the DEF filter assembly (3) and discard.
- **5.** Install a new DEF filter assembly into the DEF pump housing.
- **6.** Tighten the filter assembly to 10 N·m (88.5 lb in). Install the protective cover.
- **7.** Turning on the power will automatically prime the DEF system.

i07942258

Diesel Exhaust Fluid Filter - Replace

SMCS Code: 108K-510-FI

S/N: KFE1-Up S/N: MYK1-Up S/N: NDL1-Up S/N: LTN1-Up S/N: HDT1-Up S/N: RAZ1-Up



Illustration 758 g06183098

1. Open the Diesel Exhaust Fluid (DEF) compartment.



Illustration 759

g06210724

For clarity, the DEF assembly has been removed from the compartment.

2. Ensure that the area around the DEF filter is clean and free from dirt.

i07942263

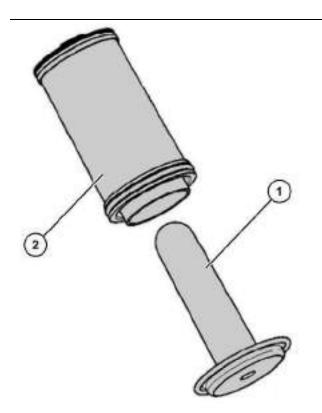


Illustration 760 g06216533

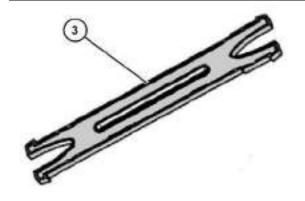


Illustration 761 g06216531

- 3. Unscrew the cap, remove expansion device (1) from DEF filter (2). Then, remove the DEF filter using special tool (3) that comes with the new filter. Discard the old filter and expansion device.
- 4. Install a new DEF filter assembly into the DEF pump housing.
- **5.** Tighten the filter cap to $20 \pm 5 \text{ N} \cdot \text{m}$ (15 ± 4 lb ft).
- 6. Turning on the power will automatically prime the DEF system.

Diesel Exhaust Fluid Injector -Replace

SMCS Code: 108I-510

S/N: KFE1-Up S/N: MYK1-Up S/N: NDL1-Up S/N: LTN1-Up S/N: HDT1-Up S/N: RAZ1-Up

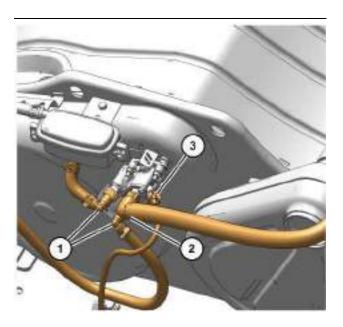


Illustration 762 g06226112

Typical example

- (1) Coolant lines (2) DEF line
- (3) Electrical connector



Illustration 763 g06226151

Typical example

- (4) Nuts
- (5) DEF injector
- (6) Clean Emission Module
- Drain the coolant to remove coolant lines (1). Remove cooling lines (1) and remove Diesel Exhaust Fluid (DEF) line (2).
- Remove electrical connector (3) from DEF injector (5) and install protection caps to DEF injector (5). Remove nuts (4) and washers (9) from DEF injector (5) and remove DEF injector from Clean Emission Module (CEM) (6).

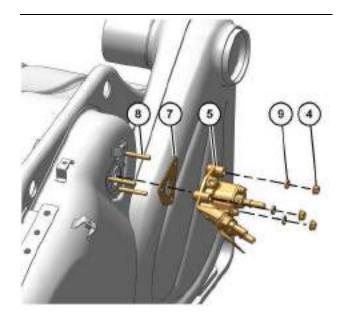


Illustration 764 g06226155

Typical example

- (4) Nuts
- (5) DEF injector
- (7) Gasket
- (8) Studs
- (9) Washers
- **3.** Remove gasket (7) and remove studs (8). Discard the gasket and the studs.
- **4.** Ensure that the sealing face of the CEM is clean and free from dirt.
- **5.** Apply bostik pure nickel ant-seize compound to ends of the new studs (8). Install the coated ends of the new studs into the CEM, and tighten to a torque of 5 N·m (44 lb in).
- Install new gasket (7), ensure that the metal side of the gasket is to the CEM. Install new DEF injector (5) to CEM (6).
- 7. Install washers (9) and apply bostik pure nickel ant-seize compound to the threads of studs (8).
- 8. Install nuts (4) and tighten the nuts to a torque of 5 N·m (44 lb in). Retighten the nuts to 5 N·m (44 lb in). Then, turn the nuts an additional 90 degrees.
- **9.** Install electrical connector (3), DEF line (2), and coolant lines (1).
- **10.** Fill cooling system to the correct level. Ensure that the correct specification of coolant is used.

If available, using the electronic service tool (ET) perform DEF Dosing System Verification test.

Engine Air Filter Primary and/or Secondary Element - Replace

i08165097

Engine Air Filter Primary and/ or Secondary Element -Replace

SMCS Code: 1054-510-PY; 1054-510-SE

Primary Air Filter Element -Replace

NOTICE

Service the air cleaner only with the engine stopped. Engine damage could result.

NOTICE Service the engine air filter elements only when a message or a warning is displayed on the monitor display. Do not open the filter compartment unless service is indicated. Opening the filter compartment when not necessary to do so increases the chance of dirt contamination in engine air intake system components.

NOTICE

Short air filter life can result if the pre-cleaner system malfunctions. If air filter life is drastically reduced from typical for the operating conditions, consult your Cat dealer.

NOTICE

Do not use the air filter elements longer than 1 year.

The engine air cleaner assembly is located behind the front access door on the left side of the machine.

1. Park the machine on a level surface. Stop the engine.



Illustration 765

g06181546

2. Open the front access door on the left side of the machine.

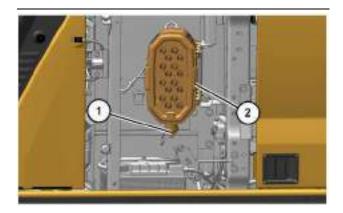


Illustration 766

g06183302

3. Squeeze outlet tube (1) to purge the dirt from the outlet tube.

Note: Purge the dirt from the outlet tube every 10 service hours or daily in a dirty environment.

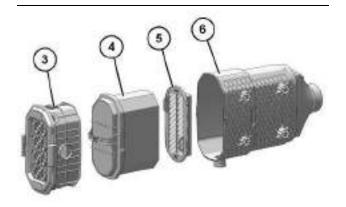


Illustration 767 q06222467

- 4. Release latches (2) that secure pre-cleaner (3) to engine air filter housing (6).
- 5. Remove pre-cleaner (3).
- 6. Clean inside the air filter housing where the precleaner was removed.

NOTICE

Caterpillar does not recommend cleaning the primary air filter element. Caterpillar only recommends to replace the primary air filter element. Caterpillar does not cover costs for damage to engine components caused by cleaning the primary air filter element.

Observe the following guidelines if you attempt to clean the primary filter element:

Do not tap or strike the filter element in order to remove dust.

Do not wash the filter element.

Use low pressure compressed air in order to remove the dust from the filter element. Air pressure must not exceed 500 kPa (73 psi). Direct the air flow up the pleats and down the pleats from the inside of the filter element. Take extreme care in order to avoid damage to the pleats.

Do not clean the air filter element more than three times. The air filter element must be replaced if the filter has been in use for one year, regardless of the number of times the filter has been cleaned.

Do not use air filters with damaged pleats, gaskets, or seals. Dirt entering the engine will cause damage to engine components.

NOTICE

Do not clean the air filter elements by bumping or tapping. This could damage the seals. Do not use elements with damaged pleats, gaskets, or seals. Damaged elements will allow dirt to pass through. Engine damage could result.

7. Remove primary air filter element (4). Replace the filter element as necessary.

Note: Replace the primary filter if the filter has been in use for 1 year.

8. Clean inside the air filter assembly housing.

Note: Do not allow any dirt or debris to contact the secondary air filter element (5).

- 9. Inspect the seal area ensure that no foreign debris has fallen into the seal area. Clean the air cleaner interior to remove remaining dust or debris
- **10.** Without removing secondary air filter element (5), inspect the filter element for damage. Replace if necessary or dirty. Refer to Secondary Air Filter Element - Replace.
- **11.** Install the secondary air filter element.
- **12.** Install the primary filter.

Note: Filters must be fully installed before the precleaner can be attached. If the pre-cleaner cannot be fully latched, verify that the filter elements are properly seated.

- **13.** Install the pre-cleaner and secure the latches that hold the pre-cleaner to the air filter housing.
- 14. Close the access door.

Secondary Air Filter Element -Replace

NOTICE

Always replace the secondary element. Do not attempt to reuse it by cleaning. Engine damage could result.

NOTICE

Do not use the air filter elements longer than 1 year.

NOTICE

Replace the secondary filter element when you service the primary element for the third time. If a clean primary element has been installed and the filter element indicator is still flashing, replace the secondary filter element. Also if the exhaust smoke remains black and a clean primary filter element has been installed, replace the secondary filter element.

1. Open the front access door on the left side of the machine.

462 M0068104-12

Refer to the section "Primary Air Filter Element -Replace". Remove the pre-cleaner from the engine air filter housing. Remove the primary air filter element from the air filter housing.

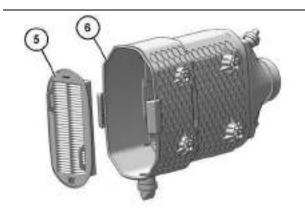


Illustration 768 g06183315

- Secondary air filter element (5) is pressed into the rear portion of engine air filter housing (6). Pull forward on the secondary air filter element to remove the element from the engine air filter housing.
- **4.** Cover the air inlet opening. Clean inside the air cleaner housing.
- Clean all surfaces of the pre-cleaner cover and body.
- 6. Uncover the air inlet opening.
- **7.** Carefully press the secondary air filter element into the rear portion of the engine air filter housing.

Note: Be certain that the new secondary air filter element is properly seated in the filter housing. Also, check to see that no damage to the filter element has occurred during installation.

- Install the primary air filter element and the precleaner.
- 9. Close the access door.

Engine Air Pre-Cleaner - Clean

Note: Do not attempt to clean the pre-cleaner by hitting the filter against another object. Damage to the filter is likely to occur.



Illustration 769 g06183310

After removing the pre-cleaner from the air filter housing, inspect the interior of the pre-cleaner through the ejection ports around the perimeter.

In general, dust and debris will clear automatically through normal pre-cleaner operation and no further service will be required.

If the ejection ports are blocked, or dust is packed between the pre-cleaner tubes, first try to clear any accumulation by vigorously shaking the pre-cleaner.

If the pre-cleaner is still blocked with dirt, the precleaner may be separated by releasing the snap features holding the front cover to the pre-cleaner body.



Illustration 770 q06069263

 Place the pre-cleaner assembly on a suitable work surface. The interior of the pre-cleaner may have accumulated debris. Protect your work surface to collect excess debris and to avoid scattering debris.



Illustration 771 g06069266

2. Lift the locking tabs on one end of the cover away from the retainers. Move the locking tabs only far enough to clear the retention posts.

Note: Do not bend the locking tabs farther than necessary to release the tabs. Damage to the air cleaner can result. Do not use tools to force the snap features off the retainers.

- **3.** Pull one end of the top cover away from the bottom half.
- **4.** Hold one end of the cover sections apart and separate one of the locking tabs on the other end of the pre-cleaner.



Illustration 772 g06069264

- **5.** Pull the top cover up and away from the bottom.
- Clear any blockage by shaking the pre-cleaner components and/or brushing away accumulated debris.

Note: Do not use picks or other stiff implements to clear debris, you may damage the pre-cleaner components

Note: Do not attempt to remove the pre-cleaner tubes from the top cover or you will damage the air cleaner.

7. If the blockage is still not cleared, you may attempt to clear the debris by use of an air nozzle limited to 500 kPa (73 psi).

Alternately, each part of the pre-cleaner may be submerged in water to loosen mud or other debris that may have dried on the interior surface of the air cleaner.

Note: Never attempt to use a pressure washer or other high-pressure water sources to clean the precleaner. Use of high-pressure water may damage the pre-cleaner tubes and reduce the pre-cleaner effectiveness.

- **8.** After cleaning, reassemble the pre-cleaner by lining up the tubes on the pre-cleaner top with the tubes in the pre-cleaner bottom.
- **9.** Allow the pre-cleaner top to rest on the pre-cleaner bottom and ensure that the four snap features are aligned.



Illustration 773 g06069247

10. If all the tabs are aligned, gently push the precleaner top down into place. Ensure that all the snap features have engaged.

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11. Before installing the pre-cleaner to the air filter housing, inspect the pre-cleaner gasket for damage. Replace if damaged.

i06970869

Engine Oil Level - Check

SMCS Code: 1000-535

A WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

NOTICE

Do not overfill the crankcase. Engine damage can result.

This machine is equipped with both an automated function for checking fluid levels and dipsticks. Refer to Operation and Maintenance Manual, "Monitoring System" regarding the automated system. If the machine is on an incline or the engine has been stopped only for a short time, all engine oil may not be in the crankcase. The fluid level cannot be properly checked by either method during these instances. Park the machine on level ground. The engine oil level can be checked after the engine has been stopped for at least 30 minutes. Do not check the oil level while the engine is running.

The machine is equipped with a ground level dipstick and a dipstick on top of the engine.

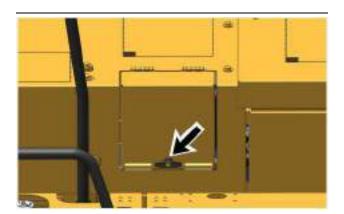


Illustration 774 g06183460

1. Open the access door on top of the machine.

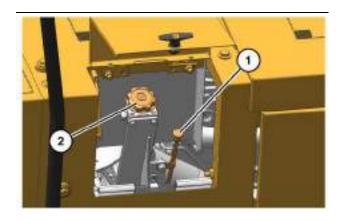


Illustration 775 q06183463

Remove dipstick (1). Wipe the oil off the dipstick and reinsert the dipstick.

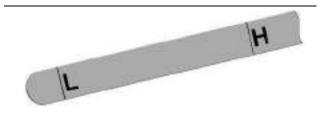


Illustration 776 g06183475

Remove the dipstick and check the dipstick. The oil level should be between the "L" mark and the "H" mark.

