



Operation and Maintenance Manual

906M, 907M, 908M Compact Wheel Loader

K56 1-UP (906M) K57 1-UP (907M) K58 1-UP (908M)

GAT

Language: Original instructions

PUBLICATIONS.CAT.COM

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.

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

Failure to follow this warning may lead to premature failures, product damage, personal injury or death.

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

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:

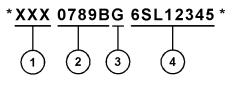


Illustration 1

g03891925

Where:

1. World Manufacturing Code (characters 1-3)

- 2. Machine Descriptor (characters 4-8)
- 3. 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 format.

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

i05943158

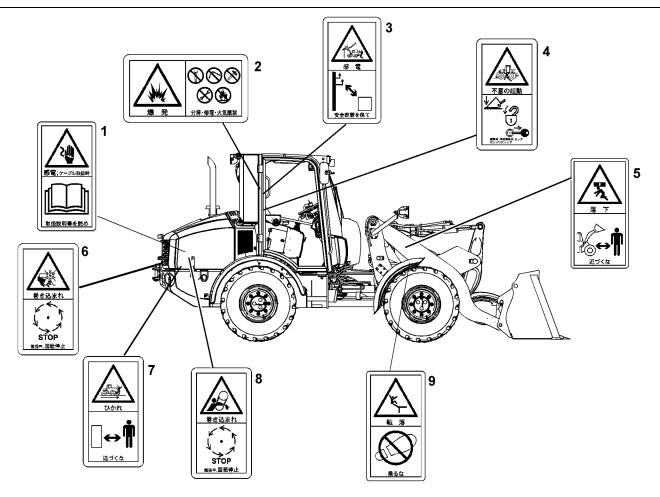
Safety Messages (Only Japanese market)

SMCS Code: 7000

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.

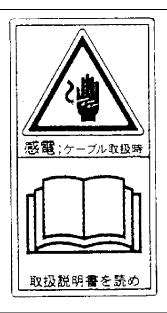
Make sure that all of the safety messages are legible. Clean the safety messages or replace the safety messages if you cannot read the words. Replace the illustrations if the illustrations are not legible. When you clean the safety messages, use a cloth, water, and soap. Do not use solvent, gasoline,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



Jump Start Cables (1)

This warning is located near the batteries.



g03369796

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.

Explosion Hazard (2)

This safety message is located on the left ROPS post.



Illustration 4

g03229317

A WARNING

Personal injury can result from improper troubleshooting and repair procedures.

The following troubleshooting and repair procedures should only be performed by qualified personnel familiar with this equipment.

Electrical Power Lines (3)

This safety message is located on the left ROPS post.

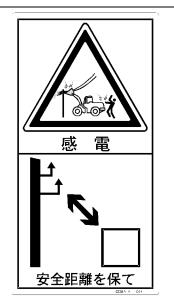


Illustration 5

g03094560

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

Crushing Hazard (4)

This safety message is located on the left ROPS post.

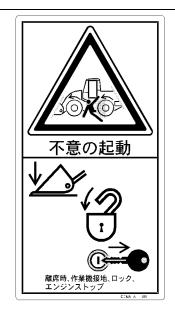


Illustration 6

g03094541

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.

Crushing Hazard (5)

This safety message is located on both sides of the lift arm.



Illustration 7

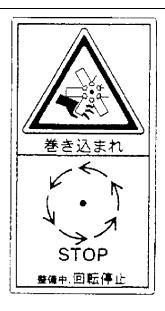
g03094656

WARNING

Stay clear of the work tool during operation. Entanglement could result in personal injury or death.

Rotating Fan (6)

This safety message is located at the rear of the machine.



g03369790

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.

Crash Hazard (7)

This safety message is located on both sides of the counterweight.



Illustration 9

g03094657

Stay back a safe distance. No clearance for a person in this area when the machine turns. Severe injury or death from crushing could occur.

Cutting Hazard (8)

This safety message is located at the rear of the machine.



g02061677

🏠 WARNING

Cutting Hazard! Keep hands clear of fan while engine is running. May cause serious injury or death.

Falling Hazard (9)

This safety message is located near the front wheels.

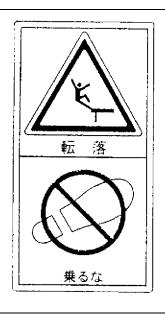


Illustration 11

g03369781

🏠 WARNING

Do not use this surface as a step or platform. This surface may not support additional weight or may be slippery. Serious injury or death could occur from a fall.

i07334467

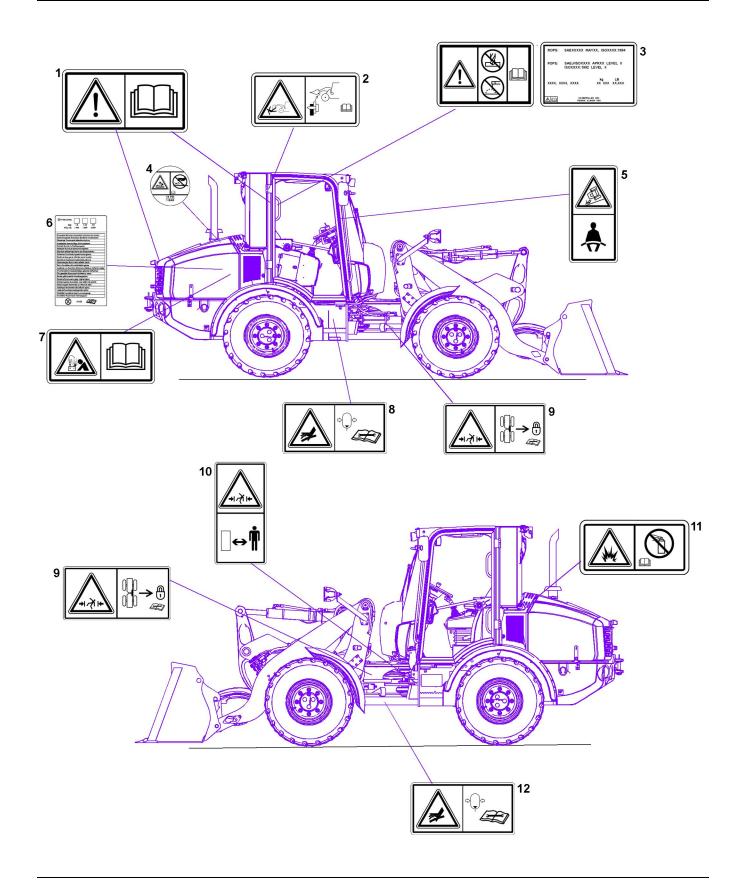
Safety Messages

SMCS Code: 7000

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 legible. 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 messages. Loose adhesive will allow the safety messages 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 Caterpillar dealer can provide new safety messages.



Do Not Operate (1)

This warning is located inside the cab on the right side pillar and in the engine compartment on the rear of the engine.

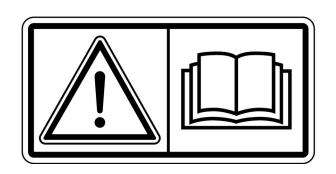


Illustration 13

g01370904



Do not operate or work on this machine or work tool unless you have read and understand the instructions and warnings in the Operation and Maintenance Manuals and Owner's Manuals. 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.

Work Tool Coupler (2)

This warning is located inside the cab on the right side pillar.

g06288246

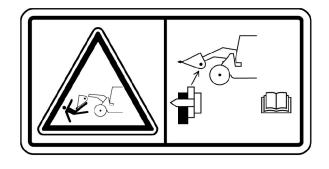


Illustration 14

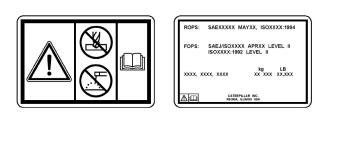
g01377715

🏠 WARNING

Do not operate machine without confirmation that coupler pins are fully engaged. Make certain all hydraulic connections are tight (if equipped). Use only Caterpillar approved work tools. Improper attachment of work tool could result in injury or death.

Rollover Protective Structure (3)

This warning is located inside the cab on the left side pillar.



g01212098

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.

Pressurized System (4)

This warning is on the right side inside the engine compartment above the expansion tank.



Illustration 16

g01370913

🏠 WARNING

The coolant is hot and the coolant is under pressure. Do not touch the hot surfaces. Refer to the Operation and Maintenance Manual for the procedure to follow when you check the radiator.

Seat Belt (5)

This safety message is located inside the cab on the front right side pillar.



Illustration 17

g01371636

🏠 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. Refer to Operation and Maintenance Manual, "Seat Belt" for more information.

Air Condition Refrigerant (6)

ÇER134a (1430)				
(kg)	1.0	1.15	1.8	
CO,e (1)	1.430	1.500	2.288	
00,20 (4			2.200	
·				
Ълържа флуорс Xontione gases fit				
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ndeholder fluorho Inthält fluorierie T			01F	
issideb fluoritud				
ICPICICEI OBODIOUX				
Contains fluorinat				
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Contiene gas Buor				
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adátyje yra fluori				uấuh xið
luortertalmú üve				
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ontém gasas fluc				
Contine gaze fluor				
beehvie fluórova	né sklenil	cové plym	¥	
sabuje fiuorirana				
tealtas fluoratiuja	kaaviha	onekana	(#	
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Illustration 18

g06288250

If equipped, this message is located inside the engine compartment on the right side of machine.

Do not service the air conditioner system unless you are following the correct maintenance/repair procedures specified in the Service Manual.

R134a is a fluorinated greenhouse gases with a Global Warming Potential of 1430. "CO2e" means the CO2 equivalent. This product contains R134a. The amount of R134a and the CO2e for this product is indicated by the tick box. The 906M, 906K, 907M. 907K, 908M, 908K system contains 1.15kg of refrigerant and 1.600 metric tonne of CO2e.

Starting with Jump Start Cables (7)

This warning is on the right side of the engine compartment near the negative battery terminal.

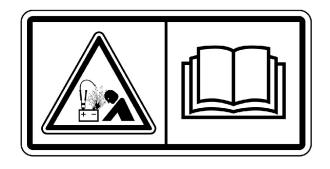


Illustration 19

g01370909

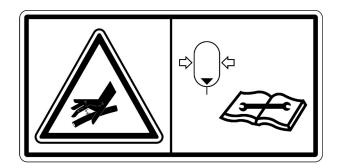
🏠 WARNING

Improper jumper cable connections can cause explosion resulting in personal injury.

When using jumper cables, always connect positive (+) cable, from external source, to positive (+) terminal of battery and negative (-) cable, from external source, to engine block or frame.

High Pressure Accumulator (8)

This safety message is on the accumulator on the right side of the machine.



g01370912

Hydraulic accumulator contains gas and oil under high pressure. Improper removal or repair procedures could cause severe injury. To remove or repair, instructions in the service manual must be followed. Special equipment is required for testing and charging.

No Clearance (9)

This warning is on both sides of the articulation joint on the front frame.

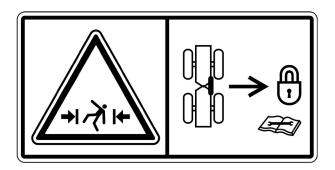


Illustration 21

g01371647

🏠 WARNING

Crushing Hazard. There is no clearance for a person in this area when the machine turns. Severe injury or death from crushing could occur. Connect the steering frame lock between front and rear frames before lifting, transporting, or servicing the machine in the articulation area.

Disconnect the steering lock and secure before resuming operation.

No Clearance (10)

This warning is on both sides of the articulation joint on the rear frame.

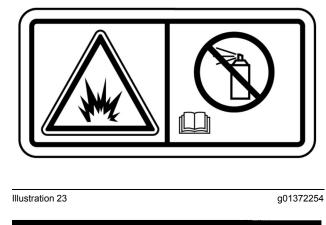


g01377717

No clearance for person in this area when machine turns. Severe injury or death from crushing could occur.

Ether (11)

This warning is on the air intake precleaner.

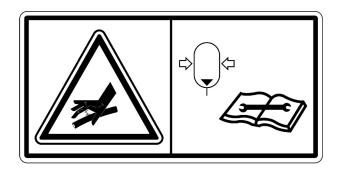


A WARNING

Do not use aerosol types of starting aids such as ether. Such use could result in an explosion and personal injury.

High Pressure Accumulator (12)

This safety message is on the accumulator if the machine is equipped with the option for ride control.



g01370912

Hydraulic accumulator contains gas and oil under high pressure. Improper removal or repair procedures could cause severe injury. To remove or repair, instructions in the service manual must be followed. Special equipment is required for testing and charging.

i06078624

Additional Messages

SMCS Code: 7000

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

Make sure that all of the messages are legible. Clean the messages or replace the messages if you cannot read the words.

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 the illustrations if the illustrations are not legible. 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.

Consult your Caterpillar dealer for replacement of messages.

Starting Aid

This message is located in the cab on the right side pillar.

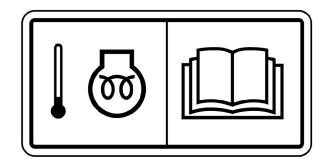


Illustration 25

g01377721

Reference: For the proper usage of the starting aid, refer to Operation and Maintenance Manual, "Engine Starting".

i07339989

Additional Messages (Only Japanese Market)

SMCS Code: 7000

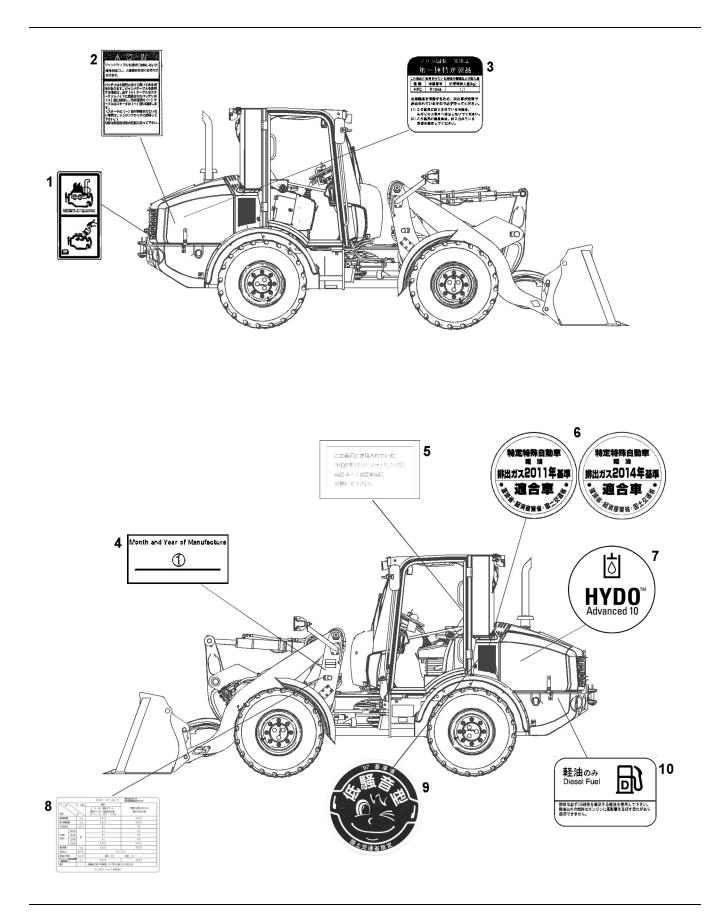
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Clean Engine (1)



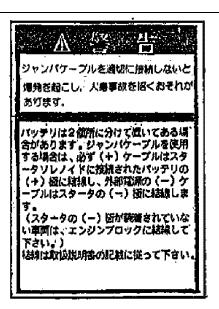
Illustration 27

g03146323

Jump-Start Cables (2)

This message is located near battery.

g06240256



g03671174

Recycle HFC Refrigerant (3)

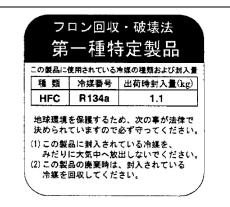


Illustration 29

g03351365

Manufacture Date (4)

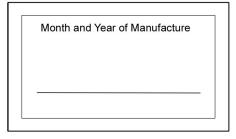


Illustration 30

g03094703

This plate is attached on the left side of the loader arms.

High-Pressure Steering Hose (5)

この車両に使用されている 全油圧形パワーステアリング用 高圧ホースは2年毎に

交換して下さい。

Illustration 31

g03146324

Emissions (6)



Illustration 32

g03862230



Illustration 33

g06240257

The two Emissions Certificates (6) are dependent on the age of the machine. The correct certification decal will be affixed to the left side of the machine as indicated.

Hydraulic Oil (7)



Illustration 34

g02096113

This film is located near the hydraulic tank.

OSHA Plate (8)

This film is on the left side of the loader frame.

			900X ホイールロータ"	労働安全農生活第42条 車両所備設備構造現48に基づく表示	
			標準 X、X m ³ 標準パケット 標準キャブ付 標準牽引仕様 OO/xx-ムム、コPR タイヤtt	労働安全衛生法による 最も不利な仕様	
機械編質量		kg	XXXX	XXXX	
最大積載質	量	kg	XXXX	XXXX	
平均接地田		kPa	ХХ	ХХ	
安定度 (静的)	前方向		ХХ	ΧХ	
	後方向	度	ХХ	ХХ	
	左方向	R	ХХ	ХX	
	右方向		XXXX	XXXX	
機体質量		kg	XXXX	XXXX	
定格出力		kW(PS)			
最高走行速度 km/h		km/h	前進 XX	後進 XX	
アタッチメント装着可能質量 (機能質量含む) kg X1		XXXX	XXXX		
備者 -		-	記載値は仕様(作業装置、キャブ等)の違いにより変化する		
			キャタビラージャパン合同会社		

Illustration 35 OSHA Plate g06177924

Low Sound Certification (9)



Illustration 36

g03316436

This message is on the left side of the machine.

Diesel Fuel (10)

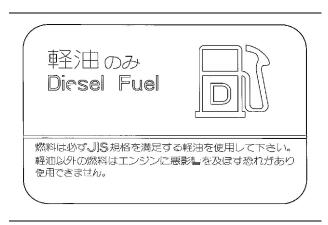


Illustration 37

g03146321

i07500894

General Hazard Information

SMCS Code: 7000

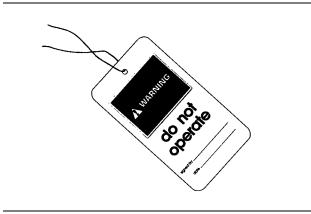


Illustration 38 Typical example g00104545

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.

🚯 WARNING

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 in order 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.

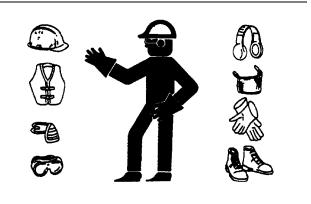


Illustration 39

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.

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.

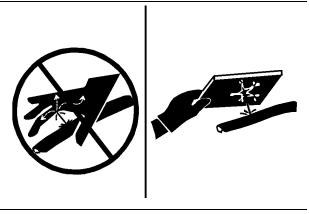
Trapped Pressure

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.



q00687600

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

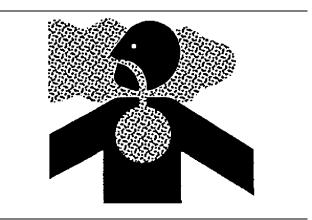


Illustration 41

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

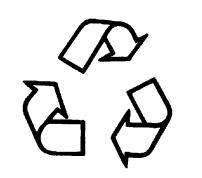


Illustration 42

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.

i04760300

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 in order 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

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 in order 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

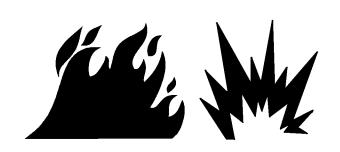


Illustration 43

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 44

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 compartment of the machine.

Battery and Battery Cables



Illustration 45

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 torgue.

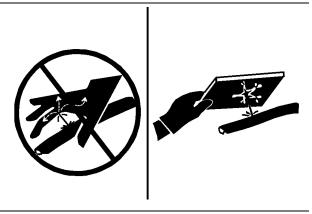


Illustration 46

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".

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

i07041871

Fire Safety

SMCS Code: 1000; 6700; 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.

i07340010

Fire Extinguisher Location

SMCS Code: 7000

Make sure that a fire extinguisher is on the machine. Make sure that you are familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher. Obey the recommendations on the instruction plate.

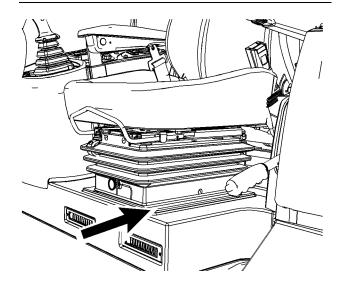


Illustration 47

g06008409

Mount the fire extinguisher on the platform at the lefthand side of the seat. This is the recommended location for mounting the fire extinguisher.

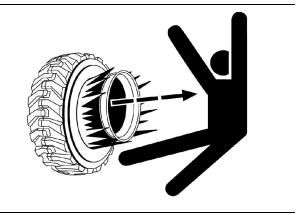
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Tire Information

SMCS Code: 7000

Explosions of air inflated tires have resulted from heat-induced gas combustion inside the tires. Explosions can be caused by heat that is generated by welding, by heating rim components, by external fire, or by excessive use of brakes.

A tire explosion is much more violent than a blowout. The explosion can propel the tire, the rim components, and the axle components from the machine. Stay out of the trajectory path. Both the force of the explosion and the flying debris can cause property damage, personal injury, or death.



g02166933

Typical example of tire is shown

Do not approach a hot or an apparently damaged tire.

Caterpillar recommends against using water or calcium as a ballast for the tires except in machines designed for this additional mass. For those applicable machines, the maintenance section will contain instructions on the correct tire inflation and filling procedures. Ballast, such as fluid in the tires, increases overall machine weight and may affect braking, steering, power train components, or the certification of the protective structure such as the ROPS. The use of tire/rim rust preventatives or other liquid additives is not required.

🏠 WARNING

Proper nitrogen inflation equipment, and training in using the equipment, are necessary to avoid over inflation. A tire blowout or rim failure can result from improper or misused equipment and personal injury or death can occur.

A tire blowout and/or rim failure can occur if the inflation equipment is not used correctly, due to the fact that a fully charged nitrogen cylinder's pressure is approximately 15000 kPa (2200 psi).

Dry nitrogen gas is recommended for inflation of tires. If the tires were originally inflated with air, nitrogen is still preferred for adjusting the pressure. Nitrogen mixes properly with air.

Nitrogen inflated tires reduce the potential of a tire explosion because nitrogen does not aid combustion. Nitrogen helps to prevent oxidation of the rubber, deterioration of rubber, and corrosion of rim components.

To avoid overinflation, proper nitrogen inflation equipment and training in the usage of the equipment are necessary. A tire blowout or a rim failure can result from improper equipment or from misused equipment. When you inflate a tire, stand behind the tread and use a self-attaching chuck.

Servicing tires and rims can be dangerous. Only trained personnel that use proper tools and proper procedures should perform this maintenance. If correct procedures are not used for servicing tires and rims, the assemblies could burst with explosive force. This explosive force can cause serious personal injury or death. Carefully obey the specific instructions from your tire dealer.

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.

i01395776

Before Starting Engine

SMCS Code: 1000; 7000

Make sure that the steering frame lock link is in the stored position. Refer to Operation and Maintenance Manual, "Steering Frame Lock" for the proper procedure. The steering frame lock link must be in the stored position in order to steer the machine.

Start the engine only from the operator's compartment. Never short across the starter terminals or across the batteries. Shorting could bypass the engine neutral start system. Shorting could also damage the electrical system.

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

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

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

Make sure that there are no personnel in the area before you start the engine. Make sure that there are no personnel in the area before you move the machine. Make sure that there are no personnel on the machine, underneath the machine, or around the machine.

i04862936

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.

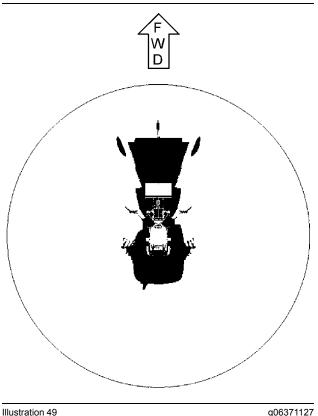
i07587714

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. Illustration 49 provides an approximate visual indication of areas of significant restricted visibility. Illustration 49 indicates restricted visibility areas at ground level inside a radius of 12 m (40 ft) from the operator. The restricted visibility area is without the use of optional visual aids. This illustration does not provide areas of restricted visibility for distances outside a radius of 12 m (40 ft).

This machine may be equipped with optional visual aids that may provide visibility to some of the restricted visibility areas. Refer to this Operation and Maintenance Manual, "Mirror" for more information on additional visibility. If your machine is equipped with cameras, refer to this Operation and Maintenance Manual, "Rear View Camera" for more information on additional visibility. For areas that are not covered by the optional visual aids, the 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".



Top view of the machine

g06371127

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

i00744324

Engine Starting

SMCS Code: 1000; 7000

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

Move all hydraulic controls to the HOLD position before you start the engine.

Move the direction control switch to the NEUTRAL position.

Engage the parking brake.

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

Before Operation

SMCS Code: 7000

Clear all personnel from the machine and from the area.

Clear all obstacles from the path of the machine. Beware of hazards such as wires, ditches, etc.

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

For the best vision of the area that is close to the machine, adjust the rear view mirrors (if equipped).

Make sure that the machine horn, the backup alarm (if equipped) and all other warning devices are working properly.

Fasten the seat belt securely.

i07443772

Operation

SMCS Code: 7000

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

While you operate the machine slowly in an open area, check for proper operation of all controls and all protective devices.

Before you move the machine, make sure that no one will be endangered.

Do not allow riders on the machine unless the machine has an additional seat with a seat belt. The rider must be seated and the seat belt must be fastened.

Never use the work tool for a work platform.

Note any needed repairs during machine operation. Report any needed repairs.

Carry work tools at approximately 40 cm (15 inches) above ground level.

Do not go close to the edge of a cliff, an excavation, or an overhang.

Avoid operating the machine across the slope. When possible, operate the machine up the slopes and down the slopes. If the machine begins to sideslip on a downgrade, immediately remove the load and turn the machine downhill.

i01380191

Avoid any conditions that can lead to tipping the machine. The machine can tip when you work on hills, on banks and on slopes. Also, the machine can tip when you cross ditches, ridges, or other unexpected obstructions.

Maintain control of the machine. Do not overload the machine beyond the machine capacity.

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

Know the maximum dimensions of your machine.

Always keep the Rollover Protective Structure (ROPS) installed during machine operation.

Fueling Machine

Ultra Low Sulfur Diesel (ULSD) poses a greater static ignition hazard than earlier diesel formulations, with a higher Sulfur content, which may result in a fire or explosion. Consult with your fuel or fuel system supplier for details on proper grounding and bonding practices.

\Lambda WARNING

To avoid possible injury or death, do not smoke while in an area that contains flammable liquids.

All fuels, most lubricants, and some coolants are flammable.

Keep all fuels and lubricants stored in properly marked containers and away from unauthorized persons.

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.

Store all oily rags or other flammable materials in a protective container in a safe place.

Remove all flammable materials such as fuel, oil, and other debris before they accumulate on the machine.

Do not expose the machine to flames, burning brush, etc., if at all possible.

Locate fuel fill on machine, and remove the fuel cap. When fueling the machine is complete, replace the fuel cap and lock into place. Fuel cap may be hot. To avoid injury, use personal protective equipment. Allow the cap to cool before fueling the machine.

Limiting Conditions and Criteria

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

The Safety Section of the Operation and Maintenance Manual 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 Maintenance Interval Schedule in the Operation and Maintenance Manual 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 Monitoring System (if equipped) described in the Operation Section of the Operation and Maintenance Manual provides information on limiting condition criteria, including a warning level that requires immediate shutdown of the machine.

i01889291

Engine Stopping

SMCS Code: 1000; 7000

Do not stop the engine immediately after the machine has been operated under load. This 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 for five minutes before shutdown. This allows hot areas of the engine to cool gradually.

For more information, refer to the following topics in the Operation Section of the Operation and Maintenance Manual:

- "Stopping the Engine"
- "Stopping the Engine if an Electrical Malfunction Occurs"

i05333750

High Pressure Fuel Lines

SMCS Code: 1000; 1252; 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.

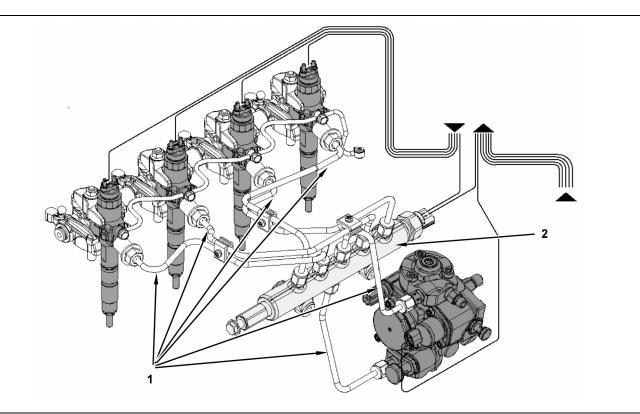


Illustration 50

(1) High-pressure line

(2

(2) High-pressure fuel manifold (rail)

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

- 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 5 minutes to pass in order to allow the pressure to be purged. Then, any service or repair may be 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.

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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, "Fuel injection lines -Remove and Fuel injection lines - Install".
- 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.

i04282529

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 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 Cat machines to maximize the value customers receive from Cat products. Caterpillar understands that special circumstances may lead a customer to use tools outside of the specifications. In these cases, customers must be aware that such choices can reduce vehicle performance. Warranty claims will be affected 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.

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

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.

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Parking

SMCS Code: 7000

Park the machine on a level surface. If you must park on a grade, chock the wheels with suitable chocks. Take into account the following:

- tire size
- · machine weight
- · ground conditions

Apply the service brake to stop the machine. Move the transmission control to the NEUTRAL position. Move the throttle control to the LOW IDLE position.

Engage the parking brake.

Lower all equipment to the ground. Activate any control locks.

Stop the engine.

Turn the engine start switch to the OFF position and remove the engine start switch key.

Ensure that the Left-Hand Steering Control (if equipped) is tilted up and out of the way before you exit the cab.

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. i07378239

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.

i01329161

Equipment Lowering with Engine Stopped

SMCS Code: 7000

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.

i07473917

Sound Information and Vibration Information

SMCS Code: 7000

Sound Level Information

The declared operator Equivalent Sound Pressure Level (Leq) is 75 dB (A) when "SAE J1166 FEB2014" is used to measure the value for an enclosed cab. This is a work cycle sound exposure level. The cab was properly installed and maintained. The test was conducted with the cab doors and the cab windows closed. The declared sound levels listed above include both measurement uncertainty and uncertainty due to production variation.

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.

The declared average exterior sound pressure level is 74 dB(A) when the "SAE J88 Jun2013 - Constant Speed Moving Test" procedure is used to measure the value for the standard machine. The measurement was conducted under the following conditions: distance of 15 m (49.2 ft) and "the machine moving forward in an intermediate gear ratio". The sound level may vary during diesel particulate filter regeneration.

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

The declared dynamic operator sound pressure level is 75 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 sound levels listed above include both measurement uncertainty and uncertainty due to production variation.

The exterior sound pressure level of the machine is noted on the film that is located under the cab door on the frame. Construction machines may not be modified in any manner that would cause an increase in noise level.

Sound Level Information for Machines in Eurasian Economic Union Counties

The declared dynamic operator sound pressure level is 75 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 74 dB (A) 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.

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

Vibration Data for Compact Wheel Loaders

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 m/s2.

Information Concerning Whole Body Vibration Level

This section provides vibration data and a method for estimating the vibration level for compact wheel loaders.

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 1 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 1												
"ISO Reference Table A	A - Equivalent vibration I	evels of wh	ole body vib	ration emiss	sion for eartl	nmoving eq	uipment."					
Machine Type Typical Operating Vibration Levels Scenario Factors												
мастте туре	Activity	X axis	Y axis	Z axis	X axis	Y axis	Z axis					
Compact Wheel Loader	load and carry motion	0.94	0.86	0.65	0.27	0.29	0.13					

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 Caterpillar suspension seat meets the criteria of "ISO 7096". This represents vertical vibration level under severe operating conditions. This seat is tested with the input "spectral class EM8". The seat has a transmissibility factor of "SEAT<0.8".

The whole body vibration level of the machine varies. There is a range of values. The low value is 0.5 m/s2. The machine meets the short-term level for the design of the seat in "ISO 7096". The value is 0.96 m/ s2 for this machine.

Guidelines for Reducing Vibration Levels on Earthmoving Equipment

Vibration levels are influenced by many different parameters, such as: operator training, operator behavior, operator mode and stress, job site organization, job site preparation, job site environment, job site weather, job site material, machine type, quality of the seat, quality of the suspension system, attachments, and conditions of the 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 manufacturer's 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.
 - a. 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.
- 7. Adjust the machine speed and the route to minimize the vibration level.
 - a. Drive around obstacles and rough terrain.
 - b. Slow down when it is 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 compact wheel loaders.
 - 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 in order 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.
- f. Minimize any shocks and impacts during sports and leisure activities.

Sources

The vibration information and calculation procedure is 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.

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

Use the following web site to find your local dealer:

Caterpillar, Inc. www.cat.com

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Operator Station

SMCS Code: 7000

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.

Product Information Section

General Information

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Specifications

SMCS Code: 7000

Intended Use

This machine is classified as a loader with wheels as described in ISO 6165:2001. This machine is attached with a front-mounted bucket or a work tool. Work tools are used for digging, loading, lifting, and carrying material such as earth, crushed rock, or gravel.

Specified Useful Life or Expected Life

The specified useful life, defined as total years of operation, or 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. Consult your Cat dealer for assistance in calculating overall owning and operating costs required to determine the machine's specified useful life or expected life. The following items are required to obtain an economical specified useful life or 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

Refer to "Specification Data" for the operating weight. The maximum approved vehicle weight is 7400 kg (16314 lb).

The maximum fore and aft slope for proper lubrication is 25°.

Specification Data

Basic machine specifications are listed below.

The specifications for the 906 Compact Wheel Loader that are listed in the table below are based on the following conditions:

- Equipped with a General Purpose Bucket and BOCE.
- · Equipped with an enclosed ROPS
- · Equipped with HPL ISO Coupler
- Equipped with 405/R70-18 tires
- Full fuel tank 42 kg (93 lb)
- 80 kg (176 lb) Operator
- 20 km/h (12 mph) transmission

Table 2

906 COMPACT V	VHEEL LOADER
Approximate Weight	5771 kg (12718 lb)
Maximum Length	5384 mm (17' 7")
Width Across Tires	1840 mm (6' 0")
Height to Top of ROPS	2924 mm (9" 7")

The specifications for the 907 Compact Wheel Loader that are listed in the table below are based on the following conditions:

- Equipped with a General Purpose Bucket including BOCE
- · Equipped with a standard ROPS
- Equipped with HPL ISO Coupler
- Equipped with 405/R70-18 tires
- Full fuel tank 63 kg (139 lb)
- 80 kg (176 lb) Operator

• 20 km/h (12 mph) transmission

Table 3

907 COMPACT V	WHEEL LOADER
Approximate Weight	5861 kg(12916 lb)
Maximum Length	5381 mm (17' 7")
Width Across Tires	1840 mm (6' 0")
Height to Top of ROPS	3047 (9' 11")

The specifications for the 908 Compact Wheel Loader that are listed in the table below are based on the following conditions:

- Equipped with a General Purpose Bucket including BOCE
- · Equipped with an enclosed ROPS
- Equipped with HPL ISO Coupler
- Equipped with 405/R70-20 tires
- Full fuel tank 63 kg (139 lb)
- 80 kg (176 lb) Operator
- 20 km/h (12 mph) transmission

Table 4

908 COMPACT V	VHEEL LOADER
Approximate Weight	6684 kg(14731 lb)
Maximum Length	5574 mm (18' 3")
Width Across Tires	1990 mm (6' 6")
Height to Top of ROPS	3137 mm (10' 3")

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Rated Load

SMCS Code: 6700

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.

Note: Rated loads should be used as a guide. Attachments, uneven ground conditions, soft ground conditions, or poor ground conditions have effects on rated loads. The operator is responsible for being aware of these effects.

Ratings for Compact Wheel Loaders

The rated loads in the following tables are based on a standard machine with the following conditions.

- Lubricants
- Full fuel tank
- Enclosed ROPS
- 80 kg (176 lb) Operator
- All buckets listed in tables are with BOCE.
- 906 & 907 with Dunlop SPT9EM 405/70 R18 tires.
- 908 with Dunlop SPT9EM 405/70 R20 tires.

Note: These tables are as a general guide and other size buckets are available with base edge or with Bolt on Teeth.

Rated loads will vary with different attachments. Contact your Cat dealer regarding the rated load for specific attachments.

The rated operating load for North America is defined by the SAE standard "J818" (May 1987) and by the ISO 14397-1 (2007) as 50 % of the full turn static tipping load. For European applications it is EN474-3:2006+A1:2009.

The corresponding dump clearance is given for each bucket at maximum lift height and at a 45 degree dump angle. The reach is given for each bucket at maximum lift height and at a 45 degree dump angle. Clearance is measured from the ground to the bucket edge to dump the load. The reach is measured from the front tire to the bucket edge.

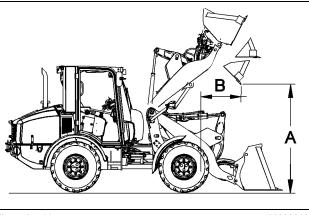


Illustration 51

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Rated Bucket Loads for 906K/ 906M, 907K/907M, and 908K/908M Compact Wheel Loaders

The following tables provide the rated operating loads for the standard machine configuration with a bucket.