NOTICE

Operating your engine when the oil level is above the "H" mark could cause the crankshaft to dip into the oil. This could lead to excessively high oil temperatures which can reduce the lubricating characteristics of the oil, lead to bearing damage, and could result in loss of engine power.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

4. Remove oil filler plug (2) to add oil, if necessary. See Operation and Maintenance Manual, "Lubricant Viscosities".

Note: If the oil is deteriorated or badly contaminated, change the oil regardless of the maintenance interval.

- **5.** Clean the oil filler plug. Install the oil filler plug.
- 6. Close the access door.

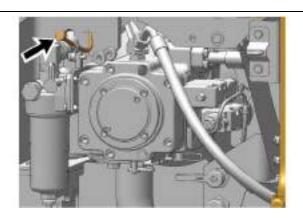
M0068104-12 465
Maintenance Section

Ground Level Dipstick



Illustration 777 g06182545

To access the ground level dipstick, open the right access door.



Engine Oil Sample - Obtain

Illustration 778 g06211545

The ground level dipstick is located near the engine oil filter and main hydraulic pump.

i07088417

Engine Oil Sample - Obtain

SMCS Code: 1000-008; 1000; 1348-554-SM; 1348-008; 7542-008; 7542-554-OC; 7542-554-SM

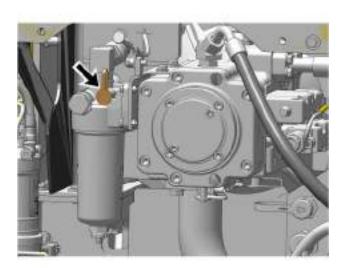


Illustration 779 g06220379

Obtain a sample of the engine oil from the engine oil sampling valve that is located on the engine oil filter housing. Refer to Special Publication, SEBU6250, "S·O·S Oil Analysis" for information that pertains to obtaining a sample of the engine oil. Refer to Special Publication, PEGJ0047, "How To Take A Good Oil Sample" for more information about obtaining a sample of the engine oil.

Engine Oil and Filter - Change

i08271902

Engine Oil and Filter - Change

SMCS Code: 1318-510

NOTICE

The engine oil and filter change interval for standard service application is every 1000 hours when the following requirements are met:

- Utilize Cat Recommended Fluids
- Utilize Cat Filters
- Utilize S·O·S Services at recommended interval

When these requirements are not met, the oil and filter change interval should be every 500 hours, or use S·O·S Services oil sampling and analysis program to determine an acceptable oil change interval.

If you select an interval for oil and filter change that is too long, you may damage the engine.

NOTICE When operating in any of the conditions or environments outlined in this Operation and Maintenance Manual, Severe Service Application, use S·O·S Services oil analysis to determine the best oil and filter change interval.

When S·O·S Services are not used in severe service applications, the oil and filter change interval should be every 250 hours...

If you select an interval for oil and filter change that is too long, you may damage the engine.

Reference: Operation and Maintenance Manual, "Lubricant Viscosities"

Reference: Operation and Maintenance Manual, "Maintenance Interval Schedule"

Reference: Operation and Maintenance Manual, "Severe Service Application"

Reference: Operation and Maintenance Manual, "S·O·S Information"

Use the table below to determine the appropriate oil and filter change interval.

M0068104-12

Table 41

Selection of Oil and Filter Change Interval				
	Conditions			
	Cat ® Recommended Fluids	Cat ® Filters	S·O·S Services	Interval
Standard Service Application	YES	YES	YES	1000 hours
	YES	YES	NO	500 hours
	YES	NO	YES	500 hours
	NO	YES	YES	500 hours
	NO	NO	NO	250 hours
Severe Service Application	NO	NO	NO	250 hours
	YES	YES	NO	250 hours
	YES	YES	YES	Use S·O·S(1)
	YES	NO	YES	Use S·O·S ⁽¹⁾
	NO	YES	YES	Use S·O·S ⁽¹⁾

⁽¹⁾ If operating in any of the conditions or environments outlined in the Severe Service Application, use S·O·S Services oil analysis to determine the best oil change interval.

Note: Initial oil and filter change is required at initial 500 hours.

Procedure for Changing Engine Oil and Filter

A WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

Note: If the sulfur content in the fuel is greater than 1.5 percent by weight, use an oil that has a Total Base Number (TBN) of 30 and reduce the oil change interval by one-half.

Note: Drain the crankcase while the oil is warm. This allows waste particles that are suspended in the oil to drain. As the oil cools, the waste particles will settle to the bottom of the crankcase. The particles will not be removed by draining the oil and the particles will recirculate in the engine lubrication system with the new oil.

1. Prepare the machine for maintenance. Refer to Operation and Maintenance Manual, "Prepare the Machine for Maintenance".

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

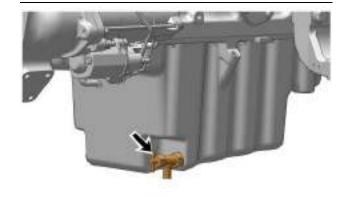


Illustration 780
Crankcase drain valve

g06183508

Open the crankcase drain valve. Allow the oil to drain into a suitable container.

Note: Discard any drained fluids according to local regulations.

3. Close the drain valve.

g06183515



Illustration 781

g06182545

Access door

4. Open the access door at the right side of the machine.

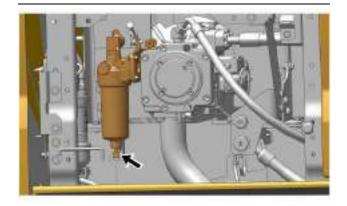


Illustration 782

g06183511

Drain valve

5. Loosen drain valve and allow the oil to drain out of the housing. The drain valve is on the bottom of the engine oil filter housing.

Note: If equipped with a fast fill system, the oil can be drained and filled using the fast fill coupler. Refer to "Fast Fill (If Equipped)"in this chapter.



Illustration 783

Oil filter

- **6.** Remove the oil filter housing. Refer to Operation and Maintenance Manual, "Oil Filter Inspect". Dispose the used filter according to local regulations.
- **7.** Remove the oil filter from the housing.
- 8. Clean the oil filter housing and the base thread.
- 9. Install the new oil filter element into the housing.
- **10.** After installing the new element, hand tighten the drain valve at the bottom of the housing.

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Illustration 784

g06604084

Oil filter gasket

- **11.** Apply a thin coat of engine oil to the gasket of the filter. Refer to Illustration 784 for lubrication points on the gasket.
- **12.** Install the filter housing with element to the filter base utilizing a socket wrench.

Note: Apply a tightening torque of 90 N·m (66 lb ft) and tighten until metal to metal contact is achieved.

Close the access door.

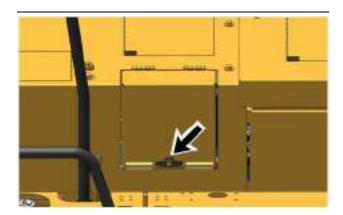


Illustration 785
Access door

g06183460

14. Open the access door on top of the machine. Refer to "Access Door and Cover Locations".

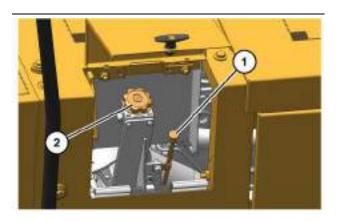


Illustration 786

g06606526

- (1) Oil level gauge
- (2) Oil filler cap

15. Remove oil filler cap (2). Fill the crankcase with new oil. See Operation and Maintenance Manual, "Capacities (Refill)". Clean the oil filler plug and install the oil filler plug.

NOTICE

Do not under fill or overfill engine crankcase with oil. Either condition can cause engine damage.

16. START the engine and allow the oil to warm. Refer to "Engine Starting". Check the engine for leaks.STOP the engine.



Illustration 787

g06183475

Oil level gauge

- 17. Wait for 30 minutes to allow the oil to drain back into the crankcase. Check the oil level with oil level gauge (1). Maintain the oil between the "L" and "H" marks on the oil level gauge(1). If necessary, add oil.
- 18. Close the access door.

Fast Fill (If Equipped)

If your machine is equipped with a deluxe service center, you may drain and add the engine oil through the fast fill port.



Illustration 788 g06182545

Access door

 Open the access door on the right side of the machine.

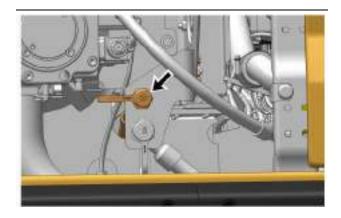


Illustration 789

Dust cover

g06183504

- 2. Remove the dust cover.
- **3.** Attach a hose that is equipped with a nozzle.

Note: Make sure that the nozzle and the receiver are free from debris before attaching.

- 4. Drain the oil or add the oil, as needed.
- 5. Install the dust cover.

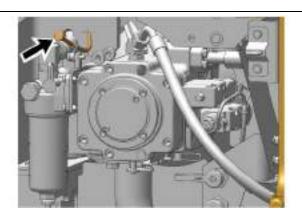


Illustration 790

q06211545

Ground level oil level gauge.

6. Verify that the correct amount of oil was added and add or remove oil as necessary. A ground level oil level gauge is in the same compartment as the fast fill port.

i07051358

Ether Starting Aid Cylinder - Replace

(If Equipped)

SMCS Code: 1456-510-CD

MARNING

Breathing ether vapors or repeated contact of ether with skin can cause personal injury. Personal injury may occur from failure to adhere to the following procedures.

Use ether only in well ventilated areas.

Do not smoke while changing ether cylinders.

Use ether with care to avoid fires.

Do not store replacement ether cylinders in living areas or in the operator's compartment.

Do not store ether cylinders in direct sunlight or at temperatures above 49 °C (120 °F).

Discard cylinders in a safe place. Do not puncture or burn cylinders.

Keep ether cylinders out of the reach of unauthorized personnel.

The ether cylinder is located inside the rear access door on the left side of the machine.

Refer to Operation and Maintenance, "Fire Prevention and Explosion Prevention" before you replace the ether cylinder.

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Maintenance Section

If Equipped



Illustration 791 g06179792

1. Open the rear access door at the left side of the machine.

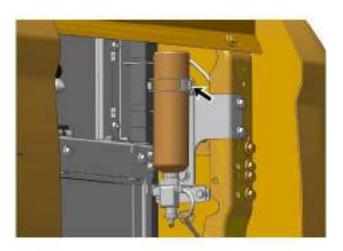


Illustration 792 g06211094

- 2. Loosen the cylinder retaining clamp.
- **3.** Unscrew the empty ether starting aid cylinder and remove the empty ether starting aid cylinder.

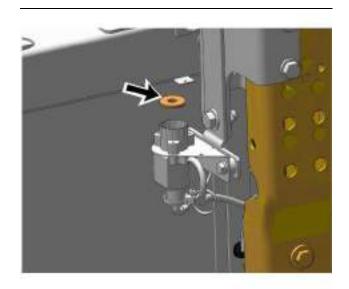


Illustration 793 g06211096

- 4. Remove the used gasket.
- 5. Install a new gasket.

Note: A new gasket and O-ring is provided with each new ether starting aid cylinder.

- 6. Install the new ether starting aid cylinder.
- **7.** Tighten the ether starting aid cylinder hand tight.
- 8. Tighten the cylinder retaining clamp securely.
- 9. Close the access door.

472

i07786001

Film (Product Identification) - Clean

SMCS Code: 7405-070; 7557-070



Illustration 794 g06435629

Cleaning of the Films

Make sure that all the product identification films are legible. Make sure that the recommended procedures are used to clean the product identification films. Ensure that all the product identification films are not damaged or missing. Clean the product identification films or replace the films.

Hand Washing

Use a wet solution with no abrasive material that contains no solvents and no alcohol. Use a wet solution with a "pH" value between 3 and 11. Use a soft brush, a rag, or a sponge to clean the product identification films. Avoid wearing down the surface of the product identification films with unnecessary scrubbing. Ensure that the surface of the product identification films is flushed with clean water and allow the product identification films to air dry.

Power Washing

Power washing or washing with pressure may be used to clean product identification films. However, aggressive washing can damage the product identification films.

Excessive pressure during power washing can damage the product identification films by forcing water underneath the product identification films. Water lessens the adhesion of the product identification film to the product, allowing the product identification film to lift or curl. These problems are magnified by wind. These problems are critical for the perforated film on windows.

To avoid lifting of the edge or other damage to the product identification films, follow these important steps:

- · Use a spray nozzle with a wide spray pattern.
- · A maximum pressure of 83 bar (1200 psi)
- A maximum water temperature of 50° C (120° F)
- Hold the nozzle perpendicular to the product identification film at a minimum distance of 305 mm (12 inch).
- Do not direct a stream of water at a sharp angle to the edge of the product identification film.

i06969803

Final Drive Oil - Change

SMCS Code: 4050-044-FLV

WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

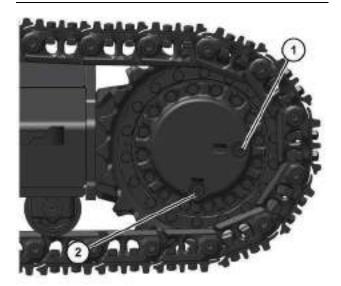


Illustration 795

g06182944

- (1) Oil level plug
- (2) Oil drain plug

1. Position one final drive so that oil drain plug (2) is at the bottom.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

- Remove drain plug (2) and level plug (1). Allow the oil to drain into a suitable container.
- **3.** Clean the plugs and inspect the O-ring seals. If wear or damage is evident, replace the drain plug, the level plug, and/or the O-ring seals.
- 4. Install drain plug (2).
- **5.** Fill the final drive to the bottom of the opening on level plug (1). See Operation and Maintenance Manual, "Lubricant Viscosities" and Operation and Maintenance Manual, "Capacities (Refill)".

Note: If the oil fills slowly, the fill hole may be blocked by the planetary gear. Rotate the final drive to move the planetary gear away from the fill hole.

Note: Overfilling the final drive will cause the seals on the travel motor to allow hydraulic oil or water to enter the final drive. The final drive may become contaminated.

- 6. Install level plug (1).
- 7. Perform Step 1 to Step 6 on the other final drive. Use a different container for the oil so that the oil samples from the final drives will be separate.
- Completely remove the oil that has spilled onto surfaces.
- **9.** Start the machine and allow the final drives to run through several cycles.
- 10. Stop the machine. Check the oil level.
- **11.** Check the drained oil for metal chips or for particles. If there are any chips or particles, consult your Cat dealer.
- **12.** Properly dispose of the drained material. Obey local regulations for the disposal of the material.

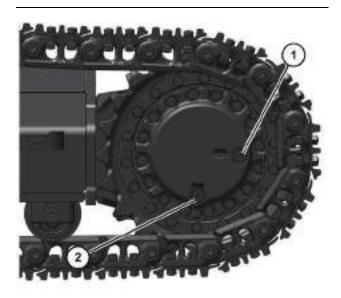
i06969810

Final Drive Oil Level - Check

SMCS Code: 4050-535-FLV

MARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.



Final Drive Oil Level - Check

Illustration 796

g06182944

- (1) Oil level plug
- (2) Oil drain plug
- 1. Position one final drive so that oil drain plug (2) is at the bottom.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

- 2. Remove oil level plug (1).
- **3.** Check the oil level. The oil should be near the bottom of the level plug opening.
- **4.** Add oil through the level plug opening, if necessary. See Operation and Maintenance, "Lubricant Viscosities".

Note: If the oil fills slowly, the fill hole may be blocked by the planetary gear. Rotate the final drive to move the planetary gear away from the fill hole.

Note: Overfilling the final drive will cause the seals on the travel motor to allow hydraulic oil or water to enter the final drive. The final drive may become contaminated.

- Clean oil level plug (1). Inspect the O-ring seal. Replace the O-ring seal if the O-ring seal is worn or damaged.
- 6. Install oil level plug (1).
- **7.** Repeat the procedure for the other final drive.

Final Drive Oil Sample - Obtain

SMCS Code: 4011-008; 4050-SM; 4050-008; 7542-008

WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

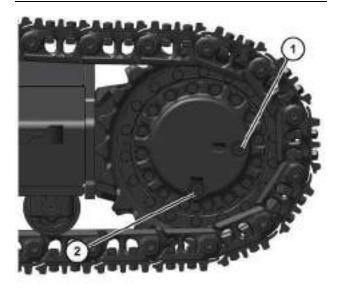


Illustration 797

g06182944

- (1) Oil level plug (2) Oil drain plug
- Position the final drive so that oil drain plug (2) is at the bottom.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on Containing Fluid Spillage.

- 2. Remove oil level plug (1).
- **3.** Obtain a sample of the final drive oil through the hole for the oil level plug.
- 4. Install oil level plug (1).

Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" "S·O·S Oil Analysis" for more information on obtaining a sample of the final drive oil. For additional information about taking an oil sample, refer to Special Publication, PEGJ0047, "How To Take A Good Oil Sample".

i07088575

Fuel Cap Filter - Replace

SMCS Code: 1261-510

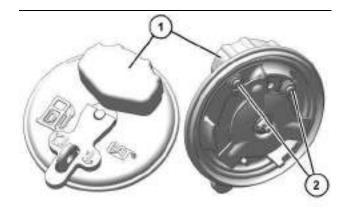


Illustration 798

g06220524

- 1. Remove the fuel cap.
- 2. Remove filter element screws (2) from the underside of the fuel cap and remove filter element (1).
- 3. Install a clean fuel cap filter element.
- Install the screws to secure the filter element to the fuel cap.
- 5. Install the fuel tank cap.

i07088554

Fuel Lift Pump Strainer - Replace

(In-line Filter)

SMCS Code: 1256; 1256-510-STR

S/N: HEX1–10000 **S/N:** RAZ1–10000

⚠ WARNING

Personal injury or death may result from failure to adhere to the following procedures.

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.

Clean up all leaked or spilled fuel. Do not smoke while working on the fuel system.

Turn the disconnect switch OFF or disconnect the battery when changing fuel filters.

NOTICE

Do not fill the fuel filters with fuel before installing the fuel filters. The fuel will not be filtered and could be contaminated. Contaminated fuel will cause accelerated wear to fuel system parts.



Illustration 799

g06182545

The fuel lift pump strainer is located behind the access door on the right side of the machine.

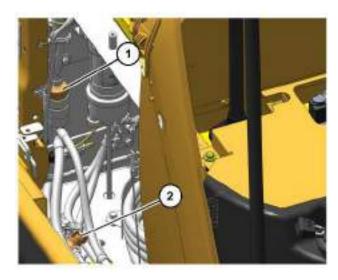


Illustration 800

g06220476

- **1.** Open the access door and close the fuel shut off valve (2) by turning the valve clockwise.
- **2.** Disconnect the hoses from the strainer (1) and remove the strainer.
- 3. Install a new strainer, and reconnect the hoses.
- Open the fuel shut off valve by turning the valve counterclockwise.

i06674757

Fuel System - Prime

SMCS Code: 1250-548

WARNING

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. To help prevent possible injury, turn the start switch off when changing fuel filters or water separator elements. Clean up fuel spills immediately.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, PERJ1017, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat * products.

Dispose of all fluids according to local regulations and mandates.

NOTICE

Do not loosen the fuel lines at the fuel manifold. The fittings may be damaged and/or a loss of priming pressure may occur when the fuel lines are loosened.

NOTICE

Do not allow dirt to enter the fuel system. Thoroughly clean the area around a fuel system component that will be disconnected. Fit a suitable cover over any disconnected fuel system components.

Prime the fuel system in order to fill the fuel filter, and prime the fuel system in order to purge trapped air. The fuel system should be primed under the following conditions:

- · The fuel tank is running low.
- The machine has been stored.
- The fuel filter is being replaced.
- Turn the engine start switch to the ON position. Leave the engine start switch in the ON position for 2 minutes.
- 2. Verify that the water separator is full of fuel.
- 3. If the water separator is not full of fuel, turn the engine start switch OFF and then turn the engine start switch ON. Turning the engine start switch off and on will cycle the fuel priming pump again.

4. When the water separator is full of fuel, attempt to start the engine. If the engine starts and the engine runs rough or the engine misfires, operate at low idle until the engine is running smoothly. If the engine cannot be started, or if the engine continues to misfire or smoke, repeat Step 1.

i06969829

Fuel System Primary Filter (Water Separator) Element - Replace

SMCS Code: 1263-510-FQ

S/N: HEX1–10000 **S/N:** RAZ1–10000

MARNING

Personal injury or death may result from failure to adhere to the following procedures.

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.

Clean up all leaked or spilled fuel. Do not smoke while working on the fuel system.

Turn the disconnect switch OFF or disconnect the battery when changing fuel filters.

NOTICE

Do not fill the fuel filters with fuel before installing the fuel filters. The fuel will not be filtered and could be contaminated. Contaminated fuel will cause accelerated wear to fuel system parts.

The primary filter/water separator is located behind the access door on the right side of the machine.



Illustration 801 g06182545

1. Open the rear access door on the right side of the machine.

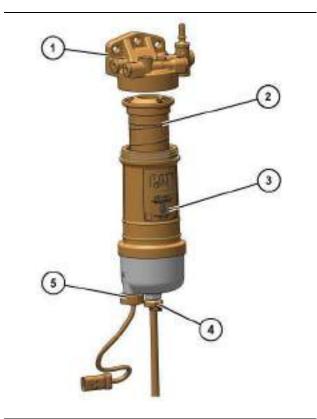


Illustration 802

q06182966

- (1) Filter base
- (2) Filter
- (3) Filter housing
- (4) Drain valve
- (5) Sensor
- 2. Turn drain valve (4) counterclockwise to open. The drain valve is on the bottom of the water separator.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information that pertains to containing fluid spillage.

Drain the water and the sediment into a suitable container.

Note: Dispose of used fluids according to local regulations.

- 4. Close the drain valve (4).
- 5. Disconnect the water sensor (5) from the harness.

Note: Do not attempt to remove the sediment bowl from the housing. The sediment bowl is permanently attached to the housing. Attempting to remove the sediment bowl may damage the bowl.

- **6.** Unscrew filter housing (3) and remove primary filter (2). A filter wrench may be used to loosen the filter housing. Properly discard the used filter.
- 7. Clean the mounting base (1).

- Lubricate the seal of the new filter (2) with clean diesel fuel.
- **9.** Install the new filter (2) into the housing.
- **10.** Tighten the filter housing approximately 1/6 of a turn. Do not use tools to tighten the filter housing to the filter base.
- **11.** Ensure that sensor (5) is in the correct position and connect to the wiring harness. If the sensor was removed from the bowl, install the sensor and tighten to 2.5 ± 0.5 N·m (22 ± 4 lb in).
- 12. Open the fuel shutoff valve.
- 13. Close the access door.

Fuel System Primary Filter (Water Separator) Element - Replace

SMCS Code: 1263-510-FQ

S/N: KFE1-Up S/N: MYK1-Up S/N: NDL1-Up S/N: LTN1-Up

S/N: YCP1-Up S/N: HDT1-Up

5/N: HEV10001 |

S/N: HEX10001–Up **S/N**: RAZ10001–Up

A WARNING

Personal injury or death may result from failure to adhere to the following procedures.

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.

Clean up all leaked or spilled fuel. Do not smoke while working on the fuel system.

Turn the disconnect switch OFF or disconnect the battery when changing fuel filters.

NOTICE

Do not fill the fuel filters with fuel before installing the fuel filters. The fuel will not be filtered and could be contaminated. Contaminated fuel will cause accelerated wear to fuel system parts.

The primary filter/water separator is located behind the access door on the right side of the machine.



Illustration 803 g06182545

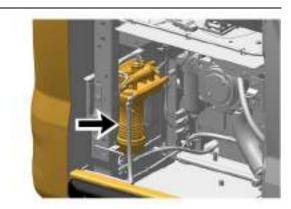


Illustration 804
Typical Example

g06342852

 Open the rear access door on the right side of the machine.

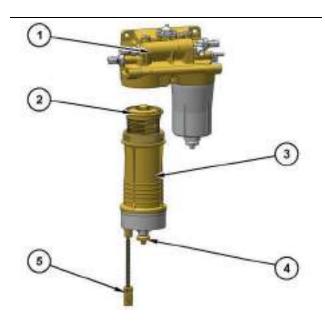


Illustration 805 q06344343

Typical example of primary filter water separator

- (1) Filter base
- (2) Filter
- (3) Filter housing
- (4) Drain valve
- (5) Sensor
- **2.** Turn drain valve (4) counterclockwise to open. The drain valve is on the bottom of the water separator.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information that pertains to containing fluid spillage.

Drain the water and the sediment into a suitable container.

Note: Dispose of used fluids according to local regulations.

- 4. Close the drain valve (4).
- **5.** Disconnect the water sensor (5) from the harness.

Note: Do not attempt to remove the sediment bowl from the housing. The sediment bowl is permanently attached to the housing. Attempting to remove the sediment bowl may damage the bowl.

- **6.** Unscrew filter housing (3) and remove primary filter (2). A filter wrench may be used to loosen the filter housing. Properly discard the used filter.
- 7. Clean the mounting base (1).
- **8.** Lubricate the seal of the new filter (2) with clean diesel fuel.
- 9. Install the new filter (2) into the housing.

- Tighten the filter housing approximately 1/6 of a turn. Do not use tools to tighten the filter housing to the filter base.
- **11.** Ensure that sensor (5) is in the correct position and connect to the wiring harness. If the sensor was removed from the bowl, install the sensor and tighten to 2.5 ± 0.5 N·m (22 ± 4 lb in).
- 12. Open the fuel shutoff valve.
- 13. Close the access door.

i06969842

Fuel System Secondary Filter - Replace

SMCS Code: 1261-510

S/N: HEX1–10000 **S/N:** RAZ1–10000

A WARNING

Personal injury or death can result from a fire.

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.

Clean up all leaked or spilled fuel. Do not smoke while working on the fuel system.

Turn the disconnect switch OFF or disconnect the battery when changing fuel filters.

NOTICE

Do not fill fuel filters with fuel before installing them. Contaminated fuel will cause accelerated wear to fuel system parts.

NOTICE

Do not allow dirt to enter the fuel system. Thoroughly clean the area around a fuel system component that will be disconnected. Fit a suitable cover over any disconnected fuel system components.



Illustration 806

g06182545

- 1. Open access door on the right side of the machine.
- **2.** Shut off the fuel supply. Refer to Fuel Tank Shutoff and Drain Control for additional information.

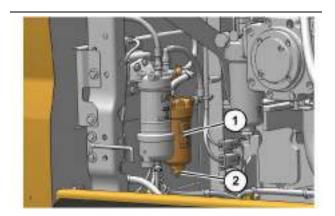


Illustration 807

g06182979

3. Loosen drain valve (2) and allow the fuel to drain out of the housing into a suitable container.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on containing fluid spillage.

- After all the fuel has been removed, tighten the drain
- Remove the secondary fuel filter housing (1) from the base.
- **6.** Remove the filter element from the housing.
- 7. Clean the filter housing and the base.
- 8. Install the new filter element into the housing.
- **9.** Apply a thin coat of clean diesel fuel to the sealing surface of the new fuel filter.
- 10. Install the new filter and tighten by hand.

- 11. Turn on the fuel supply.
- 12. Close the access door.

i07506478

Fuel System Secondary Filter - Replace

SMCS Code: 1261-510

S/N: KFE1-Up

S/N: MYK1-Up

S/N: NDL1-Up

S/N: LTN1-Up

S/N: YCP1-Up

S/N: HDT1-Up

S/N: HEX10001-Up

S/N: RAZ10001-Up

MARNING

Personal injury or death can result from a fire.

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.

Clean up all leaked or spilled fuel. Do not smoke while working on the fuel system.

Turn the disconnect switch OFF or disconnect the battery when changing fuel filters.

NOTICE

Do not fill fuel filters with fuel before installing them. Contaminated fuel will cause accelerated wear to fuel system parts.

NOTICE

Do not allow dirt to enter the fuel system. Thoroughly clean the area around a fuel system component that will be disconnected. Fit a suitable cover over any disconnected fuel system components.

480



Illustration 808

g06182545

- **1.** Open access door on the right side of the machine.
- **2.** Shut off the fuel supply. Refer to Fuel Tank Shutoff and Drain Control for additional information.