Table 5

	906K/906M Horizontal Pin Coupler (ISO)														
Bucket Type	Bucket Part Number	Ground Engaging Tools	Rateo Volur	-	Buck Weig		Buck Width		Rateo Load	1	Dump Clear		Reac	h B	
			M³	уd³	kg	lb	mm	inc- h	kg	lb	mm	inc- h	mm	inc- h	
General Purpose	284-9281	BOCE	0.95	1.2	405	891	1880	74	1782	3921	2480	97	726	29	
Multi Purpose	337-8943	BOCE	0.80	1.00	621	1368	1880	74	1599	3524	2440	96	700	27	
Light Material	261 - 1391	BOCE	1.25	1.60	510	1122	2060	81	1707	3762	2402	94	806	31	

		9	06K/90	6M Ve	rtical F	Pin Cou	ıpler (S	SL Typ	e)					
Bucket Type	Bucket Part Number	Ground Engaging Tools	Rateo Volur	-	Buck Weig		Buck Width		Rateo Load	1	Dum Clear		Reac	h B
			M³	уd³	kg	lb	mm	inc- h	kg	lb	mm	inc- h	mm	inc- h
General Purpose	284-9279	BOCE	0.95	1.2	403	888	1880	74	1672	3684	2383	93	849	34
Multi Purpose	337-8941	BOCE	0.80	1.00	598	1316	1880	74	1662	3553	2440	96	813	32
Light Material	261-1385	BOCE	1.25	1.60	473	1043	2060	81	1598	3523	2307	90	931	36

			906K/9	06M Ho	orizon	al Pin	Couple	r (Atla	s)					
Bucket Type	Bucket Part Number	Ground Engaging Tools	Rateo Volur	-	Buck Weig		Buck Width		Rateo Load	ł	Dum Clear		Reac	h B
			M³	уd³	kg	lb	mm	inc- h	kg	lb	mm	inc- h	mm	inc- h
General Purpose	470-4541	BOCE	0.95	1.2	405	891	1880	74	1777	3916	2480	97	726	29
Multi Purpose	470-4543	BOCE	0.80	1.00	621	1368	1880	74	1592	3509	2441	96	694	27

Table 8

			907K/9	907M H	lorizor	ital Pin	Coupl	er (ISC))					
Bucket Type	Bucket Part Number	Ground Engaging Tools	Rateo Volur	-	Buck Weig		Buck Width		Rateo Load	ł	Dump Clear		Reacl	nΒ
			M³	yd³	kg	lb	mm	inc- h	kg	lb	mm	inch	mm	inch
General Purpose	311-7776	BOCE	1.05	1.4	420	925	2035	80	1816	400- 2	2437	96	768	30
Multi Purpose	337-8947	BOCE	0.95	1.20	669	1472	2060	81	1574	346- 8	2742	107	1084	42
Light Material	261 - 1391	BOCE	1.25	1.60	510	1122	2060	81	1745	384- 5	2401	94	806	31

		ç	07K/90	7M Ve	rtical F	Pin Cou	ıpler (S	SL Typ	oe)					
Bucket Type	Bucket Part Number	Ground Engaging Tools	Rateo Volur	-	Buck Weig		Buck Width		Rated Load	1	Dump Clear		Reac	hВ
			M³	yd³	kg	lb	mm	inc- h	kg	lb	mm	inch	mm	inch
General Purpose	312-0122	BOCE	1.05	1.4	420	925	2035	80	1700	374- 8	2325	91	871	34
Multi Purpose	337-8945	BOCE	0.95	1.20	649	1430	2060	81	1627	358- 6	2382	93	837	32
Light Material	261 - 1385	BOCE	1.25	1.60	510	1122	2060	81	1738	383- 1	2306	90	931	36

			907K/9	07M Ho	orizon	tal Pin	Couple	er (Atla	s)					
Bucket Type	Bucket Part Number	Ground Engaging Tools	Rateo Volur	-	Buck Weig		Buck Width		Rated Load	1	Dump Cleara		Reac	hΒ
			M³	yd³	kg	lb	mm	inc- h	kg	lb	mm	inch	mm	inch
General Purpose	470-4545	BOCE	1.05	1.4	420	925	2035	80	1700	374- 8	2325	91	871	34
Multi Purpose	470-4547	BOCE	0.95	1.20	649	1430	2060	81	1627	358- 6	2382	93	837	32

			908K/	908M H	orizor	ntal Pin	Coupl	er (ISC))					
Bucket Type	Bucket Part Number	Ground Engaging Tools	Rateo Volur		Buck Weig		Buck Width		Rateo Load	ł	Dump Cleara		React	۱B
			M³	yd³	kg	lb	mm	inc- h	kg	lb	mm	inch	mm	inch
General Purpose	286-0584	BOCE	1.15	1.5	452	995	2060	81	2155	46- 50	2852	112	1043	41
Multi Purpose	337-9747	BOCE	0.95	1.20	669	1472	2060	81	2007	44- 16	3224	127	1151	45
Light Material	261-1404	BOCE	1.55	2.00	565	1047	2060	81	2024	44- 61	2770	113	1252	31

		9	08K/90	8M Ve	rtical F	Pin Cou	ıpler (S	SL Typ	e)					
Bucket Type	Bucket Part Number	Ground Engaging Tools	Rateo Volur	-	Buck Weig		Buck Width		Rateo Load	1	Dump Clear		Reac	n B
			M³	уd³	kg	lb	mm	inc- h	kg	lb	mm	inch	mm	inch
General Purpose	286-0581	BOCE	0.95	1.2	452	995	2060	81	2150	473- 9	2812	114	1195	47
Multi Purpose	337-8945	BOCE	0.95	1.20	649	1430	2060	81	2101	463- 1	2870	116	1084	42
Light Material	261 - 1396	BOCE	1.55	2.00	565	1244	2060	81	1926	424- 4	2735	107	1406	55

	908K/908M Horizontal Pin Coupler (Atlas)													
Bucket Type	Bucket Part Number	Ground Engaging Tools	ging Volume Weig				Rated Load		Dump Clearance		Reach B			
			M³	yd₃	kg	lb	mm	inc- h	kg	lb	mm	inc- h	mm	inch
General Purpose	481-4540	BOCE	1.35	1.8	469	1032	2060	81	2221	489- 4	2813	114	1142	44
Multi Purpose	470-4547	BOCE	0.95	1.20	669	1472	2060	81	1610	354- 8	2405	95	748	29

Rated Loads for the Pallet Fork

Failure to comply to the rated load can cause possible personal injury or attachment damage.

Review the rated load of a particular attachment before performing any operation. Make adjustments to the rated load as necessary.

Note: Rated loads should be used as a guide. Attachments, uneven ground conditions, soft ground conditions, or poor ground conditions have effects on rated loads. The operator is responsible for being aware of these effects.

For European applications, the rated load is defined by EN 474-3. The rated operating load for a firm, level surface is defined by the least amount of weight of the following conditions. The load center is 500 mm (20 inch).

- 80% of the full turn static tipping load
- · The minimum lifting capacity

The rated operating load for rough terrain is defined by the least amount of weight of the following conditions.

- 60% of the full turn static tipping load
- · The minimum lifting capacity

For North American applications, the rated operating load is defined by SAE J1197 2011 as 50% of the full turn static tipping load. The load center is half the length of the fork tine.

The maximum fork height (ground to top face of fork) is given for a pallet fork that is horizontal at maximum lift height.

The following tables provide the rated operating loads for the standard machine configuration that is equipped with a pallet fork.

Pallet Fork for 906K/906M, 907K/ 907M, and 908K/908M Compact Wheel Loaders for Europe (EN 474-3)

Note: The width of the carriage is 1400 mm (55 inch). "Class II" carriages

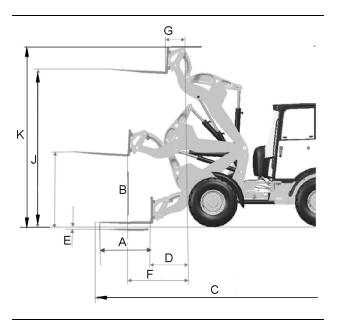


Illustration 52

g06289633

			906K/906M			
	Horizontal F	Pin (HPL-ISO)	Vertie	cal Pin	Atlas (HPL-A)	
	mm	(ft' in")	mm	(ft' in")	mm	(ft' in")
Fork Tine length (A)	1220	(4' 0")	1220	(4' 0")	1220	(4' 0")
Load Center (B)	500	(1' 7")	500	(1' 7")	500	(1' 7")
Overall Length (C)	5910	(19' 4")	5912	(19' 4")	5910	(19' 4")
Reach at Ground Level (D)	716	(2' 4")	718	(2' 4")	716	(2' 4")
Dig Depth (E)	67	(2.6")	-7	(-0.3")	67	(2.6")
Reach with Arms Level (F)	1212	(3' 11")	1276	(4' 2")	1212	(3' 11")
Reach at Full lift Height	440	(1' 5")	505	(1' 7")	440	(1' 5")
Lift with Arms Level	1383	(4' 6")	1457	(4' 9")	1383	(4' 6")
Lift at Maximum Height (J)	3047	(9' 11")	3121	(10' 2")	3047	(9' 11")
Overall Height (K)	3588	(11' 9")	3225	(10' 6")	3588	(11' 9")
	kg	(lb)	kg	(lb)	kg	(lb)
Tipping Load - straight	3432	(7563)	3275	(7217)	3392	(7475)

(Table 14, contd)

	906K/906M						
Tipping Load - full turn	2894	(6379)	2754	(6069)	2855	(6292)	
Operating weight	5538	(12205)	5622	(12390)	5590	(12319)	
		Rate	d load (% of full turi	n tip)			
	1447	(3189)	1377	(3034)	1428	(3146)	
	1737	(3827)	1652	(3641)	1713	(3775)	
	2316	(5103)	2203	(4855)	2284	(5034)	

Table 15

		906M (SSL Type)		
	SSL 4	18" Tine	SSL 6	i0" Tine
	mm	(ft' in")	mm	(ft' in")
Fork Tine length (A)	1220	(4' 0")	1220	(4' 0")
Load Center (B)	500	(1' 7")	500	(1' 7")
Overall Length (C)	5912	(19' 4")	6216	(20' 4")
Reach at Ground Level (D)	718	(2' 4")	718	(2' 4")
Dig Depth (E)	-7	(-0.3")	-7	(-0.3")
Reach with Arms Level (F)	1276	(4' 2")	1276	(4' 2")
Reach at Full lift Height	505	(1' 5")	505	(1' 7")
Lift with Arms Level	1457	(4' 6")	1457	(4' 9")
Lift at Maximum Height (J)	3121	(10' 2")	3121	(10' 2")
Overall Height (K)	3225	(10' 6")	3225	(10' 6")
	kg	(lb)	kg	(lb)
Tipping Load - straight	3263	(7191)	2853	(6287)
Tipping Load - full turn	2720	(5995)	2374	(5232)
Operating weight	5633	(12414)	5659	(12472)
		Rated load (% of full turn tip))	
	1360	(2997)	1187	(2616)
	1632	(3597)	1425	(3139)
	2176	(4796)	1899	(4186)

907K/907M						
	Horizontal P	in (HPL-ISO)	Vertic	al Pin	Atlas (HPL-A)	
	mm	(ft' in")	mm	(ft' in")	mm	(ft' in")

(Table 16, contd)

			907K/907M			
Fork Tine length (A)	1220	(4' 0")	1220	(4' 0")	1220	(4' 0")
Load Center (B)	500	(1' 7")	500	(1' 7")	500	(1' 7")
Overall Length (C)	5910	(19' 4")	5912	(19' 4")	5910	(19' 4")
Reach at Ground Level (D)	716	(2' 4")	718	(2' 4")	716	(2' 4")
Dig Depth (E)	67	(2.6")	-7	(-0.3")	67	(2.6")
Reach with Arms Level (F)	1212	(3' 11")	1276	(4' 2")	1212	(3' 11")
Reach at Full lift Height	440	(1' 5")	505	(1' 7")	440	(1' 5")
Lift with Arms Level	1383	(4' 6")	1457	(4' 9")	1383	(4' 6")
Lift at Maximum Height (J)	3047	(9' 11")	3121	(10' 2")	3047	(9' 11")
Overall Height (K)	3588	(11' 9")	3225	(10' 6")	3588	(11' 9")
	kg	(lb)	kg	(lb)	kg	(lb)
Tipping load - straight	3501	(7715)	3342	(7365)	3461	(7627)
Tipping Load - full turn	2975	(6557)	2833	(6243)	2936	(6471)
Operating Weight	5613	(12370)	5697	(12555)	5665	(12485)
I		Rate	ed load (% of full tur	n tip)		
	1488	(3278)	1416	(3121)	1468	(3235)
	1785	(3934)	1700	(3745)	1762	(3882)
	2380	(5246)	2266	(4994)	2349	(5176)

907M (SSL Type)								
	SSL 48	3" Tine	SSL 60" Tine					
	mm	(ft' in")	mm	(ft' in")				
Fork Tine length (A)	1220	(4' 0")	1220	(4' 0")				
Load Center (B)	500	(1' 7")	500	(1' 7")				
Overall Length (C)	5912	(19' 4")	6216	(20' 4")				
Reach at Ground Level (D)	718	(2' 4")	718	(2' 4")				
Dig Depth (E)	-7	(-0.3")	-7	(-0.3")				

		907M (SSL Type)		
Reach with Arms Level (F)	1276	(4' 2")	1276	(4' 2")
Reach at Full lift Height	505	(1' 5")	505	(1' 7")
Lift with Arms Level	1457	(4' 6")	1457	(4' 9")
Lift at Maximum Height (J)	3121	(10' 2")	3121	(10' 2")
Overall Height (K)	3225	(10' 6")	3225	(10' 6")
	kg	(lb)	kg	(lb)
Tipping Load - straight	3330	(7339)	2912	(6417)
Tipping Load - full turn	2799	(6168)	2444	(5385)
Operating weight	5708	(12579)	5734	(12637)
		Rated load (% of full turn tip)		
	1399	(3084)	1222	(2692)
	1679	(3701)	1466	(3231)
	2239	(4935)	1955	(4308)

(Table 17, contd)

			908K/908M			
	Horizontal I	Pin (HPL-ISO)	Verti	cal Pin	Atlas (HPL-A)	
	mm	(ft' in")	mm	(ft' in")	mm	(ft' in")
Fork Tine length (A)	1220	(4' 0")	1220	(4' 0")	1220	(4' 0")
Load Center (B)	500	(1' 7")	500	(1' 7")	500	(1' 7")
Overall Length (C)	6089	(19' 11")	6106	(20' 0")	6089	(19' 11")
Reach at Ground Level (D)	861	(2' 9")	878	(2' 10")	861	(2' 9")
Dig Depth (E)	157	(6.2")	15	(0.6")	157	(6.2")
Reach with Arms Level (F)	1309	(4' 3")	1440	(4' 8")	1309	(4' 3")
Reach at Full lift Height	460	(1' 6")	591	(1' 11")	460	(1' 6")
Lift with Arms Level	1364	(4' 5")	1506	(4' 11")	1364	(4' 5")
Lift at Maximum Height (J)	3149	(10' 3")	3291	(10' 9")	3149	(10' 3")
Overall Height (K)	3800	(12' 5")	3942	(12' 11")	3800	(12' 5")
	kg	(lb)	kg	(lb)	kg	(lb)

	908K/908M							
Tipping Load - straight	3907	(8610)	3654	(8052)	3895	(8585)		
Tipping Load - full turn	3319	(7315)	3098	(6828)	3308	(7290)		
Operating weight	6484	(14289)	6543	(14419)	6499	(14322)		
		Rate	d load (% of full turi	n tip)				
	1660	(3657)	1549	(3414)	1654	(3645)		
	1992	(4389)	1859	(4097)	1985	(4374)		
	2655	(5852)	2479	(5462)	2646	(5832)		

(Table 18, contd)

Material Handling Arm

🔒 WARNING

Failure to comply to the rated load can cause possible personal injury or attachment damage.

Review the rated load of a particular attachment before performing any operation. Make adjustments to the rated load as necessary.

Note: Rated loads should be used as a guide. Attachments, uneven ground conditions, soft ground conditions, or poor ground conditions have effects on rated loads. The operator is responsible for being aware of these effects.

The maximum placement height (ground line to the chain hook) and maximum reach (front of machine to the chain hook) are given for the highest position of the material handling arm.

Rated loads are based on a standard machine with the following conditions:

- · Lubricants
- Full fuel tank
- Enclosed ROPS
- 80 kg (176 lb) operator

Note: The Material Handling Arm is only available to fit onto the Vertical Pin Style coupler (SSL Style).

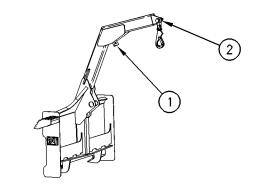


Illustration 53

g00668844

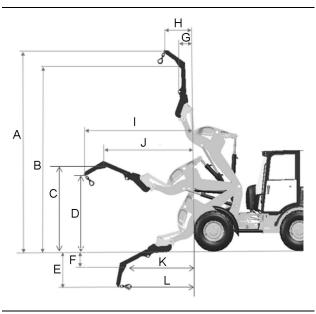


Illustration 54

g06289923

The following table provides the rated operating loads for the standard machine.

		Ma	aterial Handling	Arm		
	906k	(/906M	907k	(/907M	908K/908M	
	mm	(ft' in")	mm	(ft' in")	mm	(ft' in")
Clearance at Maximum Height (A)	4540	(14' 10")	4539	(14' 10")	4810	(15' 9")
Clearance at Maximum Height (B)	4347	(14' 3")	4347	(14' 3")	4376	(14' 4")
(C)	1515	(4' 11")	1515	(4' 11")	1706	(5' 7")
(D)	1759	(5' 9")	1759	(5' 9")	1558	(5' 1")
Clearance at Full Down (E)	1293	(4' 2")	1293	(4' 2")	1127	(3' 8")
Clearance at Full Down (F)	794	(2' 7")	794	(2' 7")	930	(3' 0")
Maximum Reach (G)	1426	(4' 8")	1426	(4' 8")	1279	(4' 2")
Maximum Reach (H)	943	(3' 1")	943	(3' 1")	1115	(3' 7")
Minimum Reach (I)	2786	(9' 1")	2786	(9' 1")	2869	(9' 4")
Minimum Reach (J)	2327	(7' 7")	2327	(7' 7")	2428	(7' 11")
(K)	1563	(5' 1")	1563	(5' 1")	1830	(6' 0")
(L)	1418	(4' 7")	1418	(4' 7")	1410	(4' 7")
	kg	(lb)	kg	(lb)	kg	(lb)
Arm Mass	130	(286)	130	(286)	130	(286)
Operating Mass	5543	(12215)	5618	(12381)	6409	(14125)
Rated Structural	907	(2000)	907	(2000)	907	(2000)

Identification Information

i07422949

Plate Locations and Film Locations

SMCS Code: 1000; 7000

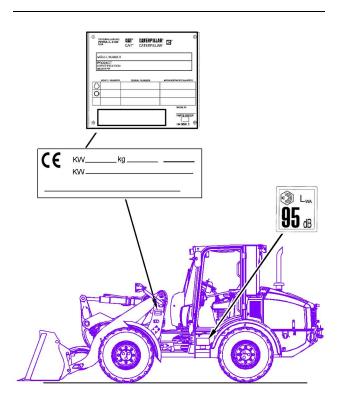
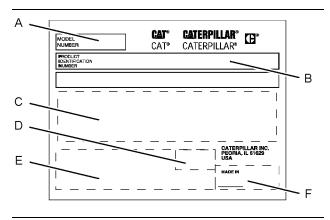


Illustration 55

g06292340

Product Identification Number (PIN) and CE Plate



This Product Identification Number (PIN) plate is on the left side of the front loader frame.

Manufacturer Name and Address ____

Model number (A)_____

Machine PIN (B)___

Service Information Plate (C)_____

Month and Year of Manufacture (If Required) (D)_____

CE Plate (If Required) (E)

Country of Origin Info Plate (If Required) (F)

Local regulation may require documentation of the Month and/or Year of Manufacture in the Operation and Maintenance Manual. Enter on line (D) above if required.

This plate is on the transfer gear case.

Transmission Serial Number

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 work tools 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 identification plates are located in the articulation joint on the left side of the machine.

This plate is on the bottom left side of the Identification Plate.

Note: The CE plate is on machines that are certified to the European Union requirements that are listed on the "Document of Conformity". If the machine is equipped with the plate for the European Union, the plate is attached to the PIN plates.

For machines that are 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 for primary engine (kW) _____
- Engine Power for additional engine (if equipped)
- Typical machine operating weight for European market (kg)
- Year of construction ______
- Machine Function ______

For machines that are compliant with "98/37/EC" the following information is stamped on the CE plate. For quick reference, record this information in the spaces that are provided below.

- Engine Power for primary engine (kW) _____
- Year _____

For the name of the manufacturer, the address of the manufacturer, and the country of origin, refer to the PIN plate.

Eurasian Economic Union

For machines compliant to the Eurasian Economic Union requirements, the EAC mark plate is positioned near the Product Identification Number (PIN) plate (see Product Information Section of the machine Operation and Maintenance Manual). The EAC mark plate is placed on machines certified to the Eurasian Economic Union requirements effective at the time of market entry.

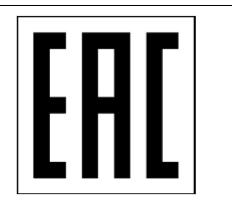


Illustration 57

g06094564

The Month and Year of Manufacture are on the PIN plate.

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

Sound Certification



Illustration 58

q06292349

A typical example of this label is shown. Your machinery may have a different value.

If equipped, 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".

Electromagnetic Emissions

Note: This label is on machines that are going into Canada.

NMB2

Illustration 59

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.

i04687649

Emissions Certification Film

SMCS Code: 1000; 7000; 7405

Certification Label for Emissions

Note: This information is pertinent in the United States, in Canada, and in Europe.

Consult your Cat dealer for an Emission Control Warranty Statement.

This label is located on the engine valve cover.

Declaration of Conformity

SMCS Code: 1000; 7000

Table 20

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

Manufacturer:

Description:

Caterpillar Inc., 100 N.E. Adams Street, Peoria, Illinois 61629, USA

Person authorized to compile the Technical File and to communicate relevant part (s) of the Technical File to the Authorities of European Union Member States on request:

Standards & Regulations Manager, Caterpillar France S.A.S 40, Avenue Leon-Blum, B.P. 55, 38041 Grenoble Cedex 9, France

I, the undersigned, _____, hereby certify that the construction equipment specified hereunder

Generic Denomination:	Earth moving Equipment
Function:	Wheel Loader
Model/Type:	906M, 907M, 908M Wheel Loader
Serial Number:	
Commercial Name:	Caterpillar

Fulfills all the relevant provisions of the following Directives

Directives	Notified Body	Document No.
2006/42/EC	N/A(BU to provide)	
2000/14/EC amended by 2005/88/EC, Note (1) (BU to provide)		
2004/108/EC (BU to provide)	N/A (BU to provide)	
2014/30/EU	N/A	

Note (1) Annex -_____ Guaranteed Sound Power Level -_____dB (A) Representative Equipment Type Sound Power Level - _____dB (A) Engine Power per _____- kW Rated engine speed - _____ rpm Technical Documentation accessible through person listed above authorized to compile the Technical File

Done at:	Signature
Date:	Name/Position

Note: The above information was correct as of April 2016, but may be subject to change, please refer to the individual declaration of conformity issued with the machine for exact details.

Declaration of Conformity

SMCS Code: 1000; 7000

Table 21

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

Manufacturer:

Description:

Caterpillar Inc., 100 N.E. Adams Street, Peoria, Illinois 61629, USA

Person authorized to compile the Technical File and to communicate relevant part (s) of the Technical File to the Authorities of European Union Member States on request:

Standards & Regulations Manager, Caterpillar France S.A.S 40, Avenue Leon-Blum, B.P. 55, 38041 Grenoble Cedex 9, France

I, the undersigned,	hereby certify that the construction equipment specified hereunde	er
---------------------	---	----

Generic Denomination:	Earth-moving Equipment
Function:	Multipurpose Bucket
Model/Type:	Multipurpose (MP) Bucket
Serial Number:	
Commercial Name:	Caterpillar

Fulfills all the relevant provisions of the following Directives

Directives	Notified Body	Document No.
2006/42/EC	N/A	
2014/30/EU	N/A	

Note (1) Technical Documentation accessible through person listed above authorized to compile the Technical File

Done at:	Signature
Date:	Name/Position

Note: The above information was correct as of April 2018, but may be subject to change, please refer to the individual declaration of conformity issued with the machine for exact details.

Declaration of Conformity

SMCS Code: 1000; 7000

Table 22

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

Manufacturer:

Caterpillar Inc., 100 N.E. Adams Street, Peoria, Illinois 61629, USA

Person authorized to compile the Technical File and to communicate relevant part (s) of the Technical File to the Authorities of European Union Member States on request:

Standards & Regulations Manager, Caterpillar France SAS 40 Avenue Leon-Blum 38000 Grenoble, France

I, the undersigned,	hereby certify that the construction equipment specified hereunder	
i, ale anaeleighea,	norosy contry and are concared action equipment operation of an area	

Description:	Generic Denomination:	Earth-moving Equipment
	Function:	Material Handling Arm
	Model/Type:	Material Handling Arm (MHA), Truss Boom, Lifting Hook
	Serial Number:	

Commercial Name:

Caterpillar

Fulfills all the relevant provisions of the following Directives

Directives	Notified Body	Document No.
2006/42/EC	N/A	
2014/30/EU	N/A	

Note (1) Technical Documentation accessible through person listed above authorized to compile the Technical File

Done at:	Signature
Date:	Name/Position

Note: The above information was correct as of January 2016, but may be subject to change, please refer to the individual Declaration of Conformity issued with the machine for exact details.

Operation Section

Before Operation

i04021647

Mounting and Dismounting

SMCS Code: 7000



Illustration 60

g00037860

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".

i06895649

Daily Inspection

SMCS Code: 1000: 7000

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.

Note: For maximum service life of the machine, make a thorough walk-around inspection before you operate the machine. Inspect the machine for leaks. Remove any debris from the engine compartment and the undercarriage. Ensure that all guards, covers, and caps are secured. Inspect all hoses and belts for damage. Make the needed repairs before you operate the machine.

Perform the following procedures on a daily basis.

- Operation and Maintenance Manual, "Backup Alarm - Test"
- Operation and Maintenance Manual, "Braking System - Test"
- Operation and Maintenance Manual, "Cooling System Level - Check"
- Operation and Maintenance Manual, "Engine Air Filter Service Indicator - Inspect"
- Operation and Maintenance Manual, "Engine Oil Level - Check"
- Operation and Maintenance Manual, "Fuel System Water Seperator - Drain"
- Operation and Maintenance Manual, "Hydraulic System Oil Level - Check"

- Operation and Maintenance Manual, "Loader Bucket, Cylinder, and Linkage Bearings -Lubricate"
- Operation and Maintenance Manual, "Seat Belt -Inspect"
- Operation and Maintenance Manual, "Tire Inflation - Check"
- Operation and Maintenance Manual, "Transmission Oil Level - Check"

Refer to the Maintenance Section for the detailed procedures. Refer to the Maintenance Interval Schedule for a complete list of scheduled maintenance.

General Machine Cleaning

Note: When using pressure washing equipment, wear safety glasses as well as protective clothing. High-pressure water can cause serious injuries.

- Always make sure that steps and grab handles are clean and free dirt, grease, ice and other debris at all times.
- Use a low-pressure water jet and brush to soak off caked mud, grease and dirt. Only use a pressure washer to remove soft dirt and oil.
- Do not wash the machine with the engine running. Allow the engine to cool sufficiently before cleaning. When washing the engine keep a minimum distance of 60 cm (24.0 inch) from the engine components.
- Do not use high-pressure washers with circular jet nozzles, or pencil nozzles. A fan nozzle is recommended when cleaning your machine.
- Do not exceed 60° C (140° F) maximum water temperature.
- Keep a minimum cleaning distance of 30 cm (12.0 inch) between the nozzle and machine surface at all times.
- Observe manufactures guidelines when operating high-pressure cleaners.
- Avoid high strength cleaning fluids. Use the solution with a "pH" value between 4 and 9. Follow the manufactures guidelines for diluting the detergent otherwise damage to the paint finish may occur.
- Do not aim the water jet directly at electrical connections or other electrical components such as alternators or electronic control modules. Also take care around door seals, lights, oil seals, bearings, etc.

- Do not concentrate the pressure on one spot. Keep the lance moving at all times.
- After cleaning the machine, run the machine until it reaches the recommended operating temperatures.
- Always grease all points on the machine after pressure washing. You may have washed grease out of important joints during the cleaning process.

Paint Finish Maintenance

After cleaning the machine, inspect the paint finish for any damage such as chips, scratches and scuffs. Repair these as you see necessary for your machine. Ignoring any damage may result in rust forming and potentially spreading.

As a preventive measure it is recommended that the paint finish should be maintained every six months.

Machines which are used in corrosive environment may suffer more from corrosion than others. Contact your local dealer for further assistance about any corrosion protection recommendations that may be available.

i06087008

Steering Frame Lock

SMCS Code: 7506

WARNING

No clearance for person in this area when machine turns. Severe injury or death from crushing could occur.

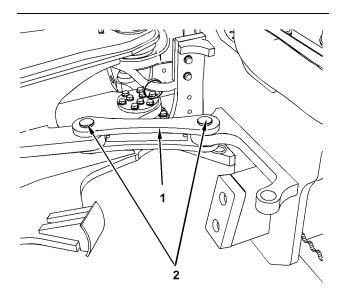


Illustration 61 g01377268 Steering frame lock in the LOCKED position

In order to lift the machine, connect the steering frame lock link (1) in the LOCKED position. In order to transport the machine, connect the steering frame lock link (1) in the LOCKED position. The pins (2) should be secured in place by the locking pins.

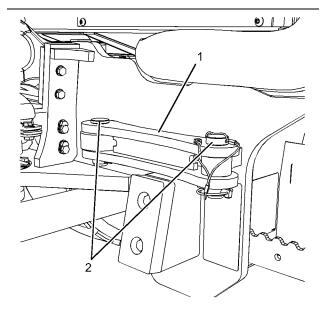


Illustration 62

q03801996

Steering frame lock in the STORED position

Disconnect the steering frame lock link before the machine is operated. Use the pins (2) in order to secure the steering frame lock link in the STORED position. The pins (2) should be secured in place by the locking pins.

Note: Ensure that the steering frame lock is in the STORED position when you only lift one tire. Damage to the frame or to the lock may occur.

i05944033

Battery Disconnect Switch

SMCS Code: 1411

Open the engine hood.

The battery disconnect switch is located on the right side of the engine compartment under the main fuses.

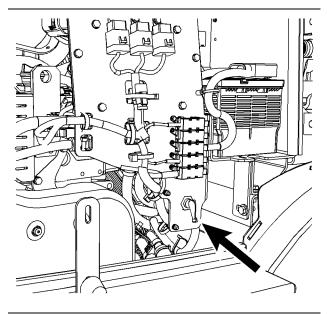


Illustration 63

a03732677

Disconnect Switch ON – To activate the electrical system, insert the key for the battery disconnect switch and turn the key clockwise. The battery disconnect switch must be turned to the ON position before you start the engine.



Disconnect Switch OFF – To deactivate the electrical system, turn the key for the battery disconnect switch counterclockwise to the OFF position.

The battery disconnect switch and the engine start switch perform different functions. To disable the entire electrical system, turn off the battery disconnect switch. When you only turn off the engine start switch, the battery remains connected to the electrical system.

Turn the battery disconnect switch to the OFF position and remove the key when you service the electrical system or any other machine components and when the machine will not be used for an extended period of a month or more. This will prevent drainage of the battery.

NOTICE

Never move the battery disconnect switch to the OFF position while the engine is operating. Serious damage to the electrical system could result.

To ensure that no damage to the engine occurs, verify that the engine is fully operational before cranking the engine. Do not crank an engine that is not fully operational.

Perform the following procedure in order to check the battery disconnect switch for proper operation:

- 1. With the battery disconnect switch in the ON position, verify that electrical components in the operator compartment are functioning. Verify that the hour meter is displaying information. Verify that the engine will crank.
- **2.** Turn the battery disconnect switch to the OFF position.
- **3.** Verify that the following items are not functioning: electrical components in the operator compartment, hour meter and engine cranking. If any of the items continue to function with the battery disconnect switch in the OFF position, consult your Caterpillar dealer.

Machine Operation

i06226176

Alternate Exit

SMCS Code: 7310

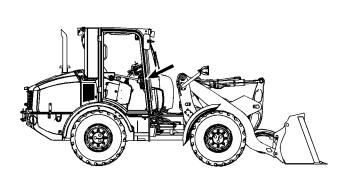
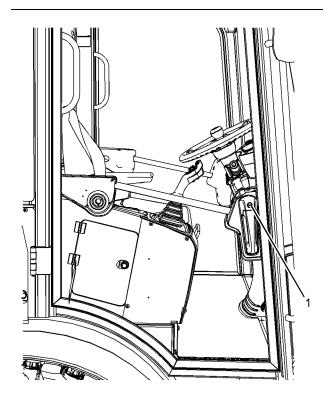


Illustration 64

g03732443

The right cab door can be used as an alternative exit. The door can be opened from the inside of the cab or from the outside of the cab.



Note: To open door from the outside pull on door handle.

In order to open the cab door from the inside of the cab, squeeze the lever on the grab handle on the door.

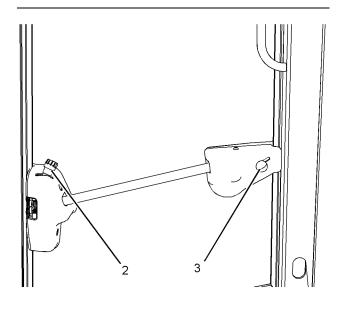


Illustration 66

g03862694

View of right-hand door in the open position

(2) Door handle

(4) Release lever

For additional ventilation, open the cab door all the way in order to engage the catch on the exterior of the cab.

To open door, from the inside with door closed:

- Push the lever on the door handle (2).
- Push door all the way open until door grabs door catch.

Note: If you are inside and the cab door is open, pull on the door release(3) on the end of the grab handle in order to close the door.

Illustration 65 View of right-hand door (1) Outside cab door release g03862675

i06087302

Cab Door

SMCS Code: 7308

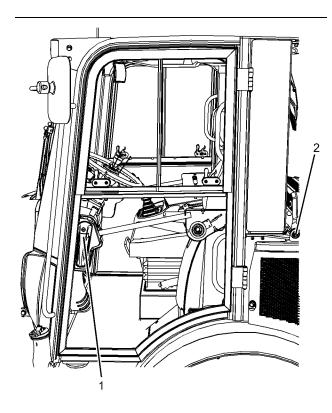


Illustration 67

g03802256

(1) Door Handle

(2) Catch

In order to open the cab door from the outside of the cab, pull outward on the door handle.

In order to open the cab door from the inside of the cab, push the lever (4) forward.

For additional ventilation, open the cab door all the way in order to engage the catch on the exterior of the cab.

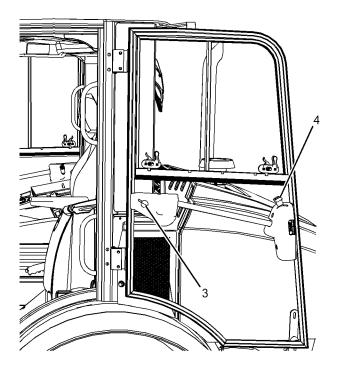


Illustration 68

g03802347

(3) Release Button (4) Release Lever

In order to release the cab door from the catch, do one of the following:

• In order to release the cab door from the catch, pull the lever (3)forwards.

If you are inside and the cab door is open, pull on the Release lever (3) on the end of the grab handle in order to close the door.

i07359627

Seat

SMCS Code: 7312

Adjust the seat to allow full travel of the pedals. Make the seat adjustments when the operator is sitting against the back of the seat.

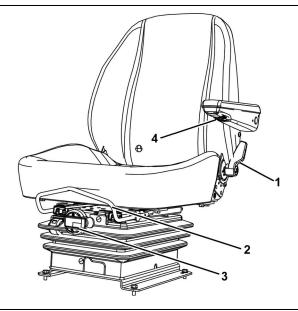


Illustration 69

g06294176

Mechanical Suspension

Seat Backrest Angle Adjustment (1) -Pull the lever upward. Hold the lever upward and adjust the backrest to the desired angle. Release the lever to lock the backrest into position.



Fore and Aft Position (2) – Pull the lever upward. Hold the lever upward and slide the seat forward or backward to the desired position. Release the lever to lock the seat into position.



Seat Height/Weight (3) - Unfold Lever from Knob and crank clockwise to increase the height and counter clockwise to decrease the height. The suspension must be adjusted so that green is showing on the indicator while sitting in the seat.

Armrest Angle Adjustment (4) - Rotate knob to adjust the angle of the armrest in the operating position.

Air Suspension Deluxe Seat (If Equipped)

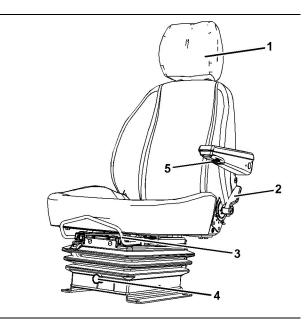


Illustration 70

q06294190



Headrest (1) – Pull up on the headrest to remove extension.



Seat Backrest Angle Adjustment (2) -Pull the lever upward. Hold the lever upward and adjust the backrest to the desired angle. Release the lever to lock the backrest into position.



Fore and Aft Position (3) – Pull the lever upward. Hold the lever upward and slide the seat forward or backward to the desired position. Release the lever to lock the seat into position.



Seat Height (Air suspension) (4) – Push in on the air valve knob (4) to raise the height of the seat. Pull out on the air valve knob (4) to lower the height of the seat.

Armrest Angle Adjustment (5) – Rotate knob to adjust the angle of the armrest in the operating position.

Heated Seat (If Equipped)

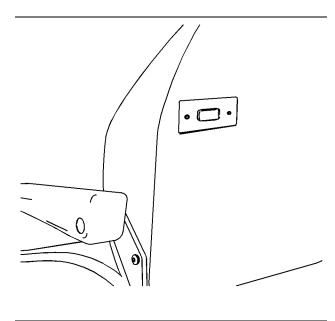


Illustration 71

A switch for the power is on the back of the seat on the left side.

i03916430

q01459685

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. See your Cat dealer for all replacement parts.

Consult your Cat dealer for longer seat belts and for information on extending the seat belts.

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

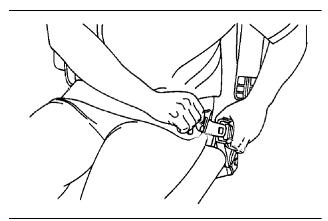


Illustration 72

g02150795

Pull seat belt out of the retractor in a continuous motion.