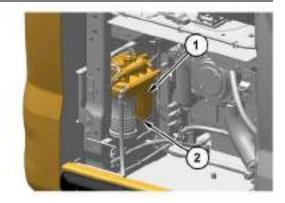


Illustration 809

g06342848

Typical Example

3. Loosen drain valve (2) and allow the fuel to drain out of the housing into a suitable container.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on containing fluid spillage.

- **4.** After all the fuel has been removed, tighten the drain.
- Remove the secondary fuel filter housing (1) from the base.
- **6.** Remove the filter element from the housing.
- **7.** Clean the filter housing and the base.
- 8. Install the new filter element into the housing.
- Apply a thin coat of clean diesel fuel to the sealing surface of the new fuel filter.

- **10.** Install the new filter and tighten to 50 +/- 5 N⋅m (36.9 +/- 4 ft lb).
- 11. Turn on the fuel supply.
- 12. Close the access door.

i06969852

Fuel System Water Separator - Drain

SMCS Code: 1263

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, PERJ1017, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat ® products.

Dispose of all fluids according to local regulations and mandates.



Illustration 810

g06182545

 Open the access door on the right side of the machine.

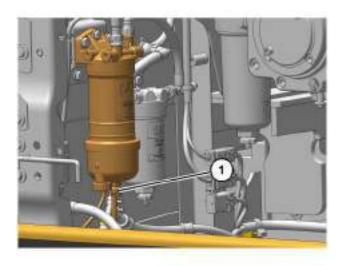


Illustration 811 g06182984

- Open drain valve (1) on the bottom of the fuel/ water separator element. Drain the water into a suitable container.
- **3.** Close the drain valve when all the water has been drained.

Note: When water is not drained from the primary filter sufficiently, water will collect in the secondary fuel filter. Trapped water will eventually overflow. Draining water from the secondary fuel filter will prevent water damaging the fuel system. The procedure for the secondary filter is the same as the primary filter.

4. Close the access door.

Fuel Tank Strainer - Clean

SMCS Code: 1273-070-STR

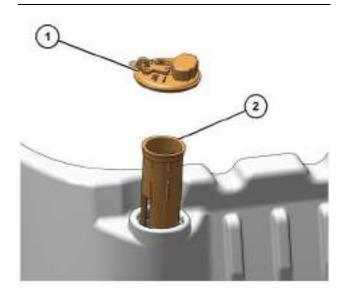


Illustration 812 g06183008

1. Remove fuel tank cap (1).

- 2. Remove strainer (2) from the filler opening.
- **3.** Wash the strainer in a clean, nonflammable solvent.
- **4.** Install the strainer into the filler opening.
- 5. Install the fuel tank cap.

i06954978

Fuel Tank Water and Sediment - Drain

SMCS Code: 1273-543

The drain valve for the fuel tank is located in the right compartment.



Illustration 813 g06182545

1. Open the right compartment door.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on containing fluid spillage.

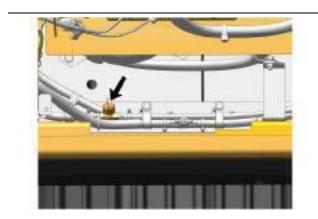


Illustration 814 g06182139

Open the drain valve by turning the valve counterclockwise. Allow the water and the sediment to drain into a suitable container.

Note: Dispose of drained fluids according to local regulations.

- Close the drain valve by turning the valve clockwise.
- 4. Close the compartment door.

Fumes Disposal Filter Element - Replace

SMCS Code: 1074



Illustration 815

g06209196

Typical example

Note: Perform the maintenance with the engine shut off.

- **1.** Open the engine hood.
- **2.** Remove the lid that holds the canister to the filter base assembly.
- **3.** Remove the filter element. Dispose of the used element properly.
- 4. Install the new filter.
- 5. Install the lid.
- 6. Close the engine hood.

Fuses - Replace

SMCS Code: 1417-510



Illustration 816 g06181624

The fuse panel is on the left side of the interior storage box. Remove the cover to access the fuses.

Fuses – Fuses protect the electrical system from damage that is caused by overloaded circuits. Change a fuse if the element separates. If the element of a new fuse separates, check the circuit and/or repair the circuit.

NOTICE

Always replace fuses with the same type and capacity fuse that was removed. Otherwise, electrical damage could result.

NOTICE

If it is necessary to replace fuses frequently, an electrical problem may exist.

Contact your Cat dealer.

Machines Equipped with C4.4 Engines

To replace a fuse, use the puller that is stored in the fuse panel.

The following list identifies the circuits that are protected by each fuse. The amperage for each fuse is included with each circuit.

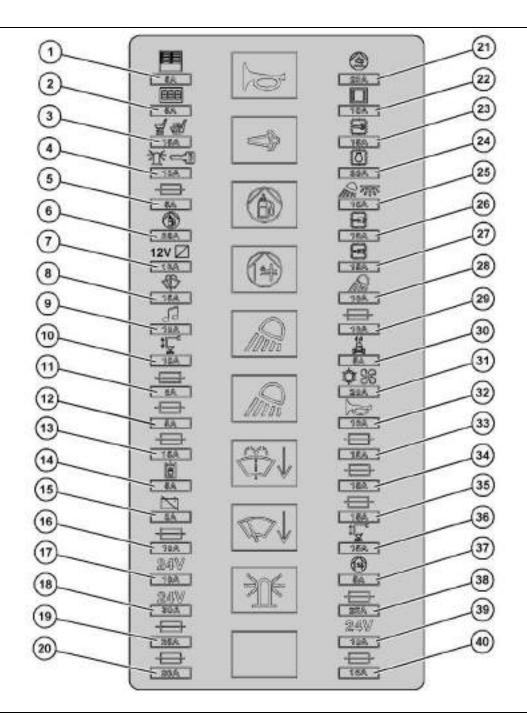


Illustration 817 g06223509

- (1) Heater and Air Conditioner Control and Monitor 5 Amp
- (2) Electronic Switch Control Panel 5 Amp
- (3) Grip, Seat Heater, and Air Suspension Seat 15 Amp
- (4) Beacon 10 Amp
- (5) Spare 5 Amp
- (6) Electric Refueling Pump 25 Amp

- (7)12V Converter 10 Amp
- (8) Window Wiper and Window Washer 15 Amp
- (9) Radio 10 Amp
- (10) Cat Grade Control 15 Amp
- (11) Spare 5 Amp
- (12) Spare 5 Amp

- (13) Spare 15 Amp
- (14) Hydraulic Lock 5 Amp
- (15) DEF Keep Alive 5 Amp
- (16) Spare 10 Amp
- (17) 24V Auxiliary Circuit 10 Amp
- (18) 24V Auxiliary Circuit 30 Amp
- (19) Spare 25 Amp
- (20) Spare 20 Amp
- (21) **DEF Pump** 25 Amp
- (22) Display and Electronic Technician Connector 10 Amp
- (23) Body Control Module 15 Amp
- (24) Engine Electronic Control Module 30 Amp
- (25) Dome Light 15 Amp
- (26) Primary Electronic Control Module 15 Amp
- (27) Secondary Electronic Control Module 15 Amp
- (28) Boom Lamp 10 Amp
- (29) Spare 10 Amp
- (30) Product Link Module 5 Amp
- (31) Air Conditioner and Heater Blower 20 Amp
- (32) Horn 10 Amp
- (33) Spare 15 Amp
- (34) Spare 15 Amp
- (35) 12V Converter 10 Amp
- (36) Cat Grade Control 15 Amp
- (37) Fuel Lifting Pump 5 Amp
- (38) Spare 25 Amp
- (39) Auxiliary Circuit 10 Amp
- (40) Spare 15 Amp

Relays

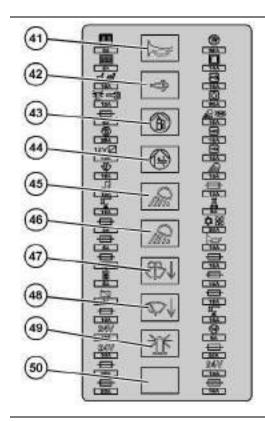


Illustration 818

g06223510

- (41) Horn Relay
- (42) DEF Pump Relay
- (43) Priming Pump Relay
- (44) Lifting Pump Relay
- (45) Boom Light Relay
- (46) Chassis Light and Cab Light Relay
- (47)Lower Washer Relay
- (48) Lower Wiper Relay
- (49) Caution Relay
- (50)Spare Relay

Machines Equipped with C7.1 Engines

To replace a fuse, use the puller that is stored in the fuse panel.

The following list identifies the circuits that are protected by each fuse. The amperage for each fuse is included with each circuit.

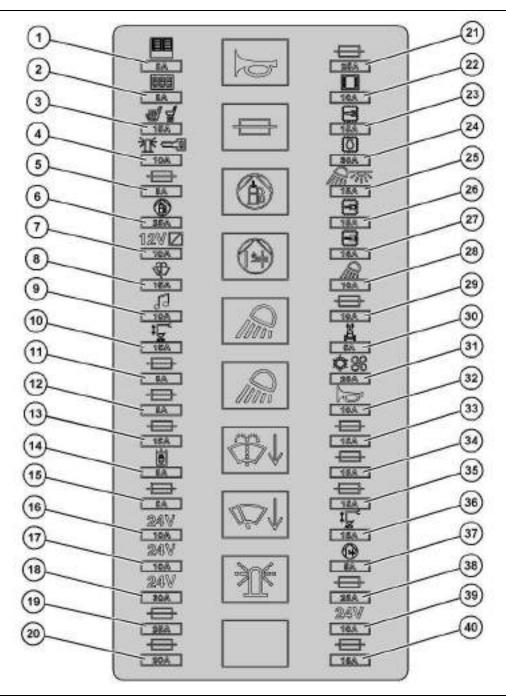


Illustration 819 g06223505

- (1) Heater and Air Conditioner Control and Monitor 5 Amp
- (2) Electronic Switch Control Panel 5 Amp
- (3) Grip, Seat Heater, and Air Suspension Seat 15 Amp
- (4) Beacon 10 Amp
- (5) Spare 5 Amp
- (6) Electric Refueling Pump 25 Amp

- (7)12V Converter 10 Amp
- (8) Window Wiper and Window Washer 15 Amp
- (9) Radio 10 Amp
- (10) Cat Grade Control 15 Amp
- (11) Spare 5 Amp
- (12) Spare 5 Amp

- (13) Spare 15 Amp
- (14) Hydraulic Lock 5 Amp
- (15) Spare 5 Amp
- (16) 24V Auxiliary Circuit 10 Amp
- (17) 24V Auxiliary Circuit 10 Amp
- (18) 24V Auxiliary Circuit 30 Amp
- (19) Spare 20 Amp
- (20) Spare 10 Amp
- (21) Spare 25 Amp
- (22) Display and Electronic Technician Connector 10 Amp
- (23) Body Control Module 15 Amp
- (24) Engine Electronic Control Module 30 Amp
- (25) Dome Light 15 Amp
- (26) Primary Electronic Control Module 15 Amp
- (27) Secondary Electronic Control Module 15 Amp
- (28) Boom Lamp 10 Amp
- (29) Spare 10 Amp
- (30) Product Link Module 5 Amp
- (31) Air Conditioner and Heater Blower 20 Amp
- (32) Horn 10 Amp
- (33) Spare 15 Amp
- (34) Spare 15 Amp
- (35) 12V Converter 10 Amp
- (36) Cat Grade Control 15 Amp
- (37) Fuel Lifting Pump 5 Amp
- (38) Spare 25 Amp
- (39) Auxiliary Circuit 10 Amp
- (40) Spare 15 Amp

Relays

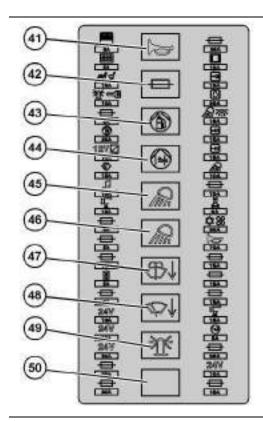


Illustration 820

g06223517

- (41) Horn Relay
- (42) DEF Pump Relay
- (43) Priming Pump Relay
- (44) Lifting Pump Relay
- (45) Boom Light Relay
- (46) Chassis Light and Cab Light Relay
- (47)Lower Washer Relay
- (48) Lower Wiper Relay
- (49) Caution Relay
- (50)Spare Relay

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Power Fuse Module



Illustration 821 g06181546

The power fuse module is located behind the front access door on the left side of the machine. Remove the cover to access the fuses.

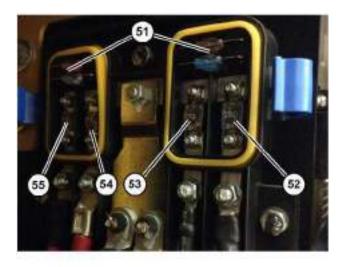


Illustration 822 q06225641



Spare (51) - The fuse module includes spare fuses which can be used if one of the installed fuses opens. One spare fuse is provided for each fuse in use.



Main Circuit 100 Amp (52) - This fuse is designed to protect the wires between the batteries and the fuses. If the wires are shorted to the machine body, this fuse would minimize the damage to the wires.



Glow Plug Circuit 70 Amp (53) - This fuse is designed to protect the glow plugs.

Alternator Circuit 150 Amp (54) - This fuse is designed to protect the alternator. If the batteries are installed with reversed polarity, the fuse would prevent the alternator from damaging the rectifier.



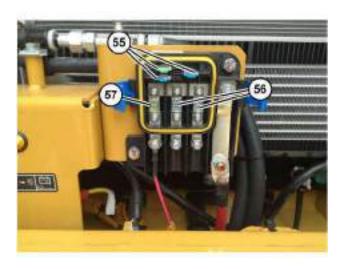
Electric Cooling Fans 125 Amp (55) -This fuse is designed to protect the cooling fans.

Secondary Power Fuse Module (If Equipped)



g06179792 Illustration 823

The secondary power fuse module is located behind the rear access door on the left side of the machine. Remove the cover to access the fuses.



g06225651 Illustration 824



Spare (55) – The fuse module includes spare fuses which can be used if one of the installed fuses opens. One spare fuse is provided for each fuse in use.