Fasten seat belt catch into buckle. 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.

g03732691

Releasing The Seat Belt

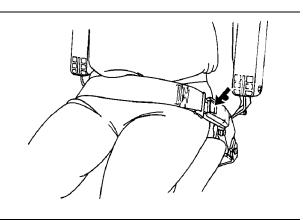


Illustration 73

g02150800

Push the release button on the buckle in order to release the seat belt. The seat belt will automatically retract into the retractor.

i06226584

Mirror (If Equipped)

SMCS Code: 7319

WARNING

Adjust all mirrors as specified in the Operation and Maintenance Manual. Failure to heed this warning can lead to personal injury or death.

Slips and falls can result in personal injury. Use the machines access systems when adjusting the mirrors. If the mirrors cannot be reached using the machine access systems follow the instructions found within the Operation and Maintenance Manual, "Mirror" in order to access the mirrors.

Note: Your machine may not be equipped with all of the mirrors that are described in this topic.

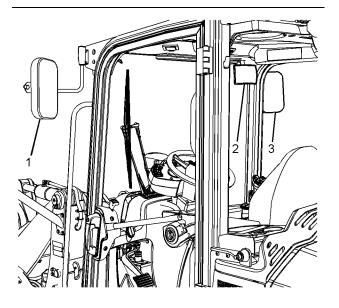


Illustration 74

(1) Left side mirror

(2) Interior mirror

(3) Right side 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.

The appropriate job site organization is also recommended in order to minimize visibility hazards. For more information refer to Operation and Maintenance Manual, "Visibility Information".

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.
- Stop the engine.

Note: Hand tools may be needed in order to adjust the mirrors. Refer to Specifications, SENR3130, "Torque Specifications" for the recommended torque.

Right Side Rear View Mirror

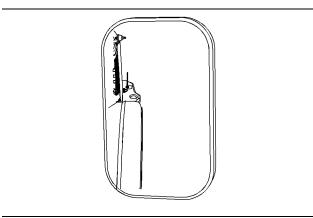


Illustration 75

g03862790

Adjust the right side rear view mirror so the side of the machine can be seen and so the rear tire can be seen. Also adjust the right side rear view mirror in order to see the following:

- 2 m (6.6 ft) of the side of the machine in front of the tire and a point on the ground 1 m (3.3 ft) from the right side of the rear tire
- See an object on the ground at a distance of 30 m (98 ft) from the rear corner of the machine.

Left Side Rear View Mirror

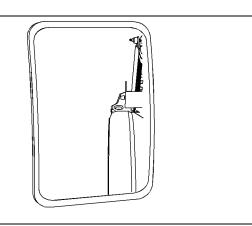


Illustration 76

g03862821

Adjust the left side rear view mirror so the side of the machine can be seen and so the rear tire can be seen. Also adjust the left side rear view mirror in order to see the following:

- 2 m (6.6 ft) of the side of the machine in front of the tire and a point on the ground 1 m (3.3 ft) from the right side of the rear tire
- See an object on the ground at a distance of 30 m (98 ft) from the rear corner of the machine.

Interior Mirror

The interior mirrors can be adjusted to a position in order to allow the operator to see preferred areas at the rear of the machine during operations such as loading and unloading.

i07488496

Operator Controls

SMCS Code: 7300; 7451

Note: Your machine may not be equipped with all the controls that are discussed in this topic.

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

Illustrations guide the operator through correct procedures of checking, starting, operating, and stopping the machine. Operating techniques that are outlined in this publication are basic. Skill and techniques develop as the operator gains knowledge of the machine and the capabilities of the machine.

The following information briefly identifies the components of the cab. More information on the operation of each item is covered separately in this manual.

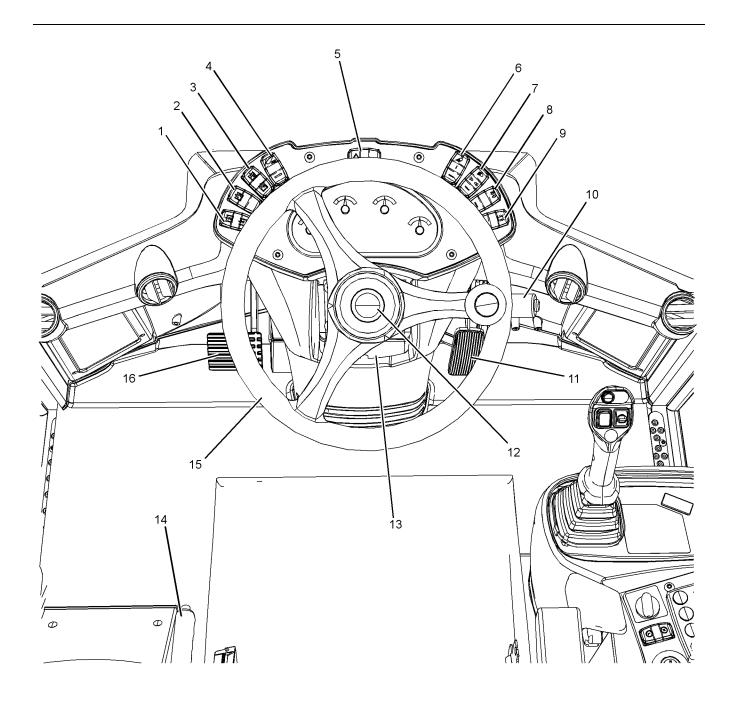


Illustration 77

- (1) Auxiliary Hydraulics 3/4 Switch (If Equipped)
 (2) Auxiliary 7 Switch (if equipped)
 (3) Auxiliary 5/6 Switch (if equipped)
 (4) ECO mode
 (5) Hazard Flashers

- (6) Front Work Lights
 (7) Roading Lights
 (8) Rear Fog Lights
 (9) Rotating Beacon
 (10) Multifunction Lever
 (11) Accelerator Pedal

g03729895

- (12) Horn
 (13) Steering Column Tilt Control
 (14) Parking Brake Control
 (15) Steering Control
 (16) Inching / Brake Pedal

Secondary Auxiliary Hydraulics 3/4 Switch (1) (if equipped)

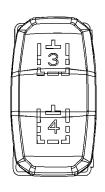


Illustration 78

g03802679

This control provides hydraulic oil flow to the auxiliary connections on the loader arm. Press the right side of the switch for normal flow to the connector. Press the left side of the switch to reverse the flow. The center position is "OFF".

Auxiliary 7 Switch(2) (if equipped)

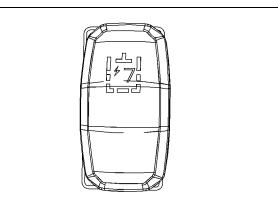


Illustration 79

g03802681

This switch supplies power to pin B on the electrical connector for the work tool. Press the left side of the switch to provide 12 V power. Press the right side of the switch to turn off the power.

Auxiliary 5/6 Switch (3) (if equipped)

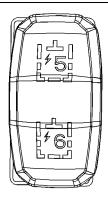


Illustration 80

g03802686

This switch supplies power to two pins in the electrical connector for the work tool. Press the left side of the switch to supply pin D. Press the right side to supply pin C. The center position is off.

ECO Mode(4)



ECO Mode – When Economy Mode is active, the indicator light on the switch will be ON and the maximum engine speed will be limited. Economy Mode may reduce the runout speed of the machine and hydraulic implement speed. The machine will still achieve maximum rimpull in Economy Mode.

Hazard Flashers (5)



Hazard Flashers - Pressing the left side of the switch will turn signal lights to on.

Front Work Lights(6)



Front Work Lights – Press the top side of the switch to the middle position to turn on the front work lights. Press the switch all the way to the top to turn on the front work lights and the rear work lights.

Roading Lights (7)



Roading Lights - Press the right side of the switch to the middle position to activate the position lights and the instrument panel lights. Press the switch all the way to the right to turn on the roading lights.

Rear Fog Lights (8)



Rear Fog Lights - Press the right side of the switch to turn on the rear fog lights. Press the left side of the switch to turn off the rear fog lights. The position lights or the

roading lights must be ON before the rear fog lights will operate.

Rotating Beacon (9)



Rotating Beacon – Press the right side of the switch to turn on the rotating beacon.

Multifunction Lever(10)

The multifunction lever controls the front window wiper and the window washer, the high beam, and low beam road lights and the directional turn signals.

Window wiper

Rotate the handle to turn on the front window wiper. Position 1 is off and position 2 is intermittent mode. Turn the switch to position 3 for wiping at low speed. Turn the switch to position 4 for wiping at high speed.

Window washer

Press in the end of the control to activate the front window washer. Wipers will complete 2-3 additional strokes to remove the remaining wiper fluid after the window washer has been released.

Turn signal

Move the lever forward to activate the left turn signal. Move the lever rearward to activate the right turn signal.

Low beam lights and high beam lights

Pull the lever upward to flash the high beam lights momentarily. Push the lever downward away from the operator to turn on the high beam lights.

Accelerator Control (11)



Accelerator Control - Push down on the pedal to increase the engine speed. Decrease pressure on the pedal to decrease the engine speed.

Horn (12)



Horn – Depress the horn button to sound the horn.

Steering Column Tilt Control (13) If Equipped



position.

Steering Column Tilt Control – Pull up on the lever to move the steering column to the desired position. Push the lever downward to lock the column in the desired

Parking Brake Control (14)



Parking Brake Control – Pull up on the parking brake lever to engage the parking brake. The hydrostatic drive will shift to NEUTRAL. Push the button on top of the parking brake lever. Lower the lever to release the brake.

Park Brake Drive Through

Note: If the parking brake lever switch is faulted or stuck in the Engaged position, the transmission will be locked to NEUTRAL. It is possible to override this interlock by quickly commanding the transmission direction from NEUTRAL to either FORWARD NEUTRAL, FORWARD, or REVERSE, NEUTRAL, REVERSE. The command must be performed in under 1.5 seconds.

Steering Control (15)



Steering Control – The steering wheel controls the directional steering of the machine. The machine will turn in the same direction as the steering wheel.

Brake / Inching pedal (16)



Service Brake – Use the service brake to slow down the machine ground speed for normal braking.

Note: The first 25 mm to 51 mm (1 to 2 inch) of the service brake travel provides the inching function. The inching function provides low ground speed. The inching function provides more power for the hydraulic system.

Note: Some machines may have an optional righthand brake pedal.

Directional Control (13) (If **Equipped**)

A control rocker switch on the implement joystick comes standard on all machines. Some machines are equipped with an optional, secondary directional control on the column.

Note: Machines with both directional controls, one must be placed into the NEUTRAL position to use the other. Failure to do so will lock the transmission into NEUTRAL.

Forward directional changes and reverse directional changes are possible while the machine is moving. However, reducing the engine speed and the machine speed is recommended, when directional changes are being made. This permits operator comfort and maximum service life of the power train components.

To avoid an unstable machine, the machine should be stopped before any directional changes are made with a raised load.

Do not use the alternate direction control switch to change while the machine drives on the public road in Japan. The machine can use the direction control switch which is located in the left-hand steering control or steering wheel.

FORWARD – Move the rocker switch on F the implement joystick forward to move the machine forward. Alternatively, move the column direction lever, if equipped, up to the machine forward.

NEUTRAL – Move the rocker switch on Ν the implement joystick to the middle position to place the transmission in **NEUTRAL.** Alternatively, move the column direction lever into the middle position , if equipped, to place the transmission into NEUTRAL.



REVERSE – Move the rocker switch on the implement joystick downward to move the machine in reverse. Alternatively, move the column direction lever, if equipped, down to the machine reverse.

Note: If the parking brake is engaged and the directional control switch is in the FORWARD position or the REVERSE position, the machine will not move. Move the direction control switch to the NEUTRAL position and release the parking brake in order for the hydrostatic drive to be engaged.

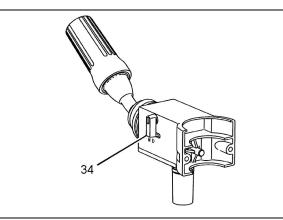


Illustration 81

g06113589

Directional Control (FNR Lever) (if equipped) (34) Lock Lever

The directional control (FNR lever) can be locked using lock lever (34). When lock lever (34) is in the "N" NEUTRAL position, forward and reverse cannot be selected. When lock lever (34) is in the "D" DRIVE position, forward and reverse can be selected.

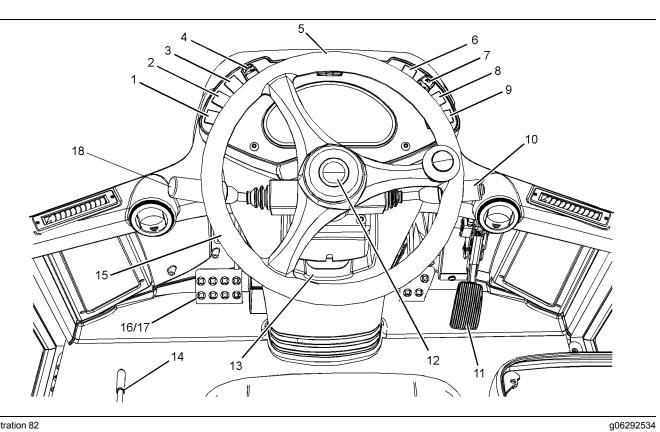


Illustration 82

Japanese Pedal Set Up

- Auxiliary Hydraulics 3/4 Switch (If Equipped)
 Auxiliary 7 Switch (if equipped)
 Auxiliary 5/6 Switch (if equipped)
 ECO mode
 Hazard Flashers

- (6) Front Work Lights
 (7) Roading Lights
 (8) Rear Fog Lights
 (9) Rotating Beacon
 (10) Multifunction Lever
 (11) Accelerator Pedal

- (12) Horn
 (13) Steering Column Tilt Control
 (14) Parking Brake
 (15) Steering Control
 (16 / 17) Service Brake / Inching Pedal
 (18) FNR Shift lever

Right Hand Console

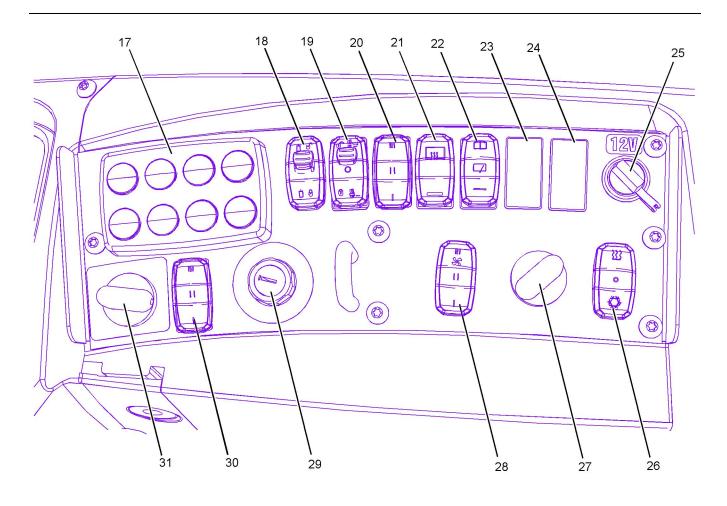


Illustration 83

- (17) Optional Keypad(18) Implement Lock out(19) Quick Coupler
- (20) Blank / Work Tool Aux Power Switch (If Equipped) (21) Rear Defrost

- (22) Rear Wiper
- (23) (Blank) (24) (Blank)
- (25) Electrical Power Receptacle (12V)
- (26) Heater and Air Conditioner On/Off Switch

- g06292854
- (27) HVAC Temperature Control(28) Fan Control(29) Key Switch

- (30) Transmission High/Low (31) Creeper Control

Optional Keypad (17)

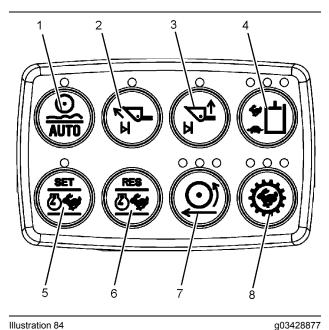


Illustration 84

- (1) Ride Control
- (2) Rack Back Positioner
- (3) Lift Kickout
- (4) Implement Modulation
- (5) Throttle Lock Set/Decelerate
- (6) Throttle Lock Resume/Accelerate
- (7) Reduced Rimpull Hystat
- (8) Hystat Aggressiveness Adjustment

(1) Ride Control Enable (if equipped) – Press to Enable or Disable the Ride Control System. When Ride Control is enabled, the LED above the button will be lit.

This feature is designed to improve driver comfort while the vehicle is traveling. It is a hydraulic system that introduces a pressurized accumulator into the head end of the lift arms and opens the rod side to the tank. This effectively provides suspension to the bucket which reduces the bouncing effect.

Ride Control has two modes of operation.

- OFF Ride Control always inactive (relay output is always off).
- AUTO Ride Control activates only when above a configurable machine ground speed.

When "AUTO" mode is engaged, the ride control will be activated when machine ground speed increases above the configurable activation speed. Ride Control will deactivate when speed drops 1 km/h (0.6 mph) below the activation speed. Activation speed is configurable in Cat ET via the "RIDE CONTROL ACTIVATION SPEED" configuration parameter. The allowable range is between 1 km/h (0.6 mph) and 35 km/h (22 mph). The default speed is 8 km/h (5 mph).

(2) Rackback Kickout Enable (if equipped) – Press to Enable or Disable the Rackback Kickout. When the Rackback Kickout is enabled, the LED above the button will be lit.

(3)Lift Kickout Enable (if equipped) – This option is not available.

(4) Implement Modulation Adjustment - Press and release the button to toggle through the implement modulation settings. The settings correspond to Fine, Normal, and Aggressive modulation. Fine is indicated by 1 LED on. Normal is indicated by 2 LEDs on. Aggressive is indicated by 3 LEDs on. When in Fine mode, the maximum speed of the implements may be reduced.

(5) Throttle Lock Set/Decelerate – Press the Throttle Pedal until the desired speed is achieved and then press the Throttle Lock Set/Decelerate button to lock that speed. When the Throttle Lock is active, the LED above the button will be lit. Press and hold of the switch will slowly decelerate the locked throttle speed to allow for small adjustments.

Note: To cancel throttle lock, press and release the Set button again or press the brake pedal past 65% travel. Alternatively, turning off Economy Mode will also cancel Throttle Lock.

(6) Throttle Lock Resume/Accelerate – Press the button to resume previous throttle lock that was set before being Canceled. Press and hold of the switch will slowly accelerate the locked throttle speed to allow for small adjustments.

(7) Reduced Rimpull – Press and release the button to toggle through the reduced rimpull setting. The setting corresponds to Maximum, Medium, and Low. The percentage of rimpull that is allowed in each mode is, Maximum is 100%, Medium is 80%, and Low is 60%. Maximum is indicated by all 3 LEDs on. Medium is indicated by 2 LEDs on. Low is indicated by 1 LED on.

Note: Reduced Rimpull feature is only available in speed range 1 or 2.

Note: Early shipped machines would have installed the 4 levels of settings for Rimpull. If machine has been updated to latter version Flash File, then only 3 levels of settings will be available for Rimpull. Please consult your Cat dealer for any file updates to your machine.

(8) Hystat Aggressiveness Adjustment – Press and release the button to toggle through hystat aggressiveness settings. The settings correspond to Soft, Normal, and Hard aggressiveness. Soft is indicated by 1 LED on. Normal is indicated by 2 LEDs on. Hard is indicated by 3 LEDs on.

Note: Options not available will have the backlight turned off.

Note: The brightness of the keypad LED's can be adjusted via the service tool, please contact your Cat dealer.

Implement Lock out (18)



Implement Lockout – Press the bottom of the switch to disable the implement controls.

Push the red locking tab upward and press the top of the switch to enable the implement controls.

Quick Coupler (19)

\Lambda WARNING

Improper engagement of work tools could result in injury or death.

Do not operate this machine until you have positive indication that the coupler pins are fully engaged.



Engage – Press the bottom of the switch to engage the coupler pins. The coupler engage function will continue for 5

seconds. After 5 seconds, it will stop when the switch is released.



Disengage – Press the red tab at the top of the switch to release the switch. The top of the switch can then be pressed to disengage the coupler pins. The coupler

disengage function will only be energized while the switch is held in the disengage position. It will stop when the switch is released.

Work Tool Aux Power Switch (If Equipped 20)

This position could be blank, or have the option of a work tool aux electrical power switch.

Rear Window Defroster (21)



Rear Window Defroster – Press the top of the switch to activate the defroster. The defroster will remain on for a maximum of 10 minutes. Press the top of the switch to turn off the defroster.

Rear Window Wiper/Washer (22)



Rear Window Wiper – Press the top of the switch once to activate the wiper. Press the top of the switch and hold the top of the switch to activate the rear window washer.

Spare (23)

N/A

Spare (24)

N/A

Electrical Power Receptacle (25)



Power Receptacle (12 volt) – The 12V receptacle can be used for supply electrical equipment and accessories.

The receptacle supplies power for diagnostic equipment.

Heater and Air Conditioning On/Off Switch (26)

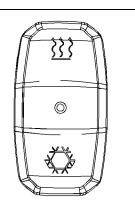


Illustration 85

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Press the top of the switch to activate the heater. Press the bottom of the switch to activate the air conditioner. The fan speed is selected by the fan control switch.

HVAC Temperature Control (27)



Temperature Control – Turn the knob to the left to COOL. Turn the knob to the right to WARM.

Fan Control (28)



Fan Control

LOW – Press the bottom of the switch to set the fan speed in the LOW position.

MEDIUM – Press the switch into the middle position to set the fan speed to the MEDIUM position.



HIGH – Press the top of the switch to set the fan speed to the HIGH position.

Engine Start Switch (29)

Engine Start Switch - Refer to Operation and Maintenance Manual, "Engine Starting" for details on starting the engine.



OFF – Machine in operation, turning key to the off position will shut off the engine and most of the machine's electrical system. If the parking, hazard, or lowbeam lights are on when the machine is keyed off the lights will remain on. The parking, hazard, or low-beam lights will remain functional after the machine has been keyed off. Turn on the parking, hazard, or low-beam light, after the machine has been keyed off. The back lighting will illuminate the parking and low-beam light buttons. Press the button to turn on the parking lights or the low beam head lights. Push the top of the switch on the right panel to turn on the hazard lights. These lights will stay on with the key switch in OFF position.



ON – Operator turning the ignition switch to on will turn on the machines electrical system. The instrument cluster will perform a "self test". Wait until completion before you start the engine.



- Engage the parking brake.
- 2. Lower any raised work tools to the ground. Refer to Operation and Maintenance Manual, "Equipment Lowering with Engine Stopped". Move the hydraulic controls to the HOLD position.

Note: This procedure only applies to the 910K AY41-UP.

Move the direction control to NEUTRAL.

Note: The engine will not start unless the direction control is in NEUTRAL.

- **4.** Hold the throttle control at the LOW IDLE position before starting the engine.
- **5.** Before the engine is started, check for the presence of bystanders or maintenance personnel. Ensure that all personnel are clear of the machine. Briefly sound the forward horn before you start the engine.
- 6. Turn the engine start switch key to the START position.

Note: In applications for cold weather, pause until the indicator lamp for the starting aid turns off. The engine start switch in the ON position activates the glow plugs. Once the indicator light for the starting aid goes off, start the engine.

Note: If the machine is equipped with the Machine Security System, turn the engine start switch key to the ON position. Hold for 3 seconds before starting the machine.

NOTICE

Do not crank the engine for more than 10 seconds. Allow the starter motor to cool for 30 seconds before cranking again.

Do not engage the starter when the flywheel is turning.

7. Release the engine start switch key after the engine starts.

Transmission High/Low (30) (if equipped)

Speed Control – This switch controls the speed range of the machine. The machine must be stationary to change the speed range. Stop the machine. Apply the service brake and hold the service brake.

High Speed Range – Press the top of the switch. The display will indicate speed range "H" when the High gear is engaged.

Low Speed Range – Press the bottom of the switch. The display will indicate speed range "1" or "2" when the Low gear is engaged.

Note: Ensure that the service brake is pressed and held while changing speed range from Low to High or High to Low. Changing speed range may take up to 5 seconds. The display will show a gear symbol while the shift is in process. Repeated operation of the brake pedal when performing gear shift may result in the brake pedal not achieving the correct position to enable a gear shift.

Creeper Control (31)

Creeper Control – The creeper control allows speed control from a full stop to full runout speed for the speed range. Turn the control clockwise to obtain maximum speed for a given engine rpm. Turn the control counterclockwise to reduce travel speed without reducing engine rpm. The creeper control will only work in speed range 1 and in speed range 2.

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Options for Joystick Control

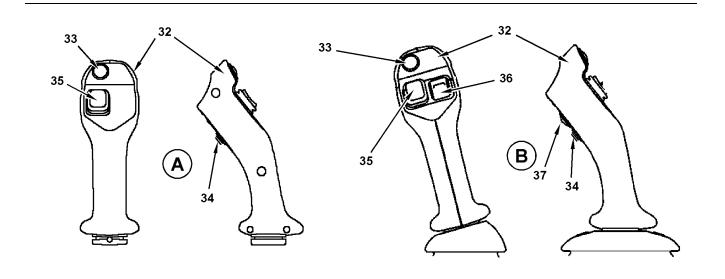


Illustration 86

(A) 2 Valve, 1 Handle

(B) 3 Valve, 1 Handle

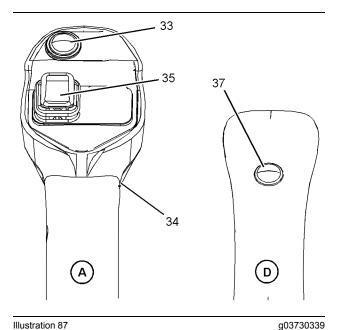


Illustration 87 Japan 3 Valve, 2 handle

- (32) Joystick Control
- (33) Speed 1 and Speed 2
- (34) Differential Lock
- (35) Forward/Neutral/Reverse Control

- (36) Proportional 3 Auxiliary Hydraulics
- (37) Continuous Flow

Float Enable and Disable Modes – Default setting from the factory the float function is enabled. If required it is possible to Disable and or Enabled the Float depending on the operators requirements.

The following steps explain how to disable and or enable.

- 1. Push the Implement Lockout Switch to disable the implements.
- **2.** Move the joystick to 100% forward into the full detent position and back to HOLD 3 times in quick succession within 1 second.
- **3.** The LED Float Indicator Lamp on the front display will blink 3 times to indicate that the above step has been successful and changed the status as required.
- 4. To confirm that the correct status has been achieved (Enabled or Disabled) push the Implement Lockout Switch to enable the implements and then in a safe area perform an operation check to see if the Float function is activated or deactivated and changed to the required status.

FLOAT – There are 2 activation methods for float.

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DUMP – Move the joystick to the right.

- Operator holds float position.
- Locked float activation position.

1. Operator Holds Float

Push the lever fully forward as far as it will travel to engage the detent position, this will activate float control. When the lever is moved into the detent, the operator will feel a slight change in the required effort to push the joystick into the detent. Releasing the joystick back to the hold position will stop the float control.

Note: This can only be held for 60 seconds as it will automatically release after that time.

2. Locked Float Activation

Push the lever fully forward through to the detent position and immediately release the joystick to allow it to return to the HOLD position. This will activate float and float willmaintained until a command to cancel it is made. To cancel this locked float position, move the joystick control to the lift position and when you see any movement of the loader the float will have been canceled.

Note: In both cases when activating/deactivating float function the indicator light on the front display will flash 3 times.

In both cases when float is active then the LED light indicator on the front display will be lit.

LOWER - Push the joystick forward.

HOLD – The joystick will return to this position when the joystick is released.

Rack Back Positioner (If Equipped) – Switch on the Keypad Control needs to be activated first to allow Rack Back Positioner to operate. Move the joystick lever fully to the left into the detent to activate the Rack Back Position.

When the operator moves the joystick lever to the detent position, the operator will feel a slight effort change to push the joystick into the detent position. Once the detent position has been reached, release the lever which will return to the HOLD position, Rack Back Position will now be activated.

To override/cancel the Rack Back Position the joystick lever must be moved at least 25% from HOLD in either left or right movement. The Kick Out Position will not be activated if the lever is held in the detent position for more than 1 second. The Kick Out will not be activated if the lever is not returned to the HOLD position within 1 second. To set the required Rack Back Position go to the section, "Adjustment, Rack Back Position (Work Tools)"

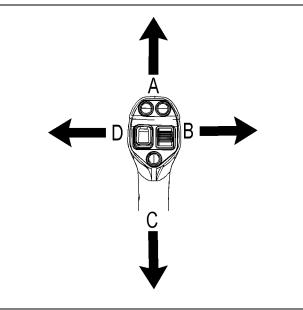


Illustration 88

- (A) Lower
- (B) Dump

(C) Raise

(D) Rack

Bucket Shake-out – Depending on machine configuration this feature may not be activated from the factory. If you need the setting to be changed to activated or deactivated, please contact your dealer to change the settings through the service tool.

This feature is used as stated and gives a rapid Bucket Shake Out Mode. To operate this Bucket Shake Out the operator needs to rapidly move the joystick left and right (dump to rack back) through the HOLD position at least 3 times in 0.5 of a second.

This action bypasses the normal implement commands and issues direct commands to the valves to provide abrupt bucket movement to shake out stuck material. After the initial 3 movements to set the Shake Out Mode continued quick joystick movements will allow continued operation of this function.

When the rapid movement stops then the Shake Out function will stop. The amount of joystick travel to activate this feature decreases proportionally depending on the selected implement aggressiveness settings.

Speed Range Selection (33)

Press and release button 33 to change from speed range "1" to speed range "2" or from speed range "2" to speed range "1". This operation can be performed while the machine is in motion.

Differential Lock (If Equipped)

There are 2 methods of activation, Press, and Hold or Press and Release as described below.

1. Press and Hold button mode allows the differential to be held engaged all the time the button is pressed.

To activate this mode push button (34) and hold the button to lock the differentials. Release the button (34) to unlock the differentials.

Note: The differential lock will stay engaged through any directional changes.

2. Press and Release mode allows the engagement and disengagement without any need to hold the button pressed constantly. To activate this mode press and immediately release the button (34) (in less than 1 second) to lock the differentials. To unlock the differentials press and immediately release the button (34) (in less than 1 second).

The differential lock will only activate if the machine speed is less than 10 km/h (6.8 mph), and it will automatically deactivate if the speed is greater than 11 km/h (6.8 mph). If travel speed is greater than 11 km/h (6.8 mph) activation will not be allowed.

Note: The differential lock will automatically disengage when any direction change is made. This feature can be disabled via the service tool please contact your dealer.

Note: Both the front differential and the rear differential will lock.

Forward/Reverse Control (35)

Note: A control rocker switch on the implement joystick comes standard on all machines. Some machines are equipped with an optional, secondary directional control on the column.



FORWARD – Press the top of the directional control switch to enable forward travel.



NEUTRAL – Press the directional control switch to the middle position to neutralize the transmission and to hystat braking

provide hystat braking.



REVERSE – Press the bottom of the directional control switch to enable reverse travel.

Note: If the parking brake is engaged and the directional control switch is in the FORWARD position or the REVERSE position, the machine will not move. Move the direction control switch to the NEUTRAL position and release the parking brake in order for the hydrostatic drive to be engaged.

Auxiliary Hydraulics

Auxiliary Flow Control

Move the auxiliary control roller (36) or secondary joystick (if equipped) to supply auxiliary hydraulic flow. The work tool function will depend on the work tool attached and the connection to the auxiliary hoses.

To supply continuous flow, move the auxiliary control roller (36) or secondary joystick (if equipped) to the desired flow. Hold that command and press and release the Continuous Flow button (37). Then release the auxiliary command to the neutral position. When Continuous Flow is active, the Continuous Flow icon will illuminate on the display.

To cancel Continuous Flow either move the auxiliary control roller (36) or secondary joystick (if equipped) out of neutral or alternatively, press and release the Continuous Flow button again while the auxiliary control is in the neutral position.

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Changing Direction and Speed

SMCS Code: 1000; 3030; 3100; 4269; 5462; 5705; 7000; 7300; 7451

NOTICE

For operator comfort and maximum service life of power train components, deceleration and/or braking is recommended before any directional shifts are made.

Directional changes at full engine speed are possible. However, if you are changing direction, reducing the machine speed and/or braking the machine is recommended. Keep a loaded bucket low to the ground.

Reference: For more information, refer to Operation and Maintenance Manual, "Operator Controls".

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Diesel Particulate Filter Regeneration

SMCS Code: 108F

General Information

Regeneration is the removal of soot from the Diesel Particulate Filter (DPF). Active and passive regeneration are used to regenerate the DPF. The DPF traps both soot and ash. The soot is removed during regeneration. The ash is removed through a cleaning process. Refer to the Operation and Maintenance Manual, "Diesel Particulate Filter -Clean/Replace" for more information on the service of the DPF.

Modes of Regeneration

Passive – Passive Regeneration occurs when the exhaust temperature is high enough for regeneration to occur. Passive regeneration may occur unnoticed by the operator. No operator action is required. Operating the machine above mid throttle and under load allows for passive regeneration during normal operation. Low idle and low load applications will have lower exhaust temperatures, where passive regeneration is not possible.

Active – Active regeneration is a late injection of fuel into the combustion chamber, which sufficiently raises the exhaust temperature for an active regeneration. The engine ECM uses multiple inputs from the engine to determine when active regeneration is needed. All applications, even high load, will require active regenerations. However, active regeneration will not occur as frequently as low idle and low load applications

There will be a slight change in the exhaust noise during an active regeneration. Active regenerations may require the engine rpm to be above the active regeneration threshold. The active regeneration may take up to 30 minutes to complete.

When an active regeneration is required with the parking brake engaged and the implements and auxiliary hydraulics not being operated, automatic adjustments of the engine speed by the ECM may occur to keep the engine RPM above the active regeneration threshold.

When an active regeneration is required, and the machine is being operated below the mid Throttle. The Warning symbol 1 "Engine Emission System (DPF) will illuminate. The operator can increase the engine speed above mid throttle with the throttle pedal or throttle lock (if equipped). An active regeneration will occur and the DPF light will turn off.

If increasing the RPM is not acceptable, alternatively the operator can allow a parked regeneration. There are three states that are checked for with three different time durations for activating a parked regen.

Idle State 1 – Machine not moving, Transmission in NEUTRAL, Implements Not Operated - If these conditions are met for approximately 3 minutes, the ECM will slowly increase engine speed, and an active regen will begin.

Idle State 2 – Same as Idle State 1 plus the Park Brake is engaged - If these conditions are met for approximately 2 minutes, the ECM will slowly increase engine speed, and an active regen will begin.

Idle State 3 – Same as Idle State 2 plus the Implements are locked out - If these conditions are met for approximately 1 minute, the ECM will slowly increase engine speed, and an active regen will begin.

After completing the active regeneration the engine speed will slowly decrease down to low idle.

The following chart describes the alert indicators and what actions, if any, the operator needs to perform to allow an active regeneration.

Warning Symbols



1 - Engine Emission System (DPF) – This emissions indicator appears on the LCD screen on the monitor.



2 - Action Lamp – This indicator appears on the center top position of the monitor.



3 - Engine Condition Indicator – This indicator appears on the lower right side of the monitor.

4 - Action Audible Alarm – Repetitive alarm inside Cab



5 - DPF Ash Load Indicator – This indicator appears on the LCD screen on the monitor.



6 - Engine Emission Malfunction – This indicator appears on the LCD screen on the monitor.

The Stage V C3.3B engine has the ability to estimate the ash level in the DPF, starting at 3,000 hours. When the ash load reaches an estimated 100% level the DPF Ash Load Indicator will appear in the LCD display notifying the operator that a DPF service is required soon. This allows the customer to proactively schedule a service rather than operating until an engine derate occurs. Due to the wide range of machine applications and load factors, it is not possible to publish a specific ash service target. However, the ash service life is expected to be greater than 3,000 hours for most applications and up to a maximum of 6,000 hours, at which point the DPF must be changed.

Note: The DPF ash load indicator will not be active below 3000 hours. When the ash load indicator is active, please contact your local Caterpillar dealer for DPF replacement/service at your earliest opportunity.

Note: The following Operator Actions are required when these Warning Symbols appear on the Monitor.

Illustration 89

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Schedule DPF service with authorized Cat dealer when practical or at earliest convenience.



Illustration 90

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Schedule a service urgently (At least 50hrs has elapsed without DPF service)

Note: Machines equipped with EU Stage V Emission Controls will also use alert indicators 1 and 3 to signal system failure. Refer to this Operation and Maintenance Manual, Diesel Particulate Filter Regeneration EU Stage V Emissions Control System for applicable models and details.

Engine Emission Alert

Table 23

Warning Symbol	Machine Action	Operator Action	
None	If the parking brake is engaged and the implements and the auxiliary hydraulics are not active, the ECM may increase the engine speed.		
Warning Symbol 1	If the parking brake is not engaged and the engine rpm is below mid throttle, an active regeneration will begin. If the parking brake is not engaged and the engine rom is below mid throttle, an active regeneration will begin. If the parking brake is not engaged and the engine regeneration was not completed or Bring the machine to a stop. Engage the parking brake. Set the engine speed to low idle. The ECM will automatically increase the engine r above mid throttle. The regeneration may take up to 30 minutes.		
Warning Symbol 1, 2 & 3	The engine will derate until an active regeneration is completed	Bring the machine to a stop. Engage the parking brake. Set the engine speed to low idle The ECM will automatically increase the engine rpm above mid throttle. The regeneration may take up to 30 minutes.	
Warning Symbol 1, 2 & 3 Action Audible Alarm	Engine will remain derated.	Regeneration can only be done through Cat Electronic Technician (ET), by an authorized Cat dealer. Consult your local Cat dealer. If the engine is run through these warning indicators, the DPF will require servicing and may require replace- ment. Engine damage can occur.	

Carbon Dioxide (CO₂) Emissions Statement

Emissions regulations require that the value of the CO_2 emissions be reported to the end user. For this engine, 807 g/kWh was determined to be the CO_2 value during the EU type approval process. This value was recorded in EU type approval certificate. This CO_2 measurement results from testing over a fixed test cycle, under laboratory conditions, with a parent engine representative of the engine family. This value shall not imply or express any guarantee of the performance of a particular engine.

EU Stage V Emissions Control System (European Union)

Operation & Maintenance of the Stage V Emissions Control System

The engine, including the emissions control system, shall be operated, used, and maintained in accordance with the instructions provided to the end users to maintain the emissions performance of the engine within the requirements applicable to the engine's category.

No deliberate tampering with or misuse of the engine emissions control system should take place; in particular regarding deactivating or not maintaining an exhaust gas recirculation (EGR) or a reagent dosing system if equipped.

It is essential to take prompt action to rectify any incorrect operation, use, or maintenance of the emissions control system.

Failure Warnings and Operator Inducement Strategy

The EU Stage V Emissions Control system detects failures of the system by Particulate Matter control diagnosis (PCD) and NOx control diagnosis (NCD). The system logs warning codes in the engine's electronic control module (ECM) and signals the operator of system failure detection via a combination of visual and audible warnings in the machine's operator station. Ignoring the operator warning signals will lead to the activation of the operator inducement system, which may result in an effective disablement of the machine.

Table 24

EU Stage V Emissions Control System Failure Warnings					
Emission Failure Cause	Control Diagnostics System	Visual Warnings via Display	Audible Warning via Cab Alarm	Inducement Response	
Removal of the DPF system	PCD (Particulate Matter)	Warning Icons 2, 3 & 6	Yes	None	
Loss of function of the DPF system			No		
Failure of the PCD system			No		
Removal of the EGR system			No	2 Stage Engine Derate	
Removal of the MAF sensor	NCD (NOx Emission)		Yes		

EU Stage V Emissions Control System Inducement Levels

Stage 1 Inducement

- Response: Engine De-rated to within 50% Max Torque, 60% Rated speed
- Occurrence: After 3 hours 15 minutes of active fault

Stage 2 Inducement

- Response: Engine delivers nearly No Net Torque, Engine Speed near low idle
- Occurrence: After 4 hours of active fault

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Product Link

SMCS Code: 7490; 7606

Note: Your machine may be equipped with the Cat $^{\mbox{\tiny \ensuremath{\mathbb{S}}}}$ Product Link $^{\mbox{\tiny \ensuremath{\mathbb{S}}}}$ 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 - 121SR/321SR/420/421/522/523"

- Operation and Maintenance Manual, SEBU8832, "Product Link PLE601, PL641, PL631, PL542, PL240, PL241, PL141, PL131, PL161, and G0100 Systems"
- Operation and Maintenance Manual, M0088349, "Product Link PL042 and PLE702 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, "Installation Procedure forProduct Link PLE640 Systems" REHS7339
- Special Instruction, "Installation Procedure for the Elite Product Link PLE601, PLE641, and PLE631 Systems"REHS8850
- Special Instruction, "Installation Procedure for the Product Link PL131, PL141, and PL161 Systems"SEHS0377
- Special Instruction, "Installation Procedure for the Pro Product Link PL641 and PL631 Systems"REHS9111

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Machine Security System

SMCS Code: 7631

Antitheft Keypad Owner Functions

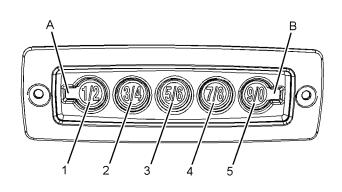


Illustration 91

- (1) Button for numbers one and two
- (2) Button for numbers three and four
- (3) Button for numbers five and six
- (4) Button for numbers seven and eight
- (5) Button for numbers nine and zero
- (Á) LED 1
- (B) LED 2

The antitheft keypad immobilizes the engine, transmission, and hydraulic systems until a valid password is entered. The password is of four characters or six characters. Two numbers are shown on each button for reference, the system recognizes the button press order. For example, for code "3-1-4-4-2-7" or code "4-2-3-3-1-8" press buttons "2-1-2-2-1-4" .

Note: A "Master" passcode and operator 'User" passcode are set by your Caterpllar dealer via the service tool upon machine delivery. Remember this code to avoid dealer visits to reset the master code. The factory shipped default is set to MSS OFF.

Normal Customer Operation

Unlock the Machine Keypad



Unlock – The unlock indicator (A) is located to the left of button (1) and will illuminate green when the keypad is unlocked.

- 1. At key on, the indicator (A) will flash red, enter desired User password within 10 minutes.
- 2. If password is correct, the unlock indictor will illuminate Green and double beep will be heard. The system is now unlocked. If an incorrect password is entered, the lock indicator will flash Red.

Note: If the password is entered 5 times incorrectly, the keypad will be placed in tamper mode and will be disabled for 15 minutes.

Note: If the key is turned to off position after 5 incorrect codes have been entered the key needs to be left on key position 1 or 2 for the system to reset.

- 3. If a valid password is entered with the key in the off position, the system will not Unlock until the key has been turned On.
- 4. If the key switch is turned to the ON position but no password is entered within 10 minutes. The system will lockout and the key switch must be turned to the OFF position again to reset.

Tamper Lockout procedure

- 1. When five wrong passcodes are entered, the keypad enters into Tamper Lockout mode and "LED 2" will flash alternating from red to amber.
- 2. Tamper mode will run for 15 minutes. Wait with the key switch ON for "LED 2" to flash a slow red light before re-entering a password.

Lock the Machine Keypad



Lock – The lock indicator (B) is located to the right of button (5) and will illuminate red when the keypad is

- 1. Turn the keyswitch to the OFF position. The unlock indicator will flash.
- 2. After a 30 second time period the keypad will automatically Lock and the Lock indicator will illuminate red.
- 3. If the keyswitch is returned to the ON position during the 30 second timeout the keypad resumes unlocked.

Note: The factory default lock time is set at 30 seconds after key off, this can be adjusted to suit operator / application preferences via the service tool - Please contact your Caterpillar dealer for further information.

Delayed Lock Feature

Temporarily keeps the machine unlocked for 15 minutes.

- 1. When turning the key switch to the OFF position, press and hold button (3) for 1 second, "LED 1" will flash green. The machine is now "Unlocked" for next 15 minutes. The machine will enter the "Locked" state after that time frame has expired.
- 2. To reset extended delay and lock machine, press button (5) at Key switch OFF position.

Note: To instantly lock the machine after key off press button (5), this will lock the machine regardless of the preset lock delay.

To Unlock with Master Password

- 1. Press and hold button (1) and button (5) for 2 seconds. "LED 2" will flash amber.
- Enter the four or six-digit "Master" code to unlock.

Master Passcode Administration

The "Master" password is used to log in and Add or Delete the User passcodes quickly from the Keypad buttons as follows:

- 1. Press and hold button (5) for 5 seconds. The backlights will flash.
- 2. Enter six-digit "Master" passcode. The keypad will beep twice and both LED lights will flash amber.

Note: When the amber LED's are flashing the system is in administration mode.

- **3.** Press button (1) to add passcode. Or press button (3) to delete passcode. Press button (5) to exit the function.
- 4. To Add a new User passcode:
 - Press button (1), listen for double beep to sound.
 - Enter the new four digit or six digit "User" passcode. Double beep sounds at end of code entry.
 - Re-enter the new "User" passcode. If passcode is OK, four beeps will sound. If passcode does not match, one long beep will sound.
 - Keypad returns to Mode Select entry. Press button (1), (3), or (5). Both LED indicator lights flash Amber.
 - To enter another "User" passcode, press button (1) and repeat the steps above.

5. To Delete an existing User passcode:

- Press button (3) at mode selection.
- Enter the password to be deleted. The passcode will be a 4-digit or 6-digit passcode. A double beep will sound at entry.
- Re-enter the passcode to delete. If password is deleted successfully, four beeps will sound. If passcode does not match, one long beep will sound.
- Keypad returns to Mode Select entry. Press button (1), (3), or (5). Both LED indicator lights flash Amber.

Note: If unknown codes have been previously entered in to the system and require deleting, Please contact your local Caterpillar dealer.

6. To exit the administration mode, press button (5) to return to normal operation. "LED 2" will flash Red.

Note: If no button is pressed for 30 seconds or a mistake is made, cycle the keyswitch OFF then ON and the keypad returns to the beginning.

Note: If unknown codes have been stored and are to be deleted, please contact your local Caterpillar dealer.

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Backup Alarm (If Equipped)

SMCS Code: 7406

Backup Alarm – The alarm will sound when the transmission direction control is in the REVERSE position. The alarm is

used to alert people behind the machine that the machine is backing up. Backup lights also turn on with the alarm.

The backup alarm is mounted at the rear of the machine within the counterweight.

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Alert Indicators

SMCS Code: 7450; 7451

Alert Indicator Panel

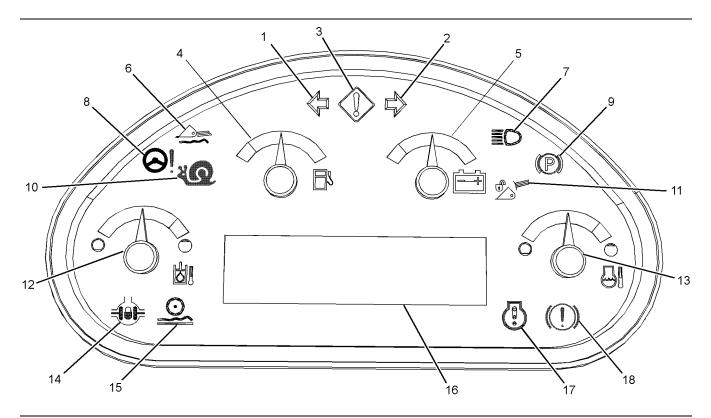


Illustration 92

- (1) Left Turn Signal
- (2) Right Turn signal
- (3) Action Lamp
- (4) Fuel Level
- (5) Battery Voltage
- (6) Implement Float Active

- (7) High Beam (8) N/A
- (9) Parking Brake
- (10) Creeper
- (11) Quick Coupler Unlock
- (12) Hydraulic Oil Temperature



Left Turn Signal – Alert indicator (1) will flash when the left turn signal is activated.



Right Turn signal – Alert indicator (2) will flash when the right turn signal is activated.



Action Lamp – Alert indicator (3) will light to inform the operator of a malfunction in the operating system.

Table 25

WARNING OPERATION					
Warning Level	Alarm	Action Lamp			
Level 1	OFF	OFF			
Level 2	OFF	Flashing			
Level 2-Special	ON	Flashing			
Level 3	Pulsating	Flashing			

The monitoring system has the following four warning levels for events:

Level 1 – This warning level is identified by the illumination of a respective warning lamp. This warning level is used to indicate that the machine

g03731440

- (13) Engine Coolant Temperature
- (14) Differential Lock (if equipped)
- (15) Ride Control Active (if equipped)
- (16) LCD Display
- (17) Engine Condition Indicator
- (18) Low Brake Charge Pressure

needs attention soon. No harm to the machine has occurred.

Level 2 – This warning level is used to indicate that the operation of the machine should be changed. Possible severe damage to components on the machine may occur.

Special Level 2 – This warning level is used to indicate that the operation of the machine should be changed as soon as possible. Possible severe damage to components on the machine may occur. The warning light may flash either red or yellow.

Level 3 – This warning level is used to indicate that the machine needs to have a safe emergency engine shutdown. Possible injury to the operator or severe damage to components may occur.



Implement Float Active – Alert indicator (6) will light when float is active.

High Beam – The alert indicator (7) will light when the high beams are on.

Parking Brake – Alert indicator (9) will light when the parking brake is engaged.



Creeper – Alert indicator (10) will light when the machine is in creeper mode.



Quick Coupler Unlock – Alert indicator (11) will light when the quick couple disengage function is active. Lock the quick coupler before operating the machine.



Differential Lock (If Equipped) – Alert indicator (14) will light when the differentials are locked.



Ride Control Active (If Equipped) – Alert indicator (15) will light when the ride

control is active. Ride Control must be enabled on the keypad. The machine must be above the set speed for the feature to activate and the light to illuminate. The light will be off when ride control is deactivated.



Engine Warning – Alert indicator (17) will light when an engine warning is activated.



Low Brake Charge Pressure – Alert indicator (18) will light when the brake charge pressure is low or there is a fault on the brake charge sensor.

Gauge Panel



Fuel Level – Gauge (4) displays the fuel level.

Note: Alert will illuminate when fuel level drops below 15%.



Battery Voltage – Gauge (5) display Battery Voltage level.



Hydraulic Oil Temperature – Gauge (12) indicates the temperature of the hydraulic oil.



Engine Coolant Temperature – Gauge (13) indicates the temperature of the engine coolant.



LCD Display – The LCD display (16) provides a display area for functions of the machine. Look below under LCD Display for more specific information.

LCD Display

99999.9

Illustration 93

a03646264

When the machine is off (Key Off and Engine Off) the LCD will display the last known Service Meter Hours.

99999.9 Jrpm

Illustration 94

g03646396

Once the machine is not started, if the Park Brake is ON, then the LCD will display the service meter hours, and direction.

800rpm 99999.9

Illustration 95

g03646289

g03646422

Once the machine is started, if the Park Brake is ON, then the LCD will display Service Meter Hours, Machine Direction, and engine speed.



Illustration 96

LCD Indicators



Illustration 97

g03646476

Alert indicators that are displayed in the bottom of the LCD display are listed below.



Glow Plug – Indicator will be used to inform the operator that the engine is too cold to start, and the operator

should wait until the indicator turns off before starting.



Machine Security System – Indicator will illuminate when the machine security system is activated.



Hydraulic Oil Filter Bypass – Indicator will illuminate to show the operator that the hydraulic oil filter bypass switch was enabled due to a certain PSI threshold.



ECO Mode – Indicator will illuminate when machine is in Machine Fuel Economy Mode.



Continuous Flow – The alert indicator will illuminate indicating the auxiliary hydraulic system is in the Continuous

Flow mode.



Constant Speed Drive – The alert indicator will illuminate when machine is in Constant Speed Drive.



Diesel Particulate Filter (DPF) – This indicator illuminates when a regeneration cycle of the diesel particulate filter (DPF) is needed.



Ash Level Indicator – The Stage V C3.3B engine has the ability to estimate the ash level in the DPF, starting at 3,000

hours. When the ash load reaches an estimated 100% level the icon will appear in the LCD display notifying the operator that a DPF service is required soon.

Once the machine is started, if the Park Brake is OFF, then the LCD will display, machine ground speed, machine gear and direction, and engine speed.



Engine Emission Malfunction – This indicator illuminates when one or more of the conditions in Table 24 in the "Diesel Particulate Filter Regeneration" section

has occurred. Will always be accompanied with Warning symbols 2 & 3.

i02608407

Parking Brake

SMCS Code: 7000

Please refer to the illustration in Operation and Maintenance Manual, "Alert Indicators" for the location.

The parking brake indicator on the operator panel and the NEUTRAL indicator on the operator panel will light when the parking brake lever is pulled up.

NOTICE

Moving the machine with the parking brake engaged can cause excessive wear or damage to the brake. If necessary, have the brake repaired before operating the machine.

Please refer to the illustration in Operation and Maintenance Manual, "Operator Controls" for the location.

If the direction control switch is in the FORWARD position or in the REVERSE position, the machine will not move when the parking brake is released. Move the direction control switch to NEUTRAL. Then, move the direction control switch to the desired direction in order for the hydrostatic drive to be engaged.

i06227084

Work Tool Operation

SMCS Code: 6700; 7000

Refer to Operation and Maintenance Manual, "Caterpillar Approved Work Tools" for a list of approved work tools for this machine.

Refer to Operation and Maintenance Manual, "Operator Controls" for the location and operation of the controls that are referenced below.

Note: All of the work tool functions that are described below are viewed from the operator station.

Operate the machine and the work tool slowly in an open area. Check for proper operation of all controls and all protective devices on the machine and the work tool.

Note: During initial operation, unexpected motion may occur due to air in the hydraulic system. Cycle the hydraulic system approximately five times in order to purge air out of the circuit. You may need to add hydraulic oil to the machine after the machine fills the hydraulic circuits of the work tool. Refer to Operation and Maintenance Manual, "Hydraulic System Oil Level - Check" for the proper procedure for checking the hydraulic oil level.

Simple Hydromechanical Work Tools

Read the manual and understand the instructions and warnings in the Operation and Maintenance Manual for these work tools. Consult your Cat dealer for replacement manuals. Proper care is your responsibility.

Standard Auxiliary Hydraulics

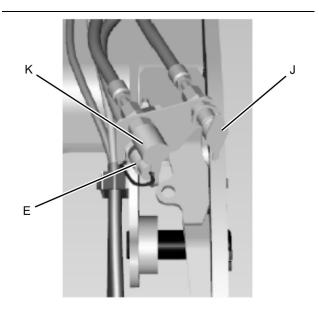


Illustration 98

q03803239

Auxiliary Hydraulic Connections for Simple Work Tools

(1) Female Connection

(2) Male Connection

(3) Electrical Connection

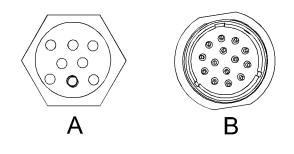


Illustration 99

g03803260

(A) 8way electrical connector(B) 14way electrical connector

The auxiliary hydraulic oil flow is controlled with button (36) and with button (37) on the joystick for pilot controlled machines.

Multipurpose Bucket

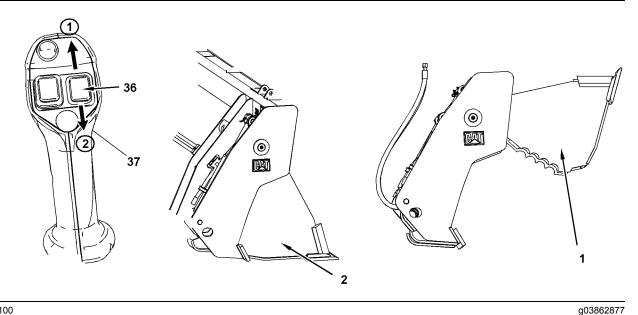


Illustration 100

Pilot Controls

Move the thumb wheel (36) to the top (1) in order to open the clam on the bucket.

Move the thumb wheel (36) to the bottom (2) in order to close the clam on the bucket.

High Flow Hydraulics

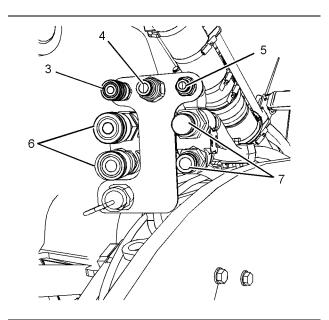


Illustration 101

g03803378

Horizontal option

(3) Activating button 4 in cab causes flow from this QD

(4) Case Drain

(5) Activating button 3 in cab causes flow from this QD

(6) Thumb Roller - Down Flow from this QD(7) Thumb Roller - Up Flow from this QD

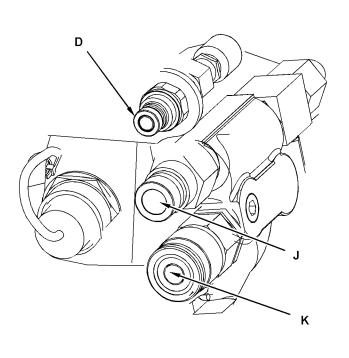


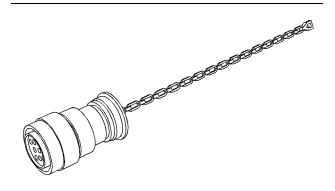
Illustration 102

g02879776

Connections for High Flow Hydraulics

The auxiliary hydraulic oil flow is controlled with button (36) on the joystick. Move the thumb wheel in an upward direction on the pilot joystick in order to provide hydraulic flow to connector (J). Move the thumb wheel in a downward direction on the pilot joystick in order to provide hydraulic flow to connector (K).

Excess oil flows to connector (D). Connector (D) returns oil to the hydraulic tank.



Note: The high flow option is activated by connecting the electrical harness for the work tool. If the high flow work tool has an electrical harness, the electrical harness must be attached in order to activate the high flow. If the high flow work tool does not require an electrical harness, the work tool will have an electrical jumper. The jumper must be attached in order to activate the high flow.

Complex Hydromechanical Work Tools

Note: For the functionality of Cat Complex Work Tools, read the Operation and Maintenance Manual for the work tool.

Consult your Cat dealer for replacement manuals. Read all the safety messages and understand all the safety messages for each work tool.

i06089249

Work Tool Coupler Operation

SMCS Code: 6129; 7000

🔥 WARNING

Improper Attachment of the Work Tool could result in injury or death.

Do not operate the machine without confirmation that the coupler pins are fully engaged. Follow the operating procedures in the Operation and Maintenance Manual.

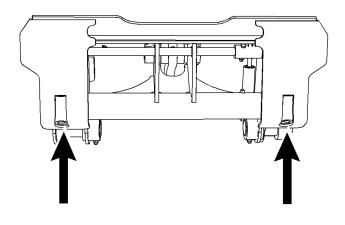
Note: The auxiliary hydraulic lines for the work tool must be disconnected before you operate the work tool coupler. Inadvertent motion of the work tool could occur.

Note: Identify the style of work tool coupler that is installed on your machine.

Identify the Work Tool Coupler

The machine may have a Vertical Pin Work Tool Coupler or a Horizontal Pin Work Tool Coupler. The operation of the coupler pins is different for each style. The following illustrations will help you identify the type of coupler on your machine.

Illustration 103 Electrical Jumper g01501910



g01354539

Illustration 104 Vertical Pin Work Tool Coupler

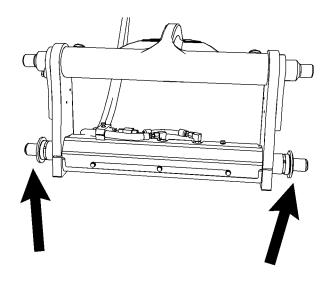


Illustration 105 Horizontal Pin Work Tool Coupler g03803489

Attaching the Vertical Pin Work Tool Coupler

Note: Before you install the work tool, inspect the coupler and the work tool mounting bracket for any wear or for any damage. Ensure that the work tool mounting bracket and the face of the coupler are clean. Ensure that the coupler has no accumulation of material. Refer to Operation and Maintenance Manual, "Quick Coupler - Clean/Inspect" and Operation and Maintenance Manual, "Work Tool Mounting Bracket - Inspect" for inspection procedures.

- 1. Position the work tool on a level surface. Move the hydraulic lines (if equipped) for the work tool away from the work tool mounting bracket.
- **2.** Ensure that the coupler pins are fully retracted before you align the work tool coupler with the hooks on the work tool.
- **3.** Refer to Operation and Maintenance Manual, "Operator Controls" for details on the location and the operation of the hydraulic work tool coupler control.
- 4. Enter the machine.
- 5. Fasten the seat belt.
- 6. Start the engine.
- 7. Disengage the parking brake.
- 8. Tilt the work tool coupler forward.

q01354513

- **9.** Align the work tool coupler between the outer plates of the mounting bracket. Move the work tool coupler under the angled plate of the mounting bracket and rack back the work tool.
- 10. Press the bottom of the work tool control (23) on the right-hand console in order to engage the coupler pins. Refer to Operation and Maintenance Manual, "Operator Controls" for details on engaging the coupler pins.
- **11.** Fully lower the loader arms.
- **12.** If the work tool is equipped with auxiliary hydraulic lines, perform the following procedure.

Note: Ensure that the hydraulic oil in the work tool is compatible with the host machine. If the oil is not compatible, the work tool system will need to be flushed.

- a. Stop the engine.
- b. Turn the engine start switch key to the ON position.
- c. Move the auxiliary control back and forth in order to relieve hydraulic pressure within the auxiliary lines.
- d. Turn the engine start switch key to the OFF position.
- e. Apply the hand brake and exit the machine.
- f. Ensure that the quick connect couplers are clean.
- g. Connect the auxiliary hydraulic hoses for the work tool to the machine. Twist the collar of the quick connect coupler for one guarter of a turn in order to secure the hydraulic connections. Refer to Operation and Maintenance Manual, "Operator Controls - Auxiliary Hydraulic Controls" for operating details. If the work tool is equipped with electrical lines, then route the electrical lines with the hydraulic hoses. Connect the wire harness to the electrical connector on the host machine. Check the connections in order to ensure that the connections are properly secured. Check the connections on the work tool in order to ensure that the connections are in the correct receptacle.

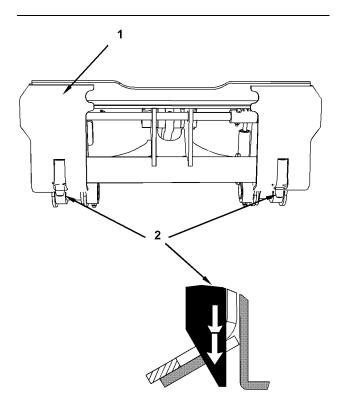


Illustration 106

(1) Hydraulic Work Tool Coupler

(2) Coupler Pins

- **13.** Engagement of the work tool mounting bracket must be verified.
 - a. Visually ensure that both coupler pins (2) are extending out of the holes in the work tool mounting bracket.

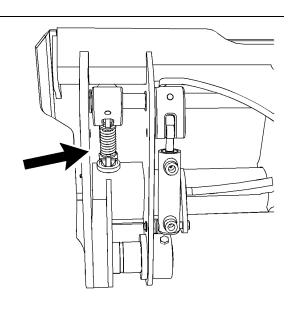


Illustration 107 g03803509 Coupler link arm in the DISENGAGED position

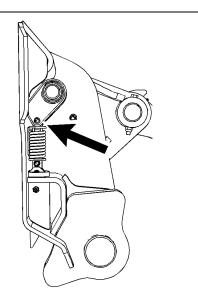


Illustration 108g03803521The coupler link arm must move over center. Note
the side panel is removed for clarity.

- b. The coupler link arm must move over center.
 Ensure that the coupler link arm has gone over center and ensure that the coupler link arm is touching the front plate of the coupler. If the coupler link arm did not move over center, then the work tool is not secure on the coupler.
 When the coupler link arm is over the center, the coupler pins are locked.
- **14.** Also use the following procedure to verify engagement of the coupler pins.

- a. Enter the machine.
- b. Fasten the seat belt and lower the armrests.
- c. Start the engine.
- d. Disengage the parking brake.
- e. Raise the work tool off the ground.
- f. Visually inspect the coupler pins (2) in order to ensure that the pins are fully extended through the work tool.
- g. Activate the tilt control in order to tilt the work tool downward.
- h. Apply down pressure on the work tool.

Note: The work tool Operation and Maintenance Manual will inform you if forward pressure should not be applied on a work tool.

- i. Move the machine backward. Ensure that the coupler pins do not disengage from the work tool.
- **15.** Test the work tool for leaks and for proper operation.

Removing the Vertical Pin Work Tool Coupler

WARNING

Disengaging the coupler pins will release the work tool from control of the operator.

Serious injury or death may result from disengaging the work tool when it is in an unstable position or carrying a load.

Place the work tool in a safe position before disengaging the coupler pins.

WARNING

Inadvertent movement of the work tool may occur if the coupler pins are disengaged before the auxiliary hose lines are disconnected.

Serious injury or death may result from disengaging the coupler pins before the auxiliary hose lines are disconnected.

Place the work tool in a safe position and disconnect the auxiliary hose lines before disengaging the coupler pins.

NOTICE

Pulling the work tool with the auxiliary hoses could result in damage to the host machine or the work tool.

- 1. Position the machine on level ground.
- 2. Lower the work tool to the ground.
- **3.** If the work tool is equipped with auxiliary hydraulic lines, perform the following procedure.
 - a. Stop the engine.
 - b. Turn the engine start switch key to the ON position.
 - c. Move the auxiliary control back and forth in order to relieve hydraulic pressure within the auxiliary lines.
 - d. Turn the engine start switch key to the OFF position.
 - e. Apply the hand brake and exit the machine.
 - f. Disconnect the auxiliary hydraulic lines for the work tool.

Note: If protective caps are available, install protective caps over the quick connect couplers.

Note: Connect the hoses for the work tool together. Connecting the hoses together will reduce the probability of contaminating the hydraulic system. Connecting the hoses together will reduce the buildup of pressure in the hoses. Connecting the hoses together will ease the connection of the hoses to the machine.

- **4.** If the work tool is equipped with an electrical line, then disconnect the wire harness from the connector on the machine. If protective caps are available, install protective caps over the electrical connectors.
- 5. Enter the machine.
- 6. Fasten the seat belt.
- 7. Start the engine.
- 8. Disengage the parking brake.
- **9.** Move the lock on the work tool control (23) on the right-hand console. Press the top of the switch. The coupler pins will disengage.
- **10.** Tilt the work tool coupler forward. Lower the work tool coupler away from the work tool.

11. Back away from the work tool.

Attaching the Horizontal Pin Work Tool Coupler

Note: Before you install the work tool, inspect the coupler and the work tool mounting bracket for any wear or for any damage.

- 1. Position the work tool on a level surface. Move the hydraulic lines (if equipped) for the work tool away from the work tool mounting bracket.
- **2.** Ensure that the coupler pins (2) are fully retracted before you align the work tool coupler with the hooks on the work tool.
- **3.** Refer to Operation and Maintenance Manual,, "Operator Controls" for details on the location and operation of the hydraulic work tool coupler control.
- 4. Enter the machine.
- 5. Fasten the seat belt.
- 6. Start the engine.
- 7. Disengage the parking brake.
- 8. Tilt the work tool coupler forward.

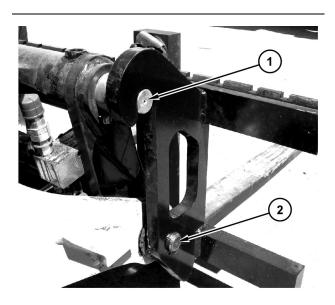


Illustration 109

g01333632

9. Align the coupler pins on the top of the coupler (1) with the hooks of the work tool. Move the work tool coupler under the hooks and rack back the work tool.

10. Press the bottom of the work tool control (23) on the right-hand console in order to engage the coupler pins. Refer to Operation and Maintenance Manual, "Operator Controls" for details on engaging the coupler pins.

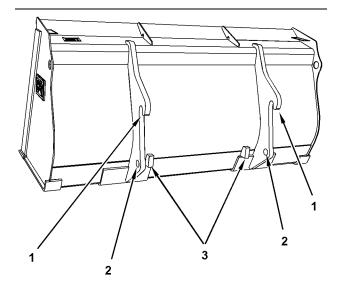


Illustration 110

- (1) Hooks
- (2) Pin Bore
- (3) Stops
- 11. The tool will move up and the tool will move out. This motion will cause clearance in two areas. The hooks will raise off the bosses in the first area. The second area should show a clearance between the quick coupler and the stop. See Illustrations.

g01525694

12. The coupler pins (2) should protrude through the bores of the work tool.

Note: There is a gap between the coupler and the stop. The stop is installed in order to provide a contact point for the work tool while the tool is being installed. The stop will position the work tool in order to align the pin bores while the pins are installed. The pins have tapered ends in order to move the work tool into alignment.

NOTICE

The stops on the work tool are used for aligning the hooks onto the pins. The stops are not intended to carry working loads. The work tool may move slightly as the pins are engaged on the Horizontal Pin Work Tool Coupler. Do not weld on the work tool or on the work tool coupler. Changes in the ability to carry the load of the work tool may result. Tool stop bars that are modified may stop the tools from being interchangeable with other similar machines. Modifying tool stop bars can accelerate wear to the work tool and the machine coupler.

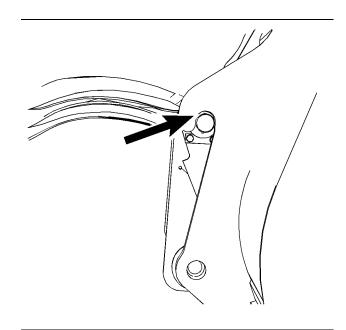


Illustration 111 The hook in the first area

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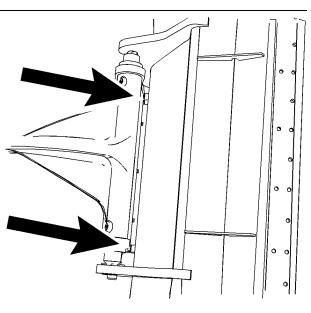


Illustration 112

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Top view of the stop in the second area

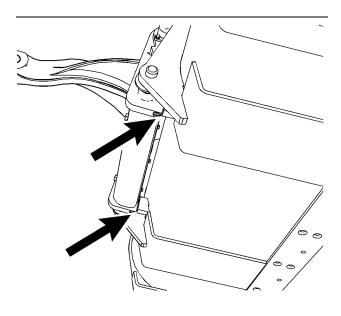


Illustration 113

g01525671

Bottom view of the stop in the second area

NOTICE

The coupler valve lever must be in the vertical position when the machine is in operation. This will prevent inadvertent movement of the coupler pins and the possible loss of the work tool.

13. Fully lower the loader arms.

14. If the work tool is equipped with auxiliary hydraulic lines, perform the following procedure.

Note: Ensure that the hydraulic oil in the work tool is compatible with the host machine. If the oil is not compatible, the work tool system will need to be flushed.

- a. Stop the engine.
- b. Turn the engine start switch key to the ON position.
- c. Move the auxiliary control back and forth in order to relieve hydraulic pressure within the auxiliary lines.
- d. Turn the engine start switch key to the OFF position.
- e. Apply the hand brake and exit the machine.
- f. Ensure that the quick connect couplers are clean.
- g. Connect the auxiliary hydraulic hoses for the work tool to the machine. Twist the collar of the quick connect coupler for one quarter of a turn in order to secure the hydraulic connections. Refer to Operation and Maintenance Manual, "Operator Controls - Auxiliary Hydraulic Controls" for operating details. If the work tool is equipped with electrical lines, then route the electrical lines with the hydraulic hoses. Connect the wire harness to the electrical connector on the host machine. Check the connections in order to ensure that the connections are properly secured. Check the connections on the work tool in order to ensure that the connections are in the correct receptacle.
- **15.** Test the work tool for leaks and for proper operation.

Removing the Horizontal Pin Work Tool Coupler

WARNING

Disengaging the coupler pins will release the work tool from control of the operator.

Serious injury or death may result from disengaging the work tool when it is in an unstable position or carrying a load.

Place the work tool in a safe position before disengaging the coupler pins.

🏠 WARNING

Inadvertent movement of the work tool may occur if the coupler pins are disengaged before the auxiliary hose lines are disconnected.

Serious injury or death may result from disengaging the coupler pins before the auxiliary hose lines are disconnected.

Place the work tool in a safe position and disconnect the auxiliary hose lines before disengaging the coupler pins.

NOTICE

Pulling the work tool with the auxiliary hoses could result in damage to the host machine or the work tool.

- 1. Position the machine on level ground.
- 2. Lower the work tool to the ground.
- **3.** If the work tool is equipped with auxiliary hydraulic lines, perform the following procedure.
 - a. Stop the engine.
 - b. Turn the engine start switch key to the ON position.
 - c. Move the auxiliary control back and forth in order to relieve hydraulic pressure within the auxiliary lines.
 - d. Turn the engine start switch key to the OFF position.
 - e. Apply the hand brake and exit the machine.
 - f. Disconnect the auxiliary hydraulic lines for the work tool.

Note: If protective caps are available, install protective caps over the quick connect couplers.

Note: Connect the hoses for the work tool together. Connecting the hoses together will reduce the probability of contaminating the hydraulic system. Connecting the hoses together will reduce the buildup of pressure in the hoses. Connecting the hoses together will ease the connection of the hoses to the machine.

4. If the work tool is equipped with an electrical line, then disconnect the wire harness from the connector on the machine. If protective caps are available, install protective caps over the electrical connectors.

Mechanical Coupler Valve

1. Enter the machine.

- 2. Fasten the seat belt.
- 3. Start the engine.

Move the lock on switch (23) on the right-hand console. Press the top of the switch in order to disengage the coupler pins. Refer to Operation and Maintenance Manual, "Operator Controls", for details on disengaging the coupler pins.

- **1.** Disengage the parking brake.
- **2.** Tilt the work tool coupler forward. Lower the work tool coupler away from the work tool.
- 3. Back away from the work tool.

Engine Starting

i06238942

Engine Starting

SMCS Code: 1000; 7000

- 1. Engage the parking brake.
- 2. Lower any raised work tools to the ground. Refer to Operation and Maintenance Manual, "Equipment Lowering with Engine Stopped". Move the hydraulic controls to the HOLD position.
- 3. Move the direction control to NEUTRAL.

Note: The engine will not start unless the direction control is in NEUTRAL.

- **4.** Hold the throttle control at the LOW IDLE position before starting the engine.
- **5.** Before the engine is started, check for the presence of bystanders or maintenance personnel. Ensure that all personnel are clear of the machine. Briefly sound the forward horn before you start the engine.

Note: When the ignition switch is turned ON, the instrument cluster will perform a "self test". Wait until completion before you start the engine.

Note: If the machine is equipped with the anti-theft keypad, the security code must be entered before starting the engine.

6. Turn the engine start switch key to the START position.

Note: In applications for cold weather, pause until the indicator lamp for the starting aid turns off. The engine start switch in the ON position activates the glow plugs. Once the indicator light for the starting aid goes off, start the engine.

NOTICE

Do not crank the engine for more than 10 seconds. Allow the starter motor to cool for 30 seconds before cranking again.

Do not engage the starter when the flywheel is turning.

7. Release the engine start switch key after the engine starts.

Note: Un-commanded loader arm drift may occur after engine start up. It may be necessary to cycle the loader arm up and down three to four cycles in order to fill the ride control accumulator with oil. This will eliminate the drift after machine has not been running for extended periods.

Note: For information on engine warm-up refer to Operation and Maintenance Manual, "Engine and Machine warmup".

🔥 WARNING

Do not use aerosol types of starting aids such as ether. Such use could result in an explosion and personal injury.

Starting Engine in Cold Weather

Prepare the machine for operation in temperatures that are below 0° C (32° F). Follow the appropriate warm-up procedures when the machine is operated in temperatures that are below 0° C (32° F).

Machine preparation requires using the correct engine oil. Refer to the "Lubricant Viscosities and Refill Capacities" for proper oil viscosity of engine oil and hydraulic oil for cold-weather operation. Refer to OMM, SEBU5898, "Cold Weather Recommendation for Caterpillar Machines". Refer to OMM, SEBU6250, "Caterpillar Machine Fluid Recommendations".

NOTICE

If the engine fails to start after 10 seconds, disengage the starter. Wait 30 seconds and repeat the procedure. Do not allow the starter motor to run continuously for more than 20 seconds.