Not Used (56) - These fuses are currently not used.



Diesel Exhaust Fluid (DEF) Pump Circuit 40 Amp (57) – This fuse is designed to protect the DEF pump circuit.

i08067436

High Intensity Discharge Lamp (HID) - Replace

(If Equipped)

SMCS Code: 1434-510

A WARNING

HID lamps operate at very high voltages. To avoid electrical shock and personal injury, disconnect power before servicing HID lamps.

A WARNING

HID bulbs become very hot during operation. Before servicing, remove power from lamp for at least five minutes to ensure lamp is cool.

NOTICE

Although HID bulb materials may change over time, HID bulbs produced at the time of the printing of this manual contain mercury. When disposing of this component, or any waste that contains mercury, please use caution and comply with any applicable laws.

- Prepare the machine for maintenance. Refer to Operation and Maintenance Manual, "Prepare the Machine for Maintenance".
- 2. Remove the electrical power from the high intensity discharge lamp (HID). The electrical power must be removed from the HID lamp for at least 5 minutes, to ensure that the bulb is cool.
- Disassemble the housing for the HID lamp to have access to the bulb.

Note: On some HID lamps, the bulb is a part of the lens assembly. The bulb is not removed separately from the lens assembly. Replace the entire lens assembly on these HID lamps.

- 4. Remove the bulb from the HID lamp.
- **5.** Install the replacement bulb in the HID lamp.

If the bulb is a part of the lens assembly, install the replacement lens assembly in the HID lamp.

Note: To avoid failure to the bulb that is premature, avoid touching the bulb's surface with your bare hands. Clean any fingerprints from the bulb with alcohol prior to operation.

- 6. Reassemble the housing for the HID lamp. Ensure that any printing on the lens is oriented correctly for the HID lamp's mounting position on the machine.
- 7. Reattach the electrical power to the HID lamp.
- 8. Check the HID lamp for proper operation.

Note: Consult your Cat dealer for additional information on HID lamps.

i07833138

Hydraulic System Oil - Change

SMCS Code: 5056-044

Cat HYDO Advanced 10 Oil Change Interval

The standard Cat HYDO Advanced 10 oil change interval is every 6000 service hours or 3 years. But a 6000 service hour or 3-year maintenance interval for hydraulic oil (change) is strongly recommended with S·O·S monitoring of the hydraulic oil after 3000 service hours. The interval for S·O·S monitoring is every 500 hours. The hydraulic oil change is strongly recommended when the oil deterioration or contamination is detected. The maintenance interval for the hydraulic oil filter is not changed.

Hydraulic Hammer Use

The use of hydraulic hammers shortens the life of hydraulic oil. If a hydraulic hammer is used, the maintenance interval is shortened, refer to Table 42 for the intervals.

Table 42

Percentage of Hammer Use	Hydraulic System Oil - Change
50%	Every 1000 service hours
100%	Every 600 service hours

Procedure to Change the Hydraulic Oil

A WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

Hydraulic System Oil - Change

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, PERJ1017, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat $^\circ$ products.

Dispose of all fluids according to local regulations and mandates.

1. Park the machine on level ground. Lower the bucket to the ground so that the stick is vertical.

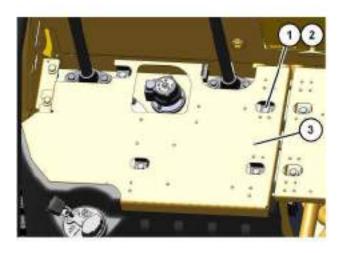


Illustration 825 g06182169

2. Remove five bolts (1) and washers (2). Remove cover (3) from the top of the hydraulic tank.



Illustration 826

g06182174

3. Clean the area thoroughly to keep dirt out of the screen cover and filler cap (4).

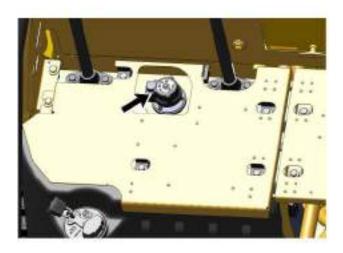


Illustration 827

g06184080

Hydraulic tank filler cap location



Pressurized system!

The hydraulic tank contains hot oil under pressure. To prevent burns from the sudden release of hot oil, relieve the tank pressure with the engine off. Relieve pressure by slowly turning the cap until the cap reaches the secondary stop.

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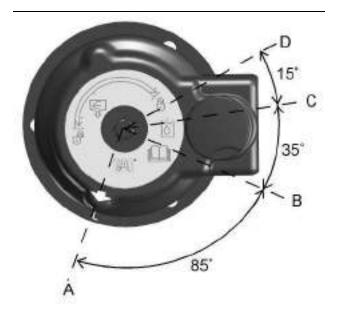


Illustration 828 q06184990

Filler cap

(A) LOCK position

- (B) PRESSURE RELEASE START position (C) PRESSURE RELEASE END position
- (D) OPEN position
- 4. Release the pressure that may be present in the return hydraulic circuit with the following procedure. Refer to Illustration 828 for filler cap positions.
 - a. Turn the filler cap counterclockwise and move the arrow from position (A) to position (B).
 - b. Release the pressure for a minimum of 45 seconds by moving the arrow from position (B) to position (C).
 - c. Move the arrow from position (C) to position
 - d. After the tank pressure is relieved, tighten the filler cap.



Illustration 829 g06182179

5. Remove the hydraulic tank access cover that is located under the upper structure. Removing the cover will allow access to the drain valve.

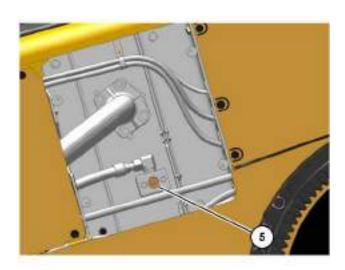


Illustration 830

g06182182

(5) Plug

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information that pertains to containing fluid spillage.

- 6. Remove plug (5).
- 7. Inspect the O-ring. Replace the O-ring if wear or damage is evident.

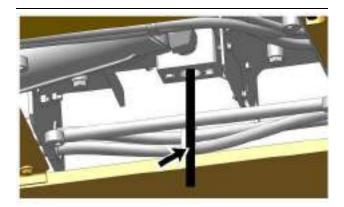


Illustration 831 g06182192

- **8.** Use a bar to push the plunger up to allow the oil to drain.
- 9. Drain the oil into a suitable container.

Note: Dispose of used fluids according to local regulations.

- After the oil has been drained, clean drain plug
 and install. Tighten the plug to 68 ± 7 N⋅m
 ± 5 lb ft).
- **11.** Open the access door on the right side of the machine.
- **12.** Clean the pump, the hydraulic lines, and the hydraulic tank.

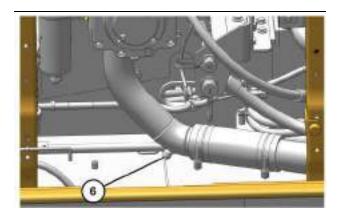


Illustration 832 g06182196

- **13.** Remove plug (6) from the tube. Allow the oil to drain into a container.
- **14.** Inspect the O-ring. Replace the O-ring if wear or damage is evident.
- **15.** Clean the plug. Install the plug and the O-ring into the drain port.

Hydraulic Tank Screen - Clean

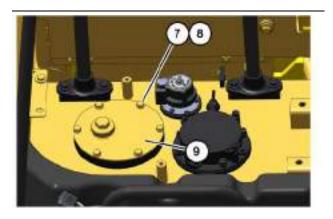


Illustration 833

g06182201

- (7) Bolts
- (8) Washers
- (9) Cover
- 1. Remove bolts (7), washers (8), and cover (9).



Illustration 834

g06182213

- (10) Spring
- (11) Screen
- 2. Remove spring (10) and screen (11).

Note: Do not allow spring (10) to fall back into the tank.

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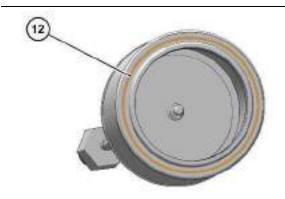


Illustration 835

g06182515

(12) O-ring seal

3. Remove O-ring seal (12) from the screen.

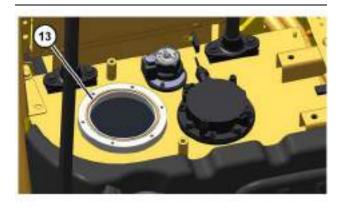


Illustration 836

g06182229

(13) O-ring seal

- 4. Remove O-ring seal (13) from the tank.
- **5.** Inspect O-ring seals (12) and (13). Replace the Oring seals if wear or damage is evident.
- **6.** Wash the screen in a clean nonflammable solvent. Allow the screen to dry. Inspect the screen. Replace the screen, if the screen is damaged.
- 7. Install O-ring seal (12) on screen (11).
- **8.** Install screen (11) and spring (10). Then install cover (9), washers (8), and bolts (7).

Note: Make sure that the O-ring seals and the spring are properly positioned during installation.

Case Drain Filter - Clean

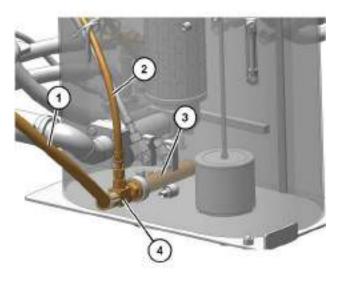


Illustration 837 g06220559

- (1) Hose
- (2) Hose
- (3) Case drain filter
- (4) Tee
- **1.** Remove hose (1) and hose (2) from tee (4). Remove tee (4).
- 2. Remove case drain filter (3) from the hydraulic
- Wash the screen of the case drain filter in a clean nonflammable solvent. Allow the filter to dry. Inspect the filter. Replace the filter if the filter is damaged.
- **4.** Inspect the O-ring seal on the filter. Replace the O-ring seal if wear or damage is evident.
- 5. Install the filter in the hydraulic tank. Tighten the filter to 175 ± 26 N⋅m (129 ± 19 lb ft).
- **6.** Install the tee onto the filter. Tighten the tee to $65 \pm 10 \text{ N} \cdot \text{m}$ (48 ± 7 lb ft).
- 7. Install the two hoses onto the tee.

Hydraulic System Oil - Fill

- Fill the hydraulic system oil tank. Refer to Operation and Maintenance Manual, "Capacities (Refill)".
- 2. Inspect the O-ring seal on the filler cap for damage. Replace the O-ring, if necessary. Clean the filler cap. Install the filler cap.

Note: Make no attempt to start the engine until the pump has been filled with hydraulic oil. Serious damage to the hydraulic components can result.

Main Pump and Hydraulic System Air Purge

1. Access the hydraulic pump. The hydraulic pump is located behind the right access door.

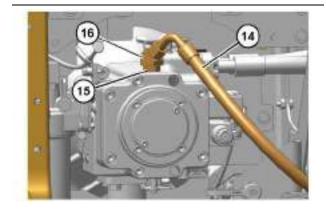


Illustration 838

g06205207

- (14) Hose
- (15) Connector
- (16) Elbow
- 2. While the engine is stopped, remove hose (14), elbow (15), and connector (16) from the top of the pump. Add hydraulic oil through the opening.
- **3.** Check the condition of the seals. If a seal is damaged, replace the seal.
- **4.** After the pump has been filled with oil, install drain hose (14), connector (15), and seal (16) to the original locations.
- **5.** Start the engine. When the engine is at low idle, raise the boom. Hold the boom in this position.
- Stop the engine. Slowly lower the boom until the work tool is on the ground. The hydraulic tank will pressurize.
- 7. Slowly loosen hose (14) until hydraulic oil flows from the connection. Oil flowing from the connection indicates that the air has been released from the pump.
- 8. Tighten hose (14).
- **9.** Start the engine. Operate the engine at idling speed for 5 minutes.



Illustration 839 g06181120

- **10.** Operate the joysticks to circulate the hydraulic oil. Lower the bucket to the ground so that the stick is vertical to the ground. Stop the engine.
- 11. Check the hydraulic oil level.

Reference: For the correct procedure, refer to Operation and Maintenance Manual, "Hydraulic System Oil Level - Check".

- 12. Close the access door.
- Close the engine hood and latch the engine hood.

Fast Fill

If your machine is equipped with a deluxe service center, you may drain the hydraulic oil through the fast fill port. You may also add the hydraulic oil through a fast fill port.

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Illustration 840 g06182545

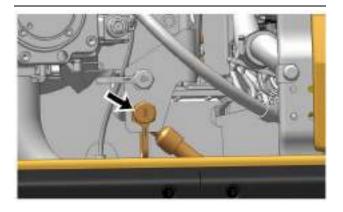


Illustration 841 g06182544

- 1. Remove the dust cover.
- 2. Attach the hose to the male coupling.
- 3. Drain the oil or add the oil, as needed.

i07833122

Hydraulic System Oil Filter (Return) - Replace

SMCS Code: 5068-510-RJ

MARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

The return filter is a cartridge type filter. The amount of foreign material that enters the hydraulic system is reduced when the filter element is replaced.

Two different filters are available for the return filter. One filter is used for standard applications such as digging and normal use of a hammer. The second filter is used for an application such as demolishing a ceiling in a tunnel with a hammer.

Note: If the message display shows that the hydraulic return filter is plugged, turn off the machine. After you make sure that the warning has disappeared, start the machine and run the machine on level ground for approximately 10 minutes. If the warning still appears in the message display, inspect the filter and replace the filter, if necessary.

Hydraulic Hammer Use

The use of hydraulic hammers shortens the life of hydraulic oil. If a hydraulic hammer is used, the maintenance interval is shortened, refer to Table43 for the intervals.

Table 43

Percentage of Hammer Use	Hydraulic System Oil Filter (Re- turn) - Replace
50%	Every 500 service hours
100%	Every 250 service hours

Return Filter Replacement Procedure

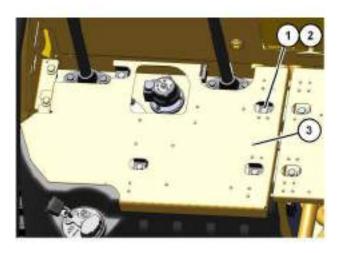


Illustration 842

g06182169

- 1. Remove five bolts (1) and washers (2). Remove cover (3) from the top of the hydraulic tank.
- **2.** Clean the area thoroughly to keep dirt out of the return filter and filler cap.