Starting Engine below -18 °C (0 °F)

Coolant heater may be required.

Starting Engine below -23 °C (-10 °F)

Consult your Caterpillar dealer. Also refer to Operation and Maintenance Manual, SEBU5898, "Cold Weather Recommendation". This publication is available from your Caterpillar dealer.

Cool Engine Elevated Idle

The Cool Engine Elevated idle feature will temporarily increase the low idle engine speed when the engine coolant is below normal operating temperature. Increasing the low idle speed will accelerate the warm-up of the engine and fluids. When the engine coolant reaches normal operating temperature, the engine speed returns to the low idle speed.

i06085549

Engine and Machine Warm-Up

SMCS Code: 1000; 7000

Note: The hydraulic lockout must be in the UNLOCKED position before the hydraulic controls will function.

- 1. 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.
- **2.** Look at the indicators and the gauges frequently during operation.

To help the hydraulic oil to warm up faster, hold the bucket control in the CLOSE position for short periods of 10 seconds or less. This will allow the hydraulic oil to reach relief pressure, which causes the hydraulic oil to warm up more rapidly.

NOTICE

The hydraulic control valve may become overheated if the bucket is operated continuously under relief conditions.

Cycle all controls in order to allow warm hydraulic oil to circulate through all hydraulic cylinders and through all hydraulic lines.

When you idle the machine for warm-up, heed 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.
- If the temperature is less than 18°C (0°F) or if hydraulic functions are sluggish, additional time may be required.

Adjustments

i07357256

Work Tool Positioner

SMCS Code: 5112

🏠 WARNING

Use caution to avoid possible personal injury when adjusting the bucket positioner.

Stop the engine and lower all equipment to relieve the hydraulic pressure.

Engage the parking brake and block the tires to prevent sudden movement of the machine.

Keep unauthorized personnel off the machine.

Please refer to the illustration in Operation and Maintenance Manual, "Operator Controls" for the location of the switches.

- **1.** Start the engine. Lower the work tool to the ground.
- **2.** Position the work tool at the desired angle to the ground.
- **3.** Stop the engine. Turn the engine start switch key to the OFF position and remove the key.
- 4. Engage the parking brake. Chock the wheels.

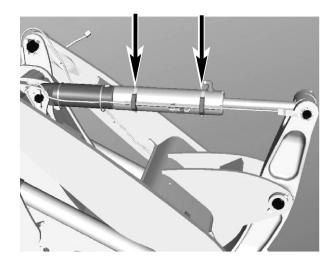


Illustration 114

q01331492

- **5.** To change the work tool angle, loosen the clamps that hold the tube assembly. Move the tube assembly downward on the cylinder to increase the work tool angle. Move the tube assembly upward on the cylinder to reduce the work tool angle.
- 6. Tighten the clamps.
- 7. Test the adjustment of the work tool positioner.
 - a. Start the engine.
 - b. Ensure that the switch for the work tool positioner is in the ON position. The switch is on the right-hand control panel in the cab.
 - c. Raise the work tool.
 - d. Dump the load.
 - e. Move the joystick to the RACK BACK position.
 - f. The work tool should return to the preset angle.
 - g. If the work tool does not return the preset angle, return to step 5.

Parking

i01795132

Stopping the Machine

SMCS Code: 7000

NOTICE Park on a level surface. If it is necessary to park on a grade, block the wheels securely.

Engage the parking brake. Do not engage the secondary brake while the machine is moving unless the primary service brakes fail.

- **1.** Apply the service brakes in order to stop the machine.
- **2.** Move the direction control switch to the NEUTRAL position.

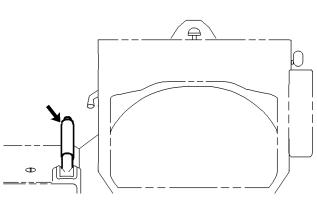


Illustration 115

g00910348

- 3. Engage the parking brake.
- **4.** Lower the work tool to the ground and apply slight downward pressure.

i01405497

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 the engine components.

1. Operate the engine for five minutes at low idle with no load.

This allows hot areas in the engine to cool gradually. This will extend the engine life.

- 2. Turn the engine start switch key to the OFF position in order to stop the engine.
- **3.** Turn the engine start switch key to the ON position. Move all hydraulic control levers back and forth in order to relieve hydraulic pressure. Turn the engine start switch key to the OFF position.
- **4.** Move all hydraulic control levers into the HOLD position.

i06093941

Stopping the Engine if an Electrical Malfunction Occurs

SMCS Code: 1000; 7000

Inside Cab

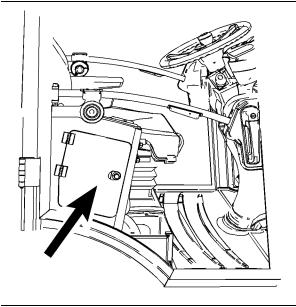


Illustration 116

g01356828

The fuse panel is located behind the seat on the right side.

Remove the cover in order to access the fuse panel.

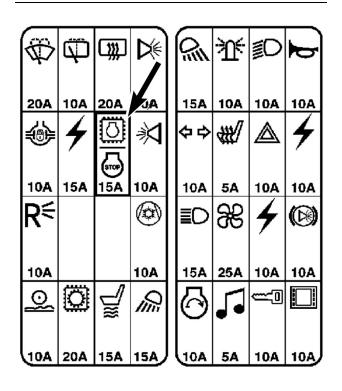


Illustration 117

g03806270

Remove the Key Switch to Engine ECM fuse in order to shut down the ECM. Removing the fuse will disable the fuel supply to the engine.

Note: Do not operate the machine until the malfunction has been corrected.

i06092878

Equipment Lowering with Engine Stopped

SMCS Code: 7000

🏠 WARNING

Personal injury or death can result from a bucket falling.

Keep personnel away from the front of the machine when lowering the bucket.

Before lowering any equipment with the engine stopped, clear the area around the equipment of all personnel. The procedure will vary with the type of equipment that is lowered. Keep in mind that most systems use a high-pressure fluid or air in order to raise or lower the equipment. The procedure will cause high-pressure air, hydraulic fluid, or some other media to be released in order to lower the equipment. Wear appropriate personal protective equipment and follow the established procedure. If the engine has been off for a short period, the equipment can be lowered to the ground. Turn the engine start switch key to the ON position. Move the joystick to the LOWER position.

Note: In order to prevent the need for replacement of the lock valve, the arms should be lowered as soon as possible after the engine stops. Before you lower the arms, ensure that it is safe.

Lowering the Equipment with the Accumulator Charged

If electrical power is available and the accumulator is charged, the loader arms can be lowered from the operator station with the work tool control.

- 1. Fasten the seat belt.
- 2. Move the engine start switch to the ON position.
- Slowly move the work tool control to the LOWER position in order to slowly lower the loader arms.

If the loader arms do not lower, the accumulator is not charged. It is possible to recharge the accumulator by cranking the engine for 15 seconds. Repeat step 2 and 3.

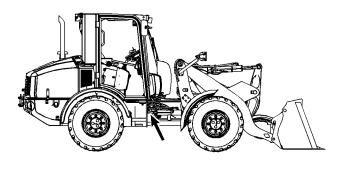
If there is no electrical power, the loader arms must be lowered by using the procedure that is explained next.

Alternate Lowering the Equipment

Personal injury can result from oil under high pressure.

DO NOT allow high pressure oil to contact skin.

Wear appropriate protective equipment while working with high pressure oil systems.



g03732709

The lowering control valve is located on the right side of the machine under the cab.

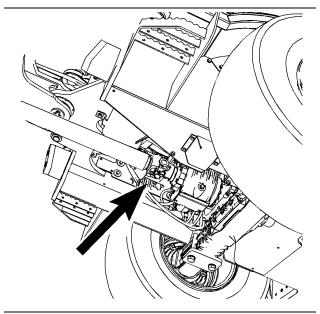


Illustration 119

g01371597

The loader arms must be lowered manually if the accumulator is not charged or if there is no electrical power.

1. If the engine has been off for a long period, or the engine is not operable, the following procedure is performed by one person.

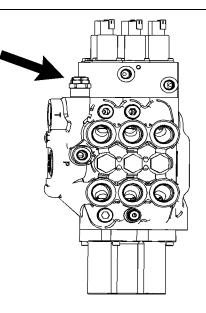


Illustration 120

g03731158

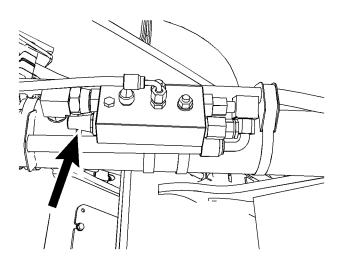
 Turn the screw of the valve clockwise until the boom starts to move. Count the number of turns. This operation will allow the equipment to lower to the ground.

Note: Return the screw to the original position. The screw must be in the original position for proper operation of the bank valve.

3. Make the necessary repairs before you operate the machine.

Machines with Load Check Valves

The load check valve must be disabled before the lift arms can be lowered. Use the following procedure before the "Alternate Lowering the Equipment" that is described above:



g03805504

- 1. Remove the tamper proof cap.
- 2. Screw the valve fully into the housing.
- **3.** Follow the procedure "Alternate Lowering the Equipment".

Note: The load check valves must be replaced if this procedure is used. Consult your Caterpillar dealer for the part numbers for your machine.

i02650270

Leaving the Machine

SMCS Code: 7000

- 1. Use the steps and the handholds when you get off the machine. Face the machine and use both hands. Make sure that the steps are clear of debris before you dismount.
- 2. Inspect the engine compartment for debris. Clean out any debris and any paper in order to avoid a fire.

Transportation Information

i02307646

Shipping the Machine

SMCS Code: 7000

Investigate the travel route for overpass clearances. Make sure that there will be adequate clearance if the machine that is transported is equipped with a ROPS, with a cab, or with a canopy.

Before you load the machine, remove ice, snow, or other slippery material from the loading dock and from the truck bed. Remove ice, snow, or other slippery material in order to prevent slippage as you load the machine. Remove ice, snow, or other slippery material in order to prevent a shift while the machine is moving in transit.

NOTICE

Obey all state and local laws governing the weight, width and length of a load.

Make sure the cooling system has proper antifreeze if moving machine to a colder climate.

Observe all regulations governing wide loads.

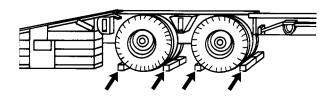


Illustration 122

g00040011

- **1.** Chock the trailer or rail car wheels before you load the machine. (The trailer is shown.)
- **2.** After the machine is positioned, connect the steering frame lock link in order to hold the front frame and the rear frame in place.
- **3.** Lower the work tool to the floor of the transport vehicle. Move the direction control switch to NEUTRAL.
- 4. Engage the parking brake.
- **5.** Turn the engine start switch key to OFF in order to stop the engine.

- 6. Turn the engine start switch key to the ON position. Move all of the hydraulic control levers in order to relieve any trapped pressure.
- **7.** Move the hydraulic shutoff control to the LOCKED position.
- **8.** Turn the engine start switch key to OFF in order to stop the engine. Remove the engine start switch key.
- **9.** Lock the door and the access covers and attach any vandalism protection.
- **10.** Secure the machine with tie-downs when you are transporting the machine on a rail car or on the tractor-trailer.
- **11.** Cover the exhaust opening.

i06092899

Roading the Machine

SMCS Code: 7000

General Information for Roading

Before you road a machine, consult your tire dealer for recommended tire pressures and for speed limitations.

Limitations for load/speed rate must be obeyed. Consult your tire dealer for the speed limit of the tires that are used.

When you travel for long distances, schedule stops in order to allow the tires and the components to cool. Stop for 30 minutes after every 40 km (25 miles) or stop for 30 minutes after every hour.

Inflate the tires to the correct air pressure.

Use a self-attaching inflation chuck and stand behind the tire tread during the inflation. Refer to Operation and Maintenance Manual, "Tire Inflation - Check".

Perform a Walk-Around Inspection and measure the fluid levels in the various compartments.

Check with the proper officials in order to obtain the required licenses and other similar items.

Learn and obey all traffic regulations when you are roading the machine. Travel at a moderate speed. Observe all speed limitations when you road the machine. Ensure that the hydraulic system is locked out. Ensure that all work tools remain securely attached to the work tool coupler. Ensure that appropriate locking pins remain in position. Ensure that the machine meets all local requirements. Ensure that all roading decals are visible. Replace any decal that is damaged. Ensure that all necessary equipment for roading the machine is installed. The necessary equipment can be obtained from your local Caterpillar Dealer.

Roading in Germany and Italy

Complete all of the following operations that are applicable to your machine before you road the machine.

Verify that all lights are in proper working order.

Turn on the roading lights when you are roading the machine.

Lift Arm

In Germany, place the lift arm and the work tool in the roading position.

Note: In Italy, perform the following procedure in order to place the lift arm and the work tool in the roading position.

- **1.** Enter the machine. Fasten the seat belt. Start the engine.
- 2. Disengage the parking brake.

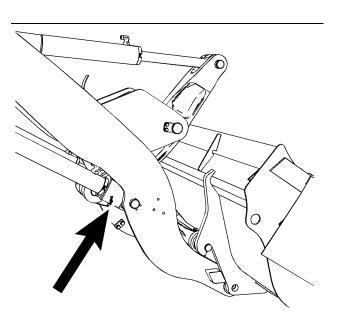


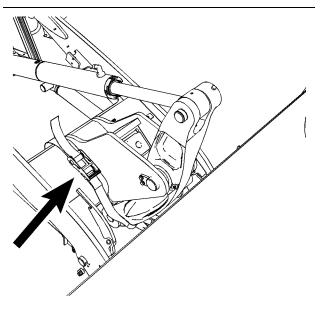
Illustration 123

q01384819

- **3.** Raise the lift arms approximately 200 mm (7.9 inches) from the parked position. Tilt back the work tool.
- **4.** Stop the engine. Set the parking brake and exit the machine.
- **5.** Insert the lift arm brace on the rod end of the lift cylinder. Insert the pin and secure the pin with the clip.

Note: The flange on the brace must face the rear of the machine.

- 6. Enter the machine. Fasten the seat belt. Turn the ignition key to the ON position. Do not start the engine.
- 7. Slowly lower the lift arm onto the brace.
- 8. Exit the machine.



g01384826

9. Install the strap for restraining the tilt cylinder.

NOTICE Do not attempt to tilt the work tool forwards with the restraining strap in place. Do not move the lift arms down while the brace is installed. Damage to the machine or damage to the equipment could occur.

10. Tighten the strap with the ratchet. Secure the loose end of the strap.

Mirrors

If necessary, adjust the mirrors.

Rotating Beacon Light

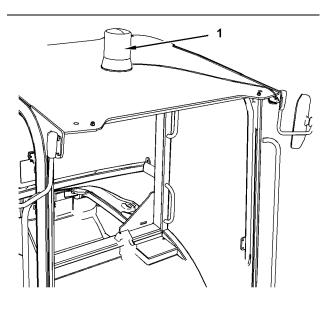


Illustration 125

g03805558

(1) Beacon

-

In Italy, install the rotating beacon light on top of the cab. Insert the plug into the receptacle on the top front on the left side of the cab.

Work Lights

Turn off all work lights.

Tires

Ensure that your machine has tires that are approved for roading. Ensure that the tires have the proper pressure. Refer to Operation and Maintenance Manual, "Tire Shipping Pressure".

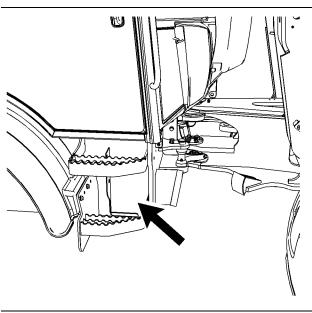
Traffic Regulations

Learn and obey all of the traffic regulations when you are roading the machine.

Leaving the Machine

Refer to Operation and Maintenance Manual, "Parking" for details about stopping the engine and lowering the equipment.

The use of a wheel chock may be required when you leave the machine at the side of the road in Germany. The wheel chock is stored behind the steps on the right side of the machine.



g01385009

The use of warning triangles may be required when you leave the machine at the side of the road in Germany.

Ensure that the equipment is stored properly before you road the machine.

Buckets

The guard for the buckets is used on both simple buckets and hydromechanical buckets.

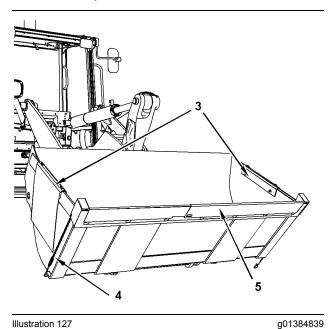


Illustration 127

- (3) Side Markers for the Bucket
- (4) Chains and Clips
- (5) Guard on the Cutting Edge of the Bucket

- **1.** In Italy, install the side markers for the bucket so that the side markers fit over the outside edge of the bucket. Tighten the bolts for the side markers.
- 2. Install the guard on the cutting edge of the bucket. Secure the guard in place with the chains and clips.

Hydraulic Shutoff

Disable the work tool control, the auxiliary hydraulic control (if equipped), and the high flow control (if equipped) when you are roading the machine. Refer to Operation and Maintenance Manual, "Operator Controls - Hydraulic Lockout" for the procedure.

i06089398

Lifting and Tying Down the Machine

SMCS Code: 7000

Note: Weight may vary with different work tools.

- 1. Refer to Operation and Maintenance Manual, "Specifications" for information about the weight of the machine.
- 2. For lifting objects, use properly rated cables and properly rated slings. Position the crane for a level machine lift.

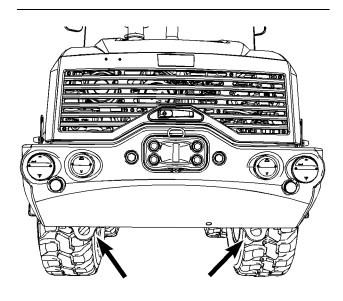


Illustration 128 Rear Tie Downs



Illustration 129 Front Lifting Eye g01331852

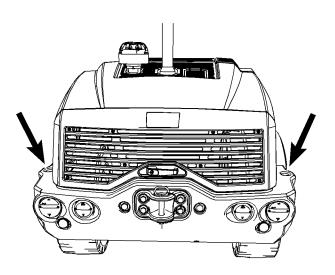
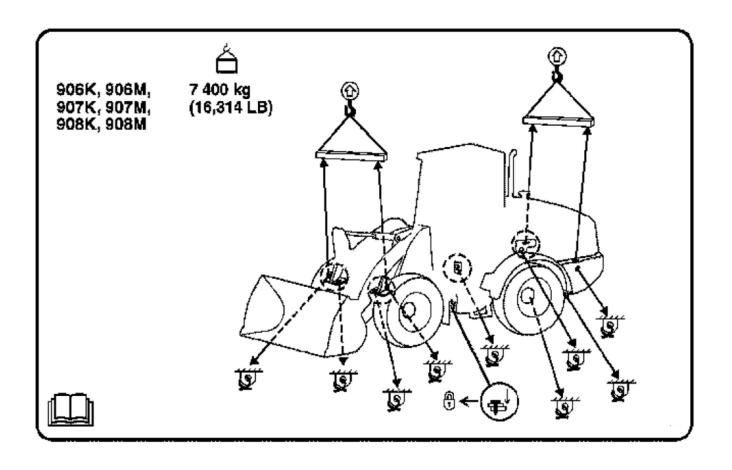


Illustration 130 Rear Lifting Eyes



 Spreader bar widths should be sufficient for preventing contact with the machine. The slings or cables should not exceed 15° from vertical when you lift the machine.

Install the tie-downs at the locations in illustration. Install the tie-downs for the bucket. Place chocks under the front wheels and under the rear wheels.

Check the appropriate laws that govern the weight of the load. Check the appropriate laws that govern the width of the load and the length of the load.

Consult your Cat dealer for shipping instructions for your machine.

Towing Information

i06582526

Machine Retrieval

SMCS Code: 7000

🏠 WARNING

Personal injury or death could result when towing a disabled machine incorrectly.

Block the machine to prevent movement before releasing the brakes. The machine can roll free if it is not blocked.

Follow the recommendations below, to properly perform the towing procedure.

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. These instructions are only for emergencies. 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 breaks or the tow bar breaks.

Do not allow an operator to be on the machine that is being towed unless the operator can control the steering and/or the brakes.

Before you tow the machine, make sure that the tow line or the tow bar is in good condition. Make sure that the tow line or the tow bar has enough strength for the conditions that are involved. The strength of the tow line or of the tow bar should be at least 150 percent of the gross weight of the towing machine. This pertains to a disabled machine that is stuck in the mud and to towing a disabled machine on a grade.

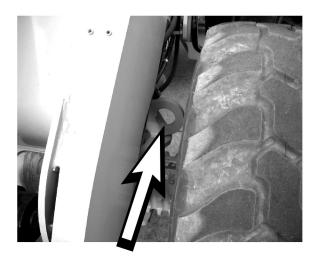


Illustration 132

g01331852

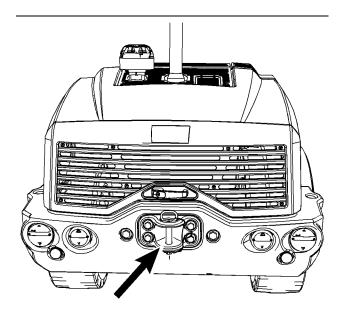


Illustration 133

g03803649

When you tow the machine from the front, attach the tow line to the tow eyes on the frame. In order to tow the machine from the rear, attach the tow line to the recovery hitch.

Note: The recovery hitch is only for machine retrieval. Do not use the recovery hitch for any of the following:

- a lifting point
- · a tie down point
- towing a trailer

• towing another vehicle

Do not use a chain for pulling a disabled machine. A chain link can break. This may cause personal injury. Use a wire cable with ends that have loops or rings. Place an observer in a safe position in order to watch the pulling procedure. The observer can stop the procedure, if necessary. The procedure should be stopped if the cable starts to break. Also, stop the procedure if the cable starts to unravel. Stop pulling whenever the towing machine moves without moving the towed machine.

Keep the tow line angle to a minimum. Do not exceed a 20 degree angle from the straight ahead position.

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.

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.

When any towed machine is loaded, the machine must be equipped with a brake system that is operable from the operator compartment.

Consult your Caterpillar dealer for the equipment that is necessary for towing a disabled machine.

Towing with a Running Engine

If the engine is running, the machine can be towed for a short distance under certain conditions. The power train and the steering system must be operable. **Tow the machine for a short distance only.** Pulling the machine out of mud or pulling the machine to the side of the road is an example.

The operator of the towed machine must steer the machine. Steer the machine in the direction of the tow line.

Comply with all of the instructions that are outlined in this topic.

Towing with a Stopped Engine for Distances that are Shorter than 150 m (492 ft)

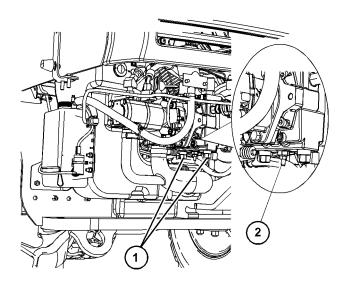
When the disabled machine's engine is stopped, perform the following steps before you tow the machine.

- **1.** Engage the parking brake. Chock the front tires and the rear tires.
- 2. Disconnect the steering cylinder and store the steering cylinder in order to allow the machine to articulate freely.
 - a. Remove the bolts from the cover on the front frame. Remove the cover. Remove the connector. Remove the bolts that hold the pin retainer. Remove the pin from the rod end of the steering cylinder.
 - b. Slowly, turn the steering wheel clockwise to retract the cylinder rod.
 - c. Tie the cylinder to a location that does not interfere with the articulation of the machine.

NOTICE

Be sure to reconnect the steering cylinder before you operate the machine.

3. Ensure that the hystat pump has cooled down to the touch.



g06027022

Counterweight removed for clarity

(1) Cross Over Relief Valve

- (2) Charge Relief Valve
- 4. The two adjustment valves for the crossover reliefs are located on the bottom of the Hystat pump to allow the machine to be towed unscrew the valve 3 turns.
- 5. Fasten the tow bar to the disabled machine.
- **6.** Turn the engine start switch key to the ON position in order for the gauges to be functional.
- 7. Release the parking brake.
- Remove the wheel chocks. Tow the machine slowly. Do not exceed 2 km/h (1.2 mph).
- **9.** Monitor the hydraulic oil temperature while you tow the machine. If the hydraulic oil temperature starts to increase, stop towing the machine. Ensure that the screws for the crossover relief valves are turned out a full 3 turns.
- **10.** After you tow the machine, allow the hystat pump to cool.
- **11.** Before operation, retighten the reliefs $70 \pm 5 \text{ N} \cdot \text{m}$ (52 ± 4 lb ft).

Towing the Machine for Distances that are Greater than 150 m (492 ft)

When you tow the machine for distances that are greater than 150 m (492 ft), remove the drive shaft. Install the steering lock link.

Tow the machine with the rear wheels off the ground.

Refer to Power Train Disassembly and Assembly.

Towing a machine with the "speeder" option

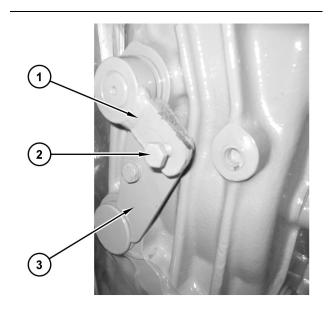


Illustration 135

q01346944

On machines that are equipped with the "speeder" option, a lever on the side of the transmission must be moved downward. The lever must be secured in place to allow the vehicle to be towed.

- **1.** Move the upper lever (1) so that bolt (2) aligns with a hole in the lower lever (3).
- **2.** Screw in the bolt (2) so that the bolt engages in the hole in the lower lever (2). This will prevent the lever from moving.
- The transmission is now in neutral. The machine may be towed.
- **4.** Return the lever to the original position before you resume normal operation of the machine.

Engine Starting (Alternate Methods)

i02646547

Engine Starting with Jump Start Cables

SMCS Code: 1000; 7000

Failure to properly service the batteries may cause peronal 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

When starting from another machine, make sure that the machines do not touch. This could prevent damage to engine bearings and electrical circuits.

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.

This machine has a 12 volt starting system. Use only the same voltage for jump starting. Use of a welder or higher voltage damages the electrical system.

Refer to Special Instruction, Battery Test Procedure, SEHS7633, available from your Caterpillar dealer, for complete testing and charging information.

Use of Jump Start Cables

When the auxiliary start receptacles are not available, use the following procedure.

- Determine the failure of the engine to start. Refer to Special Instruction, SEHS7768 on the use of 6V-2150 Starting Charging Analyzer Group. Use this procedure if the machine does not have a diagnostic connector.
- 2. Place the direction control switch in the NEUTRAL position on the stalled machine. Engage the parking brake. Lower all attachments to the ground. Refer to Operation and Maintenance Manual, "Equipment Lowering with Engine Stopped". Move all controls to the HOLD position.
- **3.** On the stalled machine, turn the start switch key to the OFF position. Turn off the accessories.
- **4.** On the stalled machine, turn on the battery disconnect switch (if equipped).
- 5. Move the machines together in order for the cables to reach. DO NOT ALLOW THE MACHINES TO CONTACT.
- **6.** Stop the engine on the machine that is the electrical source.
- 7. Check the battery caps for correct placement and for correct tightness. Make these checks on both machines. Make sure that the battery in the stalled machine is not frozen. Check the batteries for low electrolyte.
- Connect the positive jump start cable to the positive battery terminal.

Do not allow positive cable clamps to contact any metal except for battery terminals.

9. Connect the positive jump start cable to the positive terminal of the electrical source.

Note: Batteries in series may be in separate compartments. Use the terminal that is connected to the battery. This battery is normally on the same side of the machine as the starter.

- **10.** Connect one end of the negative jump start cable to the negative terminal of the electrical source.
- **11.** Make the final connection. Connect the negative cable to the ground in the engine compartment or to the frame. Make this connection away from the battery, the fuel, the hydraulic lines, or moving parts.
- **12.** Start the engine on the machine that is the electrical source. Also, you can energize the charging system on the auxiliary power source.

- **13.** Allow the electrical source to charge the batteries for two minutes.
- **14.** Attempt to start the stalled engine. Refer to Operation and Maintenance Manual, "Engine Starting".
- **15.** Immediately after the stalled engine starts, disconnect the jump start cables in reverse order.
- **16.** Conclude with a failure analysis on the starting charging system. Check the stalled machine, as required. Check the machine when the engine is running and the charging system is in operation.

Maintenance Section

Maintenance Access

i05944257

Access Doors and Covers

SMCS Code: 7273-572; 7273-573

Engine Hood

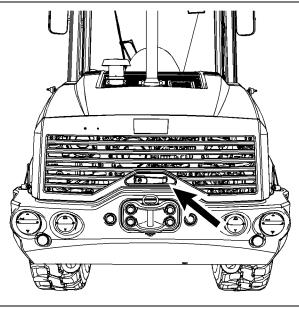


Illustration 136

g03732861

Pull up on the handle. Raise the engine hood until the hood support cylinder locks in position.

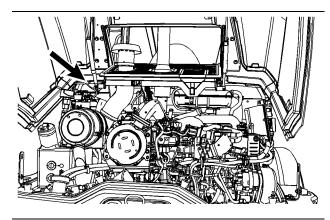


Illustration 137

g03732873

Squeeze the lock on the cylinder in order to lower the hood. Lower the hood until the hood latches.

Right Side and Left Side Access Doors and Covers

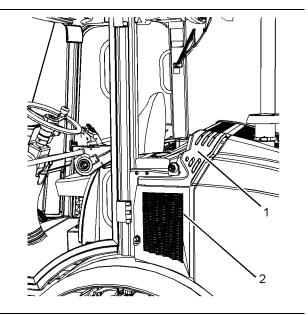
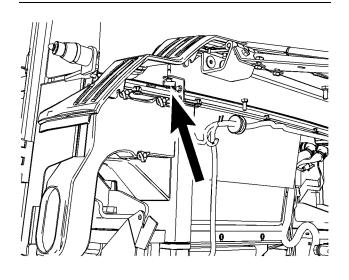


Illustration 138 (1) Access Cover (2) Access Door g03732943

The machine is equipped with right side and left side access panels.



g01355653

Thumb screw for the access panel

Note the engine hood is removed for clarity.

Open the access door in order to gain access to the thumb screw. Use the thumb screw to remove the access panel.

Fuse Access Door

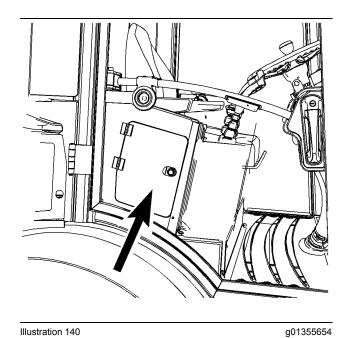


Illustration 140 The Fuse access door on the right side

Front Access Door

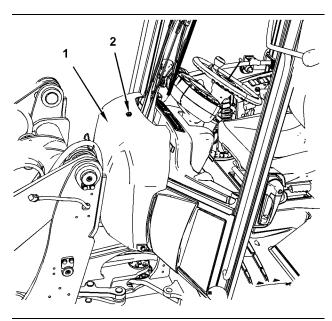


Illustration 141 (1) Access Door (2) Key Slot g01358974

Use the ignition key in order to open the front access door. Open the door away from the window.

Tire Inflation Information

i00669882

Tire Inflation with Air

SMCS Code: 4203

Use a self-attaching inflation chuck and stand behind the tread when inflating a tire.

Proper inflation equipment, and training in using the equipment, are necessary to avoid overinflation. A tire blowout or rim failure can result from improper or misused equipment.

Before inflating tire, install on the machine or put tire in restraining device.

NOTICE

Set the tire inflation equipment regulator at no more than 140 kPa (20 psi) over the recommended tire pressure.

Consult your Caterpillar dealer for operating pressures.

i02096880

Tire Inflation with Nitrogen

SMCS Code: 4203

Caterpillar recommends the use of dry nitrogen gas for tire inflation and for tire pressure adjustments. This includes all machines with rubber tires. Nitrogen is an inert gas that will not aid combustion inside the tire.

Proper nitrogen inflation equipment, and training in using the equipment, are necessary to avoid over inflation. A tire blowout or rim failure can result from improper or misused equipment and personal injury or death can occur.

A tire blowout and/or rim failure can occur if the inflation equipment is not used correctly, due to the fact that a fully charged nitrogen cylinder's pressure is approximately 15000 kPa (2200 psi).

There are other benefits to using nitrogen in addition to reducing the risk of an explosion. The use of nitrogen for tire inflation lessens the slow oxidation of the rubber. Use of nitrogen also slows gradual tire deterioration. This is especially important for tires that are expected to have a long service life of at least four years. Nitrogen reduces the corrosion of rim components. Nitrogen also reduces problems that result from disassembly.

🚯 WARNING

A tire blowout or a rim failure can cause personal injury.

Use a self-attaching inflation chuck and stand behind the tread when inflating a tire, to prevent personal injury.

Note: Do not set the tire inflation equipment regulator higher than 140 kPa (20 psi) over the recommended tire pressure.

Use 6V - 4040 Inflation Group or an equivalent inflation group to inflate tires with a nitrogen gas cylinder.

Reference: For tire inflation instructions, refer to Special Instruction, SMHS7867, "Nitrogen Tire Inflation Group".

For nitrogen inflation, use the same tire pressures that are used for air inflation. Consult your tire dealer for operating pressures.

i06227351

Tire Shipping Pressure

SMCS Code: 4203; 7500

The tire inflation pressures that are shown in the following tables are cold inflation shipping pressures. These pressures are for a standard machine under the following conditions.

- The machine is at rated load.
- The machine is operating in firm underfoot conditions.

Actual shipping pressures and operating pressures may vary depending on specific applications and working conditions. Consult the tire manufacturer of the tires on your machine for the correct pressure. Table 26

Machine	Tire size	Make	Front	Rear	Front	Rear
906K/M 907K/M	340/70 R18	Firestone Duraforce	400 kPa	250 kPa	58 psi	36.3 psi
906K/M 907K/M	405/70 R18	Dunlop SPT9	350 kPa	225 kPa	43.5 psi	32.6 psi
906K/M 907K/M	340/80 R18	Michelin XMCL	360 kPa	270 kPa	52.2 psi	39.2 psi
906K/M 907K/M	340/80 R18	Nokian TRI 2	400 kPa	400 kPa	58 psi	58 psi
906K/M 907K/M	340/80 R18	Michelin Bibload	360 kPa	270 kPa	52.2 psi	39.2 psi
908K/M	405/70 R18	Dunlop SPT9	375 kPa	250 kPa	54.4 psi	36.3 psi
908K/M	400/70 R20	MIchelin XMCL	350 kPa	260 kPa	43.5 psi	37.7 psi
908K/M	360/80 R20	Nokian TRI 2	400 kPa	400 kPa	58 psi	58 psi
908K/M	400/70 R20	Michelin Bibload	350 kPa	260 kPa	43.5 psi	37.7 psi

i02610518

Tire Inflation Pressure Adjustment

SMCS Code: 4203

Always obtain the proper tire inflation pressures and maintenance recommendations for the tires on your machine from your tire supplier. The tire pressure in a warm shop area 18° to 21°C (65° to 70°F) will significantly change when you move the machine into freezing temperatures. If you inflate the tire to the correct pressure in a warm shop, the tire will be underinflated in freezing temperatures. Low pressure shortens the life of a tire.

Reference: When you operate the machine in freezing temperatures, refer to Special Publication, SEBU5898, "Cold Weather Recommendations for All Caterpillar Machines" in order to adjust tire inflation pressures.

Lubricant Viscosities and Refill Capacities

i07577340

Lubricant Viscosities (Fluids Recommendations)

SMCS Code: 7581

General Information for Lubricants

When you are operating the machine in temperatures below -20° C (-4° F), refer to Special Publication, SEBU5898, "Cold-Weather Recommendations". This publication is available from your Cat dealer.

For cold-weather applications where transmission oil SAE 0W-20 is recommended, Cat Cold-Weather TDTO is recommended.

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 and the API CJ-4 are required for use in the applications listed below. Cat DEO-ULS and oils meeting Cat ECF-3 specification and the API CJ-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 and the API CJ-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 or API CJ-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) will plug sooner and require more frequent DPF ash service intervals.

Typical aftertreatment systems include the following:

- Diesel Particulate Filters (DPF)
- Diesel Oxidation Catalysts (DOC)

Other systems may apply.

Note: For territories where high sulfur diesel fuel is available and allowed by law, these engines will not have aftertreatment. For the areas that have diesel fuel sulfur levels greater than .2% (2,000 ppm), refer to Special Publications, SEBU6250, "Caterpillar Machine Fluids Recommendations" "Total Base Number (TBN) and Fuel Sulfur Levels for Direct Injection (DI) Diesel Engines" for recommendations.

Table 27	
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Lubricant Viscosities for Ambient Temperatures						
Compartment or System	Oil Type and Performance	Oil Viscosities	°C		°F	
Compartment of System	Requirements		Min	Max	Min	Max
Engine Crankcase	Cat DEO-ULS Cold Weather	SAE 0W-40	-40	40	-40	104
	Cat DEO-ULS	SAE 10W-30	-18	40	0	104
		SAE 15W-40	-9.5	50	15	122

Note: For engines with NO aftertreatment, Cat DEO can also be used. Refer to Special Publications, SEBU6250, "Caterpillar Machine Fluids Recommendations" "Cat Diesel Engine Oils Recommendations".

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 30 SAE 30W
- Cat BIO HYDO Advanced

The machine is factory filled with Cat HYDO Advanced 10 fluids. Cat HYDO Advanced oils have a 100% increase in the drain interval for machine hydraulic systems over second and third choice oils when you follow the maintenance interval schedule for oil filter changes and for oil sampling that is stated in the Operation and Maintenance Manual for your particular machine. 6000-hour oil drain intervals are possible when using $S \cdot O \cdot S$ Services oil analysis. 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

Lubricant Viscosities for Ambient Temperatures							
Comportment or System	Oil Type and Performance		°C		°F		
Compartment or System	Requirements	Oil Viscosities	Min	Max	Min	Max	
Hydraulic/Hydrostatic System	Cat HYDO Advanced 10 ⁽¹⁾ Cat TDTO	SAE 10W	-20	40	-4	104	
	Cat HYDO Advanced 30 Cat TDTO	SAE 30	0	50	32	122	
	Cat BIO HYDO Advanced	"ISO 46" Multi-Grade	-30	45	-22	113	
	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 Cold Weather	SAE0W-40	-40	40	-40	104	
	Cat TDTO Cold Weather	SAE 0W-20	-40	40	-40	104	

(1) -20° C (-4° F) to 50° C (122° F) if equipped with the High Ambient Cooling Attachment

Transmission and Axles

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.

When you are operating the machine in temperatures below -20° C (-4° F), refer to Special Publication, SEBU5898, "Cold-Weather Recommendations". This publication is available from your Cat dealer.

Table 29

Lubricant Viscosities for Ambient Temperatures						
Compartment or System	Oil Type and Per-		°C		°F	
	formance Requirements	Oil Viscosities	Min	Max	Min	Max
Final Drive, Differential, Transfer Drive	Cat TDTO	SAE 30	-20	43	-4	110
	Cat TDTO 10W	SAE 10W-30	-20	40	-4	104
	Cat Arctic TDTO	SAE 0W-20 (GL5)	-40	10	-40	50

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 30

	Recomm	ended Grease					
Comportment or System	Crosse Tyres		°C	°C		°F	
Compartment or System	Grease Type	NLGI Grade	Min	Max	Min	Мах	
	Cat Prime Application	NLGI Grade 2	-20	40	-4	104	
		NLGI Grade 2	-30	50	-22	122	
	Cat Extreme Application	NLGI Grade 1	-35	40	-31	104	
External Lubrication Points		NLGI Grade 0	-40	35	-40	95	
	Cat Extreme Application - Arctic	NLGI Grade 0	-50	20	-58	68	
	Cat Extreme Application - Desert	NLGI Grade 2	-20	60	-4	140	
Steering Column ⁽¹⁾ Drive Shaft Universal Joints ⁽²⁾ Drive Shaft Support Bearing	Cat Utility	NLGI Grade 2	-30	40	-22	104	

(1) HMU Steering

⁽²⁾ 980 Drive Shaft is maintenance free.

Grease for the Autolube System (If Equipped)

The grease used with the automatic lubrication system must not contain any graphite or PTFE.

Note: Pumpability is based on "US Steel Mobility and Lincoln Ventmeter Tests". Performance may vary depending on lubrication equipment and the length of the lines.

Reference: Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for additional information about grease. This manual may be found on the Web at Safety.Cat.com.

Table 31

Recommended Grease for the Autolube System						
Compartment or System	Grease Type	NLGI Grade	°C	°F		
compartment of System	Grease type	NLGI Grade	Min	Min		
	Cat Prime Application	NLGI Grade 2	-18	0		
		NLGI Grade 2	-7	20		
Cat Autolube System	Cat Extreme Application	NLGI Grade 1	-18	0		
Cal Autolube System		NLGI Grade 0	-29	-20		
	Cat Extreme Application - Arctic	NLGI Grade 0	-43	-45		
	Cat Extreme Application - Desert	NLGI Grade 2	2	35		

Diesel Fuel Recommendations

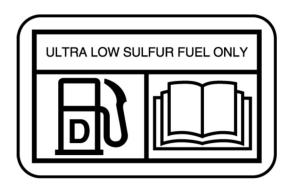


Illustration 142

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United States and Canada

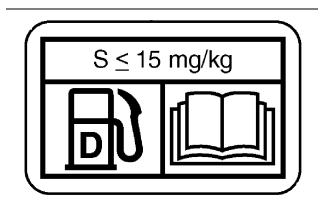


Illustration 143 Rest of World Film

Diesel fuel must meet "Cat Specification for Distillate Fuel" and the latest versions of "ASTM D975" or "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.

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 nonroad Stage IIIB and newer standards and are equipped with exhaust aftertreatment systems.

European ULSD 0.0010 percent (\leq 10ppm (mg/kg) at origin, or 0.0020 percent (\leq 20ppm (mg/kg) at point of final distribution, sulfur fuel having a cetane number \geq 45 and an FAME (bio-diesel) content \leq 7% (v/v) is required by regulation for use in engines certified to European nonroad Stage V and newer standards and are equipped with exhaust aftertreatment systems.

Misfueling with fuels of higher sulfur level may void the warranty or affect warranty claims coverage and 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).
- Increase overall operating costs.

Failures that result from the use of improper fuels are not Cat factory defects. Therefore the cost of repairs would not be covered by a Cat warranty.

For Tier 4/Stage IIIB/Stage IV/Stage V certified engines always follow operating instructions. Fuel tank inlet labels are installed 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 requirements. **Note:** The maximum allowable fuel sulfur level is controlled by various emissions laws, regulations and mandates consult federal, state and local authorities for guidance on fuel requirements for your area.

Diesel fuel containing greater than .0015% (15 ppm) sulfur is acceptable for areas of the world where allowed by law. The engines in these territories are not equipped with aftertreatment. For these lesser regulated countries, refer to the following for allowable diesel fuel sulfur content.

For engines that do not use aftertreatment but do use Exhaust Gas Recirculation (EGR), diesel fuel containing more than 0.05% (500 ppm) sulfur is not approved.

For engines that DO NOT use aftertreatment nor use Exhaust Gas Recirculation (EGR), use of diesel fuel containing more than 1.0% (10,000 ppm) sulfur is not approved. Diesel fuel containing less than 0.1% (1,000 ppm) sulfur is highly recommended. Fuel sulfur levels between 0.5% (5,000 ppm) and up to 1.0% (10,000 ppm) may significantly shorten the oil change interval. Cat S.O.S. Service oil analysis is verystronglyrecommended. Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" "Total Base Number (TBN) and Fuel Sulfur Levels for Direct Injection (DI) Diesel Engines" for more information.

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 D975-09a" includes up to B5 (5 percent) biodiesel. Currently, any diesel fuel in the U.S. may contain up to B5 biodiesel fuel.

European distillate diesel fuel specification "EN 590" includes up to B5 (5 percent) and in some regions up to B7 (7 percent) biodiesel. Any diesel fuel in Europe may contain up to B5 or in some regions up to B7 biodiesel fuel.

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. **Note:** Up to B7 biodiesel blend level is acceptable for use in SSL, MTL, and CTL engines.

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 and for standby power generation engines.

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 without Supplemental Coolant Additives (SCA) or without inhibited coolant. Water alone is corrosive at engine operating temperatures. In addition, water alone does not provide adequate protection against boiling or freezing.

i06092739

Capacities (Refill)

SMCS Code: 7560

Table 32

APPROXIMATE REFILL CAPACITIES					
Compartment or System	Liters	US Gallons	Imperial Gallons		
Cooling System	17	4.5	3.7		
Fuel Tank 906	52	13.7	11.4		

(Table 32, contd)

APPROXIMATE REFILL CAPACITIES						
Compartment or System	Liters	US Gallons	Imperial Gallons			
Fuel Tank 907 and 908	78	20.6	17.2			
Engine Crankcase	11.2	3.0	2.5			
Front Differential	8	2.1	1.7			
Rear Differential	8	2.1	1.8			
Final Drive (each side)	0.8	0.2	0.2			
Drop Box/Transfer Drive	1.3	0.34	0.29			
"Speeder" Drop Box/ Transfer Drive.	1.25	0.33	0.27			
Hydraulic Oil	70	18.5	15.4			
Master Brake Cylinder "non-Speeder" only	0.2	0.05	0.04			
	kg	lbs	Recommended Type			
Refrigerant (1)	1.5	3.3	R134a			

(1) Refer to Service Manual, UENR4125, "Air Conditioning and Heating R-134a for All Caterpillar Machines" for additional information

i07445339

S·O·S Information

SMCS Code: 1348; 1350; 4070; 4250; 4300; 4350; 5050; 7542

 $S \cdot O \cdot S$ 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, $S \cdot O \cdot S$ Services can help determine the cause of an existing product problem.

Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluid Recommendations" for detailed information concerning $S \cdot O \cdot S$ Services.

The effectiveness of $S \cdot O \cdot S$ 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 $S \cdot O \cdot S$ program for your equipment.

Maintenance Support

i06230827

System Pressure Release

SMCS Code: 1250-553-PX; 1300-553-PX; 1350-553-PX; 3000-553-PX; 4250-553-PX; 4300-553-PX; 5050-553-PX; 6700-553-PX

\Lambda WARNING

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.

🛕 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.

- **1.** Lower the implements to the ground.
- 2. Shut off the engine.
- **3.** Turn the key to the ON position before moving control levers.
- **4.** Move the control levers through the full range of travel. This procedure will relieve any pressure that may be present in the implement hydraulic system.
- **5.** Turn steering wheel several times in both directions.
- 6. Depress the brake pedal repeatedly. This procedure will relieve any pressure that may be present in the brake hydraulic system.
- **7.** Press the breaker/relief valve release button on the tank before loosening the cap.

- 8. Slowly loosen the filler cap in order to release the pressure.
- 9. Tighten the filler cap.
- **10.** The pressure in the hydraulic system has been released. Lines and components can be removed.

i07539955

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 in order 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 in order to prevent heat related damage. The following steps should be followed in order 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.
- 2. 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 in order 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.
- **5.** Use standard welding procedures in order to weld the materials together.

Prepare the Machine for Maintenance

SMCS Code: 1000; 7000

🏠 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.

🚯 WARNING

Sudden movement of the machine or release of oil under pressure can cause injury to persons on or near the machine.

To prevent possible injury, perform the procedure that follows before testing and adjusting the power train.

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, "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 the operator's sight.

- 1. Move the machine to a smooth, horizontal location that is away from operating machines and away from personnel.
- **2.** Place the direction control in the NEUTRAL position.
- **3.** Engage the parking brake. Place wheel blocks in front of the wheels and behind the wheels.
- 4. Lower the work tool to the ground.
- 5. Stop the engine.
- 6. Install the steering frame lock.
- 7. Make sure that all system pressures are released before you perform any maintenance procedures to the machine. For more information refer to Operation and Maintenance Manual, System Pressure Release.

Maintenance Interval Schedule

SMCS Code: 7000

When Required

"Battery or Battery Cable - Inspect/Replace"	138
"Bucket Cutting Edges - Inspect/Replace"	142
" Cab Air Filter - Clean"	143
" Engine Air Filter Primary Element - Clean/ Replace"	152
" Engine Compartment - Clean"	155
"Fuel Tank Cap and Strainer - Clean"	162
"Fuel Tank Water and Sediment - Drain"	162
"Fuses - Replace"	163
" Hinges - Lubricate"	168
" Oil Filter - Inspect"	176
"Radiator Core - Clean"	178
"Window Washer Reservoir - Fill"	185
"Window Wiper - Inspect/Replace"	185

Every 10 Service Hours or Daily

" Air Cleaner Dust Valve - Clean/Inspect"	137
" Articulation Bearings - Lubricate"	137
" Backup Alarm - Test"	137
"Brake System Fluid Level - Check"	141
" Cab Air Filter - Clean/Replace"	144
" Cooling System Coolant Level - Check"	147
" Engine Air Filter Service Indicator - Inspect/ Replace"	154
" Engine Oil Level - Check"	156
" Fuel System Primary Filter (Water Separator) - Drain"	160
"Hydraulic System Oil Level - Check "	175
" Lift Arm and Cylinder Linkage - Lubricate"	175
" Quick Coupler - Clean/Inspect"	176
" Quick Coupler - Lubricate"	177
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" Steering Cylinder Bearings - Lubricate"	181

" Tilt Cylinder Bearings and Bucket Linkage Bearings - Lubricate"
" Tire Inflation - Check" 183
" Wheel Nut Torque - Check"
" Windows - Clean"
"Work Tool - Lubricate" 186
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Every 250 Service Hours

"Belts - Inspect/Adjust/Replace"	138
" Brake Pads - Check"	140
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" Engine Oil Sample - Obtain"	157
" Steering Column Play - Check"	180
" Transfer Drive (Hydrostatic) Oil Level - Check"	183

Initial 500 Service Hours

"Cooling System Coolant Sample (Level 2) - Obtain"	148
" Differential and Final Drive Oil - Change"	149
" Transfer Drive (Hydrostatic) Oil - Change"	183

Every 500 Service Hours

"Cab Air Filter - Replace" 145
" Differential and Final Drive Oil Sample - Obtain"
" Engine Oil and Filter - Change" 157
" Frame and Body - Inspect" 158
" Fuel System Filter (In-Line) - Replace" 159
" Fuel System Primary Filter (Water Separator) Element - Replace"
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" Hydraulic System Oil Sample - Obtain" 175
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"Bucket Tips - Inspect/Replace"..... 143

Every 1000 Service Hours

" Differential and Final Drive Oil - Change"	149
" Engine Air Filter Secondary Element - Replace"	153
" Engine Valve Lash - Check"	158
"Hoses and Clamps - Inspect/Replace"	168
" Rollover Protective Structure (ROPS) - Inspect"	179
"Transfer Drive (Hydrostatic) Oil - Change"	183

Every 1500 Service Hours

" Engine Crankcase Breather - Replace" 155

Every 2000 Service Hours

"Brake System Fluid - Change"	140
" Hydraulic System Oil - Change"	172

Every 2 Years

"Hoses and Clamps - Replace"	
------------------------------	--

Every 3000 Service Hours

" Steering Column Spline (HMU Steering) -	
Lubricate"	180
"Belts - Replace"	139

Every 3 Years

Every 3 Years After Date of Installation or Every 5 Years After Date of Manufacture

" Seat Belt - Replace'	"	179
Cour Don Tropiaco		

Every 6000 Service Hours

" Cooling System Coolant (ELC) - Change"	145
"Diesel Particulate Filter - Clean/Replace"	148

Air Cleaner Dust Valve - Clean/ Inspect

SMCS Code: 1051-571-VL

- **1.** Open the engine hood.
- **2.** The air filter housing is located on the left-hand side of the engine compartment.

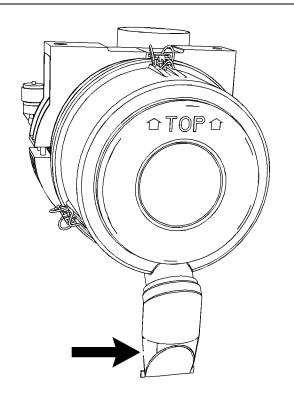


Illustration 144

g01379352

- **3.** Check the dust valve after every 10 service hours or at the end of each day. Actuate the valve by squeezing the lips of the valve in order to remove any accumulated debris.
- 4. Close the engine hood.

i05944438

Articulation Bearings -Lubricate

SMCS Code: 7057-086-BD; 7065-086-BD; 7066-086-BD

Wipe the grease fittings before you lubricate the grease fittings.

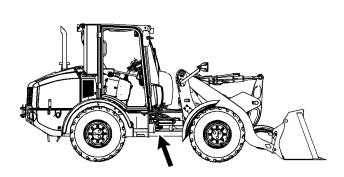


Illustration 145

g03732983

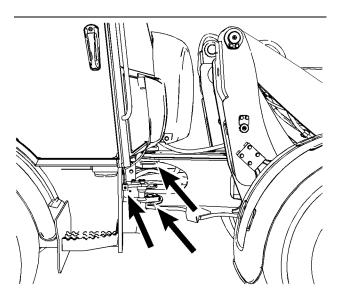


Illustration 146

g01355731

Apply lubricant to the grease fittings for the upper and lower bearing and for the oscillation bearing.

i06093014

Backup Alarm - Test

SMCS Code: 7406-081

The backup alarm is located at the rear of the machine within the counterweight.

The backup alarm has one sound level. The sound level is not adjustable.

Turn the engine start switch key to the ON position in order to perform the test.

Apply the service brake. Move the direction control switch to the REVERSE position.

The backup alarm should immediately sound. The backup alarm will continue to sound until the direction control switch is moved to the NEUTRAL position or to the FORWARD position.

i05940016

q03731036

Battery or Battery Cable - Inspect/Replace

SMCS Code: 1401-040; 1401-510; 1402-510; 1402-040

- **1.** Turn the engine start switch to the OFF position. Turn all switches to the OFF position.
- **2.** The battery is located under the hood on the right side of the machine. Open the hood.

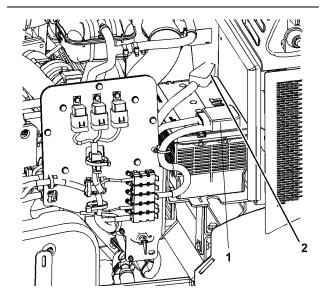


Illustration 147

Battery on Right Side

- (1) Negative Battery Terminal
- (2) Positive Battery Terminal

🔒 WARNING

To avoid personal injury from electrical shock, ensure that the negative battery cable is disconnected first.

- **3.** Disconnect the negative battery cable at the battery.
- **4.** Perform the necessary repairs. Replace the cable or the battery, as needed.
- **5.** Disconnect the positive battery cable. Remove the old battery from the machine.

- **6.** Place the new battery in the machine. Connect the positive battery cable to the battery.
- 7. Connect the negative battery cable at the battery.

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

i05939994

Belts - Inspect/Adjust/Replace

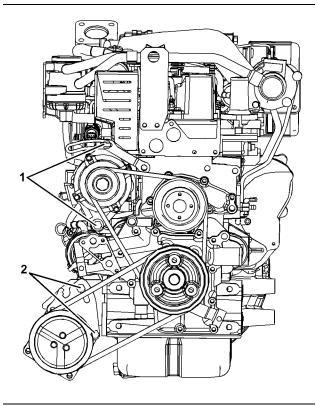
SMCS Code: 1357-025; 1357-040; 1357-510

If a new belt is installed, check the belt adjustment after 30 minutes of operation. A belt is considered used after 30 minutes of operation.

Stop the engine in order to inspect the belts.

Inspect the condition of the belts and the adjustment of the belts. The belts should deflect 10 mm (0.39 inch) to 11 mm (0.43 inch) under a straight push of 98 N (22 lb). This measurement should be taken between the alternator pulley and the crankshaft pulley. This measurement may be taken also between the crankshaft pulley and the air conditioner compressor pulley.

Note: A 144-0235 Borroughs Belt Tension Gauge may be used to measure belt tension.



g03731018

- 1. Loosen the bolts (1).
- **2.** Move the alternator until the correct tension is reached.
- 3. Tighten the bolts.
- **4.** Recheck the belt deflection. If the amount of deflection is incorrect, repeat the adjustment procedure.
- **5.** Ensure that the wiring harness from the alternator is in the proper location.
- **6.** Repeat the procedure for the air conditioning compressor belt (2).

i07527067

Belts - Replace

SMCS Code: 1357-510; 1397-510

- 1. Stop the engine to replace belts.
- 2. Open the engine access hood.

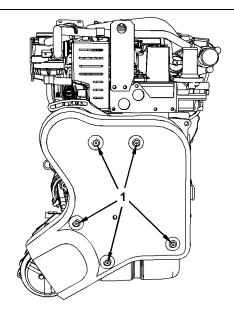


Illustration 149

g06350237

3. Loosen the 5 bolts (1) on the front of the belt protection guard, and remove guard to access belts.

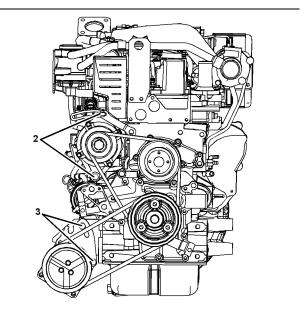


Illustration 150

- 4. Loosen the mounting bolt and adjusting bolt (2).
- 5. Remove belt.
- **6.** Install new belt. Be sure that the belt is fully seated on the pulleys.

7. Move the alternator until the correct tension is reached. The belts should deflect 10 mm (0.39 inch) to 11 mm (0.43 inch) under a straight push of 98 N (22 lb). This measurement should be taken between the alternator pulley and the crankshaft pulley. This measurement may be taken also between the crankshaft pulley and the air conditioner compressor pulley.

Note: A 144-0235 Borroughs Belt Tension Gauge may be used to measure belt tension.

- **8.** Tighten the adjusting bolt. Tighten the mounting bolt.
- 9. Install belt protection guard.

Air Conditioner

Note: For the air conditioner belt (2), use the same procedure and the same measurements for the belt tension.

i02699193

Brake Pads - Check

SMCS Code: 4267; 4273

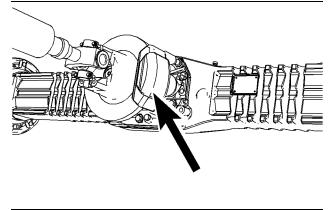


Illustration 151

g01355884

The brake pads are located behind the front axle on the drive shaft. Measure the thickness of the brake pads. If the thickness of either of the two brake pads is less than 4.00 mm (0.16 inch), replace the brake pads. Refer to Disassembly and Assembly, "Brake Caliper - Remove" and Disassembly and Assembly, "Brake Caliper - Install". i02699194

Brake System Fluid - Change (If Equipped)

SMCS Code: 4258-044; 7579-044-BRK

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

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, "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: Brake fluid reservoirs are available only on standard machines.

Purge valves for the brake system are located on service brake cylinders. The cylinders are located on the drive axle. Access the purge valves below the machine.

- 1. Park the machine on a hard, level surface. Stop the engine. Allow the fluid to cool for five minutes. However, the brake fluid should be warm for this procedure.
- **2.** Thoroughly clean the outside of the purge valves. Attach a line to the purge valve. Drain the fluid from each purge valve into a suitable container.

Brake System Fluid Level -Check (If Equipped)

SMCS Code: 4258-535-FLV; 7579-535-BRK

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

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, "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.

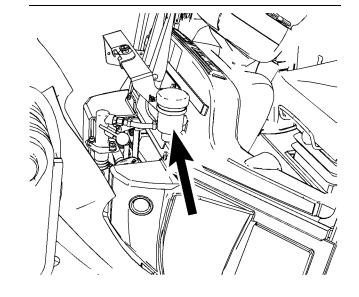
Note: Brake fluid reservoirs are available only on standard machines.

- 1. Park the machine on a hard, level surface.
- **2.** The fluid reservoir is located in the compartment in front of the cab.
- 3. Check the fluid level when the engine is stopped.
- 4. Maintain the fluid level between the marks on the reservoir.
- 5. If the fluid level is low, add fluid.
 - a. Remove the lid on the brake fluid reservoir.
 - b. Add the correct type of brake fluid to the reservoir. Refer to Operation and Maintenance Manual, "Lubricant Viscosities Chart" for the correct fluid.
 - c. Install the lid on the reservoir.
- **6.** Check for any leaks. Maintain the fluid level between the marks on the reservoir.

Illustration 152

q01355891

- **3.** Remove the lid on the brake fluid reservoir. The fluid reservoir is located in the compartment in front of the cab. Add the correct type of brake fluid to the reservoir. Refer to Operation and Maintenance Manual, "Lubricant Viscosities Chart" for the correct fluid.
- 4. Open the purge valve.
- **5.** Fully depress the service brake that is being purged.
- 6. Close the purge valve.
- 7. Release the service brake.
- 8. Repeat Steps 4 through 7 until no air is in the fluid that drains from the purge valve. Ensure that the reservoir remains full of fluid.
- **9.** Start the engine. Run the machine for a few minutes. Check for any leaks. Maintain the fluid level between the marks on the reservoir.



Braking System - Test

SMCS Code: 4011-081; 4267-081

Service and Parking Brake Holding Ability Test

The ability of the service brakes or parking brake to hold the machine in place can be tested by placing the machine in Brake Test Mode. Brake Test Mode is automatically enabled by the software. When the operator commands the machine to meet in a specific set of conditions in a specific order.

With the Key Off, set Park Brake to Engaged and FNR to Neutral

- 1. Key ON the machine and start the engine
- 2. Fully depress the Left Pedal
- 3. Fully depress the Throttle Pedal
- 4. Using the FNR switch, perform a FORWARD, NEUTRAL, FORWARDquickly, or REVERSE, NEUTRAL, REVERSE action quickly.

Note: This procedure will place the transmission into Forward or Reverse gear with the machine held in place by both the parking brake and service brake. The Brake Test Mode is now active. This mode is indicated by the Parking Brake indicator on the display flashing.

5. To perform a Service Brake Test, release the Park Brake while holding the Left Pedal. To perform a Park Brake Test, release the Left Pedal while keeping the Park Brake engaged.

Note: The machine should hold in place. If machine does not, shift to Neutral and release the throttle pedal. Service the machine.

Optional – To immediately test the other brake, reapply the park brake while maintaining a fully depressed left pedal. Fully depress the left pedal while the park brake is engaged. Then, follow the procedures above to test the other brake system. **6.** To finish the Brake Test Mode, shift to Neutral and then release the Throttle Pedal.

i07331615

Bucket Cutting Edges -Inspect/Replace

SMCS Code: 6801-510; 6801-040

Personal injury or death can result from bucket falling.

Block the bucket before changing bucket cutting edges.

Note: Check for bolts that are loose, damaged, or missing. Tighten loose bolts, and replace and tighten damage or missing bolts. Use caution with damage bolts. There is a chance of the bolts having sharp edges leading to an injury or laceration.

Note: The cutting edge may weigh as much as 50 kg (110 lb). Use assistance as needed.

- 1. Remove all combustible material from the bucket.
- 2. Lower the lift arms fully. Tilt back the bucket so the bucket cutting edge is accessible.
- 3. Place blocks under the raised edge of the bucket.
- 4. Clamp the cutting edge to the bucket.
- 5. Use a torch or cut-off wheel to remove the nuts.
- 6. Remove the bolts.
- 7. Carefully remove the clamps and cutting edge.
- 8. Clean the contact surfaces.
- **9.** Use the opposite side of the cutting edge, if this side is not worn.
- **10.** Install a new cutting edge, if both edges are worn.
- 11. Install the bolts.
- 12. Remove the blocks that are under the bucket.
- **13.** After a few hours of operation, check the bolts for proper torque.

i01764331

Bucket Tips - Inspect/Replace

SMCS Code: 6805-040; 6805-510

WARNING

Personal injury or death can result from bucket falling.

Block the bucket before changing bucket cutting edges.

- **1.** Lower the lift arms fully. Tilt back the bucket so that the bucket tips are accessible.
- 2. Place blocks under the raised edge of the bucket.
- **3.** Remove the mounting bolts. Remove the bucket tips.
- 4. Clean the mounting surface.
- 5. Replace the bucket tips.
- 6. Install the bolts.
- 7. Remove the blocks that are under the bucket.
- **8.** After a few hours of operation, check the bolts for proper torque.

Cab Air Filter - Clean

SMCS Code: 7342-070

Clean Internal Filter Element

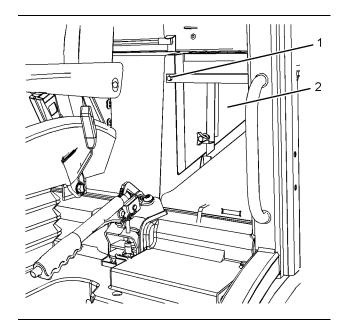


Illustration 153(1) Screws(2) Internal Filter Element

g03805646

The internal filter element is located in the cab on the left side. There may be a cover panel over the filter. If your machine has a storage box in the cab, the filter is behind the storage box.

- 1. Remove the cover panel or remove the storage box.
- 2. Remove the 2 screws that hold the filter in place.
- 3. Remove the filter element. Clean the filter element with compressed air. You can also wash the filter elements with a solution of warm water and of a nonsudsing household detergent.

Do not wash the filter element while the filter element is installed on the machine.

Replace the filter element if the filter element is damaged.

- **4.** Rinse the filter element in clean water. Air dry the filter element thoroughly.
- 5. Install the filter element and replace the screws.

6. Install the cover panel or install the storage box.

i05944519

g03732943

Cab Air Filter - Clean/Replace

SMCS Code: 7342-510; 7342-070

Note: Clean the filter elements more often in dusty conditions. If there is a noticeable reduction in the air flow from the air vents, check the filter elements.

Clean External Filter Element

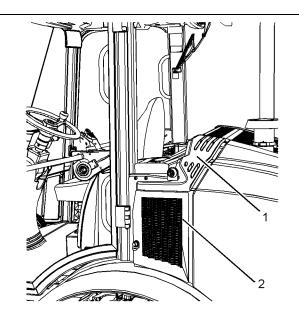


Illustration 154

(1) Access Cover

(2) Access Door

1. Open the access door (2) on the left side of the machine.

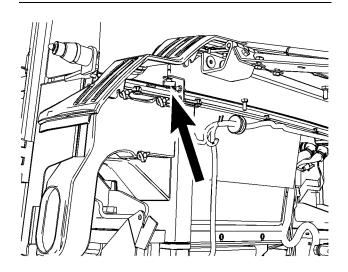


Illustration 155 Thumb screw for the access panel

Note that the engine hood is removed for clarity.

2. Remove the access cover (1).

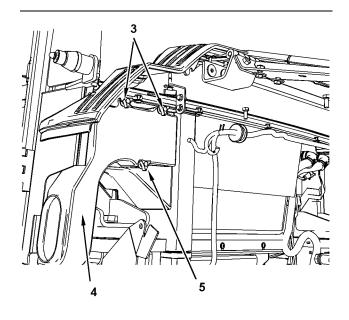
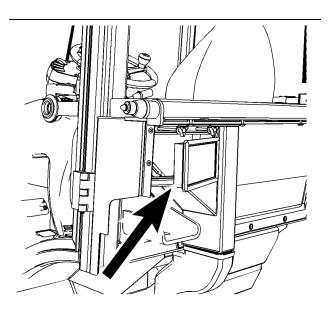


Illustration 156

g01355920

g01355653

3. Loosen the two top thumb screws (3) that hold the air duct (4). Remove the bottom thumb screw (5).



q01355951

- **4.** Remove the filter element. Clean the filter element with compressed air.
- **5.** Install the filter element and replace the thumb screw.
- 6. Tighten all of the thumb screws.
- 7. Install the access panel.

8. Close the access door.

i07523655

Cab Air Filter - Replace

SMCS Code: 7311-510; 7342-510

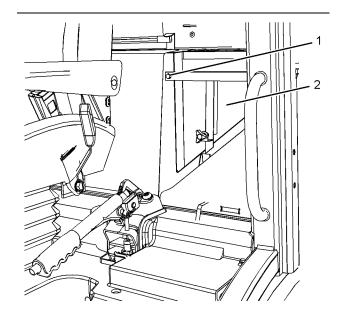


Illustration 158 (1) Screws (2) Internal Filter Element

The internal filter element is located in the cab on the left side. There may be a cover panel over the filter. If your machine has a storage box in the cab, the filter is behind the storage box.

- 1. Remove the cover panel or remove the storage box.
- **2.** Remove the 2 screws that hold the filter in place, and remove filter.
- **3.** Install the new filter element and replace the screws.
- 4. Install the cover panel or install the storage box.

i06089686

q03805646

Cooling System Coolant (ELC) - Change

SMCS Code: 1395-044-NL

The factory fills the cooling system with Cat ELC coolant. With the recommended $S \cdot O \cdot S$ Services coolant analysis, the maintenance interval for the coolant change is 12,000 hours. If $S \cdot O \cdot S$ Services coolant analysis is not used, the recommended change is 3000 hours.

🏠 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.

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: The machine was shipped from the factory with Extended Life Coolant (ELC) in the cooling system.

For information about the addition of Extender to your cooling system, see the Operation and Maintenance Manual, "Cooling System Coolant (ELC) Extender - Add" or consult your Cat dealer.

Drain the coolant whenever the coolant is dirty or whenever the coolant is foaming.

Allow the machine to cool before you change the coolant.

1. Open the engine hood. Refer to Operation and Maintenance Manual, "Access Doors and Covers".

Note: The coolant tank is located in the engine compartment on the right side.

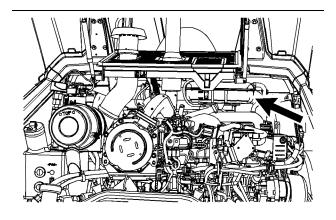


Illustration 159

g03737954

2. Slowly loosen the cap in order to relieve system pressure. Remove the cap.

3. Remove the cover plate on the bottom of the engine compartment. Locate the drain for the engine coolant. Open the drain and allow the coolant to drain into a suitable container.

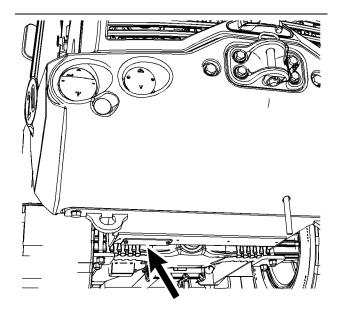


Illustration 160

g03803849

4. Remove the access panel under the rear of the machine.

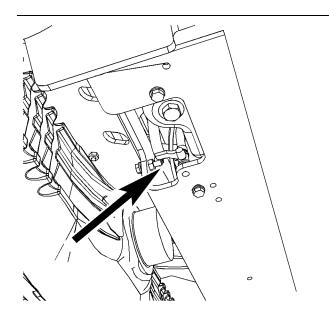


Illustration 161

- **5.** Open the drain and allow the coolant to drain from the radiator into a suitable container.
- 6. Close the drain.
- 7. Replace the access panel.

- 8. Replace the thermostat. See Operation and Maintenance Manual, "Cooling System Water Temperature Regulator - Replace" for the process for replacing the thermostat.
- **9.** Add the coolant solution directly to the coolant tank. Refer to Operation and Maintenance Manual, "Capacities (Refill)". Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations".

Note: Premix the coolant solution before filling the cooling system. The coolant solution should contain 50 percent coolant and 50 percent distilled water.

Note: Add the coolant solution at a maximum rate of 5 liters per minute. Air may get trapped inside the engine block. A large amount of trapped air can cause localized heating to occur upon start-up. Localized heating may result in engine damage, which may lead to failure of the engine.

- **10.** Start the engine. Run the engine without the radiator cap for 30 seconds. Stop the engine. Allow the engine to sit for 1 minute. Check the coolant level. If necessary, add coolant.
- **11.** Check the coolant level in the coolant tank. Maintain the coolant level to the top mark on the tank.
- **12.** Stop the engine. Inspect the cap for the coolant tank and the gasket. Replace the cap if the cap or the gasket is damaged. Install the cap.
- 13. Close the engine hood.

i05956472

Cooling System Coolant Level - Check

SMCS Code: 1350-535-FLV

🏠 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.

Open the engine hood. The coolant tank is located in the engine compartment on the right side.

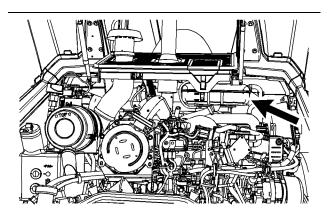


Illustration 162

g03737954

- 1. Remove the cap from the coolant tank.
- Maintain the coolant level between the marks on the side of the tank, when the cooling system is cool. If you need to add coolant daily, check the cooling system for leaks.
- 3. Replace the cap if the seal is damaged.
- 4. Install the cap on the tank.

i06089784

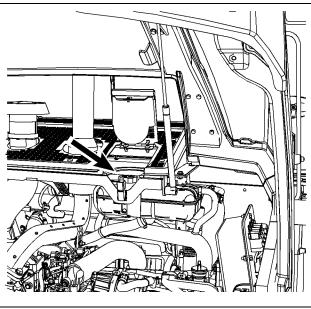
Cooling System Coolant Sample (Level 1) - Obtain

SMCS Code: 1395-008; 7542

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.

Note: Level 1 results may indicate a need for Level 2 analysis.



g03803913

- 1. Open the engine hood and small door. Coolant samples can be taken from the coolant tank.
- 2. Sample the coolant.
- 3. Submit the sample for Level 1 analysis.

i06089800

Cooling System Coolant Sample (Level 2) - Obtain

SMCS Code: 1395-008; 7542

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.

The coolant tank is located in the engine compartment next to the engine air cleaner. Slowly loosen the cap in order to relieve system pressure. Remove the cap.

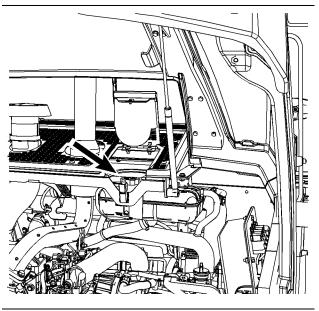


Illustration 164

g03803913

- 1. Open the engine hood and small door. Coolant sample can be taken from the coolant tank.
- 2. Sample the coolant.
- 3. Submit the sample for Level 2 analysis.

i05761300

Diesel Particulate Filter -Clean/Replace

SMCS Code: 108F-510; 108F-070; 1091-070; 1091-510

Note: Only applies to engines with aftertreatment.

Consult your Cat dealer when the DPF needs to be cleaned.

The approved Caterpillar DPF maintenance procedure requires that one of the following actions be taken when the DPF needs to be cleaned:

- The DPF from your machine can be replaced with a new DPF
- The DPF from your machine can be replaced with a remanufactured DPF
- The DPF from your machine can be cleaned by your local authorized Cat dealer, or a Caterpillar approved DPF cleaning machine, and reinstalled

Note: In order to maintain emissions documentation, the DPF that is removed from the machine when the DPF is cleaned must be reinstalled on the same machine.

i02699128

g01357818

Differential and Final Drive Oil - Change

SMCS Code: 3278-044; 4050-044

Wipe the covers and surfaces around openings before you check the oil. Wipe the covers and surfaces around openings before you add oil.

Differential Oil

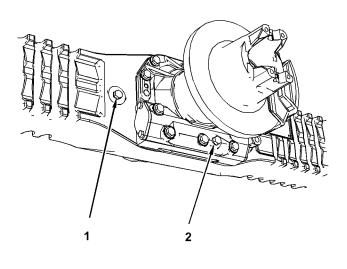


Illustration 165 Front Differential

- (1) Level/Fill Plug
- (2) Drain Plug

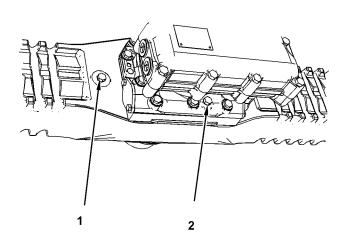


Illustration 166 Rear Differential

(1) Level/Fill Plug

(2) Drain Plug

1. Remove the drain plugs (2) from both differentials. Allow the oil to drain into a suitable container.

- 2. Clean the drain plugs and reinstall the drain plugs.
- **3.** Remove the differential level/fill plug (1) from both differentials.
- **4.** Fill the differentials with oil. See Operation and Maintenance Manual, "Lubricant Viscosities" and Operation and Maintenance Manual, "Refill Capacities".
- **5.** Maintain the oil level at the bottom of the threads for the plug.