MARNING

Pressurized system!

496

The hydraulic tank contains hot oil under pressure. To prevent burns from the sudden release of hot oil, relieve the tank pressure with the engine off. Relieve pressure by slowly turning the cap until the cap reaches the secondary stop.

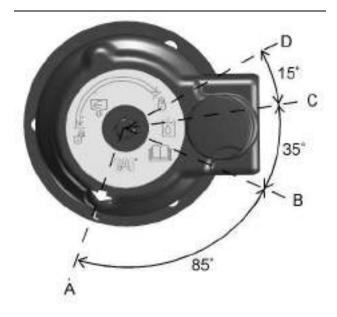


Illustration 843

g06184990

Filler cap

- (A) LOCK position
- (B) PRESSURE RELEASE START position
- (C) PRESSURE RELEASE END position
- (D) OPEN position
- Release the pressure that may be present in the return hydraulic circuit with the following procedure. Refer to Illustration 843 for filler cap positions.
 - a. Turn the filler cap counterclockwise and move the arrow from position (A) to position (B).
 - Release the pressure for a minimum of 45 seconds by moving the arrow from position (B) to position (C).
 - c. Move the arrow from position (C) to position (D).
 - d. After the tank pressure is relieved, tighten the filler cap on the hydraulic tank to position (A).
- **4.** Check the hydraulic system oil level.

Reference: For the correct procedure, refer to Operation and Maintenance Manual, "Hydraulic System Oil Level - Check".



Illustration 844

g06254537

5. Remove four bolts (4), disconnect the harness connector from the filter bypass switch, and remove cover assembly (5) from the tank. Inspect the O-ring on the cover for damage and replace as necessary.



Illustration 845

g06254829

6. Remove filter element (6) and discard. Install a new element into the filter case.

M0068104-12 497



Illustration 846 g06254537

7. Place cover assembly (5) into position in the tank. Install four bolts (4) and tighten to 30 ± 7 N·m (22 ± 5 lb ft). Install the harness connector on the filter bypass switch.

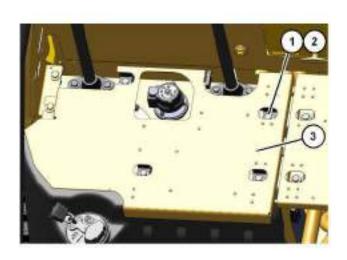


Illustration 847 g06182169

8. Position cover (3) in place on the top of the hydraulic tank. Install five bolts (1) and washers (2).

i07174987

Hydraulic System Oil Level - Check

SMCS Code: 5050-535

A WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

NOTICE

Never remove the fill/vent plug from the hydraulic tank if the oil is hot.

Air can enter the system and cause pump damage.

498



Illustration 848 g06181120

1. Park the machine on level ground. Lower the bucket to the ground with the stick in a vertical position, as shown.



Illustration 849 g06219991

Open the access door on the right side of the machine.

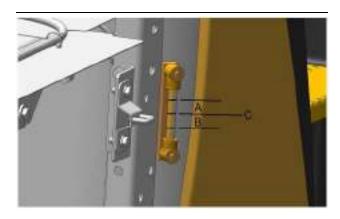


Illustration 850 g06182648

- (A) High temperature range
- (B) Low temperature range
- (C) Mid temperature range

- 3. If the hydraulic oil temperature is between 10° to 30° C (50° to 86° F), maintain the oil level in low temperature range (B). If the hydraulic oil temperature is between 50° to 80° C (122° to 187° F), maintain the oil level in high temperature range (A). If the hydraulic oil temperature is between 31° to 49° C (87° to 121° F), maintain the oil level in mid temperature range (C).
- 4. Close the access door.

Note: Perform Step 5 through Step 8 if the oil level is low

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information that pertains to Containing Fluid Spillage.

A WARNING

Pressurized system!

The hydraulic tank contains hot oil under pressure. To prevent burns from the sudden release of hot oil, relieve the tank pressure with the engine off. Relieve pressure by slowly turning the cap until the cap reaches the secondary stop.

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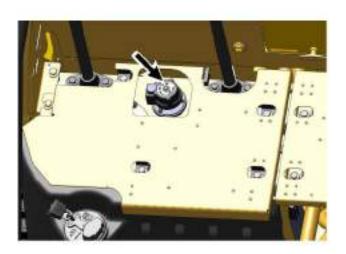


Illustration 851 g06182653

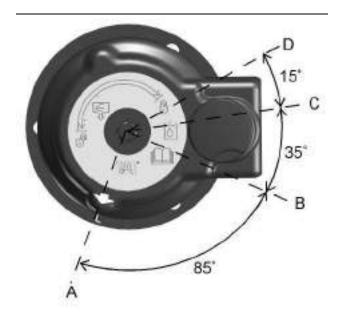


Illustration 852

g06184990

Filler cap

- (A) LOCK position
- (B) PRESSURE RELEASE START position
- (C) PRESSURE RELEASE END position
- (D) OPEN position
- 5. Release the pressure that may be present in the return hydraulic circuit with the following procedure. Refer to Illustration 852 for filler cap positions.
 - a. Turn the filler cap counterclockwise and move the arrow from position (A) to position (B).

- b. Release the pressure for a minimum of 45 seconds by moving the arrow from position (B) to position (C).
- c. Move the arrow from position (C) to position (D).
- d. After the tank pressure is relieved, remove the filler cap.
- **6.** Add oil if necessary. See Operation and Maintenance, "Lubricant Viscosities"
- **7.** Check the O-ring seal on the filler cap. Replace the O-ring seal if the seal is damaged.
- **8.** Clean the filler cap and install on the tank. Tighten the filler cap on the hydraulic tank to position (A).

i06972505

Hydraulic System Oil Sample - Obtain

SMCS Code: 5050-008-OC; 5095-008; 5095-SM; 7542-008; 7542

Note: If Cat HYDO Advanced hydraulic oils are used, the hydraulic oil change interval is extended to 6000 hours. S·O·S services after 3,000 hours is strongly recommended. Consult your Cat dealer for details.

The hydraulic oil sampling valve is near the accumulator on the main valve.

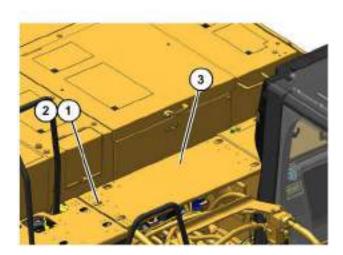


Illustration 853 g06225772

1. Remove bolts (1), washers (2), and cover (3).

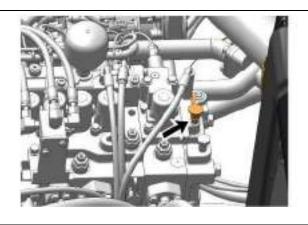


Illustration 854

g06183830

- Obtain a sample of the hydraulic oil from the hydraulic oil sampling valve that is on the main valve next to the accumulator.
- 3. Install cover (3), washers (2), and bolts (1).

Refer to Special Publication, SEBU6250, "S·O·S Oil Analysis" for information that pertains to obtaining a sample of the hydraulic oil. Refer to Special Publication, PEGJ0047, "How To Take A Good Oil Sample" for more information about obtaining a sample of the hydraulic oil.

i03753191

Indicators and Gauges - Test

SMCS Code: 7450-081; 7490-081

- **1.** Look for broken lenses on the gauges, broken indicator lights, broken switches, and other broken components in the cab.
- 2. Start the engine.
- 3. Look for inoperative gauges.
- **4.** Turn on all machine lights. Check for proper operation.
- Move the machine forward. Release the travel levers and the travel pedals. The machine should stop.
- 6. Stop the engine.
- **7.** Make any repairs that are required before operating the machine.

Oil Filter (Hydraulic Hammer) - Replace

(If Equipped)

SMCS Code: 5068-510

WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

The use of hydraulic hammers shortens the life of hydraulic oil. If a hydraulic hammer is used, the maintenance interval is shortened, refer to Table 44 for the intervals.

Table 44

Percentage of Hammer Use	Oil Filter (Hydraulic Hammer) - Replace
50%	Every 250 service hours
100%	Every 100 service hours



Illustration 855

g06181120

- Park the machine on level ground in the service position as shown.
- **2.** Move the hydraulic lockout control to the UNLOCKED position.
- 3. Turn the engine start switch to the ON position.
- **4.** Move the joysticks and the travel levers/pedals to the full stroke positions to relieve the pressure in the hydraulic lines.
- 5. Turn the engine start switch to the OFF position and return the lever for the hydraulic lockout control to the LOCKED position.

M0068104-12 501

Maintenance Section

If Equipped

WARNING

Pressurized system!

The hydraulic tank contains hot oil under pressure. To prevent burns from the sudden release of hot oil, relieve the tank pressure with the engine off. Relieve pressure by slowly turning the cap until the cap reaches the secondary stop.

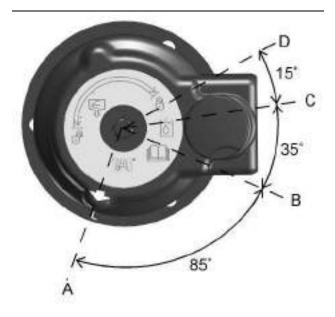


Illustration 856

g06184990

Filler cap

- (A) LOCK position
- (B) PRESSURE RELEASE START position
- (C) PRESSURE RELEASE END position
- (D) OPEN position
- **6.** Release the pressure that may be present in the return hydraulic circuit with the following procedure. Refer to Illustration 856 for filler cap positions.
 - a. Turn the filler cap counterclockwise and move the arrow from position (A) to position (B).
 - Release the pressure for a minimum of 45 seconds by moving the arrow from position (B) to position (C).
 - c. Move the arrow from position (C) to position (D).
 - d. After the tank pressure is relieved, remove the filler cap.
- **7.** The oil filter for the hammer is located near the base of the boom.

Note: Some configurations may invert the hammer filter installation.

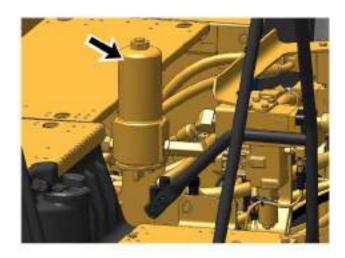


Illustration 857

q06211151

8. Position a suitable container to contain the oil.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on containing fluid spillage.

9. Loosen the filter housing and remove. Inspect the plug on the top of the housing. If there are signs of leakage, replace the O-ring on the plug. Tighten the plug to59 ± 5 N·m (44 ± 4 lb ft).

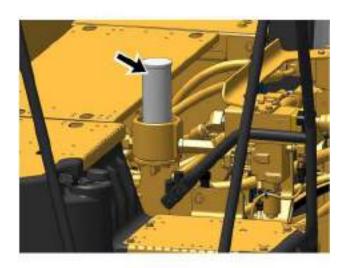


Illustration 858

g06211156

10. Remove the filter element and discard. The element cannot be reused.

502 M0068104-12

Maintenance Section Oil Filter - Inspect

Note: Used filter elements should always be disposed of according to local regulations.

- 11. Install the new filter element.
- 12. Clean the filter housing and install on the filter base. Tighten the nut on the filter case to 98 ± 10 N·m (72 ± 7 lb ft).
- **13.** Start the engine and operate the machine slowly for 10 to 15 minutes. Move each cylinder evenly through several cycles and operate the hammer.
- **14.** Return the machine to the service position. Check the machine for oil leaks.
- 15. Stop the engine.
- **16.** Check the hydraulic oil level.

Reference: For the correct procedure, refer to Operation and Maintenance Manual, "Hydraulic System Oil Level - Check".

i07349186

Oil Filter - Inspect

SMCS Code: 1308-507; 5068-507

Inspect a Used Filter for Debris



Illustration 859

g06224663

The element is shown with debris.

Use a filter cutter to cut the filter element open. Spread apart the pleats and inspect the element for metal and for other debris. An excessive amount of debris in the filter element can indicate a possible failure.

If metals are found in the filter element, a magnet can be used to differentiate between ferrous metals and nonferrous metals.

Ferrous metals can indicate wear from steel parts and on cast iron parts.

Nonferrous metals can indicate wear from the aluminum parts of the engine such as main bearings, rod bearings, or turbocharger bearings.

Small amounts of debris may be found in the filter element. This debris could be caused by friction and by normal wear. Consult your Cat dealer to arrange for further analysis if an excessive amount of debris is found.

Using an oil filter element that is not recommended by Caterpillar can result in severe engine damage to engine bearings, to the crankshaft, and to other parts. This can result in larger particles in unfiltered oil. The particles could enter the lubricating system and the particles could cause damage.

i06972489

Radiator, Aftercooler and Oil **Cooler Cores - Clean**

SMCS Code: 1063-070-KO; 1353-070-KO; 1374-070-KO

⋒ WARNING

Personal injury can result from air pressure.

Personal injury can result without following proper procedure. When using pressure air, wear a protective face shield and protective clothing.

Maximum air pressure at the nozzle must be less than 205 kPa (30 psi) for cleaning purposes.



Illustration 860

q06179792

1. Open the access door on the left side of the machine.



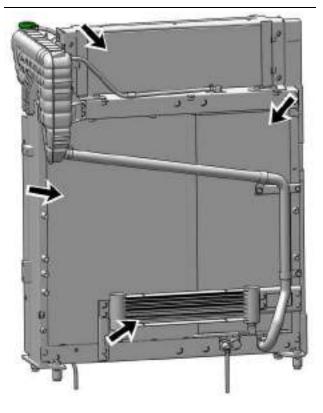


Illustration 861 g06183814

2. Remove dust and debris from all the core fins.

Compressed air is preferred, but high-pressure water or steam can be used to remove dust and general debris from a core.

See Special Publication, SEBD0518, "Know Your Cooling System" for more detailed information about cleaning core fins.

Close the access door on the left side of the machine.

Receiver Dryer (Refrigerant) - Replace

SMCS Code: 7322-510; 7322-710

⚠ WARNING

Personal injury can result from contact with refrigerant.

Contact with refrigerant can cause frost bite. Keep face and hands away to help prevent injury.