6. Clean the differential level/fill plugs and install the plugs for each differential. Operate the machine for a few minutes in order to allow the oil to flow completely through the axles. Remove the differential level/fill plugs and recheck the oil level. Add oil, if necessary. Install the differential level/fill plugs for each differential.

Oil for the Wheel

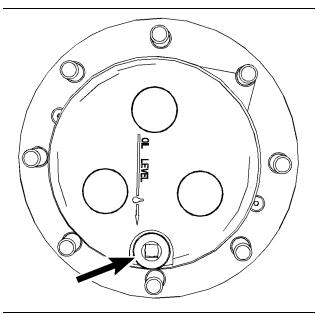
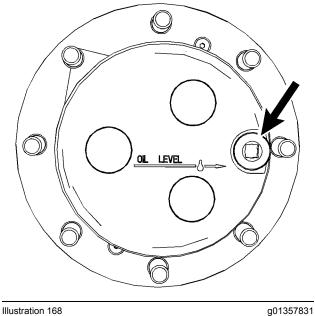


Illustration 167 Wheel in the position for draining

g01357829



Wheel in the position for filling

Note: Work on one wheel at a time.

- 1. Move the machine so that the plug on the wheel is on the bottom of the wheel.
- 2. Remove the drain plug from the wheel. Allow the oil to drain into a suitable container.
- **3.** Move the machine so that the plug on the wheel is in the horizontal position.
- 4. Fill the wheel with oil. See Operation and Maintenance Manual, "Lubricant Viscosities" and Operation and Maintenance Manual, "Refill Capacities" for information about the oil.
- **5.** Maintain the oil level at the bottom of the threads for the plug.
- 6. Clean the plug and install the plug. Operate the machine for a few minutes in order to allow the oil to flow completely through the axles. Remove the plug and recheck the oil level. Add oil, if necessary. Install the plug.
- 7. Repeat steps 1 through 6 for each wheel.

i02699138

Differential and Final Drive Oil Level - Check

SMCS Code: 3278-535-FLV; 4050-535-FLV

Differential

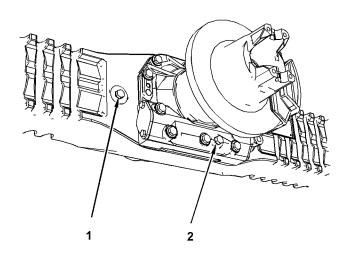


Illustration 169 Front Differential (1) Level/Fill Plug (2) Drain Plug

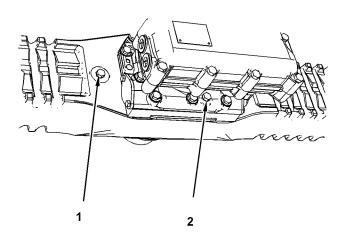


Illustration 170 Rear Differential g01357819

(1) Level/Fill Plug

(2) Drain Plug

- **1.** Remove the differential level/fill plugs (1) for the front axle and the rear axle.
- **2.** The oil level should be at the bottom of the threads for the plug.
- 3. Add oil, if necessary.

4. Clean the plugs and install the plugs.

Wheels

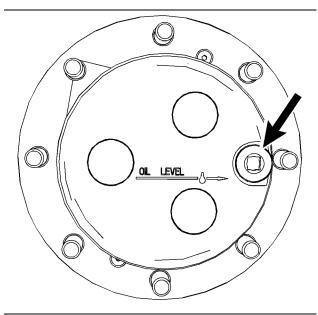


Illustration 171

g01357831

Wheel in the position for checking

Note: Work on one wheel at a time.

- **1.** Move the machine so that the plug on the wheel is in the horizontal position.
- 2. Remove the level/fill plugs for the wheel.
- **3.** The oil level should be at the bottom of the threads for the plug.
- **4.** Maintain the oil level at the bottom of the threads for the plug.
- 5. Add oil, if necessary.
- 6. Clean the plug and install the plug.
- 7. Repeat steps 1 through 6 for each wheel.

i02699139

Differential and Final Drive Oil Sample - Obtain

SMCS Code: 3278-008; 4050-008; 4070-008; 7542

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

- 1. Operate the machine for a few minutes before you obtain the fluid sample. This will thoroughly mix the fluid for a more accurate sample.
- Obtaining a sample will require a vacuum pump or an equivalent. Withdraw the oil through the filler opening.

Reference: For more information, refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" and Special Publication, PEHP6001, "How To Take A Good Oil Sample".

i05956509

Engine Air Filter Primary Element - Clean/Replace

SMCS Code: 1054-070-PY; 1054-510-PY

NOTICE

Service the air cleaner only with the engine stopped. Engine damage could result if the air cleaner is serviced while the engine is running.

Service the air cleaner filter element when the yellow piston on the engine air filter service indicator enters the red zone. Refer to Operation and Maintenance Manual, "Engine Air Filter Service Indicator -Inspect".

NOTICE

Caterpillar recommends certified air filter cleaning services that are available at Cat dealers. The Cat cleaning process uses proven procedures to assure consistent quality and sufficient filter life.

Observe the following guidelines if you attempt to clean the 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 207 kPa (30 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 use air filters with damaged pleats, gaskets, or seals. Dirt entering the engine will cause damage to engine components.

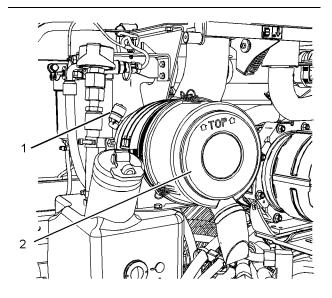


Illustration 172

g03737996

Location of the engine air filter

(1) Engine Air Filter Service Indicator

(2) Engine Air Filter

1. Open the engine hood.

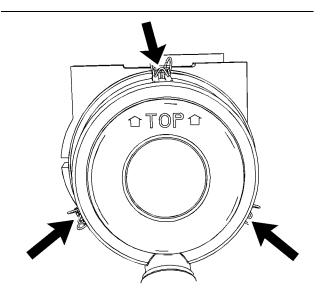
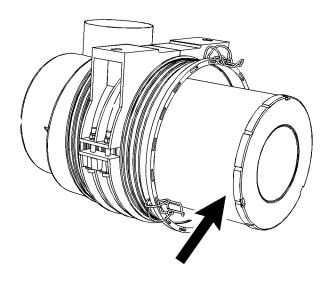


Illustration 173

g01379338

2. Release the three clips on the air cleaner housing cover. Remove the air cleaner housing cover.



g01379340

- 3. Remove the primary filter element.
- 4. Install a clean air filter element. Install the air cleaner housing cover and fasten the clips.
- 5. Reset the engine air filter service indicator.

If the yellow piston in the indicator remains in the red zone, replace the secondary element.

i02699205

Engine Air Filter Secondary Element - Replace

SMCS Code: 1054-510-SE

NOTICE

Always replace the secondary filter element. Never attempt to reuse it by cleaning.

The secondary filter element should be replaced at the time the primary element is serviced for the third time.

The secondary filter element should also be replaced if the yellow piston in the filter element indicator enters the red zone after installation of a clean primary element, or if the exhaust smoke is still black.

NOTICE Service the air cleaner only with the engine stopped. Engine damage could result if the air cleaner is serviced while the engine is running.

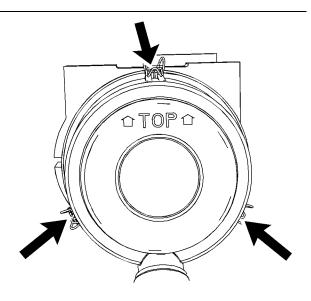


Illustration 175

g01379338

1. Release the 3 clips on the air cleaner housing cover. Remove the air cleaner housing cover.

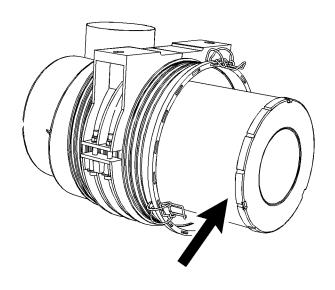


Illustration 176

g01379340

2. Remove the primary filter element.

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g03737996

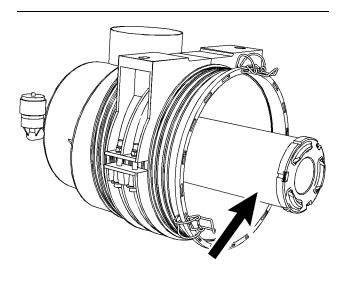


Illustration 177

g01379368

- 3. Remove the secondary filter element.
- **4.** Cover the air inlet opening. Clean the inside of the air cleaner housing.
- **5.** Inspect the gasket between the air inlet pipe and the air cleaner housing. Replace the gasket if the gasket is damaged.
- **6.** Uncover the air inlet opening. Install a new secondary element.
- 7. Install the primary element.
- **8.** Install the air cleaner housing cover and install the clip.
- 9. Reset the engine air filter service indicator.

Engine Air Filter Service Indicator - Inspect/Replace

SMCS Code: 7452-510; 7452-040

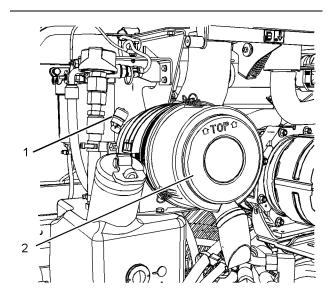


Illustration 178

Location of the engine air filter

(1) Engine Air Filter Service Indicator

- (2) Engine Air Filter
- 1. Mount the machine.
- 2. Fasten the seat belt and start the engine.
- 3. Run the engine at high idle.
- 4. Stop the engine.
- 5. Open the engine hood.
- 6. Inspect the indicator. If the yellow piston in the indicator enters the red zone, service the air cleaner.

Note: See Operation and Maintenance Manual, "Engine Air Filter Primary Element - Clean/Replace". See Operation and Maintenance Manual, "Engine Air Filter Secondary Element - Replace".

7. Reset the indicator.

Note: To check the condition of the service indicator, try resetting the service indicator. Three pushes of the reset button may be required to reset the indicator. Next, check the movement of the yellow piston in the service indicator. Start the engine and accelerate the engine to high idle for a few seconds. After the governor control pedal is released, the yellow piston should remain at the highest position that was achieved during acceleration. If either of these conditions are not met, replace the service indicator.

i06090196

Engine Compartment - Clean

SMCS Code: 1000-070-CPA

Inspect the engine compartment for dirt buildup or debris. Remove any dirt or debris from the engine compartment.

1. Open the engine hood. Refer to Operation and Maintenance Manual, "Access Doors and Covers".

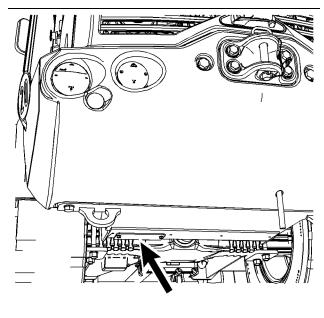


Illustration 179

g03803849

2. Remove any debris or dirt from the engine compartment. If necessary, remove the belly plate in order to clean out the engine compartment. The belly plate is located under the rear of the machine on the left side.

Note: Use care when you clean the engine compartment. Damage to the machine may occur.

3. Install the belly plate. Close the engine hood.

i06092702

Engine Crankcase Breather -Replace (and PCV Valve Check)

SMCS Code: 1317-510

Note: Only applies to engines with aftertreatment.

- 1. Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers".
- 2. Open the engine hood. Refer to Operation and Maintenance Manual, "Access Doors and Covers"

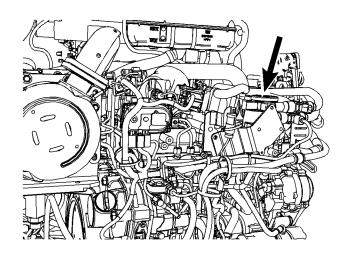


Illustration 180 C3.3B g03805679





3. The breather is located in the engine compartment on the right-hand side of engine. There is cap on the breather and a replaceable element inside.

Note: This service may be performed without removing the housing from the engine.

4. Remove the breather cap and remove the filter element.

Note: The C3.3Bis equipped with cap on bottom portion of the canister. Use a wrench to remove the breather cap.

5. Clean the housing and the cap for the breather.

(1)

(2)

(3)

(4)

i06093080

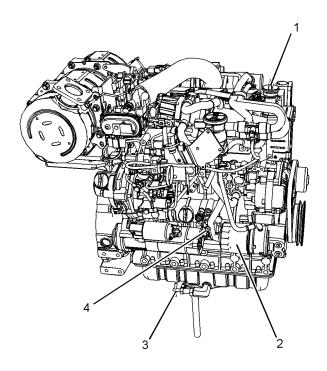
g03805696

Engine Oil Level - Check

SMCS Code: 1348-535-FLV

NOTICE Do not overfill the crankcase. Engine damage can result.

1. Open the engine hood.

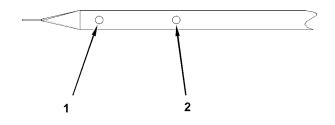


- Illustration 183
- (1) Oil Filler Cap (3) Oil Drain Valve





- (1) Cover
- (2) O-ring (3) Filter Element
- (4) Housing
- 6. Install the new filter element in the breather. Install the breather cap.
- 7. Tilt the radiator downward.
- 8. Close the engine access door.



g01277108

(1) Oil level add mark

(2) Full mark

2. Maintain the oil level between the mark (1) and the mark (2) on the dipstick.

Note: After 10 minutes, check the oil level on the dipstick.

- 3. If necessary, remove the oil filler cap and add oil.
- 4. Clean the oil filler cap and install the oil filler cap.
- 5. Close the engine hood.

i05939957

Engine Oil Sample - Obtain

SMCS Code: 1348-008; 7542

Open the engine hood.

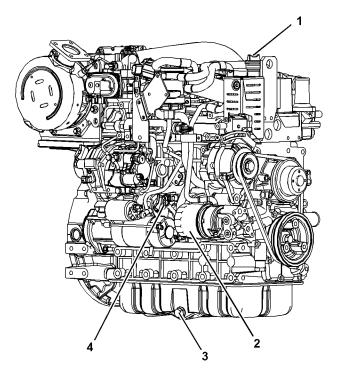


Illustration 185

g03730932

(1) Oil Filler Cap
 (2) Oil Filter
 (3) Oil Drain Valve
 (4) Oil Dipstick

The engine oil sample is taken through the dipstick tube. Use a Vacuum Extraction pump to collect the sample. Measure and cut new tubing to the length of the dipstick. Connect one end of the tubing to the pump. Insert the other end into the dipstick tube. Draw the sample.

Discard the tubing after each sample. Follow all local regulations for discarding oil sampling equipment. Refer to How to Take a Good Oil Sample, PEGJ0047 for more information.

i05939969

Engine Oil and Filter - Change

SMCS Code: 1308-510; 1348-044

The normal engine oil change interval is every 500 service hours or 1 year. If the engine is operated under severe conditions or if the oil is not Cat oil, change the oil after every 250 service hours or after 6 months. Severe conditions include the following factors: high temperatures, continuous high loads and dusty conditions.

Refer to the results of the $S \cdot O \cdot S$ oil analysis in order to determine if the engine oil change interval should be decreased. Consult your Cat dealer for detailed information regarding the optimum engine oil change interval.

1. Open the engine hood.

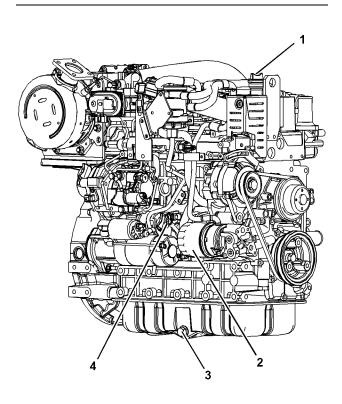


Illustration 186

- (1) Oil Filler Cap
- (2) Oil Filter
- (3) Oil Drain Valve
- (4) Oil Dipstick
- 2. Open the crankcase drain valve and drain the oil into a suitable container.
- 3. Close the crankcase drain valve.
- **4.** Remove the filter element with a strap type wrench. Refer to Operation and Maintenance Manual, "Oil Filter Inspect".
- 5. Clean the filter mounting base with a clean cloth. Make sure that the old filter gasket has been removed.
- **6.** Apply a thin film of clean engine oil to the sealing surface of the new filter element.
- 7. Install a new engine oil filter hand tight until the seal of the engine oil filter contacts the base. Note the position of the index marks on the filter in relation to a fixed point on the filter base.

Note: There are rotation index marks on the engine oil filter that are spaced 90 degrees or 1/4 of a turn away from each other. When you tighten the engine oil filter, use the rotation index marks as a guide.

8. Tighten the filter according to the instructions that are printed on the filter. Use the index marks as a guide. For non-Cat filters, use the instructions that are provided with the filter.

Note: You may need to use a Cat strap wrench, or another suitable tool, in order to turn the filter. Make sure that the installation tool does not damage the filter.

- **9.** Wipe the area around the oil filler cap. Remove the oil filler cap. Fill the crankcase with new oil. Refer to Operation and Maintenance Manual, "Lubricant Viscosities" and Operation and Maintenance Manual, "Refill Capacities". Clean the oil filler cap and install the oil filler cap.
- **10.** Start the engine and allow the oil to warm. Check for leaks.

Note: After you stop the engine, wait for 10 minutes before you check the oil level. This time allows the oil to drain back into the oil pan.

- **11.** Stop the engine and wait for 10 minutes in order to allow the oil to drain into the oil pan. Maintain the oil level in the crosshatched region of the engine oil dipstick. Add oil, if necessary.
- **12.** Close the engine hood.

a03730932

i04538255

Engine Valve Lash - Check

SMCS Code: 1105-025

In order to perform the valve lash adjustment, refer to Systems Operation, Testing and Adjusting, "Engine Valve Lash - Inspect/Adjust".

Note: A qualified mechanic should adjust the engine valve lash because special tools and training are required.

i07360156

Frame and Body - Inspect

SMCS Code: 3250-040; 3260-040; 3268-040; 7000-040; 7050-040; 7051-040; 7113-040; 7258-040

All earthmoving equipment is prone to a high degree of wear. Regular inspections of frame and lift arms for structural damage are necessary. Regular inspections can minimize the risk of accidents and can reduce down time. The interval between these inspections depends on the following factors:

- The age of the machine
- The severity of the application
- · The condition of the haul road
- The amount of routine servicing that has been carried out
- The operator skill and technique

These inspections should be carried out at intervals no longer than 500 service hours. Older machines, or machines that are operating in severe applications will require more frequent inspections.

If the machine has been involved in a collision, or if the machine has been involved in any accident, the machine must be inspected thoroughly. Inspect the machine regardless of the date of the last inspection.

The machine must be clean before the machine is inspected.

Proper repair of frames and structures requires specific knowledge of the following subjects:

- Materials that have been used to manufacture the frame members
- Frame member construction
- Repair techniques that are recommended by the manufacturer

Consult your Cat dealer if repairs are necessary. Your Cat dealer is qualified to carry out repairs on your behalf.

All repairs should be carried out by a Cat dealer. If you carry out your own repairs, contact your Cat dealer for advice about proper repair techniques.

The primary method of inspection for this procedure is visual inspection. Examine components for any gouging, paint cracking around welds, voids, or fractures within or near any welds, or other obvious signs of damage. Paint cracking along a weld is not a definite sign of the presence of a crack but is an indication that damage may be present. Magnetic particle or dye penetrant methods may be used to confirm the existence of any cracks. i06093352

Fuel System Filter (In-Line) -Replace

SMCS Code: 1261-510

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, "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: Do not fill fuel filters before installation in any circumstance.

Note: Do not open any high-pressure lines in order to purge air from the fuel system.

Note: Replace the fuel filter before the scheduled interval if any of the following occur:

- Engine performance is poor.
- · Hard Starting
- · Engine dies under load.
- Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers". The filter is located on the left side of the engine compartment.

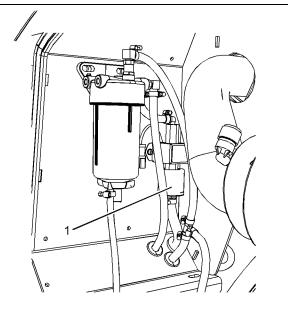


Illustration 187 (1) Filter g03805959

- 2. Loosen the hose clamps.
- 3. Remove the fuel filter and discard the fuel filter.

Note: Use a wrench on the hex shaft of the pump to hold the pump securely to avoid pump damage.

- **4.** Replace the fuel filter. Ensure that the arrow on the filter points upward.
- 5. Tighten to a torque of 45 ± 7 N·m (33 ± 5 lb ft).

Note: Use a wrench on the hex shaft of the pump to hold the pump securely to avoid pump damage.

- 6. Tighten the hose clamps.
- 7. Start the engine.
- 8. Check for leaks.
- 9. Close the engine access door.

Fuel System Primary Filter (Water Separator) - Drain

SMCS Code: 1261-543; 1263; 1263-543

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, "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.

The fuel system water separator is located in the left side of the engine compartment.

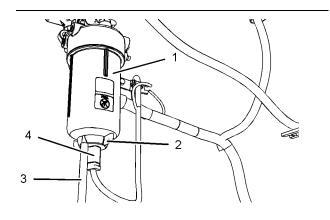


Illustration 188

- (1) Filter Housing
- (2) Drain Valve
- (3) Drain Hose(4) Water-In-Fuel Sensor Plug
- 1. Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers".
- **2.** If equipped, disconnect the water-in-fuel sensor plug (4).
- Insert the drain hose (3) into a suitable container. Loosen the drain valve (2) on the bottom of the housing.

Note: One half turn to one full turn will fully open the valve.

i06133412

- **4.** Tighten the drain valve (2) by hand. Do not tighten the drain valve (2) with a tool. Damage to the valve or to the seals may occur.
- 5. If equipped, reconnect the water-in-fuel sensor plug (4).
- 6. Close the engine access door.
- **7.** Dispose of the water and sediment according to local regulations.

i04728774

Fuel System Primary Filter (Water Separator) Element -Replace

SMCS Code: 1260-510-FQ; 1260-510; 1260; 1260-510-SE; 1260-070; 1261; 1263-070; 1263-510-FQ; 1263-510; 1263

NOTICE

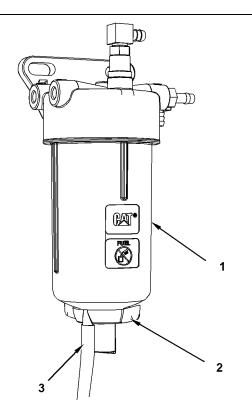
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "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: This unit has a dual purpose. The element serves as a water separator and a fuel filter.

1. Open the engine access door. Refer to Operation and Maintenance Manual, "Access Doors and Covers".



Ilustration 189	
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(1) Filter Housing

(2) Drain Valve

(3) Drain Hose

2. Open the drain on the fuel filter (2). Allow the water and fuel to drain into a suitable container.

Note: One half to one full turn will fully open the valve.

- **3.** Close the drain valve by hand. Do not tighten the drain valve with a tool. Damage to the valve or to the seals may occur.
- **4.** Rotate the fuel filter housing counterclockwise to remove.
- 5. Clean the mounting base for the fuel filter.
- 6. Clean the housing for the fuel filter.
- 7. Lubricate the seal with clean fuel. Install the new fuel filter and housing onto the mounting base. Rotate clockwise in order to fasten the fuel filter to the mounting base. Hand tighten until the lip of the housing is in contact with the mounting base.

Note: Do not prefill the filter with fuel. Contamination of the fuel system may occur.

 Prime the fuel system in order to fill the fuel filter with fuel. Refer to Operation and Maintenance Manual, "Fuel System Priming Pump - Operate".

q02625923

9. Close the engine access door.

i02724242

Fuel Tank Cap and Strainer - Clean

SMCS Code: 1273-070-Z2; 1273-070-STR

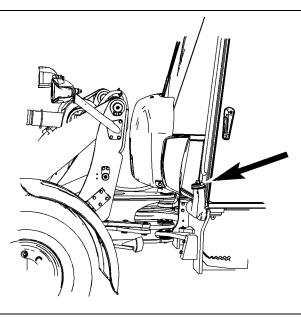


Illustration 190

g01366657

The fuel cap is located in the center on the left side of the machine.

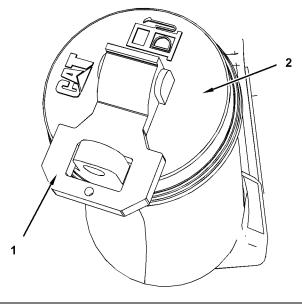


Illustration 191

g01366659

- Lift the lever (1) and turn the lever counterclockwise until the lever stops. Remove the cap (2).
- 2. Inspect the seal for damage. Replace the seal, if necessary.
- **3.** Remove the strainer that is located in the filler opening.
- **4.** Wash the strainer and the fuel tank cap in a clean, nonflammable solvent.
- 5. Install the strainer into the filler opening.
- **6.** Install the fuel tank cap. Close the engine access door.

i05260551

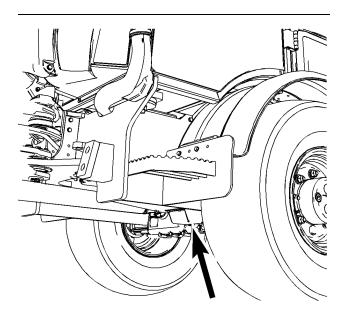
Fuel Tank Water and Sediment - Drain

SMCS Code: 1273-543-M&S

Release the pressure in the fuel tank by loosening the fuel tank cap.

The fuel tank drain valve is located in the center on the left side underneath the machine.

Note: Machines if equipped with an Eco Drain tube, will be equipped with an Eco Drain fitting on the fuel tank. The drain tube connects to the fitting and allows for draining without spillage into a suitable container.



g01358191

Remove the cover.

Open the fuel tank drain valve. Allow the water and sediment to drain into a suitable container. Close the fuel tank drain valve.

Replace the cover.

i06084176

Fuses - Replace

SMCS Code: 1417-510

Fuses

Fuses – Fuses protect the electrical system from damage that is caused by overloaded circuits. Replace the fuse if the element separates. If the element of a new fuse separates, check the circuit. Repair the circuit, if necessary.

NOTICE

Replace the fuses with the same type and size only. Otherwise, electrical damage can result.

If it is necessary to replace fuses frequently, an electrical problem may exist. Contact your Caterpillar dealer

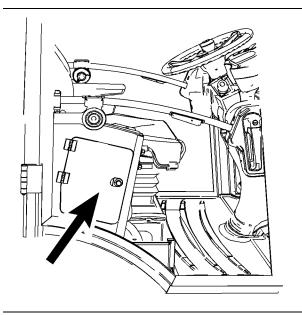


Illustration 193

g01356828

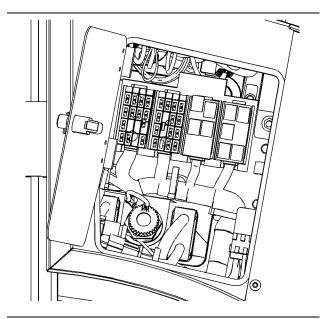
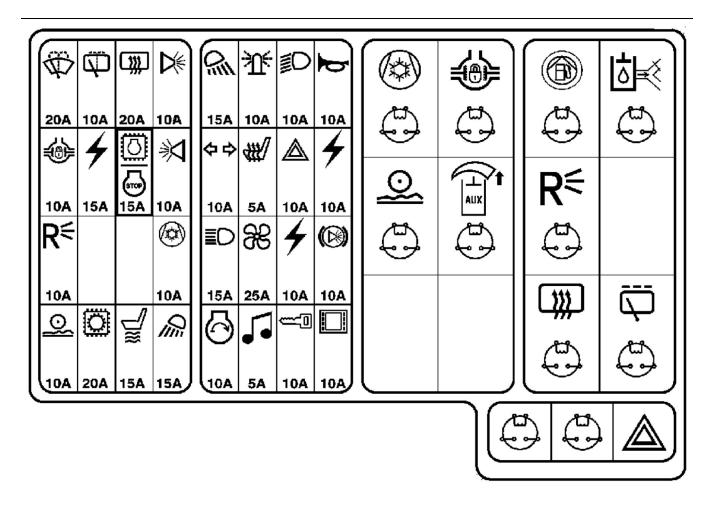
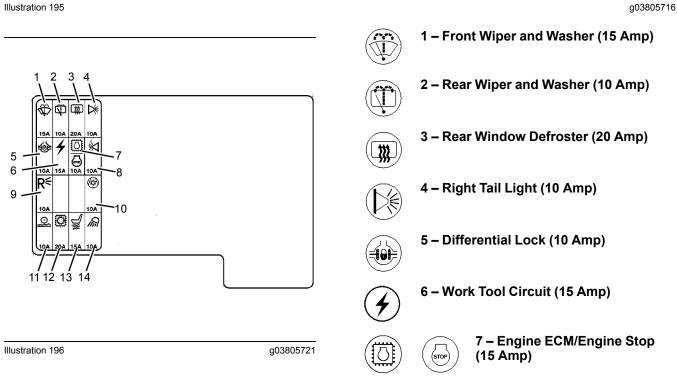


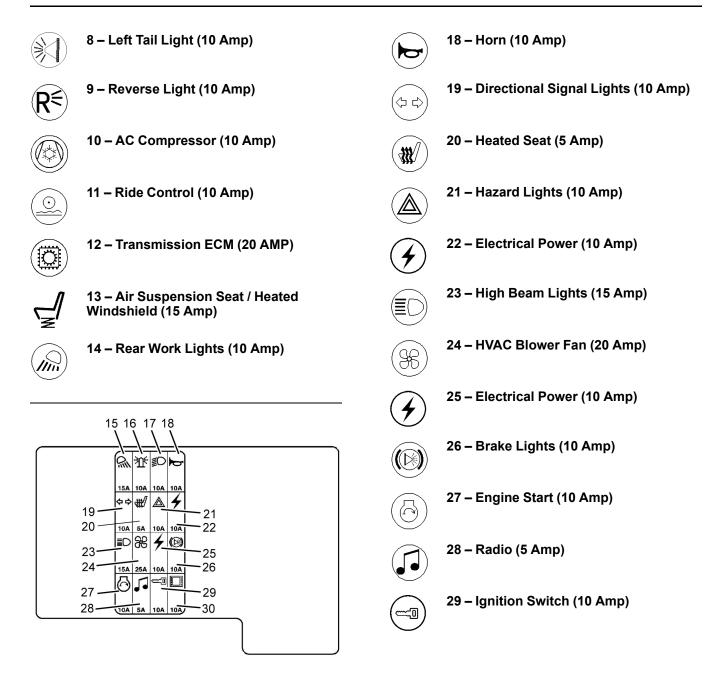
Illustration 194

g03730776

The fuse panel is located on the right side of the cab. In order to access the fuse panel, you must open the right side door.







g03805727



15 – Front Work Lights (10 Amp)

(AF)

16 – Beacon (10 Amp)

17 – Lights (10 Amp)



30 – Electronic Display (10 Amp)

Relays

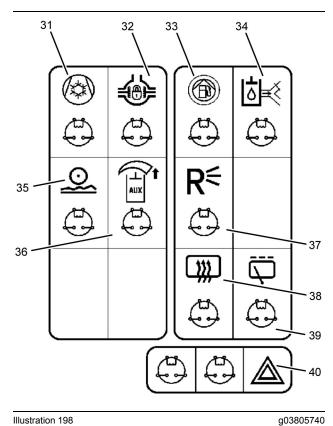


Illustration 198

31 – Clutch for the Air Conditioner Compressor

32 – Differential Lock

33 – Fuel Pump



33 - Hydraulic Oil - Diverter Valve Fourth Function

35 – Ride Control

36 – Hydraulic Flow Control - Auxiliary Circuit



37 – Reverse Light



38 – Rear Window Defroster

39 - Intermittent Front Window Wiper

40 - Hazard Warning Lights

Main Fuses

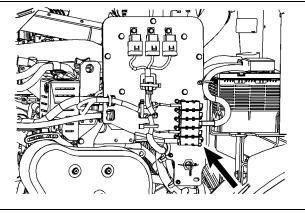
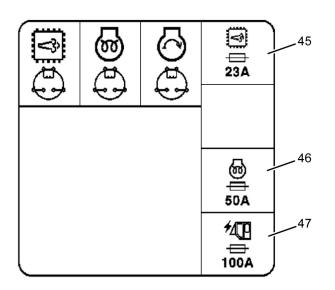


Illustration 199

g03730868

There are 3 main fuses in the engine compartment on the right side under the battery. If the element of either one of these fuses is separated, investigate the cause before operating the machine.



47 – Load Circuit

Main Relays

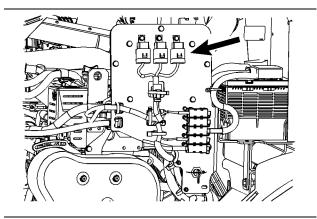


Illustration 201

g03804184

g03804153

There are three main relays in the engine compartment on the right side under the battery.

Illustration 200

g03804101



45 – Engine Emission System (Aftertreatment) - ECM



46 – Engine - Electrical Preheat

Illustration 202



48 – Engine Emissions System (Aftertreatment) - ECM

$\overline{(m)}$

49 – Engine - Electrical Preheat



50 – Engine - Start

i01416931

Hinges - Lubricate

SMCS Code: 7000-086-HNG

Use dry film lubricant for the following applications: all moving door latches, hinges, door locks, lock for the hood, hinges for the hood and throttle pedal linkage.

i06093398

Hoses and Clamps - Inspect/ Replace

SMCS Code: 1000; 7554-510; 7554-040

Note: Only applies to engines with aftertreatment.

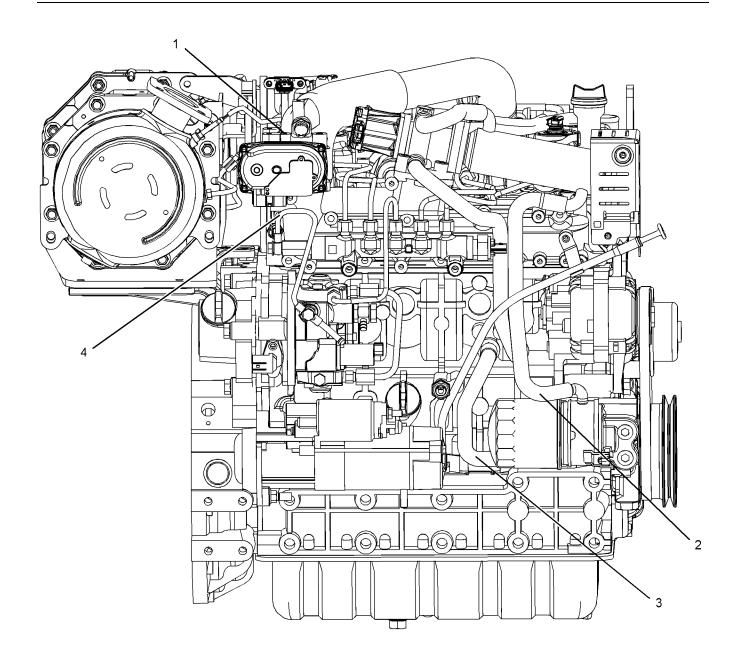
For each hose use the following procedure:

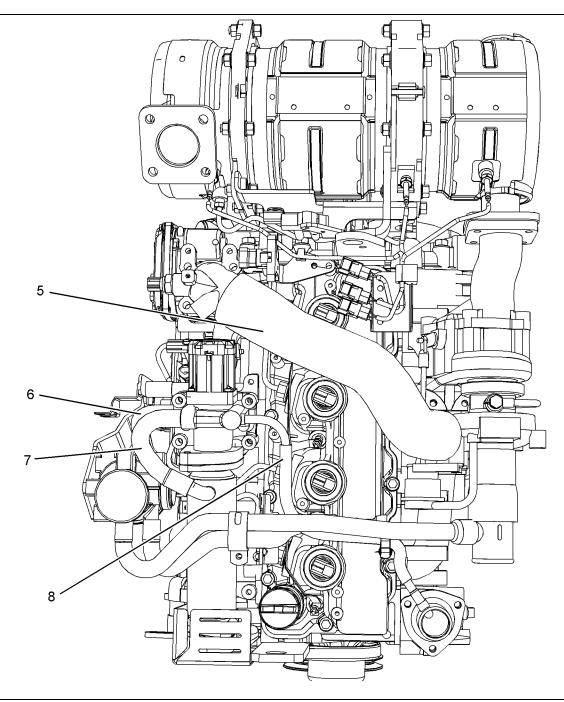
- **1.** Inspect all hoses due to cracking, for softness next to the clamps, and for loose clamps.
- 2. Tighten any loose clamps.
- **3.** Replace hoses that are cracked or soft. Use new clamps, when replacing hoses.

The following is a summary of all the hoses that require replacement.

Table 33

C3.3B Hose Replacement		
Hose Location	Hose Name and Quantity	
1	Boost Pressure -1	
2, 3	Oil Cooler - 2	
4	Return Hose - 1	
5	Intake Hose - 1	
6, 7, 8	NOx Reduction System (NRS) Cooler - 3	
9,10,11	Closed Crankcase Breather - 4	





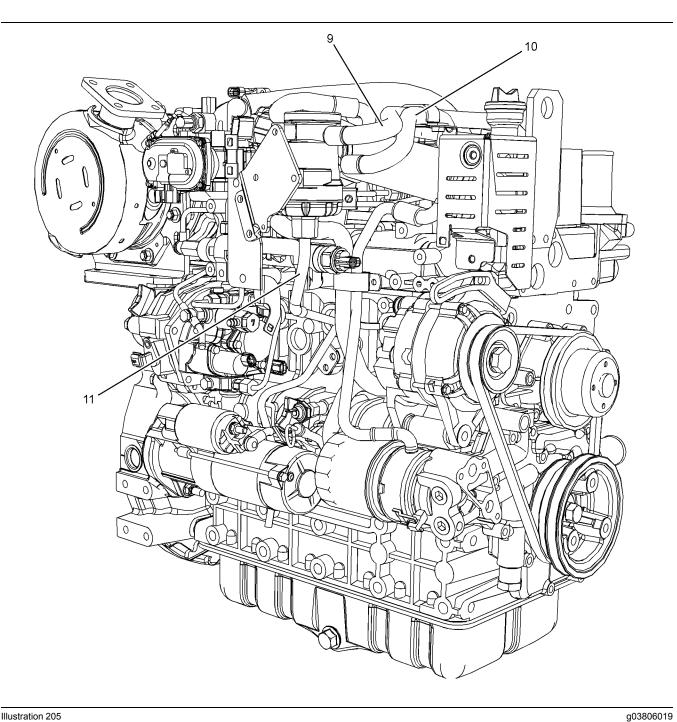


Illustration 205 C3.3B

i06092732

Hoses and Clamps - Replace

SMCS Code: 1380-510; 7554-510

Note: Only applies to engines with aftertreatment.

Replace two hoses (A) :

- (1) Loosen the clamps.
- (2) Replace the hose and clamps.
- (3) Tighten the clamps.

The following is a summary of all the hoses that require replacement.

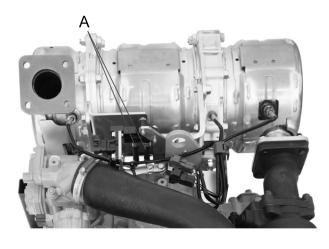


Illustration 206 (A) C3.3B DPF Differential Pressure Hoses g03650071

i07358396

Hydraulic System Oil - Change

SMCS Code: 5095-044

Selection of the Oil Change Interval

The factory fills the hydraulic system with Cat HYDO Advanced 10. With continued use of Cat HYDO Advanced 10 and the recommended $S \cdot O \cdot S$ Services oil analysis, the maintenance interval for the oil change may be extended.

Your machine may be able to use an extended interval for the hydraulic oil. The hydraulic oil is in the system that is not integral to the service brakes, the clutches, the final drives, or the differentials. The oil should be monitored during intervals of 500 hours. The extended interval can be used if the following criteria are met.

HYDO Advanced 10

Cat HYDO Advanced 10 is the preferred oil for use in most Cat machine hydraulic and hydrostatic transmission systems when ambient temperature is between -20 °C (-4 °F) and 40 °C (104 °F). Cat HYDO Advanced 10 has an SAE viscosity grade of 10W. Cat HYDO Advanced 10 has a 50% increase in the standard oil drain interval (up to 2000 hours) for machine hydraulic systems over second and third choice oils when you follow the maintenance interval schedule for oil filter changes and for oil sampling that is stated in the Operation and Maintenance Manual. Extended oil drain intervals are possible when using $S \cdot O \cdot S$ Services oil analysis. When you switch to Cat HYDO Advanced 10, cross contamination with the previous oil should be kept to less than 10%. Consult your Caterpillar dealer for details about the benefits from the improved performance designed into Cat HYDO Advanced 10.

Oil Filters

Cat oil filters are recommended. The interval for changing the oil filter is given in the Maintenance Interval Schedule.

Oil

The extended interval for changing the oil is specific to Cat HYDO Advanced 10 and the recommended $S \cdot O \cdot S$ Services oil analysis.

The regular interval for changing the oil is for the following oil types.

- Cat Transmission and Drive Train Oil (TDTO)
- · Cat TDTO-TMS
- Cat Diesel Engine Oil
- Cat Biodegradable Hydraulic Oils (HEES)
- Cat Multipurpose Tractor Oil (MTO)
- Heavy-duty diesel engine oils with a minimum zinc content of 900 ppm

If Cat oils cannot be used, use heavy-duty oils with the following classification: Cat ECF-1, API CG-4, API CF, and TO-4. These oils must have a minimum zinc additive of 0.09 percent (900 ppm).

Note: Industrial hydraulic oils are not recommended in Cat hydraulic systems.

Monitoring the Condition of the Oil

The oil should be monitored during at the recommended intervals. Cat standard SOS Fluids Analysis or an equivalent oil sampling program should be used.

The current guidelines for cleanliness of the oil should be observed. Refer to "Measured Data".

If an oil sampling program is not available, follow the interval for changing the oil given in the Maintenance Interval Schedule.

Measured Data

The following information should be monitored through sampling of the oil:

- Significant changes in wear metals should be monitored. These metals include iron, copper, chromium, lead, aluminum, and tin.
- Significant changes in the following additives should be monitored: zinc, calcium, magnesium, and phosphorus.
- Contaminants should not be present. These contaminants include fuel and antifreeze. Water content should be 0.5 percent or less.
- The silicon level should not exceed 15 parts per million for new oil. The particle counts should be monitored.
- The recommended level of cleanliness for Cat machines that are operated in the field is ISO 18/ 15 or cleaner. The cleanliness should be monitored by particle count analysis. The levels of contamination should not exceed the normal by more than two ISO codes. Action should be taken to determine the cause of the contamination. The system should be returned to the original levels of contamination.
- There should not be significant changes in sodium, silicon, copper, and potassium.
- The allowable level of oxidation is 40 percent (0.12 Abs units).
- The kinematic viscosity of 100 °C (212 °F) oil should not exceed a change of more than 2 cSt from new oil.

Procedure for Changing the Hydraulic Oil

Operate the machine for a few minutes to warm the hydraulic system oil.

The machine should be on level ground. Lower the bucket to the ground and apply slight downward pressure. Engage the parking brake and stop the engine.

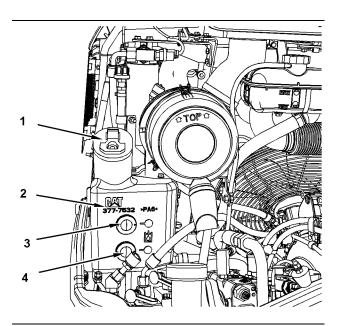


Illustration 207

(1) Filler Cap

(2) Hydraulic Tank

(3) Upper Sight Gauge

(4) Lower Sight Gauge

1. Open the engine hood.

2. Remove the hydraulic tank filler cap.

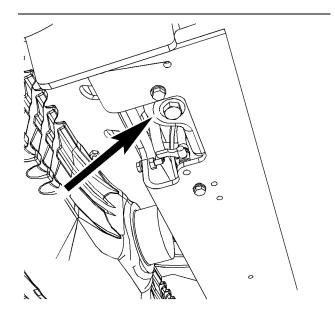


Illustration 208

g02877799

 The hydraulic tank drain plug is on the bottom of the hydraulic tank on the underside of the machine. Remove the drain plug and allow the hydraulic oil to drain into a suitable container.

Note: Machines if equipped with an Eco Drain tube, will be equipped with the Eco Drain fitting on the Hydraulic tank. The drain tube connects to the fitting and allows for draining without spillage into a suitable container.

4. Install the drain plug.

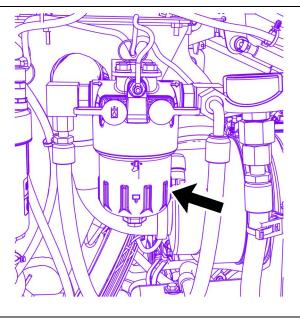


Illustration 209 Hydraulic Oil Filter

g06293671

- **5.** Change the hydraulic system filter. Refer to Operation and Maintenance Manual, "Hydraulic System Oil Filter (Return) Change".
- 6. Fill the hydraulic system oil tank with hydraulic oil. Refer to Operation and Maintenance Manual, "Lubricant Viscosities" and Operation and Maintenance Manual, "Refill Capacities".

Note: Observe the sight gauges for the hydraulic oil level as you fill the hydraulic system oil tank. Do not overfill the tank.

7. The sight gauges for the hydraulic oil level are on the side of the tank below the filler cap. Maintain the hydraulic oil level in the center of the top sight gauge. Add oil, if necessary.

Note: The oil must be free of bubbles. If bubbles are present in the oil, air is entering the hydraulic system. Inspect the suction hoses and hose clamps.

- **8.** Inspect the gasket on the hydraulic tank filler cap for damage. Replace the gasket, if necessary.
- 9. Install the hydraulic tank filler cap.

10. Close the engine hood.

i07358510

Hydraulic System Oil Filter (Return) - Replace

SMCS Code: 5068-510-RJ

- **1.** Open the engine hood.
- 2. Remove the hydraulic tank filler cap.

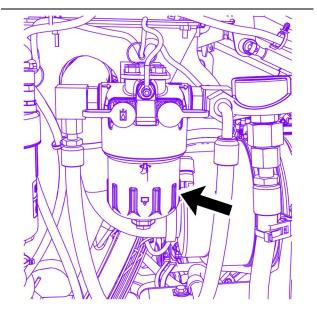


Illustration 210 Hydraulic Oil Filter

g06293671

The hydraulic oil filter is located in the engine compartment.

- **4.** Remove the plug from the bottom of the filter to drain the contents into a container.
- **5.** Remove the filter housing and the element. Discard the old element.
- 6. Clean the housing and install a new filter element.
- 7. Apply a light coat of oil to the gasket of the housing.
- 8. Install the new element and filter housing onto the filter head. Tighten the filter according to the instructions that are printed on the filter. The proper torque is 40 ± 5 N·m (30 ± 4 lb ft)

Note: Maintain the hydraulic oil level at the middle of the top sight gauge. Add oil, if necessary.

9. Inspect the gasket on the hydraulic tank filler cap for damage. Replace the gasket, if necessary.

10. Install the hydraulic tank filler cap.

11. Close the engine hood.

i07358877

Hydraulic System Oil Level -Check

SMCS Code: 5095-535-FLV

Note: Check the hydraulic system oil level with the machine on a level surface.

- **1.** Lower the work tool to the ground. Turn off the engine.
- 2. Open the engine hood.
- **3.** Wait for about 5 minutes before checking the level of the hydraulic oil. The hydraulic tank is located on the left side of the engine compartment.

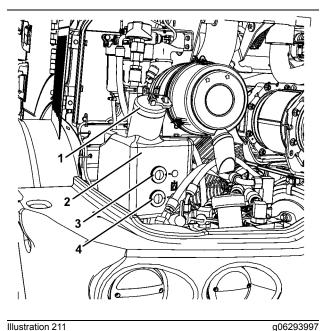


Illustration 211

- (1) Filler Cap
- (2) Hydraulic Tank
- (3) Upper Sight Gauge
- (4) Lower Sight Gauge
- Maintain the oil level to the middle of the upper sight gauge. Do not overfill the hydraulic tank. Never allow the hydraulic oil level below the center of the lower sight gauge.
- **5.** Remove the hydraulic tank filler cap and add hydraulic oil, if necessary.
- **6.** Clean the hydraulic tank filler cap. Install the hydraulic tank filler cap.
- 7. Close the engine hood.

i07358949

Hydraulic System Oil Sample - Obtain

SMCS Code: 5050-008; 5056-008; 7542

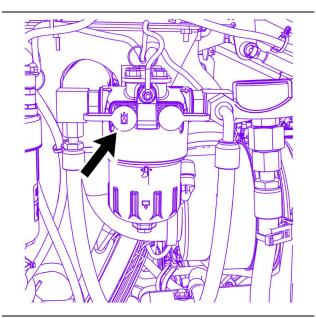


Illustration 212

Open the engine hood.

The sampling port for the hydraulic oil is on the hydraulic oil filter base on the left side of the engine compartment.

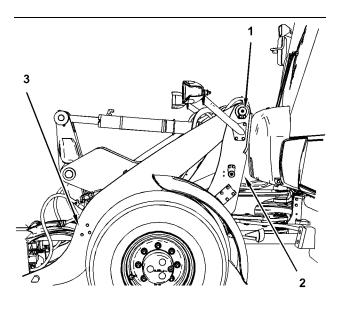
i02699155

q06294029

Lift Arm and Cylinder Linkage - Lubricate

SMCS Code: 5102-086-BD; 6107-086-BD

Wipe all of the grease fittings before you apply lubricant.



g01358346

Apply lubricant to the grease fittings (1) for the frame and for the lift arm. There is a grease fitting for each side of the machine.

Apply lubricant to the grease fitting (2) for the head end of the lift cylinder. There is a grease fitting for each side of the machine.

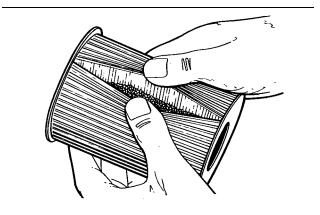
Apply lubricant to the grease fitting (3) for the rod end of the lift cylinder. There is a grease fitting for each side of the machine.

i02106227

Oil Filter - Inspect

SMCS Code: 1308-507; 3004-507; 5068-507

Inspect a Used Filter for 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 on steel parts and on cast iron parts.

Nonferrous metals can indicate wear on 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 could be caused by friction and by normal wear. Consult your Caterpillar dealer in order 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.

i06090919

Quick Coupler - Clean/Inspect

SMCS Code: 6129-070; 6129-040

Personal injury or death can result from improperly checking for a leak.

Always use a board or cardboard when checking for a leak. Escaping air or fluid under pressure, even a pin-hole size leak, can penetrate body tissue causing serious injury, and possible death.

If fluid is injected into your skin, it must be treated immediately by a doctor familiar with this type of injury.

Note: Do not weld on the quick coupler without consulting your Caterpillar dealer.

1. Clean the quick coupler prior to inspection in order to properly inspect the quick coupler. Remove the work tool.

i06090969

Illustration 215

This is the back side of the quick coupler. The lift arm and the tilt cylinder are removed for clarity.

- (1) Coupler Pins
- (2) Hydraulic Cylinder
- (3) Top Edge
- **2.** Tilt the quick coupler all the way forward in order to clean the debris away from the pins.
- **3.** Move the coupler pins (1). Ensure that the pins are not bent or broken.
- **4.** Make sure that the coupler pins extend through the bottom of the quick coupler assembly. Check the pins for wear and check the pins for damage.
- **5.** Check the top edges (3) of the quick coupler assembly for wear or for damage. Check the face of the quick coupler assembly for wear or for damage.
- 6. Inspect the components inside the quick coupler for the following problems:loose bolts, oil leaks, broken parts, missing parts and cracked components
- Inspect the hydraulic lines and the hydraulic fittings for damage or for wear. Repair any worn components or replace any worn components. Repair any leaking components.
- **8.** Inspect the steel material of the quick coupler for cracks.

Note: Perform all repairs before placing the quick coupler back into operation.

Quick Coupler - Lubricate

SMCS Code: 6129-086

Vertical Pin Coupler

Wipe the grease fittings before you apply lubricant to the grease fittings.

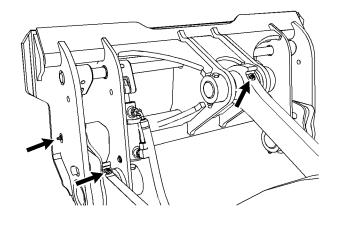


Illustration 216

q03804285

g03804372

Apply lubricant to the grease fittings for the pins of the work tool coupler. There is a grease fitting for each side of the machine.

Horizontal Pin Coupler

Wipe the grease fittings before you apply lubricant to the grease fittings.

q01358454

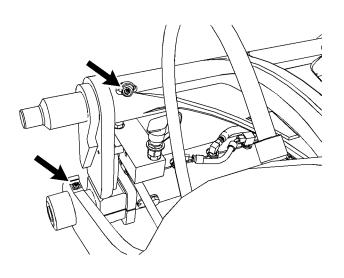


Illustration 217

g03804403

Apply lubricant to the grease fittings for the pins of the work tool coupler. There is a grease fitting for each side of the machine.

i06084869

Radiator Core - Clean

SMCS Code: 1353-070-KO

1. Open the engine hood. Refer to Operation and Maintenance Manual, "Access Doors and Covers".

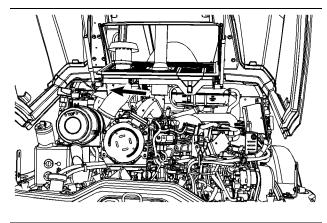


Illustration 218

g03801180

- 2. Move the lever toward the rear of the machine in order to move the hydraulic oil cooler away from the radiator.
- **3.** Open the side access doors. The hydraulic oil cooler and the radiator may be reached from the left side and from the right side.

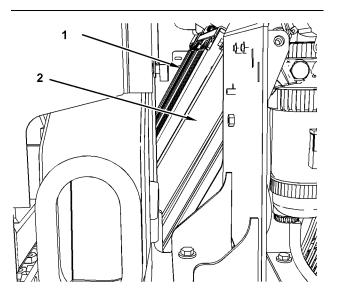


Illustration 219

View From the Left Side (1) Hydraulic Oil Cooler (2) Radiator

NOTICE

When you are using compressed air or high pressure water to clean the radiator fins, ensure that the air or water is directed parallel to the fins. If the compressed air or high pressure water is not directed parallel to the radiator fins, the radiator fins could be bent or damaged.

- **4.** You can use compressed air, high-pressure water, or steam to remove dust and other debris from the radiator fins. However, the use of compressed air is preferred.
- 5. Clean the hydraulic oil cooler and the radiator.
- 6. Move the lever to the right in order to lower the hydraulic oil cooler to the original position.

Note: Ensure that the hydraulic oil cooler is returned to the original position. Failure to return the hydraulic oil cooler may cause overheating of the hydraulic oil.

- 7. Close the side access doors.
- 8. Close the engine hood.

i06085186

Rollover Protective Structure (ROPS) - Inspect

SMCS Code: 7323-040; 7325-040

Inspect the ROPS for loose bolts or for damaged bolts. Replace any damaged bolts or missing bolts with original equipment parts only.

Tighten the bolts that hold the ROPS to the frame to a torque of $460 \pm 60 \text{ N} \cdot \text{m}$ (339 ± 44 lb ft). There are four ROPS retaining bolts.

Do not straighten the ROPS. Do not repair the ROPS by welding reinforcement plates to the ROPS.

Consult your Caterpillar dealer for repair of any cracks in the ROPS.

i04423622

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.

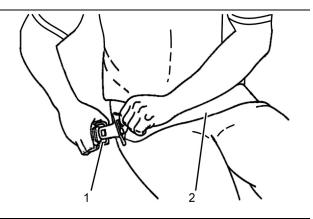


Illustration 220 Typical example

g02620101

i ypical example

Inspect buckle (1) for wear or for damage. If the buckle is worn or damaged, replace the seat belt.

Inspect seat belt (2) 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).

i01970036

g01022746

Seat Belt - Replace

SMCS Code: 7327-510

Within three years of the date of installation (2) or within five years of the date of manufacture (1), replace the seat belt. Replace the seat belt at the date which occurs first. A date label for determining the age of the seat belt is attached to each seat belt.

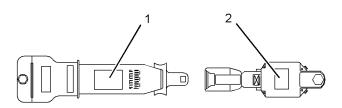


Illustration 221

(1) Date of Manufacture

(2) Date of Installation

Contact your Caterpillar dealer for the replacement of the seat belt.

i03589859

Steering Column Play - Check

SMCS Code: 4310-535

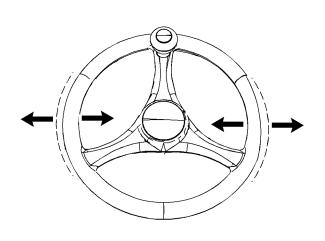


Illustration 222

g01408466

- **1.** Hold the steering wheel with both hands.
- Try to move the steering wheel from one side to the other side. The maximum allowed movement in the steering column should not exceed 25 mm (1.0 inch). If the value is not within the limit, perform the following steps:
 - a. Inspect the pivot joint for loose bolts.
 - b. Tighten the bolts if the bolts are loose.

Note: Apply 9S-3263 Thread Lock Compound to the bolts before tightening.

- c. Inspect the pivot joint for excessive wear.
- Replace the bushings if there is excessive wear.

🏠 WARNING

Failure to perform this inspection and repair may cause loss of steering control, which may result in personal injury or death.

Do not operate the machine until the inspection and repair are completed.

Contact your Caterpillar dealer for any other required service.

i06091028

Steering Column Spline (HMU Steering) - Lubricate

SMCS Code: 4310-086-JF; 4343-086-JF

The metering pump is located under the cab.

WARNING

Crushing Hazard. Connect the steering frame lock between front and rear frames before servicing the machine in the articulation area. Disconnect the steering frame lock and secure it in the stored position before resuming operation. Failure to do so could result in serious injury or death.

Refer to Operation and Maintenance Manual, "Steering Frame Lock" before entering the articulation joint.

Note: Do not disconnect any hydraulic lines from the metering pump.

Use the following steps to lubricate the splines on the steering column:

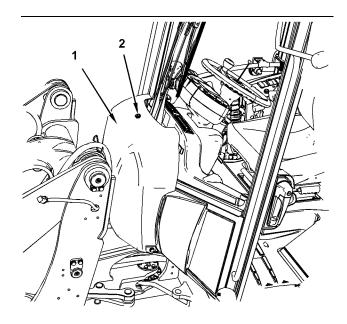


Illustration 223

g01358974

 Open the access door on the front of the cab. Refer to Operation and Maintenance Manual, "Access Doors and Covers" for information about the access door.

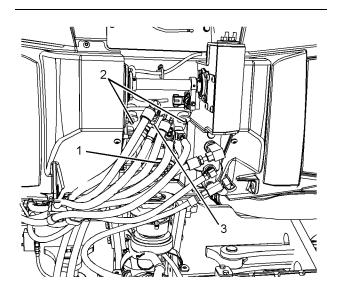


Illustration 224

g03804430

2. Support the metering pump (1). Loosen the four bolts (3) that hold the pump. Do not loosen the hose couplings (2).

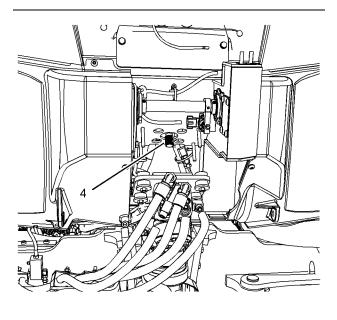


Illustration 225

g03804431

- 3. Lower the pump in order to expose the splines (4).
- **4.** Clean the male splines on the steering column. Clean the female splines in the pump.
- **5.** Apply proper grease to the splines. Refer to Operation and Maintenance Manual, "Lubricant Viscosities" for selecting the proper grease.
- 6. Push the pump into position.

- 7. Tighten the four bolts that hold the pump.
- 8. Test the steering system.

i02724032

Steering Cylinder Bearings -Lubricate

SMCS Code: 4303-086-BD

Wipe all grease fittings before you apply any lubricant to the grease fittings.

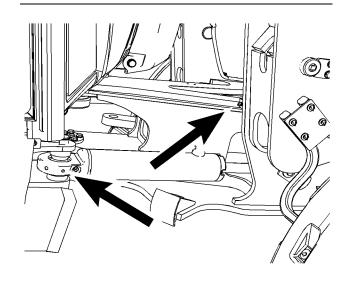


Illustration 226

g01378086

Access both grease fittings on the right side of the machine. Apply lubricant to the grease fitting for the rod end of the steering cylinder and for the head end of the steering cylinder.

i02699164

Tilt Cylinder Bearings and Bucket Linkage Bearings -Lubricate

SMCS Code: 5104-086-BD; 6107-086-BD

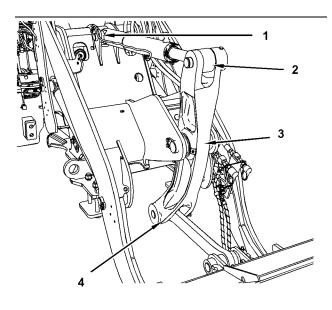


Illustration 227

g01358743

Wipe all grease fittings before you apply lubricant.

Lubricate the grease fitting (1) for the head end of the tilt cylinder.

Lubricate the grease fitting (2) for the rod end of the tilt cylinder. There is one grease fitting in the center of the machine.

Lubricate the grease fitting (3) for the upper pivot pin of the tilt linkage. There is one grease fitting in the center of the machine.

Lubricate the grease fittings (4) for the lower pivot pin of the tilt linkage. There is one grease fitting in the center of the machine.

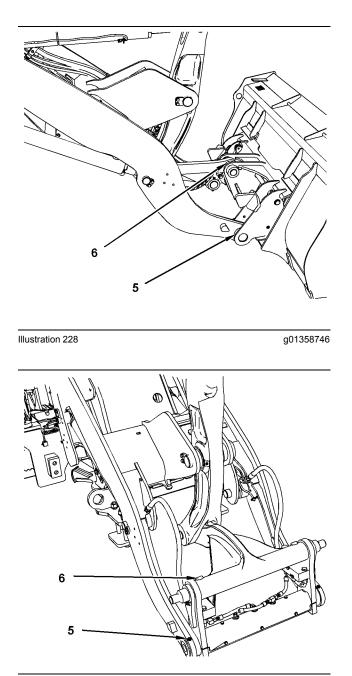


Illustration 229

g01358749

Lubricate the grease fitting (5) for the upper pivot pin of the quick coupler assembly. There is one grease fitting in the center of the machine.

Lubricate the grease fittings (6) for the lower pivot pin of the quick coupler assembly. There is a grease fitting for each side of the machine. i01409489

Tire Inflation - Check

SMCS Code: 4203-535-AI

Measure the tire pressure on each tire. Consult your Caterpillar dealer for the correct load rating and for the correct operating pressures. These correct load ratings and correct operating pressures can also be obtained from your tire dealer.

Inflate the tires, if necessary. See Operation and Maintenance Manual, "Tire Inflation with Air" or Operation and Maintenance Manual, "Tire Inflation with Nitrogen".

i02699169

Transfer Drive (Hydrostatic) Oil - Change

SMCS Code: 3159-044-OC

The transfer drive is located underneath the machine in front of the rear axle. There are 2 styles of transfer drive:

- Standard Drive
- "Speeder" Drive

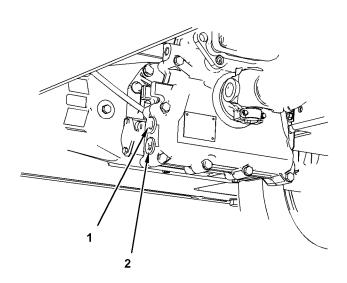


Illustration 230 Standard Drive g01358806



(2) Drain Plug

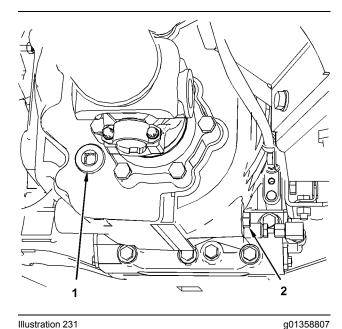


Illustration 231 "Speeder" Drive

(1) Level/Fill Plug

(2) Drain Plug

- **1.** Remove the drain plug (2) and allow the oil to drain into a suitable container.
- 2. Clean the drain plug and install the drain plug.
- Remove the oil level/fill plug (1). Add oil until the oil is level with the bottom of the plug threads. Refer to the Operation and Maintenance Manual, "Lubricant Specifications" and Operation and Maintenance Manual, "Refill Capacities".
- **4.** Clean the oil level/fill plug and install the oil level/fill plug.

i02708167

Transfer Drive (Hydrostatic) Oil Level - Check

SMCS Code: 3159-535-OC

The transfer drive is located underneath the machine in front of the rear axle. There are 2 styles of transfer drive:

- Standard Drive
- "Speeder" Drive

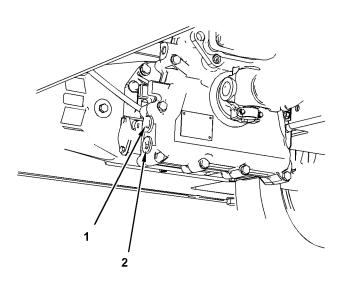


Illustration 232

g01358806

- Standard Drive (1) Level/Fill Plug
- (2) Drain Plug

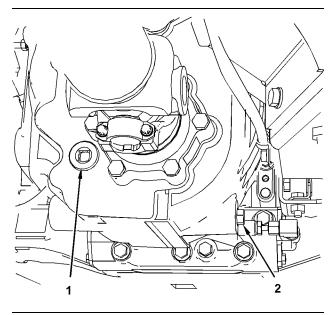


Illustration 233

g01358807

- "Speeder" Drive
- (1) Level/Fill Plug (2) Drain Plug
- (2) Drain Plug
- **1.** Remove the oil level/fill plug. The oil should be level with the bottom of the plug threads.
- 2. Add oil, if necessary. Refer to the Operation and Maintenance Manual, "Lubricant Specifications" and Operation and Maintenance Manual, "Refill Capacities".

3. Clean the oil level/fill plug and install the oil level/fill plug.

i02708170

g01358806

Transfer Drive (Hydrostatic) Oil Sample - Obtain

SMCS Code: 3159-008; 7542

The transfer drive is located underneath the machine in front of the rear axle. There are 2 styles of transfer drive:

- · Standard Drive
- "Speeder" Drive

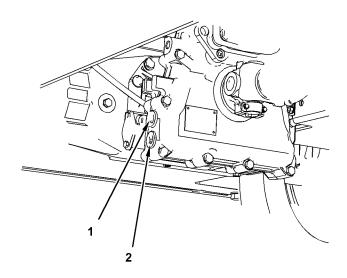


Illustration 234 Standard Drive (1) Level/Fill Plug

(2) Drain Plug

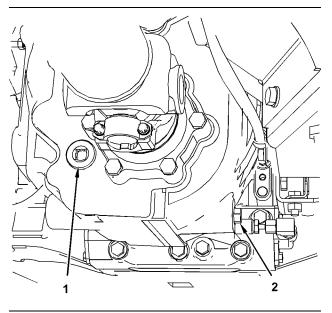


Illustration 235 "Speeder" Dr g01358807

"Speeder" Drive

(1) Level/Fill Plug

(2) Drain Plug

Remove the filler plug for the transfer drive. Sample the oil through the hole for the filler plug. Install the plug after obtaining the sample.

i03599802

Wheel Nut Torque - Check

SMCS Code: 4210-535

Check the torque on new wheels or repaired wheels after every ten service hours until the specified torque is maintained.

The nut and the stud should be clean and dry for reassembly. Apply one drop of lubricating oil to the stud before installing the nut onto the stud.

Torque the wheel nuts to a torque of $360 \pm 25 \text{ N} \cdot \text{m}$ (266 ± 18 lb ft). Use a star pattern when you torque the nuts.

Check the nuts on all four wheels.

i05956779

Window Washer Reservoir -Fill

SMCS Code: 7306-544

NOTICE

When operating in freezing temperatures, use Caterpillar nonfreezing window washer solvent or equivalent. System damage can result from freezing.

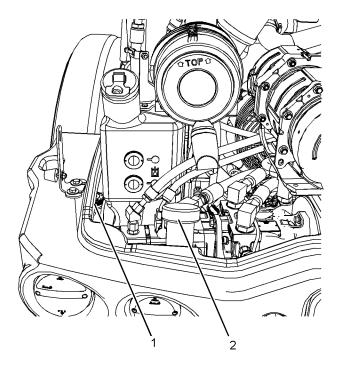


Illustration 236

(1) Window Washer Reservoir (2) Fill Pipe

The window washer reservoir is located in the engine compartment on the left side.

Pour the window cleaning solution into the fill pipe.

The reservoir is located under the counterweight.

i01258249

q03738113

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.

i01409502

Windows - Clean

SMCS Code: 7310-070

Use commercially available window cleaning solutions in order to clean the windows. Clean the outside windows from the ground unless handholds are available.

i02608161

Work Tool - Lubricate

SMCS Code: 6700-086

Apply lubricant to the grease fitting for all pivot pins.

Apply lubricant to the grease fitting for the rod end of all cylinders.

Apply lubricant to the grease fitting for the head end of all cylinders.

i05943054

Work Tool Mounting Bracket -Inspect

SMCS Code: 6700-040-BK

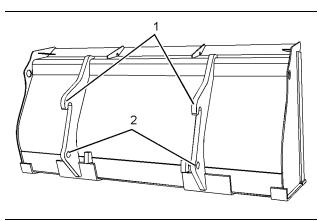


Illustration 237

g03732219

Inspect upper Hook plates (1) and ensure that the hooks are not bent or otherwise damaged. Inspect holes (2) for wear and for damage. If any wear is suspected or any damage is suspected, consult your Caterpillar dealer before you use the work tool.

Warranty Section

i06112217

Emissions Warranty Information

SMCS Code: 1000

The certifying engine manufacturer warrants to the ultimate purchaser and each subsequent purchaser that:

- 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:
 - a. 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:
 - a. 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.
 - 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.

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

i03989612

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. Consult the nearest Cat dealer for additional information.

i07595184

Caterpillar Approved Work Tools

SMCS Code: 6700

Only use Caterpillar approved work tools on this machine.

Note: Do not use a Cat work tool on a machine that is not approved by Caterpillar.

Table 34	
	Mac

Machine	906K/906M	907K/907M	908K/908M
General Purpose Buckets			
1880 mm (74 inch)	0	!	!
2035 mm (80 inch)	!	0	!
2060 mm (81 inch)	!	!	0
0.9 M ³	0	!	!
1.1 M ³	!	0	!

(Table 34, contd)

Machine	906K/906M	907K/907M	908K/908M
1.3 M ³	!	!	0
Multipurpose Buckets			
1880 mm (74 inch)	0	0	!
2060 mm (81 inch)	!	!	0
0.75 M ³	0	0	!
0.9 M ³	!	!	0
Light Material Buckets			
2080 mm (82 inch)	0	0	0
Industrial Grapple Bucket			
Industrial Grapple Bucket 81'	0	0	0
Mixing Bucket			
MB200	0	0	0
MB250	0	0	0
Side Discharge Bucket			
BD118	0	0	0
BD121	0	0	0
Augers			
A14B	0	0	0
A19B	0	0	0
A26B	#	#	#
Bale Spears			
Single Bale Spear 39"	0	0	0
Double Bale Spear 39"	0	0	0
Single Bale Spear 49"	0	0	0
Double Bale Spear 49"	0	0	0
Brooms			
BA18	0	0	0
BU115	А	А	А
BU118	0	0	0
Cold Planers			
PC203	0	0	0
PC204	0	0	0
PC205	#	#	#
PC206	#	#	#
PC210	#	#	#
Fork Carriage and Forks			

(Table 34, contd)

Machine	906K/906M	907K/907M	908K/908M
Fork Carriage Class II 1030 mm (41 inch) wide	0	0	!
Class II Fork 1120 mm (44 inch) long	0	0	!
Class II Fork 1220 mm (48 inch) long	0	0	!
Fork Carriage Class III 1030 mm (41inch) wide	!	!	0
Class III Fork 1120 mm (44 inch) long	!	!	0
Class III Fork 1220 mm (48 inch) long	!	!	0
Heavy-Duty Carriage			
Heavy-Duty Tines 48" (1219mm)	0	0	0
Heavy-Duty Tines 60" (1524mm)	0	0	0
Industrial Brushcutter			
BRX118	#	#	#
BRX318	#	#	#
BRX418	!	!	!
Landscape Rakes			
LR15B	А	А	A
LR18B	0	0	0
Landscape Tillers			
LT13B	А	А	A
LT18B	0	0	0
Material Handling Arm			
	0	0	0
Power Box Rakes			
PR172	А	А	А
PR184	0	0	0
PR190	0	0	0
Stump Grinders			
SG16B	0	0	0
Trenchers			
T6B	0	0	0
Т9В	0	0	0
T15B	#	#	#
Vibratory Compactors			
CV16B	А	A	A

(Table 34, contd)

Machine	906K/906M	907K/907M	908K/908M
CV18B	0	0	0
Wheel Saws			
SW45 (3)	#	#	#
Bale Grapple			
Bale Grapple	0	0	0
Snow Pusher			
8'	0	0	0
10'	0	0	0
12'	0	0	0
8' (Rubber Edge)	0	0	0
10' (Rubber Edge)	0	0	0
12' (Rubber Edge)	0	0	0
Snow Blade			
6'	0	0	0
7'	0	0	0
8'	0	0	0
9'	0	0	0
10'	0	0	0
Box Blade			
BB121	0	0	0
BB124	0	0	0
Adapter Bracket			
ISO-SSL Adapter Bracket ⁽¹⁾	0	0	0
Silage Defacer			
DFS118	0	0	0
DFS121	0	0	0
DFS124	0	0	0
Snow Multi V Plow 1524 mm (60.0 inch)	0	0	0
Snow Multi V Plow 2133 mm (84.0 inch)	0	0	О

⁽¹⁾ SSL Work Tool Compatibility charts located in ISO-SSL Adapter Bracket Special Instructions for Installation

O – The machine performance is optimum with this work tool.

A – The machine performance is acceptable with this work tool.

! - This tool is not approved for use on this machine.

– The machine performance is optimum with the available High Flow option.

Many of the work tools in the table have an Operation and Maintenance Manual. Refer to the Operation and Maintenance Manual that is provided with the work tool for the proper use of the work tool.

Consult your Cat dealer concerning specific work tools and part numbers that are approved by Caterpillar for this machine. This list was complete at the time of publication. There may be more work tools that have been approved since that time. Consult your Cat dealer for an updated list of approved work tools.

INTENDED USE STATEMENT for the Material Handling Arm

This Work Tool has the intended functions of lifting and transporting suspended loads. Always select sufficiently sized lifting accessories. Always inspect the lifting accessories before use.

Do not use the work tool improperly.

Remove the work tool from the machine before you lift the host machine. Refer to Operation and Maintenance Manual, "Lifting and Tying Down the Machine" for details.

INTENDED USE STATEMENT for the Multipurpose Bucket

This Work Tool has the intended functions of dozing, digging, loading, lifting, carrying, and moving material such as earth, crushed rock, or gravel.

Do not use the work tool improperly.

Remove the work tool from the machine before you lift the host machine. Refer to Operation and Maintenance Manual, "Lifting and Tying Down the Machine" for details.

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Product and Dealer Information

Note: For product identification plate locations, see the section "Product Identification Information" in the Operation and Maintenance Manual.

Delivery Date: _____

Product Information

Model:
Product Identification Number:
Engine Serial Number:
Transmission Serial Number:
Generator Serial Number:
Attachment Serial Numbers:
Attachment Information:
Customer Equipment Number:
Dealer Equipment Number:

Dealer Information

Name:	Branch:		
Address:			
	Dealer Contact	Bhono Numbor	Hours
	Dealer Contact	Phone Number	Hours
Salaa			
Sales:			
Denter			
Parts:			
o .			
Service:			



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200 February 2019