Protective goggles must always be worn when refrigerant lines are opened, even if the gauges indicate the system is empty of refrigerant.

Always use precaution when a fitting is removed. Slowly loosen the fitting. If the system is still under pressure, release it slowly in a well ventilated area.

Personal injury or death can result from inhaling refrigerant through a lit cigarette.

Inhaling air conditioner refrigerant gas through a lit cigarette or other smoking method or inhaling fumes released from a flame contacting air conditioner refrigerant gas, can cause bodily harm or death

Do not smoke when servicing air conditioners or wherever refrigerant gas may be present.

Use a certified recovery and recycling cart to properly remove the refrigerant from the air conditioning system.

NOTICE

If the refrigerant system has been open to the outside air (without being plugged) for more than 30 minutes, the receiver-dryer must be replaced. Moisture will enter an open refrigerant system and cause corrosion which will lead to component failure.

Prepare the machine for maintenance. Refer to Operation and Maintenance Manual, "Prepare the Machine for Maintenance".

Refer to Service Manual, "Air Conditioning and Heating R-134a for All Caterpillar Machines" for the proper procedure to change the receiver-dryer assembly and for the procedure to reclaim the refrigerant gas.

i07103309

Rollover Protective Structure (ROPS) - Inspect

SMCS Code: 7323-040; 7325-040

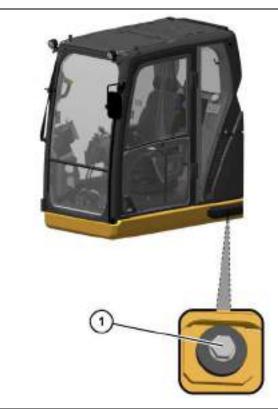


Illustration 862

g06184357

Consult your Cat dealer for repair of any cracks in the ROPS.

Inspect the ROPS for loose bolts or for damaged bolts. Replace any damaged bolts or missing bolts with original equipment parts only. Tighten the M24 bolt (1) to $425 \pm 50 \text{ N} \cdot \text{m}$ (315 $\pm 40 \text{ lb ft}$).

Note: Apply oil to all ROPS bolt threads before you install the bolts. Failure to apply oil to the bolt threads can result in improper bolt torque.

Do not straighten the ROPS. Do not repair the ROPS by welding reinforcement plates to the ROPS.

Consult your Cat dealer for inspection of any potential damage or repair of any damage to any operator protective structure. (Including ROPS, FOPS, TOPS, OPS, and OPG) Refer to Special Instruction, SEHS6929, "Inspection, Maintenance, and Repair of Operator Protective Structures (OPS) and Attachment Installation Guidelines for All Earthmoving Machinery"

Seat Belt - Inspect

SMCS Code: 7327-040

Always inspect the condition of the seat belt and the condition of the seat belt mounting hardware before you operate the machine. Replace any parts that are damaged or worn before you operate the machine.



Illustration 863

g06224278

Typical example

Inspect buckle (2) for wear or for damage. If the buckle is worn or damaged, replace the seat belt.

Inspect seat belt (1) for webbing that is worn or frayed. Replace the seat belt if the webbing is worn or frayed.

Inspect all seat belt mounting hardware for wear or for damage. Replace any mounting hardware that is worn or damaged. Make sure that the mounting bolts are tight.

If your machine is equipped with a seat belt extension, also perform this inspection procedure for the seat belt extension.

Contact your Cat dealer for the replacement of the seat belt and the mounting hardware.

Note: The seat belt should be replaced within 3 years of the date of installation. A date of installation label is attached to the seat belt retractor and buckle. If the date of installation label is missing, replace belt within 3 years from the year of manufacture as indicated on belt webbing label, buckle housing, or installation tags (non-retractable belts).

Seat Belt - Replace

SMCS Code: 7327-510

The seat belt should be replaced within 3 years of the date of installation. A date of installation label is attached to the seat belt retractor and buckle. If the date of installation label is missing, replace the belt within 3 years from the year of manufacture as indicated on the belt webbing label, buckle housing, or installation tags (non-retractable belts).

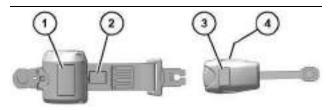


Illustration 864

q06183390

- (1) Date of installation (retractor)
- (2) Year of manufacture (tag) (fully extended web)
- (3) Date of installation (buckle)
- (4) Year of manufacture (underside) (buckle)

Consult your Cat dealer for the replacement of the seat belt and the mounting hardware.

Determine the age of a new seat belt before installing on seat. A manufacture label is on the belt webbing and imprinted on the belt buckle. Do not exceed the install by date on the label.

A complete seat belt system should be installed with new mounting hardware.

Date of installation labels should be marked and affixed to the seat belt retractor and buckle.

Note: Date of installation labels should be permanently marked by punch (retractable belt) or stamp (non-retractable belt).

If your machine is equipped with a seat belt extension, also perform this replacement procedure for the seat belt extension.

i06991878

Shovel Crane - Inspect (If Equipped)

SMCS Code: 6500-040

S/N: HEX1-Up

▲ WARNING

Do not operate the shovel crane with a hook that has cracks or deformities. Failure to follow these instructions may cause the load to fall and result in injury or death. Replace the shovel crane hook if there are any signs of cracks of deformities.

- **1.** Position the machine on a level surface and retract the bucket. Lower the bucket to the ground.
- **2.** Move the hydraulic lockout control to the LOCKED position. Stop the engine.

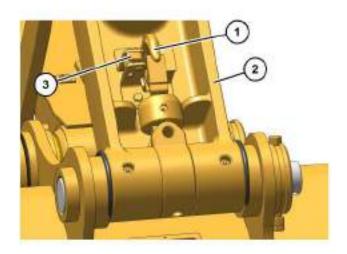


Illustration 865

q06191360

Type 2

- (1) Shovel crane hook
- (2) Bucket linkage
- (3) Latch assembly
- **3.** Unlock shovel crane hook (1) from latch assembly (3) for inspection.
- 4. Inspect the shovel crane hook and the hook latch. Make any repairs before operation of the shovel crane.

Inspect Shovel Crane Hook

Ensure that the shovel crane is properly lubricated. Refer to this Operation and Maintenance Manual, "Shovel Crane - Lubricate" for the correct procedure.



Illustration 866 g06191406

Inspect for notable scratches, tears, or welded parts.

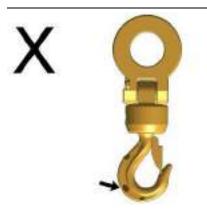


Illustration 867 g06191407

Visually inspect for corrosion and rust. If corrosion or rust is found, polish the area with a grinder and lubricate the hook with oil.



Illustration 868 g06191409

Inspect the shovel crane swivel. The swivel should rotate smoothly and not rattle.



Illustration 869 g06191411

Inspect the tip of shovel crane hook and ensure that the tip is not bent to either side.

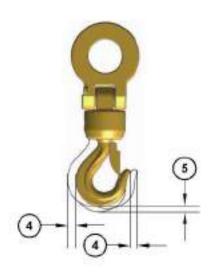


Illustration 870

g06191428

- (4) Horizontal movement
- (5) Vertical movement

Inspect the shovel crane hook for excessive movement. The horizontal movement (4) of the hook should not exceed 5 mm (0.2 inch). The vertical movement (5) of the hook should not exceed 4 mm (0.2 inch.) vertically.

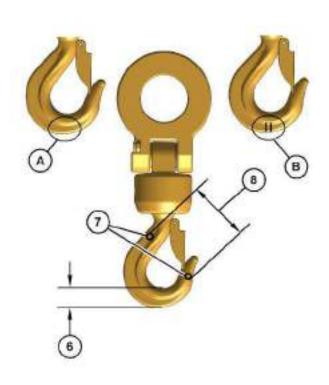


Illustration 871

g06191434

- (6) Width
- (7) Punch marks
- (8) Length

There are two types of hooks:

Hook (A) – This type of hook will not have a mark to indicate the area intended to bear the weight of a suspended load.

Hook (B) – This type of hook will have a mark to indicate the area intended to bear the weight of a suspended load.

Measure the shovel crane hook to ensure that the specifications do not exceed the thresholds found in the table below.

Table 45

Disposal Reference Chart				
Hook Type	New Sho Specifica Refer		Shovel Hook Specifica- tion Threshold	
	Length (8)	Width (6)	Length (8)	Width (6)
Α	66 mm (2.60 inch)	31.8 mm (1.25 inch)	69.3 mm (2.73 inch)	30.2 mm (1.19 inch)
В	65 mm (2.55 inch)	31.8 mm (1.25 inch)	68.2 mm (2.69 inch)	30.2 mm (1.19 inch)

Note: Length (8) is the distance between punch marks (7).

Replace shovel crane hook for any of the following reasons:

- · Deep scratches, tears, or welded parts
- Corrosion or rust that cannot be removed with a grinder
- · Hook swivel does not rotate smoothly
- Tip of the hook is bent to either side
- Hook has excessive movement in the swivel
- Hook exceeds the specification thresholds found in the disposal reference chart.

Inspect the Shovel Crane Hook Latch



Illustration 872

g06191466

- (C) Open
- (D) Closed
- (E) Operating range

Inspect the latch to ensure that the latch moves smoothly in operating range (E).



Illustration 873 g06191481

Inspect the latch for excessive play (F). Ensure that the spring is not broken and the latch does not rattle.



Illustration 874 g06191492

Inspect the latch to ensure that the latch closes completely and there is no gap between the latch and the hook. The latch should rest firmly on the tip of the hook.

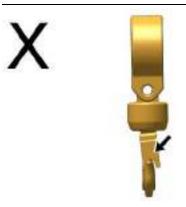


Illustration 875 g06191696

Inspect the latch to ensure that the latch is not bent or deformed. The latch should be centered on the tip of the hook.

Replace shovel crane latch for any of the following reasons:

- Latch does not move smoothly within the operating range
- · Latch has excessive movement or rattles
- · Latch does not fully close
- · Latch is bent or deformed

i06995214

Shovel Crane - Lubricate (If Equipped)

SMCS Code: 6500

S/N: HEX1-Up

Note: Caterpillar recommends the use of 5% molybdenum grease for lubricating the shovel crane linkage. Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for more information on molybdenum grease.

Wipe all fittings before you apply lubricant.

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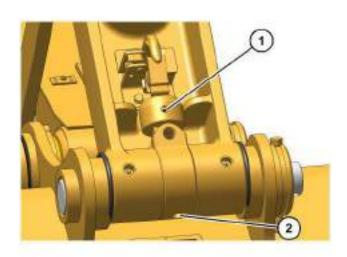


Illustration 876 g06191976

1. Apply lubricant through fittings (1) and (2). Continue to fill with grease until the grease is visible.

Note: Service the above fittings after you operate the shovel crane under water.

2. Check the hook for cracks and deformities. Replace the hook if necessary.

Note: Refer to this Operation and Maintenance Manual, "Shovel Crane - Inspect"

i06987212

Swing Bearing - Lubricate

SMCS Code: 7063-086

Note: Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for more information on grease.

Note: Do not overgrease the swing bearings. Do not grease more than the recommended maintenance interval. Refer to Operation and Maintenance Manual, "Maintenance Interval Schedule" for more information.

Wipe the fittings before you lubricate the swing bearing.

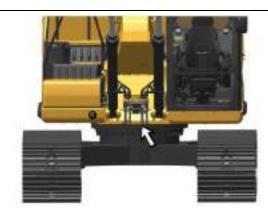


Illustration 877

g06210366

The swing bearing grease zerks are located at the front of the swing drive housing near the boom cylinders.



Illustration 878

g06188212

Apply lubricant through the fittings until the lubricant overflows the bearing seals.

i07349198

Swing Drive Oil - Change

SMCS Code: 5459-044



Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.



Illustration 879 g06188541

1. Remove the access cover that is located below the swing drives.

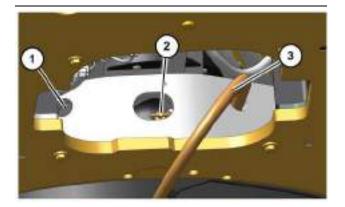


Illustration 880 g06192018

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information that pertains to Containing Fluid Spillage.

- 2. Remove drain hose (3) from holder (1) on the upper frame. Face the end of the hose toward the container.
- **3.** Loosen drain valve (2). Drain the oil into a suitable container.

Note: Drained fluids should always be disposed of according to local regulations.

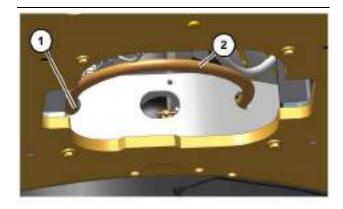


Illustration 881 g06192024

4. Tighten the drain valve. Return the drain hose to holder (1). Make sure that the end of the hose is facing upward.

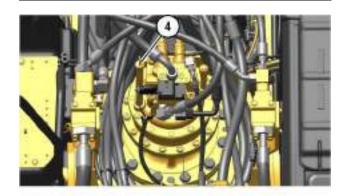


Illustration 882 g06188581

- 5. Remove dipstick (4).
- **6.** Add the specified quantity of oil through the dipstick tube. See Operation and Maintenance, "Capacities (Refill)".

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- 7. Maintain the oil level between the "ADD" and "FULL" marks on the dipstick.
- **8.** Check the oil that has been drained for metal chips or metal particles. Consult your Cat dealer if any metal chips or metal particles are found.
- Drained materials should always be disposed of according to local regulations.

i06988089

Swing Drive Oil Level - Check

SMCS Code: 5459-535-FLV

A WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.



Illustration 884 q06188672

The dipstick for the swing drive oil is on the swing drive at the rear base of the boom.

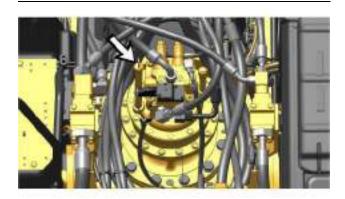


Illustration 885 g06188677

1. Remove the dipstick.



Illustration 886 g06188660

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information that pertains to Containing Fluid Spillage.

- 2. Check the dipstick. Maintain the oil level between the "ADD" and "FULL" marks on the dipstick. Add oil through the dipstick tube, if necessary. Refer to Operation and Maintenance Manual, "Lubricant Viscosities" when you select an oil. If the oil level is above the "FULL" line, then remove oil from the system. Restore the oil to the correct level position.
- 3. Insert the dipstick.

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Swing Drive Oil Sample - Obtain

i06988143

Swing Drive Oil Sample -Obtain

SMCS Code: 5459-554-OC; 5459-008; 5459-008-OC; 5459-OC; 7542-008

WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.



Illustration 887 g06188677

Obtain an oil sample of the swing drive oil through the opening for the dipstick. Refer to Special Publication, SEBU6250, "S·O·S Oil Analysis" for information that pertains to obtaining an oil sample from the swing drive housing. Refer to Special Publication, PEGJ0047, "How To Take A Good Oil Sample" for more information about obtaining an oil sample from the swing drive housing.

i06988169

Swing Gear - Lubricate

SMCS Code: 7063-086

Note: Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for more information on grease.

NOTICE

Improper lubrication can cause damage to machine components.

To avoid damage, make sure that the proper amount of grease is applied to the swing drive.

When the amount of grease in the compartment becomes too large, the agitation loss becomes large, thereby accelerating grease deterioration.

Grease deterioration can cause damage to the pinion gear of the swing drive and swing internal gear.

Not enough grease will result in poor gear lubrication.

Remove the inspection cover that is located near the boom base. Inspect the grease.

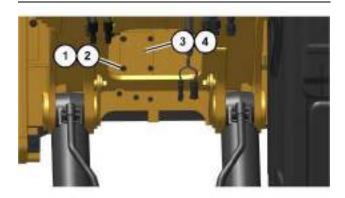


Illustration 888

g06188728

- (1) Bolts
- (2) Washers
- (3) Cover
- (4) Gasket
- 1. Remove bolts (1) and washers (2). Remove cover (3) and gasket (4).
- 2. Inspect gasket (4). Replace the gasket if damage is evident.

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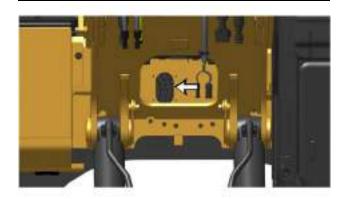


Illustration 889 g06188736

- 3. Check the level of grease. The level of grease is correct when:
 - Waves of grease are present from the rotating swing drive pinion.
 - The grease is evenly distributed on the floor of the pan.

Note: Smeared or waveless areas are evidence for a lack of grease.

Note: Add grease, as needed. Remove grease, as needed. Too much grease will result in the deterioration of the grease because of excessive movement of the grease. Too little grease will result in poor lubrication of the swing gear.

Refer to Operation and Maintenance Manual, "Capacities (Refill)" for the size of the pan.

Check for contamination and for discolored grease.

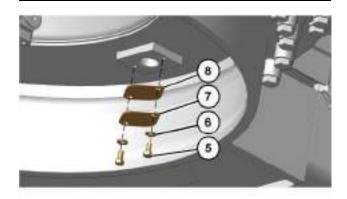


Illustration 890

g06188788

- (5) Bolts
- (6) Washers
- (7) Cover
- (8) Gasket

- 5. If the grease is contaminated or discolored with water, change the grease. Remove the covers from below the swing drive underneath the undercarriage frame.
- **6.** Remove bolts (5), washers (6), cover (7), and gasket (8) to allow the water to drain. When you reinstall cover (7), inspect gasket (8). Replace the gasket if damage is evident.



Illustration 891 g06188791

- **7.** Raise the boom and turn the upper structure by 1/4 turn. Lower the bucket to the ground.
- **8.** Repeat Step 7 at every 1/4 turn in four places. Add grease, as needed.
- **9.** Install gasket (4), cover (3), washers (2), and bolts (1).

i06988628

Track Adjustment - Adjust

SMCS Code: 4170-025

MARNING

Personal injury or death can result from grease under pressure.

Grease coming out of the relief valve under pressure can penetrate the body causing injury or death.

Do not watch the relief valve to see if grease is escaping. Watch the track or track adjustment cylinder to see if the track is being loosened.

Loosen the relief valve one turn only.

If track does not loosen, close the relief valve and contact your Caterpillar dealer.

NOTICE

Keeping the track properly adjusted will increase the service life of the track and drive components.

Note: The track tension must be adjusted according to the current operating conditions. Keep the track as slack as possible if the soil is heavy.

Measuring Track Tension

1. Operate the machine in the direction of the idlers.

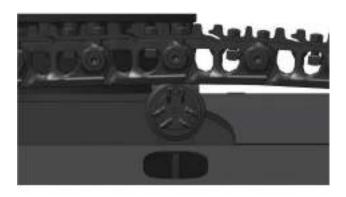


Illustration 892 g06188816

Stop with one track pin directly over the front carrier roller. Park the machine and turn off the engine.



Illustration 893 g06208711

3. Place a straight edge on top of the track grousers between the front carrier roller and the idler. The straight edge should be long enough to reach from the front carrier roller to the idler.

Note: If your machine is equipped with three carrier rollers, place a straight edge on the tracks between the carrier rollers. The straight edge should be long enough to reach from one carrier roller to another carrier roller.

4. Measure the maximum amount of sag in the track. The sag is measured from the highest point of the track grouser to the bottom of the straight edge. A track that is properly adjusted will have a sag of 40.0 to 55.0 mm (1.57 to 2.17 inch). **5.** If the track is too tight, or if the track is too loose, adjust the track tension according to the appropriate procedure below.

Adjusting Track Tension



Illustration 894

g06188820

Typical example

The track adjuster is located on the track frame.

Tightening the Track

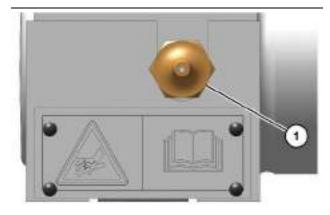


Illustration 895

g06188830

(1) Grease valve

Wipe the fitting before you add grease.

- **1.** Add grease through grease valve (1) until the correct track tension is reached.
- **2.** Operate the machine back and forth in order to equalize the pressure.
- **3.** Check the amount of sag. Adjust the track, as needed.

Loosening the Track

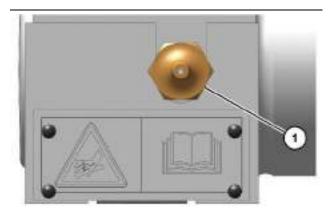


Illustration 896

g06188830

(1) Grease valve

- Loosen grease valve (1) carefully until the track begins to loosen. One turn should be the maximum.
- 2. Tighten grease valve (1) to 34 ± 5 N·m (25 ± 4 lb ft) when the desired track tension is reached.
- **3.** Operate the machine back and forth in order to equalize the pressure.
- Check the amount of sag. Adjust the track, as needed.

i06969791

Track Adjustment - Inspect

SMCS Code: 4170-040



Illustration 897

g06182929

Check the track adjustment. Check the track for wear and for excessive dirt buildup.

If the track appears to be too tight or too loose, refer to Operation and Maintenance Manual, "Track Adjustment - Adjust".

Travel Alarm - Test (If Equipped)

SMCS Code: 7429-081

Move the machine to test the travel alarm.

- **1.** Start the engine. Move the hydraulic lockout control to the UNLOCKED position.
- **2.** Raise the work tool to avoid any obstacles. Make sure that there is adequate overhead clearance.



Illustration 898 g06181402

- Use the travel levers or the travel pedals to move the machine forward. The travel alarm should sound.
- **4.** Release the travel levers and the travel pedals to stop the machine.
- Use the travel levers and the travel pedals to move the machine backward. The travel alarm should sound.



Illustration 899 g06181631

- **6.** Press the alarm mute button. The travel alarm should shut off.
- **7.** Stop the machine. Lower the work tool to the ground. Move the hydraulic lockout control to the LOCKED position. Stop the engine.

Undercarriage - Check

SMCS Code: 4150-535

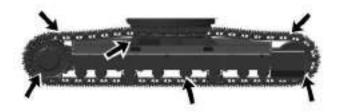


Illustration 900 g06182923

- **1.** Check the carrier rollers, the track rollers, and the idler wheels for possible leakage.
- Check the surface of the track, the carrier rollers, the track rollers, the idler wheels, the track shoes, and the drive sprockets. Look for signs of wear and loose mounting bolts.
- **3.** Listen for any abnormal noises while you are moving slowly in an open area.
- **4.** If required, clean the undercarriage to keep excess material from building up and solidifying.
- **5.** If abnormal wear exists or abnormal noises or leaks are found, consult your Cat [®] dealer.

i06954326

Window Washer Reservoir - Fill

SMCS Code: 7306-544-KE

NOTICE

When operating in freezing temperatures, use Caterpillar or any commercially available nonfreezing window washer solvent.



Illustration 901 g06181546

 Open the access door on the left side of the machine.



Illustration 902 g06181644

- 2. Remove the filler cap.
- **3.** Fill the window washer reservoir with washer fluid through the filler opening.
- 4. Install the filler cap.
- 5. Close the access door.

i01258249

Window Wiper - Inspect/ Replace

SMCS Code: 7305-040; 7305-510

Inspect the condition of the wiper blades. Replace the wiper blades if the wiper blades are worn or damaged or if streaking occurs.

Windows - Clean

SMCS Code: 7310-070; 7340-070

Clean the outside of the windows from the ground, unless handholds are available.



Illustration 903
Typical example

g06224268

Cleaning Methods

Aircraft Window Cleaner

Apply the cleaner with a soft cloth. Rub the window with moderate pressure until all the dirt is removed. Allow the cleaner to dry. Wipe off the cleaner with a clean soft cloth.

Soap and Water

Use a clean sponge or a soft cloth. Wash the windows with a mild soap or with a mild detergent. Also use plenty of lukewarm water. Rinse the windows thoroughly. Dry the windows with a moist chamois or with a moist cellulose sponge.

Stubborn Dirt and Grease

Wash the windows with a good grade of naphtha, of isopropyl alcohol, or of Butyl Cellosolve. Then, wash the windows with soap and with water.

Polycarbonate Windows (If equipped)

Special care is needed to clean polycarbonate windows.

Wash polycarbonate windows with mild soap and warm water that does not exceed 50° C (122° F). Use a soft sponge, or damp cloth. Never use a dry cloth or paper towels on polycarbonate windows. Rinse the windows with a sufficient amount of clean cold water.

Note: Naphtha or kerosene can be used to remove labels, films, paint, or marking pen from polycarbonate windows.

Note: Do not use abrasive, or highly alkaline cleaners. Do not use sharp instruments, such as squeegees or razor blades on polycarbonate windows. Do not clean polycarbonate windows in the hot sun or at elevated temperatures.

Warranty Section

Warranty Information

i06044323

Emissions Warranty Information

SMCS Code: 1000

The certifying engine manufacturer warrants to the ultimate purchaser and each subsequent purchaser that:

- 1. New non-road diesel engines and stationary diesel engines less than 10 liters per cylinder (including Tier 1 and Tier 2 marine engines < 37 kW, but excluding locomotive and other marine engines) operated and serviced in the United States and Canada, including all parts of their emission control systems ("emission related components"), are:
 - Designed, built, and equipped so as to conform, at the time of sale, with applicable emission standards prescribed by the United States Environmental Protection Agency (EPA) by way of regulation.
 - b. Free from defects in materials and workmanship in emission-related components that can cause the engine to fail to conform to applicable emission standards for the warranty period.
- 2. New non-road diesel engines (including Tier 1 and Tier 2 marine propulsion engines < 37 kW and Tier 1 through Tier 4 marine auxiliary engines < 37 kW, but excluding locomotive and other marine engines) operated and serviced in the state of California, including all parts of their emission control systems ("emission related components"), are:
 - Designed, built, and equipped so as to conform, at the time of sale, to all applicable regulations adopted by the California Air Resources Board (ARB).
 - b. Free from defects in materials and workmanship which cause the failure of an emission-related component to be identical in all material respects to the component as described in the engine manufacturer's application for certification for the warranty period.

- 3. New non-road diesel engines installed in construction machines conforming to the South Korean regulations for construction machines manufactured after January 1, 2015, and operated and serviced in South Korea, including all parts of their emission control systems ("emission related components"), are:
 - a. Designed, built, and equipped so as to conform, at the time of sale, with applicable emission standards prescribed in the Enforcement Rule of the Clean Air Conservation Act promulgated by South Korea MOE.
 - Free from defects in materials and workmanship in emission-related components that can cause the engine to fail to conform to applicable emission standards for the warranty period.

The aftertreatment system can be expected to function properly for the lifetime of the engine (emissions durability period) subject to prescribed maintenance requirements being followed.

A detailed explanation of the Emission Control Warranty that is applicable to new non-road and stationary diesel engines, including the components covered and the warranty period, is found in a supplemental Special Publication. Consult your authorized Cat dealer to determine if your engine is subject to an Emission Control Warranty and to obtain a copy of the applicable Special Publication.

Reference Information Section

Reference Materials

i07422648

Reference Material

SMCS Code: 1000; 7000

Additional literature regarding your product may be purchased from your local Cat dealer or by visiting publications.cat.com. Use the product name, sales model, and serial number to obtain the correct information for your product.

publications.cat.com

i07743978

Decommissioning and Disposal

SMCS Code: 1000; 7000

When the product is removed from service, local regulations for the product decommissioning will vary. Disposal of the product will vary with local regulations.

Improperly disposing of waste can threaten the environment. Obey all local regulations for the decommissioning and disposal of materials.

Utilize appropriate personal protective equipment when decommissioning and disposing product.

Consult the nearest Cat dealer for additional information. Including information for component remanufacturing and recycling options.

M0068104-12

521 Index Section

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Product and Dealer Information

Delivery Date: _____

Note: For product identification plate locations, see the section "Product Identification Information" in the Operation and Maintenance Manual.

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Produc	Product Information				
Model:					
Product Ide	ntification Number:				
Engine Seri	al Number:				
Transmissio	on Serial Number:				
Generator S	Serial Number:				
Attachment	Serial Numbers:				
Attachment	Information:				
Customer E	quipment Number:				
Dealer Equ	pment Number:				
Dealer	Information				
Name:		Branch:			
Address:					
	Dealer Contact	Phone Number	<u>Hours</u>		
Sales: -					
Parts: -					
Service: -					

